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The “Vitesse”

We have already received hundreds of letters of congratulation from readers who are building our latest all-wave battery receiver. It is obvious that there is a demand for a receiver of this type, and as we have already explained, the battery user has the past been precluded from making the same excursions into the realms of short-wave listening as have been available to the all-mains listener. It should not be necessary to point out that short-wave listening offers many difficulties, not the least of which is the delicacy of tuning which is required. But this is easily mastered after the receiver has been in use for two or three hours. We do not propose to go into figures showing how dozens of stations can be incorporated in the space occupied by only two on the medium wave band, but it will be found that at certain points on the short-wave tuning scale six or seven stations will be tuned in and out—all separated from one another—in the space which, on the medium waves, will perhaps only cover two stations such as the London National and Firecamp. The hour at which you listen is also an important point when covering a large band of short-wave stations such as will be heard on the “Vitesse”, but these details are fully covered in the article on page 729. We hope to receive some interesting logs and details from constructors, which will be published in due course. If you have not yet started to build this receiver and did not obtain last week’s issue with the Free Blueprint, you should place an order with your newsagent without delay.

Japanese Daily Transmissions

WHILST on the subject of short-wave stations we may mention that having brought into operation its new 50 kw. transmitter, JZ1, on 31.46 m. (9.385 mc/s), the Japanese Broadcasting Corporation has initiated a daily programme destined to European listeners. This takes place between G.M.T. 20:00-20:30, and is simultaneously transmitted through the 20 kw. station, JVP, on 32.96 m. (7.51 mc/s). The call is given out in Japanese, German, French, Spanish, and in English. The last-named reads: “This is the Japanese Broadcasting Corporation, Tokyo, in the Land of the Rising Sun. The station closes down with a flourish of trumpets and the Japanese National Anthems.”

A Flying Doctor

In Australia one doctor carries out his visits by air. He makes long journeys into the bush to visit those who are otherwise out of reach of medical assistance, and amateur radio has, on many occasions proved of great value in calling for such assistance. Recently received W9LYC relayed an urgent call for help which resulted in the flying doctor arriving the next day after a flight of close on 400 miles.

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New Television Fields

THE search for new material for the television programmes recently led the B.B.C. to broadcast two acts from the current London Casino cabaret show. The London night-club and theatre fields provide, of course, a mine of talent upon which to draw, and a Marconi-type television receiver was installed in the foyer of the London Casino so that visitors could see the broadcast and note the high standard of entertainment which is provided by this new field.

The English Channel

ENGLAND’S “Guard and Wall” is the subject of a feature programme to be broadcast from the National on March 21st. The historical story of the Channel is a rich and varied one, and it will be traced from the earliest days. Famous names in fact and fiction, including the Phenician traders, Julius Caesar, William the Conqueror, the Vikings, Philip of Spain's Armada, the Mayflower and many others, will take a place in the production. It is also hoped to draw on the works of Byron, Dickens, Thomas Hardy and many other writers, whilst music will also play an important part, including, of course, the popular sea choruses.

Television Exhibition

THE first public exhibition devoted solely to the development and modern attainments of television will be staged at the Science Museum at South Kensington early in June. It is anticipated that it will remain open for three months. All the principal British manufacturers interested in the development of television are cooperating with the R.M.A. and the B.B.C. to make the exhibition truly representative, and it is expected that it will do much to spread a wider appreciation and understanding of television as it is now available in the home of the listener. In addition to an illustration of the development of television equipment, demonstrations will be given of the B.B.C. programmes on modern receivers, and a local transmitter will be shown in operation so that the receivers can operate when no B.B.C. transmission is available.

Henry Hall’s Hobby

LIKE all popular people, Henry Hall has a hobby. But unlike the majority, Henry’s hobby is closely connected with his work. He collects music! His collection embraces every song hit published during the last thirty years, and although many of them were purchased in the ordinary way, some existed only on publishers’ files and have had to be copied. Behind his office in Maidia Vale there are bound volumes containing about 20,000 tunes which have been sung, hummed and whistled since the early years of the century. Quite a number of these copies have been picked up on second-hand music stalls, and even music publishers have gone to Henry Hall for copies of music which they have been unable to obtain.
ROUND the WORLD of WIRELESS (Continued)

Old English

One of Galsworthy’s most charming plays will, on March 7th (National), be heard over the microphone for the first time. Essentially a study in character rather than a play of action, it should prove particularly suitable for the purposes of radio drama. The scene is set principally in the boardroom and offices of a shipbuilding company in Liverpool, and the central figure of the drama, “Old Heythorp,” the chairman of the company, is drawn on a truly heroic scale. A typical late Victorian, at once stubbornly wrong-headed and shrewdly good-hearted, he embodies within himself all the strength and weaknesses of an era that has for ever vanished. Many listeners will, no doubt, enjoy this intensely human comedy of commercial life.

Too American!

The following story has been passed on to us by Pye Radio Ltd., concerning a recent experience of their service agent of Paignton, South Devon: A prospective purchaser insisted on hearing an American all-wave receiver before definitely deciding to purchase. A trans-Atlantic station was tuned in, but she declined to buy, giving as her reason that the set talked too much like an American. When the explanation was given that the set was actually manufactured in the United States, she said that probably accounted for it, and a decision was then made for the installation of a Pye T.10 receiver.

Popular Concert from Bath

The Bath Pump Room Orchestra, conducted by Maurice Miles, will broadcast a popular concert from the Pavilion, Bath, on March 8th, in the Western programme.

Interesting and Topical News and Notes


Variety Programme

Variety will be broadcast from the Prince’s Theatre, Bristol, on March 12th, when listeners will hear Nima Meakin, Jack Warren, and Steffani’s 21 silver songsters.

Musical Comedy Programme

The B.B.C. Welsh Orchestra, conducted by Idris Lewis, will give a Musical Comedy Programme on March 10th.

Opera from Oxford

The Royal Carl Rosa Opera Company, conducted by Charles Webber, will be heard on March 5th in a performance of Act I of Wagner’s opera, ‘Tannhäuser,’ from the New Theatre, Oxford. John Myddlin will take the part of Tannhäuser, and Pauline Mander that of Venus.

Sonata Recital

On March 7th, Western Regional listeners will hear a sonata for violin and piano by Hal (violin) and Pauline Baring. The work to be performed will be Sonata in E flat major by Strauss.

A Floating Service Station

A unique service station for wireless transmitting and receiving apparatus exists in Alaska. It is housed in a yacht off the coast, and is owned by a Seattle radio firm. In addition to servicing radio receivers possessed by the scattered population of this part of the world, it also undertakes repairs to the transmitting and receiving equipment installed on board various ships.

Variety from Blackpool

An excerpt from the variety Bill will be broadcast from the Palace Theatre, Blackpool, on March 5th. Acts which listeners will hear include Harold Walden, Nell and Clare, and Mario Lorenzi.

B.B.C. Scottish Orchestra

On the afternoon of March 6th the B.B.C. Scottish Orchestra, conducted by Gwynt Warrack, will play the Overture, “Russian and Ludmilla,” by Glinka; Symphony No. 16 in G (the Oxford), by Haydn; Dances and Melodies from “Don Gill,” by Brahmefals; and “Slavonic Dances,” by Dvorak.

America’s Radio Tax

Although there is no licence fee for wireless users in America, the U.S. Government obtains money from listeners in an indirect manner by an excise tax of 5 per cent. on receivers, gramophones, and other domestic electrical equipment. Last year this revenue amounted to five million dollars.

“Midland Parliament”

At its next session, on March 4th, “Midland Parliament” will discuss Time-Study and Speeding-Up in Industry, including the effects of various systems upon output and as judged from the workers’ point of view. The speakers will be Sir Charles Mander in the Chair, W. M. W. Thomas, managing director of a well-known motor firm, George Jones, secretary of the Midland Miners’ Federation, and Andrew MacLaren, M.P. for the Burslem Division. It is hoped also to have a representative from some factory where one of the time-study systems is in operation.

SOLVE THIS!

Problem No. 233.

The 7.1 l.p. transformer in Hulton’s receiver was overloaded the output plate valve and causing distortion. How could the external wiring to the transformer be altered so as to provide a lower degree of amplification? Three books will be awarded for the first three correct solutions offered. Address your solutions to the Editors, PRACTICAL AND AMATEUR WIRELESS, Geo. Newnes, Ltd., Tower House, Southampton Street, Strand, London, W.C.2. Envelopes must be marked Solution No. 233 in the top left-hand corner, and solutions must be posted or received before the first post on Monday, March 8th, 1937.

Solution to Problem No. 232.

The capacity of the condenser feeding the A.T.C. mode of the D.I.T. valve was too high. The following three readers accurately solved Problem No. 231, and books are accordingly being forwarded to them: E. F. Chinn, Meriton, 15 Ringwood Rd, Parkstone, Dorset; Charles P. Fiske, Mariette, Abylneys, Bantry, I.P.A.; 8, Sunnybank, Robin Hood Lane, Waldershare, Chatham, Kent.
The Experimenter's Equipment

This Week the Experimenters Give Some Advice to a Young Experimenter Concerning the Kind of Meters and Test Gear Which He Will Require.

The select circle of "Experimenters" has been augmented. A new and youthful recruit has joined us. When he first came into our midst he was inclined to be rather bumptious, but we are gradually effecting a cure and he will soon "fall into line." You see, he has taken a course in the theory of electricity and wireless at a university, and this has given him the idea that he knows all about radio experimental work. As a matter of fact, he is just about to start to learn something of a practical nature. He is very good at using high-sounding technical terms, but if the occasion arises when it becomes necessary to give a brief, accurate and reasonably adequate definition, he is lost for words.

But we are digressing. This new recruit isn't half as "dumb" as we try to make him believe, but we must cure him of his pedantry, especially since we others are more interested in practice than in theory, and always make a point of using highly-technical terms only when simpler language is incapable of giving a proper explanation. What we really intended to tell you in this "bulletin" is that our new friend has been seeking our advice regarding the type of test gear and equipment which he will require for his "shop." During his course of training elaborate and costly meters have been at his disposal, and there have been complete pieces of apparatus for every test and measurement which it has been desired to make. Now, he has to "come down to earth," or else spend so much money on gear that there will be none left with which to carry on actual construction—which is, after all, the most interesting part of experimental work.

Measurements Required

It is appreciated that meters will be required for the measurement of current, voltage, resistance at least. Bridges for measuring inductance and capacity would also be useful, as also would a moderated oscillator and a wavemeter. In the first place, however, we are recommending him to be satisfied with a few good meters; he can later build the more elaborate apparatus for himself, using the meters which he has.

The choice of meters is not easy, if a fair degree of accuracy is essential, and at the same time the available cash is strictly limited. A multi-purpose meter, such as the Avo-meter or Avo-Minor is extremely useful, but is fairly expensive when a type is required for both A.C. and D.C. These combination instruments can be used for reading currents, voltages and resistances in several ranges, and are very convenient. But since our friend is unable to spend more than about £4, requires to measure both D.C. and A.C., and will sometimes with to use two instruments at the same time, we suggest that he buys a good moving-coil milliammeter reading up to 10 mA, a moving-iron volt meter with a full-scale reading of 5 volts, another moving-iron meter reading up to 250 volts, and a moving-iron milliammeter reading up to about 20 mA. The first of these will cost about 30s., whilst the other three will cost about 15s. each. Actually, the moving-iron milliammeter will rarely be required and could be omitted from the list if desired. Cheaper instruments are available, but they would not be likely to be sufficiently accurate for other than simple receiver-test purposes.

Moving-Coil Milliammeter

The moving-coil milliammeter can be used for most D.C. current readings without modification, and can be used for higher ranges by adding shunt resistances, or for voltage measurement by the addition of series resistances. It can also be used for measuring resistances (be enlarged appropriately) in conjunction with a battery. Moving-iron meters can be used for measuring either A.C. or D.C., and can be obtained in types which are accurate to within about 5 per cent, at the approximate price mentioned above.

Rather than build the meters into a complete test panel, we suggest that he purchase a number of standard meters and some small panel holders, as shown in Fig. 1, fitting a length of red-and-black flex with test prods to the terminals. In order to save space many lmps up to the normal full-scale reading is necessary simply to break the circuit under test and hold the test prods against the sides of the break as indicated in Fig. 2, where the meter is shown connected to measure the anode current passed by an L.F. valve.

In order to double the scale reading a resistance equal to the resistance of the meter can be connected in parallel with it. This may be done most easily if a pair of terminals is fitted to the inclined panel, as shown in broken lines in Fig. 1. A 0-10 mA meter generally has an internal resistance of about 20 ohms, so a resistance of that value would be required. If it were desired to multiply the scale readings by three, the shunt resistance would need to have a value of one-half that of the meter, or 10 ohms. As it is not always easy to obtain resistances with values as low as these, except as expensive precision components, an alternative arrangement is to use a 25-ohm variable resistance of good quality instead. The correct settings for this can easily and accurately be obtained by connecting the meter in a circuit passing about 5 mA. Without making any other alterations, the shunt resistance should then be careful and adjusted until the reading of the meter is exactly half of the previous figure. Next connect the meter, with shunt, in another circuit passing about 10 mA (5 mA reading on the scale) and again set the variable shunt resistance until the reading is halved, as before. The reason for using the half-scale deflection as a basis for adjustment is that this point any slight inaccuracy of the meter is at a minimum.

Measuring Resistance

If the variable resistance were mounted on the meter panel it (Continued overleaf)
THE EXPERIMENTER'S EQUIPMENT
(Continued from previous page)

might be a subtree to draw lines to indicate the position of the knob pointer for doubled and trebled readings, but before reliance is placed on these settings, they should be checked a number of times to ensure that the actual resistance in circuit always corresponds to the setting of the pointer.

Resistance measurements can be taken by using a voltmeter in conjunction with the milliammeter, as shown in Fig. 3. It will be seen that the voltmeter is connected in parallel with the resistance, while the voltmeter and the milliammeter are connected in series. For resistances of 2,000 ohms and over the value can be ascertained by dividing the voltage indicated by the voltmeter by the current reading of the milliammeter. The result will be in thousands of ohms. As an example, if the voltmeter were 3 (when using a G.B. battery for convenience) and the current 1 mA, the value of the resistance would be 3,000 ohms. On the other hand, if the voltmeter were 300 and the current 4 mA, the value would be 12,500 ohms. From these examples it will be seen that a voltages of 1 to 3 can satisfactorily be used with up to about 1000 ohms, whilst higher voltages up to 100 or so are better when measuring higher resistances. A tapped H.T. battery is very convenient for the purpose, provided that the voltmeter does not pass more than a little over 10 mA.

Meter Resistance

A typical 5-volt moving-iron meter has a resistance of 60 ohms, and so passes nearly 90 mA, at full-scale deflection; in that case, the meter should be kept in circuit for a few seconds only, whilst it would be preferable to use an accumulator for providing the voltage. Alternatively, the current would be halved if the voltage were similarly reduced. Moving-iron meters for reading up to 250 volts can be obtained with a resistance of 6,500 ohms. Such a meter would pass nearly 40 mA, when the full scale is used, but this could be cut down to 10 mA, by using a voltage of 60. These are points which must be borne in mind if a battery is not to be run down.

Another method of keeping down the current passed by the meter is to double its scale reading, by connecting in series with a resistance of value equal to that of the meter. When dealing with resistances of less than about 2,000 ohms, accuracy can be ensured only by subtracting from the calculated value the resistance of the milliammeter—20 ohms in the case under discussion. It will have been noticed that in many cases it is necessary to know the resistance of the meters used; in consequence, instruments should not be bought unless they are of specified resistance.

Capacity from a Milliammeter

It is not always known that condenser capacities can be found fairly easily by using simple methods of the types described in conjunction with a source of alternating current of known frequency. The latter can be the mains supply, and the required condenser resistance for the circuit of the type shown in Fig. 4. A 9,000-ohm, 10-watt variable resistance is connected across the mains supply (which preferably be fed through a twin plug with two 25 to 5-amp. fuses) and the 250-volt meter is joined between the slider and one end of the resistance. The moving-iron milliammeter and condenser are then connected in series with each other and in parallel with the voltmeter. Before connecting to the mains supply it is well to move the slider of the variable resistance to a low setting in order to avoid the possibility of passing more than 20 mA through the milliammeter.

After the connections have been made and readings taken from the two meters, the condenser capacity can be calculated from the formula:

\[
\text{Capacity (in mfd)} = \frac{\text{Current (mA)}}{\text{Voltage} \times \text{Frequency} \times 0.0003}
\]

In most cases, the frequency will be 50 cycles, and therefore, if the voltage was 160 and the current 5 mA, the capacity would be 160 \times 50 \times 0.0003, or 1,000 mfd.

For the circuit of the type shown in Fig. 4.

Fig. 4.—Theoretical circuit diagram and pictorial arrangement for simple capacity measurement.

Broadcasting Equipment in London Fire Station

A striking example of the practical application of modern electric amplifying equipment is provided by the loudspeaker announcing system manufactured by the General Electric Co., Ltd., which is being installed at the Heston and Northolt Fire Station. Specially-designed loudspeakers are being installed to cover the engine house, the reception room and the parade room. At a single press of a button, an automatic message can be sent to all members of the Brigade for an urgent call.

The main microphone is in the control room, and a second microphone can be used on the parade ground for instructional purposes. A "priority call" device is installed, however, so that even if the parade-ground microphone is being used, it will be immediately cut out of circuit by the main microphone if a sudden summons has to be made. In the same way, while a switching control normally enables a choice of any of the loudspeaker channels to be made, the "priority call" automatically switches all loudspeakers into circuit. Since the authorities required an equipment which would always be ready for use at a second's notice, the amplifier is operated direct from an accumulator bank which is auto-charged from the D.C. supply.

La Voz de Costa Rica

CAREFUL tuning in the early morning hours, namely, between 6.00, 02.00-03.00, on most days will bring you the broadcasts of HNRM, Heredia, Costa Rica, a 150-kw transmitter, at 2507 kHz. Announcements are frequently made in Spanish and English and occasionally in the French language. Programme is preceded by a 10-minute broadcast and closes down with a fanfare reminiscent of the Last Post.

Address for reports: Señor Ananio Cepedes Marin, Apartado Postal, 40, Heredia, Costa Rica.

Dance Music

BILLY MERRIN and his Commanders will give a programme of dance music on March 13th from the Midlands Regional. The vocalists will be Rita Williams and Eric Stanford.

Birmingham Fire Brigade Band

THE Birmingham Fire Brigade Band, which is the only one attached to a city fire brigade in the country, will revisit a Birmingham studio on March 7th, when it will give a popular programme conducted by Station Officer R. Ward. Fireman G. Fryer will be the solo saxophonist in Foulth's Kite Suite, and Firemen E. Jordan and W. Kane will give a xylophone duet, Barnott's 'Flotsam and Jetsam.' The vocalist will be Edmund Letta, the Walsall baritone.

ITEMS OF INTEREST

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About Electrolytic Condensers

The Properties and Uses of these Components are Described in this Article

The electrolytic condenser is one which enables large capacities to be obtained at comparatively small cost and with certain advantages, but also certain limitations. They are divided into three classes, viz., wet, semi-dry and dry.

A condenser of the ordinary type consists of two parallel conducting plates separated by a non-conductor of "dielectric," which may be air, mica, wax-impregnated or oil-impregnated paper, etc. In the air- and mica-dielectric type condensers, a flat laminated construction is usual as in Fig. 1, but where impregnated paper is employed, it is more usual for alternate strips of foil and paper to be rolled helically to form a cylindrical body. The condenser will pass A.C., and it does not matter which way round it is connected on D.C. supplies.

In the electrolytic condenser the dielectric instead of being a separate entity, takes the form of an electro-chemically formed thin layer of oxide on the surface of an aluminium foil which is itself one of the plates of the condenser (see Fig. 2). The place of the second condenser plate is taken by a conducting layer of electrolyte (usually held in some form of porous separator), to which connection is made by means of another metal plate (sometimes the actual aluminium case of the condenser). Under the influence of the impressed D.C. voltage, any flaws which may occur in the oxide film while the condenser is in service will be sealed by electrolysis. The two aluminium foils, separated by the electrolyte, are rolled together forming a cylindrical section, which is mounted in a suitable container. (See Figs. 3, 4 and 6.)

General Electrical Properties

The capacity of the condenser being inversely proportional to the separation distance of the two conducting plates, it becomes obvious that the capacity per unit area of foil must be unusually high in an electrolytic condenser, since the separation is simply the thickness of the oxide film. This ultra-microscopic, the film being only a few molecules thick. Herein lies the main advantages of condensers of this type, the volume and price of a condenser of a given rating being much smaller than would be the case if a mica or paper dielectric were used.

There are, however, certain limitations which render this class of condenser unsuitable for certain work. Owing to the unidirectional conductivity property of the oxidized dielectric film on the aluminium, an electrolytic condenser must, with certain few exceptions, have a D.C. polarising voltage applied. In other words, it must always be connected so that the aluminium foil on which the oxide is formed is the positive connection. When this foil is made positive and the other plate and electrolyte negative, the oxide acts as a very high resistance and the condenser action occurs. If, however, the polarity of the plates is reversed, the current-blocking action of the film is absent, and the assembly ceases to be a condenser. The film is not initially harmed by such a reversal of connections, but if the comparatively high reverse current is allowed to continue, overheating occurs, the oxide dissolves, and the condenser burns out. Electrolytic condensers cannot, therefore, be used on raw alternating current.

They are designed for use as reservoir and voltage-doubling condensers for use with rectifiers and also in anode and grid bias decoupling circuits. They may also be used where a steady D.C. voltage has an A.C. ripple superimposed upon it.

Different Types of Electrolytic Condenser

The original type was the "wet" or "aqueous" condenser, in which the electrolyte is completely fluid, the assembly being sealed in a metal can with a vent to allow free escape of the gases generated by the electrolysis of the liquid. Condensers of this type will not easily break down and will act as surge limiters. They possess certain disadvantages, however, in that they are of rather poor general electrical characteristic, and comparatively large in size. They must also be mounted so that the vent is on top, above the level of the liquid.

The semi-dry condenser has an electrolyte of treacle-like consistency and must be mounted in a leak-proof container. The dry type of condenser, which is by far the most popular, contains an electrolyte which is sufficiently dry to allow of mounting in card cartons, boxes and tubes as well as in metal cans. (Figs. 3, 4, and 6.) A maximum of compactness and cheapness, therefore, attained by its use. This type of condenser will not limit surges in the same way as the aqueous types, but they nevertheless possess considerable re-scaling powers, even complete breakdowns being refulmed providing the breakdown spark has not been sufficiently powerful to dent the foil and cause it to penetrate the separator.

Fig. 2.—Internal construction of an electrolytic condenser.

Fig. 3.—Group of manufacturers' type dry electrolytic condensers. Fig. 4.—Reversible type dry electrolytic condenser (two condensers of 8 mfd. capacity each in the one container; case negative).

In normal use, a small leakage current of about 3 mA flows continuously through an electrolytic condenser, and the magnitude of this leakage depends upon the capacity of the condenser and the applied voltage.

The following summary of properties and permissible working conditions may be found useful:

Ratings

The rating of an electrolytic condenser is usually given as a peak voltage. This
includes the maximum A.C. voltage ripple, and any surges which may be experienced by the condenser when the apparatus is first switched on, such, for example, as occurs with a rectifier in a mains radio receiver. A condenser rated at a maximum of 200V. D.C. working will not withstand surges over this figure, and if the steady D.C. voltage which will be applied when the radio receiver is in normal use, i.e., after all the valves have warmed up, is 450 volts, then the A.C. ripple must not exceed 35V. R.M.S.

**Working Temperature**

Modern electrolytic condensers are made to withstand the temperature found in the average all-mains receiver, but they should not be over loaded too near a valve, especially if it is of the output class, where the temperature rise is very great. In general, if the conditions regarding ripple and peak voltage are complied with, satisfactory working will be obtained up to about 50 degrees C. without impairing the useful life of the condenser. If higher temperatures are met with, the ripple voltage must be reduced. In any case a high temperature will increase the leakage current, and this in itself will tend to heat up the condenser still further and a cumulative effect will occur, resulting in the eventual burning out of the condenser.

Higher temperatures raise the capacity and the leakage; lower temperatures lower capacity and temperature. Unless of the aqueous type, freezing will not hurt an electrolytic condenser, but where it is intended for use under tropical conditions it is advisable to work the condenser well below its maximum rating, both as regards peak voltage and ripple.

**Life**

Providing an electrolytic condenser is properly used, it will have a very long and efficient life. It should be borne in mind, however, that an electrolytic condenser is not permanent like the paper or mica versions, but that its life ends when the electrolyte has been exhausted by the action of the leakage current which tends to increase as time goes on. When such exhaustion does occur, the capacity drops to zero, but this does not occur until after a period of many thousands of hours, far more than the usual life of a radio set.

Where such condensers are being used by experimenters it should be borne in mind that a slight change in capacity occurs while an electrolytic condenser is standing idle, and that there is also a gradual decay of the oxide dielectric film. Hence, if a condenser is put on load after idling, the leakage current may initially be high, say 10 mA or more, but the electrolyte re-forms the film under the action of the applied D.C. voltage, so that the leakage current falls off, and a current of less than 1 mA is reached after two or three minutes on load.

The time taken to return to the normal load leakage depends on the length of time the condenser has been standing idle. After one week, it may be only two minutes, in fact it is appreciably equal. But a period of six months idleness may result in the condenser taking as long as 15 minutes to reach normal leakage. In such cases it is advisable, therefore, to put the condenser on load for about half an hour before using it, when it will then be in a satisfactory condition.

A slight drop in capacity occurs at the beginning of the load life of an electrolytic condenser. This is usually about 5 per cent. and the initial capacity is often slightly more than the high side, to allow for this drop, which mostly occurs during the first 500 hours use, after which a very gradual decrease in capacity is met with. It will be seen, therefore, that an electrolytic condenser may be compared in many respects with a dry battery, only the action is very much slower.

The amount of moisture in the air to be found in this country under all normal conditions is not sufficient to have any effect on an electrolytic condenser, but for tropical climates where abnormally high humidities occur it is advisable to use only those condensers which are mounted in metal containers.

**High Frequency Uses**

For normal dry type condensers, the effective capacity changes with the applied ripple voltage. The capacity at 50 cycles is decreased by 5 per cent, as the frequency is raised to 500 cycles per second, and by 15 per cent as it is raised to 5,000 cycles.

**Testing Electrolytic Condensers**

A good condenser may be distinguished from a faulty one by testing for leakage current after the condenser has been allowed to re-form as previously described. The minimum leakage value for any condenser should be 0.1 mA and an 8 ufd. condenser rated for 500 volts peak D.C. working should have a leakage current of about 1 mA. Condensers may also be tested by bridge or impedance methods, in which case it should be noted that the capacity value obtained by bridge measure-

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**Fig. 5.**—Group of wet electrolytic condensers used for filter purposes at a tramway depot.

Sometimes, both a working voltage and a surge voltage are specified. The working voltage must again include the peak of the A.C. ripple, but a further allowance must be made for any extra surges which may be applied over the working voltage when the set is first switched on, and this must not exceed the higher rated "surge voltage" figure given.

**Amount of Ripple**

Without going into technical and mathematical considerations, it may be said that the A.C. ripple applied to a normal dry electrolytic condenser should not in general be more than 10 per cent. (calculated as an R.M.S. voltage) of the D.C. polarising voltage. Thus, a condenser rated at 500 volts peak may not have applied to it more than 50 volts R.M.S. ripple, so that the permissible maximum D.C. voltage is 450 volts.

**Polarity**

With normal types of electrolytic condenser, the marked polarity must be strictly observed, for the reasons already given. For D.C. or universal mains radio receivers, however, where accidental reversal can occur due to the mains connector being put in the wrong way round, special reversible condensers are available (Fig. 4). These are, of course, more expensive and larger than the normal type, and, although they may be connected either way round, the D.C. polarising voltage is still necessary, and they are not suitable for use on raw A.C. In fact all the precautions regarding ripple, peak voltage, and so on, must be strictly observed as before.

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**Fig. 6.**—Two T.C.C. electrolytic condensers of the type shown in Fig. 4.
A PAGE OF PRACTICAL HINTS

An Improved Unit H.T. Battery Assembly

STILL employ the old method of building up one's H.T. supply from 4.5v. torch batteries, since I find it most convenient financially, and admirable for short-wave work. I find, however, that the detrimental effect of accelerated corrosion caused through tightly packing the batteries without individually separating them called for a new method of assembly, and in employing the idea illustrated I have appreciably lengthened the normal life of my H.T. battery, since corrosion is retarded by the employment of the glass separators. I can recommend this simple improvement for the new life it gives to the battery, and also its portability.—N. J. E. Smythe (Liverpool).

A Simple Tester

ON my receiver, which employs an H.F. Pen, Det., L.F. Pen, circuit, I have often found whilst experimenting that time and again I have had to make plate and screen voltage tests. The accompanying sketch shows a method I have adopted to facilitate these intermediate tests. The "tapping block" I made by inverting an old 2-pin valve base, and connecting valve leads to pins, and connector sockets attached to voltmeter leads finished my tester.—A. T. Bassett (Edgware).

THAT DODGE OF YOURS!

Every Reader of "PRACTICAL AND AMATEUR WIRELESS" who has originated some little dodge which would interest other readers. Why not pass it on to us? We pay £2-10-0 for the best wrinkle submitted, and for every other item published on this page we will pay half a guinea. Send that idea of yours to account by sending it in to us addressed to the Editor. "PRACTICAL AND AMATEUR WIRELESS." George Newsom, Ltd., Tower House, Southampton Street, Strand, W.C.2. Put your name and address on every item. Please note that every notion sent in must be original. Note envelopes "Radio Wrinkles" Do NOT enclose Queries with your wrinkles.

An Auto Morse Sender

IT is very difficult to carry out many "running tests" with a transmitter when using C.W. owing to the fact that the key requires operating.

A novel automatic Morse sender for carrying out "running tests."

The device was first made for a friend of mine, a well-known transmitter, to allow a test call to be put out whilst the last call was being entered up in the log during contests. It worked so well that, whilst when I first made it the call was "TEST. TEST. TEST. DE. G6LM. G6LM. G6LM." it was soon made to call "TEST. TEST. TEST. DE. G6LM. G6LM. AUTO KEY." and many a time the reply has come back "pass dope on auto key O.M."

I have now made another one for my own use, and it allows me to try out various ideas on transmission, monitoring, etc., whilst not having to touch the key. It can be relied on to give good sending providing sufficient time is taken to accurately cut the disc of three-ply wood. Its construction is very simple, and I think that the accompanying sketches make the details quite clear. The copper foil which I use is off baseboards of old S.W. receivers, and is cut into strips about $\frac{1}{4}$ in. wide. These are soldered together, as used, underneath the disc. The screw A is the pivot on which the arm B is fixed. A fairly heavy spring, C, keeps the end of the disc tight against the rubber tube forced over the top of the turntable spindle D. The amount which can be put on to one of these discs (mine are about 8ins. in dia.) is entirely dependent on the speed at which it is allowed to revolve, and also the fineness of the slots in the disc, but providing the spaces are accurate, the governing of the speed of the turntable spindle will help a lot in getting a proper speed.—W. J. Ford (Swindon).

A Multiple Connector

THIS simple device enables a component to be quickly connected to any form of connector without changing terminals.

The connector can be made from old pieces of brass strip. After completing all cutting and soldering, thread a washer and brass bolt (which are sold together) through arms A, B and C, respectively, and fix with screw on a milled nut, as illustrated. Each arm should be about $\frac{1}{4}$ in. wide and $\frac{1}{12}$ in. long. Two of these connectors will be required, one for each lead.—G. Thompson (Birmingham).

Condenser Microphone

I recently tried to use a condenser microphone of well-known make, but experienced complete failure. Finally, I made a single-valve L.F. stage with a high-gain L.F. transformer output, and mounted this in a small metal box, with an Osram Midget valve, Type A.567, and the microphone was mounted in one side of the box. Results are now perfect.—W. Watts (Hendon).
Constructional Details of "Amateur Wireless" Receivers

The Following Notes Give Information which is Often Asked For Concerning "Amateur Wireless" Designs for which the Associated Issues are Out of Print.

Nothing is more annoying to the constructor when, after carefully selecting a receiver design from our Blueprint List or after having a certain circuit recommended by a friend, he finds that while he can secure a copy of the blueprint it is not possible for a copy of the issue containing constructional details to be obtained, owing to all available supplies being out of print.

That such a state of affairs should exist, may seem to many very unsatisfactory, but, unfortunately, it is one of those evils which cannot be avoided. Only a certain number of copies of any issue are printed, and many readers are wise enough to keep all copies, having the various volumes bound, or stowing the copies away in a safe place for future reference.

Many constructors are finding that it is becoming increasingly difficult to secure copies of back numbers, although quite a number of blueprints of the receivers are still available; therefore, it is proposed to deal, as often as may be necessary, with the vital constructional details of those receivers whose associated issues are out of print. To commence with, let us consider Crystal Receivers, the first being the 150-mile Crystal Set.

Coil Construction

The coil construction and circuit of this receiver is somewhat different from the usual run of crystal sets, therefore the following details are essential if it is to be built to the designer's specification.

The theoretical circuit is shown in Fig. 1, from which it will be seen that three tappings are required, apart from the two end connections.

The coil consists, in all, of 213 turns of 28 S.W.G. enamelled wire, the first tapping being taken at the 5th turn from the aerial end of the coil. The second tapping is at the 20th turn, and the third at the 38th, this forming the end of the medium-wave winding.

The long-wave section is straightforward, as it is formed with 175 turns of the same wire; in fact, it is really a continuation of the medium-wave winding, there being no need to break the wire.

Each end is made fast to the former by small bolts, or by threading it through a couple of small holes; the method of no importance as long as it is secure. Care must be taken to see that the tappings are also quite firm, and that there is no chance of them coming loose. Fig. 3 shows one of the best ways of bringing out these leads.

The switch S is a "double-pole double-throw," and is used to change over the aerial connection from the medium-wave tapping to the long-wave tapping, at the same time shorting out the L.W. section when medium waves are being received. Any reliable make of switch can be used, as it does not matter whether it is rotary, lever or push-pull, as long as good contacts are made.

The 1934 Crystal Set

This receiver (blueprint number A.W. 444) was described in the issues of Amateur Wireless of August 4th and September 22nd, 1934.

The complete circuit is shown in Fig. 4 and the coil constructional details are as set out below.

The coil former is a length of six-ribbed ebonite tube, the dimensions being 2½in. long by 3½in. in diameter.

Tappings are taken at the points indicated in the diagram, and an anti-break through choke, the same as for the previous set, is included in the aerial lead, a switch being connected in parallel to cut it out of circuit when medium waves are being received. The wire required for the coil is 22 S.W.G., and not 26 S.W.G., as mentioned in the list of parts.

The potentiometer has a resistance of 400 ohms and is of the baseboard mounting type; the tuning condenser is an Ormond type R 425, of .0005 mfd. capacity, while the dry battery is a Siemens type G.T.

The component marked A.B.C. is an inductance which is embodied in the aerial circuit to prevent the medium-wave stations breaking through when L.W. transmissions are desired. In the original specification, this item is a commercial product, but as it is doubtful if it can now be obtained, it can be constructed quite easily. It consists of a simple bank wound coil, consisting of 200 turns of 34 S.W.G. wound in a slotted former ¾in. wide, the diameter of the former (Fig. 2) being 1in.

It should be noted that one end of A.B.C. is connected to a separate aerial terminal via a .0002 condenser, and if any interference is experienced from M.W. stations when receiving an L.W. station, the aerial should be connected to this terminal.

For M.W. reception, the better of the other two aerial connections should be used, i.e., according to the aerial arrangements in use. A.2 will give the most selective results.

Figs. 4 and 5.—The finished coil, and theoretical circuit for the 1934 Crystal Set.
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A Single-valve All-waver

Constructional Details of a Simple Experimental Receiver are Given in this Article.

By J. R. S. Thom, B.Sc.

Owing to the ever-increasing popularity of all-wave receivers, the little set described below will perhaps be of interest to readers of Practical and Amateur Wireless. It will be seen from the theoretical circuit, Fig. 1, that the set arranges in quite conventional, except for the tuning unit, details of which are given so that this should present no difficulty.

The tuning unit consists of three coils wound on 1 in. diameter formers and covers long, medium and two short-wave ranges. Changing from one band to another is effected by rotating the unit through 90 deg.

Details of Medium and Long-wave Coil

To make the unit, commence by winding the medium and long-wave coil. The former used is 1 in. diameter and 2½ in. long, four separating spacers being fitted 1 in. apart at the foot to take the long-wave and part of the reaction windings, as shown in Fig. 2.

The winding can be commenced by putting 300 turns of 36-gauge enamelled wire into the two bottom slots (150 turns in each). A looped centre tapping should be taken after winding 150 turns.

The reaction turns can now be wound, and care must be taken to wind in the opposite direction to that followed by the long-wave winding. Again 36-gauge enamelled wire is used, 90 turns being placed in the third slot, and the remaining 10 turns on the former next to the medium-wave winding.

The medium-wave winding consists of two single layer coils of 45 turns each. In this case 32-gauge enamelled wire is used, and the turns must go in the same direction as the long-wave winding.

The method of anchoring the wire is the same in each case, and consists of making two small holes in the former through which the wire is threaded from the outside through to the inside and back to the outside again.

When all the windings are complete the leads are connected to their appropriate studs by looping the ends of the leads and gripping them between two washers fitted under the terminal nuts.

Short-wave Coils

The two short-wave coils should now be wound using in this case 32-gauge D.C.C. wire, although thicker wire may be used if desired. The actual number of turns will depend on the waveband to be covered, but as a guide the numbers in the table at the foot of Fig. 3 might be tried out in the first instance.

The three coils having been made, the assembling of the unit can be proceeded with. First of all, cut two plywood discs, each 4 in. in diameter, and drill them for the studs, as shown in Fig. 4. Small (Continued on page 740)

Fig. 2.—Details of coil former and windings for the medium- and long-wave coil.

Fig. 3.—Details of windings for the short-wave coils.

Fig. 4 and 5.—End and side views of the complete coil assembly.

Fig. 6.—Showing the connections between the coils and contact studs.
A Cunning Move

Chiefly as a result of my repeated onslaughts on crooners and crooning I am glad to notice a national outburst against it. I understand that certain band leaders who always have their ears to the pavement of Fleet Street are heeding the warning, and now realise that song plugging can only be profitable for a time. We all know that they do not select their tunes according to the merit of the tune, but according to the digits on a cheque which the song publishers hand out to those band leaders who are partial to this form of bribery and corruption. These band leaders are now seeking to give the impression that they are dropping jazz and "hot" music by indulging in what they now call swing music—which is merely another name for it. So I warn the Als, Eds, Lews (most horrible sounding name of all), Bills, Jacks, and others who love to revel in the names associated with the gutter, that I am closely watching the situation, and they are not going to get away with that form of subterfuge. I shall not rest content until jazz or swing music is banned from this country. One of the few good things I can say about the Scottish race is that a group of Scottish schoolboys threatened to protest to the B.B.C. about it. The B.B.C. must be taught that it must not listen to the noisy minority of mental ineptics who praise jazz. Because the costermonger likes fish and chips out of a newspaper, you do not expect to get it at the Savoy or the Ritz. The B.B.C. is supposed to be a dignified body. It has hundreds of staff who spend a great deal of time saluting one another, and indulging in other games of red tape. They must learn that intelligent people do not take the trouble to write and complain, and that they are being misled by thinking that the only correspondence they receive is representative. It is only representative of the lower scale of listener, and I implore them to take heed of my remarks. Let them have jazz music for half an hour once a fortnight. I am quite certain that I am right on this point, for I have yet to meet someone who likes jazz music. It is true that I hear from a few readers who do, but I hear from hundreds who do not. The B.B.C. has no right at all to foist on the listening public something it does not want. It can easily check my statement by inviting listeners to fill in a coupon inserted in one of its publications. Here is a fair sample of the sort of letter I am receiving: "Your correspondent of a fortnight ago will have (or, even, may have had) a threatening deputation to his doorstep if he insults them by comparing them to a part of a jazz band. I went into a large store this morning to buy some solder; they put on a record, called, 'Harlem'; I bought my solder elsewhere. The B.B.C. should very carefully screen their aerials when some dance bands are playing; a cheaper method would be to switch the microphone out altogether. My idea of some crooners is rather as if a microphone were put near a specially prepared jellyfish electrically stimulated to vibrate at audio frequency in sympathy with some vile instrument (plus or minus about 10 cycles), but following it at a distance of ½ to 1 second. Let them keep their jazz for the silk industry!"

Sunday Programmes

And here another from an Overseas reader, H. W., of Raisalpu, India: "I must write to congratulate you on your outburst on the Sunday programmes and the Victorian, sneaky way in which the 'ardent' Christian sneaks from church to listen to radio that blabs dance piffle, then turns round and criticises others for listening to the wireless on Sundays. Down with old dodderers! Unseat the 'pious' hypocrites! Abolish the funeral dirges that represent the B.B.C.'s Sunday programmes. It fairly sickens me to listen to them. Of all the six transmissions of the Sunday Empire programmes I only listen to the 15-minute news bulletin. Then round the world on the short wave for a decent programme : Java ! Holland ! Germany ! Japan ! and Hong Kong ! Anywhere but the B.B.C. Thanking you for an article which I read avidly as soon as it arrives. Long live Themion and ' P. & A. W. '

Television at H.P. Terms

Since the B.B.C. decided to transmit at least until the end of 1938 on the Marconi-E.M.I. system, manufacturers of television receivers immediately reduced the price of their sets, and some of them refunded to previous purchasers the difference in price. One or two companies have since offered their sets on hire purchase terms, which indicates that design has reached a stage where frequent changes will not be necessary. This proves the argument I raised some time ago that it was not practicable to design a television receiver which would work equally well on both systems. It should never have been started that way. Television has been the victim of a good deal of caprice on the part of the authorities and inventors, and I now hope that it will be left alone for a couple of years, so that radio entertainment can be perfected.

There can be no doubt at all that the public is sated with listening. It now demands vision as well as sound, and no further obstacles should be placed in the way of its attainment. At first manufacturers were afraid of television. They did all they could to oppose it, thinking that it would destroy the sales of wireless sets. You cannot stop progress any more than
you can keep a good man down. I blame manufacturers as much as anybody for the fact that television has been kept back for at least three years. The Baird Company say that their installation at the Alexandra Palace was not of itself responsible for the undeservedly bad name the system has suffered, and their loss of the right to transmit from the London station will not affect the financial position of the company. It is, of course, very probable that they will transmit from some of the provincial television stations.

In my view, the Cossor system of transmission should be given a trial. Sooner or later the B.B.C. will find out that velocity modulation is the inevitable system for television transmission, and they should give it a chance to demonstrate its claims, equally with any other system. It had, in my opinion, a raw deal at the hands of the Television Committee.

Personnel of the B.B.C.

A PROPOS my recent note about our friends over the borrrrrrrrrrrrrrrrrr, several correspondents have gleefully pointed to the fact that the personnel of the B.B.C. is largely Scottish, and they ask me why. I don’t know. Sir John Reith is Scottish, and there are others I know in the B.B.C. who belong to the same race. It is perhaps a matter for inquiry as to why, if it is so, so many Scots are employed at the B.B.C. Some of my correspondents are suggesting that the first requirement before you can get a job there is that you must be Scottish, and I must say that on those occasions when I have had to ring up the B.B.C. I am answered by someone who speaks the dialect. The B.B.C. should be constituted of people best able to carry out the particular job. It probably is, but I am not one of those who subscribe to the doctrine that intelligence is indigenous to the soil of Scotland only. I know my Scottish friends think so, but I would respectfully suggest that they stayed at home in their own country, which is sadly in need of development, before gravitating to England, and telling us what smart Scots they are.

There is no doubt at all in my readers minds that the fact of you being Scottish weighs heavily when applying to the B.B.C. for a job. Shall be glad to publish any reply they make.

Car Ignition and Television

The methods used to overcome interference with television reception caused by the ignition systems of motor-cars and electro-medical apparatus, which was mentioned by

Record Three Volume Control

Several readers have complained that the 50,000-ohm potentiometer fitted on their Record Three does not effectively control the volume. In most cases this trouble has been due to the spindle of the control being in contact with the supporting bracket, thereby earthing the centre tag. Insulating washers are supplied with the potentiometer, and these should, of course, be used to insulate the spindle from the bracket. If there is any doubt whether the spindle is effectively insulated the metalising underneath the bracket should be removed. If this does not provide a remedy the fault will probably lie in the potentiometer itself. This may be verified by removing the G.B.—lead from the end tag and the 50,000-ohm resistance from the centre tag, joining the G.B.—lead to the resistance, and then noting whether volume is progressively reduced as the plug attached to the G.B.—lead is moved upwards from the + to the —9 volt socket of the G.B. battery. If a progressive reduction of signal strength can be produced in this manner, but not by means of the potentiometer, it will indicate that the latter is faulty.

Limit Four Coils

If trouble is experienced in obtaining medium and long-wave reception on this receiver, the switch tags at the base of the Wearie coil unit should be examined. We have found in some cases that these touch the metalised surface of the chassis when the coil unit is screwed down tightly. The clearance between the tags and the chassis is normally very small, and if a tag happens to protrude slightly it will touch the chassis and the coil winding to which it is connected will be earthed. To avoid the possibility of this occurring a piece of thin cardboard may be fixed underneath the coil unit.

Superhet Selectivity

It is not generally realised that the selectivity of a superhet is governed to a much greater extent by the I.F. couplings than by the H.F. tuned circuits. Improving the selectivity of the H.F. circuits reduces whistles, due to unwanted signals reaching the frequency changer at the same time as the wanted signal, but the actual station spread is governed by the I.F. circuits. Selectivity may be improved by adding an extra I.F. stage or even by only adding an extra I.F. transformer. Another method is to provide a greater separation between the windings of the existing transformers.

Sir Noel Ashbridge, the B.B.C. engineer, in a lecture in London recently, were described by G.E.C. technical experts in an interview.

Normally within five or six miles interference is not serious, because the signal strength is so high, but farther out, especially beyond twenty miles, television receivers on main roads may be subject to considerable interference from motor-car ignition.

As it is possible to fit every car with a suppressor, other means have been found to minimise the interference. The main method is to raise the signal input to the receiver by an "aerial array," i.e., an arrangement of reflectors and directors in conjunction with a dipole aerial.

There is an example of an array on the roof of Magnet House, the G.E.C. headquarters, where there was some interference from the Ophthalmic Hospital. This consists of three reflectors, one placed a quarter of a wavelength behind the dipole in line with the transmitter and two reflectors at the side of the dipole at a distance of half a wavelength. (The television wave length is approximately 7 metres.) Before the erection of the array, interference often completely spoilt the programme; now, it is practically negligible and the programme can be enjoyed.

Television Inquiry Bureau

O wing to the rapidly growing public interest in television, the General Electric Company has opened an information bureau at Magnet House, Kingsway.

"Since the reduction in the price of television receivers, inquiries from both the trade and the public have increased," said Mr. D. Murdock, who is in charge of the bureau. "The most frequent inquiries are from the public to know if they are in the reception area. From our experience of installing sets up to fifty miles of Alexandra Palace, we are able to give them detailed information. We have also received many inquiries about the prospects of the Coronation ceremony being televised."

"We have discovered, rather surprisingly, that many misapprehensions about television still exist. A lady rang up to-day to ask what size of screen it was necessary to have in the drawing room: another inquirer thought that television provided still pictures like a magic lantern."

"We have also received many inquiries on transmission from the trade, which are dealt with by the technical staff."
Adjusting and Operating F.J. Camm's "Vitesse" All-Waver

Further Constructional Notes and the Method of Operating this Receiver

The following notes have been prepared especially for the beginner and may be skipped by those who are familiar with receiver construction or who build a receiver from a theoretical circuit diagram. The blueprint is intended primarily for those who are not familiar with construction, and therefore there are a few points which might present difficulty to the beginner. Firstly, the battery lead which is marked H.T. +2, and which is shown extending from the hole numbered 5 across to the coil unit, passes, in the blueprint, close to the aerial socket, but must not come into contact with this socket. In a blueprint drawing, junction points are generally indicated by a large white dot, and although this lead is close to the socket it will be noted that there is no dot on it, and therefore it must not be joined to the aerial connecting lead. Lead No. 8 from the coil unit is joined to the end of this H.T. lead and the two are connected to condenser C6, not to C5. Cro and resistor R6 are connected together, and, as was explained last week, are anchored to a small ebonite block which is in turn bolted to the metal chassis. Take care not to allow the ends of these two components or their connecting leads to come into contact with the chassis.

Screening the Leads
The metal screening sleeve which is employed on some of the leads is ineffective unless it is joined to earth, and therefore it will be noted that short leads are connected to this sleeve at various points. Some constructors find it difficult to make this connection satisfactorily, but there is really nothing hard about it, provided a really hot soldering iron is employed. A length of tinned copper

wire should be wrapped round the sleeveing for two or three turns, and a little Fluxite smeared over the point. Then, with a good blob of solder on the point of the iron, run round the turns of wire, and it will be found that the solder will run round it and firmly attach it to the sleeveing which, of course, is already tinned for the purpose. If the iron is not hot enough the Fluxite will run down and make it difficult to get a sound joint while the insulation inside the sleeveing will be burnt away. The screening of the lead from the centre tag of R8 is earthed by joining it to the thick wire seen in the centre of the chassis connected to two earthing bolts (marked M.C.). Note also that the screened sleeveing must be prevented from coming in contact with the bare ends of the wire which is carried inside the sleeveing. If there is any doubt about this, wrap a few turns of thread round the end of it and over the internal wire.

The Gang Condenser
The three connections to the fixed sections of the gang condenser are shown in broken lines on the blueprint. This is to indicate that the leads in question pass underneath the condenser unit. They must be cut off short enough to enable them just to reach the connecting lug, and must not sag and touch the metal chassis. It is best to measure these and cut them off, attaching them to the condenser before bolting this down. The screened lead attached to the top cap of V1 is joined to the tag in the

A sketch showing the general appearance of the "Vitesse" All-waver.
centre which is in contact with the centre section fixed vanes. Finally, make certain that the chassis is quite clean (scrapping away the paint and any dirt which may be present) at the points where the ganged condenser and the earthing bolts are connected.

---The Ideal Battery---

into the maximum tapping. G.B.—1 should be inserted into the first socket on the battery (1.5 volts), but perhaps later when the H.T.
effects wave-changing and the knob is provided with four coloured spots to denote the appropriate ranges. The indication is given by the spot which is on top, and the colours and wave-ranges are as follow:

Blue spot—Long waves from 850 to 2,200 metres (approximately). Yellow spot—Medium waves from 220 to 550 metres (approximately). Red

Adjusting the Receiver

Before making the preliminary adjustments, the three trimmers on the gang condenser should be unscrewed and the screws removed. Bend up the top plate of the trimmer at right angles and take out the mica insulating strip, as these trimmers are not required and must not be left in circuit due to the fact that they will affect the short-wave tuning range. The coil unit will be supplied ready trimmed and should not require any adjustment, but this point may be left until later. Similarly, the two L.F. transformers are sent out approximately correct, and only a very slight adjustment should be needed. Connect the battery leads in the following order. The H.T.—, L.T.— and G.B.:+ leads should all be joined to the battery terminals or sockets bearing these markings. H.T.:+1 should be inserted into the H.T. battery at some point between 48 and 72 volts (the best point being found later), H.T.+2 at a point between 60 and 84 volts, and H.T.+3

battery has become slightly run down it may be inserted into the G.B. positive socket together with the G.B. positive lead. G.B.—2 should be inserted at 4.5 or 6 volts. Attach the aerial and earth leads, and for a receiver of this type a medium size of aerial will be found best. Something about 40 or 50 feet in length and well insulated should prove satisfactory, and later on you can erect one of the special all-wave aerials if you so desire. Connect the two leads marked “To speaker” to the appropriate terminals on the back of the loudspeaker and you are ready to listen.

Trimming

The receiver is switched on (and off) by means of the combined volume control and on-off switch found in the centre of the lower three knobs on the receiver. The right-hand control affects the tone and enables this to be varied from “all top” to “no top,” or in other words governs the high-note cut off. The left-hand knob

Note the clean and tidy appearance of the chassis.

LIST OF CO

Coil unit, Type AWS/B. ........................... B.T.S.
Three-gang condenser, Bar Construction Type 6, ........................... Polar
.0005 mfd. ........................... Polar
Slow-motion drive, type V.P. Horizontal. ........................... Varley
Two I.F. transformers, type BP06. ........................... Varley
Ten fixed condensers:—
Three .1 mfd. ........................... T.C.C.
Two .01 mfd. (tubular) ........................... T.C.C.
One .5 mfd. ........................... T.C.C.
Four .0001 mfd., type M ........................... T.C.C.
Seven fixed resistors (.1 watt type)
One 50,000 ohms ........................... Bulgin
One 40,000 ohms ........................... Bulgin
One .1 meg. ........................... Bulgin
Two .25 meg. ........................... Bulgin
One .5 meg. ........................... Bulgin
One 1 meg. ........................... Bulgin
Two variable potentiometers; 500,000 ohms (type VS.63); 50,000 ohms (type VC.60). ........................... Bulgin
spot.—Short waves from 18 to 53 metres (approximately). The green spot indicates that the receiver is switched for gramophone record reproduction. For preliminary tests, turn to the medium-wave band unless you are in close proximity to the long-wave B.B.C. station, when, of course, this station may be used as a test. Turn the volume control to maximum, the switch operating after the first few degrees, and will be heard as well as felt in the finger tips. Turn the tuning control to a point on the dial corresponding to the local station, and some signal should be heard, although at first it will not be at full volume. Now very carefully turn the trimming screws on top of the I.F. transformers, but note beforehand the position occupied by the screws and do not turn them two or three times in each direction. They should only need a partial turn, and if no improvement is effected, they should be set back to the position they first occupied. Hence the need for noting the position before carrying out the adjustment. All four trimmers will have to be adjusted, and as soon as any improvement in volume is effected, the volume control should be turned back so as to keep the signal at its weakest. By doing this you will more easily be able to discern the changes made by the trimmers and will thus be able to find the correct positions. When no further adjustment can be made, carefully adjust the three trimmers on the rear of the coil unit for maximum response, but again note the positions before you start to make any alteration so that you can return to the correct position if no adjustment is found necessary.

When correctly trimmed, no further adjustments should be required on the remaining wavebands, and it should then only be necessary to turn the wave-change switch to the desired range in order to cover the various bands for which the receiver is designed.

**What You Can Hear**

It is not advisable to give a list of the stations which can be heard, as conditions vary in different parts of the country and atmospheric conditions vary from night to night. It may be quite a simple matter to obtain American stations at full loud-speaker volume some nights, and yet at others they may be inaudible. You will remember how the B.B.C. have had to cancel their proposed relays on some nights due to conditions being unsuitable. However, under normal circumstances the G.E.C. station at Schenectady, W2XAD, on 19.56 metres, should be heard with the pointer about ½ in. along the dial. W8XK also generally makes a good signal slightly above this point, and as marker the German station at Zeesen may be found here. In some parts of the country the Empire transmitter at Daventry will also be heard about this point, and some care is necessary in separating the stations.
3,000 Square Miles of Television

At the inauguration of the first official television service three months ago, Lord Sieldon said he would be unwilling to lay heavy odds against a Hindhead receiver being 42 miles from London, viewing the Coronation. As he gave the initial range at about 20 miles, it may be of interest to consider the prospect of such a prophecy being realised.

A ring of television installations now embraces Alexandra Palace at distances varying upwards of 30 miles. Within this range consistently good reception has been fairly well established, but farther afield—governed largely by geographical conditions and, of course, transmission power—exceptionally good results are being obtained.

As a result, the G.E.C., for example, have already installed standard home sets in ten counties within an area embracing about a quarter of the population of the United Kingdom and covering more than 3,000 square miles. At each point reception is well up to standard.

Outside the 25-mile radius these installations include not only such places as Luton, Camberley, Dorking, and Woking, but towns nearly 40 miles away, such as Reading (Berks), East Grinstead (Sussex), Tandridge (Sussex), and the environs of Southend-on-Sea (Essex). In these fringe towns alone the population is more than 300,000.

Noisy Volume Controls

AFTER considerable usage the volume control potentiometer fitted to most receivers loses its high sensitivity, the most satisfactory cure is replacement, but this is sometimes difficult, owing either to inaccessibility or to a new one being unobtainable. A very satisfactory way of minimising the noise is to connect as big a condenser as possible between the moving arm terminal and the terminal at the "load end" of the winding.

A Group-listening Organisation

ACCORDING to a recent announcement, in order to make continued provision for the organisation of Group Discussion Groups, in connection with B.B.C. talks, it has been decided to create a Group-listening organisation to undertake and develop the work hitherto carried on by the Corporation's Adult Education Advisory Board. This new autonomous organisation will be based on the existing Area Councils for Group Listening, which will be linked by a Central Co-ordinating Committee. Principal J. H. Nicholson, who has played a prominent part in the development of the Wireless Discussion Group movement, and who has been Chairman of the Adult Education Advisory Committee since its inception, has accepted the Corporation's invitation to be Chairman of the new Central Committee.

To this Group-listening organisation the Corporation will make, until June, 1940, an annual grant of money, based on the Corporation's annual expenditure on this listening end work since it began in 1935. As June, 1940, approaches, the Corporation will be prepared to review the situation.

The Central Council for School Broadcasting has agreed that its secretary, Mr. A. C. Cameron, shall act also as Secretary and Executive Officer of the Group-listening organisation. A full-time assistant for this work will be provided for Mr. Cameron. The first meeting of the Central Committee was held on February 10th.

EVENING INTERLUDE

This charming listener enjoys her favourite melody, with the aid of her Coscor 3-valve A.C. superhet.

BROADCASTS THE SCHOOLS ENJOY

THAT the B.B.C.'s Travel Talks for Schools are still very popular among Britain's radio-minded children is evident from figures for the Autumn Term, recently published.

3,129 schools listen regularly to these Travel Talks—exactly 1,000 more than at this same time a year ago.

As regards other school broadcasting courses, the choice of the schools has remained remarkably uniform, and past favourites, in nearly every case, retain their order of popularity. Nature Study, Regional Geography, British History and World History follow Travel Talks as popular favourites. Numbers of schools listening to these courses range from 2,572 in the case of Nature Study, to 2,255 in that of World History.

Miss Ann Driver's "Music and Movement" for very young children has nearly doubled its number of followers, and already, though it was heard only for one term, there are over 1,600 schools listening to her "Music and Movement" for children aged from seven to nine years.

Other courses which started experimentally last term have secured a wide following. Over 2,000 schools are listening to Junior English, a course in which young children have been encouraged, among other things, to mime and read poetry. "History in the Making," consisting of topical events dealt with in relation to the history books, has been found to meet a need. Friday afternoon Feature Programmes, which have included radio trips for youngsters down to local mines and on board trawlers, have met with enthusiastic response from children and teachers alike.

Included in the schedule for the spring term programmes, which opened with the week beginning January 18th, are play and poetry broadcasts, and further series of talks on understanding the home, Concert Lieder, a recital of Schubert, and more special Feature Programmes, two of which are to deal with the Docks and with the Cotton Industry.

The Roving Reporter

THIS monthly broadcast, prepared by a team of Birmingham journalists, will be produced by Myrvin Webster on March 12th. About half a dozen Midland people with unique stories to tell will be interviewed by the Roving Reporter.

Philco—Authorised Components

AS a protective measure for all Philco wireless set owners, a decision was announced recently by Philco officials that all of their dealers must use nothing but genuine and approved valves and parts in all sets sold and serviced. For several years Philco Research Laboratories have worked to perfect a valve which will give accurate reception and a long life. The same laboratories have perfected shields, suppressors and condensers of the highest quality, and adapted to the special circuits of the sets Philco manufactures. As a result of the specialised experimentation, Philco has produced a balanced set which is known to operate best with Philco approved valves and components. For this reason, Philco dealers are trained to use nothing but these units to ensure the set owner the most satisfactory results, and the longest life to each part.
**BRIEF RADIO BIOGRAPHIES—1**

By RUTH MASCHWITZ

Robb Wilton

ROBB WILTON—Mr. Muddlecombe, J.F., in these days of Colonel Plimpson showed evidence of his historic leanings at an early age when he gave performances with a puppet theatre and a collection of the costumes of his playmates. Unfortunately the shows were usually interrupted by the neighbours who wanted to hang out their washing.

His parents apprenticed him to an engineer, but all their thoughts were on the stage, and in his spare time he organised a trio called the Mascots, which gave shows of the concert party type. When lucky, they were paid for their services. However, he came to radio debut as an amateur by an engagement by a football club to give two after-parties. After the interval of the first show, the audience trooped out—it couldn’t hear Robb’s even songs.

A short while after, Robb was offered a trial at a theatre in Liverpool. All went well till the middle of his song—a comedy number. Robb’s mind suddenly became a blank and he bolted into the wings. That put a stop to his career as a comedian for fourteen years! For a while he played in melodrama in “hit-ups” through England, Scotland, and Wales, and for three and a half years he was a member of a stock company. At the end of that time he began to play comedy parts and write his own material.

The result was a three-year contract in variety at 47. Since then he has toured Australia, Canada, and America with his own acts, broadcast since the Savoy Hill days, and has appeared in numerous films.

Richard Gooden

Richard Gooden—Mr. Penny fame—made his radio debut as an amateur on Boat Race night at Oxford. Ingrebted students, of which he was one, were supposed to burst into the studio and interrupt. An old student who was listening in, wrote a horrified protest of such unseemly behaviour. Obviously the under-graduates could not be gentlemen.

Richard was offered his first stage engagement at the age of 28, without any previous professional experience. A member of the O.U.C.S., Bernard Fagan was so impressed by his ability that when he started the Oxford Players, Richard was the first member of the company to be enrolled. He played every type of part, usually those of elderly men, so it was a complete change when he appeared in London as a boy of eight, in “Riverside Nights.”

He has acted in a diversity of shows, some of the more recent being, “The Country Wife,” “Beau, It’s the Boat Deck,” and “The Dominant Sex.”

Richard describes himself as a person to whom nothing ever happens. He only told me that he had once been chased by a lion, and on another occasion had been present at a daring robbery in a cafe. The barmaid had shocked the customer only Richard happened to be reading a book at the time, and never even noticed that anything untoward was afoot.

His grand vision through Europe third class! Being a small man he tells me he finds it very comfortable sleeping in the luggage rack.
The Middle Regions

At the Royal Society the other day Mr. Watson Watt, superintendent of the Broadway research station of the Air Ministry, announced the discovery of three new electrified regions in the atmosphere; this being the result of observations spread over a year by the National Physical Laboratory. Even the non-technical layman has come to realise the significance of the more familiar Heaviside-Appleton effects, and is impatient to know how their presence some fifty to one hundred miles away has enabled radio signals to be reflected back to earth and so permit the signals to travel round the earth. These new electrified belts, however, are between five and forty miles above the earth's surface, and while they do not interfere with the longer waves used for sound broadcasting or commercial services, they are found to be capable of reflecting the ultra short-waves used for the television service. The indisputable proof of their presence has cleared up two mysteries associated with the B.B.C. television transmissions. One is the greatly increased distances over which the signals have travelled, at least double the estimated service range being now quite common, and the other the ghost or double images seen on the receiver screen. Up to the present it was very strongly suspected that the ghost images were brought about by faults in the transmitting equipment. Similar effects can be seen when reflections are present in the lines connecting the camera with the modulating equipment and the output of the video amplifier. If there is over-correction in the amplifier in order to compensate for any loss or attenuation in the top frequencies of the video signal, a double image will be caused. The careful experiments undertaken by Mr. Watson Watt and his colleagues, however, have exonerated the television transmitter.

Use of "Echoes"

At the Royal Society meeting photographs were shown of radio impulses which had been projected vertically, with their "echoes," which indicated the distance they had travelled and therefore gave figures for calculating the height of the new layers. American research workers have discovered these layers also, but since the work of the British scientists was first, these new regions are undoubtedly British, and for want of a better name they are known at present as the Middle Regions, but no doubt they will be given a name before long which will associate them with their discoverers. Unfortunately, although the mysteries have been cleared up and the problems clarified, the solution has still to be found, but it is certain that science will find a remedy for the double pictures in the near future. The increased range of the new wave lengths, however, is a very vital factor, and will bring about a complete revision of the tentative plans drawn up for a chain of television stations to cover the whole area of the country.

A Good Customer

The B.B.C. is still the biggest customer among the television manufacturers, for apart from the transmitting equipment now being brought to its final condition prior to being taken over completely by the Corporation engineers, there is a constant aspect of reception. Officials and engineers have had receiving sets installed in their homes and offices in order to compile necessary data concerning quality of reception, nature and effects of interference, percentage of breakdowns and last, but by no means least, make observations on the programme material incorporated in the radiated pictures. Now it is stated that a special studio is to be built at Broadcasting House as soon as the necessary extensions and measure of rebuilding are undertaken. This is to enable important public officials and star artists to be televised in the heart of London without the necessity of making the journey to Alexandra Palace. This will be a distinct advantage, and will add still more to the scope of the programme material.

In Germany

The reports concerning television development in Germany are rather spasmodic in character. This may be the outcome of the division of work and responsibilities which operate in that country. The Post Office, with its wide experience and splendid laboratory facilities in Berlin, is solely responsible for all the technical equipment and improvements, authorities, however, but their full use is dependent on the rapidity with which the technical authorities make progress with their electron cameras. It is felt that this work is being applied more particularly to security and airneeds.

Railway Demonstration

Saturday, March 6th, will be "railway day" in television, for the camera is to be taken to Alexandra Palace station in the afternoon to show viewers the latest rolling-stock used on the L.N.E.R. Viewers will be taken through the newest in sleeping cars and Post Office mail vans and will also witness a demonstration of railway signalling. Leslie Mitchell, who is conducting this outside broadcast, will give a commentary.
LISTENING TO THE AMATEURS

Fascination of Amateur Reception : Method of “Calling” : The “Q” Code : A Suitable Circuit : Making the Coil

By FRANK PRESTON

Especially for those who hope eventually to take out a transmitting licence, there is a considerable amount of interest in listening to amateur transmissions. These are made on a number of channels, but the 20-metre and 40-metre bands are generally of greatest interest to the listener. On Sunday mornings these two bands are extremely busy, and listeners in any part of the country can be sure of picking up a number of transmissions at good strength. Those who have not yet tried it will find a considerable amount of fascination in “following” the two-way tests between amateur stations miles, hundreds of miles, or even thousands of miles apart. In most cases it is possible to tune from one transmission to the other by moving the tuning condenser through a few degrees.

Exchanging Callsigns

It is usual for two or three amateur transmitters to arrange to chat together at a certain time. One of them starts by giving the callsign of the station he is calling, followed by his own call. For example, British station G2XY might call British station G2YZ thus: “Hello, G2YZ, G2XY calling.” Yes, this is repeated several times, sometimes giving equivalent words in place of the call letters to avoid possible misunderstanding. Thus an amateur whose call is YT (preceded by a numeral) might give his sign as “Yokohama, Tokio.” To the uninitiated this might give the impression that the transmitter is speaking from Tokio, when actually he is probably in Wigan. This arrangement will soon be understood by regular listeners.

In other cases, a transmitter might announce “G2XY calling test,” or “G2XY calling CQ.” This means that he has not arranged to “work” anyone in particular, and wishes to establish contact, or two-way working with another transmitter who might report on his transmissions, or on any particular tests which he wishes to carry out. At the end of each transmission the transmitter announces “G2XY now changing over,” or “G2XY over to G2YZ—dah-de-dah.” This means the transmitting side, for he can follow the various experiments which are being carried out. In some cases, he can even take part in those experiments by sending a report of the reception to the transmitter concerned. Generally, it is of little use doing this unless the distance between the listener and the transmitter is more than a couple of hundred miles, but this rule is not invariable and depends upon the nature of the tests. When valuable reports are received, the transmitter generally acknowledges these by sending a QSL (or reply) card, overprinted with his callsign and giving brief details of his station. Additionally, he might give details of his times of transmission.

Names and Addresses

Names and addresses of almost every amateur transmitter in the world are given in the Radio Amateur Call Book Magazine, which is obtainable in this country from F. L. Postlethwaite, Esq., 41, Kinfams Road, Goodmayes, Ilford, Essex, for 1s. post paid. This also gives all of the intern.

Fig. 1.—Theoretical circuit for a straight two-valve for the 20- and 40-metre waves.

Fig. 2.—This shows the arrangement of windings for a six-pin plug-in coil.

Fig. 3.—How the three windings are joined to the six pins of the coil former.
SHORT-WAVE SECTION  
(Continued from previous page)

national prefixes; it is reprinted and brought up to date at regular intervals.
Amateurs can be received on any short-wave band from 20 to 400 metres, but it is often thought worth while to make a special set for the purpose, so that it can be used at the same time as the "family" set, e.g., for the reception of normal broadcast programmes. Besides, by making a separate set, maximum efficiency can be secured on the two particular bands.

Two-valve Circuit

A circuit for a suitable type of set is given in Fig. 1. This uses two valves as detector and L.F. amplifier, both valves being pentodes. The first is an H.F. pentode and the second a high-efficiency L.F. pentode. It will be seen that the arrangement is similar to that used in any other short-waver, although a two-range coil is shown, and this is tuned by a .0001-mfd, variable condenser. This condenser does not cover a very wide range of frequencies, but it simplifies tuning over the two bands in question, and maximum efficiency is ensured by using a coil which requires only a small additional capacity for tuning purposes.

Two standard six-pin coils could be used instead if desired, the smaller one having eight grid turns, and the larger about 18 turns. On the other hand, it is more convenient to make one 18-turn coil, taking a tapping after the eighth turn. A Q.M.B. switch can then be connected between the tapping and the lower end, as shown. A method of winding the coil is shown in Fig. 2, where it can be seen that the separate aerial winding or primary is wound along-side the first few turns of the grid coil. This primary might consist of six turns of 30-gauge wire, the grid coil being wound with 22-gauge wire or Litz. A reaction winding, consisting of 40-gauge wire, is placed about 1 in. below the grid winding. All three windings are in the same direction, and the connections to the pins are shown in Fig. 3, those corresponding with those indicated in Fig. 1. After winding the coil it is worth while experimenting with the best number of turns in order to bring the 20-metre and 40-metre bands in the centre of the tuning scale. If preferred, a single eight-turn coil could be used in conjunction with two tuning condensers working on the band.

Three New Stations to Log

On the upper section of the short-wave band two Venezuelans have made their appearance; they are YV1RG, Maracaibo, 1225 m. (6.28 mc/s), calling itself Emisora Philco, and of which the distinguishing signal is composed of six chimes, and YV1RV, Valera, on 47.17 m. (6.36 mc/s), which also transmits under the name of Radio del Territorio. Address reception reports for YV1RG to Apartado Postal, 261, Maracaibo, Venezuela, and for YV1RV to HC1PM, La Fuerza del Patrocinio, who have been heard on 42.4 m. (7.074 mc/s), at G.M.T. 01.00.

The Saigon Transmissions

A new station at Saigon (French Indo-China), which had been experimenting on 25.2 m. (11.905 mc/s), has now temporarily adopted 25.58 m. (11.72 mc/s), and tests daily on this channel between G.M.T. 10.30-14.30. The broadcasts conclude with a gramophone recording of the "Marie Laurencin," so much favored by French studios. Tune in immediately below Radio-Colonial (Paris), TPA4, 25.6 m. (11.72 mc/s).

Czechoslovak Broadcasts

OLR, Podebrady continues to relay Prague programmes daily on various channels. Those most regularly used are 25.54 m. (11.84 mc/s) and 49.75 m. (6.06 mc/s), but 49.92 m. (6.01 mc/s), 49.84 and 49.87 m. (unofficial channels) are also being tested as to their possibilities. The call is put out casually by a man and woman announcer, and occasionally during the broadcast, as well as at the close-down, five languages are heard, namely, Czech, Italian, German, English and French. Before the station signs off, the next times of transmission, as well as the wavelengths adopted, are very clearly stated.

A Distant Call from China

Sharing the same channel as ZBH3, Hong Kong, and FZI, Saigon—fortunately not working to a regular schedule—QN, Macao (Portuguese China), broadcasts every Monday and Friday between G.M.T. 19.00-13.30 a weird programme, mainly composed of instrumental music. Announcements are made in Portuguese, English, French and Chinese. Macao is situated at a spot about eighty miles from Canton and forty miles from Hong Kong, and the station is run by the local administrator of Posts and Telegraphs, South American theme song: the I.B.C. March. You will hear the call: Radio- 

difusora YV2RC (Broadcasting Caracas) from the City of Perpetual Spring. Transmissions are made daily from G.M.T. 22.00-02.00 or 03.00, and every Saturday night the programme features an orchestral concert with Venezuelan artists of repute. The time for the start of this part of the broadcast is G.M.T. 02.45. An English news bulletin is given out nightly at G.M.T. 23.00. Address, for reports of reception: Almagén.

Leaves from a Short-wave Log

The first batch of new, H.M.V. television receivers being checked before dispatch to dealers from "His Master's Voice" factories at Hages, Middlesex, recently. These receivers are now priced at 50 guineas.

A Popular Venezuelan Station

YV1RC, Caracas, on 51.72 m. (5.68 mc/s), is without doubt the most popular and best-heard of the Venezuelan short-wavers. Rated at 1 kilowatt its signals are now picked up in using even on the other side of the world. The first signal consists of four bells, but the studio opens and closes with a well-known

Senior Joaquín P. Estrella de Oliveira, to whom all reception reports should be sent.

Americano, Estaciones YV1RC y YV2RC, Apartado Postal, 2000, Caracas, Venezuela.

Johannesburg Moves Up

ZTJ, no longer in its experimental stage but now carrying out a regular schedule seems to have moved up to 49.25 m. in order to rid itself of the overcrowded air-line. This new programme is very well received in this country, viz., from G.M.T. 04.45-07.00, 08.15-12.00, 14.00-16.30, and from 19.00-20.00,
The Language of the Amateur

THE details which we published in our March 6th, 1937 issue on the 20th March of this year have not received any further comments or responses from the amateur community. However, based on Mr. Austin Forsyth's (G6FO) recent remarks, it seems that the interest in the amateur bands is still strong. As a member of the audience, we think it is important to recognize the contributions made by the RST code, which has been a significant element in the field of amateur radio communication. The RST code is a standardized method of transmitting information, and it is widely used to ensure the accuracy and reliability of the transmitted data. The RST code is based on a three-letter code, where R represents the receiver, S represents the signal strength, and T represents the time of transmission. This method allows for clear and concise communication between amateur radio operators, regardless of their location. Furthermore, the RST code is a part of the broader language of the amateur, which includes other elements such as call signs, frequency assignments, and operational procedures. These elements are essential for ensuring the proper functioning of the amateur radio community and for maintaining the integrity of the radio spectrum. Therefore, it is important to continue to support and promote the use of the RST code and other elements of the language of the amateur to ensure the continued success of this vibrant community.

New W2XIE Schedule

The following is the new schedule for the popular American station W2XIE, effective July 1st, 1937:

- **7:30 a.m. to 11 a.m.**
  - 15,750 kHz, 13.94 meters
  - 1 p.m. to 5 p.m., 15,270 kHz, 19.64 meters
  - 5 p.m. to 10 p.m., 11,850 kHz, 25.36 meters
  - 10 p.m. to 11 p.m., 6,120 kHz, 49.02 meters

All the above times are Eastern Standard Time, not Greenwich, and are the same time W2XIE announces that the power is being increased ten times, on a date to be announced later.

NEW TIMES SALES BARGAINS

**B. T. S. ADABAND**

**Add the Short Waves to your Set**

**AMAZING BARGAINS**

- **WAVELENGTH 13-74 Meters**
- **LIST £4:00 BARGAIN £2:19:6**
- **Two sets only on lot of the ADABAND**
- **BRING AMERICA to your present set! A simple change in leads and connections, of any 
  D.C. or A.C. type will enable you to have a complete U.S., Canada, and England broadcast 
  set with a single set of leads.**

**BATTERY MODEL**

- **List £3:00 BARGAIN £2:15:0**
- 12 volt 12 or 24 volt 11 monthly payments of 7:6

**1937 W.B.**

**SPEAKERS**

- **MODEL 727, Domestic reproduction by 22 in.x15 in. x12 in. x16 in. x25 in. x37 in. x65 in.**
- **List £2:10:0, C.O.D. £2:0:0, 2% down and 11 monthly payments of 5:6**

- **MODEL 371 (Oldest), Cash or C.O.D.**
- **List £4:12:0, 2% down and 11 monthly payments of 5:6**

- **We supply any W.B. Speaker on similar easy terms**

**N.T.S. SHORT WAVE 2**

**SUPER-ALL-WAVE S.G.3**

- **List £4:00 BARGAIN £2:19:6**
- **F.F. Band, 1931, 1932 and 1933 M.P.'s.**
- **£2:10:0, C.O.D. **
- **£2:0:0, 2% down and 11 monthly payments of 5:6**

**STRAIGHT 3V. BATTERY RECEIVER**

- **List £4:19:6 BARGAIN £2:19:6**
- **Cash or C.O.D. £2:0:0, 2% down and 6 monthly payments of 5:6**
- **Includes 3 BRITISH VALVES**
- **4 BRITISH VALVES, 4 middle bands.**
- **4 BRITISH VALVES, Complete Air Valve.**
- **Complete and ready to play.**

**BARGAIN CLASS "B" 4 RECEIVER**

- **LIST PRICE £8:18:6 BARGAIN £4:19:6**
- **Includes 4 BRITISH VALVES, 4 middle bands.**

**NEW TIMES SALES CO., LTD.**


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**March 6th, 1937**

**PRACTICAL AND AMATEUR WIRELESS**

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**BRITISH LONG DISTANCE LISTENERS' CLUB**
"Gnome" Charger

FOR the battery user who wishes to charge his own accumulator there are many types of trickle charger available. The nearest which we have yet seen fit between the terminals of a battery and is sent for review by Gordon Equipments, Ltd. This charger measures only 3½ in. by 2½ in., and is finished in a neat blue enamel. A substantial length of mains flex, fitted with a two-pin plug for connecting purposes, and two output sockets are mounted on the side of the charger. These are coloured red and black, and when two output plugs are provided for attachment to leads for subsequent connection between the accumulator and the charger. The casing is perforated to guard against overheating and the charger incorporates a standard Westinghouse metal rectifier. The output is rated at ½ amp, and the consumption from the mains at about 5 watts. The charger has been tested and found to deliver ½ amp, without any suggestion of overheating. It is neat and efficient unit, and should prove of great value to those who are not within easy reach of an accumulator charging depot. The price is 13s. 6d.

New Ever Ready Batteries

SOME new batteries are announced by the Ever Ready Company, and these include a family of accumulators measuring 2½ in. by 1½ in. by 5½ in., and 4½ in. by 3 in. by 6½ in. The first model is known as model 133 and costs 11s., whilst the second model is 128 and costs 12s. 6d. Two ½ H.P. batteries complete the new range and these are designed for use in certain commercial receivers, although they may, of course, be used with any type of receiver where the right dimensions are found suitable. The first is a 120- volt battery known as the 120-volt Long, and measures 11½ in. by 3½ in. by 2½ in. The other battery, which measures 15 in. by 15 in. by 4½ in., is rated at 150 volts, tapped at every 1½ volts up to 13.5 volts and then at every 13.5 volts. The price of this is 15s. 3d.

New G.E.C. Receivers

FOUR new receivers are announced in the G.E.C. range. One is a six-valve superhet for A.C. mains, the second a five-valve model of the transportable type for A.C. mains use, the third is an all-wave battery-operated receiver, and the fourth is an eight-valve fifty All-wave superhet for A.C. mains use. The prices range from 16 to 25 guineas, and we are arranging to try one out of these in the near future in order to provide our readers with a test report.

Suppression Kit

MESSRS. BELLING & LEE announce that they are prepared to supply a complete suppression equipment on hire for use during the Coronation period. This offer is made especially to dealers and service engineers who are fitting public address equipment for large demonstrations, and who may find that local interference demands the use of some efficient form of suppression. The equipment will consist of an anti-interference aerial and a type 300 Set Lead Suppressor. The hire fee will be 25s. for the first week, and 2s. 6d. for each subsequent week up to a maximum period of four weeks. The price includes packing and carriage one way, and all applications must be made direct to the company at Cambridge Arterial Road, Enfield, Middlesex, enclosing a Trade card.

Ferranti Receivers

CHANGES in the reference numbers and prices of some of the new (Ferranti receivers are now announced. Model 1337B is, in future, to be known as Model 1327B. The price reductions are in respect of models 637B, 637BR and 1337B, for which the new figures are, respectively, 6 guineas, 6½ guineas and 12½ guineas.

Gramophone Record Price Increase

THE manufacturers of Panachord, Regal Zonophone and Rex record announce that, as from March 1st, the 1s. type records are increased to 1s. 3d. These records include many well-known broadcast artists and bands, and current lists may be obtained from the nearest local dealer.

Aerialite Aerials

A NUMBER of different types of aerial wire and equipment are now offered by Aerialite, Ltd. These include the "Coltite," which now costs 12s. 6d., as well as the popular Aerialite 7-strand aerial wire, the new prices of which are 3s. per 100 ft., 2s. 3d. for 75 ft., 1s. 6d. for 50 ft., or 9d. for 25 ft. The 11-strand super aerial wire costs 3s. 6d. for a 100ft. coil, 2s. 6d. for 75ft., and 1s. 9d. for 50ft. In addition to these ordinary aerial wire systems, this company also markets the Tranpare aerial, the "Little Marvel" aerial, and the new "Radial" aerial, all of which are of the capacity-aerial type. These are designed for erection on the side of a building in order to compensate with the necessity for the standard aerial mast, and are thus ideal for flat-dwellers and others who have no garden facilities for the ordinary type of aerial system.

"Engineering Opportunities" FREE!

The unique hand-book shows nearly 1,000 opportunities in AERIALS, ANTENNAS, MALE, FEMALE, and similar qualifications. We guarantee "No Pay—No Fee." Details are given in the British Institute of Engineering Technology, 409, Blackfriars Road, 17, 16, 15, 14, 13, 12. Easy Terms.

EASY TERMS

WE OFFER THE LOWEST TERMS FOR ALL RADIO SETS.

THE IMPORTANCE OF THE DETECTOR STAGE
(Continued from last week’s issue)

In the second detector stage of a superhet, the Westector makes an admirable detector, for it is cheap, permanent, gives linear rectification, and, due to the fact that the intermediate frequency is very low, less damping and selectivity is necessary. Selectivity for straight and superhet receivers were given in last week’s issue.

The various methods of detection cannot be better summarised than by the accompanying tables.

<table>
<thead>
<tr>
<th>Type of Detector</th>
<th>Anode Voltage</th>
<th>Damping</th>
<th>Sensitivity</th>
<th>Power-handling Cap-</th>
<th>Detector Distortion</th>
<th>General</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leaky Grid</td>
<td>Low</td>
<td>Reasonable</td>
<td>Fair</td>
<td>Good</td>
<td>Small</td>
<td>Righ on large inputs. Suitable for straight sets providing sufficient H.F. amplification is available.</td>
</tr>
<tr>
<td>Power Grid</td>
<td>High</td>
<td>Fair</td>
<td>Fair</td>
<td>Fair</td>
<td>Large</td>
<td>Handles fairly large inputs, but not very sensitive. Not suitable for R.C. or high feedback coupling.</td>
</tr>
<tr>
<td>Westector type W</td>
<td>High except on low frequencies</td>
<td>Poor except on low frequencies</td>
<td>Fair</td>
<td>Very large</td>
<td>Nil</td>
<td>Chief use in superhet where the frequency is low and large signal strengths are encountered.</td>
</tr>
<tr>
<td>Westector type WX</td>
<td>Less than type W</td>
<td>Better than type W at almost all frequencies</td>
<td>Fair</td>
<td>Very large</td>
<td>Nil</td>
<td>Suitable for straight sets providing sufficient H.F. amplification is available.</td>
</tr>
<tr>
<td>Diode</td>
<td>Low</td>
<td>Good</td>
<td>Fairly good</td>
<td>Large</td>
<td>Very low</td>
<td>Suitable for straight sets and superhet, provided the H.F. voltage is large.</td>
</tr>
</tbody>
</table>

beter selectivity are obtained. A special Westector, type WX, which has a very low self-capacitance, is available, however, for use in straight receivers and, where the H.F. amplification is sufficiently high, will work as well as a diode valve. Typical circuits for straight and superhet receivers were given in last week’s issue.

Conclusions.

Since conditions vary for every set and every locality, a serious experimenter will decide upon the conditions under which his detector will have to work, and should be able to choose the correct system by the aid of the table. For example, in a locality remote from any station and with little H.F. amplification, the leaky-grid system would be preferable. In a superhet, or under conditions when the voltage applied to the detector will be high, a diode or a Westector would appear to offer the most satisfactory solution. Every system will work efficiently, however, provided the conditions referred to under the various descriptions are obtained.

REPLIES IN BRIEF

The following replies to queries are given in abbreviated form either because of non-compliance with our rules, or because the point raised is not of general interest.

E. S. S. (Hull). C3 and C4 are interchangeable as the same identical sections of the condenser. It makes very little difference as both terminals are earthed. It is more usual, of course, to earth the negative side.

R. W. B. (Liverpool). The water will short-circuit the signal, of course. An external aerial is employed, and the vessel rises to the surface to transmit and receive messages.

W. M. (Kirkcudbright). What is the voltage rating of the lamp? This information is important, and also the resistance of the meter. Upon receipt of this further details we will try to solve the difficulty.

H. E. (Wellington). We have devoted considerable space to the past to beginners, but we shall not overlook them. The present replies will be given shortly.

J. D. (Limerick). There should be no need to make any alteration, and you may have made some mistake in the wiring of the first coil. If the coils are faulty this could cause the trouble, so perhaps before going any further you could get the coils tested by the maker.

R. W. B. (Liverpool 19). The trouble is undoubtedly due to H. F. instability and you will have to cure this before you can accurately gage the circuits. Trim the detector section first, and if you are using a wavelength calibrating dial, get this to read the correct wavelength.

L. H. (Woodbridge). We regret that we have no blueprint now available in which the coils you mention are employed.

J. W. (Cheshunt). You could use the coils of the 04, 042 and 043 combination in the 43 Superhet three, but we have no blueprint of a receiver using the other coils you mention.

V. N. (Chichester). We do not supply components in the distances stated, and the switching is as follows:

A. B. (Leeds, N.E.) We do not supply blueprints of commercial receivers, and doubt whether the Marconi Company could now supply details of the receiver you refer to, as this is many years old. However, you could write to them for the information and they may be able to assist you.

W. D. (M. B.). Full details of the receiver will be found in our issue dated January 9th last. The back number is 36, 6d., and the switch is.

J. Y. (York). There are several coils which answer to your description, and the connections are all different. We suggest that you write to the makers and explain clearly the type of coil you have.

J. M. (Lewisham, 13). Any standard L.F. transformer may be used in place of the component, with a resistance-capacity (parallel-fed) coupling.

G. W. H. (Rehoboth). There should be no trouble with the trouble you mention which may be due to the cabinet or design. Perhaps you are listening at the wrong times, and you must remember that on the short wavelengths the sense of listening is important.

R. S. (Desnag). The "Vitesse" receiver described in last week’s issue would exactly answer your requirements.

A New 40-Page Booklet—Free

This booklet, which is yours for the asking, gives particulars of the many opportunities in the I.C.S. The industry is progressing with amazing rapidity. Only by knowing the basic principles can pace be kept with it. I.C.S. Instruction includes American broadcasting as well as British wireless practice, and provides ambitious men with a thoroughly sound training.

Here are the I.C.S. Courses:
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- Complete Radio Sales, Service and Sales
- City and Guilds Exams. in Radio Communication
- F.M.G. Certificates in Wireless Telephony
- I.E.E. Graduate Exam.

The Complete Radio Course covers equipment and radio principles as well as practice.

Efficient Servicing is of first importance to every wireless dealer and his assistants.

In addition to inculcating the art of selling, the Service and Sales Course provides that knowledge which enables the salesman to hold his own with the most technical of customers.

Television will soon be a tremendous branch of the industry. Our Course deals adequately with this subject, and covers the various important systems.

SEND FOR OUR BOOKLET TO-DAY

And, if you wish, ask for our free advice on any matter concerning your career. We shall be most pleased to inform you and help you, without placing you under any obligation.

Letters from Readers

Our Service to Readers

Sir,—I should like to convey my very grateful thanks for the most helpful and exhaustive answers to my wireless queries of last week. Considering the hundreds of queries that you must receive, the way in which you so thoroughly assist your readers is indeed splendid, and it is a service of the greatest value to us all. Allow me, then, to express my greatest appreciation. —R. Comins (Hayes, Middx.).

Car Radio: Interference Suppression

Sir,—I have been reading your very interesting articles on "Car Radio," but I thought perhaps you would be interested in a problem I was up against for some time.

So long as the car was stationary, results were clear and good, but as soon as I got under way an appalling crackle developed which drowned all signals on every position on the dial. The set, by the way, is a Phillips dual-wave model installed by myself. Two dipole aerials were fitted underneath the car, one on each side, 4in. from the ground. With the car stationary and the engine running, the ignition was dead silent, and I found it necessary to put only one suppressor in the H.T. lead.

I eventually traced the crackle as being due to H.F. in the front-brake drums, and the cure is to scrape all the grease from the hubs which are then filled up with a special graphite grease obtainable for about one shilling a tin. Should the rear drum offend, drain the rear axle and fill up with graphite oil. Although I'd told that graphite is not good for a half-race, I have so far had no ill effects, and the set continues to give splendid results. —R. F. Radcliffe (Summerdale).

S.W. Reception under Difficulties

Sir,—I recently built an adapter for my set, and have had quite a bit of bother to reduce hum and instability, but I have remedied the trouble at last. I have just been listening to W2XAD, and for fifteen minutes heard a gas company's programme, which I hope never to hear again. This was followed by fifteen minutes of a "Home town" programme, which was not quite so bad; then followed a half-hour of Beethoven's music, a "Country and Western" show, and some good chapel organ music. My aerial is of the coiled type, and is pulled out to about 10ft. and rig-ragged across a small window. Fortunately, I am at the top of a 40ft. house, but that means that my earth lead is over 40ft. long, which gives some very hand-capacity effects occasionally. At other times there isn't a trace of hand-capacity, so that my results, I suppose, are fairly good. —L. R. Armstrong (Newcastle).

Heard on the 80-metre Band

Sir,—Although I have seen many interesting logs published in your pages, I have not yet seen one for 80 metres.

I therefore enclose my log of stations heard this year on that wavelength on 'phones: WJND, W2HIX, W3EFS, VE1EI, ON1EI, W2OEE, PAOW, W2OEM, W3AU, W2JFA, PAOF, F2NF, FSME, HIBRA, C2OV, G6LL, G6HB, G2ZP, G5CU, G6PA, G6MN and E19D.
The transatlantic stations were heard on February 14th. The receiver used was a one-valve with a 35ft.-outdoor antenna.—A. P. L. Casling (Hale, Cheshire).

With the Amateurs

Sir,—I have not seen a log from this district in the past twelve months, so I enclose mine. These stations were logged during the past two weeks. One or two of them on 10 metres, and the remainder on 20 metres. I have been on the "Shorts" for the past twelve months; but until the beginning of this year I have not bothered about the amateurs. Now I am starting out on the 10 and 20-metre bands. My receivers are a three-valve short-wave and a two-valve, both sets being home-builts to my own design. I manage to get down to about 9 metres with the two-valver, with no alterations to the circuit. Most of the stations I use for speaker and broadcast stations.


Long-distance Reception

Sir,—I have received a verification card from W0XAZ; it gives some interesting information which I think may interest N.W.4Z.L.

W0XAZ operates on a frequency of 26,000 kc/s, with 500 watts power. It is low level modulated, and has high-fidelity standards. The receiving system consists of a half-wave vertical antenna suspended above the roof of the Schroeder Hotel, at a height of 25ft. above the street. The station is owned and operated by The Milwaukee Journal, which also owns and operates Station WTM3 (620 kc/s).

I have a QSL card from W9PHI, Canton, Illinois, who says, "Thanks, Q. M., for your 28 m.c. report on my phone. It is appreciated, and am glad to make it the eighth card for you. I use 800 watts with a diamond antenna."

W9SPC, another "ham" I reported on 28 m.c.s, uses 100 watts, and his antenna uses four half-waves in parallel.

W7FIW, Jacksonville, Fla., requests reports, and VE1FW also. W8IWG sends a fine card. Station VE1IN belongs to the Bowdoin-Kent Island Expedition in the Bay of Fundy.—R. Towlen (Bingley, Yorks.).

Adjusting the "Vitesse"

(Continued from page 731)

Although the slow-motion drive will assist in this if correctly used, it must be turned very slowly and carefully, as tuning is exceedingly sharp. The well-known station at Rome should be heard just below the centre of the dial at a point corresponding roughly with the setting of the London Regional station, at a tuning to the North Regional and then switching over to the short-wave range, the 40-metre amateur band should be heard, covering two degrees or so. The well-known Boundbrook station, W3XAL, on 49.18 metres, is almost at the top of the dial, a useful pointer being Athrone on the medium-wave band. Again, the German station at Zeesen will be found very close to this American and will serve as a guide, Keswick, however, shows that it is necessary to listen at certain definite hours for short-wave stations, and in general the lower half of the band will be heard best during daylight, whilst the upper part of the short-wave band offers the best reception during the hours of darkness.

A Single-valve All-waver

(Continued from page 720)

wooden planks to the inside of the former should be screwed to the ends. When the coils have been placed in position a 3/16in. screwed rod should be threaded through the centre of the unit and the ends bolted up tight. Seven spring contacts should also be cut from a thin sheet of brass, each approximately 3in. long by 4in. wide. The contacts should be bent and mounted, as in Fig. 5, so as to press against the studs.

The unit should be mounted on two small brackets and the central brass rod allowed to come through the panel in order to mount the control knob. Fig. 6 shows the connections between the coil windings and control studs.

This little set, which has proved very interesting, may provide the basis of many further experiments.

Do you know

---THAT gas discharge tubes such as are used in television time bases may be obtained with the aid of the patent gas Billings, 570 Brompton Road, London, S.W.7.
---THAT it is not essential to use this type of equipment for all types of work.
---THAT a muck-bucket coil may be incorporated in a pick-up to remove hum caused by an induction type meter.

The Editor will be pleased to consider articles of a practical nature suitable for publication in Practical and Amateur Wireless. Such articles should be written on one side of the paper only, and should contain name and address of the author. The Editor does not hold himself responsible for manuscripts, and it is understood that any and addressed envelope is enclosed. All correspondence intended for the Editor should be addressed: The Editor, Practical and Amateur Wireless, George Newspapers, Blackfriars House, Southwark, London, S.E.1.

Owing to the rapid progress in the design of wireless apparatus and to our efforts to keep our readers in touch with the latest developments, we give no warranty that apparatus described in our columns is not the subject of letters patent.
Swansea Radio Club

The 8th club was formed at a meeting held at the Y.M.C.A. on February 10th, 1917. Fourteen people were present, including Mr. C. H. H. Williams and two A.A. licence holders, and there is a prospect of the membership increasing rapidly.

The President, Mr. E. R. D. (G2ULX), suggested that the first series of lectures should consist of talks by the more experienced fully-licensed members on various transmission circuits.

Mr. D. J. A. (G2ULX), assisted by the Secretary, will give a talk on Power Amplifiers and Frequency Amplifiers on March 10th. National Field Day will also be a subject of discussion in the near future, and is keenly looked forward to. Meetings are to be held at the Y.M.C.A. at 7 p.m. on alternate Wednesdays, commencing February 24th, and all those interested will be welcome. Full particulars will be circulated by the Secretary, Mr. R. J. C. Davies, Messrs. Watson and Davies, Mansel Lane, Swansea.

The New Zealand DX R.A.

The New Zealand DX (Radio Association) is a strictly amateur all-wave DX Society. It has active branches throughout New Zealand and representatives in all corners of the globe. The activities include matters as the production of technical papers, and the reduction of electrical interference, the elimination of "faked" DXing, and arrangement of special programs.

Life membership costs 2s. 6d., or about 45 cents in American currency, including badge and certificate of membership. There are nearly 1,200 members in the Association.

The official organ is Tune In, a monthly printed publication of eight pages, containing all DX information. The annual subscription for the Bulletin is 1s. (stamps accepted).

The official call book is Radio Calls of the World, published quarterly, price 1s., postage 1d. (25 cents). It includes lists of all broadcast and short-wave stations of the world and gives operating schedules of all N.Z. and Australian broadcasting stations. Secretary and Publicity Officer, 37, Chancellor Street, Christchurch, N.I., New Zealand.

Radio and Television Society (Merchant Taylor's School, Northwood)

After a most interesting debate on the commercial propositions of television, a demonstration was given of the photo-conductivity of selenium. A powerful mains amplifier for ultra-short waves is under construction, for use in conjunction with the Society's apparatus. At the next meeting there will be a demonstration of a Lissen Short-wave set.

Exeter and District Wireless Society

At the last meeting of this Society Mr. T. D. Humphreys, A.M.I.E., gave an interesting and well-illustrated lecture on television. His lecture was divided into two portions, the first being the present position of television generally, and the second the technical aspect of high-definition reception. The lecture was illustrated by a large number of slides. Sec.: W. J. Chung, B. Sivell, Plow, Heavitree, Exeter.

Golddens Green and Hendon Radio Scientific Society

In the course of a lecture by Mr. E. R. W. (Stradbrooke), of Messrs. Belling Lee, Ltd., before the above society, adequate earthing of the supply mains at many points was regarded as the remedies suggested for a common bogey of electrical interference with broadcast reception. A convincing demonstration of the way to deal with small domestic motors, such as in a hair drier, was given. The Automatic Toning of Radio Receivers is the subject of the next meeting, which will be addressed by Mr. E. Gardiner, B.Sc. Particulars can be obtained from the Hon. Sec., Mr. A. G. Griffiths, "Horsemans", Priory Drive, Stanmore, Middx.

Brentwood Amateur Radio Society

At the regular fortnightly meeting of this society, held on February 17th, members were given a very interesting demonstration of Lissen receivers and Hi-Q components by Mr. E. Cholot. After the demonstration, members tried out the various receivers for themselves and the excellent reception of a large number of DX stations greatly impressed them.

This society has recently been granted a transmitting licence with the call sign G5HV. This station will soon be operating on the 40- and 30-metre bands.

All readers in the district who are interested in short-wave reception are invited to communicate with the Hon. Secretary, H. R. Read, 2BNK, "Slichton," Herrington Grove, Hutton Mount, Brentwood, Essex.

Radio, Physical and Television Society

At a meeting of this society held at 72a, North End Road, West Kensington, on February 19th, the President, Dr. C. E. L. Lemon, A.M.I.E.E., made some interesting comparisons between members' own loudspeakers and a "W.R." model kindly lent by Messrs. Whiteley Electrical Radio Co., Ltd., priced at 42s. All the speakers were subjected to the most rigid tests by means of an oscillator, and in actual broadcast reception, the "W.R." speaker gave a quite good performance against several high-priced models, and reproduction was excellent over a wide range of frequencies. Hon. Sec., M. E. Arnold, 72a, North End Road, W.14.

Swindon and District Short-wave Society

This society still continues to progress. Mr. R. A. Hiscock (G61MX) gave a lecture on February 18th, on "Short-wave Receiver Design," which was greatly appreciated by the members. Fast and slow Morse classes are also held, and a QSL corner. The society's short-wave receiver is now available, and the society will have an A.A. transmitting licence by the time this appears in print. A visit is being arranged to the station of 6LM at Chippenham. Messrs. Whiteley Radio Co., the manufacturers of the well-known W.B. moving-coil speakers, have kindly loaned the society one of their senior models for test. The society would like to hear from other radio firms.—Hon. Sec., W. C. Barnes, 7, Surrey Road, Swindon.

THERE'S A T.C.C. CONDENSER FOR EVERY PURPOSE

ALL-BRITISH CONDENSERS

SPECIFIED FOR THE 'VITESSE' ALL-WAVER

Short-wave reception demands above all else DEPENDABILITY of components. Because of T.C.C.'s 28 years' specialization in Condenser design and manufacture, Mr. F. J. Conn says "Use T.C.C.—they are DEPENDABLE."

The Specified Condensers
THREE T.C.C. Type 250.1mfd. . . . each 1s. 4d.
TWO T.C.C. Type 300.1mfd. . . . each 1s. 6d.
ONE T.C.C. Type 250.3mfd. . . . 2s. 6d.
FOUR T.C.C. Type A.3001mfd. each 8d.

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</table>

### CRYSTAL SETS.

- **Blueprint, 1s.**
- **Crystal Sets**

| 152 | F 204,000 | 2.00 |

### Futura Battery Sets.

- **Blueprint, 1s.**
- **Futura Sets**

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- **Mains Sets**

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### SHORT-WAVE SETS.

- **Blueprint, 1s.**
- **Short-Wave Sets**

| 152 | F 204,000 | 2.00 |
A Pocket Aerial

"I am very interested in the pocket aerial that was advertised in one of the back numbers of your double-duty Book. I am enclosed in your tube similar to a propelling pencil, and fitted with a clip for retaining in the pocket. The aerial is in the form of a springy-spiral of wire, attached to the inside of the tube at one end, and to the portion corresponding to the point of the pencil at the other. This is of metal, in the form of a standard wunder plug, and is inserted into the aerial socket of a receiver. A total length of 16ft. is available when the aerial is stretched out. The price is 2s. 6d.

£4 Superhet 4

"I would like to add A.V.C. to this set, if you advise it, would you let me know how it should be arranged? I am told improving the selectivity by bringing grid and plate leads of I.F. valve near to each other, how is this done? I tried it and blew the fuse twice, and the set was switched off. Am I right in presuming that the I.F. valve is the vari-mu H.F. pentode valve?"—W. C. C. (Leix).

In this particular receiver there is really insufficient H.F. amplification to enable an effective A.V.C. circuit to be fitted. You will have seen from the recent articles on A.V.C. that the degree of control is dependent upon the H.F. current, and where this is small, some additional voltage has to be employed. The most satisfactory way of including A.V.C. would be to replace the detector by a double-diode valve, and as you know, we do not approve of modifications of such a comprehensive nature to our published circuits. To improve selectivity the best plan is to modify the positions of the secondary and primary of the I.F. transformers, and instructions for doing this have already been given. Bringing the leads together as mentioned by you only causes the I.F. valve to oscillate, and this is done to receive C.W. signals as explained last week in our short-wave section. The I.F. valve is the vari-mu pentode.

Fitting a Frame Aerial

"I have a 4-valve mains receiver (H.F. Det., L.F. and rectifier) for the long- and medium-wave bands, which is greatly encumbered by an external aerial and earth. Would it not be possible to fit an ordinary frame aerial, and, if so, how should I construct it, and how would it affect the reception? There are two aerial terminals on my receiver, 6ft. 3in. and 4ft. 6in. I notice that some of the makers do not have a fixture to which the aerial is attached and, this is a problem. To what pair of terminals should I affix the frame aerial, and would an earth be necessary? Also, what internal alterations would be necessary? I would be much obliged if you would tell me"—T. A. J. (S.W.7).

In the ordinary way the frame aerial takes the place of the input tuned circuit. If your receiver is of fairly modern design a gauged tuning condenser will have to be fitted. The frame aerial would have to have an inductance identical with the coil now being used so that the gauged tuning condenser will still act in the correct manner. You would, of course, have to remove the present aerial coil. There would be some difficulty in building a suitable frame under these conditions.

RULES

We wish to draw the reader's attention to the fact that all letters intended for publication must be written on one side of the paper only, and should be of a size and length suitable for publication. We cannot guarantee to return unsolicited MSS.

(1) Supply circuit diagrams of complete built-in receiver.
(2) Suggest alterations or modifications of receivers described in our contemporaries.
(3) Suggest alterations or modifications to commercial receivers.
(4) Answers to questions on the telephone.
(5) Grant interviews to queries.

Please note also, that queries must be limited to one question per letter, and sketches and drawings which are sent to us should bear the name and address of the sender. Requests for blueprints must not be enclosed with queries as they are dealt with by a different department.

If a postal reply is desired a stamped addressed envelope must be enclosed. Send your queries to the Editor, PRACTICAL AND AMATEUR WIRELESS, George Brewe, Ld., Tower House, Southampton Street, Strand, London, W.C.2.

The Coupon must be enclosed with every copy.

A.V.C. and Load Resistance

Your very interesting articles on A.V.C. give very interesting diagrams with the paragraph to A.V.C., but they don't show where the other end of the line is to be connected. What is a load resistance? Perhaps you could explain these two points? —E. C. B. (West Wickham).

The object of A.V.C. is to control the amplification of H.F. or I.F. valves by varying the applied voltage to the grid via a grid-leak, in which case a fixed condenser must be inserted in the grid lead to avoid short-circuit. The load resistance is included in the outside circuit of a valve or Westector in order to develop the signal voltage for subsequent amplification. In the case of a triode, you can see that there is a fluctuating anode current present in the anode circuit, but you cannot apply a current to a following valve for amplification. You therefore include a resistance in the circuit and the current flowing through this results in a voltage drop across it, the voltage changing with current. Thus the changing potential at the grid may be applied to the following valve.

Tuning Indicator

"I am building a short-wave set, detector stage followed by two-valve amplifier. Can you suggest any possible means of using a tuning indicator for distant reception?"—G. T. (Waferloos).

As we explained in the article recently dealing with A.V.C., this arrangement is only applicable where A.V.C. is the variable only. The Earth circuit provides the H.F. amplification and makes it difficult to discern the exact resonant point. In a simple detector stage there is no such variable to render it difficult. When you are exactly tuned, and the signal strength will show when the exact resonant point is reached. You could, of course, include a milliammeter in the anode circuit to show the variation in current, but it is definitely not worth while in a circuit of the type mentioned by you.

Radio FZK (Saiyon, Indo-China)

"Can you give me any details concerning this station which I recently received at good strength?"—P. D. (Essex).

One of our readers recently received a verification letter from this station, and in the course of this they give the following details of the transmitting station. The power is about 10 watts in the aerial, and the wavelength is now 31.75 metres. Experimental transmissions are carried out every Saturday and Sunday in the 1450 to 1451 M.G.M.T. whilst for the remainder of the week experiments may also be carried out at the same time. The Sundays are from 03.00 to 05.00.
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