



**SPECIAL EDITION  
RAGCHEW  
In memory  
of Tom Morgan G3XMM**

## **Special “Ragchew”**

### **In Memory of Tom Morgan G3XMM by Brian G4CIB**

I first met Tom at a Gloucester Amateur Radio Society meeting in 1969 when the club met at the “Lamb” Inn (long since gone), located opposite the Old Cattle Market in Market Parade, adjacent to the entrance of Kings Square. After a few visits, I joined GARS and remember Tom giving a talk on antennas, with particular reference to matching. In the early 1970s, the club moved to the RAFA club in Spa Road as the “Lamb” Inn was demolished in the redevelopment of Kings Square.

The highlight of the club year was the first weekend of June, National Field Day, which in those days we operated from the Gordon League Rugby Club ground in Hempstead Lane. Tom lived close by in Hempstead and on one memorable occasion came down to the station (G3MA/P) on the Sunday afternoon dressed very elegantly in his “Sunday-best”. On that particular field day, the home-brew high-tension power supply which powered the HRO receiver and located under the operating table had developed a fault. Every couple of hours or so, one of the electrolytic capacitors would blow up. Not having time to try and locate the source of the problem, Pat G3MA’s solution was to have a box of electrolytic capacitors handy and keep replacing them as and when required. Tom was invited to operate and just as he had got going, an electrolytic capacitor exploded, depositing gunge all over his trousers. He was not a happy bunny!

Tom served as Chairman for a number of years and on retiring presented the “Morgan Key”. In the words of our Society handbook, “the key is presented at the Annual General Meeting and is the only award solely in the gift of the committee. It is awarded to the member who, in the judgement of the committee has contributed most to the furtherance of the Society during the year”. In this way, Tom’s memory lives on in the club.

### **My Memories of Tom by Tony G4CMY**

I first met Tom when I was a 15 year old school boy. I had been interested in electronics for a few years and this evolved into short wave listening when I was given an old table-top radiogram to play with (for the younger readers, this was a combined radio receiver and record player). It had a short wave band which covered the 40 metre amateur band, amplitude modulation only. Back then (early 1970's) there was still a reasonable amount of AM activity on 40 metres.

Tom ran the school Amateur Radio Society and eventually I plucked up the courage to go and talk to Tom about joining the club. Of course, I was welcomed with open arms.

I needed a better receiver and I would regularly seek Tom's opinion on cheap radios that were advertised in publications such as Exchange and Mart. Of the ones I could afford, Tom would generally say they were no better than the receiver I had already. After a while Tom took pity on me and loaned me an R1155 (an ex-RAF receiver as used in Lancaster bombers) and gave me some ideas for modifications that I could do to improve it.

That got me started on serious listening on 160m, 80m, 40m and 20m but its performance on 15m and 10m was not good. To remedy this Tom set me off on a project to modify an RF24 unit (used in radar by the military) for use as a converter for the higher HF bands - the output appearing between 4 and 6 MHz which the R1155 could handle well. This got me going on all the HF bands. I had already taught myself morse so there was no stopping me. In 1973 I got my licence and the rest is History - a History that would have been very different if not for Tom.

Tom had set up a station in school in a room off the Chemistry Lab. This comprised of an HRO receiver and a Minimitter AM/CW transmitter. Despite its name this was a huge piece of equipment. The station was completed with a trapped dipole on the roof. I ended up in his A-Level Chemistry class and it was not unknown for Tom to set us a problem to think about while he disappeared for a short while into the shack and we would hear the sound of morse code drifting across the Lab as he worked stations on the HF bands.

## Memories of Tom by Graeme G0EEA

Tom taught at Sir Thomas Rich School (STRS) before he retired, and our son, our daughter (who is herself now a teacher), and our nephew were amongst his pupils. I can recall, when our nephew became enthusiastic about Radio Controlled model cars, Tom telling me that in previous years he clearly had to close a model car club at STRS because it had become some sort of a clique, excluding anyone whose model car was not of a specific, "approved" make!

At GARES, Tom was always available for a chat and with sound advice and was a bit of an authority on both the history of communications (including signalling, telegraphy, and radio ) and also on valves, of which he had a "G3XMM Collection". I still have a copy of his 11 page article, dated 2008, which lays particular emphasis on World War 2 valve developments.

## Reminiscences of a Very Supportive Fellow Radio Amateur

by Dave G4HJV

I first knew Tom when I attended Sir Thomas Rich's School from 1971 to 1976 when, like some other members of GARES, he was my chemistry teacher and by his formation of the school radio club. It was his enthusiastic involvement in amateur radio that encouraged me to join the Gloucester Amateur Radio Society as it was then. My recollection is he was always calm and good natured, supportive and generous.

At STRS he installed G3XMM/A in a prep room next to the chemistry lab on the top floor of the school, with an antenna conveniently stretching along the roof. This enabled many frequent skeds to be made during lunch times, which I was able to sit in on with special permission to be inside the building during break time. This contributed enormously to my interest in amateur radio at an early age. Tom's latest involvement on the air has been as a regular contributor to the club's daily skeds on 2m and other bands where his enthusiasm, countless anecdotes and keen wit will very much be missed.



**NFD 1981 - Gordon League Rugby Club Ground**

**Tom G3XMM centre of photo between Ian G4CLR (SK) and Leta G4RHK**



# Gloucester Day by Day

A WORLD-WIDE invitation to chat will go out from Sir Thomas Rich's School, Gloucester, on Saturday. *13MAY69*

"CQ—this is GB3STR, this is GB3STR," will be the call going out on the world radio networks, from the specially licensed radio station being set up for the school's "Bus Fair."

Members of Gloucester Amateur Radio Society, with pupils from the school, have got the special call sign from the GPO and if American operators get to hear that the 300-year-old school is on the air, the radio waves are expected to be very busy.

## Six hours

AS well as British operators, the crew of nine, who will be operating the £3,000 station for a continuous six hours, hope to raise Continental, Australian and African radio hams.

They are just one of the many side shows being put on at the fair, which is attempting to raise well over £1,000 for a school mini bus. It will be used to carry school parties and teams to various functions around the country.

The school has proved in the past that £1,000 is not beyond their means. This time they will have the school open for festivities from 11.0 am onwards.

The title "Bus Fair" arose, I gather, from a staffroom sign one morning, and promptly stuck.

## After trophy

AN Old Richian, Mr. Pat Perkins, will be in charge of station operations on Saturday.

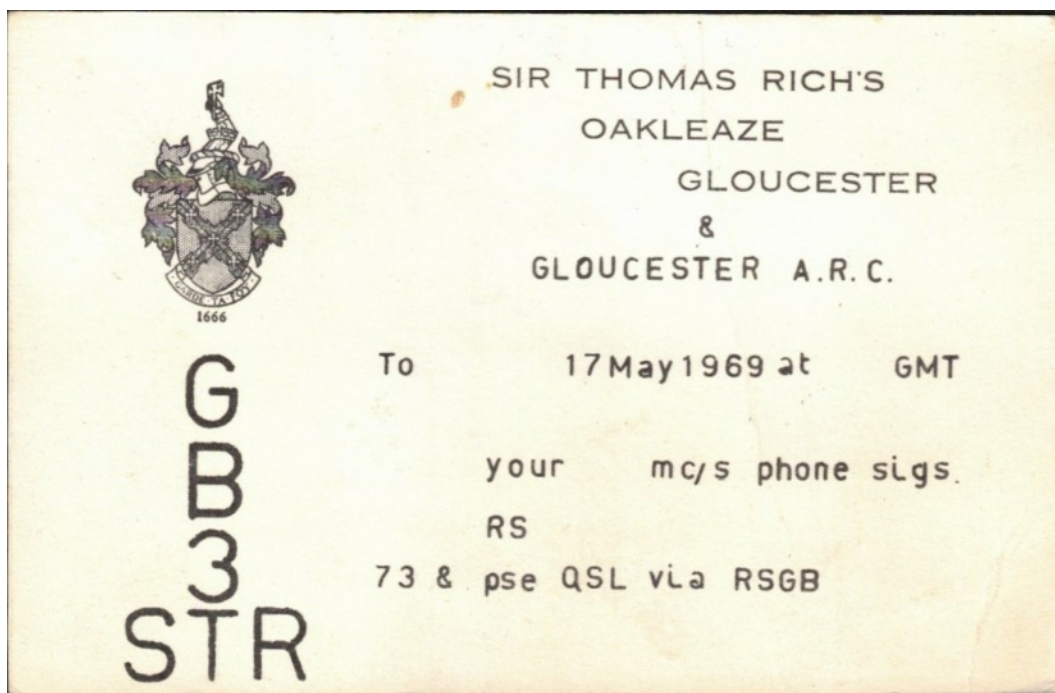
He lives at 40 Calton-rd., Gloucester, and is area representative on the British Amateur Radio Society.

Mr. Perkins tells me that the Gloucester Society will be trying on June 7 and 8 to regain the National Field Day Trophy which they took the first year—in 1934—and have not held since. They will be setting up a special station on the Gordon League Ground at Hempsted, and from there they will try to raise as many operators as possible in a 24-hour period.

This is how **GB3STR** was reported in the Gloucester "Citizen" newspaper "Gloucester Day by Day" column on Tuesday 13<sup>th</sup> May 1969.

Interesting to note that it states that the "crew of nine" will be operating a £3000 station! I can only assume that a certain establishment in Cheltenham, courtesy of Owen G2HX or Mick G3H DU loaned some Collins S-Line equipment.

Do any of the former STRS pupils have any memories of the station details? Or was the £3000 a misprint?



## **Tom G3XMM – SK by Derek G3NKS**

The following tribute was published in a recent edition of the Cheltenham Amateur Radio Association News and is reproduced here with the permission of Derek G3NKS.

“It is with much sadness and regret that we record here the passing of Tom G3XMM, a well-known local radio amateur and a former member of CARA. He died overnight on 24th/25th November in Gloucester Royal Hospital having collapsed at home a few days earlier with pneumonia, he was 86.

Tom grew up in Dorset with his mother who was widowed early in WWII. He attended the local grammar school and went on to read Chemistry at Bristol University. A successful and satisfying teaching career followed, first at Kingston-upon-Thames Grammar School and then from 1968 at Sir Thomas Rich’s school in Gloucester where he rose to become head of Chemistry. He also taught electronics having taken an Open University course in mid-career.

His amateur radio “career” began in 1958 when he passed the RAE (the old-style Radio Amateurs’ Examination – a 2 (or was it 3?) hour written exam). However, he didn’t take the then mandatory 12 wpm Morse Test for access to the HF bands until 1968 when he was issued with the call sign, G3XMM. During his 57 years on-the-air he tried several aspects of amateur radio but favoured HF and VHF using CW, FM and SSB employing a variety of different rigs. It’s thought that he never ran more than 100W and always used simple wire antennas. He enjoyed QRP operation, mainly on CW. He was keen on older equipment and at one stage had a collection of interesting vintage broadcast receivers and became quite knowledgeable on the subject.

Tom was a keen member of CARA from the 1980s/90s and served on the committee for a while. He wrote regularly for CARA News and contributed many interesting articles about valves of which he had a large collection. “Thoughts from the Bathtub” was another series which he wrote. He supported CARA in many on-the-air activities including special event stations, DX chasing challenges and contests even though the latter was not really his forte. About 20 years ago he returned to the Gloucester club where he also served on the committee and took an active role in the well-being of the club.

Tom was widely read and was very well informed on several subjects beyond chemistry and electronics including applied philosophy, music (he sang and played the piano), aircraft, steam engines, aspects of history and some military matters. He was a true polymath. He was always happy to discuss issues and to impart his extensive knowledge to help others. In recent years in particular he was always willing to assist fellow radio amateurs (mainly CARA and GARES members) by supplying items from his “stores”, especially hard-to-get bits, for their constructional projects.

Although quiet and reserved, and a very private person, he was approachable and willing to chat. Following the arrival of Covid he became rather reclusive, rarely leaving his house. But he continued to enjoy keeping in touch with friends over the air and regularly joined several local nets. His presence on the air will be much missed both locally and further afield. As will his wise counsel and encyclopaedic knowledge.

His funeral will take place at 11.30am on Tuesday 19th December at Gloucester Crematorium.

We offer our deepest sympathies to Angela, his close friend of many years, and to Jessica his daughter on their very sad loss.”

## From Ed McCann AG6CX

Just as I was putting this special edition of “Ragchew” together, out of the blue I received an email from Ed AG6CX, as follows:

“Hi Brian: Looking at an ancient RagChew (No 7 Aug 2012) I noticed Tom Morgan was looking at the history of a famed ham G2BI and trying to suss out details of his antenna (*“Ragchew” article reproduced below - Ed*), reporting that he was having trouble finding history beyond G2BI with name W L Palmer, of Wiltshire. I recently ran across a T&R Bulletin from 1934 in which G2BI described his antenna.

I pass it along in the spirit of keeping the flame of ham radio flickering.

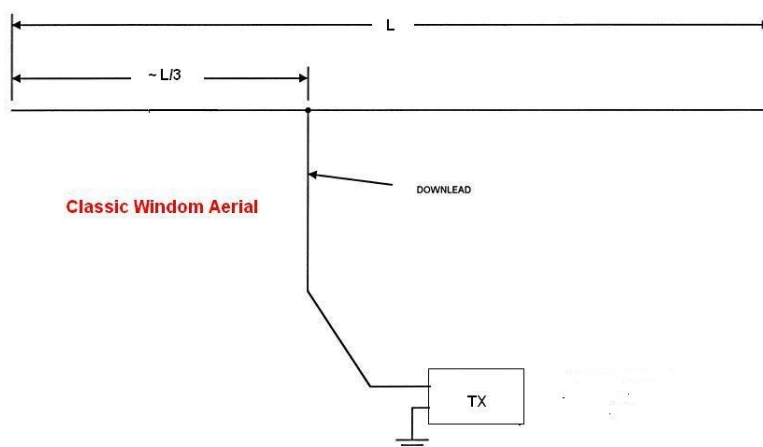
Hope it is useful and of interest.

73, Ed McCann AG6CX, Sausalito CA USA”

### **G2BI and his Aerial by Tom Morgan G3XMM**

You may remember (probably not!) mention of a G2BI-type aerial in some previous articles about early National Field Days (NFD). At the time of writing I invited comments as to what it might have been. I was delighted therefore to hear from Cliff that it was some sort of Windom aerial and this inspired me to do a bit of research in various publications and on the Web.

The first point to note is that the Windom of the 1930’s was not quite the aerial that is often called A Windom today.



In the diagram the length  $L$  of the top section is a half-wave on the frequency of interest. A single-wire feeder, marked DOWNLEAD is tapped in at about a third of a wavelength from one end of the top section. In theory it is possible to adjust this tapping point so that there are no standing waves on the down lead and all the radiation takes place from the top section of the aerial.

As described above the aerial is a single band affair although later compromise designs enabled it to function reasonably well as a multiband aerial on the HF bands of the time. The field-day station at Painswick needed an aerial that would radiate effectively on two bands viz. 20 and 40 metres.

The G2BI solution was to fabricate A Windom for 20 metres and to adjust the length of the downlead so that the aerial could be matched on 40 metres also. The aerial would not function as A Windom on the lower frequency but would look more like a rather asymmetric “tee” with the downlead becoming part of the radiating system. It must have worked well enough since, as we have seen, the combination of the Gloucester and Bristol stations gained third place in the in the first experimental NFD..

So what about the man himself? An old call-book lists him as W.L. Palmer with an address in Calne. Wiltshire, it was part of RSGB Region 5, together with Herefordshire, Gloucestershire and Oxfordshire. So it is quite possible that his advice was sought when planning the regional stations.

Elsewhere in the literature he is mentioned as advocating and extending the use of the Windom. I have not been able to discover more than that, so if anyone knows any more about him I would be pleased to hear it.



# THE T. & R. BULLETIN

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H. Bevan Swift (G2TI)

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No. 6

## LAGGING BEHIND

**S**TATEMENTS in the American radio press and elsewhere to the effect that the new Acorn valves suitable for ultra high-frequency work, are available for amateur use, follow closely upon the news that the Bell Laboratories have produced commercial A.T. cut crystals, with zero temperature co-efficient. These announcements, and others of a similar nature, must arouse in the heart of every British amateur a feeling that our own commercial concerns are lagging behind.

Power pentodes and valves suitable for suppressor grid modulation are now coming to us from America, as are tubes capable of rectifying up to 2,500 volts at half an ampere—incidentally, the latter are being sold at a price approximately the same as that charged for a British rectifier giving only 1,000 volts at half the current.

It is probably no exaggeration to say that five out of every ten British amateurs are to-day using foreign-made valves of some sort or other in their transmitters and receivers. These men are not disloyal to their country, but are compelled to make this choice because no suitable British valves are available at a price which meets the limitations of their pocket books. More often than not, when British valves *are* available, they are unsuitable, a fact which was pointed out by the designer of the tri-tet push-pull transmitter described in our last issue.

We rather wish a meeting could be arranged between a group of our leading amateurs and representatives of the valve industry, for it would then be possible for us to indicate in a frank and friendly manner where we consider the trade is losing for itself both money and prestige by failing to appreciate that a demand exists in the home market for more and better valves suitable for amateur and general use.

But the lag is not only in valve research; as an example, let us take the case of the single signal superheterodyne receiver, with its associated crystal filter, we find that although the fundamental principles underlying the circuit were developed by a British engineer, it was left to the American radio companies to adapt it for amateur work.

These conditions must be remedied if the amateur movement in Great Britain is to go forward under the banner of research and experiment. There appears to be only one method available of effecting an improvement. Our suggestion is that every member requiring a special valve or component, which is not obtainable in this country, but can be imported from abroad, should write to at least one British manufacturer and point out the facts of the case. We are fully aware that a large company cannot be expected to make valves in penny numbers, but a demand exists for quantities of small pentodes similar to the American

(Continued on page 240.)



## THE 14 MC WINDOM

(With Some Notes concerning its Use on other Amateur Bands.)

By LIEUT.-COLONEL W. L. PALMER (G2BI).

*Who has not heard of, or used, the so-called G2BI antenna? It is with much pleasure that we have persuaded its originator to tell us the story of its development.*

THIS article is prompted, firstly by the fact that, in the writer's opinion, the Windom is one of the best of all amateur aerials, provided the conditions necessary to its proper use can be, and are, complied with, and secondly, because it is known, from personal correspondence, that many are using, or desire to use this system, but are doubtful on several points concerning it.

The following are some of its good features:

- (a) It is one of the very few radiators which carries a perfect current distribution curve, and a radiator which does not do so is, at best, only a compromise.
- (b) It is fed by a single feeder, which is non-radiating, whose losses are negligible, and which can be of any length desired.
- (c) It is the simplest of all systems to design and erect, except perhaps the AOG.

### *Origin of the Windom.*

The original article, on what is known as the Windom aerial, appeared in *QST* about five years ago, and since many will not have seen it, perhaps a short *résumé* of its contents will be of interest.

The actual experiments were carried out by three electrical engineers, under the direction of Prof. W. L. Everitt, of the Department of Electrical Engineering, Ohio State University.

A special experimental station was erected at the University for the sole purpose of this investigation, and special apparatus was devised to measure current distribution, etc., accurately.

First, a half-wave radiator with a single-wire feeder was erected, with feeder attached about six feet from the centre, and tuned by means of a meter at the centre.

Tuning for maximum current at the centre resulted in a greatly distorted current curve on the radiator, and a bad standing wave on the feeder. Various lengths and feeder positions were then tried, with the same results. It was thus abundantly proved that the method of tuning a single-feeder Hertz, by means of a meter, or lamp, at the centre of the radiator was *wrong*, and should not be used.

Then somebody had a brain-wave!

Two equal-reading ammeters, *as close together as possible*, were placed in the radiator at a random point (anywhere between the centre and the end) and the feeder connected between them. The transmitter was then tuned until the two ammeters read exactly the same. A perfect current curve on the radiator resulted.

Different lengths of radiator were tried, and the result was always the same, *i.e.*, a perfect half-wave current distribution curve, thus showing that the radiator was being energised at its fundamental.

A further series of tests were made, and it was found that the fundamental was approximately 2.07 times the length in metres, *i.e.*,  $\lambda = 2.07l$ .

There were still standing-waves on the feeder, so the next step was to try and get rid of them. Starting with the feeder near the centre, current curves for it were taken as it was moved outward. As it was changed, the standing-wave on the feeder began to disappear until, at a very definite point, the feeder curve became a straight line. Beyond this point, standing-waves again began to appear.

A number of similar tests were made, with various lengths of radiator, and it was found that this definite position of the feeder from the centre was a fixed ratio to the length of the radiator. It was also found that the position of the feeder had no effect on the fundamental of the radiator, and that the length of the feeder was immaterial for all normal operation.

The above has been dealt with at some length in order to show with what care and precision the tests were made, and the formulae evolved, and, therefore, how chary we should be of departing from them.

In fact, it is maintained they should always be rigidly adhered to.

Some users want to adjust both the length of the radiator, and the position of the tapping point, to meet what is termed local conditions, but this would appear to be entirely wrong.

Undoubtedly, there are certain essential conditions which must be met before the Windom will function as it is intended to do, but if these conditions cannot be met, one cannot by any means produce a true Windom.

If the length of the radiator, or the position of the tapping point (given by the formulae for a given frequency) be altered, then the current distribution curve will no longer be a true sine-curve, nor the feeder non-radiating, and the system will not be a true Windom.

### *Essential Conditions.*

The following are considered to be the essential conditions for the proper functioning of the Windom:

1. *Design the system according to the formulae.*

There are only two, one for the length of the radiator, and the other for the position of the tapping point.

Always work out the dimensions from the formulae, and do not attempt to use a graph, unless you make a large-scale and accurate one of your own. All those seen by the author are on too small a scale, and absurdly inaccurate.

Measure the length of the radiator from the first bend round the insulators at each end, and keep



the return, necessary for making fast, as short as possible.

2. *The radiator must be in free space—that is to say, uninfluenced by the earth or surrounding objects.*

Opinions differ with regard to this point; but it is considered that the condition will be satisfied if all parts of the radiator are a half-wave-length in the clear.

In the case of the 14 mc. Windom, this necessitates a minimum height of, at least, 33 ft., and a minimum distance between aerial supports of about 100 ft.

(For a 7 mc. Windom, these measurements will, of course, require to be doubled.)

The radiator and feeder must both be of round, solid copper wire.

3. *The feeder must leave the radiator at right-angles for a distance of, at least, one-third the length of the latter, otherwise the current distribution will be affected.*

The feeder, after dropping away from the radiator at right-angles, should run in a gradual curve to the amplifier coil. On no account should it contain angles, or sharp bends.

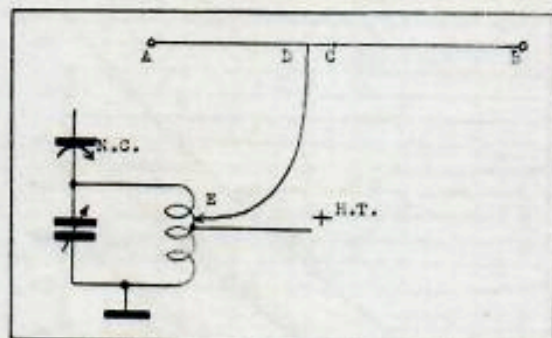


Fig. 1.  
The G2BI Aerial for 7 mc. operation.

#### Practical Application.

When using the Windom it is most desirable, and easier, to adjust the transmitter to the frequency for which the radiator is cut, *before* connecting the aerial system.

If the transmitter is crystal controlled there will, of course, be no difficulty, but in other cases there may be, unless an accurate wave-meter is available.

To adjust the transmitter to resonance with the Windom radiator, after the latter has been connected, the best method is, undoubtedly, that referred to earlier in this article, *i.e.*, to place two matched ammeters, or flash-lamps, in the radiator, as close together as possible, one on either side of the feeder, and tune to equal readings or brilliance.

This device might also be used when the transmitter is crystal controlled, to give visible indication of correct working.

There are also other methods, notably G6JX's, referred to later on in this article.

Finally, there is one most important adjustment to be made, and that is the position of the feeder-tap on the tank-coil of the transmitter. It is really extraordinary what a different to output and efficiency its correct location makes.

This position should be such that the impedances are matched, and is best determined as follows:

By means of two equal leads, temporarily clip an ammeter, or flash-lamp, across two, three or in

the case of low powers, even four feet of the radiator, at its centre. The transmitter should now be started, and accurately adjusted, with the feeder disconnected.

Attach the feeder in an approximately correct position, *i.e.*, on 14 mc., about  $1\frac{1}{4}$  turns from the H.T. centre-tap on the side remote from the plate. The flash-lamp should glow, or ammeter show a current.

Now adjust the position of the feeder-tap on the coil until the glow, or reading, is a maximum, and the job is done. Note the location of the tap, and remove the flash-lamp or meter.

No adjustment or re-adjustment of the transmitter must, on any account, be made during the process, and it is absolutely incorrect to tune by a lamp or meter in the centre of the radiator.

#### The G2BI Aerial.

So much for the true Windom, of which the 14 mc. variety forms the basis of what is known as the G2BI system.

This system was developed in order that the writer, who desired a really good aerial on the 7 mc. band, could also work on the other bands without having to shift aeriels, or make complicated adjustments.

The system has been found to work excellently on all the amateur bands, but it should be understood that no *special* efficiency is claimed for it on any but the 14 mc. band.

#### 7 mc. Operation.

Referring to Fig. 1, the feeder ED is cut to such a length that the total length EDB is the fundamental wavelength of the frequency desired in the 7 mc. band. EDB is then used as an end-on half-wave Hertz, and is tapped direct on to the output tank coil of the transmitter.

It has been found that the portion AD of the 14 mc. radiator has little or no effect on this arrangement. Since, however, the radiator EDB is no longer wholly in free space, the formula will not give the absolutely correct length, and it will be necessary to adjust it by the cut and try method.

A method of doing this, described by C6JX in THE BULLETIN last July\* seems excellent, and exceedingly simple.

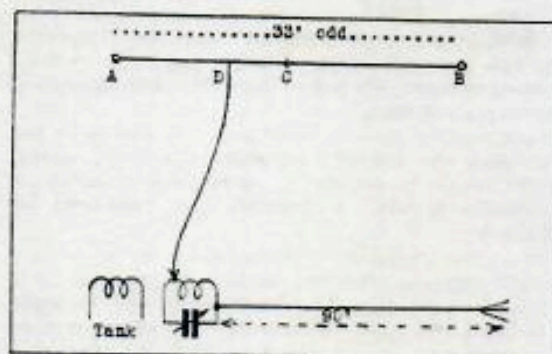


Fig. 2.  
The G2BI Aerial for 1.7 and 3.5 mc. operation.

\* Vol. 10, page 18.

(Continued on page 240.)



**EDITORIAL.**—(Continued from page 199.)

59, for power pentodes similar to the RK20, for cheap mercury vapour rectifiers and, above all, for valves of the Acorn class.

The question of prices also needs consideration, for it is of little use British manufacturers producing new valves and components, if the retail prices are to remain as at present, far in excess of those asked for a foreign article equally suitable.

British radio manufacturers must be made to appreciate that the short-wave amateur movement, which includes television enthusiasts, is growing, and growing fast, and if they wish to retain the support of this large group of experimenters, they must immediately take steps to meet their requirements. The industry itself is blessed with all the skilled technicians it requires; it is our duty, therefore, to see that these men get a chance to retrieve the position before the lag becomes even more serious than it is at present.

**MODULATION SYSTEMS FOR 56 MCs.**—

(Continued from page 207.)

receiver. This surmise was found to be correct although it should be pointed out that the adjustment is somewhat delicate if satisfactory results are to be obtained. When the first tests were made it was noticed that extremely high peak voltages were produced; the tuning condenser, which was a *Bulgin* baseboard neutralising type sparking over with 120 volts H.T., whilst a long arc was produced when the voltage was increased to 200 volts. It is essential, therefore, in using the circuit shown to use a widely-spaced condenser. The circuit is self-explanatory, and it will be seen that the modulator valve filament and microphone are open circuited when i.c.w. is being used. The volume control functions on both i.c.w. and speech and the setting appears to vary with both systems. Best results with i.c.w. have been obtained by advancing the volume control to the point where the valve just breaks into low-frequency oscillation, it having been found detrimental to allow violent L.F. oscillation to occur. A variable grid leak adjusts the bias on the oscillating valve to an optimum value when speech is used.

High-frequency oscillators, aerials and coupling systems have not been mentioned, as these special modulating circuits can be applied to any transmitter. Details of the component parts used are given beneath the diagrams for the benefit of those who wish to follow the design closely. The author will be interested to hear from other members who test out these systems, and will be pleased to compare results with them.

**THE 14 MC WINDOW.**—

(Continued from page 209.)

**1.7 AND 3.5 MC. OPERATION.**

The 14 mc. Window is used exactly as it stands, with the addition of a single-wire counterpoise, 90 ft. long, and a tuned coupling coil. See Fig. 2.

A variable condenser of .0005 mfd. capacity, and a 4 in. diameter coil of about 16 turns is suitable for both bands.

**FORMULÆ.**

The formulæ are as follows:

Length of radiator, AB (Fig. 1),

$$L = \frac{474150}{f \text{ (kc)}} \text{ feet.....(1)}$$

Distance of feeder tapping point from centre, CD (Fig. 1):

$$X = \frac{L(\text{feet}) \times F}{180} \text{ feet.....(2)}$$

Formula (1) is derived from the equation

$$\lambda = L \times 2.07$$

The factor F in Formula (2) varies with the diameter of the wire used.

For wire 80 mils diameter (14 S.W.G.), F=23.2

For wire 20 mils diameter (16 S.W.G.), F=25.0

For wire 12.4 mils diameter (25 S.W.G.), F=30.0

From these values it is easy to construct a graph for solid copper wire of any other diameter.

**R.E.S. NOTES.**—(Continued from page 219.)

It will be seen that when the switch is on A relay operates, A operates B at A1. B, in operating, disconnects A, which, in releasing, releases B. B1 falls back and re-operates A and so on. It is possible to slow the sender right down to about two words a minute!

The brothers 5FV have promised to send along details of their crystal oven and peaked audio device soon.

G5AR and G2AF have nothing to report at present.

**STRAYS**

Mr. F. A. Robb (G6TK) would appreciate reports on his 3.5, 7 and 14 mc. transmissions from DX transmitting and receiving stations. Schedules are wanted with Asia or Oceania. All reports acknowledged.

Mr. C. R. Handby, c/o The United African Co., Ltd., P.O. Box No. 5, Warri, West Africa, will shortly be operating under the call sign ZD2F and would appreciate reports.

Mr. J. W. J. Tyrrell (VU2BM) has now returned to England and hopes to be on the air with a G call shortly. He wishes to thank all Empire and foreign stations for their QSO's with him.

**Ham Parodies No. 4.**

(WITH APOLOGIES).

This is why I'm lonely,  
This is why I'm blue,  
Not a bit of luck has come my way,  
Can't think what has happened  
But I couldn't work a soul to-day.  
Pulled the gear to pieces,  
Built it up anew,  
Thought and thought until I'm nearly grey.  
Calls are all in vain though  
And I couldn't work a soul to-day.  
Stations there are plenty  
Working on the air,  
(And DX is really fine),  
Eighty, forty, twenty,  
Anywhere,  
Answer every call but mine.  
Valves are all in order,  
Juice is coming through,  
And the old antenna seems O.K.  
Gee! It's got me guessing,  
'Cause I couldn't work a soul to-day.

" Pips "





Gary M0XAC and Tom G3XMM on the roof of Gloucester Cathedral, setting up GB4GC in September 2014 for Churches and Chapels on the Air and Gloucester Heritage Day