2 M.C. TEST REPORT

T. & R. Bulletin

THE JOURNAL OF

The Inc. Radio Society of Great Britain

AND THE

British Empire Radio Union

Vol. 6. No. 11. MAY, 1931 (Copyright) Price 1/6

THE INCORPORATED

Radio Society of Great Britain

AND THE

British Empire Radio Union

53, Victoria Street, London, S.W.1 (Phone: VICTORIA 4412)

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T&R

Bulletin

The only Wireless Journal Published by Amateur Radio Experimenters in Great Britain

MAY, 1931. Vol. 6. No. 11

Mainly to the European Societies.

Last October we made a few remarks and generally aired our feelings on the subject of " Smarter and Quicker Operating," and ended with the words, " We look forward to a definite improvement in operating throughout the world, and particularly on the Continent of Europe." We do not propose at the moment to consider whether general operating is better or worse than it was six months ago. We have not the time to consider this in detail. We have, though, a very much greater complaint to make to the world in general, though particularly to the amateurs of certain European countries. We refer to the disgusting notes heard nowadays and, though we are loath to admit it, the remarks apply, in a milder degree, to some of our own stations both in this country and in parts of the Empire.

To say the notes of some of the European stations are disgusting is putting it in polite terms. The owners of such stations show an utter disregard for the feelings of other stations who are working at the same time, and the sooner those selfish amateurs blow themselves and their ghastly apparatus to bits the better we shall be pleased. Certain bands were given exclusively to amateurs by Washington in 1927, and as we, referring to the amateurs throughout the world, are the only sufferers from the abuses of our own brother amateurs, we have to do the policing of these bands ourselves. We cannot here go into technical discussions on the construction and adjustment of transmitters that do justice to the amateur movement as a whole, though we are confident that sufficient has been published on the subject throughout the world that no plea of ignorance can be put forward.

Though the owners of the stations concerned are directly responsible for the raucous noises heard in Europe, considerable blame attaches itself to certain European societies. We refrain from naming these societies at the moment, though many that are responsible for the atrociously bad notes heard are member societies of the International Amateur Radio Union, and as such we consider it their duty to police their own territory and see to it that their own amateurs show some consideration for the enjoyment of others. We know not whether the societies concerned are unable, or do not wish, to keep the air clean, or it may be that the amateurs responsible for the safe running of the societies concerned are themselves the chief offenders in polluting the ether. We do say, however, that if a speedy improvement is not noticed, we shall endeavour, through the medium of the I.A.R.U., to compel the societies concerned to take the necessary steps to clean the air.

We have in mind publishing a list of stations reported with notes so bad as to be almost beneath contempt, and we will willingly do this if it is generally thought that such an action will have any beneficial effect on the situation.

A Journey into the World of Science.

By G. G. Blake, M.I.E.E., F.Inst.P., F.R.S.A.

(A paper read before the R.S.G.B. on April 29, 1931.)

BEFORE we commence this lecture I want to make clear to you the attitude of Science towards its theories. Unlike the theologian who has complete faith in his dogmas, the scientist considers all his theories to be only working hypotheses approximating to the truth, after which he diligently gropes. So soon as some hitherto undiscovered fact presents itself, if it throws doubt upon a theory, no matter how old and cherished that theory may be, he readily accepts the situation and alters the theory to fit the fact.

I want you, therefore, to realise that many of the explanations which I shall give to you this evening may only be reflections of the full truth, some of our theories may survive, but others will be discarded as we advance nearer to actuality.

* * *

The World of Science, like the physical world, may be said to be divided into many continents and islands, wherein dwell numerous tribes speaking different tongues, but, like the human race, joined together with one common bond—the love of science. For example, the chemist inhabits a continent of chemical phenomena and uses special words and terms scarcely understood by people who study other branches of science. The botanist has little to do with such terms as electron, proton, or wavelength so glibly employed by the physicist. The electrical engineer would find difficulty in deciphering a physician's prescription, while the latter, if confronted by some simple problem in physics, would be even more at a loss. Not unlike the world of Nature, all the physical sciences can be said to be joined together by a common ocean or sea of mathematics. Measurements and calculations are needed in all sciences, and here at least the same laws hold good.

At this point I will end my simile, for, unlike our physical world, the World of Science is almost unexplored; we have as yet only located some of the continents, and have not completely explored even the smallest of the islands.

If you will bear with me for a brief hour I will conduct you through some of the regions with which I am most familiar, those in which my language (that of Physics) is spoken, if we turn aside here and there on our way into other countries, I will borrow words from interpreters in order to tell you of their discoveries of which I have a lesser knowledge.

We will imagine that we have commenced our journey and have arrived at the first port in the land of Physics. You must prepare yourselves for some very curious discoveries; this land is very different to the country wherein your ordinary senses dwell. The first observation that we make is that, while externally everything appears to be quite as usual, nothing is really solid. I can prove this to you in several ways. First of all take a sheet of glass; to our senses this feels as solid as a piece of wood, yet if I alternatively interpose both in a beam of white light, the former will allow the light to pass through it, while the latter will not allow it to pass.

In the normal pursuit of our lives our bodies appear to us to be very solid, heavy objects, yet if we interpose a human body in a beam of X-rays, the rays pass right through it, and we soon discover that the penetration of the rays is dependent upon their wavelength, already we begin to realise that solids are not so solid after all; we are deceived by our senses; solidity is a relative term.

Sir Oliver Lodge once showed an experiment to illustrate how whirling motion would give the appearance of solidity. He filled a length of rubber tube with water, and then by hanging it vertically from the spindle of a small motor, and rotating it, he gave the water a whirling motion. The tube was then removed from the motor, and so long as the water within it continued to rotate, the tube exhibited all the properties of a solid rod.

Experiment 1.

The transparency of the human body to X-rays was demonstrated. (The apparatus employed was a portable X-ray outfit exactly similar to that with which His Majesty the King was recently X-rayed.)

Four lantern slides were shown further illustrating the transparency of human beings and animals to X-rays.

Experiment 1a.

At this point another experiment was shown to illustrate how our senses can deceive us. After looking fixedly at a revolving spiral the audience were told to look at a white disc on the wall, which then appeared either to come towards them or to recede according to the direction in which the spiral was first revolved.

As Einstein points out, everything is relative. Everything from the stars in the heavens, on the one hand, to electrons on the other, can be said to belong to some certain order of magnitude. For example, we should not compare the fastest movement of a man's arm to the speed at which light travels (186,000 miles per second). Compared with that stupendous speed, the arm at its fastest is practically standing still, each belongs to an entirely different order of magnitude.

Experiment 2.

By the flash of light from an electric spark a moving arm appears to be stationary. (This was demonstrated.)

We speak of a thousand oranges, but we should not speak of 1,000 specks of dust; we should measure the latter by the ounce—each belongs to a different order of magnitude. Let us consider the smallest visible speck of chalk dust. This is composed of a large cluster of molecules of calcium carbonate ($CaCO_3$), a single one of which represents the smallest possible sub-division we could make for it to retain its characteristic properties.

If we divided the calcium carbonate molecule into its component parts, we should find that it was built up of a number of atoms of various elements, together forming one geometrical group. Sir William Bragg has spoken of atoms as Nature's alphabet, and molecules as Nature's words. Everything throughout not only this world, but throughout the Universe, we know to be built up from an alphabet of 90 letters.

According to our present belief an atom is not solid, but it in some respects (according to Bohr's theory) resembles our solar-system, having at its centre a tiny nucleus or "sun" surrounded by a number of tiny negative entities which we call electrons; these circle around it like our planets travel round our sun, and relatively to their sizes they are as far away from their nucleus as our planets are from our sun. The nucleus itself is believed to be made up of a number of positively charged entities known as protons and a certain number of fixed negative particles or electrons. It is thought to be the number and grouping of these fixed protons and electrons which give to an atom those chemical properties by which we are able to distinguish it from an atom of another element.

Einstein's theory of Relativity is very useful when we are trying to get some conception of things belonging to an entirely different order of magnitude. Consider for a moment a world so remote from this earth that it takes light more than 130 years to reach it; if its inhabitants possessed a telescope of sufficient power to enable them to observe people moving to and fro upon our earth, they would at this moment be witnessing some scene in the French Revolution.

In order to see an electron we should require a microscope having a magnification power of an order comparable to their telescope. Sir Oliver Lodge once said, "There are as many atoms in a glass of water as there are glasses of water in the Atlantic Ocean," and there are so many electrons in a 10-oz. glass, that if Adam had been provided with the means for removing them at the rate of two per second and had lived throughout the ages, working night and day (and Sabbath-breaking as well) they would not nearly all have been removed from the glass even now.

Again, 100 million atoms in a row would barely span 1 in. The weight of the air in this lecture room is somewhere between one half to three-quarters of a ton.

An atom of mercury magnified 100 thousand times would look about the size of a small marble. If we applied the same power of magnification to this hall, the ceiling would be approximately at $2\frac{1}{2}$ times the distance of the moon from the earth.

I realise that it is all very well for me to make all these statements, and that you would like some tangible proof of the actual existence of atoms and molecules. The following experiment may help you to realise the actuality of their presence in the air of this room.

The air is composed of molecules or groups of oxygen and nitrogen atoms, together with a smaller proportion of numerous other atoms; the forces in most of these atoms, like those in our solar-system, in perfect balance. Each atom has its correct number of electrons, so that the forces of attraction and repulsion are balanced within the atom, and therefore no forces are exhibited without it.

EXPERIMENT 3.

In these two little tubes there are small quantities of radium. At present the tubes are closed, and the radium is thereby kept from contact with the air in the hall. When, however, I remove the tubes, I expose the air of the room to the action of the radium, and alpha particles which are constantly being shot out from the latter, instead of being stopped by the walls of the glass tubes, fly out into the atmosphere and knock it about in a most alarming manner. Some of the atoms when struck by alpha particles have electrons knocked out of their solar-systems; others, again, get electrons driven into them. So far, however, we are not conscious that anything has happened; all our atoms and molecules, regardless of whether they now carry a positive or a negative charge, are mixed up like chocolates in a box. If, however, I make this radium holder negative, it will repel all the atoms which have a negative charge to the other side of the hall, and it will at the same time attract a cloud of those which carry a positive charge. (The latter are those from which an electron or electrons have been removed.)

A mechanical slide was shown to make this experiment more easily understood.

Some of you will doubtless remember that I showed you this experiment once before in a lecture I delivered here in 1922.*

In addition to the planetary electrons, all metals contain swarms of detached electrons which, by the application of an electrical motive force, can be driven along a piece of metal or a metallic wire like gnats before a wind.

It is this movement of free electrons which does our work and constitutes our electrical current for electric lighting, etc. The electrons are there in all metals, and in the electric light wires of our houses always; all that the dynamo at the electric light station does is to drive them along the wires.

EXPERIMENT 4.

This was illustrated by an electroscope when a charged rod was brought near to it; its leaves were seen to diverge as electrons were driven down into them, and they closed up together again as soon as the top of the electroscope was touched and the electrons were allowed to escape.

We are accustomed to think of water as a liquid, air as gaseous, and lead as a solid, and it comes almost as a shock to us when we realise that solid, liquid and gaseous are relative terms dependent on temperature. Water is the same chemical H_2O whether it is frozen solid, in liquid form, or heated to steam; so is lead or any other substance.

The difference between these three conditions is that in solids all the molecules are closely packed together in a solid mass, the movement of each molecule being strictly limited. In liquid form the molecules are beginning to break away, and can slip over one another.

SLIDE TO SHOW A DRIP OF WATER.

This was illustrated by the dripping of water from a tube to make it more clear; the experiment was projected on to the lantern sheet. When

* "The Modern View of Electricity and the Three-electrode Valve"—*Journal of Wireless Society of London*, Vol. III, May, 1922, Part 2.

water is heated, say over a gas ring, the hottest molecules rise to the top, some of them with such force that they are ejected from its surface, or, as we say, the water is evaporated. When the water actually boils an enormous number are suddenly shot out with such force that they drive the air before them and create a partial vacuum at the surface of the water.

In a gas the molecules are separated from one another and are in a state of wild commotion, kissing one another like flies at play, and then rushing off at high speed to the walls of the vessel containing them. When a 1d. balloon is inflated with gas it is the continuous impact of the contained gas molecules against the inner walls of the balloon which keeps it inflated; if we heat the gas we increase the commotion within the balloon and it will inflate still more.

Experiment 5.

It was shown that when a box full of sand was given a vibratory motion, light objects floated up to its surface and heavy objects sank to the bottom of the box.

As I pointed out before I commenced this lecture, the scientist is always prepared to modify his theories in order to make them fit in with facts. There are several other atomic theories in addition to that of Bohr.

There is a theory put forward by Lewis and Langmuir which depicts the electrons vibrating slightly about fixed positions instead of travelling round in circles.

Then we have a more recent theory as postulated by Schrodinger; this is a highly mathematical theory and much more difficult to picture mentally. It imagines each atom to be a sphere of electrical charge, capable of fluctuating in density, this fluctuation or pulsation having a frequency dependent upon the size of the sphere. An emitted electron, according to this theory, would be a little bunch of waves thrown off from a vibrating sphere something like a wisp of flame thrown up from a wood fire. If it meets another vibrating sphere it will coalesce with it, and, adding its energy to the existing vibrations, will give a new frequency to the atom. This theory is coming more and more to the forefront of science, as it not only gives an explanation of all the facts which the Bohr atom explains, but in addition it throws light upon the relative intensities of the lines of the spectrum which the Bohr theory failed to do. Much of the theory is of too complicated a nature to admit of non-mathematical expression, and it is therefore impossible to deal with it in such a lecture as this.

At the last meeting of the British Association at Bristol, Dirac propounded yet another theory. His new theory is not unlike the old "one fluid theory" of electricity.

He pictures the entire universe pervaded by electrons, and that all positive electricity is simply the absence of electrons from their homes. A proton being, so to speak, the empty space which should contain an electron.

These empty spaces move about in the ocean of electrons just as positively electrified particles would, and remain in existence until a wandering electron is driven in and fills the space.

At this point we will leave our examination of matter and revert to a consideration of light. Let us enter a flower garden in the world of physics; we will group ourselves in a circle around a flower bed in which many variously coloured flowers are in bloom. What do we see? At first we see nothing out of the ordinary, just the sun shining overhead above a lot of pretty flowers. But let us consider more closely; did we but realise it, here is a miracle of the highest order. Whence comes this colour? Not from the flowers. At night when there is darkness they show no colour. All the colours are conveyed to the flowers in the white light from the sun; each flower absorbs some of the sun's radiations and reflects or rejects all the rest, i.e., the red flower absorbs all the rest of the colours and reflects red. A blue flower by its side absorbs all the rest of the light but blue, which it rejects; or again, a purple blossom reflects back both blue and red simultaneously. Not only are all the colours of the visible spectrum present, but the ether is vibrant with more than 53 octaves of other vibrations which are invisible, any or all of which may be crossing and recrossing our field of view, while we gaze upon our pretty flowers. Yet in spite of all that is going on each flower continues to reflect its own colour, which can be clearly seen by each observer, so that the rays from each flower cross and recross in every direction without interfering with each other. What a wonderful world we are in, what laws, and what design; it gives one a feeling of awe to contemplate these miracles.

A slide of the visible spectrum was shown. 53-octave slide.

This slide shows some 53 of the octaves of vibrations of the ether known to science, and more have been discovered since this was made.

Experiment 6.

I will once more show you the apparatus which I demonstrated on the occasion of the inaugural address* which I delivered to the Associate Section of the R.S.G.B. in January, 1923, and which I demonstrated at the Royal Institution three or four years ago. It shows that it is possible from one source of electrical energy to make the ether vibrate so as to produce simultaneously visible light, ultra violet, radiant heat, and Hertzian waves.

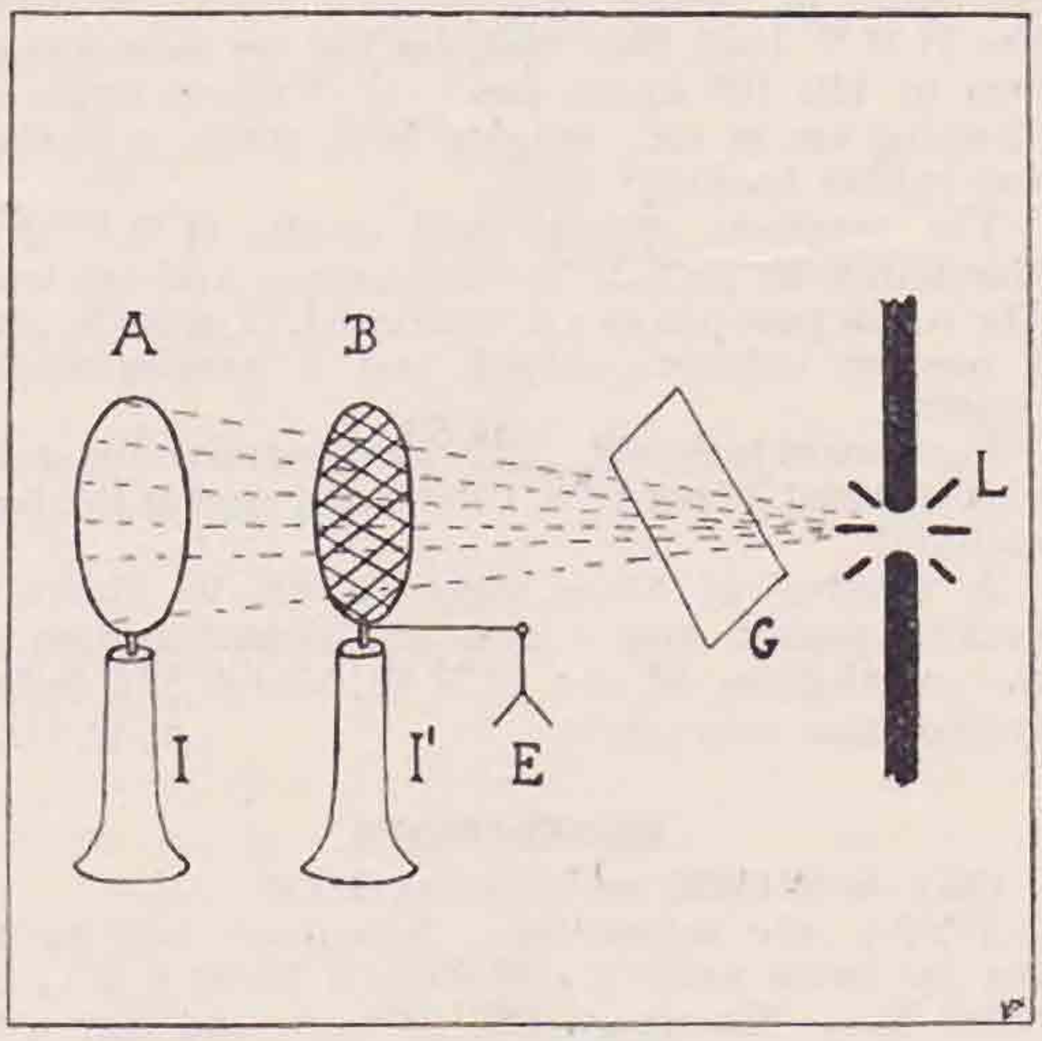
By means of a special filter which cut out all the visible light from the lantern, but allowed ultra violet rays to pass, various fluorescent objects were caused to fluoresce and emit a bright light.

If an artist, say Turner, could have seen all the visible beauty possible on this earth! We know that he, like all the rest of us, was blind to more than 53 other octaves of wavelengths. They are there all the time but cannot be seen. Compare this to being able only to hear three or four notes of a piano.

I have been speaking of waves and wavelengths. What is the medium which conveys these waves? As yet we have no very clear conception. We imagine that both inter-atomic and inter-planetary space must be filled with something, and to this something we give the name of ether. If we place a glass globe over an electric bell and an electric light, and then extract all or as much as possible of the air from the globe, as the air is withdrawn the sound of the bell will grow fainter and fainter, until

* "The Elementary Principles of Radio Telephony"—*Wireless World*, Vol. XL, 1923.

it can be no longer heard, but the intensity of the light will remain constant. This proves that light is not a wave motion of the air, and we therefore conclude that some other medium unaffected by the air pump must still be left behind within the globe. This medium apparently pervades all things, and conveys the light first to the walls of the globe and then through the glass and through the air in the room to our eyes. Newton thought that light was composed of innumerable and infinitely small particles or corpuscles which were fired across space from the source of light, so fine and impalpable were they that they could pass through glass and other transparent bodies. This corpuscular theory did not, however, fit in with all the facts, and it was superseded by the wave or undulatory theory. All space (or the ether) was pictured by Huygens, Lord Kelvin and others as being filled with some intangible substance having the properties of a jelly. When a suitable commotion was made at any point, an undulatory motion spread out in all directions, and that it was this wobbling or wave motion which we observe as light.



Long before this, Faraday had regarded electric and magnetic effects as stresses in a medium. Maxwell showed that this same medium (ether) could do double duty, i.e., carry electric effects and transmit light. Hertz produced electro-magnetic effects which travelled at the same speed as light, and only differed in wavelength.

I will do my best to give you a mental picture of what this means, according to Faraday's theory. Let us imagine a metal ball in the centre of a room; if this ball is charged with electricity it will exert an attractive force in every direction, i.e., to the walls and ceiling and the floor of the room: in fact, you could draw an imaginary line from any point on its surface to the nearest point on the wall, and you could go on drawing these lines in endless numbers, and each such line could be mentally pictured as a "line of force" having elastic properties. If the ball were moved away from one wall and put closer to another, all the lines on the far side would be stretched while those on the nearer side would close up.

Now let us imagine this metal ball reduced to the proportions of a single electron which, like the ball, is surrounded by innumerable lines of force radiating from it in every direction. If we move an electron or a number of electrons about by hand, the speeds are relatively so slow that the most we can do is to move the line of force longitudinally, i.e., to strain the ether slightly in the vicinity of the electron.

EXPERIMENT 7.

This was illustrated by the movement of a rope, the latter representing a line of force and the lecturer's hand, for the purpose of the illustration, representing an electron.

If, however, we move the electron at a speed which is comparable to that of light, we can set our line of force in wave motion. This is what happens, according to the undulatory theory, when a candle burns or when a wireless station transmits.

Now, so far as most phenomena go, the undulatory theory fits in very well, but there are one or two awkward facts which it does not seem to fit in with.

A slide was shown giving the frequencies or colours of light necessary to cause electronic emission from various metals.

Na	Sodium	Yellow
Al	Aluminium	Blue
Mg	Magnesium	Violet
Zn	Zinc	Ultra violet
Sn	Tin	do.
Bi	Bismuth	do.
Cu	Copper	do.
Pt	Platinum	do.

EXPERIMENT.

I and I^1 are two insulating stands supporting respectively A, a polished zinc disc, and B, a grid made of cotton coated with black lead. The latter was connected by a wire to an electroscope E. The zinc disc A was given a negative static charge, and it was shown that when the light from an arc L fell upon its surface it emitted electrons which were collected by the grid B, and as the latter retained more and more of them a negative charge was built up which caused the leaves of the electroscope to diverge. It was shown that the inter-position of a sheet of glass G between the arc and the zinc disc cut out the ultra violet rays and stopped the experiment; it was therefore the ultra violet radiations which caused the emission of the electrons and not the visible rays which the glass did not impede.

This experiment only holds good for zinc. To obtain emission of electrons from aluminium, wavelengths of the frequency of blue light are required. Each metal requires a different frequency (as shown in the list above).

When light falls upon a polished surface of zinc (and other metals) electrons are thrown out of the metal. This we would expect, but the speed at which they are ejected should correspond to the intensity of the light, and it does *not* do so, they come out at just the same speed for the feeblest as for the strongest light, only there are fewer of them.

If sea water behaved like this, a calm sea breaking on a beach would throw up stones with just as much force, and as far, as would a rough sea. Something is obviously wrong. Einstein has suggested that light contains units or quanta of energy which behave much like particles. When one collides with an

(*Continued on page* 325.)

The Electrical Pick-up.

Outline of a Lecture given by Mr. E. M. Payne, of the Research Department, the Gramophone Co., Ltd., before the Inc. Radio Society of Great Britain on February 27, 1931.

The Radio-Gramophone Pick-up.

IN order to understand our fundamental facts, it is necessary to consider in a simple way the manufacture of disc records.

We must picture the artist or orchestra in front of the microphone, and in some remote recording room a disc of wax, upon which is being traced a sinuous spiral comparable with the sound waves striking the microphone.

By means of electro-deposition processes a hard metal matrix disc is formed, which is subsequently used for impressing into hot plastic material the identical sinuous wave form which was on the original cut wax.

When the cooled record is played by means of the electrical pick-up, the movement of the needle reconverts, by means of its mechanical vibration in the grooves of the record, the complex sinuous spiral into an alternating current identical with those from the original music.

The two chief types of pick-up are the electro-magnetic and the condenser. In the electro-magnetic type, the voltage output is proportional to the rate of change of flux, which is proportional to the velocity of the mechanical movement, and as sinusoidal motion is being considered the voltage output is proportional to the product of amplitude of motion by frequency.

In the condenser type of pick-up, the voltage output is irrespective of the frequency of oscillation, and this fact forces us away from the condenser type of pick-up.

It is now generally appreciated that, owing to constructional difficulties, recording is made at constant amplitude below 250 cycles per second. Our ideal pick-up would therefore be designed to give an increased output below that frequency, and for further considerations a rising characteristic above 3,000 cycles. A pick-up with a rising characteristic above 3,000 cycles may need a scratch filter operating between 4,000 and 5,000 cycles per second.

Particular stress at this point must be laid upon the desirability of changing the needle for each playing. Some magnified models of worn needles were shown ably indicating the necessity of this simple operation.

Design of a Pick-up.

The overall stiffness of needle tip relative to pick-up body should not exceed 6×10^6 dynes per cm., as measured over a deflection of 0.003 inches, whilst the downward pressure of needle tip on record should lie between 100 and 150 grams. Serious record wear is caused if these figures are greatly exceeded.

By means of microscopical examination of worn records in the H.M.V. laboratories, it has been found possible to identify the make of pick-up used, and in one case the instrument had a stiffness of 50 10^6 dynes per cm.

There are numerous types of pick-up upon the market; in one, the translational, the armature moves in a straight line in one plane. The full Baldwin arrangement, in which the armature is pivoted about its centre as in the old Baldwin telephones, and the half Baldwin movement in which the armature is pivoted about one end, are other types.

In order to obtain good treble response, the armature must be made as light as possible, although saturation distortion will occur if the cross-section of the armature is made too small.

Damping is essential in order to reduce the resonance of needle stiffness and armature mass. For H.M.V. loud tone steel needles we have a stiffness of 110 10^6 dynes per cm. Various types of damping are in use, ranging from strips of rubber and rubber bushings to oil.

The magnetic system used in the H.M.V. and Marconiphone pick-up is both unique and efficient. The south pole pieces are laminated, in order to give a greater voltage output and a greater treble response.

Permanent magnets are always used on commercial pick-ups and 36 per cent. cobalt cast steel is the best material.

A number of slides were shown to illustrate various points, and a practical demonstration of the capabilities of the H.M.V. Model 521 radio-gramophone was given. A. D. G.

EXPEDITIONS.

QST de W1MK, received by G2IM.

WSEA, the submarine "Nautilus," will be on the air twice daily, at 15.00 and 21.00 E.S.T. on 8,290 K.C. He would like to work and test with as many amateurs on 7 M.C. as possible. Please report on his signals via A.R.R.L.

DDOE will be on the air by May 15, and will work amateurs on the following schedules:—16.00-18.00 E.S.T. on 14,400 K.C.; 18.00-20.00 E.S.T. on 11,300 K.C.; and 20.00-22.00 E.S.T. on 8,780 K.C. Please report on his signals via A.R.R.L.

(Continued from opposite page.)

to be believed. Even when conditions are at their worst, Herr Klotz usually succeeds in finding somebody on the other side of the world who can hear his signals. A large input is employed, but no small credit must be given to Herr Klotz's keenness, skill and patience. In conclusion I would like to say that if any British amateur happens to be in the vicinity of Heidelberg, he should not miss the opportunity of visiting D4ABG. I speak from personal experience when I say that nowhere will he be welcomed with greater hospitality or see more striking evidence of the true ham spirit.

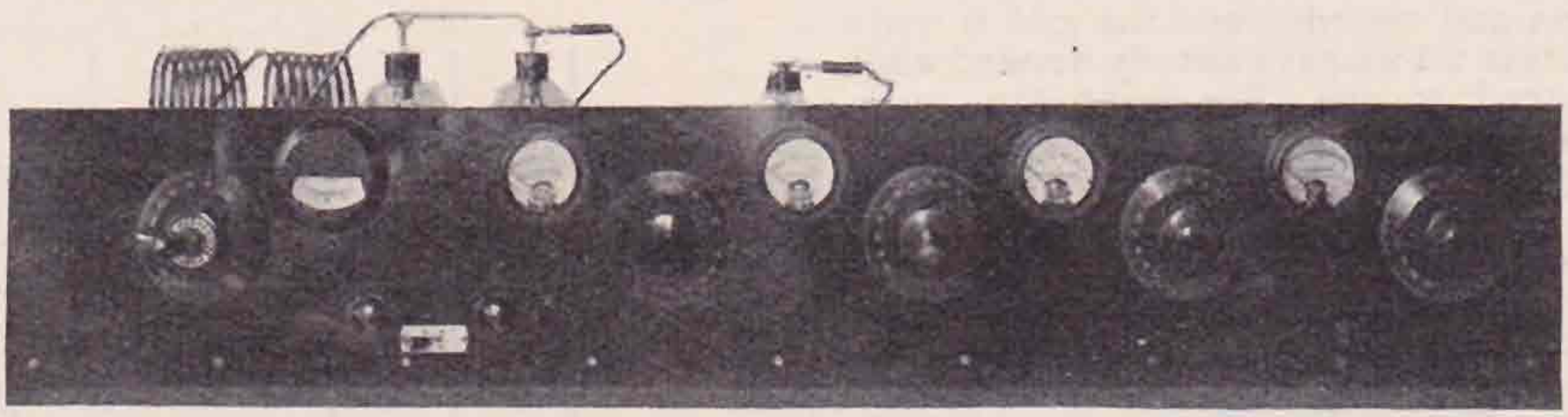
Station Description No. 14.

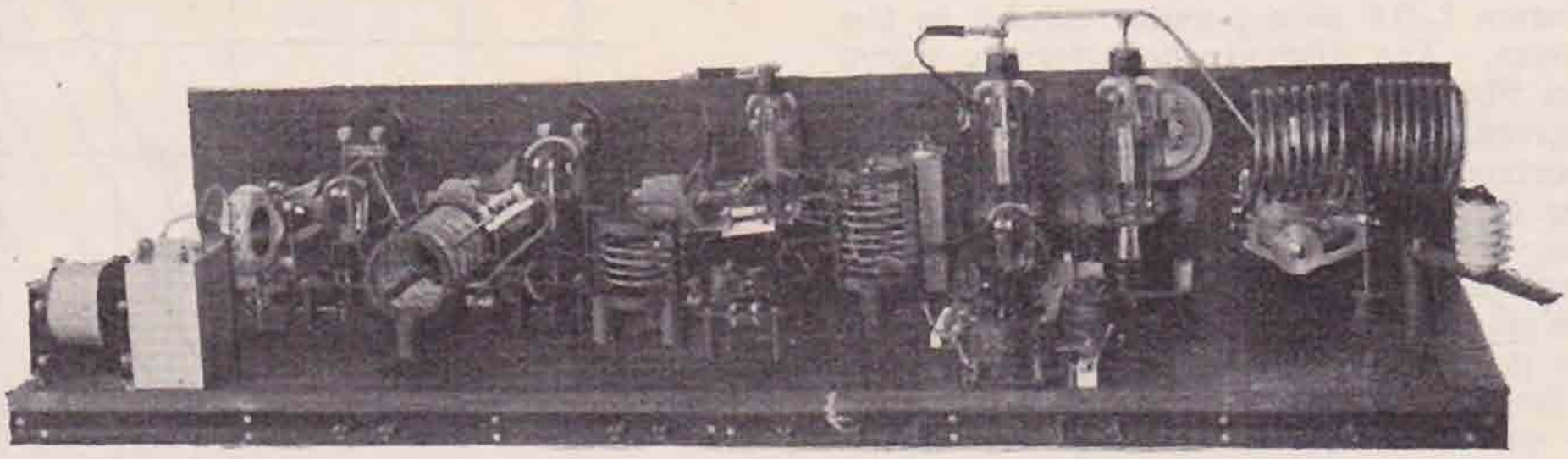
D4ABG.

By D. C. G. Gattiker (G6DG).

FEW British amateurs have the opportunities of visiting the stations of amateurs abroad, and since descriptions of foreign stations occur only too rarely in the Bulletin, perhaps the description of D4ABG may be of interest to some readers.

D4ABG, owned and operated by Herr Otto Klotz, is probably one of the oldest and best known amateur stations in Germany. In the course of many years, in which the station has undergone many alterations, all continents have been worked, and even to-day, under adverse conditions, contact with the more distant continents is still a comparatively easy task.





All the gear is housed in a room on the third storey. The transmitter is crystal controlled, consisting of four stages, as shown in the accompanying photograph. The crystal oscillator (shown on the left) is followed by two frequency doubling stages, the power amplifier being on the right. The transmitter is designed for work on both the 7 M.C. and the 14 M.C. bands, and a crystal having a fundamental of 3.5 M.C. is employed in the oscillator, so that for 7 M.C. work one of the frequency doublers is cut out. The power stage is neutralised, and consists of two Telefunken RS.31 valves in parallel, together dissipating about 250 watts. It may be of interest to know that, in spite of regular use, these two valves have been used ever since 1926 and still show no signs of deterioration. The filament current is derived from a large capacity 12-volt accumulator, kept fully charged from a small Lorens direct current generator, worked from the mains. The anode supply for the crystal oscillator and the frequency doubling stages is obtained direct from the 440-volt D.C. mains, the optimum voltage for the first two stages being obtained by adjustment of a potentiometer. The anode supply to the power amplifier is derived from another Lorenz generator, giving a D.C. output at 1,200 volts. The output from this generator is arranged in series with the mains, thus giving a total input of 1,640 volts to the amplifier. Smoothing is effected by means of 30 Henry chokes, together with condensers. The transmitter is neutralised in the manner already described by me in a previous article in the Bulletin. A point of interest, not often found in British stations, is the inclusion of a thermo-ammeter recording maximum R.F. current in the anode of the crystal oscillator valve, when the crystal is oscillating. Readings of 1 ampere or more are usually obtained.

The extraordinary compactness of the outfit, which does not seem to depreciate its efficiency, is shown by the photograph.

The antenna system for use on 14 M.C. consists of a simple inverted L, 33 metres in length, used in conjunction with an indoor counterpoise 4.50 metres long. On 7 M.C. an inverted L, 53 metres long is used in conjunction with a counterpoise 8.50 metres long. Both aerials are about 30 metres high.

The results obtained at D4ABG have to be seen

(*Continued at foot of previous page.*)

Design of a Power Amplifier for High Frequencies.

By F. Charman (G6CJ).

PART I.

THE principles governing the design of a power amplifier for high frequencies are somewhat different from those concerning the ordinary low-frequency amplifiers, and whilst a good deal has been written of the latter, it is thought that a few notes on the former may be helpful, as the use of low-frequency amplifier design for that of a transmitter will lead to erroneous conclusions.

Considering first the material we have to help us, we turn to the characteristic curves, to aid us in the selection of a valve. Unfortunately, we have only the grid volts-anode current curves, and the curves for the valves are useless in that form. It will be realised that we are primarily concerned with the power output of the valve and its relation to the power fed into it. All this concerns only the anode voltages and currents, and the grid is quite out of the picture till we have already decided what valve we intend to use. We want the anode volts-anode current characteristics of the valves. Although we may derive these from the published curves, it is rather unfortunate that we have to do so, as they are of far more use than the grid-volts-anode current curves, not only for our particular purpose, but also for most other purposes. There seems, however, to be some sign that we may get these curves in the future.

Let us devise our characteristic curves. We will take the Osram L.S.5 as a popular exhibit in the way of valves. The alleged characteristic curve is shown in Fig. 1. It will be seen that several curves are given for different anode voltages. Suppose we construct a scale of anode volts and anode current (Fig. 2). Now we proceed to travel up the vertical line, or ordinate of Fig. 1, for grid volt (Eg)=0, and plot the intersection of each curve for a particular valve of anode voltage (Ea), as we come to it, on the scale of Fig. 2. We finally obtain the line in Fig. 2 marked Eg=0. We can, from this curve, readily determine the anode current for any given anode voltage, when the grid voltage is zero. In a similar way, by travelling up the ordinate for Eg=—20 we obtain the second line below Eg=0 on Fig. 2. And so on until we obtain a complete new set. The curves shown have been dotted in beyond 400 volts, because in practice, although the steady anode voltage is 400, the actual voltage will swing up and down about that point when the valve is in operation. This will be obvious later. They are dotted in to the same shape as the complete lines obtained, as they take the same form, but cannot easily be measured without destroying the valve. Although the conditions on these curves occur for short intervals of time in operation over part of an oscillation, if the valve were set up in a steady condition of, say, for example, 600 volts 50 milliamps, it would rapidly heat up under the influence of the 30 watts it was trying to dissipate, and would undoubtedly be damaged. The published curves generally only show safe "steady" conditions, the rest often being dotted in.

Now, with the aid of the curve, let us tackle the valve as an ordinary amplifier. Looking at the curve Eg=0, we see that it is approximately a straight line, and, also, that it could represent the conditions of voltage across, and current in, a resistance. We see that 400 volts would cause to flow a current of 66 milliamps, which is, by Ohms Law, the current which would flow in a resistance of 6,000 ohms. Coming down to 200 volts, a pure resistance would give 33 m/a, but the valve only passes about 26. This is because the valve's resistance is not pure but increases as the anode current is reduced, rising sharply as it approaches zero.

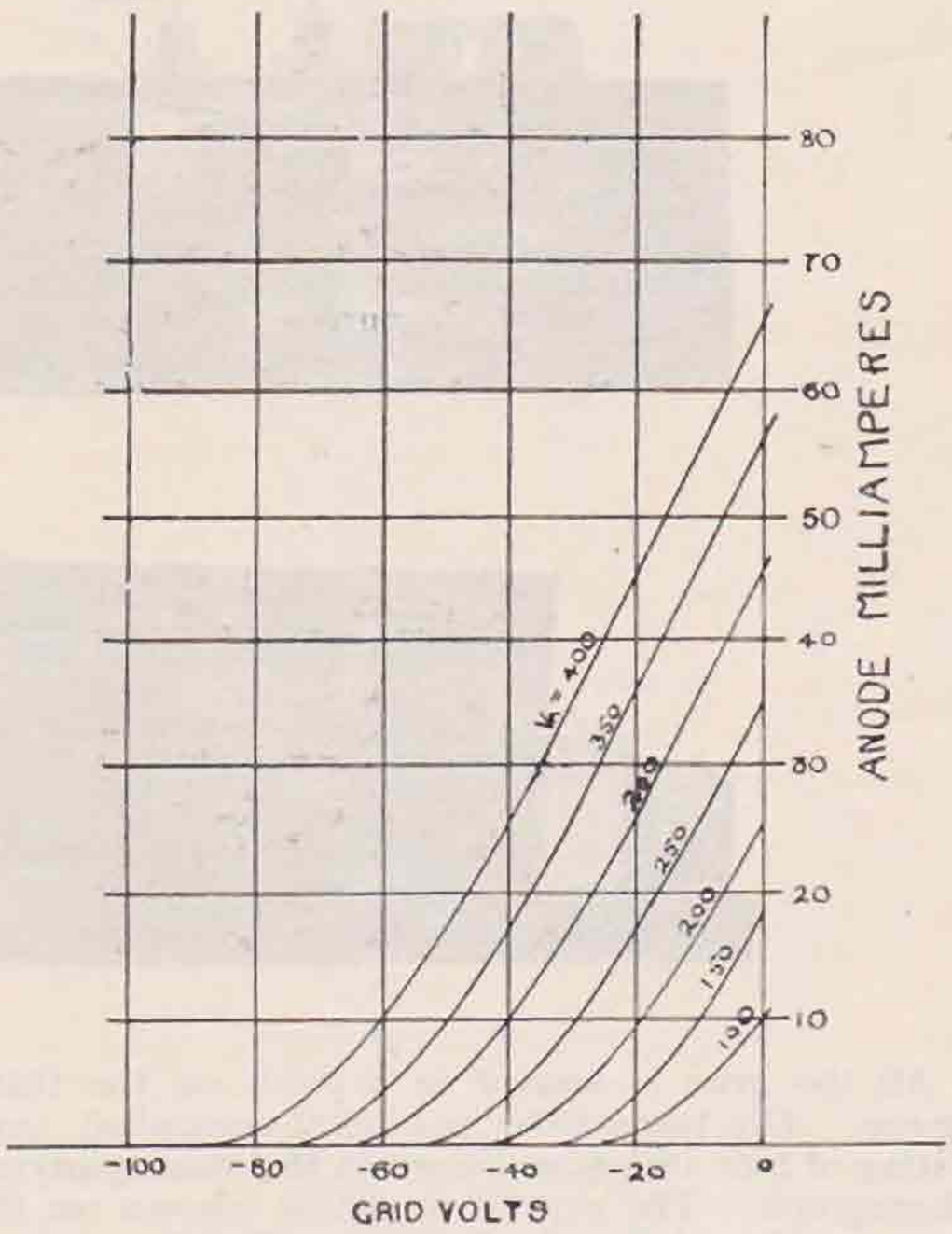


Fig 1. Characteristics of the LS5

Let us connect a resistance in series with the valve as in Fig. 3 and, just for fun, let us make it 6,000 ohms. Now, the current flowing through the circuit can be regarded as a current through the valve due to a voltage Va on its anode, or to a current through the resistance due to a voltage Ea—Va across it. Making the grid of the valve more positive will cause more current to flow through the circuit, and will have the same effect as altering the resistance of the valve. The valve can thus be regarded as a resistance which is variable at will

by varying the grid voltage. An increase in the anode current will cause the voltage across the resistance to increase, and the value of Va to decrease, since the positive end of the resistance is fixed at the voltage Ea. The effective resistance of the valve has dropped a greater percentage than the percentage increase in the current, because otherwise the voltage Va would remain steady: this, of course, is what would happen if there were no resistance in series. We thus see that making the anode current vary up and down about a steady value makes the voltage across R do likewise, but causes the voltage of the anode to vary in the reverse manner, or, if you like, to be in

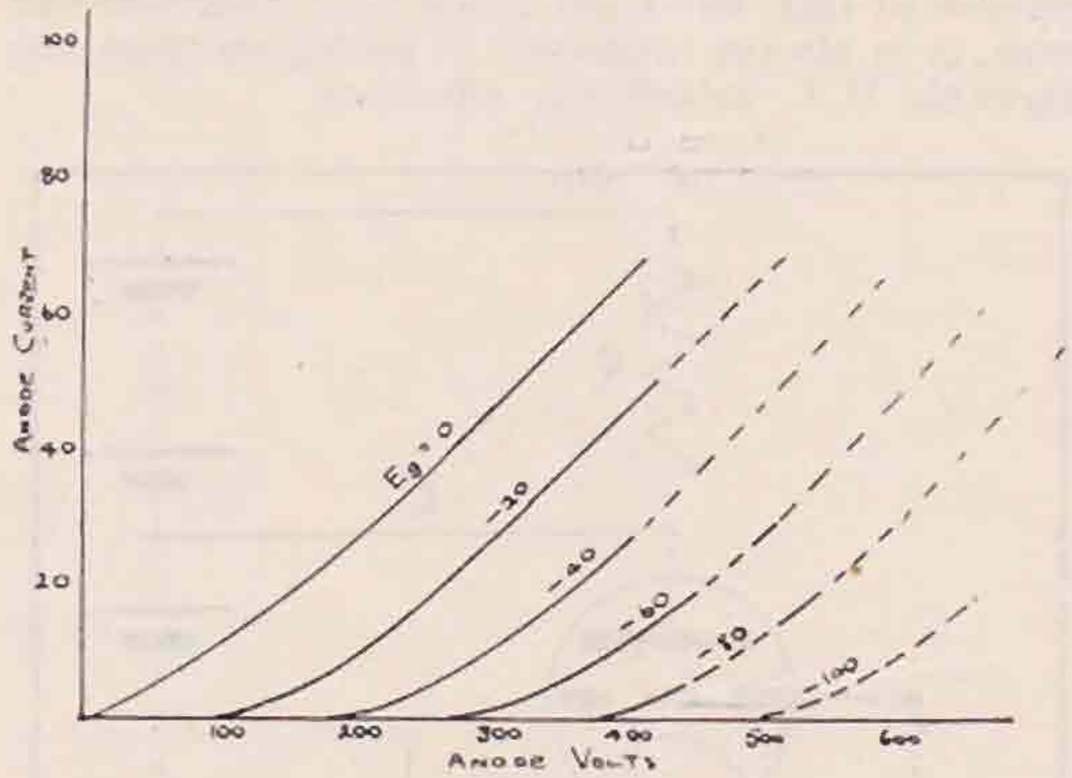


FIG 2

opposite phase to the anode current. Perhaps we can plot the variation of the voltage across R on the curve Fig. 2. Suppose Ea=400 volts. R is 6,000 ohms. If the resistance of the valve were zero, the current would be 66 m/a, whilst the voltage across R would be 400 volts, and Va would

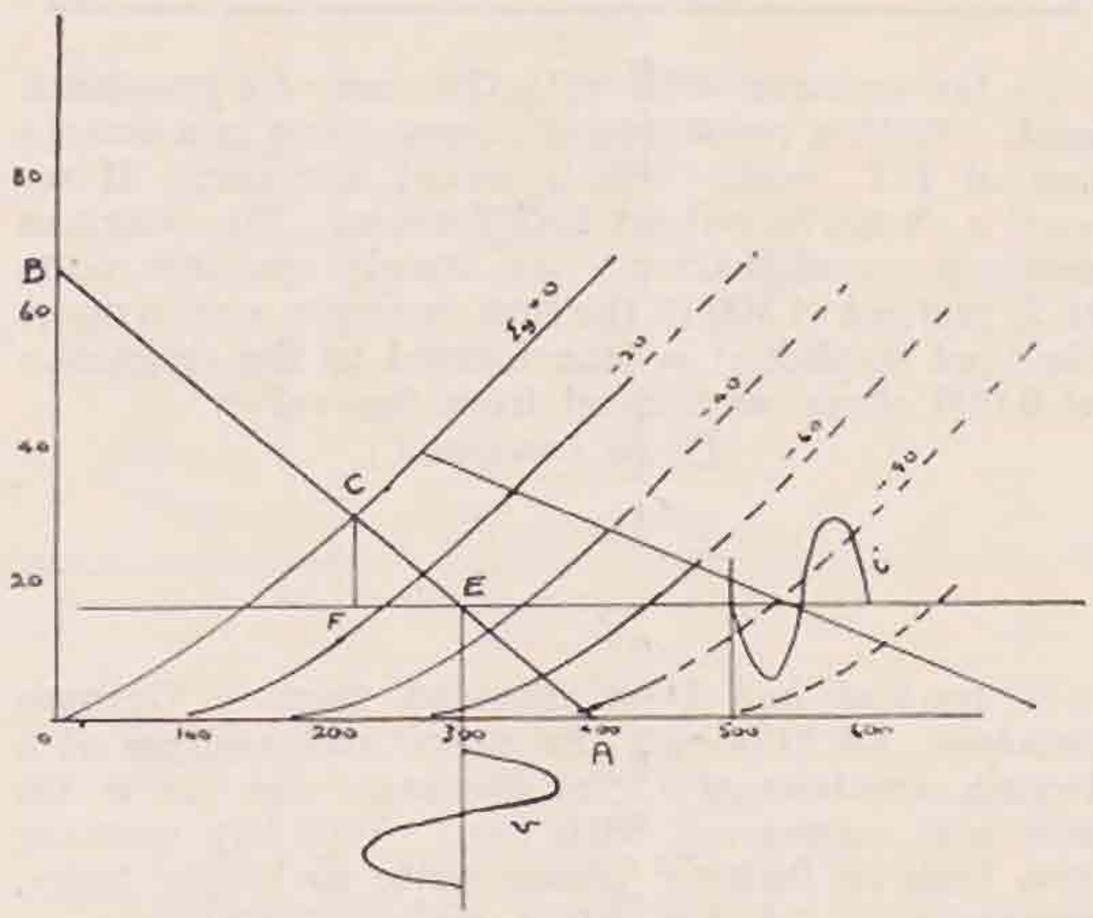


FIG 4

be zero. Plot on Fig. 4 (Fig. 2 re-drawn), the point Va=0, Ia=66. Again, if the valve were biased sufficiently negative, Ia could be reduced to zero, the effective resistance of the valve would be infinite, and Va would be 400. Plot Va=400, Ia=0. Intermediate conditions will obviously be on a line joining these two points, the line AB in Fig. 4.

This line can be said to represent the resistance of R, in the same way as the valve characteristic represents a resistance. It slopes in the opposite direction, because its excursion in a horizontal direction represents the voltage across R, and this, of course, starts from the point 400 volts and comes downwards as the current rises.

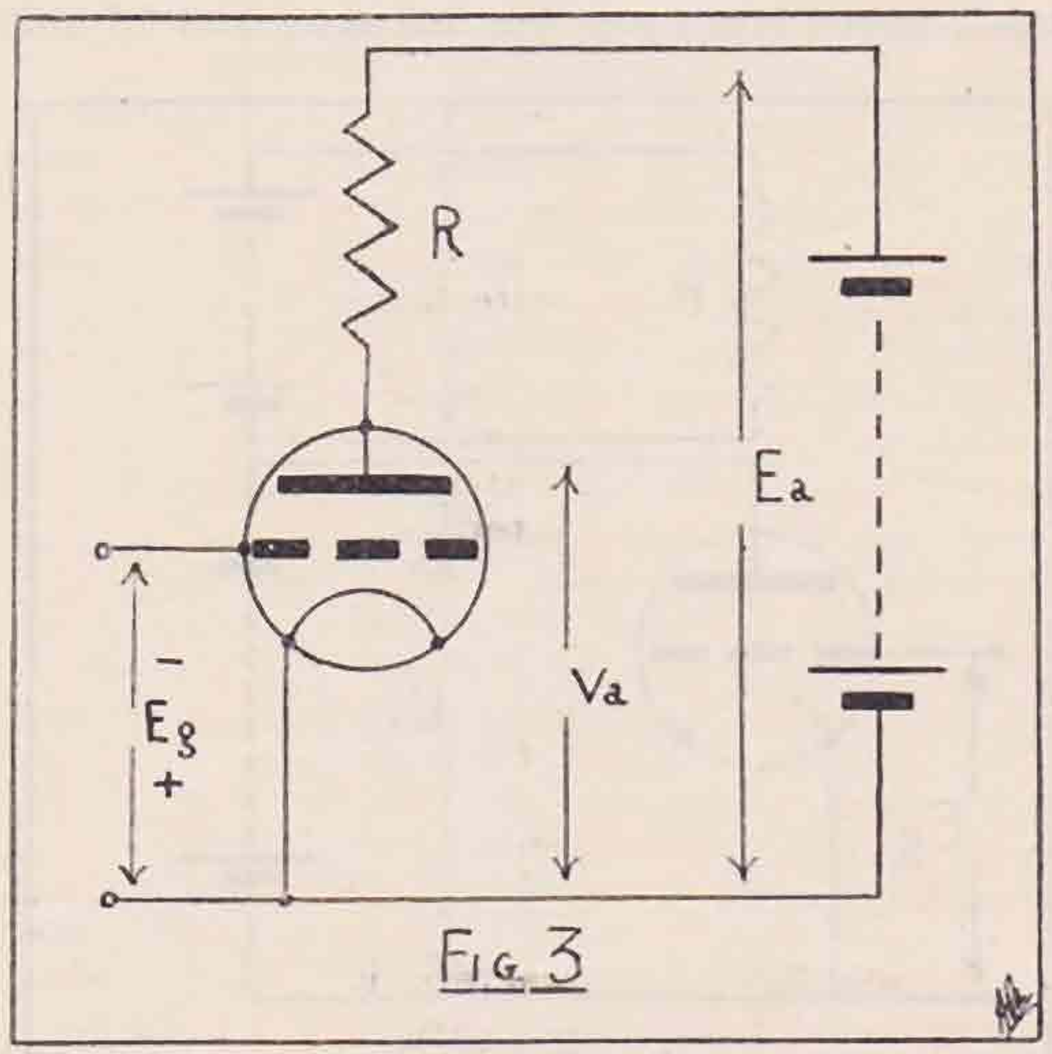


FIG 3

Now, considering the circuit we have set up, suppose we had, instead, two separate units, the valve and the resistance, each supplied with current from batteries, as in Fig. 5. If the current flowing in each circuit were 10 m/a, we see from Fig. 4 that, for the valve $E_1=100$ volts, and for the resistance $E_2=400-333=67$ volts. For a current of 20 m/a, we have $E_1=165$ volts, $E_2=125$ volts. Now, when the current is 30 m/a, we note that $E_1=220$ volts, and $E_2=180$, and $E_1+E_2=400$ volts. Under these last we could thus combine the circuit of Fig. 5, as in Fig. 6, without disturbing any of the currents or voltages, and so we could finally remove the wire C, which is now carrying two equal currents in opposite directions, or in effect no current, and we should be back to Fig. 3. Now, note that the value of current which allows us to do this is given by the intersection C of the valve curve Eg=0 and the "load line" AB, as it is called.

In the same way, the intersection of AB with Eg=—20 gives the condition of anode voltage Va=270, and Ia=21 m/a which would occur with a bias of 20 volts in the same circuit. Thus, we see that if the grid bias were to alternate between 0 and 80, the anode current would alternate between 30 m/a and about 2 m/a, and the anode voltage between 220 and about 390 volts, and we could establish the relative values at any particular instant of the cycle. We see also that the average value of one of these would establish the conditions indicated by meters which were too sluggish to record the alternations.

Using the valve as a low-frequency amplifier, we cannot travel further up AB than the point Eg=0 because the grid would become positive, grid current would flow, and so the characteristics of the input circuit would appear different over the

positive and negative halves of the cycle, with consequent distortion of the waveform which it was intended to supply to it.

For similar reasons, we cannot travel too low down the line, not lower than, say, 5 m/a, at Eg= —70, owing to the cramping of the valve curves at the lower anode currents. The bias must therefore be set half way, at —35 volts, when the steady anode conditions are 300 volts and 16 m/a.

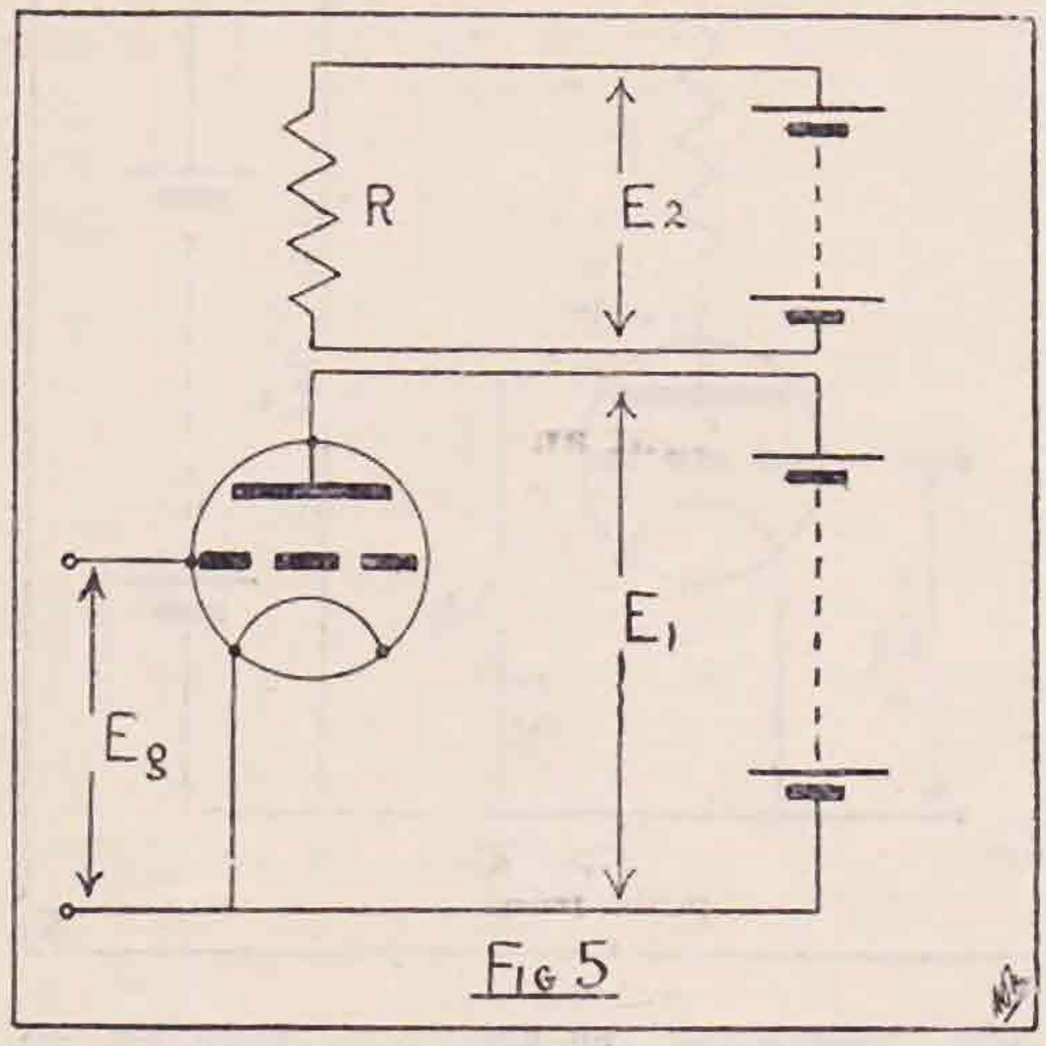


Fig 5

To determine the A.C. power developed in the load R, draw in one cycle of anode voltage alternatives, as curve v in Fig. 4. The corresponding current variation i is also shown. Even under the conditions specified, i is distorted. The A.C. power represented by a swing of EF peak volts and CF peak amps is the average of the product of current and volts over one cycle, and comes to $\frac{1}{2}\,vi$ for some waves, i.e., the product of the RMS values of v and i, $\sqrt{2}v \times \sqrt{2}i$. This is equal to $\frac{1}{2}$EF × CF, or the area of the triangle CEF, $\frac{1}{2} \times 80$ volts $\times$ 13 m/a or .52 watt. The D.C. input to the valve is 300 volts 16 m/a, the area of the rectangle E0, the efficiency being thus $.52 \div 4.8$ or 11 per cent. The D.C. input to the whole stage is 400 volts 16 m/a, or 6.4 watts, and the overall efficiency 8 per cent.

The only remaining quantity to determine is the drive, and this is seen from the curve to be the bias of the point E, 35 volts peak or 70 volts swing.

The efficiency is low. It can be improved a little by trying some more load lines, and putting up the D.C. watts, but about the best we can get is the line at 500 volts 20 m/a, with 750 volts H.T. The D.C. input to the valve is 10 watts and the A.C. output 2.2 watts, or 22 per cent. efficiency. Possibly with 600 volts on the anode the theoretical 25 per cent. might be approached more closely, but notice that we have already begun to develop over 700 volts across the pinch of the valve with the 500-volt condition. The manufacturers would not approve of this, but I am afraid that wherever one turns, it is always necessary to go higher than the allowable H.T. to get any efficiency.

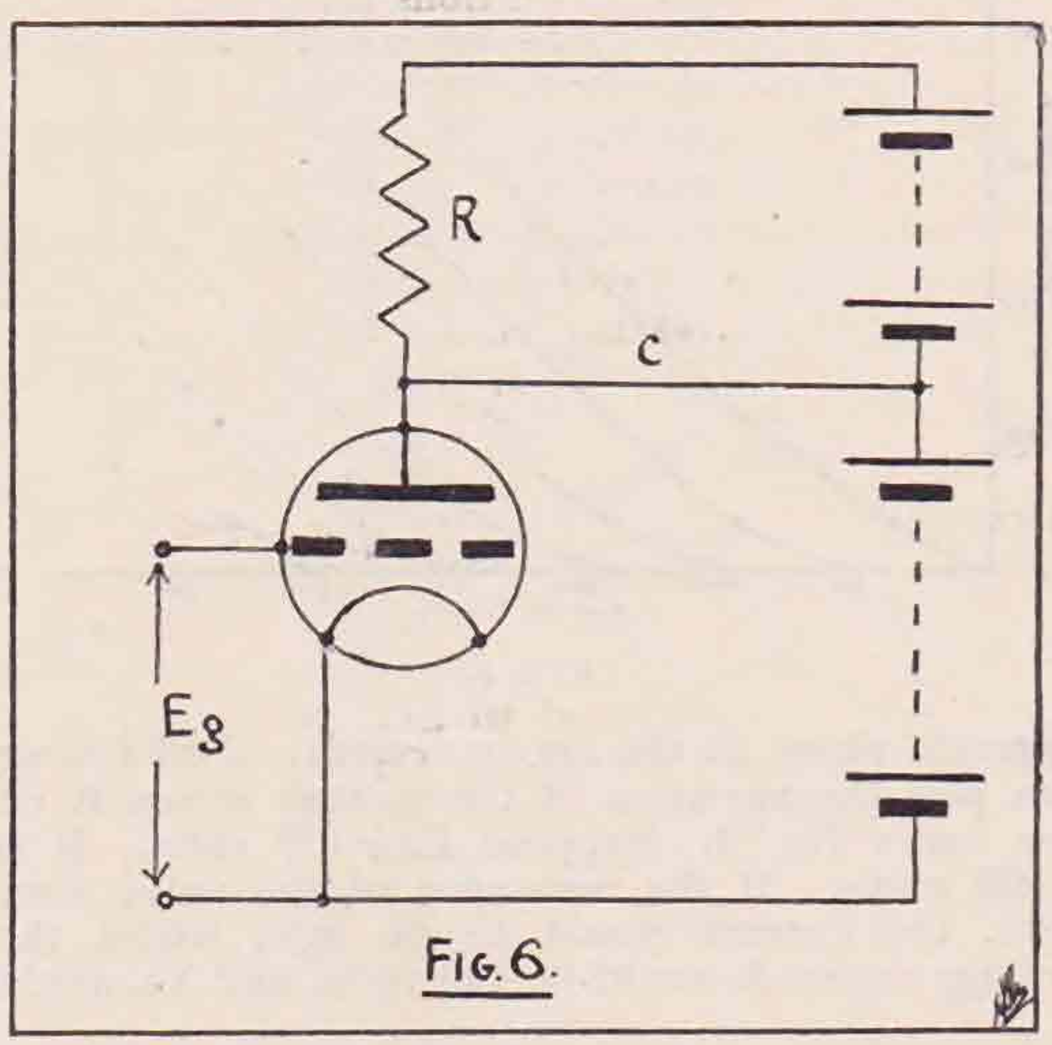


Fig. 6.

So far we have dealt with the case of a resistance load. With a resistance of course there is a certain loss of D.C. volts, which would not occur if we used a choke in output transformer. The diagram needs no modification: we simply use 300 volts H.T. instead of 400 in the first example, and arrange the load so that it is transformed to the resistance of 6,000 ohms, as viewed from the valve.

(To be continued.)

Strays.

OBSK2 (Borneo) and VW2PN (India) run a sked twice weekly and obtain 100 per cent. contain. Power is 0.8 watt and distance 3,500 miles. Congrats!

* * *

ZE1JD and ZE1JG ask for British stations to keep a look-out for them on the 14 M.C. band.

* * *

G6MB, G5VB and G5RV had a fine three-cornered fone QSO on 7 M.C. recently and would like to hear from others who would take part in a multi-way fone QSO any Sunday morning on 7 M.C. Please write G5RV.

A request has been received from a German amateur, DE1174, for the name and address of a British amateur of about the same age (he is 18) who will correspond with him. Will any member who feels so inclined please write to Heinz Jager, Elisabethstr. 2[illegible], Frankfurt (Oder), Germany.

* * *

G2ZQ informs us that F8GZ received "CQ ten DE VQ3AJ" at 00·30 G.M.T., April 18, 1931, R7 QSA5. G2ZQ will also be pleased to receive reports on his C.W. and phone on the 1.7, 7 and 14 M.C. bands. His address is 63, Hervey Road, London, S.E.3.

GET THAT "BULLETIN" FEELING AND TELL US ABOUT IT.

2 M.C. Tests, 1931.

By J. Hum (G5UM).

"LIKE 7 M.C. on a busy night," was the description given by several people to the 2 M.C. tests that were held on four Sundays in March. Indeed, not for seven or eight years has "The Old Band" been so crowded. EI7C wins the Powditch trophy (transmitting) and G6YL retains the R.S.G.B. Committee trophy (receiving). Conditions throughout the month were not what would be called excellent. Atmospherics and fading were present almost all the time, and to a larger extent than might be expected. That this was due to weather conditions may be discounted at once, for the weather prevailing during March was of a typically British mixture. Let us take each Sunday in turn :—

March 8.—Extremely cold everywhere, but fine weather in many districts. Barometer 29.8, rising slowly, with the isobars running east-west.

March 15.—Weather continues fine, but much warmer. Barometer 29.9, isobars running north-south.

March 22.—Cloudy and fairly warm weather and damp atmosphere. Barometer 29.9, rising. Centre of high pressure over Northern England.

March 29.—Cold, cloudy, and wet. Barometer 30.3, falling.

Sunspots are believed to have been present all the time to a small extent. On March 15 and 22, when visibility was favourable, G2ZN noticed a few spots on the solar disc. Concurrently, conditions on the higher frequencies are reported to have shown an extraordinary improvement. Nevertheless, it is significant that at no time during the 2 M.C. tests was DX working quite impossible. The only difficulties appeared to be atmospherics and fading—which, coupled with the good conditions on short waves and the presence of a few sunspots, may lead to certain conclusions. BRS250 says that these conditions support the sunspot theory; that the 2 M.C. band improves as the 11-year period of no spots advances, while the high frequencies deteriorate; and that occasional bursts of spots will favourably react on short waves while only affecting the longer wave band by causing more static and fading. This view, first expressed, one believes, by G2ZN and now elaborated by the independent observations of BRS250, seems a very sound one.

Such transient bouts of good conditions were not known on 2 M.C. during the period of solar activity around 1927-8. Thus, the band seems to be less susceptible to isolated periods of sunspots than to the steady 11-year cycle of activity on the sun's surface.

When conditions are good on 2 M.C. they are not necessarily bad on 7 M.C., we conclude.

Is Weather Important?

Local weather effects seem to play a very minor part on the 2 M.C. band. In fact, most participants in the tests were quite unable to trace any connection whatever between conditions and physical weather phenomena. The presence of a low cloud in stormy weather would, however, increase the static level, and possibly even cause fading—which is not an uncommon effect on most other bands. Clouds, though, are *not* the direct cause of static. Atmospherics are evident in summer and winter on evenings when there is not a cloud in the sky, and again, with similar intensity, when the sky is overcast.

Stations up to 1,000 miles distant were heard at good strength at all times of the tests, and only the aforementioned fading and static (and, of course, local interference) were troublesome.

Daylight and Darkness.

The tests have proved conclusively that long-distance daylight working is easy on 2 M.C. Signal strength drops off very considerably in daylight, and with the standard 10-watt transmitter, 100 miles is the limit for reliable working. A surprising number of distant contacts were made during the light periods of the tests, and satisfactory signal strengths obtained as well, even during the middle of the day.

At midday signals from everywhere over 100 miles distant are at their minimum strength. At 17.00 G.M.T. a slight increase was noted; immediately the sun is below the horizon all strengths jump enormously, as does static. For about an hour after sunset fading was rather bad, but signals became more and more consistent as the evening progressed. From 20.00 until 06.00 they remained very constant, and static dropped off usually after midnight. Fading, too, was negligible about 22.00 G.M.T. All these times are, of course, only applicable to March, and would have to be modified according to the time of year. In winter there is a very long period when signals are 100 per cent. copyable, while in summer this period amounts only to three or four hours.

To those many participants in the tests who stayed up from midnight to midday it was patent that enormous distances could be covered from midnight till dawn. This is the time when tests should be arranged with America if the much-longed-for 160-metre 10-watt contact with U.S.A. is to be brought about. Fading and atmospherics are at a minimum during those few hours, and signal strengths are at a maximum.

Skip and Directional Effects.

Pronounced skip effects are mentioned in many reports. During daylight stations up to 200 miles were heard at poor strength with slow fading. Their strengths increased with the approach of darkness and fading increased slightly in speed. At about midnight they fell away in strength, and stations up to 1,000 miles, who had hitherto been rather faint, improved considerably, fading now having diminished all round. Ultimately, really distant stations averaged R7 if they were using anything over 2 watts, and those up to 200 miles, on the whole, were R5.

Provided the correct hour was chosen, long-distance contacts on low power were easily effected.

Undoubtedly the best low-power contact was that of G2ZC-G6IZ, at 21.20 G.M.T. on March 22. Neither station was using more than 4½ watts. In passing, it is interesting to note that G2AP, of Wick, N.B., worked two Czechoslovakian amateurs on 5 watts on 2 M.C. in one evening. His own signals afforded an excellent example of the increase in the strength of really distant stations about midnight and he worked southern stations with ease. G6IZ, whose 2-watt signals from Aberdeen were generally R7 in the south, affords another case in point.

Turning to the question of directional wave propagation on 2 M.C., we are up against a difficult problem. Very few stations in London and the South-East of England were on the air during the tests, and those elsewhere might well assume that there was a blanketing effect Londonwards. On the other hand, the intense activity of Irish stations (noted by practically everybody) could signify that conditions were such that EI and GI signals were subject to uncontrollable directional effect.

There is good reason to believe that, apart from permanent screening effects, the only other causes that might conceivably reduce the strength from a given station would be a fog belt (either of the damp or of the soot variety—or both) or a prolonged rain-storm.

When discussing the question of directional reception, however, we should not forget that most 2 M.C. aerials have quite definite directional properties themselves, either by reason of their actual construction or because of local influences, such as adjacent telegraph wires, railway lines, trees or metalliferous hills. When rain has fallen on such screening objects attenuation of a radiated wave will often occur, though reception at the station in question may not be affected at all. This has often been noticed on 2 M..C

Operation during the Tests.

Let us now review the tests from the competition angle.

As has been indicated, EI7C wins the transmitting trophy, while G6YL retains that for receiving. Thanks to the generosity of G5AV, however, a third prize was available in the shape of a guinea cash. It was decided to present this to G6ZH, who obtained second place, being only two points behind EI7C. Comments are universal on the highly efficient operating of these two stations. It should be noted, incidentally, that EI7C was a one-man station throughout the contest: diligent readers of the BULLETIN will remember that the issue for January carried the announcement that the " J.B." half of EI7C had left Dublin to take up professional duties at Chester.

EI7C amassed 159 points and G6ZH 157 points. Third place was taken by G2QI (150 points; fourth, G6UJ (148 points); fifth, GI6YW (124 points); sixth, G6FO (121 points); seventh, G5AV (107 points); and eighth, G2IG (105 points). We will not go below the hundred mark.

It was found necessary to make a slight modification in the system of scoring; the Irish Free State was regarded as G and contacts with and from EI (outside 100 miles) counted as two points in daylight and one point at night. Had this modification not been made, the I.F.S. entrants would have had an overwhelming and unfair advantage over the rest of the British Isles. This fact, incidentally, was pointed out by EI7C himself, which was a truly sporting action. The Free State was originally regarded as " foreign " to give Western stations a chance of a " foreign " QSO. As it happened, though, no Continental amateurs entered for the tests, so this provision was actually unnecessary. Nevertheless, German, French, Danish, Swiss, and Czechoslovakian amateurs were on the band.

Certain participants who happened to work a station not in the tests asked the latter to confirm to G5UM reception of the code letters. Unfortunately, however, confirmation was not received in numerous instances, and rather than allow participants thus affected to suffer any loss of points, it was decided that only QSO's between stations possessing letter-codes should be counted, in fairness to all. There were 49 transmitting entries, but very few receiving.

By far the majority of participants possessed T9 notes, whether they used crystal control or not! One or two rough notes *did* show themselves, and a few unnecessary spacing waves were present; G2QI reports that one station had a spacer covering 10 degrees, or one-sixth of the band, on his receiver.

As far as is known, no participants used telephony for exchanging letter-codes. In response to the requests of some stations who took part in the 1930 tests phone was made permissible, but during the course of the tests the interference caused by inconsiderately operated telephony stations was enough to alienate permanently the most tolerant and long-suffering amateurs against phone. This complaint was received from every quarter of the British Isles, and is not confined to any particular area. One station used buzzer modulation, another conducted a children's hour, yet a third ground out gramophone records all day, while several others exhibited types of carrier wave and modulation that would have been regarded as antediluvian seven years ago. Such a state of affairs is quite unnecessary, as is demonstrated by the really fine transmissions put out by some stations whose phone is noted for its B.B.C.-like quality.

This is, however, not the place for pointing out that telephony is only useful if taken seriously, and when employed otherwise is a public nuisance: thus thought many of the transmitting and receiving stations during the 2 M.C. tests.

Exactly why nearly everybody was crowded at the bottom end of the frequency band was not at all plain, unless this were due to the use of crystals giving harmonics on the higher frequencies, and thus having fundamentals of round about 1,780 K.C. Two stations who were invariably at the other end of the band nearly always obtained a QSA5 report. These were G2OA, a well-known low-power man, and GI5HV, of Belfast. Both had T9 notes which, with the absence of interference on their waves, made them particularly easy to copy at a distance.

Activity during daylight was much less than during darkness. Many stations either closed down owing to B.B.C. transmissions, or turned their attentions to higher frequencies until darkness was approaching. Thus, people situated remote from amateur activity may have thought that a complete wipe-out of 2 M.C. signals occurred duringday time. Those more centrally situated, however, do not

share this view; they heard most of the stations who *were* on during daytime, but, of course, at rather bad strength.

It was a pity that more receiving stations did not enter for the tests. Possibly there was some doubt about the conditions for reception, although none of the receiving stations mention this point.

G6YL, using a O-V-1 receiver, heard practically every station on the band during the tests, and scored 196 points. Miss Dunn's log was the result of a sustained effort on each of the four Sundays. Judging by the map, her QRA at Felton, Northumberland, would appear to be rather favourable for 2 M.C. reception, though whether this is the fact one cannot say. G5VL, Cornwall, seems to have been the most consistent distant station received, followed by G6ZH, G2QI and G6FO, both in daylight and darkness. The best DX reception, apart from sundry non-participating Continental amateurs, is that of G2ZC, Jersey, 420 miles; G2ZC was heard several times, but on March 22 and 29 he was picked up shortly after 17.00 G.M.T., at R2. His low power has already been mentioned.

BRS250, of London, S.E.16, also turned in highly commendable logs each week. He scored 177 points, no small feat considering that he had never been on 2 M.C. before. He reports hearing distant stations who had difficulty in obtaining contacts, which obviously shows how important local conditions are on the band. He logged G, GI, EI, OZ, OK, HB, D, F, and several overtones of American commercial transmitters. G2AP was the best DX test-participant heard (530 miles), a O-V-2 receiver being used.

To the list of countries heard by BRS250, BRS327, of Oxfordshire, adds PA, SP and ON. He confirms the diminution in strength during daylight. Both he and 2AHK, Merthyr, report that conditions were very good, particularly on March 22.

From DE1114, a Saxony receiving station, comes an excellent and well-kept log of stations heard during March. G6ZH was heard on March 15, 22 and 29 at R4. On March 15, G6DR and G2QI were also heard, and on March 22 G2QI, G6IZ and G6FO were logged on one or more occasions. The receiver was a O-V-2. FB, DE1114!

HB9N had hoped to enter for the tests, but studies kept him busy in Germany. He got back to Switzerland in time to give several G stations their first HB contact on 2 M.C.

Conclusion.

It is very evident that for local daylight contacts and fairly distant night work 2 M.C. is the ideal band. Its reliability is particularly useful where it is desired to exchange long messages.

The scheme of allotting code letters to confirm contacts over 100 miles radius proved to be eminently satisfactory, and the tests have shown what may be expected of 2 M.C.

In conclusion, one wishes to thank all those who have helped to make the contest a success, either by entering or by offering helpful suggestions for future tests. In the latter connection, one would especially mention G5VL, GI6YW, G6PA and G2ZC. And last, but definitely not least, the assistance of G6CW (ex-BRS313) in checking up the scores and working out the results were invaluable indeed.

Book Review.

THE RADIO AMATEUR'S HANDBOOK. Seventh Edition. Published by the A.R.R.L., Inc. Obtainable from R.S.G.B. Price 4s.

I should think every amateur worthy of the name has a copy of the old blue Handbook, well thumbed and probably bearing traces of soldering paste. "Is the new one worth buying when I have the old one?" is the question which I imagine you to be asking. It certainly is worth buying; I will try to show you why in a brief summary.

It is larger, there being 216 pages instead of 201.

Chapter 2 has been beneficially altered, and now contains a map showing the different W districts.

"Fundamentals" has been augmented by a few practical calculations based on the subject-matter, and these must assist the tyro in applying the theory to his own problems.

Chapter 4 has been much altered and brought up to date.

The chapter on receivers is improved; and A.C. receiver and a super-het converter are fully described.

Chapter 6 is now "Frequency Meters and Monitors," and constructional details are given for a Dynatron frequency meter.

The single-control, low-power transmitter is added to "Transmitters," and the section devoted to crystal control is enlarged and modernised. The data, published some time ago in "QST," on H.F. chokes is included.

Radio-telephony gets a chapter to itself, and the introductory remarks on modulation should be widely read in Europe.

Modulator "tube" calculations, a modulometer, and practical operating hints are the outstanding features.

Some new material on electrolytic rectifiers, details of electrolytic condensers, and a short note on voltage doubling, have been added to the chapter on "Power Supply."

"Keying and Interference Elimination" is a special chapter and a welcome one. The methods of key-click and wipe-out elimination may bring light to many who now see as through a glass darkly.

"Antennas" is much augmented. A two-wire matched-impedance system, methods of coupling transmission lines to transmitters, and the single-wire feed system enhance the value of this chapter.

The Appendix alone is worth the cost of the book. I see the five-figure logarithms were unappreciated, and we are now advised to work with a globe and a piece of string! (Hush! We did so, anyway!) Additions have been made here also, the most notable of which is the "nearest British SWG number" column in the wire table. This is very helpful. I can think of only one ham abbreviation which has been left out of the list, viz "YPH" (meaning—as pronounced).

Yes, the new Handbook is well worth buying. Why not give the blue one to someone who is just beginning to show the symptoms?

T. P. A.

Some Wireless Experiences in Nigeria.

By Capt. Wilmot (FN2C).

AS Nigeria is very little known to radio amateurs at home, it is thought that the following notes on transmission and reception work which have been carried out by station FN2C during December, January and part of February, 1931, may be of interest. As far as can be ascertained, this is the only amateur transmitting station working in the country at present, though it is believed that there is one other licence holder.

A great deterrent to the progress of amateur wireless out here is the fact that the European population is always changing, the normal "tour" being only 18 months, on account of the climate. Also a large percentage are usually moving about, being only a few months in one place.

First of all, a word about the situation from which the work has been carried out. The actual site is out in the "bush," South East of Kaduna in Northern Nigeria (about 10° N. and 8° E) where the writer has been since the beginning of December.

The station is situated on an open plateau about 2,300 feet above sea level, with not a tree within half a mile. The mas s are two 40-ft. portable Laker steel masts. These were chosen because each weighs just 56 lbs., which is one "carrier" load out here.

The "shack," which is also the operator's temporary home, is a grass walled and grass roofed shelter with the top half of the walls removed in one corner to allow the aerials to come straight in. There are two aerials, one 30 ft. long and almost vertical, for the receiver (it was found that a longer one only increased QRM), the other an A.O.G. (full wave on 14 M.C.) inverted L in shape and pointing due west for the transmitter.

Both transmitter and receiver stand on tables made of sticks over which mud had been spread to make the tops level.

A short description of the transmitter and receiver may be of interest. The circuit of the transmitter is the tuned plate tuned grid, and the only difference from normal construction is that the coils instead of being fixed on insulators rest on cradles formed by ebonite rods which are in turn mounted on insulators. This method makes it very easy and quick to change coils from one wave to another. It has also been found that it is unnecessary to use ribs or formers to make the larger coils rigid. The grid and plate coils are well spaced, being about 20 ins. apart. Keying is in the negative H.T. lead.

The receiver was built in England before the writer left there, and consists of untuned S.G. H.F.-S.G. detector and 2 L.F. (one R.C. one transformer coupled).

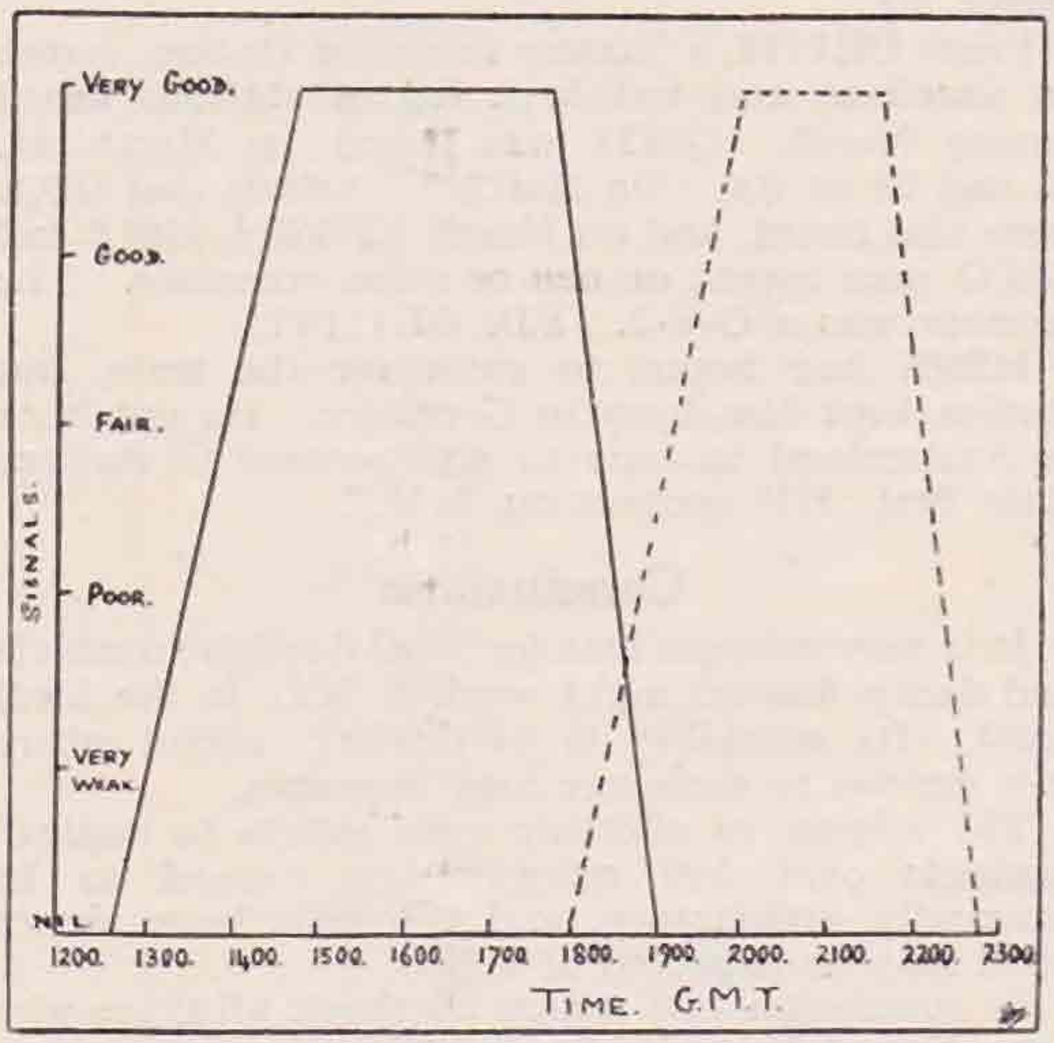
The second L.F. stage is only used for loudspeaker S/W broadcast reception, and is switched off when not in use.

The set is tuned by a .00015 Cyldon condenser with a very small condenser consisting of one fixed and one moving plate of a stripped midget .00005 condenser. Rotating the dial of this condenser from 0-180° only covers half the wave band on the 14 M.C. band. The coils are of the type used in the R.S.G.B.3, and so wound that the amateur bands come in with the main tuning condenser set at about 10°.

Practically all work has been confined to the 14 M.C. band, the QRN on the 7 M.C. band being usually too bad except between the hours of 08.00 and 14.00 G.M.T. No stations have ever been heard on 7 M.C. between these hours, though a daily schedule has been worked for the last month at 11.00 G.M.T. with a receiving station in the country about 500 miles away, using an input of 3 watts.

On 14 M.C. both listening and transmission were carried out on 44 days in the last two months, averaging about one hour's work a day. The time of work was altered from day to day, notes of results being made, and practically the whole period of 24 hours was covered. Conditions on the whole have not been good, the band only seeming to be crowded on one or two occasions.

One interesting fact is that no Indian or Australian amateurs have been heard, only two stations east of here having been logged. They are ST2D and VQ4CRE and were both worked. Broadcast programmes from 7LO Nairobi, which is east of here, come in at full loud-speaker strength, and VK2ME has also been heard.



The graph which is shown is made from the average of the observations taken, the variations actually from day to day being very little. The graph gives a good idea of the best hours for work. Except for the two definite periods shown, the band is usually dead for the rest of the day. It is dark here about 18.00 G.M.T., and sunset does not vary

more than half an hour during the whole year. From the observations, it seems that the best conditions for the distances worked, i.e., 3,000 to 6,000 miles, are when the sun is fairly low at both stations or when one station is in darkness and the other light.

The arrival of the first signals and the commencement of the fade out are always accompanied by sudden and very bad fading, signals often completely disappearing for about 10 seconds. This period seems to last about 20 minutes only.

As regards transmission, power has been very restricted. A start was made with 45 watts to a DETISW from a rotary transformer run by a car battery. However, the local-made charging apparatus broke down after the first day, so it became necessary to economise. Batteries to be charged had now to be sent 85 miles, part by road, part by rail, and it was estimated that it would take two weeks to send a battery in and get it back again. The DETISW was replaced by an LS5, and the power dropped to 10 watts from H.T. batteries, one being the 150-volt one used for the receiver and the other a spare, giving a total H.T. of 300. Power was quickly reduced to 5 watts to economise H.T., as the batteries were only 20 milliamperes consumption type. The 6-volt accumulator now ran down, and the one remaining 2-volt accumulator was called on to work both transmitter and receiver, the valve in the transmitter being now a Tungsram SP230, and the input 1.8 watts. During all this period contacts were being obtained, though work was restricted to maintaining a schedule with F8SWA while power was only 1.8 watts. He reported signals R2/R3. Luckily, this period only lasted three days, as four dry cells arrived. Three of these were used to light the filament of a Tungsram P430 valve for the transmitter, and the power was raised to 3 watts. The remaining cell was used for the receiver, which was found to work very well with 1½ volts L.T.

In the 44 days' work, 78 contacts were effected on 14 M.C. as follows :—With 45 watts, 3 contacts ; with 10 watts, 35 contacts ; with 5 watts, 15 contacts ; with 1.8 to 3 watts, 25 contacts.

As far as can be ascertained, the nearest amateur station to here is ON4CAA (Belgian Congo) about 1,000 miles away. He is the nearest one heard and worked on 14 M.C. Of the 78 contacts, 70 were 3,000 miles over. Of the countries heard, all except CX have been worked. They are : England, Northern Ireland, France, Belgium, Portugal, Yugoslavia, Sudan, Kenya, S. Rhodesia, S. Africa, Belgian Congo, U.S.A. (1, 2, 8 and 9 districts), Brazil, Argentine, Chile.

The writer hopes to return to his permanent station shortly, when power will be raised to 45 watts and further tests carried out.

As regards broadcast reception on the short waves, G5SW comes in at moderate loud-speaker strength with the lunch-time programme, and is usually very good from 7 to 8 p.m. G.M.T., after which he often fades right out. Rome on 25 metres, Leeson, PCJ and W2XAF are all usually very good on the loud-speaker, though atmospherics are bad on the last three at times. W8XK on 25.25 metres comes through quite well. Nairobi and the new Vatican station on 48 metres are very strong, but static is usually very bad. W9XF Chicago on 49 metres is usually at full loud-speaker strength between 5 a.m. and 7 a.m. (6 to 8 a.m. here.).

As a final word, FN2C would be very pleased to fix up schedules with anyone keen on getting in touch with this country, if they will write to him c/o R.S.G.B.

No. 2 District Conventionette at Hull.

Opening remarks were made by the DR (G6OO), who welcomed the 19 members and one non-member present at the meeting and congratulated Mr. Bevan Swift, our new President, and thanked the Secretary (G6CL) and the Editor (G5YK) for the fine work they had done for the Society.

1. *Splitting of the District.*—G5TQ complained of the lack of support given to his meetings in the Leeds area and also stated that G6LF (Sheffield sub-manager) was having the same trouble. G5TQ said he was prepared to carry on as sub-manager, and as representative, should the district be split up. BRS428 moved that "Yorkshire be divided into three or more districts with a manager for each." This was seconded by G2PK. The motion was carried unanimously. (This matter is being discussed by Council J.C.)

2. *The 3.5 M.C. Band.*—The DR fully explained the 3.5 M.C. position.

3. *Subscriptions.*—G6OO requested all members to pay their subscriptions early and not to wait for letters, requesting payment, from H.Q.

4. *No. 2 DR.*—G6OO explained the trouble he had been having and stated that he was willing to carry on as DR.

5. *Future Meeting.*—G6UJ proposed that the next meeting for East Yorks members should be held at Hull in October next. G6OO proposed October 17 for the above.

6. *Letter Budget.*—The DR explained that he was not receiving much support for the L.B., and that some members were keeping the budget too long and not passing it along. After discussion, BRS428 proposed "That the Letter Budget be scrapped in favour of regular local meetings."

Other Business.

G2WS asked that early notice be given regarding future meetings.

G6UJ said that H.Q. should consult the DR's with reference to the splitting up of the districts.

G6OO read a letter received from G5QY (Northumberland and Durham sub-manager) giving details of progress in that area.

G5QT proposed that G6OO should carry on as the DR.

G2VQ (attending as representative of H.Q.) gave some interesting remarks on old-time working, the work at H.Q., running of the QSL Section, BERU and BERW, ELS and their work, the BULLETIN and membership. He asked that all transmitting members should help the BRS men as much as possible. He also requested suggestions regarding BERW, but none were forthcoming.

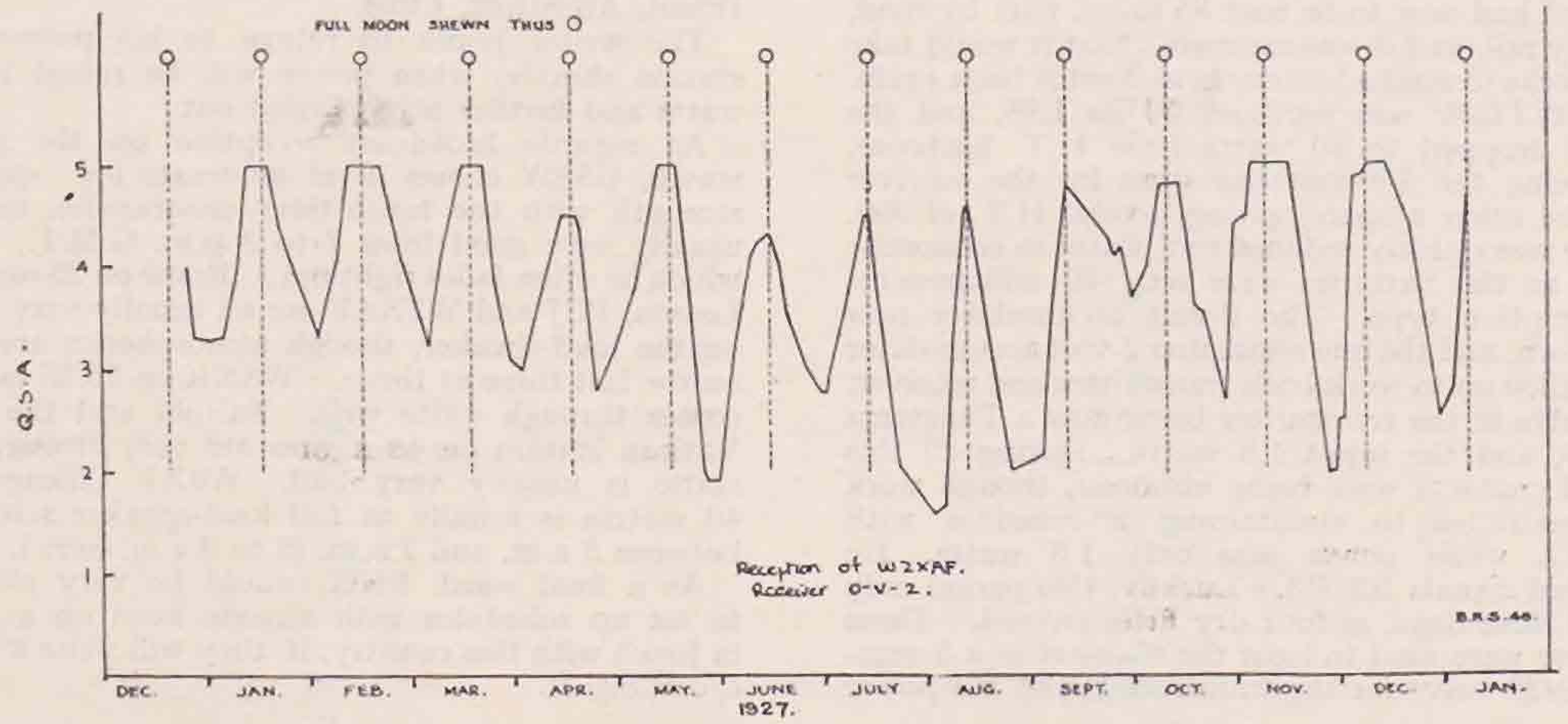
In closing the meeting the DR thanked all the members present for putting in an appearance and also G2VQ for attending in his official capacity and for the talk he gave. T. W.

Lunar Effects on Short Waves.

By BRS46.

The accompanying graph may be of interest to those whose experimental work involves the collection of reception data. During 1925 and 1926 the writer noticed that certain weather conditions, in conjunction with the phases of the moon, had a large bearing on the reception of short waves. Since January, 1927, a rough record has been kept of these conditions at each time of reception. In all cases, notwithstanding climatic or barometric conditions, reception was found to be better near the period of full moon. It should be mentioned that the graph has been plotted on reception from W2XAF, the wavelength being about 31 to 32 metres during the period under review. Similar results were obtained on the amateur 45 metre band.

Although since 1927 reception conditions have been getting worse, it has been observed that the best results have been round about the period of full moon.



The First QSL Card?

We reproduce below a facsimile of a QSL card that was issued from station G2UV in 1922, and is

With the Compliments
of
2. U. V.
IN ACKNOWLEDGEMENT OF.
AN EXCHANGE OF
SIGNALS
W. E. F. CORSHAM.
104, HARLESDEN GARDENS.
HARLESDEN. N.W. 10. *Date* 1922.

believed to be one of the first, if not the first, ever issued from a station in Europe. The card shown is a very embryonic form of QSL and does not bear much resemblance to its modern counterpart. We shudder, however, at the thought of G2UV's fate when our QSL manager finds out who was the original perpetrator of the QSL card habit!

Mr. Corsham, of G2UV, is one of the all-too-few "old timers" still active, and we are proud to think that we still have him as a member of the Society with which he had so much to do in its early years; in fact, Mr. Corsham was one of the four members forming the first committee of the T. & R. Section of R.S.G.B. in 1923, so that his connection with the Society is a very long-standing one.

G2UV has a splendid record of achievement, and, although we have discontinued the publishing of records of first contacts between England and other countries, we feel that the following will be of interest to every reader of the BULLETIN, particularly those who remember those pioneer days themselves.

Here is the list, and a very creditable one, too :—
1922, April 9 : London—Scotland with G2JZ.
1924, April 6 : England—Holland with PCTT.
1924, April 14 : England—Switzerland with SXY.
1924, April 16 : England—Italy with ACD.

1924, May 1 : England—Denmark with 7EC.
1925, January 2 : England—Sweden with SMZZ.
1925, June 12 : England—Jugo-Slavia with 7XX.
1925, June 13 : England—Ireland with 7AR.
1925, June 14 : England—Germany with K4EA.
1927, October 4 : England—Finland with 2NCA.

Those who have copies of *Wireless World* going back to 1922 will find a very interesting account of the first London—Scotland contact mentioned above on pages 551-553 of the number issued on July 29, 1922.

Strays.

SU1AQ states that the call SU8RS has not been used since Mr. Runeckles left Egypt on February 2, and any station now heard using the call SU8RS is presumed to be a pirate.

2AHD and BRS496 will be pleased to welcome any ham visiting Jersey, C.I., during the coming summer. Drop a line to 45, Colomberie, Jersey, C.I.

* * *

2AMV, 9, East Shrubbery, Redland, Bristol, will be pleased to stand-by for tests from any station on 1.7, 7 and 14 M.C. bands.

* * *

If any member hears dance music being transmitted on 7.85 metres between 23.00 and 01.00 G.M.T. will he please report it to the Editor, who will forward it to somebody in touch with the station concerned ? The transmissions emanate from outside England.

Apparatus Worth Buying.

The "Wufa" Loud-Speaker.

The "Wufa" unit is an extremely interesting one from an experimenter's point of view. Six different resistances can be obtained, from 250 ohms to 3,000 ohms, to match the output circuit of the amplifier. The air-gap between the pole-pieces and armature is adjusted by means of a cam and lever mechanism which expands or contracts the magnet poles, while the armature remains stationary. The cams are of generous proportions, and this method makes exact adjustment very simple. The cone is made of special paper and is 15in. in diameter. It is suspended in the chassis with thin leather, and the whole unit can be fitted to a baffle-board by four screws. The unit was tested aurally under ordinary working conditions, with both triode and pentode as output valves alternatively. Impedances were matched in each case, and very pleasing results were obtained. The price of the unit complete with chassis, and ready for fitting to baffle-board, is 40s., or without chassis, 27s. 6d.

* * *

The Mullard Wireless Service Co., Ltd., announce improvements in the characteristics of two of their power valves, the P.M.252 and the P.M.254. The general characteristics of both these valves are known to everybody, and in both cases the mutual conductance has been considerably increased. The P.M.252 now has an anode impedance of 1,900 ohms and an amplification factor of 7 ; this gives a mutual conductance of 3.7 mA/v., as compared with 2.1 in the older types. The corresponding figures for the P.M.254 are 2,150 ohms, 6.5 (amplification) and 3 (as against 2.1) mA/v.

New Members.

APRIL, 1931.

CORPORATES—GREAT BRITAIN.

DR. W. H. MARSTON (G2PD), 691, Coventry Road, Birmingham.
J. A. YEATS (G2YA), 68, Bonaccord Street, Aberdeen.
T. W. BROWN (G5DI), 253, Helmsley Road, Newcastle-on-Tyne.
C. WRIGLEY (G5WR), 68, Church Road, Urmston, Manchester.
H. BRABROOK (G6BB), 31, Court Lane, Dulwich, S.E.21.
N. E. READ (G6US), Dene Well, Middle Drive, Ponteland, Newcastle-on Tyne.
R. E. GRIFFIN (2AMC), 7, Davis Buildings, West Street, Bedminster, Bristol.
F. KEEN (2ATR), 26, Pall Mall, Leigh-on-Sea, Essex.
J. N. WALKER (2BCX), 414, Fishponds Road, Eastville, Bristol.
E. R. S. BATES (BRS527), 95, Upper Tulse Hill, S.W.2.
W. LAMBERT (BRS528), A.F.V. Signals, Tidworth, Hants.
G. Q. EVISON (BRS529), 35, Roxborough Park, Harrow-on-the-Hill, Mdx.
G. L. GRISDALE (BRS530), 39, Ranelagh Gardens, Ilford, Essex.
W. W. PATERSON (BRS531), Overlea House, Clarkston, Renfrewshire.
G. E. S. HOLT (BRS532), 7, Montem Road, New Malden, Surrey.
F. C. NYE (BRS533), 23, Sedlescombe Road, St. Leonards-on-Sea.
G. W. WEST (BRS534), Park Cottage, East Lockinge, Wantage, Berks.
J. C. IMRIE (BRS535), 8, Balgonie Place, Markinch, Fife.
G. P. ANDERSON (BRS536), 24, Mill Way, Mill Hill, N.W.7.
J. J. A. ALLNUTT (BRS537), 193, Brixton Road, S.W.9.
W. REEVE (BRS538), 137, Humberston Lane, Thurmaston, nr. Leicester.
R. K. SHEARGOLD (BRS539), "Glenmore," Manygate Lane, Shepperton, Mdx.
G. A. WISDOM (BRS540), 12, Kingsborough Gardens, Glasgow.

CORPORATES—COLONIAL.

W. SCHNEEBERGER (HB9G), Fleurettes 20, Lausanne, Switzerland.
J. F. MACKEL (VK2HG), "Alster," Devonshire Street, Chatswood, N.S.W.
R. R. CHILTON (VK2RC), Chilton Avenue, Wahroonga, N.S.W.
P. J. O'BRIEN (VS6AE), 7, Homantin Street, Kowloon, Hong Kong.
A. N. BRAUDE (VS6AL), Hong Kong Telephone Co., Hong Kong.
G. H. TODD (VS7GT), c/o. Director of Public Works, Colombo, Ceylon.
C. H. BURCHETT (YI2DC), Aircraft Depot, R.A.F., Hinaidi, Iraq.
D. L. MARTIN (YI2DC), "C" Aircraft Depot Squadron, Hinaidi, Iraq.
J. T. S. DICKINSON (ZE1JD), Post Office, Plumtree, S. Rhodesia.
J. B. ELLIOTT (ZL3CC), 25, Frankleigh Street, Spreyden, Christchurch, N.Z.
J. P. MALAN (ZS2N), Lombard Street, Sterkstroom, S.A.
T. EVANS (VK2NS), 193, Rocket Street, Bathurst, N.S.W.
C. R. W. LONG (BERS60), "Edgecliffe," Cliff Road, Frankston, Victoria.

Empire B.E.R.U. News.

B.E.R.U. Representatives.

Australia.—H. R. Carter (VK2HC), Yarraman North, Quirindi, N.S.W.

Canada.—C. J. Dawes (VE2BB), Main Street, St. Anne de Bellevue, Quebec.

Ceylon and South India.—G. H. Jolliffe (VS7GJ), Frocester Estate, Govinna, Ceylon.

Egypt and Sudan.—H. Mohrstadt (SU1AQ), No. 1 Co. Egypt Signals, Polygon, Cairo.

Hong Kong.—P. J. O'Brien (VS6AE), 12, Kent Road, Kowloon Tong, Hongkong.

Iraq.—H. W. Hamblin (YI6HT), Wireless Section, R.A.F., Shaibah, Basra, Iraq.

Irish Free State.—Col. M. J. C. Dennis (EI2B), Fortgranite, Baltinglass, Co. Wicklow.

Kenya, Uganda and Tanganyika.—G. F. K. Ball (VQ4MSB), The Radio Station, Mombasa, Kenya Colony.

Malaya.—G. W. Sa lt (VS2AF), Glenmarie Estate Batu Tiga, Selanagor, Malay States.

Newfoundland.—Rev. W. P. Stoyles (VO8MC), Mount Cashel Home, St. John's East.

New Zealand.—D. W. Buchanan (ZL3AR), 74, Willis Street, Ashburton; and C. W. Parton (ZL3CP), 69, Hackthorne Road, Cashmere Hills, Christchurch.

Nigeria.—Capt. G. C. Wilmot (FN2C), 1st Battalion Nigeria Regiment, Zaria, Nigeria.

South Africa.—W. H. Heathcote (ZT6X), 3, North Avenue, Bezuidenhout Valley, Johannesburg.

South Rhodesia.—S. Emptage (ZE1JG), Salcombe, Plumtree, Southern Rhodesia.

"The B.E.R.U. Trophy."

We have much pleasure in presenting a full list of contributors to the B.E.R.U. Trophy, and accordingly thank all who responded to the invitation. The full total subscribed amounted to £22 1s. 6d. :—

H. M. Swann, The "Stacs," E. T. Somerset, M. W. Pilpel, J. Lees, F. W. Miles, V. M. Desmond, Miss B. M. Dunn, D. B. Fry, Col. M. C. Dennis, D. H. Johnson, Capt. G. C. Price, C. J. Watts, J. C. Watts, E. F. Baker, J. Noden, F. E. Grainger, J. C. Runge, L. E. G. Grosvenor, R. Barr, S. Townsend, A. Watson, J. Deheer, T. Woodcock, J. D. Chisholm, J. Wyllie, Bryan Groom, C. Morton, T. P. Allen, W. H. Martin, W. S. Davison, J. Montgomery, H. B. Old, H. V. Wilkins, L. N. Wilkins, J. J. Curnow, H. A. Savage, G. W. Thomas, F. Charman, D. Wilkes, P. E. A. Griffiths, G. Edwards, D. N. Corfield, H. A. M. Whyte, A. O. Milne, C. A. Webb, A. D. Gay, J. B. Kershaw, W. H. Andrews, K. H. Randall, S. Buckingham, A. C. Wilberforce, R. L. Royle, F. Adams, Miss A. J. Burns, L. R. Harper, J. S. Dykes, A. H. Mason, S. W. Rowden, J. W. Kyle, J. B. Sturrock, J. Oxley, G. M. Thomson, G. O. Kollien, J. T. Robertson, R. Millar, T. Scott, L. Liddell, D. McInnes, R. J. Jeffrey, A. T. Wilson, R. H. Kidd, A. Hargreaves, S. W. Cutler, S. C. Godden, Lieut.-Col. W. S. Palmer, R. C. Neale, A. E. Watts, A. W. Alliston, W. J. Kempton, F. A. Durrant, L. J. Fuller, J. W. Mathews, J. E. Johnson, L. Waddington, T. A. St. Johnston, H. J. Ahier, E. A. Bellamy, W. Lucas, A. E. Livesey, J. A. Sang, T. Craig, W. C. Haddick, C. B. Cleeland, W. Harvey, J. E. Fynn, R. Jardine, R. A. Fereday, H. Seagood, F. H. Walters, R. F. Bartlett, Norman H. L. Platt, T. R. Clarkson (ZL1FQ), H. Harding, District 14 Members, P. J. A. Hankey, C. I. Orr-Ewing, Dr. J. R. W. Talbot.

AUSTRALIA.

By VK2HC, via ZL3AR and G2VQ.

Results on the 28 M.C. band this year are not equal to last season, and practically no DX is being heard at all, although VK2XN reports hearing two VK6 stations QSO on 28 M.C.

The old 3.5 M.C. band is quite active—good local and ZL contacts are plentiful, and several W and K6 G.W. and fone stations have been heard. The W.I.A. frequency sub-standards are nearing completion under the direction of VK3BQ.

The R.A.A.F. wireless reserve has been particularly active this month. N.S.W. have a new guard station in VK2DY.

Some of the broadcasting stations have allowed the W.I.A. a short time each week for information to members.

BRITISH ARABIA.

P. Seymour, BERS25, C. Flight, No. 8 (B) Squadron., Khomaksat, Aden.

Reception conditions here during March have been, on the whole, much better than during the previous month. A great number of G's and W's have been heard usually at good strength, but, unfortunately, there has also been a proportional increase in the amount of QRM and QRN, the latter sometimes reaching R5. Star stations consistently received here during the month were G6VP, G6NF, G6RB, G6QB, G2BY. May I, as a new member, pay tribute to the excellence of G sigs. as compared with most other countries?

CANADA.

By VE2BB.

We are glad to report much better DX conditions—in fact, almost like old times. All countries are worked repeatedly on 14 M.C. and VK and ZL stations are good after 1.30 a.m. on the 7 M.C. band. No further reports have been received as to DX on 3.5 and 28 M.C.

HONG KONG.

By VS6AE.

During January 7 M.C. improved considerably, and signals from all continents, with the exception of South America were heard and worked consistently. The prevailing conditions afforded first two-way contact with Italy, Switzerland, Germany, Spain and France, and is regarded as quite a record.

The same conditions prevailed during February, but, unfortunately, fading set in, and towards the end it became apparent that B.E.R.W. would not be blessed with these ideal conditions. It turned out as expected, and 14 M.C., which has been silent for many months, was given a successful try-out, but signals were spasmodic. VS6AL and VS6AE were the only two contestants for Hong Kong, and feel they have done well with the odds against them. VS6AH was unfortunately taken ill, and was, therefore, unable to participate.

14 M.C. is improving, and on March 10 contact with W1 and W8 was made by VS6AH, being two more first contacts for Hong Kong.

[Congratulations to VS6AH, who, we hear, has just worked VE and so gets the first WBE for Hong Kong.—Ed.]

INDIA AND CEYLON.

By VS7GJ.

Ceylon members have apparently ceased to send in reports, so am only able to give my results, which are confined to a few nights' working only. Both on the 7 and 14 M.C. bands conditions have improved this month, but atmospherics have been very bad on the higher wave-length.

Mr. Shepherd Nicholson, S. India, reports that conditions have been steadily improving, with a marked improvement at the new moon on March 19. He is still awaiting allotment of his call sign.

From Northern India BERS14 and BERS52 both report a marked improvement in signals during this month. It was unfortunate that BERS14 could not compete in the B.E.R.U. week, as his list of calls heard justify a good run for his money.

IRAQ.

By YI6HT.

The season of heat, flies, electric fans and QRN is with us again, and DX has vanished in a cloud of crackles and bangs, except on 28 M.C., which sounds more lively than at any time since the March tests of last year. No ham signals have been heard, but harmonics of SUZ, PLL, JNA, and the English end of the transatlantic fone have been heard at various strengths between R4 and R7. A thrice weekly sked with VU2FX still proves a washout.

The following stations are active: YI2GM, YI2FU, YI6RK, YI2DC, YI6HT, and YI1CI.

I shall be glad if anyone can let me have the QRA of YI1HF.

IRISH FREE STATE.

By EI2B.

With the continued general improvement in conditions on all bands, there has been a marked increase in activity amongst EI stations.

Conditions on 14 M.C. are excellent at present, although cases of sudden fade-out have been frequently noted at the writer's station. The first contact between EI and KA has been effected by EI8B. Several J stations have also been logged and VK's come in well in the afternoons. On 7 M.C., whilst conditions remain good, DX contacts for QRP stations are largely a matter of luck in getting through the appalling QRM. On 3.5 M.C. conditions are also fairly good, but the best contact effected is only Eastern Russia. On 2 M.C. conditions continue excellent, and quite a number of European stations have been logged at good strength. We await with interest the results of the R.S.G.B. tests on this band as one of our stations has a record which we anticipate will take some beating.

I am glad to be able to report a notable increase in the prospective membership of R.S.G.B. amongst EI stations.

KENYA, UGANDA AND TANGANYIKA.

By VQ4MSB via G2GM.

It is with very great regret that I have to record that VQ5NTA is QRT for good, and leaves for England this month. During Empire Week VQ5NTA worked three stations, VQ3MSN eight, and VQ4CRF 19. Both VQ4CRF and VQ5NTA report that QRN was bad during Empire Week, but VQ3MSN reports that conditions were fairly good. VQ5NTA, although contacting three stations, had only 2 watts to do it with—FB, OM. He reports that 14 M.C. seemed ever so much better during February. The following stations are active in the area : VQ3MSN, VQ4CRE, VQ4CRF, VQ4KTA, VQ4MSB, VQ5NTA.

NEW ZEALAND.

By ZL3CP via ZL3AR and G2VQ.

B.E.R.W. was a wash-out here, and only ZL4AI and ZL3CP sent in logs. ZL4AI sent in a fair score, but ZL3CP using QRP on 7 M.C., could only work VK. ; no other parts were heard on that band.

Conditions on 7 M.C. are good for DX at present, and on 3.5 M.C. things are certainly becoming lively, and Europeans are occasionally heard. We hope for QSO's soon.

QSO's with W on this band are getting quite common. ZL3BN and ZL3CK, with quite low powers have worked some good W DX. 28 M.C. seems to be dead.

Membership of N.Z.A.R.T. is going ahead in leaps and bounds, and "Break-in" is getting bigger and better. We are fortunate in having a live HQ trio in ZL2GP, ZL2BC, and ZL2DG.

SOUTH RHODESIA.

By ZE1JG (ex VP9SR).

The present DX season has not proved the success it was in 1929-30, although it promised well ; there was a general falling off until about the middle of February, when things were at their lowest here. Then a gradual improvement until there has not been a dud night for more than three weeks. During this latter period more stations have been worked than during the whole of October-February. The following stations are active: ZE1JB, ZE1JF, ZE1JG, ZE1JI, and ZE1JD.

SOUTH AFRICA.

By ZU1D.

The Annual Conference of the S.A.R.R.L. took place in Cape Town on April 4, and the result of the deliberations is evident in the increased interest and enthusiasm. The Governor-General, the Earl of Clarendon, late Chairman of the B.B.C., is President of S.A.R.R.L. for the ensuing year, and His Excellency opened the conference with a very inspiring address, which was successfully relayed on 7 M.C. by ZS1P. Matters of constitution were discussed, and a more workable scheme was put forward to enable headquarters and the annual

conference to be more definitely representative of the league.

The fone question was left open again until next year, but it was hoped that the real ham spirit would prove effective in avoiding unnecessary QRM.

Mr. Cook (ZU1J, ex G6UO) gave an excellent paper on Hertz radiators to the conference, but we regret to hear that he is leaving us for Japan.

EMPIRE CALLS HEARD.

Calls Heard Lists will, in future, contain only British Empire calls (including Great Britain) and those of British ships at sea and British Expeditions.

By VK2HC since April 5, 1930:—7 M.C.: vu2kh, zs4m, zt5r, zt5z. 14 M.C.: g2cx, g2lz, g2tl, g2vq, g5ml, g5vm, g5yg, g5yk, g6nf, g6qb, g6rb, g6vp, g6wt, g6wy, st2c, st6hl, su1aq, su8rs, vq2ba, vq4crf, vs6ae, vs6ag, vs6ah, vs7ai, vs7ap, vu2ah, vu2pn, yi6ht.

By BERS25, Aden, during March. 14.00-20.00 G.M.T. 7 M.C.: vk6jk, zu5b. 14 M.C.: G2ao, g2ay, g2az, g2by, g2cj, g2gm, g2ig, g2ir, g2lv, g2ma, g2ml, g2nh, g2ol, g2op, g2ux, g2wq, g5bj, g5bx, g5fb, g5is, g5la, g5ml, g5mu, g5nc, g5pj, g5vm, g5wq, g5yg, g5yk, g6gb, g6gs, g6hf, g6hp, g6jg, g6nf, g6ot, g6qb, g6qv, g6rb, g6rg, g6up, g6vp, g6wn, g6wt, g6xn, g6zn, gi5nj,su1aa, su1ot, ve1dr, ve2ac, ve2ca, ve2ka, ve3hq, vq2ty, vs7ap, vu2ah, vu2kt, vu2pn, yi6ht.

By 2AUM, "Astroll," 73, Oakland Av., Belfast. April 1, 1931—April 23, 1931. 2 M.C.: ei2b, ei7c, g2ip, g2oa, g2oi, g2qi, g5av, g5fp, g5jk, g5st, g5vl, g6dr, g6fo, g6jg, g6tg, g6uj, g6zh, gi5hv, gi6yw. 14 M.C.: ap6jm, ve1bv, ve1cm, ve1dr, ve2aa, ve2ac, ve2ca, ve3cf, vk2jt, vk3pa, vk3rj, vk3wl, vk3za, vk5hg, vs6ae, vs7ap, yi6ht, zl3ar.

By BRS392, 14, Wall Street, Ebbw Vale, Mon.—14 M.C.: ap6jm, ve4wx, ve5aw, vk3oc, vo8mc, vo8or, vq4crf, vq4msb, vs6ae, vs6ah, ze1jg, zl3ar.

By VS7AP, Wellawatte, Colombo, Ceylon.—14 M.C.: ap6jm, g2cj, g2cx, g2dh, g2gm, g2ol, g2op, g2vq, g2ux, g5bj, g5fa, g5is, g5la, g5ml, g5vm, g5yg, g5yk, g6dh, g6gs, g6lk, g6rg, g6vp, g6wn, g6wy, g6xn, g6zs, gi5nj, obsk2, ve2ca.

By BRS459, 11, The Circle, Tredegar, Mon.—2 M.C.: Ei2b, ei7c, g2ap, g2dq, g2fs, g2gg, g2ig, g2ip, g2ko, g2kt, g2lz, g2mx, g2oa, g2oi, g2qc, g2qv, g2ug, g2ws, g2xs, g2yi, g5av, g5bc, g5bt, g5cm, g5gy, g5jk, g5km, g5ok, g5rm, g5rx, g5st, g5um, g5vl, g5wb, g5ym, g6ax, g6dr, g6io, g6iz, g6jg, g6ll, g6lr, g6mn, g6ns, g6nw, g6oo, g6pa, g6qb, g6ql, g6qo, g6qw, g6sr, g6tg, g6tx, g6uu, g6zh, g6zr, g6zs, gi2cn, gi5hv, gi6yw.

By BERS14, Ambala, Punjab.—G2ux, g2vq, g5bj, g5gy, g5la, g5ml, g6jg, g6rg, 6gob, g6vp, g6xn, vk2dy, vk2hc, vk2hm, vk2ns, vk2nu vk3bz, vk3hl, vk3kv, vk3ml, vk3wl, vk3wx, vk3xc, vk3zw, vk3zx, vk4bs, vk4ju, vk5bo, vk5cm, vk5gr, vk5hg, vk5lx, vk5rk, vk5wr, vk6jk, vk6wi, vk7ch, vk7jk, vu2jb, vu2pn, vs6ah, vs7ap, zl3as, zs5u, zt2c.

By BERS52, Waziristan, N. Frontier, India.—G2vq, g5ml, g5rq, g6hp, g6vp, g6cr, g6wn, g6nf, vu2pn, vu2ah, vu2fz, yi1ej, yi6ht, yi6kr, yi2fu, zl2bz, zl1ca, vk2dy, vk2lr, vk3pa, vk3rj, vk3wl, vk5xk, vk5gr, vs6ah, vs6ag, vs7ai, ap6jm, su1aa.

Correspondence.

The Editor does not hold himself responsible for opinions expressed by correspondents. All correspondence must be accompanied by the writer's name and address, though not necessarily for publication.

Thank You, OM.

To the Editor of T. & R. BULLETIN.

DEAR SIR,—May I express my appreciation of the great work of the Society in all its branches. We amateurs away from England are very glad to hear our small share of work in the Society is being recognised by appointment as B.E.R.U. link stations, etc., and I sincerely hope we may always be allowed to help in the numerous duties of the R.S.G.B. It is a very great pleasure to be just one of a coming, and already, wonderful organisation.

The Society is British and great. Its work and publications are fine examples for every amateur in the world.

I wish the R.S.G.B. and the B.E.R.U. the great success it deserves. May our membership increase beyond all limits this coming year. Not only is it a pleasure to belong to the Society, but I, with the remainder, consider it to be a great honour.

Yours sincerely,
KENNETH S. J. RANCOMBE, YI6KR.

We Welcome You, OM!

To the Editor of T. & R. BULLETIN.

DEAR SIR,—Would you please express through the medium of the BULLETIN my sincere appreciation of the honour the Society has accorded me by the award of the "Wortley Talbot Trophy." I trust I shall be able to maintain the high "ham" standard set by the previous holders and, incidentally, by all members of the Society.

I would also like to thank all those whom it has been my pleasure to meet since my return for their cordial welcome, and hope to see them again shortly.

Yours sincerely,
"RUNNY" (ex SU8RS).
"The Myrtles," Needham Market, Suffolk.
March 31, 1931.

Appreciation.

To the Editor of T. & R. BULLETIN.

DEAR SIR,—Having just received from the G.P.O., through the agency of the Society, my extended 3,500 K.C. permit, I should like to express my sincere thanks to those executive members who are doing such splendid work on behalf of their colleagues, and in this respect it would be of great interest to know whether some still have the opinion that the Society is a slothful body, whose leaders care only for hamfests and similar functions, and do nothing whatever to justify their existence.

Yours truly,
LAWRENCE FULLER (G6LB).
13, Seagry Road, Wanstead, E.11.
April 17, 1931.

Stray.

Mr. Hogg, G2SH, sends his "love" to all the fellows from TF3TP *via* G6LK and G5LA.

HIC et UBIQUE.

Calibration Services.

The National Physical Laboratory will transmit calibration signals from G5HW on 1,785 kcs., on the first Tuesday in March, June, September, and December of each year at 9 p.m., the next taking place on Tuesday, June 2.

The form of the transmission will be "CQ de G5HW" repeated several times, then "Standard wave frequency transmission on 1,785 kilocycles," followed by a continuous dash, the whole transmission lasting about 10 minutes; this procedure will be repeated six times in the hour, i.e., at 0, 10, 20, 30, 40 and 50 minutes past the hour.

* * *

A Calibration Service will be transmitted from G2NM, Mr. Marcuse's station at Sonning-on-Thames, Berkshire, on 3,583.13 K.C., according to the following schedule :—

At 11.00 every Sunday (Telephony).

At 23.00 every Sunday and Thursday (Morse).

Times are G.M.T. or B.S.T., as in force. The frequency has been checked and approved by the Post Office.

* * *

80-*Metre Permits.*

The attention of members is drawn to the fact that facilities have now been granted for the use of the above band from 8 p.m. to 8 a.m. daily. Permission to operate on this band must be applied for through the Society.

In the event of any member who has in the past made an application and has not yet received the necessary permission, he is asked to notify H.Q. immediately.

* * *

W.B.E. Certificates.

W.B.E. certificates have been issued to H. M. Cooper (VK5HG), T. Evans (VK2NS), Mrs. E. L. Hutchings (VK3HM), G. W. Tonkin (G5RQ).

Regarding our publication of the President's address last January, the Editor of the *Wireless World* points out that the *Wireless World* did not suspend publication during the war, but actually continued right through, when it was incorporated with the *Marconigraph*.

* * *

Broadcast Talk.

Mr. H. Bevan Swift, the President, will read the Society's Bulletin from the London Station at 6.35 p.m. on May 22.

* * *

We are informed that a special course of six lectures on Thermionic Valves will be given by W. H. Date, B.Sc., A.M.I.E.E., at the Polytechnic, 307-311, Regent Street, W.1, on Wednesdays, commencing May 13, from 6.30—8.30 p.m. (No lecture will be given on May 27). Fee for the course, 7s. 6d. Full details on application to the above address.

* * *

One Watt Week.

At the time of writing no reports have come in, but from information received unofficially the tests have been an unqualified success. Some splendid

work has been done, and several stations situated in the London district have distinguished themselves. It is certain that all those stations who consider that the use of high power is absolutely a necessity in these days of multi-QRM will receive the shock of their lives when the results of the tests are published. M. W. P.

QSL Section.

As we have recently received rather a large number of photographs, letters, etc., *enclosed in envelopes* for forwarding to foreign amateurs, may I take this opportunity of reminding members that, under the rules governing the use of the special postal rate at which cards are sent abroad, no enclosures are permitted. We feel that members ought to know that we therefore have to open all such letters. If you want to send a small photograph the best plan to ensure that it does not get lost or caught up with anything else, it is to pin it to a QSL or plain postcard. Letters intended for destinations abroad should not be enclosed in envelopes but folded into, roughly, the size of a postcard and marked with the call-sign of the address on the *outside*. This obviates any delay caused in reading through the letter in order to discover for whom it is intended.

Stray.

Mr. L. W. Humphreys, G5IU, will welcome reports from BRS or G stations. He will be working intermittently every day on 7 M.C.

QRA Section.

Manager : M. W. Pilpel (G6PP).

NEW QRA's.

G2FA.—F. Bennett, 32, Fairfield Road, London, N.8.
G2RY.—D. Hanley, 97, Cadogan Gardens, London, S.W.3.
G2WL.—A. T. Wilson, 8, Hermiston Avenue, Springboig, Glasgow.
G5FB.—G. Faetherby, 30, Lindsey Road, Bishops Stortford.
G5KW.—R. Hodges, " Beggars Roost," Wadham Road, Daybrook, Arnold, Notts.
G5MH.—D. P. McNeish, 29, Wiverton Road, Nottingham.
G5PK.—A. J. Peck, 21, Geere Road, West Ham, E.15.
G5QG.—G. W. H. Tripp, Winthill, Banwell, Somerset.
G5WB.—C. A. Webb, 1a, Crescent Gardens, Swanley, Kent.
G5WG.—W. E. Corbett, c/o Phillips Lamps, Ltd., 25, Stanley Street, Liverpool.
G5YU.—C. F. Scruby, Kent House Restaurant, Foots Cray, Sidcup, Kent.
G6CW.—J. J. Curnow, 11, Grove Avenue, London, N. 10.
G6HJ.—E. H. Jenkins, 40, Eardley Crescent, London, S.W.5.
G6QF.—A. M. Robertson, 97, Derbyshire Lane, Stretford, Manchester.
G6UY.—L. H. Cordon, 82, Lenton Boulevard, Nottingham.
G6VH.—S. V. Smith, 30, Clifton Gardens, London, N.15.
2AGM.—T. B. Smith, 106, Cloberhill Road. Knightswood, Glasgow, W.3.
2AYB.—W. Hibbert, 42, Bushey Wood Road, Totley Rise, Sheffield.
2GGO.—L. B. Flagg, 20, Denton Avenue, Lidgett Lane, Leeds.
G2MC.—T. L. McCormick, " Maxton," West Parade, Bexhill-on-Sea.
G2WT.—J. W. Wroth, 281, Mount Pleasant Road, London, N.17.
G5DL.—P. V. Simmans, 68, Netherfield Gardens, New Barking, Essex.
G15DU.—R. J. W. Harvey, 144, Deerpark Road, Cliftonville, Belfast.
G5FP.—A. M. Hardie, 131, Hamilton Place, Aberdeen.
G5LY.—K. C. Lay, " Kenway," Downes Road, Langley, Bucks.
G5OF.—P. J. A. Hankey, Stanton Manor, Chippenham, Wilts.
G5PX.—J. Partington, " Moston," Hutton Avenue, Ashton-under-Lyne.
G6BB.—H. Brabrook, 31, Court Lane, London, S.E.21.
G6BW.—A. B. Whatman, R.A.M.C. Mess, Tidworth, Hants.
G6IG.—E. Brady, 7, Gladstone Terrace, Ripon, Yorks.
G6QC.—E. Pethers, 3, Conley Street, London, S.E.10.
G6QX.—R. Jardine, " Remiencourt," Ardleigh Green Road, Hornchurch, Essex.
G6SG.—H. C. J. Seagood, 20, Sunnydene Avenue, London, E.4.
G6YX.—R. F. G. Holness, 4, Park Parade, London, N.12.
2AMB.—J. L. Thompson, 32, Hall Lane, London, N.W.4.
2AGN.—C. S. Brown, 39, Westfield Way, Dormanstown, Redcar.
2BXD.—H. J. Horsley, 27, Grange Road, Ramsgate, Kent.

The following are cancelled :—G5GL, G6ZC, 2AGV, 2ANH.

QRA's wanted :—CR9CN, CS2A, FM4AB, K4MZA1T.

SUBSCRIPTION RATES.

The Annual Subscription Rates to the Radio Society of Great Britain and British Empire Radio Union are as follows :—

CORPORATE MEMBERS.	
Town Members (those residing within 25 miles of Charing Cross)	**£1 1 0**
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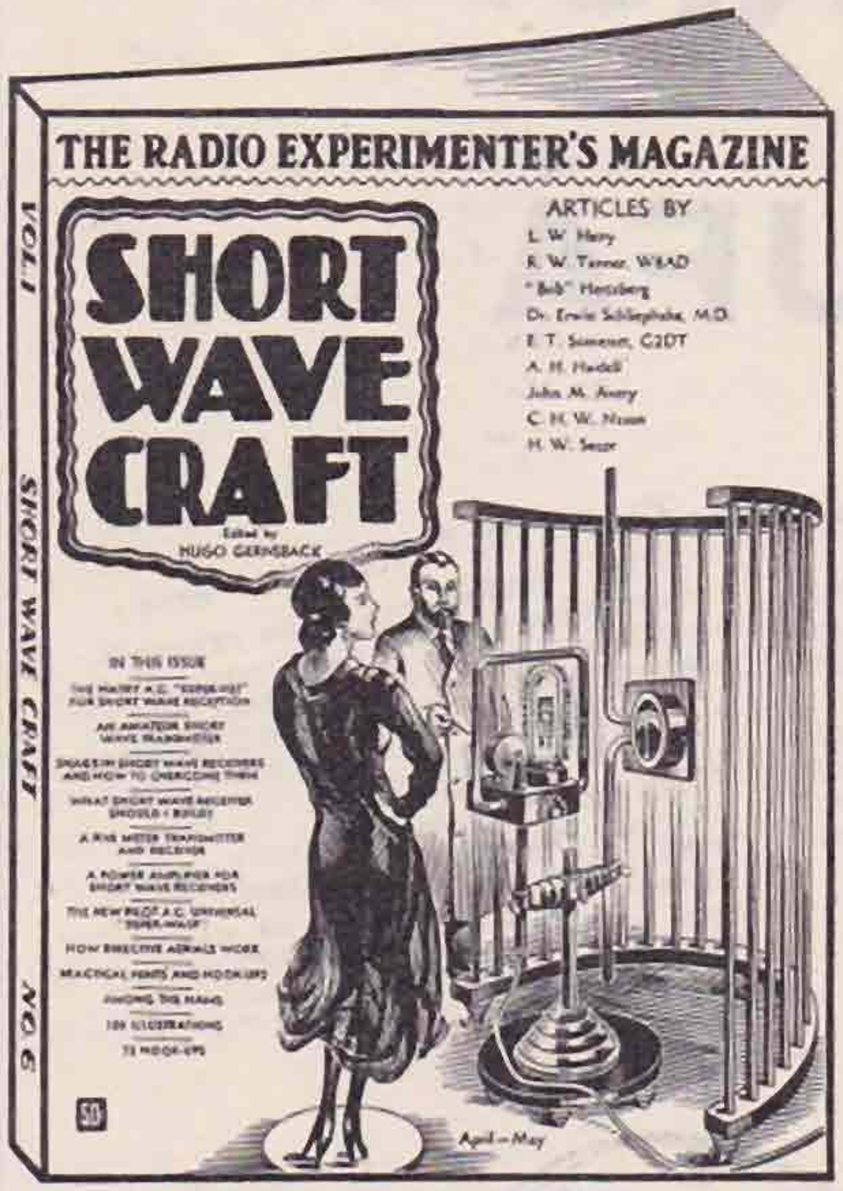

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A Journey into the World of Science—(*Continued from page* 305).

electron it gives up its energy to the electron which can then escape from the metal.

In a given kind of light all the quanta are the same, the stronger the light the more numerous they are.

The energy of each quanta is the frequency of the light multiplied by a quantity "h" (found by measuring the energy of the electrons emitted by light of known frequency). (Prof. Millikan places this as $h = 6.55 \times 10^{-27}$.)

In order to formulate his theory that the electrons move in orbits round the nucleus Bohr had to assume a behaviour of the electrons quite contrary to ordinary dynamics, and curiously enough the same quantity "h" came in, though in quite a different way.

Not only did the electrons obey different laws to those postulated by Maxwell and Newton, but they were not consistent about it. Some of their actions required the old laws, and others a new and inconsistent set. Sometimes both had to be employed in different parts of a calculation.

As Prof. G. P. Thomson has said, "Physicists at this stage were very much in a position of a man trying to make sense of an account of a game which started as golf, and suddenly for no apparent reason turned into tennis, and then back to golf; and even worse than that, the physicist's electrons did not appear to play fair at the game they had for the moment chosen."

The results were nearly right but *not quite*; it was, however, noted that the quantity "h" came in whenever the atom chose to break the old rules. It was de Broglie who observed that electrons in an atom seemed to follow two different sets of rules at once, and behaved much more like waves than particles. According to de Broglie's theory, which is a mathematical one based on relativity, all moving particles are accompanied by waves, and the smaller the particle the longer the wave. For all objects having a magnitude comparable to our order of being, Newton's laws, motion in a straight line, acceleration proportional to force, and so on hold good, because short waves are indistinguishable from a particle. The scale of de Broglie's waves is, however, given by "h" which is an exceedingly small quantity, and therefore his waves are proportionately long, and have a guiding influence on the motion of the particle in radiation, or quanta.

Our modern idea of an electron, then, is that when in an atom its waves curl round on themselves, and therefore do not exhibit forces outside the atom, but when it gets free as a cathode ray or escapes from the filament of a wireless valve it uncurls and expands indefinitely. In fact, an electron can be compared to a "gossamer spider" which throws out fine threads. If the wind carries the spider so that one of its threads catches on to an obstacle, the spider will be swung round and its path deflected, although its body has not struck anything solid. An electron and its waves behave in a similar manner.

Our modern conception of light has also changed; we no longer picture light as waves breaking on the shore of matter and thus disturbing it; we now picture it as a stream of tiny bullets which only affect the objects they hit; but these bullets do not move as ordinary bullets would—they are directed by their accompanying waves. I think by this time I have led you well into the intellectual fog which obscures the world of physics. We have not completely lost our way, we can see glimmerings of light ahead. Fortunately we are travelling along the railway track of reason and can always return along its lines, even when we can no longer see anything through the fog.

Before I close I would like to take you for a few minutes into the physicist's mental gymnasium, where students of relativity disport themselves.

(*To be continued.*)

Trouble with Crystal Control.

By G2CJ.

IT is now about eighteen months since my station became crystal controlled, and up to a few weeks ago no trouble had ever been experienced.

Two transmitters, working on 14 and 7 M.C. respectively, are in use, and in each case the output stage is the conventional neutralised P/A employing an Osram DET1 valve. Prior stages utilise Osram LS5B valves, and everything was cleaned up and new bias batteries were installed before B.E.R.W.

For two days everything went splendidly. After that, however, the trouble started. On switching on the 14 M.C. transmitter and pressing the key, the milliammeter needle in the last stage would indicate (as it should) about sixty milliamps. This figure would be maintained for a few seconds, after which the needle would flicker and then gradually subside to about thirty milliamps, where it remained fairly steady. The meters in the FD power leads also showed a decline, though in this case only a small one.

I do hope the diagnosis appears as obvious to others as it did to me! Evidently one or more of the valves had lost emission, and accordingly all were replaced by their counterparts in the 7 M.C. outfit. Precisely the same trouble occurred.

The bias voltages were checked, the crystal changed, all leads examined. Nothing doing! The power supply was found in order and, in case any fixed condenser in the transmitter was gradually failing in insulation, all were renewed. Since this did no good, a new set of LS5B's were fitted. Still ND!

By this time it appeared that a cure could only be effected by the unstinted use of a coal-hammer, followed by a complete rebuild. The hammer was raised for the first smite when it was suddenly realised that the bias batteries should be tested with the transmitter actually running. A high resistance meter was placed across a ninety-volt battery which supplied the bias for the PA and part of the bias for the other valves. For a few seconds after switching on the needle remained steady at about ninety volts, then it started to flicker, and in a short time was showing nearly one hundred and thirty volts. On switching off the voltage sank to its original value.

Everyone knows that bias batteries, used in medium or high-powered transmitters, commonly attain an increased voltage after a period of use. The trouble was probably due to the particular make of battery used, since it is one in which the makers claim that a special chemical substance is used. On installing another make of battery the transmitter functioned normally.

Contact Bureau Notes.

By H. C. Page (G6PA).

I WOULD like to commence this month's notes by thanking all those who took part in the 2 M.C. Tests. We might have had more entries it is true, but those we did have were all live ones. Thanks are especially due to G5UM for his tireless energy in organising the whole concern. I shall not make any comments on the results, for elsewhere in this issue you will find a full account of all that took place.

You will remember reading quite a lot about harmonic reception in last month's Notes. Well, here is a letter from F8BJ, which GI6YW has very kindly forwarded me. M. Godfrin's letter is very interesting, so I propose to quote it at length. He writes :—

" In the present state of radio there are only two possible cases in which a station transmitting on 14 M.C. can be heard on a receiver listening on 28 M.C.

" (1) The transmitter radiates at the same time on both 28 and 14 M.C. The harmonic is picked up by the receiver ; then we can say that we have a true communication on the 28 M.C. band.

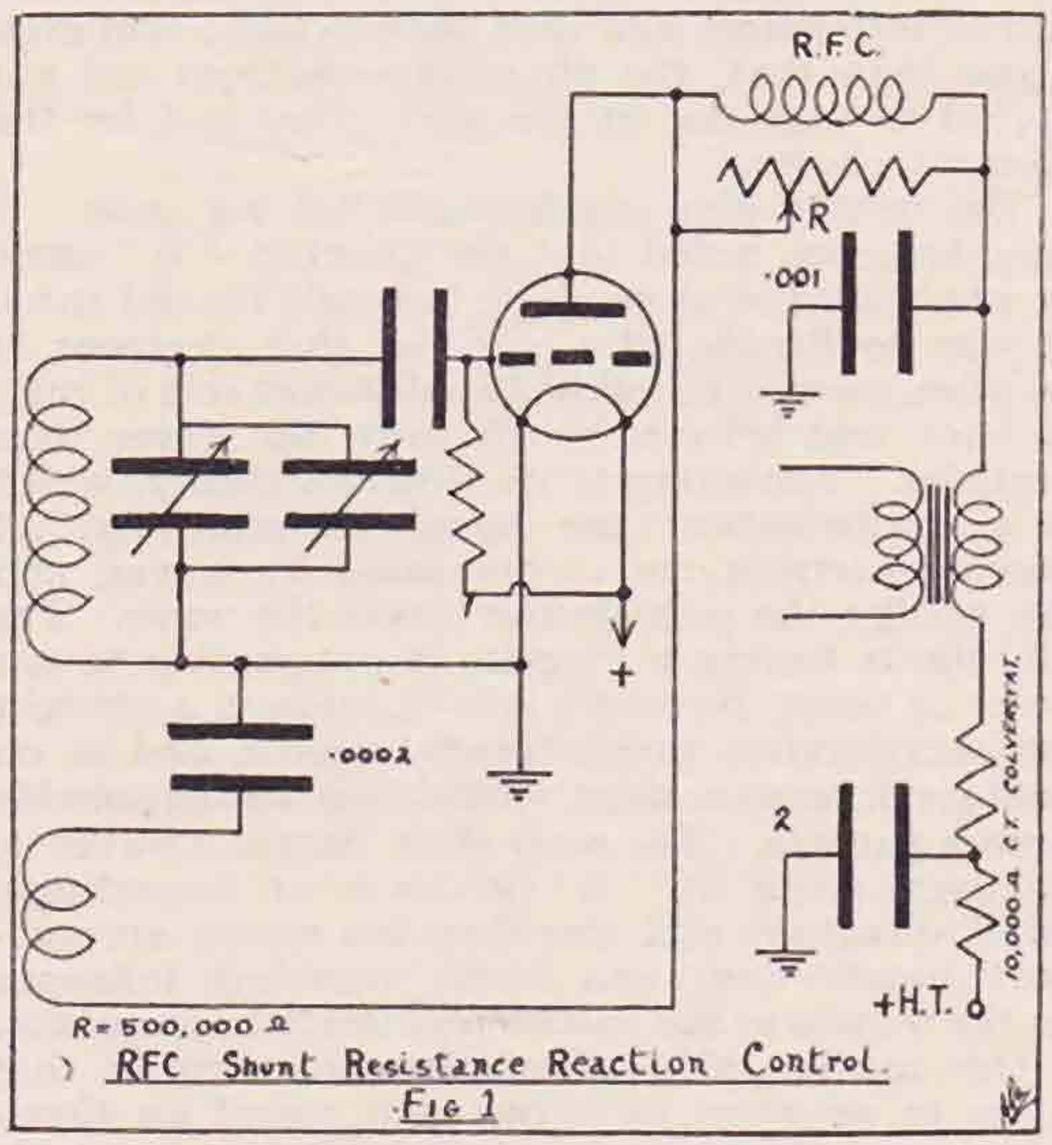
" (2) The transmitter radiates only on 14 M.C., or if it radiates on 28 M.C. this wave does not come to the receiver ; but *the* 14 *M.C. wave* is picked up by the receiver, if the relation between the output and the input of the receiver is linear nothing can be heard because a given receiver can only receive waves whose frequencies are multiples of its own (beat sound between the incoming wave and the fundamental, or one of the harmonics of the oscillating receiver). But let us suppose that the relation between the output and input of the receiver is not linear, then the incoming wave is distorted, and in the the output we find not only *the fundamental frequency of this wave, but also its harmonics, and in particular the* 28 *M.C. harmonic*. Of course, this harmonic is not always very strong, but in certain cases it can be heard very well. I think the second case is the most usual ; it is likely to occur when the detector works in the bend of the plate-current-grid-tension curve. In that case the station could be heard at the same time on a 14 M.C. receiver, which is not obligatory in (1).

" This explanation shows why some stations pick up 14 M.C. transmissions more easily than others ; it is because their receiver is very much distorting at the H.F. point of view."

Now this seems to me to be a very good argument, and I think we should all be interested to hear what the other people who have brought up the subject have to say about it. I shall be very pleased to have your views, OM's.

VU2FX, as usual, sends his report by Air Mail. I never have to think who his letter is from. The stamp tells me, and the letter is so regular, too. He regrets to report that the VU-VS people have not had much luck as yet on 28 M.C. He himself has only heard commercials during the last month, but as these are increasing, he thinks that perhaps better conditions are on the way. No doubt he means the harmonics of commercial stations, and so he should be very interested in the letter from F8BJ, which is given above.

He says he heard FRS1 on the band at 14.30 I.S.T. with a nice C.C. note R5. VU2PN has heard SU1AA at 16.25 I.S.T. strength R4. VU2PN then arranged a schedule with SU1AA for March 22 at 16.30. On this schedule SU1AA was R5. He finished calling VU2PN, and then was R7. VU2PN replied, and was much astonished to hear him reply right away at R8 ! Unfortunately SU1AA had a schedule on 56 M.C. right away and was not able to finish the QSO. However, before he finished this QSO he had faded to R2, and then to nothing. VU2PN also reports reception of several commercial harmonics, such as GFV, GFW, KBJ and KAY. NPO was heard at R6 at 11.30 I.S.T. on 27 M.C.



RFC Shunt Resistance Reaction Control.

Fig 1

VS7AI at Colombo has not heard any amateur signals yet, but receives the harmonic of PLL with wonderful regularity. He does not share the opinion of the others that 28 M.C. is improving.

G2DT, the Super Het Specialist, sends in an improved form of reaction control, which he has culled from one of our contemporaries across the sea. A glance at Fig. 1 will make this quite clear as regards the actual circuit arrangement. The explanation of the operation is as follows : Actual reaction is obtained by the reaction coil and the fixed condenser of .0002 Mfd. When the resistance " R " is at its highest value the choke operates in the normal manner, and the detector oscillates, owing to the .0002 Mfd. condenser being a fixed maximum value. When the value of " R " is

reduced the choking effect of the choke becomes less and less, and the radio frequency currents are by-passed direct to earth through the resistance and the .001 Mfd. condenser, instead of through the reaction coil and the .0002 Mfd. condenser. Although complete control is obtained there is no alteration in the capacities of the circuit.

G2ZN forwards the usual sunspot charts for the month, having special regard to the period of the 1.75 M.C. Tests. He points out that, owing to the poor weather conditions, it is very hard to make any observations, and in fact he was only

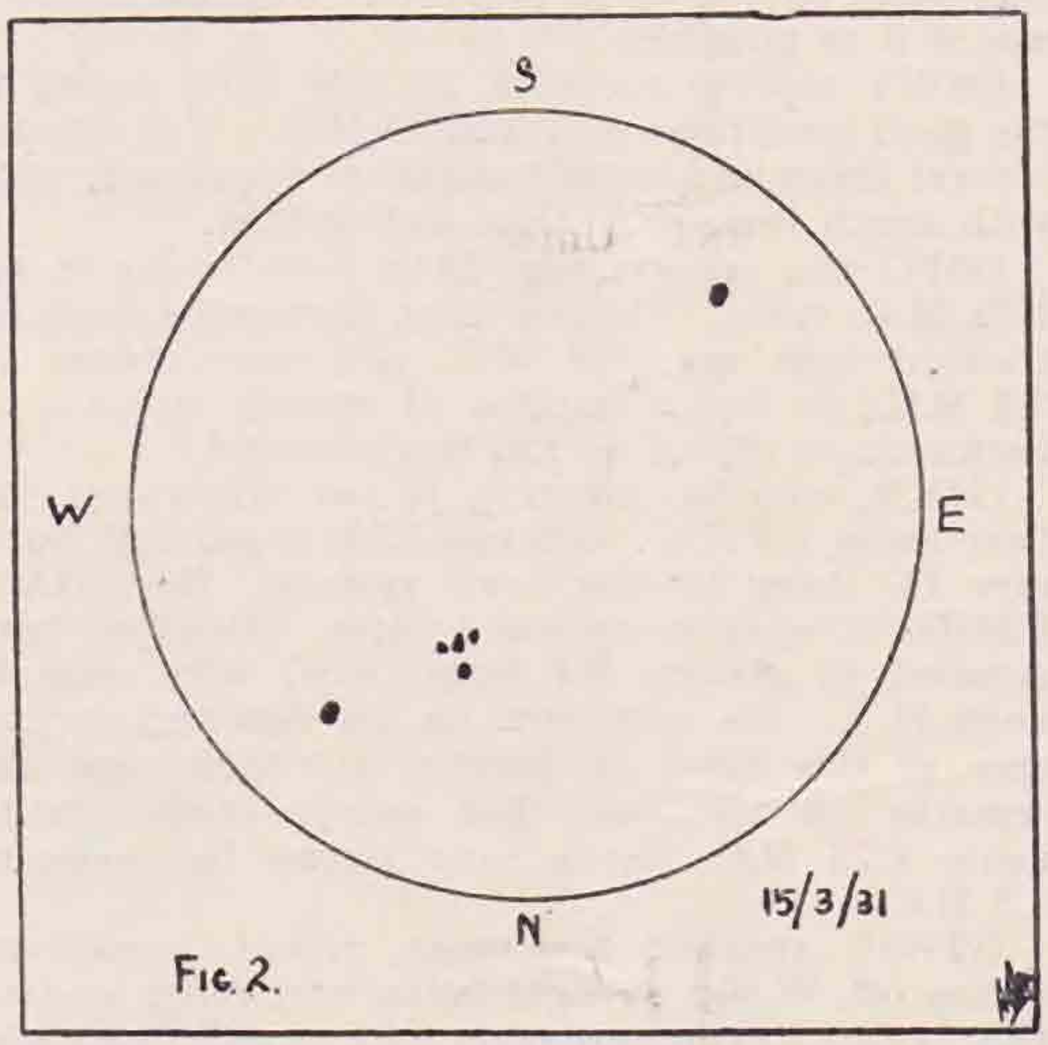


Fig. 2.

able to make two during the whole of March, i.e., the 15th and 22nd of the month. Owing to this he does not wish to make any comments, as he feels that the data is not sufficient. All he does say is, that *probably* the 22nd gave the best all-round results for the tests.

He states that he is somewhat handicapped by the fact that he cannot possibly listen regularly on all bands, and this is essential in order to get valuable data for the sunspot theory. He wonders if any of the BRS or AA men would like to give him a hand in this connection. All that is necessary is to obtain a periodical sketch of the conditions on all bands. (I shall be very disappointed if some of you don't offer to help in this, OMs.—G6PA.)

In Fig. 2 you have the sunspot map for March 15. G2ZN sends two other maps. One for March 22, which has two small spots very close together, and about midway between West and North near the circumference of the disc. The other map, which is for April 12, shows two similar spots between South and East, also near the circumference.

Although a great number of letters are received at Contact Bureau each month, very few of them offer ideas or suggestions for publication. Possibly you feel that all your ideas for C.B. should go to your Group Manager. This is not so. Any ideas or theories you may have, apart from those which concern the work of the group you are in, can be sent direct to C.B. I am always on the lookout for interesting matter to publish, and some months it is very hard to find enough; so see if you can find me a bit more, OMs.

Group Reports.

28 M.C. Work.

G6VP, Group Manager.

Group 1C.—Particulars of G6WN's DX are now to hand. They are much to be congratulated, not only on their results, but on their faith and courage in using a band that has been so difficult this year.

All the more so when so much satisfaction is so easily to be obtained on both the 7 and 14 M.C. bands at the moment. They have been regularly on "10 metres" since 1928, and ran a successful weekly sked with G6VP for over a year. This is, however, the first occasion on which they have managed to work a station outside the British Isles.

SU1AA was worked on March 14 on 14 M.C. and a sked was arranged for the following day on 28 M.C. for 11.00 G.M.T. It was not, however, until 11.40 that they heard each other. Signals, although weak, were consistent and remained so till 12.35 G.M.T. when they mutually QRT'D.

SU1AA heard on that day FM8BG, FM8IH, F8KN, F8GQ, and HAF9AF.

It may be interesting to know that the WN's use a very low impedance tube, i.e., an LS6A, which, with some 40-50 watts input, is proving very efficient on both 14 and 28 M.C.

It no doubt comes as a surprise to us to hear of the number of French stations that are still regularly on 10 metres. Monsieur R. Allard (R357), 14 Rue du Pont à Neuilly, has been kind enough to send me some copies of the *Journal des Huits*. I was struck with the attention that 28 M.C. was receiving. Occasionally our signals—fundamental—are received in France. Why not arrange some definite skeds? M. Allard will be pleased to further this plan, or if you wish, I can no doubt also assist in this direction. G6DH is listening frequently, but does not intend to transmit till he hears some amateur signals. He still hears plenty of commercial harmonics.

G2XH states that he has had the band to himself, but as both G5LT and G6YC are now to come up, he will have the local co-operation so much desired.

G6VP has now got an aerial up that seems satisfactory; it is $6/2\lambda$—$4/2$ on the span and $2/2\lambda$ down lead. He has had so much trouble with the usual locked P.A. that he intends to revert to the semi-driven capacity locked amplifier. He has nothing but local work to report.

Group 1B.—G5SY writes chiefly about the "season" for 28 M.C. work, and agrees with 6LL that January appears to be the middle of the season. In support of this, he furnishes statistics dating from 1928. He also thinks that the sunspot theory is premature, and suggests the many other factors that probably do influence reception, pointing out the exaggerated results with increase of frequency. Barometric pressure, or the forces that govern this, are receiving much attention.

Group 1F.—BRS25 reports that he has had a long letter from OZ7T. His transmitter is novel, in that he can either use it as CO-3FD's, CO-F.D. PA, or CO.2FD's PA. He has been using a Zepp, but complains of the difficulty of correctly timing the feeders. G6HP is rebuilding, and, I understand, modifying his power supply. BRS25 has not been active owing to domestic affairs.

G6NF is forming another group with G6RH as

a nucleus. Write to him direct for inclusion. There is also one vacancy in Group 1C.

Fading, Skip, and Blindspotting.

G2ZC, Group Manager.

Group 2A.—G.C. G6NK and his group have been discussing cloud and the effect on wireless signals.

BRS426 suggests that some cloud systems act as a reflector and send signals back to earth, while others allow signals to pass to the Heaviside layer, reflect them back to the layer, and finally return to earth, thus accounting for extraordinary skip conditions. He also thinks that similar conditions occur during periods of thick widespread fog.

BRS504 noticed a particular cloud caused complete cessation of signals, which gradually returned as the cloud passed away, and suggests this is due to refraction more than absorption, and therefore alteration of skip distance. He also thinks that these conditions apply only to low, dense clouds, and that high clouds have little effect. (Why ? G.M.)

G6NK finds similar conditions during passage of very low cloud. He also thinks fog would cause similar conditions, according to height and density.

(Can we arrange a discussion on a two group basis ? Let your G.C. know if willing to co-operate. G.M.)

Group 2B.—Aurora Display and Changing Earth Potentials were the two subjects under discussion this month, and a long budget resulted. Regarding aurora display, it is quite obvious that the group have here a question about which none of them know anything, and so we can rule that off our list of subjects to be discussed. Changing earth potential, however, has proved an interesting subject.. Small changes of potential may contribute to fading, while. violent ones, as caused by earthquakes, cause a lifting of the skip on 7 M.C. in no uncertain manner. This is not theory only, but has been put to the test. Individual points are as follows : CT1BK says that G5SW is heard very well in Portugal from 19.00 to 20.00 regularly every day, and then fades right out for the rest of the evening. He draws attention to the fact that other things in Nature run in cycles as well as the *Solar Cycle* affecting signals ! and quotes certain crops as having definite good years.

G6YL gives a detailed log of the happenings of signals during the earthquake in New Zealand, which agrees with those of 6PP and 2ZC. She agrees with 2A over the increase of DX signals up to full moon, and adds that QRN also increases.

G2IM asks if, neglecting magnetic and electrical theory, could there be a " chemistric " theory why the Heaviside layer is lower by day than by night. He also suggests that the layer may not actually move at all, but that it may become " thicker."

G6PP gives an outline of some interesting points relating to earth potential changes in relation to sunspots, earthquakes, etc.

G2ZC suggests that a skip blanket on 7 M.C. influences directional effects on 2 M.C., as was evident during the 2 M.C. tests, both in receiving and transmitting. A directional aerial is disproved, as two were in use, and 2ZC did not hear any of the stations audible to him working stations eastwards. The directional effect seemed to be best in a north-westerly direction on 2 M.C. when skip was bad on 7 M.C.

3·5 M.C. Work.

G6RB, Group Manager.

No doubt due to the good conditions prevailing on the higher frequencies and the numerous tests, very little appears to have been done during the month on the 3.5. MC. band. Doubtless when the DX period passes we shall see a return to this band, especially as we have now been granted the daily use of it for a further 12 months. I would remind everyone who is interested in 3.5 M.C. work that it is only due to the untiring efforts of G2NM and G6CL that the P.M.G. has allowed us to retain this band, so it is up to everybody to make as much use of it as possible.

G6WY reports no work on this band owing to the good conditions on 7 and 14 M.C. Has listened several times and found conditions apparently good with much less QRN than anticipated.

G6FO also reports very little done owing to the 1.75 M.C. tests. Reports that harmonics from his transmissions on 1.75 M.C. are very strong on 3.5 M.C., in fact a number of reports indicate his harmonic as strong as the fundamental.

G2KB, who has recently joined this group, has been using T.P.T.G. with two LS5s in parallel, but is now CC using Goyder Lock system. Best DX is FM8IH R7 with an input of 4 watts. Ultra QRP tests resulted in getting R4 from G6SO with only 50 volts H.T. He comments on the deserted appearcnce of this band on Sunday mornings, and also remarks on the fact that nearly every station using 1.75 M.C. has a very strong harmonic on 3.5 M.C.

G2WP, another newcomer, reports conditions falling off, W sigs at night being very much weaker. Has been carrying out tests with aerials, and finds the best to be one employing two 66-ft. wires erected at right angles current fed to transmitter at centre. Is using an input of 8 watts and getting out on the Continent very well.

BRS408 sends in a very FB report dealing with WX conditions and DX heard on this band. Is experiencing trouble with hum from A.C. mains, and has overcome this by placing an H.F. choke direct across terminals of receiver.

G6RB has not been on this band very much during the month, mainly due to the A.R.R.L. contest and its aftermath. Conditions seemed fairly good during the early part of the month, and W was again worked. QRN has not been as bad as anticipated ; in fact the band during the last few days has been fairly clear of it. This is in contrast with the conditions prevailing last year. Spent two Sunday mornings recently on 3.5 M.C., but could only raise one station between 10.30 and 13.00 G.M.T. Where are you all, OMs ?

The group " party " on Sunday, April 19, will, I hope, be the forerunner of many enjoyable QSO's away from the QRM of the more or less useless 7 M.C. band.

56 M.C. Work.

G2OL, Group Manager.

I have the sad duty this month to announce the demise of Group 7A. I cannot do better than to quote the G.C.s own words, which are in 7A's last report.

7A was the first group to be formed for 56 M.C. work, and has done some of the finest work on this frequency yet. In 1929 its G.C., G2DT, was the

first station in this country to receive signals from a distance of over 100 miles. 7A has arranged countless transatlantic tests, and the group has a reputation to be proud of, and it is exceedingly unfortunate that the group should collapse through a sheer lack of enthusiasm and reports from its members.

There are four stations towards a new group, and two more are required to complete it. Will any stations interested please write to G2OL, 15, Queen's Gardens, Ealing, W.5.

One thing of note only has occurred this month. G6XN was QSO G2OL on March 30, and put over some good crystal-controlled fone. He was working with FD only, feeding a six-wave AOG aerial, choke control modulation, and was receiving G2OL on an all A.C. receiver. This receiver functions on all waves, from the broadcast downwards, and employs an SG stage, detector and pentode.

Group 7A (G.C. G2DT).—With extreme regret this report announces the demise of this group—at any rate under Group Centre G2DT, who feels it is totally impossible to carry it on owing to lack of reports and lack of success in the 56 M.C. tests. W9AUH reports that he heard nothing, so once more the " ultra short " have got the better of us.

In conclusion, and before bidding " Adieu " to many friends, the G.C. would like especially to thank OM's Allen, Powditch, and Noden for many helpful kindnesses shown in the past.

Group 7B (G.C. G2OL).—Only two members have reported this month, but as all tests are now over, and the summer beginning (we hope !) activity should liven somewhat, and a more lengthy report will appear in the next BULLETIN.

QRP Work.

G2VV, Group Manager.

My appeal for more QRP Groups has met with response already, and I am pleased to say that a new group has been formed. This is 8D with G2MR as G.C., and G6BU, G5LX, G5QY, BRS397, and 2AGN (ex BRS290).

I have had some letters from other QRP men who wish to join a group, and more members are wanted to complete a Group E. Come on OM's.

Group 8A.—G.C. G5RV has been working on QRP and QRO this month, and notices improved conditions. Complains of R7 QRM from G5SW close at hand ! His aerial is half indoors ! G5VB is now putting out excellent fone, using 1 watt on 7 M.C. G6MB has worked W1AFU getting R4. Notices that QRP signals seem to get out best when conditions are poor and QRO stations weak, and wants to know why this is so. G2ZQ, using 4 watts, has worked W1AVV and W1RY on 14 M.C., and OZ on 1.7 M.C. G5RV is giving out a general fone call to group members on Sundays at 11.00 and would welcome reports, but does not state what wave will be used. I presume this will be on 7 M.C. (G2VV).

Group 8B.—G.C. G2VV was active during the 1 watt tests, and in spite of many hours operating only scored nine points. Transmitter was Ultraudion with CT25X valve. All QSO's on 7M.C. Is now working on 3.5 M.C., but so far has not had a QSO. Reports of reception on this band will be welcomed. Visited G6BU in the Isle of Wight and was impressed by this F.B. QRP station. Has worked G6BU on schedule since. Reception on 14 M.C. has improved, and good DX is heard but not worked. 3.5 M.C. band seems dead here lately, and can't hear any stations to call. Has been getting out well on 1.75 M.C. using fone and c.w., and has been heard in Bristol on fone when using 5 watts. Had an interesting QSO with the 2 M.C. manager on this band. Can only work on this band on Sundays owing to BCL QRM. G5CM is the " star turn " this month, having at last worked W. Was R3 QSA3 at W1BUX. Using 4 watts on 7 M.C. has worked SU twice and many EU's, and usual local Europeans. Is on 1.75 M.C. every Sunday and works G.C. each week-end. Has new V.F. aerial which is only 33 ft. 3 in. long with lead tapped 11 ft. 1 in. from end and then on to plate end of plate coil. Has got R8-9 on 14 M.C. from FM when using 4 watts and R3 when using 1 watt Suggests a monthly group broadcast on 1.75 M.C. from a different station each month. (This is being discussed in the Budget. G2VV.) G6SO was in 2 M.C. tests, and best station worked was an EI. Has worked G5CM on this wave at last. Is experimenting with a spark coil arrangement to get 200 to 300 volts using only a 6-volt battery. At the moment details are strictly secret. (It would be better if the note was to be kept secret as well.—ED.) 2ANU reports fine DX reception on 14 M.C., and notes greatly improved conditions. Is now using a Triotron UD2 super-power for oscillator in the TX. Is still busy with G2NH type crystal control, and also hopes to try out the G6MU method soon. G2OA does not report, but is believed to be active on 7, 14 and 1.75 M.C. We regret that G5JF has resigned from R.S.G.B. and Group 8B, but his work takes so much of his time that little or no time is left for radio. (We are sorry to lose you OM, and wish you the very best of luck for your future success. G2VV.) 2AHB fills the vacancy open by G5JF's resignation. He has just got his " A.A." ticket, and is second operator at G2VV. His transmitter is an Ultraudion with a CT25X and .5 to 4 watts input.

Group 8D.—G2MR has not yet had time to collect reports, but sends a few details of his own station. Is using c.c. with 5 watts, and has received two reports from Scotland. He is working on 7 and 14 M.C.

2 M.C. Work.

G5UM, Group Manager.

Group 10A.—At G.C. G5UM's suggestion G6ZH has sent along a few details of his gear which won him second place in the 2 M.C. tests. It consists of a T.P.T.G. transmitter with a P650 run off 200 volts of accumulators. This valve is found to be particularly efficient, and gives a reading of .5 amp. on the aerial ammeter. An inverted-L antenna is used, 40 ft. high, with 60 ft. flat-top. A three-wire counterpoise is erected 7 ft. above ground. " Polar " short-wave condensers tune a " Lewcos " 40 receiving coil in both the grid and plate positions, these coils having been found to be particularly efficient, even with 10 watts. A 35 " Lewcos " coil in the aerial circuit is tuned with a .0005 mfd. condenser in series. Finally a Varley 10,000 ohm power resistance for grid leak and a " Lewcos " receiving choke complete the components. A 3-valve SG-Pen receiver is used generally with a speaker. G6ZH says that he searched especially in the middle of QRM, as he thinks that interference

must be very bad before it defeats a really good C.W. signal. During the tests he was puzzled by a loss of efficiency in the transmitter, and did not discover until afterwards that the 80-metre choke had been left in, instead of the 160-metre one! G6ZH suggests that a westerly wind with a depression and rain clears the atmosphere and reduces the QRN level.

Reports of R7 from OK and OZ and R5 from Germany have been received by G5RX. Breakdowns at the power station caused RX much trouble during the tests, but good work was done "when the juice was on." The period from 03.00 until 07.00 is regarded as the best time for really consistent work on the band. A new 1882 k.c. crystal has been ground to clear the wave of local QRM.

G6FO kept an all-night vigil throughout the tests, and though no transmitting was done during BCL hours sixth place was obtained. Special arrangements with G2QI (QRB 1½ miles) were made to minimise mutual interference. Transmitting waves were chosen very close together at the top of the frequency band, and receivers made ultra-selective. This system worked admirably, and practically no QRM was caused at all. G6FO is now working on a push-pull transmitter with two P650 valves and 230 volts D.C. on the plates. An input of 18 watts gives 70 per cent. efficiency, and .72 amp. in the aerial.

G5UM has had one or two Continental reports, and made a recent contact with HB9N, getting QSA5 R6 with 9 watts push-pull crystal oscillator.

Group 10*B*.—G.C. G6OO writes: Conditions on 2 M.C. were pretty good throughout the R.S.G.B. Tests in March. It was noticeable that a complete fade out would occur at about 08.00 G.M.T. and generally continue till noon. QRN was worst from 19.30 to 00.00 G.M.T. In Group 10B G6UJ stood out as the most consistent station throughout. G6DR and G6MN stood out very well and came through at great strength whenever they were on. G2KO did not feel that he had a very great chance with his QRP outfit, using only 2 to 3 watts, so he closed down. G6OO has added HB to the list of countries worked on 2 M.C., HB9N being raised. It is interesting to note that G6OO and G5DR, both of Bridlington, acting respectively as shore and shipboard stations, were recently commandeered by the Air Ministry, and given special call signs and a wave-length of 150 metres.

Television.

G5CV, Group Manager.

Group 11*A*.—G5GJ is making progress with his new receiver and hopes to have it working soon. He intends to carry out a series of experiments with Kerr cells and polarised light.

G5CV has been receiving fairly good images in Devon with a portable with one additional L.F. stage (R.C.) added externally. On one occasion a faint ghost image was obtained. 5CV has also been exhibiting apparatus at the Television Society's exhibition in London.

A letter budget is being commenced this month, and more members are required for this group.

Antenna Group.

G2OP, Group Manager.

The first budget is now in circulation, and I have asked members of this group to test out and report to me on what I will call the "Wilkinson" aerial. (See Fig. 3.) I call it the "Wilkinson" because I am indebted to G2YU for bringing it to our notice. The 40 metre variety consists of 33 ft. top with an 8 ft. 6 in. feeder at 8 ft. 6in. from the end. Feeder goes to thermo couple ammeter, .00025 variable, nine turn coupling coil, the other end of which is connected to a 33ft. counterpoise.

The 20-metre variety consists of a 16 ft. 6 in. top fed with a 9 ft. long feeder at 4 ft. 1½ in. from end. Counterpoise in this case is 16 ft. 6 in. With this tiny affair G2YU raised FY, LU, VE, CE, W, VK, AU, FM, amongst others, using never more than 8 watts.

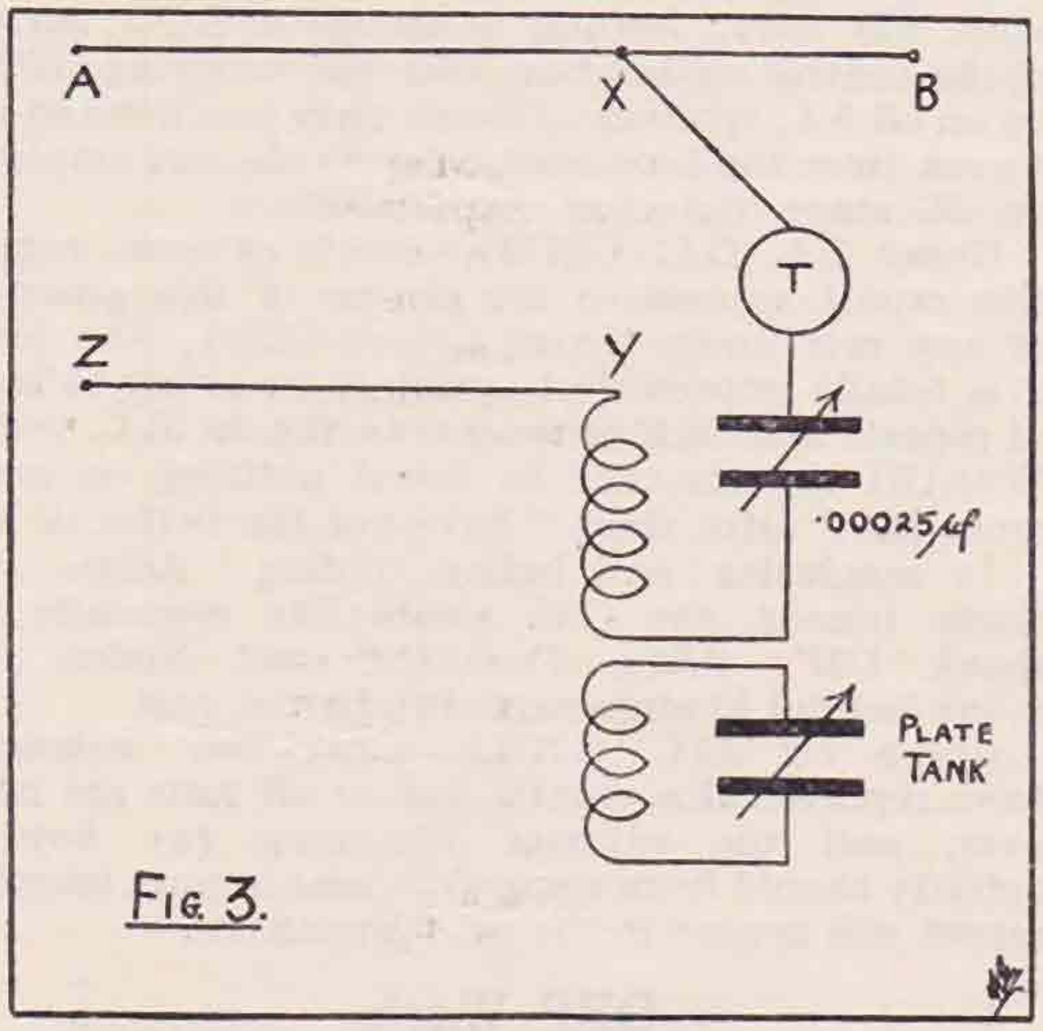


FIG. 3.

Fig. 3.

FOR 7 M.C.—AB 33 ft.; XB 8 ft. 6 ins.; XT 8 ft. 6 ins.; YZ 33 ft.; Y 9 turns.

FOR 14 M.C.—AB 16 ft. 6 ins.; XB 4 ft. 1½ ins.; XT 9 ft.; YZ 16 ft. 6 ins.; Y 6 turns.

T is a thermo coupled ammeter.

For best results the top should be at an angle of 45 degrees from the horizontal.

At the moment the G.M. is testing this himself, and I can tell you that my very first test call brought me back a W in the early evening, and this was immediately followed by a good QSO at R4 with ZU6W.

If anyone tries out this arrangement, will he please send in a detailed report to G2OP.

Another interesting aerial which gives most excellent results is a real A.O.G. used by our old friend G2BI, and this will be the next one for test purposes.

In the meantime I am ready for more members and even still more ready to have brought to my notice anything except the usual 66 ft. Zepp fed. Why should everybody take the Hertz as a matter of course; can't somebody send some dope on a Marconi type or rather a type using an *even* number of quarter waves standing?

Review of Foreign Magazines.

Another sunspot article appears in the March *Proc. I.R.E.*—"Note on the 15th month period in Solar Activity, Terrestrial Magnetism and Radio Reception," by J. W. Pickard. A 15-month period has been reported in sunspot and meteorological

phenomena, and in this paper it is shown that radio and terrestrial magnetic disturbances follow the same change. The relationship between the sunspot numbers and reception phenomena has followed the same cycle over the period of observation, but a phase change occurred at the beginning of 1929.

In a note on screen-grid detectors in the current *CQ*, H. Heidelberg states that he has always had trouble due to secondary emission from the screen-grid, but this was overcome, and excellent results were obtained by using a pentode detector.

The *Journal of Scientific Instruments* can be classed as a "foreign" magazine so far as the average ham is concerned. The March issue contains a paper by C. L. Fortescue and L. A. Moxon (G6XN) on the comparison of ammeters at very high frequencies. Considerable difficulty is experienced in comparing the calibrations of ammeters at frequencies of 50-100 M.C.'s, owing to the impedance of the ammeters, stray capacities, and lead inductances. A perfected balance method, which successfully overcomes these troubles, is described.

Erratum.

The following details were unfortunately omitted from Fig. 1 in Contact Bureau Notes last month:

C^1 Cyldon 75 mmfds.
C^2 Cyldon 25 mmfds.
C^3 Dubilier 100 mmfds.
RFC-8' 4" of 36 S.W.G. enamelled wire single spaced.
R-wire wound, 5,000 ohms approximately.
L-4 turns ¼" copper tube 2" diameter spaced ¾", centre tapped.

European Notes.

Amateur activity in Europe during the last few months has certainly increased. Conditions on most bands have improved to a remarkable extent, and plenty of DX stations are to be heard almost every day. We hear from Finland that crystal control is now looked upon in that country as indispensable, and most stations are now employing this method of transmission. The R.S.G.B. 28 M.C. tests were very disappointing in Finland, and so far as is known no station has been heard on this frequency since October, 1930.

A Finnish journalist recently visited Station KA1ZA at Manila. Whilst there he managed to get into communication with his home country and family, and an interesting account of KA1ZA has been published in a prominent Finnish weekly paper.

The annual meeting of the S.R.A.L. took place on February 14 and was a great success.

An interesting phenomenon, exemplifying skip distance, is mentioned by a German receiving station, who points out that W stations in the 1st and 2nd districts are heard best around 22.00 G.M.T., whilst stations in the 3rd and 4th districts came through well at midnight and stations in the Middle West are at their best at 02.00 G.M.T. At the same time, the 1st and 2nd district stations drop out completely.

We are asked through the columns of this report to request amateurs overseas to do their best to reply to reports they receive from German receiving stations. The licence situation in Germany is rather an awkward one and most of their enthusiastic amateurs are confined to sending receiving reports to other stations, and any foreign station that replies to such reports is helping to encourage the amateur spirit in Germany.

We should like to remind everyone that the date of the Hamburg annual convention is May 22-26. All foreign amateurs are welcome.

NOTES & NEWS FROM THE BRITISH ISLES.

MEMBERS corresponding with their District Representative on Society matters are asked to enclose a stamped self-addressed envelope when expecting a reply. Many D.R.'s are finding their postage bill mounting considerably.

* * *

DISTRICT No. 3.

By J. NODEN (G6TW).

According to the following, Thursday, March 26, proved to be a good QSO night, for G6OM reports that at 21.06 G.M.T. he worked VK5GR, QSA 2/3, T8 ; also he was received about the same strength ; this was on 7000 kc. band, and immediately after he had a QSO with SU1OT, whose sigs. were QSA 4, T7. Perhaps other hams have recollections of the conditions prevailing on this night.

DISTRICT No. 4.

Representative : J. LEES, (G2IO), 17, Trevose Gardens, Sherwood, Nottingham.

No. 4 District Annual Conventionette is to be held on Saturday, June 20 next, at the Reform Club, Victoria Street, Nottingham. Informal meeting at 3.30 p.m., tea at 4 p.m., and dinner at 7.30 p.m. A visit of topical interest will be arranged between tea and dinner, together with station visits, time permitting. Early notification is requested so that the necessary accommodation can be reserved.

Eleven members attended the April meeting which was held in Worksop, visits being paid to the stations of G6MN and G2XS.

The following report active : G2HD, G2VQ, G2XS, G2IO, G5DM, G6HK, G6LI, G6MN, BRS365, BRS366, BRS402, BRS426. G6LI managed to QSO J1DP during the Easter holiday and was reported R5 on 14 M.C. Please remember the Letter Budget.

DISTRICT No. 5.

Representative : F. W. MILES (G5ML) Rydal, Beechwood Avenue, Coventry.

I should like to thank all those members who attended the Conventionette for their kind support.

A meeting will be held at Webb's Radio Shop, 133, New Street, Birmingham, on Tuesday, May 26, at 8 p.m. prompt, to discuss arrangements for holding regular monthly meetings, and it is hoped all interested will do their utmost to attend and air their views. It is intended to make these meetings of interest to BRS members as well as the active transmitters.

The Letter Budget has been very disappointing so far ; we have over 60 members in this District and yet only eleven contribute. What about it, Staffordshire ? "Let's hear from you." All reports by the 15th to V. M. Desmond, Esq., G5VM, 199, Russell Road, Moseley, Birmingham.

DISTRICT No. 6.

Representative : R. C. HORSNELL (G2YI), "Hepani," Guernsey Gardens, Wickford, Essex.

I am sorry District 6 has had no notes of late, but none have come to hand.

Several of the stations in the district are active on 3.5 M.C. G5GJ is hoping to start up again soon on 1.7 M.C. after about six years' absence. The 1.7 M.C. band is being used considerably in this area for gramophone record transmissions, and I am afraid rather in excess by some of our members, who transmit, it seems, for the benefit of local B.C.L.'s ; this is rather selfish when others are using the same band nearby, and it is certainly not the "ham" spirit.

BRS191, G2DQ, G6NW, and G2YI are all active. G2LZ is busy with automatic recording of other hams, and returning their own fone back to them ! Try and let me have reports, OMs, and as I am now on the air, give me a call.

DISTRICT No. 7.

By R. C. NEALE (G6GZ).

The outstanding feature of last month's work was the performances of the QRP Group—one in particular being a QSO with FM by G5CM, using .5 watts. Some of our 1.7 M.C. stations seem to be getting out to the Continent nicely—many QSO's reported. Also we can boast of as many active on 3.5 M.C. as most Districts. The conditions in general are reported good on all bands, with occasional patches of "freak." Last month's Letter Budget was poor. Surely you are not all too busy to drop a line each month. Neither are you QRT, as I often hear you on the air. Come along ; surely you have something to tell us.

The following report active :—G6NK, G2VV, 2APG, G5CM, G5MR, G6PA, BRS432.

DISTRICT No. 8.

By R. C. NEALE (G6GZ).

Two or three hitherto medium band stations have turned to the higher frequencies, and from reports seem to be getting out quite well. Reception reports are very good and nicely detailed. Excellent ones reach me regularly from the Channel Isles. I'm sure this is just a useful distance for those who require reports of their 1.7 and 3.5 M.C. work. Drop a line to 2AHD. Little notice was taken of my proposed Conventionette. Might I presume it isn't wanted ? I hear two or three stations active in this District who do not contribute to Letter Budget. There is heaps of room for you. If you haven't the idea, drop a line to me and I will forward a back number for you to see. One gets the monthly news and activities of the area, together with all sorts of ideas and tips in return for one letter per month as their contribution. The following report active :—G2WK, G2GG, BRS343, BRS157, G2BI, G6BU, G5UY, 2AHD, BRS496, G5CS, G6GZ.

DISTRICT No. 9.

Representative : G. COURTENAY PRICE (G2OP), 2, St. Anne's Villas, Hewlett Road, Cheltenham.

As reported last month, the District Annual Conventionette will be held at Bristol on Saturday, June 13. This, of course, is open to all members, whether in the district or not, and I welcome attendance from H.Q. and the neighbouring districts. Tickets will be 5s., and full particulars may be obtained from G2OP or G6RB.

May I take this opportunity of congratulating G2CJ on his excellent appointment at Norwich. Although I like to see anyone making progress in

life, yet it is a matter of great personal regret that CJ is leaving me, and the district will also be very much the worse by it.

Our loss will be the gain of No. 6 District, and CJ carries with him our very best wishes.

DISTRICT No. 10.

Representative: S. BUCKINGHAM (G5QF), 19, Oakleigh Road, Whetstone, London, N.12.

The District Budget continues to flourish and has now some 15 contributors. This fact is the primary reason for lack of notes in the BULLETIN, as I have not received the Budget back until early in the month, instead of by the 25th. However, it is very gratifying to know that the District continues to progress, especially interesting is the increase in *active* B.R.S. members.

During May the first District meeting will be held at G6CL, when I hope everyone will attend. The date is May 23, and the time 6.30 p.m. onwards.

The District congratulates G5UM on the successful manner in which he organised the recent 1.7 M.C. tests, and we are all glad to learn that the tests have been well supported.

We are also pleased to hear that Mr. Curnow (G6CW) has started up and we wish him good luck.

BRS478 and 497 are actively engaged in recording DX on 7 and 14 MC. and report that they have visited G6CL. Our old friend G5SL is now working on 14 M.C. and with a re-designed station hopes to add some good DX to his log book. G2WV is working considerable DX and can be heard most week-ends on the 14 M.C. band. G6CL has carried out some very good work, both local and DX. Probably his most interesting contact was with J1DE, whom he raised on a chance call with a 6-watt input. During one week-end Africa, Asia and Europe were worked on telephony, using the same power, whilst many local 7 M.C. fone contacts have been made with 4 to 5 watts, W1, 2, 3, 4 and 8, VE1 and 2, TF, SU, YI, FH, and AU have also been worked on QRP. G5QF has made many DX QSO's with W1, 2, 3, 4, 8 and 9, VE1 and 2, and CX, using an input of 10 watts. G6OT has come to active life again and has worked America on fone and had many good contacts with other distant places. G6UN, G6PP, G2IM, and G6KW are all more or less active on their usual bands.

DISTRICT No. 11.

Representative: L. H. THOMAS (G6QB), 66, Ingram Road, Thornton Heath, Surrey.

I think most of the active members in the District are getting the Letter Budget already. Those who are not have only themselves to blame, as the announcement was made in the BULLETIN some time back, and the Budget is being kept to those who applied to be put on the list. It has between 14 and 17 "subscribers," and plenty of enthusiasm is in evidence, this being backed up by the good conditions prevailing at the moment. Several of the high-powered men have distinguished themselves by contacts with Japan this month, G2UX has done excellent work on low power (W.A.C. and W.B.E.), and G6HP has bagged the first contact with OM2CS (Guam). A scheme is in the air for a "No. 11 District Monthly Broadcast," for news of which please "watch this space"! Several new members are on the air, and if there are any whose acquaintance I have not yet made, will they drop me a card? I shall be glad to see them any time, provided that I am at home!

DISTRICT No. 13.

Representative: H. V. WILKINS (G6WN), 81, Studland Road, Hanwell, W.7.

The April meeting was poorly attended, due in the main to bad weather. The next will be at G6XN, 37, Vallis Way, Ealing; 'bus No. 97 from Ealing Broadway. It is proposed to discuss summer meetings, so please turn up. The area "hamfest" is fixed for Saturday, May 30, 7 p.m., for 7.30 p.m., and the rendezvous The Doves, Upper Mall, Hammersmith. Nearest station, Ravenscourt Park. The charge will be 3s. 3d., and as accommodation is limited, I must know four days in advance, otherwise I cannot guarantee tickets. Please pay me on arrival. Most stations have found conditions excellent, and G2OL and G6XN have run up quite good scores in the QRP tests. Nearly all DX has been done on 14 M.C. G2OL has had three QSO's on this band with U.S.A., using one watt input. The first two were preceded by QRO contacts, the third entirely with QRP, but spoilt with QRM. The following have reported and sent letters for the Budget: G2YC, G6YP, G2OL G6XN, G5CV, BRS438, and G6CO.

DISTRICT No. 14.

To the Hams in the West: A landmark in 1931 Radio—No. 14 District Conventionette at Newport (Mon.) on Sunday, May 31. To be held at the Queens Hotel, Newport (Mon.). Conventionette to commence at 10 a.m. at above hotel, when visitors will be met, introduced, and station visits made to nearby stations for early arrivals. At 12 noon the Conventionette will be formally opened by the Provincial District Representative G2VQ, and will be followed by luncheon.

A discussion will be opened by G2QI on "The Use of the 1.7 M.C. Band."

Tea and personal QSO's will follow, and the meeting will formally close at 4.45 p.m. The charge per head will be 4s. (inclusive of luncheon and tea).

The remainder of the evening will be filled in with organised station visits in Newport. All details from G2HH, Trive Cottage, Ebbw Vale, Mon., and all are invited, but please notify G2HH.

SCOTLAND.

Representative: JOHN WYLLIE (G5YG), 31, Lubnaig Road, Newlands, Glasgow.

The outstanding feature of the March-April period has been the remarkable return at the beginning of April to the fine working conditions of 1928. This particularly with regard to the 14 M.C. band, where conditions have been phenomenal. Stations and countries unheard of hitherto from a radio point of view have been pouring in at extraordinary strengths, and the South American stations, which have been absentees for months, are once again as prolific as formerly.

For the first time Japanese amateurs have been heard and worked from Scotland, both G2MA, and the writer having made contact. This, however, is not the first Scottish contact with Japan, as G5DA made contact with a Japanese commercial station away back in 1925, on a frequency of 3.1 M.C. One first Scottish contact does fall to be recorded, however, as the writer connected with CR9CN, of Macao (China), on April 18, at 16.03 G.M.T.

There has been a diminution of activity in "A" District, and apart from G2MA, G5ST, G5XQ,

G5YG and G6WL, no " A " District stations have been heard on the air. This, of course, may indicate intense research proclivities, but I doubt it, and am afraid that the commencement of the summer sports season is the real cause of the trouble. Unfortunately, the writer must join the ranks of the silent workers at the beginning of June, owing to rebuilding of the station, which has been brought about by change of house power supply. As summer holidays also intervene, G5YG will not be on the air again till October.

" B " District reports another new transmitter in the person of Mr. A. M. Hardie (BRS375), who has now been allotted the call G5FP, and who, with G2YA, G2AP and G5JK, has been active on the 1.7 M.C. band. These stations are mostly C.C., and G6IZ (Hon. District Manager) reports most favourably on the quality of their transmissions. G5JK and G6IZ now licensed for 3.5 M.C., expect to make an incursion on that band at an early date.

" C " District, unfortunately, is not making itself heard, but developments are expected here, as several of the BRS members hope in the near future to join the transmitting ranks, Mr. Millar, of Dundee, having already been granted A.A. licence 2AHZ.

" D " District, from a communal point of view, takes the palm. Mr. Bamford, ably backed by the members, has infused new life into the South-East, and amateur radio is more flourishing there at present than it has ever been since the inception of the Scottish organisation. Congratulations to you all. Fortnightly meetings at various QRA's are held and are very well attended. Morse classes, conducted by Mr. French, have proved most helpful. Mr. French (BRS56) and Mr. Kollien (BRS179) await the issue of their radiating call-signs, and Mr. McKenzie (BRS468) has been granted an A.A. licence (please let me have your call, OM.—G5YG).

" D " District was visited this month by ON4BV, who was suitably entertained and dragged around.

NORTHERN IRELAND.

Representative: C. MORTON (GI5MO), Simla, Glastonbury Avenue, Belfast, N.9.

I have to welcome a new member to the transmitters this month: Mr. Wilson Harvey, GI5DU, " Glenshesk," Deerpark Road, Belfast, and I wish him the best of good luck. GI5NJ reports contact with Japan, the first Irish station to do so. He has also worked a number of Australian and N.Z. stations during the month. I congratulate GI6YW, who is now WAC and WBE on 14 M.C. This was done during Easter, when EI7C was staying at GI6YW, and the " bag " included many VK's, Siberia, Iceland, China, and many W's. On 2 M.C. he has worked first QSO between H.B. and Ireland, and has now worked five countries on that band.

Notice to Contributors.

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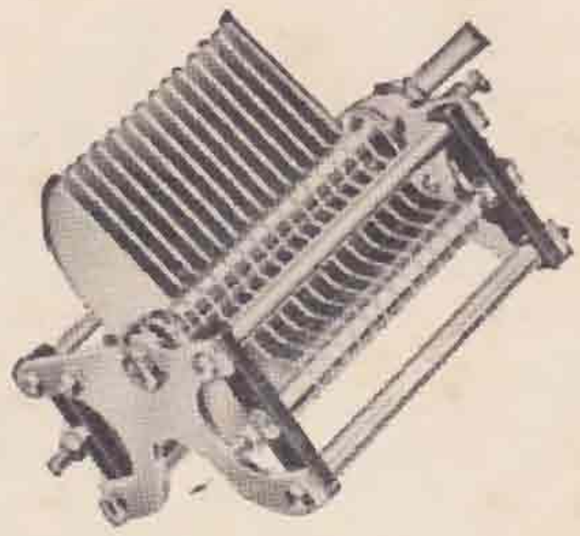

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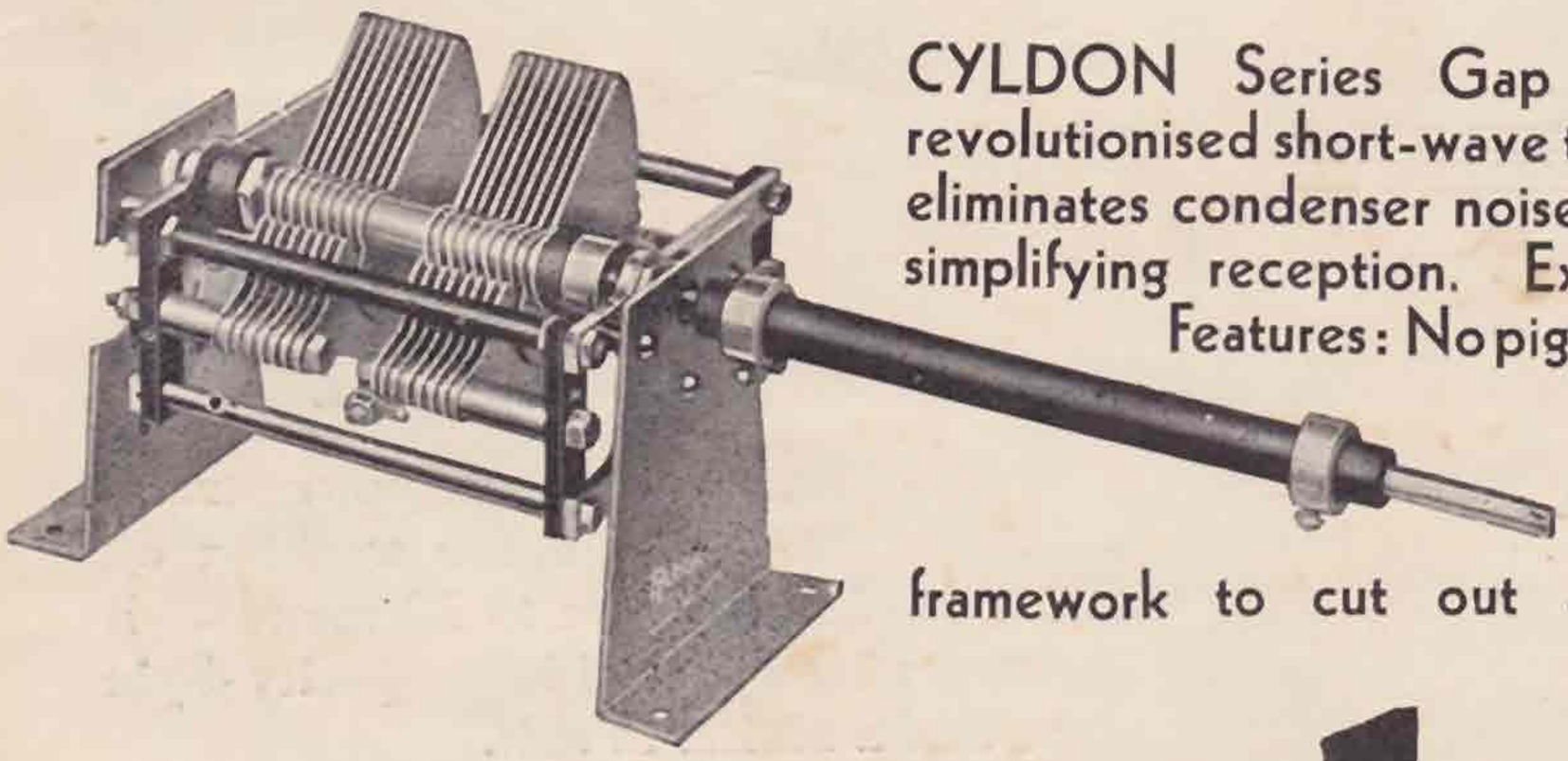

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Printed for the INC. RADIO SOCIETY OF GREAT BRITAIN, 53, Victoria Street, London, S.W.1, by LOXLEY BROTHERS LTD., 50, Southwark Bridge Road, London, S.E.1.