



RAGCHEW

MARCH 2018

FROM THE EDITOR - G4CIB

I know many of you will join me in thanking **Dave G4BCA** for his interesting Amateur Satellite talk a few weeks ago. I hope too that you enjoyed the article by **Graham G3VKV** in the February "Ragchew". This has certainly inspired me to find out more about this interesting facet of our hobby. Thanks also to **Tony G4CMY** who pointed me towards a software TNC which can be found on <https://github.com/wb2osz/direwolf>. This has proved to be extremely effective for monitoring and decoding APRS packets

In this month's Ragchew we have the second antenna article by **Cliff G8CQZ**, and this time he shows us how he built a dual band dipole for 4 and 6 metres. **RF Notes** by **Tony G4HBV** last month described the operation of a half-wave dipole in free space. This month he moves on to describe what happens under real conditions

Also in this issue I revisit an old project under the title of "**And Here's One I Made Earlier**" - a little 1 watt CW transmitter for 6 metres which I built in time to get on the band at midnight on 1st February 1986 when the band was allocated to the Amateur service after the demise of Band I 405 line TV. I say "allocated" but for some of our then members, in particular **Pat G3MA** it was a case of getting the band back because what was then the 5 metre band (56MHz) had been removed from the Amateur service after World War II when that part of the frequency spectrum was allocated to Band I 405 line TV.

A successful **Antenna Tuning Unit Workshop** recently took place at Club and was very well attended. **Andy M0RON** demonstrated the effect of presenting different impedances to the output of a transmitter and how to manually tune an Antenna Tuning Unit or to be more correct - an Antenna Matching Unit. More Antenna Workshops are planned and will cover the construction of a dipole centre and balun (16th April) and making and testing the antenna 30th April)

I'm looking forward very much to the talk on the BBC Micro:Bit as I started experimenting with one of these little boards a while ago and need to make some further progress.

Articles from members on any aspect of amateur radio are more than welcome! Email your article to me at g4cib@outlook.com

73 and good DX!

Brian G4CIB

CONTEST ROUND-UP

AFS Superleague 2017/18

The results of the Affiliated Societies Super League 2017/18 have been announced and GARES came in at 24th compared to 55th in 2016/17. Analysis of the results show that we dramatically improved our score on 2m and 70cm, with 80m CW slightly down, the 80m SSB score identical to the previous year and a good showing on 80m Data - the first time that Data modes have been included in the Super League table. The new 2018/19 AFS Superleague season kicks off again on October 21st with the 50MHz AFS contest.

VHF/UHF UKAC

The club has made steady progress and currently we are lying in 16th place in the overall Local Clubs table. 2m is our strongest band at present where we are in 10th place. On 6m we are 15th, on 4m 18th and 70cm 17th

Many thanks to all who are submitting logs on a regular basis.

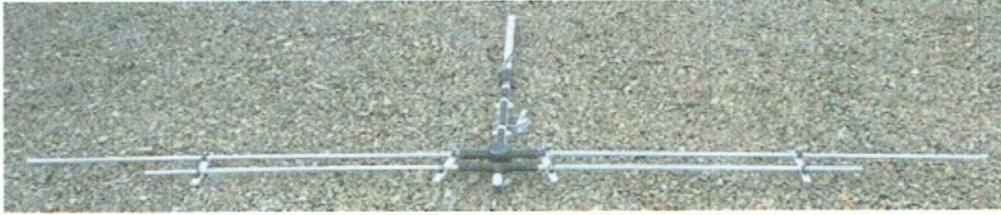
432MHz AFS

This was the final event which contributed to the AFS Superleague 2017/18 session (see above) with five entries from club members. Teams comprise four members so we had an "A" Team (M0XAC, G0ULH, G4CIB and M0HFY) and a "B" Team (G4IZZ). The "A" Team came in 25th place and the "B" Team 53rd but just to complicate matters the combined scores contribute to the AFS Superleague score. Another peculiarity of the scoring is that each call sign's score is normalised against the leader in the relevant column. So **Gary G0ULH** had the most points (2160) but when normalised against the leader in his column, he scored 77 points, **Les G0ULH** scored 1055 points normalised to 69 points, **Brian G4CIB** 959 points normalised to 79 points and **Barry M0HFY** 495 points normalised to 45 points. In the "B" Team **Mike G4IZZ** scored 142 points normalised to 6 points. The AFS Superleague 2018/19 session starts on 21st October with the 50MHz AFS contest.

80m Club Championship

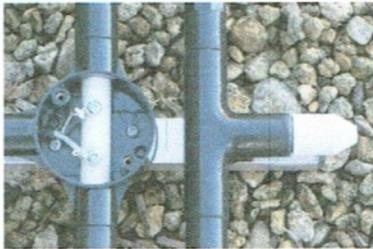
The club is currently in 14th place in the Local Clubs table thanks to entries from **Bob M0NQN** (CW and Data), **Gary M0XAC** (CW and Data), **Mike G4IZZ** (CW) and **Tony G4CMY** (CW).

A 4m/6m Multiband Dipole



The completed 6m and 4m Multiband Dipole

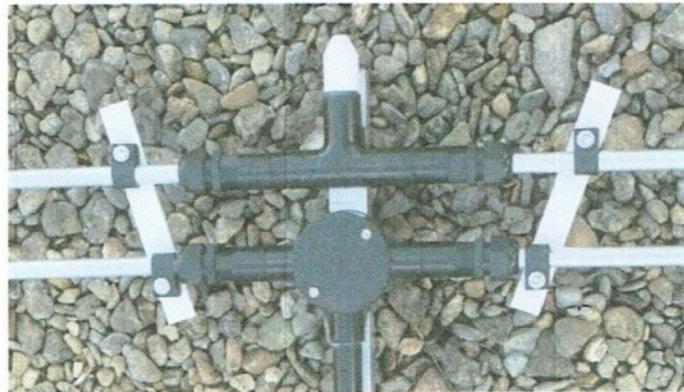
It looked easy. If I was going to update my 2m aerial then adding a 6m dipole to the mast would be simple. I had seen a piece in RadCom (April 2016 page 30) about multiband dipoles, complete with dimensions for adding 4m to a commercial 6m dipole so this is also what I would do. What could go wrong? Well the first thing was that every supplier seemed to be permanently out of stock of 6m dipoles but that wasn't a real problem was it? If young Alys can build a 2m dipole then I, with all my years of experience, can build a 6m dipole. A more recent article (November 2017) even showed how to fashion the centre from electrical conduit.



Electrical Conduit

Now, electrical conduit is great for joining the arms of the dipole but how to join it to my 2" diameter round scaffold pole mast? Then, how do I join the 4m parasitic element to the 6m dipole without it slowly drooping down to sit underneath, rather than in front of, the 6m dipole?

My answer was to use a stub mast made of 1" square tube. Not only would it provide a solid mount for the conduit but it would also prevent the 4m element from drooping and shorting to the mast - as long as it was insulated so I also mounted the centre of that element in conduit as well.



Parasitic element fixing.
(Note how spacing can be adjusted by twisting white spacers)

I have built enough dipoles to know that you don't start by cutting them to the length given in the book. Cut them longer and then trim. So that's what I did and got better than 1.5:1 across the 6m band. Then I added the parasitic element, trimming it to length and not worrying about the SWR. Finally, I adjusted the spacing between the 6m and 4m elements, for the best SWR (1.1:1) on 4m. Checking back on 6m showed that the SWR had not changed.

So, how did it do on the air? Well my first problem is that I don't have any 4m gear that will run SSB but I did enter the 6m UKAC in January. I was only able to do the first hour and a half, due to other commitments, but I made 12 contacts and two of them were over 100km away. The important thing, I reminded myself, is that it's still only a dipole and dipoles have no gain (and very little directionality).



In Situ
(with Colinear & Rotator)

GB4QBP - 'Quedegley Brownie Pack' 2018.

By Gary M0XAC.

This year was the second year the club has put on a Special Event Station for the Quedegley Brownies. It is for what they call 'Thinking Day' when they commemorate the founders of the Scouts and Girl Guides, Robert Baden-Powell and his wife Olave who both have the same birthday, 22nd February and 'Thinking Day on the Air' is the Radio part of that anniversary which is usually done on the third weekend of the month, in this case 17th February.

Putting on a Special Event Station actually involves a lot of work before during and after the event but it's something we don't do every week so I find it quite enjoyable, not only constructing the station, or stations in this case, from scratch, but doing it with other members from the club.

I may have mentioned it before but the amount of equipment needed for such an event never ceases to amaze me but having said that, I am also responsible for it's increase by the additions of computers and a more substantial and higher pole than we had previously. You can never have too much stuff in my view!

On the day it was cold but sunny which always helps and we started by putting up the poles. 10 metres for the VHF station with a Slim Jim on top and 11 metres for the HF dipole. It was 12 metres to start with but a bit of comedy meant it went up twice and was reduced slightly in the process!

Once that was done we could proceed inside and set up the two stations. We also had a Morse activity station, as last year, provided by Mike G6OTP and this year we had a demonstration of APRS provided by Dave G4BCA. The HF station using the clubs Kenwood TS-590S was run by Alan G4MGW and Ray G1NVS. I ran the VHF station using my Yaesu FT-857D.

We then only needed some Brownies who eventually arrived, although not as many as last year. Brownies were put on the air on HF and VHF where we had some club members ready and waiting to receive their monosyllabic communications from their respective QTH's. It is amazing what putting a microphone in front of kids does to them, never mind a Radio Amateur!



As well as local VHF contacts, contacts were made with three other Guide/Scout stations on 40 metres as well as a smattering of other private stations. The best one was one in Renfrewshire GB0GGR where we assisted Op Bob to put several of his Brownies on the air.

Due to the variable nature of propagation and attendance at these types of events I never look at the number of attendees or the number of contacts made as a measure of success. I look at how smoothly everything that we did went and by that measure I think we had a good Special Event Station. We learn something every time we do them and get more efficient at it as well as more comfortable. We even had an earth this year courtesy of Les GOULH!

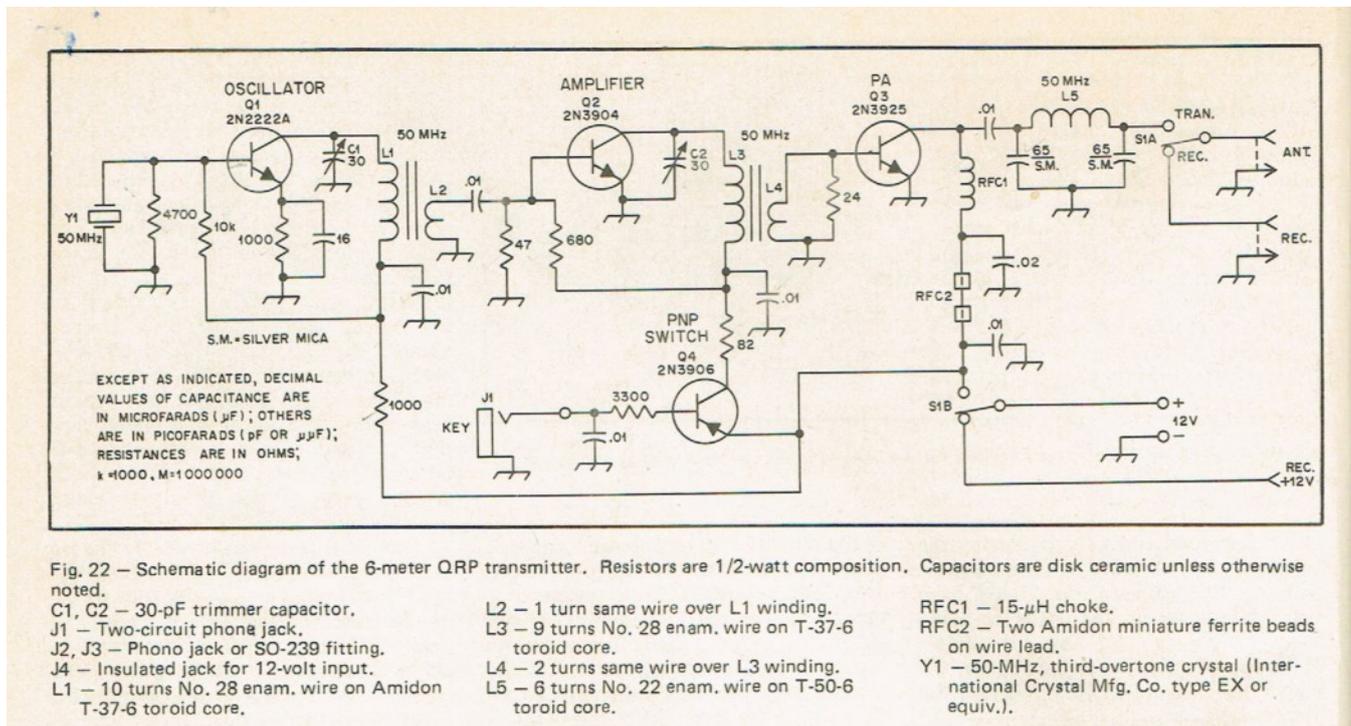
All in all we had a good day and thanks go to the team at the station and visitors and all those members that helped as 'out' stations. It was a good club effort.

Advance Notice - Special Event Station - GB4LMG

This SES will be active as part of the International Museums Weekends 2018 and will operate from the Gloucester Life Museum (formerly the Folk Museum), Westgate Street on **Saturday 16th June**. Please contact Alan G4MGW for further information

Here's One I Made Earlier - by Brian G4CIB

In the early 1980's 405 line Band I TV was in decline and scheduled to be closed down in 1984. Without going into the detailed history of the allocation on 6m to UK amateurs, suffice it to say that in 1983 permits were issued to some 46 amateurs to enable operation on the band outside of TV hours. Many of the permit holders operated cross-band to enable non-permit holders to have experience of using the band and my log book records several QSO's I had receiving on 6m and transmitting on 80m. In March 1984 I logged G2AOK, Harry, G6XM Bill, and GW3MHW John, receiving them all on a 6m converter fed into an FRG-7 receiver and transmitting to them on my HW101 HF transceiver. Such was my interest I joined the UK Six Metre Group (of which I am still a member today) with membership number 86. In June 1985, the Minister of State for Industry and Technology stated in Parliament that the band 50 to 50.5MHz was to be allocated to the UK amateur service and that Class A licensees would be permitted to use the band from 0001 on 1st February 1986. I was determined to have a go at being on at the start so I searched around various publications and came up with the design of a 6m QRP transmitter in the book "Solid State Design for the Radio Amateur" by Wes Hayward W7ZOI and Doug DeMaw W1FB. The circuit (reproduced below) consists of a crystal oscillator, a buffer amplifier operating in class A and power amplifier in class C, and a switching transistor keying the buffer. Measured output is about 1 watt. It is built "point-to-point" style on double sided copper clad board with vertical screening between each stage.



I stayed up late on the evening of 31st January 1986 in anticipation of activity at midnight on the 1st February and I was not disappointed as my log records that at 0030 I worked my first station on 6m - GB4MTR operated by Peter G4ENA in Stroud. He was obviously operating phone as I gave him 5-9 and he gave me 3-1-9. At least my 1 watt into a 6m indoor wire dipole made it to Stroud!! My log shows the next QSO at 0149 with G4WAD, Dave in Evesham with reports of 599 sent and 579 received. I must have gone to bed as my next QSO is at 0926 with G2AHU, Ray at Yarpole near Leominster followed by later in the morning with G4VXE, Tim in Cheltenham and G3YNT, Tony in Newent. In the next few days I had QSOs with G3JFH, Terry in Bishops Cleeve and G4BAO in JO02CG via aurora - my best ever dx using this little transmitter. My interest in the band had certainly been stimulated and it was not long before I bought a Howes 6m Transverter which opened up new horizons on the "Magic Band".

As you can see in the photograph below, the transmitter is built into a die cast box and includes an antenna change-over relay and also the facility to switch between two crystal frequencies. 12v Power is fed via a phono socket. The antenna connectors are Belling-Lee type which were still very popular (and inexpensive) for use on HF equipment up to the 1980's.



6m QRP transmitter

From right to left - oscillator stage, buffer stage also antenna changeover relay and PA compartment

Club Visit to BBC Droitwich Transmitter - 3rd May 1983



This group photo taken outside the entrance includes Brian G4CIB (4th from left), Steve G4HFT (6th from left) and Alan G4MGW (far right)

The GB4MTR award was designed to promote activity on the UK 70MHz (Four meter) band.

This card verifies a contact with just one of the many volunteers who operated the special event call sign for a 28 day period sometime during 1986. All are devotees of four meters and all are anxious to see more operators on this largely under-used and underestimated band. Although the UK is the only major country in the world to have the four meter allocation, much activity is available via crossband contacts to continental stations, typically using 28.885 Mhz as a talkback frequency. All characteristic VHF modes of propagation occur on the band including ms, aurora, sporadic E and tropo, often at far more enhanced levels than on 2 meters and above.

It is hoped that by working this special event station it may encourage more people to give four meters a try in the future.

Use it or lose it!

To Station: **G4CIB**

Confirming UR QSO with GB4MTR

Operator: Peter GAENA

County: GL

Date: 1/2/86 Time: 00:23 GMT

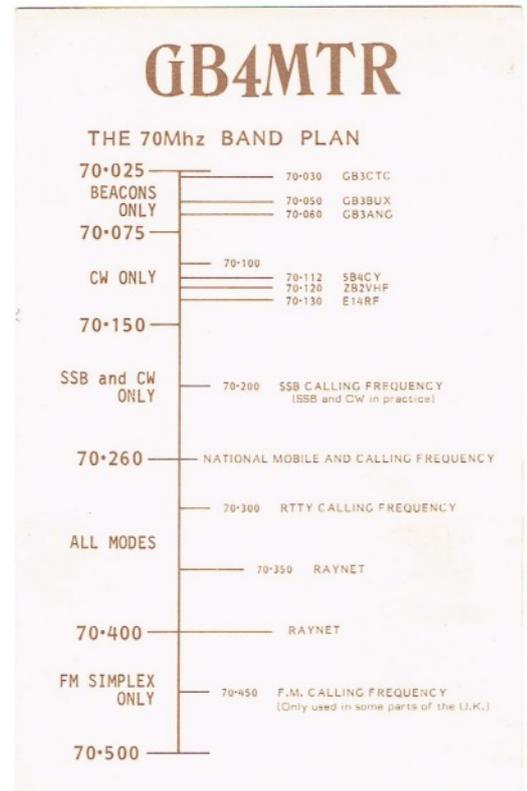
Frequency TX: 50.190 RX: -

Mode: CW RST: 319 Loc: IO81UR

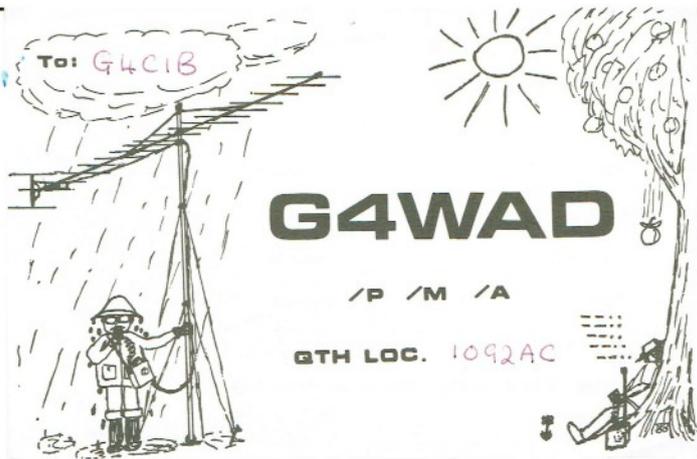
Equipment: Home Brew Dipole

Remarks: Only GB on 6m 1986

Above: GB4MTR QSL card for a QSO 30 minutes after the 50MHz band was released to all UK Class A Licensees on 1st February 1986. Note that the call sign was GB4MTR, issued to promote 4 metre activity but it was used on 6 metres for the opening day on this band.



Below: QSL cards received from G4WAD and G4VXE for QSOs on 1st February 1986. Note the old style locators before the Maidenhead system was adopted, also Tim's comment on my transmitter.



G4VXE

Tim Kirby, 29, Tivoli Road
Cheltenham, England.

Zone 14 QRA: YL10e WAB: SO92
County: Gloucestershire

To Radio: G4CIB

D. J. C. Bushell

Operating GTH 24 ALMOND CLOSE, Evesham, WORCS.

ASL 120'

To G4CIB confirming our 50 MHz QSO

Date: 1.2.1986 GMT: 01.47

UR RST: 579 Mode: CW

Tx/Rx: 1C271E/MUTEK Input: 10w
100V 50C
100V

Antenna: 3 el Yagi, homebrew

PSE TNX QSL Direct Via RSGB

*Hee chaps
5x
73 Dave*

Mhic tnx for QSL & QSO, Brian. Very pleased to have worked you on 1st day of 50mhz

Grid: IO81

To: G4CIB - Brian

Wkd/Hrd: 1st February 1986

1145 GMT-On 50.25 MHz

RST: 559 2x CW-SSB-FM

Tx: 1com 1C505 10watts

Rx: -

Antenna: Dipole

Tnx for the nice qso. Congrats on your enterprising tx... Hpe do so.

Pse Tnx QSL Via Buro/Direct 73 Tim

RF NOTES BY TONY, G4HBV

In my last "RF Notes" I described how a half-wave dipole works in free-space. Now I'm going to describe what happens under real conditions – that is when the dipole is not exactly a half-wave and when it is erected above the ground and close to nearby objects.

Imagine a doublet antenna (where the arms are no longer a quarter wavelength at the operating frequency), fed by the same 75 ohm ribbon feeder. This time, however, our transmitter, again having a balanced output, for the purpose of this explanation must possess an almost indestructible output stage. As before we consider what happens during the positive half-cycle of power from the TX with current passing up the right-hand side of the feeder. When this current reaches the connection point to the doublet, some of the current will be reflected back down the feeder to the TX, because the input impedance at the doublet centre will not match the 75 ohm characteristic impedance of the feeder.

Unlike the half-wave dipole, the input impedance of the doublet will include some reactance – it is inductive or capacitive depending on its length.

As before, when this forward current reaches the open-circuit at the doublet's far end, it is reflected to ensure the condition of net zero current at the open-circuit. The reflected current flows back along the doublet arm to the feeder connection. This time, however, because the length of the doublet arm is not a quarter-wave, the reflected current is no longer zero when it reaches the feeder connection point. This reflected current now enters the feeder and together with that already reflected forms a standing wave pattern with the forward current.

Associated with the currents, forward and reflected voltages are also present and this is why I specified that the TX PA should be able to withstand a superimposed voltage due to the reflected energy. Nowadays the pre-occupation with achieving low SWR is precisely because solid state devices in the PA will not withstand such reflected energy. It wasn't always so; in the days of valve transmitters, SWR was considered much less important than it is today.

As well as entering the feeder as just described, some of this reflected current will be re-reflected at the feeder connection point on the doublet and also at the TX output. These re-reflected currents, having a small phase difference to the initial currents, all contribute to the radiation from the antenna and this process continues until it becomes insignificant. What I have described is what happens AT EVERY INSTANT in the whole positive half-cycle of current from the TX and as before the induction field replicates these currents in the other half of the doublet.

The effect of increased feeder SWR on the radiation from the antenna is of secondary importance to the likely damage to an output stage in the TX. For example, a 5:1 SWR on the feeder will result in just over 2dB loss – a value unlikely to be noticed (because eventually all reflected currents still contribute to the radiation).

There is another effect of significant SWR on the feeder however and it is one that I think has caused much misunderstanding about matching and SWR in general. On a mismatched feeder, reflections cause the current and voltage to vary along its length, meaning that the impedance "looking into the feeder" also varies, depending where you measure it. This has given rise to a mistaken belief that you can reduce SWR by altering the feeder length.

Radiation from our horizontal doublet now also reflects off the ground beneath it. Whether this radiation adds or subtracts from the primary radiation off the antenna depends on the height of the doublet above ground. A graph of net radiation from the doublet would show this varies with height above ground because of the phasing of the ground reflected ray to the primary ray and at low heights above ground the radiation resistance of the doublet is also affected.

Objects close to the antenna will also affect the radiation and if these are in the near zone of the antenna, they will absorb energy from the induction field and thus limit the current taken by the antenna. This explains why indoor antennas tend to be less efficient than those erected in the clear.

In the next "RF Notes" I aim to round off this topic by discussing the use of ATU's and SWR meters in overcoming the problems of non-resonant antennas. I shall show that the ATU and the SWR meter, in typical installations, don't do what their titles imply.

March 1970 144MHz Contest by Brian G4CIB

The recent cold "snap" brought back memories of the March 1970 2 metre contest which I took part in with my amateur radio "mentor" Arthur G8BRN. We had located a site on a minor road in the Cotswolds near the village of Cutsdean. There was a convenient lay-by adjacent to the "trig point" and as Arthur possessed a Bedford Dormobile (a popular camper van of the era) we decided that this would be a suitable location to set up our station. The weather was much as it has been recently - a biting easterly wind with snow lying on the ground. We set up an 8 element yagi in the lay-by. The Dormobile was equipped with a Calor gas stove for cooking purposes so we knew we would at least be able to keep fed and watered. My main recollection of the weekend is that it was bitterly cold so leaving the vehicle to turn the antenna was a pain. Also about 10.00pm we heard a tapping on the window and it was a couple of lads who told us that in the early hours of the morning a car rally would be passing through and would we mind if they placed an oil lamp (the type used in those days at roadworks etc) behind our vehicle which of course we agreed to. At some unearthly hour in the morning we decided to have a brew-up but somehow got carried away with our contest duties because when we came to pour the tea out, it had frozen in the pot!! During the Sunday morning we were paid a visit by another local amateur Paul, G8DBW who proudly presented us with a cold meat pie made by his sister which was eagerly devoured. I subsequently recounted our experiences of the bitterly cold weather to an uncle of mine who was involved in the Royal Observer Corps and the following year we gained permission to operate from one of their underground bunkers which was located near by at Brockhampton - but that's another story!



Arthur G8BRN alongside his Dormobile



Adjusting the 8 element yagi.

G4CIB's Ford Anglia in the foreground