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Practical Hints for Home-Recording

One of the most interesting "side-lines" of radio is the making of records, and it is possible to record either home-made entertainment or actual broadcasts received on standard radio apparatus. There are endless possibilities for the keen experimenter, not only in the results which may be obtained, but in the circuits and processes adopted for the purpose. We have here given details of the main requirements, and in this issue we go into the matter a little more fully, and deal with special circuits which may be needed where the work to be carried out is involved. It should be remembered in connection with this work that special records are available by means of which sounds or special types of music may be obtained and incorporated in a home-made record. Trumpet fanfares, for instance, may be used as a prelude to a spoken announcement or to conclude a short play or talk, and the home-recording enthusiast will find that this branch of radio will greatly add to the interest of his hobby as it is a different matter to make a really high-class sound accompaniment for a home-made film, or to run for any length of time. For the latter purpose, of course, twin turntables and pick-ups will be needed to avoid a break between the playing of successive discs.

America Again

From the U.S.A. comes the news that a machine has been built in which an oscillator and various filter and tone circuits have been so incorporated that by means of the operation of keys resonating a piano, speech sounds may be reproduced through a loud-speaker. It is stated that this machine speaks fluently in several languages, but has a slight "electrical" accent.

"To the Public Danger"

With his first original work for radio, Patrick Hamilton demonstrated on "Money with Menaces" - a complete appreciation of all the opportunities provided by the medium of broadcasting. His new play, to be heard on the National programme on February 25th, is first and foremost a first-class radio, with a thrilling plot, clear-cut characterisation and an ingenious use of sound effects. But it is more than merely a play; it is a persuasive and moving social document. He is concerned in the play with the problem presented by the criminally foolish type of person who drives when under the influence of alcohol. This tragic theme—for it is no loss—is handled with a careful realism that is infinitely more effective than melodrama. The production will be by Val Gielgud.

Anti-Interference

A further step in the removal of interference with radio equipment is announced from Poland, where the Villa Licensing in Denmark

In an endeavour to increase the popularity of listening in Denmark the Broadcasting Council has reduced the licence fee by 60 per cent. This concession will remain in force until March 31st next.

News Bulletins

As a result of research made by the authorities at Broadcasting House, it has been discovered that the 6 o'clock bulletin has the greatest reach. Next in popularity comes the 9 o'clock bulletin, followed in order by the 10 o'clock and 7 o'clock recitals. As a result of this research the R.B.C. are considering the transfer of the 10 p.m. Regional News to the National wavelength at 9 p.m.

Shrove Tuesday Programme

A special Shrove Tuesday programme in Welsh will be broadcast on February 21st, and will present to listeners some of the old customs and songs connected with the feast in North Wales. In England, apparently, the only social custom that survives in connection with Shrove Tuesday is the eating of pancakes, and this was probably originated because all the eggs and fats had to be used up before Lent, when these things were forbidden. In France the day is still known as Mardi Gras—"Fat Tuesday."

West Cumberland Variety

In 1936, Newcastle broadcast a programme called "Hark Forrard," a feature including a number of radio actors and by people from West Cumberland. Listeners greatly enjoyed the broadcast, and since then there has been a second successful programme of the same kind, but with different artists. On February 23rd, again from Newcastle, listeners will be given a third edition of "Hark Forrard," and, as before, the bill will be compiled by W. S. Nowall, a journalist in Whitehaven, who has contributed several items to Northern programmes. This broadcast will be on the Stagshaw and Northern wavelengths, and it is sure to be awaited with great interest by listeners who live on the Cumberland coast, for it will carry a criticism of variety programmes nearer than in this part of the North Region.
ROUND the WORLD of WIRELESS (Continued)

The First Radio Stamp

At the Second National Stamp Exhibition, held recently in New York, the N.B.C. Philatelists' Club had a stand on which were exhibited all the stamps which had in any way referred to wireless. The earliest stamp in this category was of 1913 origin, and depicts the Guatemalan Government station.

Torkildsbu Station Out of Action

The Norwegian commercial radio station, Torkildsbu Radio, in south-east Greenland, was recently practically destroyed by a violent blizzard. No member of the staff was seriously hurt, and they were able to salvage the most valuable part of the equipment.

To Assist Aircraft Landing in Fog

In conjunction with the Lorenz radio directional beam which is to be installed at Ringway Airport, Manchester, the Air Ministry intends to lay down a powerfully illuminated glass-covered "fog line," about 1,400 yards long, and stretching across the aerodrome flush with the ground.

A New Wavelength Plan

It is probable that a number of channels allocated to European transmitters may be altered at the next meeting of the European Commission for Broadcasting.

Interesting and topical news and notes

Paris P.T.T., 419 m. (715 kc/s); Poste Général (Paris), 280 m. (1,071 kc/s); Eiffel Tower will remain on 206 m. (1,450 kc/s); PTT Grenoble and Lyon will take 446 m. (670 kc/s); PTT Marseilles, 370 m. (708 kc/s); PTT Toulonnes Marseille, 552 m. (800 kc/s); PTT Toulouse, 321.9 m. (932 kc/s); PTT Limoges, 301.5 m. (996 kc/s); PTT Rennes, 271.1 m. (1,070 kc/s); PTT Nice Côte-d'Azur, 261 m. (1,150 kc/s); Nice Radio (Nice), 298.1 m. (1,260 kc/s); PTT Nîmes, 293 m. (1,023 kc/s); Nice Côte-d'Azur, 261 m. (1,150 kc/s); PTT Nîmes, 293 m. (1,023 kc/s); PTT Montpellier, 228 m. (1,344 kc/s); in Africa, Radio Maroc, according to French papers, will work on 489 m. (812 kc/s); and PTT Algiers, 265 m. (1,023 kc/s). Moreover, France is asking that the following channels should also be reserved for her use: 221 m. (1,357 kc/s); 217 m. (1,382 kc/s); 211 m. (1,422 kc/s); 207 m. (1,449 kc/s); and 204 m. (1,470 kc/s). The following stations which already existed at the time the Plan de Luneuve was brought into operation have not received, so far, any definite wavelength, and it is hoped that at the next meeting specific channels may be allotted to them. They are: Bordeaux-Sud-Ouest, Radio Côte (Paris); Radio Agen; Radio Lyon; Radio Méditerranée; Radio Normandy; Radio 37 (Paris); Poste de l'Île de France (Paris); and Radio Nice.

Orchestra Deserts the Classics

Rousignol and light-hearted concert has been arranged for February 20th by the B.B.C. Scottish Orchestra. Instead of classical concert with its demand for more careful attention, listeners will hear a Sousa march, a selection from "snow White and the Seven Dwarfs," the Prelude and Fall from "Mary Rose," and Eric Coates "Springtime" suite. The orchestra will be under its conductor, Guy Warrack, who has been with the B.B.C. in Scotland since 1936. In that time he has broadcast close on two thousand works.

Mr. W. N. Robson's Visit Postponed

We are informed by the B.B.C. that, owing to exceptionally heavy programme commitments in his own country, William N. Robson has been forced to postpone his visit to London. It is hoped that later in the year listeners will have an opportunity of hearing the work of this brilliant producer, whose programmes for the Columbia Workshop, the experimental Drama Department of the Columbia Broadcasting System of America, have aroused wide interest in the U.S.A.

Solve this!

Problem No. 335

Wilkinson was not satisfied with the reproduction from his battery four-valve set and decided to fit a tetrode. On looking up one or two circuits he found that the usual arrangement was a variable resistance in series with a fixed condenser across the anode circuit, and he believed it would be included in the L.P. stage between anode and earth. He decided to try this, but then found that he had no suitable condensers available. He thought the resistance alone would suffice and accordingly he joined this in the above position. What was wrong with this? Three books will be awarded for the first three correct solutions opened. Entries must be addressed to The Editor, PRACTICAL AND AMATEUR WIRELESS, Geo. Newnes, Ltd., Tower House, Southwark Street, Strand, London, W.C.2. Envelopes must be marked Problem No. 335 in the top left-hand corner and must be posted to reach this office not later than the first post on Monday, February 20th, 1939.

Solution to Problem No. 334

When Smith joined the transformers together as indicated he upset the inductance values. To obtain the increased selectivity he should have included a small variable condenser between the secondary of one transformer and the primary of the other, and this would have given him the desired results. The following three readers successfully solved Problem No. 331 and books have accordingly been forwarded to them: R. J. Gunn, 65, Kirkstead Street, Hyson Green, Nottingham; R. W. Walker, 66, Laverne Place, Sandyford, Newcastle-on-Tyne; E. A. Sherrock, 36, Park Lane, Bolton-on-Denise, Nr. Rotherham.
Making Your Own Components—7

Class B, Output and Microphone Transformers

Constructional Details of a Class B Input Transformer, of a Class B Output Choke, and of Transformers Suitable, for Use with Microphones.

By FRANK PRESTON

TRANSFORMERS for use in a Class B circuit are rather more critical than the L.F. transformers which I described last week. In other words, the ratio between the primary and secondary turns must be chosen to suit the particular valve in use, whilst the D.C. resistance of the secondary or the driver transformer must be kept low. Apart from these considerations the method of construction is practically identical with that previously explained.

The step-down ratio of the driver transformer can be found by dividing the optimum anode load of the valve used as driver by the input impedance of the Class B valve, and then taking the square root of the result. The answer will generally be found to lie between two and one to one, although for most practical purposes it is convenient to make the transformer with an overall ratio of 1.5 to one and to take a tapping one-third of the way through the primary, it is necessary first to settle the question of the core size and then of the primary windings. Let us first assume that we shall employ No. 4 Stalloy stampings; these are larger than necessary, but we have previously seen the value of keeping to this popular size wherever convenient.

Three dozen pairs would be suitable, and the primary could well consist of a total of 3,000 turns of 38-gauge enamelled wire. As already mentioned, we should make a tapping after winding the first 1,000 turns, whilst many constructors might care to take a second tapping after 500 turns. It would then be convenient to divide the windings accordingly.

If a number of other similar calculations were made for different valves, it would be found that the number of turns would vary, but that the ratio would remain fairly constant.

Ratio Calculation

The matter will probably be more readily understood if we take just one example. Let us assume that we shall use the Cosor 215 P (small power) valve as driver and the Hivac B 250 in the output stage. It can be shown from the makers' literature that the former has an optimum load of 9,000 ohms and that the latter has an input impedance of 4,000 ohms. Dividing 9,000 by 4,000 we get 2.25 as the answer, and the square root of 2.25 is 1.5. Thus we see that the correct ratio in this instance would be 1.5 to 1.

Now to settle the gauge of wire. Which gauge of wire would be suitable for a transformer with a one-to-one ratio? The average length per turn can be taken as approximately 6in, when using the core decided on. This indicates that the length of wire in 4,000 turns is approximately 40,000 per 1,000 yards. Looking down our wire table on this page we find that 36-gauge wire has a resistance of 529.2 ohms per 1,000 yd., thus the resistance of 700 yards would be something under 370 ohms. That gauge of wire would therefore be suitable, although as we have ample space and it would therefore be worth while to use 34-gauge enamelled wire. This has a resistance of only 361.2 ohms per 1,000 yards and the total secondary resistance would be in the region of 250 ohms, which is ideal.

That gives us windings as: primary 3,000 turns in all of 38-gauge enamelled wire; secondary, 4,000 turns in all of 34-gauge enamelled wire. We could place a spacing check on our winding space as shown in Fig. 1, winding the primary in the smaller section and the secondary in the larger. As with the other transformers that I have previously described, it is wise to divide each winding into about four parts by means of waxed paper or oiled silk. For making of winding and making tappings, you should refer to the three previous articles in this series.

Output Choke

When using Class B it is necessary to have either an output transformer or an output choke if the transformer fitted to the speaker is not specially wound for Class B use. Of the two components a choke is generally better, and this should be tapped where possible.

From the above it will be understood that the 2,000 turns are intended for use as primary with a one-to-one ratio. That means that this number can conveniently be used as a basis for determining the correct number of secondary turns. In this respect there is an important point to bear in mind; to obtain a one-to-one ratio the transformer which is centre-tapped to feed the two halves of the Class B valve, must have twice the number of turns on the primary. In other words, for the transformer under discussion we should want 4,000 turns, with a tapping at 2,000.

Wire Gauge

Now to settle the gauge of wire, which is dependent upon the D.C. resistance requirement. If it is agreed to place the primary and secondary windings side by side on a spool made as described in recent articles dealing with transformer construction, the average length per turn can be taken as approximately 6in, when using the core decided on. This indicates that the length of wire in 4,000 turns is approximately 40,000 per 1,000 yards. Looking down our wire table on this page we find that 36-gauge wire has a resistance of 529.2 ohms per 1,000 yd., thus the resistance of 700 yards would be something under 370 ohms. That gauge of wire could therefore be used, although the resistance would be slightly higher than the desirable maximum. At the same time, if the winding space were at a premium that wire could be used with fair success. When using No. 4 stampings, however, there is ample space and it would therefore be worth while to use 34-gauge enamelled wire. This has a resistance of only 361.2 ohms per 1,000 yards and the total secondary resistance would be in the region of 250 ohms, which is ideal.

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Items of Interest

Wireless Fund’s Great Week

So much has been written of late about the British “Wireless for the Blind,” some of it in exaggerated terms, that it is perhaps appropriate to emphasize that the Fund has provided sets and relay installations in the homes of nearly 45,000 sightless people throughout the country. The motto of the Fund is “Let the Blind Hear.” Originally, the sets supplied were of the one-valve headphone variety, but these have now become obsolete, and have been replaced by loudspeaker instruments of the most modern kind. These are also supplied to the newly blind.

Up to the end of its past financial year, the total expenditure of the Fund had amounted to about £127,000. Of this sum, nearly £117,000 had been spent on the actual provision of wireless sets. The usual revenue of the Fund is about £12,000 a year, but this is supplemented by donations amounting to about £127,000.

The chief point of interest is that the balance of the total expenditure of £127,000, given to the “newly blind.”

A “Super-hotted” Superhet

FROM the West Gloucestershire Power Company Ltd., comes the interesting story of “the super-hotted” superhet—a Marconophone Model 325—that continues to function perfectly even after being subjected to extremes of fire and water.

The receiver, shown in the accompanying illustration, was involved in a disastrous fire recently at Cinderford, and when it was salvaged from the gutted ruins was found to be in excellent working order apart from a charred speaker cone. The speaker was replaced, and further minute examination failed to reveal any fault except slight misalignment of the L.F. due, apparently, to the terrific heat to which the trimmers had been exposed.

Although insurance of this kind are fortunately rare, the fact that this Marconiophone set continued to function perfectly satisfactorily after such an unheard-of “hott-up” is a significant pointer to its reliability, even under the most exacting conditions.

Versatility of the Television Orchestra

THE B.B.C. Television Orchestra, consisting of twenty-two players, was formed in 1936 by Hyam Greenbaum, who, under Sir Henry Wood. The Television Orchestra must be one of the most versatile in existence. It must be ready when called upon to appear in vision, the members being made up for the television cameras. In the course of the day, their programmes may vary from “hot Mammas” songs and high-speed variety programmes to slow movement from a Beethoven concerto, a ballet, or an excerpt from grand opera.

The orchestra is heard more often than it is seen, and when not in vision may be playing in a studio remote from the one in which the performance is taking place. The instrumentals are faced by problems peculiar to television when they appear before the studio. Care must be taken that the brass instruments do not reflect the highlights into the camera lens, and that is why a newcomer to this studio may think that the orchestra was careless about cleaning the instruments.

“People prefer them dirty,” said one of the players. “On the television screen they appear to be clean, which is all that matters, and we avoid dazzle.”

Elise Carlisle Well Again

Elise Carlisle, the popular contralto, who has just recovered from a serious illness, spent an afternoon recently making gramophone records at the “H.M.V.” studio at St. John’s Wood. Listeners will remember that Elise collapsed while broadcasting just before Christmas, when she sang “Two Sleepy.

February 18th, 1939

PRACTICAL AND AMATEUR WIRELESS
MANY listeners are now interested in the subject of record making, and we have received various queries from time to time concerning the types of apparatus and circuits for simple recording at home, but there are often special types of programme required which need more elaborate apparatus. For instance, a microphone may be used in order that speech may be recorded, but in addition to this, it may be necessary to furnish a background of music, sound effects, or other noises which may be required in varying proportions whilst the speech is being made. In a play, for instance, it may be necessary to fade out speech as some particular sound effect is brought in, and then the position may have to be reversed. It may also be found desirable, at times, to include a portion of an actual broadcast picked up on a radio receiver, and thus special input circuits will be called for.

In the first place, the microphone will be connected to the recording amplifier via a special transformer, and thus we may assume that this will be correctly matched so far as its input impedance is concerned. If a pick-up is also to be used this will also have to be arranged in such a manner that the correct impedance is applied to the amplifier and the same applies to any other apparatus which may be used.

"Play-back" Switching

The first essential circuit when the programme and apparatus have been decided upon, is some form of play-back switching. It is, of course, quite a simple matter to change over pick-up, mike and speaker, but this is at the best a rather troublesome process, and two simple double-pole change-over switches will enable the circuit to be changed instantly from recording to play-back. In Fig. 1 the arrangement is shown diagrammatically and it will be seen that the recording head and other items are instantly connected where required, and thus it is a simple matter to ascertain at once whether or not a record has been properly made. In this case, of course, care must be taken not to damage the new record before it is processed, according to the type of record being made.

On the input side, as has already been stated, various items may be needed, and it should be remembered that the output from a good pick-up with a standard record may be much greater than that obtained from an ordinary microphone. Consequently, an ordinary mixer circuit, such as is shown in Fig. 2, may prove of little use owing to the fact that the maximum output from the mike may fall so much below that of the pick-up that the latter has to be operated with the volume control at such a setting that quality is impaired. This difficulty may be overcome by using an extra valve for the mike, and connecting the output from that valve to the circuit as shown in Fig. 3. With all volume controls there is a point where, due to the small amount of resistance left in circuit, some form of frequency distortion is introduced, and for recording purposes it is quite possible that this will prove a disadvantage and spoil the recorded items.

In such a case the additional expense of a toneless volume control circuit, or constant impedance control may be justified. Three volume controls are then called for, and are wired as shown in Fig. 4, the values of the controls chosen according to the type of programme or pick-up which are employed. This arrangement may, of course, be duplicated and used in each "leg" of the mixer circuit shown in Fig. 2.

Tone-control

There is a resonant frequency in the ordinary type of pick-up, and this is sometimes evident on certain records. When a similar pick-up is used as a recording head there is a risk of the two frequencies clashing, and thus a slight defect may assume serious proportions and ruin a record. A special tone-control should, therefore, be used across the pick-up, the values of the components being selected to remove the resonance. Headphones in the output circuit of the complete arrangement, shown in Fig. 1 by broken lines, will enable the operator to hear whether or not this resonance is eliminated, and a circuit of the type shown in Fig. 5 in most cases suffices to cut out the trouble.

For effects purposes various records may be obtained and it will thus be necessary to make some provision for picking out a particular section of a record at a given moment in order that it may be included in its proper place in the record being made. For this purpose an indicator should be made up and attached to the pick-up carrier and something on the lines of the idea shown in Fig. 6 being suitable. It is then a simple matter to play through the record, and make a note of the exact point at which the particular sound or effect occurs when the needle may be instantly placed at that point, when making your special record.

The importance of elaborate mixer circuits and tone-controls of the type men-

(Continued on next page.)
PRACTICAL HINTS FOR HOME-RECORDING

(Continued from previous page.)

The test receiver is an A.C. mains-operated multi-band receiver of the amateur type, and the circuit which is incorporated is shown below. A special coil unit with selector switch provides a continuous coverage from 10 to 550 metres—from which it will be noted that no provision has been made for long-wave reception. On the input side a special coil is used with flexible leads in place of sockets or terminals, and it is thus possible to use a dipole aerial or a simple aerial and earth scheme. There is no H.F. stage in this particular model and the first valve being a triode-pentode for frequency changing, followed by an unusual arrangement in which a triode-rectifier acts as an amplifier and a frequency oscillator. Next comes a double-diode-rectifier acting as re-tuner for A.V.C., second detector and L.F. amplifier, the last-named feeding a pentode output stage through an R.C. network. A mains-energised speaker is employed, and the set is quite free from hum or similar troubles.

On the panel there is a 'phone jack, beat-frequency on/off switch, combined volume control and on/off switch, wave-length control, A.V.C. on/off switch, and A.M./S.W. on/off switch. In addition to these are the main tuning controls, which are part of the well-known B.T.S. mechanical bandspread tuning system. The large full-visibility scale is calibrated in wavelengths and is clearly read.

Test Report

The receiver has been tested in our laboratories over a considerable period and has been found to function in a very satisfactory manner. Tuning is extremely simple with the special dial, and no difficulty is experienced in reproducing special station settings with the two-pointer arrangement which is provided. On the short-wave bands the performance is fully up to the requirements of the experimenter, and American stations have been received regularly in daylight. On the broadcast band all worth-while stations are received at ample volume and the quality of reproduction on the local stations is particularly pleasing. The bass is far clearer and free from thump or other distortion than one would expect from a small cabinet type of receiver of this nature, and high notes are reproduced with clean-cut brilliance. There is, naturally, some whistle interference at certain parts of the scale, but this is to be expected from a superhet which does not employ an H.F. selector stage. It is not, of course, of an objectionable nature. When used with a full outdoor aerial of the inverted "L" type, results were perfectly satisfactory although, in that case, in the locality where the set was tested, interference assumes rather large proportions. This is, however, considerably reduced when the standard doublet is employed and this is, of course, recommended for short-wave work. The receiver is sold complete at $10, and may be obtained on easy payment terms if desired.

B.T.S. TROPHY 5

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PRACTICAL WIRELESS

By F. J. CAMM.

From all Booksellers 5/- net, or by post 5/6 direct from the Publishers, George Newnes, Ltd. (Dept.), Tower House, Southampton Street, Strand, London, W.C.2.
Television Interference

In a recent issue I gave my views on the television interference problem, and I gave it as my considered view that the greater proportion of television interference was not due to the ignition systems of motorcars. My opinion, of course, based upon my personal experience with television, and it is confirmed by the few friends I have who own television receivers. Now, I do not think that anyone can accuse me of being anti-television, and it is also true to say that this journal has published more information about television than any other technical periodical. It was one of the first to believe in the future of television, and the Editor of this journal backed up his opinion by starting a monthly journal entitled Television and Short-wave Radio immediately after the Television Committee had issued its favourable report recommending the regular high-definition transmissions. When that journal suspended publication because events showed that it was ahead of its time, and that the Commission had been a little too optimistic as to the state of the science—facts proved by the sudden rise and fall in television shares on the Stock Exchange, and by the failure of the public to be enthused by the report—I said at the time that television had been a victim of the caprice of inventors, and that it would also suffer fierce opposition from those firms who were unable to manufacture television receivers. I also foresaw that it was inevitable for the patent situation to be mitigated by some pool and licence system. One company which formerly had sought to protect its right in the word “television,” which it had registered as a trade mark, generously relinquished its rights. No one will deny that my predictions proved sound in the light of present knowledge, for it was on January 31st, 1935, that the report of the Television Committee was presented to Parliament by the Postmaster-General, and it is not until February, 1939, just over four years later, that the industry decided that the moment is ripe to indulge in a television push.

Lack of Gratitude

This journal has, week by week, published a special television section, and has been one of the keenest television propagandists. Notwithstanding this, the industry has not given evidence of its appreciation, not even to the extent of following normal trade procedure and posting to us reports of its meetings. I repeat, the remarks I made in a previous issue, when I gave it as my opinion that the majority of television interference is not due to motor-cars, and I also expressed the opinion that it probably be solved in the future by a change to a longer wavelength. I also said that I considered that the interference problem is one which should have been tackled by the set-makers, who, having achieved the almost impossible by splitting up a scene in the television studio into its electrical counterparts, transmitting it through the ether and reassembling it on the end of a cathode-ray tube, should not find insuperable the smaller, even trifling, problem of the interference created by vacuum cleaners, hair dryers, medical apparatus, and other electrical devices which give rise to television interference. These devices outnumber motor-cars by so per cent., and I understand from the statistical department of those whose duty it is to analyse and tabulate these matters that the total number of motor-cars likely to give rise to television interference is about 3,500,000. Apparently the Television sub-Committee appointed by the R.M.A. to investigate this problem are under the impression that only motor-cars in London can give rise to go per cent. of the interference, and that the other apparatus to which I have referred is in use outside London!

A Simple Check

FALSE reasoning! This committee should well be able to check by figures that there are 16 million pieces of electrical apparatus in this country which can interfere with television, so that in London alone, and the law of average applying, there is at least five times as much television interference from such apparatus as there is from motor-cars! Yet, with a nonchalance, sang-froid and sanguinity which would amuse even Charlie Chaplin, they address a letter to the Editor of this paper classifying my opinions as “colossal technical ignorance.” I will leave my readers to judge as to where the ignorance exists.

I also expressed the point of view in the articles to which this committee objects that it would not be possible to make television interference illegal. I base my views not only on a knowledge of the law, but also on a knowledge of what has gone before. Television at the moment is a form of entertainment local to London, and which only a few thousand people indulge in. It is hoped with the present television push to increase that number, and I devoutly hope that the efforts will succeed. They will not succeed, however, by adopting an attitude of compulsion, and by writing to the Editors of papers who have the courage to face up to the situation and facts, offensive letters couched in objectionable language. They must not bury their heads in the sand like the ostrich. In the first place, I say with all the emphasis that type can convey that notwithstanding the fact that a draft Bill is in existence which seeks to make suppression of all likely causes of television interference compulsory, it is doubtful whether it will reach the Statute Book, for the simple reason that such an Act to be effective would have to apply to every motorist in the country, and it would be unreasonable and unconscionable to compel individuals living in the North of Scotland, Wales, the West of England or in any other district outside the service area of Alexandra Palace to go to the expense of fitting suppressing devices merely because some thousands of people in London wish to operate television receivers. Such an act would be the surest way...
of fostering national hostility against television among those who do not desire to look in. Pleasanter and voluntary means must be sought.

Now, there is such a thing in this country as common law, and it applies to such questions as right of way, ancient lights, lammas rights, and many other things interwoven with the liberty of the subject. Such rights cannot be taken away by Act of Parliament. If, for example, a doctor operating an ultra-violet ray apparatus, or the owner of an electric motor, or a vacuum cleaner, can prove that they have been using such apparatus without complaint for a number of years, it would be impossible legally or otherwise to prove that they are guilty of interference.

No Standard Device

They must also learn that it is not possible at the present time to manufacture any piece of suppressing apparatus which is successful in every case. Two identical electrical motors, for example, will not yield to the same suppressing arrangements.

The correspondent, who is the chairman of this television interference sub-committee and who wrote objecting to my comments, will, I am certain, be the first to agree with me on that point. He will also, I am sure, agree that at the present moment the question of suppressing devices interfering with the efficiency of the apparatus to which they are fitted has not been satisfactorily solved.

My remarks that I consider a change of wavelength would help to solve the problem are backed by the experiments of a famous Russian scientist. My comments on this point, however, have been warped to indicate that I necessarily meant that high frequency television would be transferred from ultra-short wavelengths to the medium or long-wave bands. I neither said nor implied anything of the sort. Four metres is a longer wavelength than 9 or 10. No one has a greater belief in the future of television than I, and you merely have to peruse the optimism I have breathed in this page for a number of years to verify that. I have on numerous occasions said that television is inevitable, and that within our lifetime the present sound programmes will occupy in the public taste the same position as the silent films. A problem which has been created by television itself, however, must be solved by the industry. I maintain that interference must be solved by the set maker.

Short-wave Coils

Many constructors use short-wave coils of the self-supporting type made from tinned copper wire. These coils are highly efficient, but there is one important point which must not be lost sight of. It is often found desirable to make connection to various points on these coils by means of clips—for instance, for aerial or reaction connections. The arrangement is perfectly satisfactory so long as the wire is clean. Tinned copper wire will oxidise fairly rapidly, especially if it is placed near the flames from an accumulator. It must, therefore, be well cleaned if the position of a tapping clip has to be changed, and loss of efficiency will arise if this point is not attended to.

Unusual Effects

We have before reported instances of erratic performance arising from peculiarity which cannot be understood. A recent instance of this sort which has been brought to our attention was a case of efficiency caused by using two earth leads to a screened anode connection. This was 8ins. in length and at each end of the screened covering the constructor had connected a bare wire joined to the nearest earth point. As results were not up to standard various tests had been applied and when removing a connection made to a common earthing point one of the leads to the screened cable in question was accidentally removed. Results immediately improved and subsequent tests showed that as soon as the two leads were in position the performance fell off. When either of the earth leads was removed, efficiency improved. The connections were soundly made and no short-circuits or similar defects could be traced.

Earthed Spindles

We must again remind constructors that certain types of volume control potentiometer on the market have the spindle "live." That is, in actual metallic contact with the other arm. When the control is used with a metal chassis, or in conjunction with a metal component mounting bracket mounted on an earthed chassis it is essential to use an insulating washer on each side of the mounting bush, or the control will be short-circuited. In some circuits, of course, the arm is intended to be earthed and therefore can be used without using a control dismantled from an old set or when substituting a specified component careful attention should be paid to this point.

A Parallel Case

Now, it is undeniable that almost every home in the country owns a wireless set, and many of the sets are located in districts subject to interference. In fact, there are very few districts not subject to some form of this trouble. The Post Office has been performing yeoman service in tracking down sources of interference, and once it has found it the most it can do is tactfully to recommend to the owner of the offending apparatus that he should fit suppressors. It is logical to assume that, with the combined resources and power of the Post Office and the.B.B.C. and the Government, it had been possible to introduce legislation making interference an offence where such legislation would have been introduced a long time ago.

A form of interference to which insufficient attention has been devoted, because it has not been considered as interference, is the "flat spot." There are many districts in England which for one reason or another are screened. It may be a steel building or some mountain containing metal deposits or some other screen which prevents listeners in those particular districts from receiving programmes. It would be logical to suggest that it should be illegal for a mountain to be in the way of factories engaged in Government work to erect steel buildings.

"Off My Wavelength"

Before I leave this matter I should like to address some remarks to the writer of a paragraph in a trade paper who suggests that I am "off my wavelength," in discussing the matter in a previous issue. He asks me what evidence I have for my statement that the greater proportion of interference does not come from motor vehicles. The foregoing provides the answer to the naive paragraphist. I said that the problem must be solved by the design of the television apparatus. The paragraphist thinks that" surely is like fitting the population with gas masks (not A.R.P. pattern because they don't work in this case) as a precaution against leaks from gas companies' mains. In any case it is probably impossible."

My detractor here has given his paragraph a special box, and you will note that he merely queries my remarks without showing where I am wrong. I hope that the comments I have made will convince him that I have given rather more thought to it than those individuals acting as critics who fasten on to something without stopping to consider whether the phrases are based on reason.
No matter what type of short-wave receiver is used, whether it is a regenerative detector and one L.F. combination, or the latest in superhetas, its performance is to a considerable degree governed by the efficiency, or otherwise, of the aerial system used in conjunction with it.

Although we can receive world-wide transmissions, using as an aerial a few feet of wire behind the picture rail, or under the rafters, such arrangements do not exploit the potentialities of the receiver to the full, and because of this the most efficient aerial it is possible to erect is to be advised.

Amateur interest nowadays centres around ultra-short-wave reception. There is no doubt about the potentialities of ultra-short waves outside of visual ranges, and the indications are, in the writer’s opinion, that eventually DX will become common, though doubt about the potentialities of ultra-short waves will increase somewhat for short waves outside of visual ranges, and the indications are, in the writer’s opinion, that eventually DX will become common, though doubt about the potentialities of ultra-short waves will increase somewhat.

The essentials are an efficient aerial system, erected at a good height in order to avoid the possibilities of screening and consequent damping. The higher the better is a rule which applies equally from the reception point of view as that of freedom from electrical interference.

Wooden poles, generally, are for some reason regarded as expensive items. It is, however, possible to erect a neat and efficient aerial at low cost, if square section timber is used.

The most simple method is to mount the necessary insulators on one side of the pole. Fig. 1 shows an alternative method, which can be adapted to suit the single wire and doublet type systems, and is, in the writer’s opinion, a much better arrangement. The height of the pole, generally, is a matter of convenient length, connected with the cross sectional dimensions of the timber used and stability of construction.

Finest erections, however, will not do, no matter what type of aerial is to be erected. With the exercise of a little care and attention to detail, it is possible to erect an ultra-short-wave aerial system which will withstand the strongest gales, and yet have the minimum of sway, thus avoiding erratic signal reception. The height, however, should be governed in the choice of timber, which should be straight, entirely free from knots, and as free from defects as may reasonably be expected. If the length of the pole is comparatively short, 10 ft. section redwood will be sufficient rigidity. If, on the other hand, a long pole is necessary in order to extend the system clear of the building, 20 ft. or 21 ft. section timber will be necessary, in order to avoid excessive whip in high winds.

Constructional Details

The two arms should not be nailed in position, but half-lapped and screwed as shown in Fig. 2, which should be studied in conjunction with Fig. 1.

Fig. 3 shows a suggested arrangement for a vertical dipole, with twisted feeders, and Fig. 2 shows, in dotted lines, how the additional side is half-lapped to the horizontal members.

In Fig. 4 is shown the general arrangement for a horizontal dipole, the insulators being mounted on the cross-member at the centre, which is also shown in Fig. 5 half-in, in superhets, and reflector systems, as shown at Fig. 5.

In instances where a pole of comparatively heavy section is required as, for example, greater than 2 ins. square, and cross members of the same section would be too heavy, and very unsightly, Fig. 7 shows a 2 ins. section pole with a 1 in. by 2 in. half-lapped into the pole to its full length.

Aerial Dimensions

Aerial dimensions are of vital importance, and should be worked out at the start, using one metre as the basis of calculation. The same applies to feeder arrangements, in that the form these are to take should be decided beforehand.

In order to discuss U.S.W. aerials in detail, and also their dimensions, the various sketches will be referred to in turn. Concerning Fig. 1, we may centre feed or end feed. The latter should be half-wave in length, according to the band on which it is desired to receive at maximum efficiency. That is, of course, from Fig. 2. In the case of Fig. 3, L to M and N to O should be respectively one quarter wave-length. As considerable interest is being shown in the five-metres band I give some useful data which can be used as a basis of experiment.

Fig. 1 P to Q, 8 ft., centre fed, W.T. twisted (Continued on next page)
SHORT-WAVE SECTION

(Continued from previous page)

flex, each connection to be 4ins. each side of the centre feed, and is left unconnected.

In the case of Fig. 3 we have a vertical dipole with two quarter-wave sections L-M and M-N0, the flex transmission line being connected to M and N respectively. The dimensions are L = M = 4ft.; N to O = 4ft. The distance between insulators M and N0 is 6in.

The foregoing dimensions also apply to the horizontal dipole shown in Fig. 4.

Passing on to Fig. 6 this shows the simplest aerial and reflector system.

The aerial may be end or centre fed. The dimensions are:
Aerial-4ft. 4in.
Reflector-8ft. 7in.
Distance between aerial and reflector: 4ft. 4jin.

A method may be used in conjunction with the dipole shown in Figs. 3 and 4, and placed one quarter wave behind the aerial.

Opinions differ as to the comparative length of transposed feeder lines. On the one hand it is considered best to order optimum results to make them an odd multiple of half the actual aerial length, i.e., one to five times the wavelength to be received, or more, according to circumstances.

On the other hand this is regarded as more or less unimportant. In the writer’s opinion where conflicting opinions exist it is best to decide the point by personal experiment, and try precautionary measures first under one’s own conditions. So far as beginners are concerned, the transposed transmission line or feeder is recommended, as it is easier to arrange the line to leave a vertical aerial system at right angles for one quarter wavelength. When block transmission is used, the problem sometimes presents more difficulty in practice than an illustration leads one to believe.

Aerial Coupling

Concerning aerial coupling, there are various methods as outlined in the sketches, Figs. 8, 9 and 10. Each and all should be tried before the final decision is made.

LEAVES FROM A SHORT-WAVE LOG

East Africa and France

The Djibouti (French Somaliland) stations now in the limelight are FZES on 17.36 m. (17.25 mc/s), 5 kilowatts, and FZEX, 39.65 m. (17.67 mc/s) 5 kilowatts; they constitute the principal radio links between France’s East African Colony and Paris. Although mainly used for traffic FZES works in the morning hours and FZEX until about G.M.T. 21.00—telephone is also heard from them. FZES only broadcasts a radio programme once monthly, namely, on the first Thursday in each month from G.M.T. 13.00-13.30.

Three More Channels for Finland

The Suomen Yleis radio A/B of Helsinki (Finland) has added three more channels for the Lofi transmitter, and experimental broadcasts will be shortly carried out on them. They are: OFO, 10.75 m. (10.0 mc/s); OFH, 16.85 m. (17.8 mc/s); OFY, 13.02 m. (21.55 mc/s).

These frequencies are in addition to three already in daily use, i.e., OFE, 20.47 m. (11.75 mc/s), and OFP, 31.58 m. (9.5 mc/s), to which reference was made recently in this log.

New French West Indian Station

Paris papers report that the Colonial authorities have opened a 100-kw broadcasting station at Pointe-a-Pitre, in the island of Guadeloupe, French West Indies. The call sign is FG8AA. So far FZES, Terre de Boege, has changed its channel from 62.37 m. (4.81 mc/s) to 65.44 m. (4.86 mc/s); H3AXB, Bogota, La Voz de Colombia, formerly on 49.129 m. has moved to 61.86 m. (4.85 mc/s); H3JABD, Cali, La Voz del Valle, hitherto on 31.48 m. (19.30 mc/s), is now on 63.25 m. (4.82 mc/s); HJ7ABD, Bucaramanga, from 62.24 m. (4.81 mc/s) has given to 63.14 m. (4.71 mc/s), and has changed its call to HJ7BAD. HJ6A13H, Armenia, Caldas, has left the 31-metre band, and is now operating on 61.9 m. (4.87 mc/s).

Altered Call Signs and Wavelengths

Another Tokio 50-Kilowatt

In order to render more efficient the daily broadcasts destined to European listeners, JHC, on 11.58 m. (17.25 mc/s), has been brought into operation for the news service. It may be heard between G.M.T. 19.30-21.00.

Albania Tries Out New Channel

Albania, with a view to increasing strength of directional aerials beamed towards Latin America, has a more favourable channel to be adopted. Broadcasts are now heard daily between G.M.T. 23.00-24.00.

Boundbrook’s Increased Power

For its 25-kilowatt transmitters W3XAL and W3XJL, situated at Boundbrook, N.J. (U.S.A.) the National Broadcasting Company of America is erecting two directional aerials beamed towards Latin America, with a view to increasing station power. This would mean roughly doubling the present output of a 600-kilowatt plant. The frequencies to be adopted are 9.67 mc/s (31.02 m.) and 21.63 mc/s (40.57 m.).

February 18th, 1939

PRACTICAL AND AMATEUR WIRELESS

Short-Wave Section

(Continued from previous page)

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Paris papers report that the Colonial authorities have opened a 100-kw broadcasting station at Pointe-a-Pitre, in the island of Guadeloupe, French West Indies. The call sign is FG8AA. So far the transmitter has been operating in the amateur band on 42.5 m. (7.068 mc/s) but the power will soon be increased, and a more favourable channel is to be adopted. Broadcasts take place daily between G.M.T. 23.00-24.00.

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Removing Tight-fitting Valves

A SMALL tin about 5 or 6ins. long and 2in. diameter was cut to make the short claw-like flanges on the bottom leaving a hole large enough to take the average size valve. The lid was fitted with a sorho pad protecting the valve, should it come away quickly.

A ring was soldered to the top of the lid which was also soldered to the tin. A stout ring was slipped over the whole, and pushing the ring down forcing the flange under the valve, it can then be pulled from sliding right off.

Another shade was placed over this until a speaker was in a bad state, the paper cone having split. I devised the following dodge.

I then joined a pair of headphones in series with the sound-box of the gramophone. The flex itself, at the point of being cut, is then fitted over any troublesome valve, and the battery by means of the length of flex is soldered to the metal frame of the gramophone as shown at "a" in the sketch. I then joined one end of a single wire to one side of a 6-volt battery. The other end of the wire is then joined to the metal diaphragm of the sound-box, by screwing it in the needle socket along with the needle (as at "b"). The battery is kept out of harm's way in the cabinet part of the gramophone, and for every other item published interest other readers. Why not pass it on to them. —J. J. Josins (Dinder, Somerset).

Making a Speaker Cone

MY spare cone speaker was in a bad state, the paper cone having split. My problem was to make another. I used damp linen stretched round a flat conical type lamp-shade, and by slipping a flat ring over the shade a step near the rim was brought up to fit the cone, and the whole is then sprayed with a solution of mucilage and water. Another shade was placed over this until I had a cone speaker.

Soldering-iron Connector

THE trailing flex attached to an electric soldering iron is still a troublesome problem. To obviate this, take the electric iron, cut off the flex about two inches from the handle, and attach to the connecting half a standard lamp adapter. This adapter is then fitted into the end of the handle (which should be suitably drilled to allow the adapter to force its own thread in the wooden handle), making itself rigid with the handle. The flex itself, at the point of being cut, is then fitted with a standard lamp-hold, which would allow for easy connecting and disconnecting of the soldering iron. A further advantage of the flex and lamp-hold is that it could be utilised for the purpose of an inspection lamp when the soldering iron is not required. The accompanying sketch shows the principle adopted.—E. Cookes (Widnes).

GrampHONE Music on Phones

I HAVE an aged relative who is bedridden, but who enjoys listening to gramophone records of old-time dance bands. The gramophone we possess is an ordinary console model, driven by means of a clockwork motor. In order that those of us downstairs can also enjoy the tunes, I devised the following dodge.

One wire of a length of electric light flex is soldered to the metal frame of the gramophone as shown at "a" in the sketch. I then joined one end of a single wire to one side of a 6-volt battery. The other end of the wire is then joined to the metal diaphragm of the sound-box, by screwing it in the needle socket along with the needle (as at "b"). The battery is kept out of harm's way in the cabinet part of the gramophone, and by joining a pair of headphones in series with the sound-box and the battery by means of the length of flex, my relative can hear and enjoy a perfect reproduction of the records downstairs.—J. J. Josins (Dinder, Somerset).
MUCH has been written regarding the advantages and disadvantages offered by a superhet circuit. Quite a number of radio-operators argued that "straight" H.F. amplification was a far better proposition if one was concerned with quality reproduction.

The discussion waxed hot and strong in these pages for several weeks; each school of thought put forward such strong cases that the controversy ended in a deadlock.

It is not proposed, therefore, to open up the debate in this article, and it should be noted that the receiver about to be described is not being put forward as a superhet's rival. To make such claims would only start the battle all over again and, quite possibly, give the superhet supporters something to write about.

The "Request" Straight Six has been designed to compromise between the two extreme demands; primarily, its object is to give the best quality reproduction consistent with reasonable battery consumption, together with an effective range and a degree of selectivity adequate to satisfy most normal requirements when operating in an area not coming within the shadow of the transmitting masts of a powerful station.

During the last Radio Exhibition special details were published in this journal of the "Admiral" Four-valver, a receiver employing two stages of H.F. amplification followed by a triode detector and pentode output. This circuit is most satisfactory, but, and there is always a "but", as no design can satisfy every reader, a certain number of readers who are particularly keen on high-quality reproduction, and a rather generous portion at that, expressed their desire for more ambitious low-frequency arrangements.

To satisfy their requirements, therefore, the H.F. and detector circuits of the "Admiral" have been taken and used as the basis for a six-valver, the additional valves being employed to give a greater low-frequency amplification and output without the risk of sacrificing quality through overloading.

The Design
When the modifications were being considered, the problem immediately arose as to what refinements should or should not be embodied. Was a bandpass circuit, either before or after the first H.F. stage essential? Was sufficient H.F. available for efficient A.V.C. control, and should the existing chassis of the "Admiral" be used or should the circuit be split into two distinct sections? These were just three of the major items which had to be examined.

A decision could be quickly arrived at if a constructor was making the receiver for his own particular requirements, but when it is a matter of considering cost, ease of construction and control, and the widely.

A Two-unit Quality Receiver Designed Without Employing the Superheterodyne

Chassis
To attempt to mount the additional valves and associated components on the original chassis of the "Admiral" is cutting things a little too fine, and asking for trouble, through the cramping of the H.F. and L.F. circuits.

Apart from those considerations, there are a vast number of constructors who already possess an efficient L.F. amplifier and, likewise, only require the H.F. and Det. portion, so it was decided to make the "Request" in two distinct sections.

This method of construction has many advantages. It does not necessitate the purchase of all the components at once; it allows faults to be localised and traced more quickly and, what is also a consideration, it enables the L.F. amplifier to be removed very easily and used for P.T.I. or microphone work on sites remote from the receiver installation.
STRAIGHT SIX
Meet the Request of Readers Requiring a Method of Giving Good Range and Selectivity

By L. O. Sparks

Both chassis are made from aluminium, and the first, the one used for the H.F. and det. stages, is 10ins. by 9 ins. by 3 ins.

The Circuit
The theoretical circuit of the first section is shown below. It is perfectly straight, combined with well-designed components and valves, which assures its efficiency and stability.

The governing factor with a circuit of this type is the characteristics of the coils, and for this reason the Varley Coil Unit Type B.P.116 has again been selected.

It will be noted that transformer coupling is employed for the aerial and both H.F. stages. The first of these has a switched primary for medium and long waves, but the last two have their primaries so designed that switching is not essential. This has the advantage of eliminating complicated switching, bearing in mind that H.T. is flowing through the H.F. primaries.

Both H.F. valves are of the variable-mu type, allowing the utmost control to be obtained before the detector stage.

The necessary variable bias is provided by a potentiometer connected across a 9-volt G.B. battery, each bias feed being adequately decoupled by a by-pass resistance and a by-pass condenser to earth.

The screens of the valves are fed through a fixed potentiometer across the H.T. supply, each screen having its own resistance network and a decoupling resistance wired in series with the screen, with, of course, the necessary by-pass condenser.

To avoid a continual current drain from the G.B. and H.T. batteries by their respective potentiometers, the on-off switch, which is fitted to the coil unit and operated by the wave-change control, breaks the H.T. negative and G.B. positive supplies, apart from the L.T., when the receiver is switched off. It should be noted that while the fixing bracket and operating cam for the switch form part of the coil unit, the switch is a separate item and is not supplied with the coil unit.

The secondary of the second H.F. transformer, i.e., the third coil, passes the amplified signal on to the grid of the detector via the usual grid condenser and leak combination. A triode is used for this position.

The three secondaries are tuned by a three-gang variable condenser, each section of which has a capacity of .001 mfd, plus a small trimming condenser which allows the three circuits to be satisfactorily balanced.

In the anode circuit of the detector is inserted an H.F. choke and by-pass condenser to earth, to prevent the passage of unwanted H.F. currents into the L.F. section. This is a very essential consideration with a circuit of this type, therefore the choke should be of reliable make and efficiently screened.

Output
As it is very desirable for the output leads or sockets to be so connected that they do not carry any direct current in the form of H.T. supply, a simple resistance-capacity coupling is used between the detector anode and output. The anode feed is decoupled sufficiently for all normal requirements, and the only time any modification might be necessary is with some forms of H.T. battery eliminators.

Construction
Although it is not possible to include the complete constructional details in this article, a few reminders concerning this work will not be amiss.

When two H.F. stages are embodied in a layout, particular care must be given to the placing and wiring of the components and the efficiency of all earth connections.

Where screened connecting wires are shown, see that they are used, and that the metal sleeves is connected to the nearest earth point.

Arrange all resistances so that they are firmly supported, and don't let them straggle all across the chassis by using longer connections than necessary.

For most satisfactory results, solder all connections, taking care to use tinned solder and proper flux. If you are not good at soldering, then have some practice until you are able to make a neat and efficient job.

Next week we will publish constructional details of this section of the receiver.
The "Colt" All-wave Three

Main Constructional Details of the Simple Battery-operated All-wave Three-valve Set which is the Subject of Blueprint PW72

Many constructors ask for a design of a simple battery-operated all-wave receiver using not more than three valves. For the beginner a baseboard form of construction is often preferred, and when the circuit is of the Detector-2-L.F. type, this may be said to represent a fairly popular type of receiver. The "Colt" was designed on these lines in 1930, and owing to the large demand for blueprints and back numbers describing the main constructional details, the latter are now entirely out of print. Accordingly, we are giving here some of the main details for the use of those who still wish to obtain the blueprint but who are uncertain regarding certain constructional points. The circuit incorporates four separate wavebands -15-35, 30-85, 200-550, and 1,000-2,100 metres. The short-wave coils are arranged in a separate can, and a special five-way switch unit is needed to complete the circuit. As the coils are intended for chassis mounting it is necessary to mount them on a separate base in this particular receiver, and then the wiring to the switch unit becomes quite a simple task. This also enables the overall height of the receiver to be kept down and a more compact receiver is made possible. The remainder of the circuit is quite standard. R.C.C. components are used, with the exception of No. 4 and that tag connections, and, therefore, soldering has to be resorted to in this receiver. Remember, however, that the tags are attached to soft material and make quite certain that a really hot iron is employed and leave it in contact with the tags for the very minimum of time. If this point is not attended to, electrolytes may be loosened and the switch will fail to operate satisfactorily. Carefully clean each contact with a piece of well-worn emery cloth and apply the best compound or Fluxite or similar soldering paste. Use a really hot iron thoroughly, and if it is heated in a gas flame or the flame from a fire lighter before it with a piece of old rag. Apply the solder carefully along the soldering tag and it should instantly adhere, removing the iron at once. Now refer to the switch wiring connections. It will be noted that there are two plates, marked A and B, and on the switch plate B is the one attached directly to the mounting bracket, and when screwed down this is the one farthest from the control panel. The contact points are not attached to the baseboard. An ordinary component mounting bracket is employed for this purpose, with a bolt passed through one of the two fixing holes in the foot of the bracket and through the fixing holes in the coil unit. A screw and large washer may then be used to hold down the bracket through the long slot in the arm, and this enables the coil to be accurately positioned when mounting the bracket.

LIST OF COMPONENTS FOR THE "COLT" ALL-WAVE THREE


Making Good Connections

The switch plate and the coil unit utilise soldering tag connections, and, therefore, the coil unit is ready to be wired to the coil tags, and it will be noted that in some cases there are two wires attached to the coil contacts. Terminal 4 and terminal E nearest to it are now joined together, and the coil unit is ready to

(Continued on page 579.)
Brief Biographies

ADELAIDE HALL

STARTING with his broadcasts on the " Sick Call " with his hospital patients, Australian native, Jack Jelley, has recently returned to Australia. Born in Melbourne, Victoria, his parents were John and Harriet Jelley. Jelley began his broadcasting career in 1937 at the age of 19, and has since become one of Australia's most popular entertainers, hosting numerous television shows and radio programs. He is also the author of several best-selling books, including "The Art of Broadcasting" and "The Jack Jelley Collection." Jelley is widely regarded as one of the greatest radio and television personalities in Australia's history.

PATENTS AND TRADE MARKS.

Any of our readers requiring information and advice respecting Patents, Trade Marks or Designs, should apply to Rainger and Co., Patent Agents, 31, Southwark Chambers, Southwark, London, E.C.3, who will give free advice to anyone mentioning this paper.

BARGAINS

Nearly 100,000 short-wave enthusiasts can't be wrong. Secure YOUR N.T.S. kit NOW at an amazing bargain price.

FREE VALVES!

New 1-V.2 Shortwave

Complete kit—COILS 4 valves FREE!

List value £3.6.

BARGAIN 49/6

N.T.S. 3079

2-valve short-wave receiver employing a high frequency stage and a 1-Valve Detector and Pentode Valve, List value £5.6. All you need is a battery, & a speaker. FREE valves included.

POST ORDERS.

All goods offered sent carrier or post charge added. Orders between 10/- and 21/- £1.00 extra over 10/-. Goods carriage extra. Samples sent free.

ORDER now for your copy of the N.T.S. Short-wave Book. Send 2/6 for complete bargain lists without obligation.

BARGAIN 5/6

List value 18/.

LONGITUDE TELEPHONES

15/-

All wave ONLY.

ALL-WAVE BARGAIN

The N.T.S. 3089 Short-wave Receiver. Complete kit—COILS 4 valves FREE! List value £4.6. All you need is a battery and a speaker. FREE valves included.

HURRY!!

ALL-WAVE KITS—VALVES FREE—

ALL-WAVE WORLD, 6.G.4, Westinghouse makes. 5 Wave-ranges. 4 Wave-ranges. All Wave-ranges. 3 Wave-ranges. 2 Wave-ranges. 1 Wave-range. 3 valves given FREE. 5 valves given FREE. 10 valves given FREE. 18 valves given FREE. All Wave-ranges include A.M., S.G., PENTODE, C.O.D., or 12 month payments of £1.00.

REPLACEMENT VALVES.

Rush now for N.T.S. Bargain list "V" of replacement valves. Amazing offers come with every bargain. Send 2/6 for FREE copy of the N.T.S. Short-wave Book.

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1939 All-wave Battery 5.C.3

AMAZING FAMOUS-NAME OFFER

LIST VALUE \$4.15

15/-

51/-

18 months of payments of 6/-.

Send your order now, and get your many-valued Bargain. This superb Super All-wave Battery 5.C.3, will give you programming from all over the world. Circuit comprises 1 valves. Circuits include all types. Efficiency Detector and Pentode. A wave-range, 14-2,100 metres. 10 Wave-ranges. 3 Wave-ranges. Excellent value, barrel mounting, 12 inch. 11h. 11h. deep. Tone-controlled tuning. Quartz-controlled power diode. Less battery.

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A Television Survey

It is apparent that Birmingham is determined not to lose any of its claim to be considered as the next city in which a television transmitter will start operating in this country. Their efforts are to be admired, and should be noted by other provincial cities who feel that they should be considered in any Government scheme which aims at providing a network of stations to cover the television service needs of the bulk of the country's population. In the case of the first-named city, however, an aerial survey has been made of the point to point route between the Alexandra Palace and Birmingham. This was undertaken on the assumption that a radio, and not a cable link, would be employed for relaying the television picture signals from London to the site chosen. If high points are required for erecting the relay stations which receive and then re-transmit the signals, then places mentioned are Binley, Byfield, or a place near Daventry. In proximity to Birmingham itself (there is Walton Hill, near Solihull), but the conclusions arrived at from this preliminary aerial flight are that there should be no difficulty in providing a satisfactory signal with only two repeater stations. Incidentally, it is worth remembering that although the main aim is to serve the Provinces for the viewer to capture the whole atmosphere of the home, any break in the component parts is apt to destroy the degree of illusion which is so essential when watching television pictures in the comfort of the home.

An Assurance

It was a happy thought on the part of the authorities to inaugurate the campaign for making the public more television minded by a special morning transmission from Alexandra Palace. Both Mr. Ogilvie and Mr. Stanley made short speeches pointing out how the organisation was being undertaken, and stressing that this was the first real cooperative effort of a young and growing industry which bids fair to outstrip many of its rivals. From the show but little change for a long time. Too often have rumours been spread that prices would tumble down, but if one examines the contents of a modern television set it will be realised that serious price reductions are an economic impossibility unless quality is sacrificed very materially, and picture size reduced. The American boast that even although their own public television service would not start until May, they would sell more television sets by the end of 1938 than Britain would in the whole year, was taken up by the R.M.A. television development committee. There are many technical reasons involved in this problem, but perhaps the most important is the peculiar effects which occur in the high power valves themselves.

Television Sound Quality

Although it is generally recognised that the quality of the sound which accompanies a television transmission is superior to that given by ordinary medium and long-wave broadcasting, this should not be allowed to dull the engineers responsible for the whole of the work into a sense of false security. Improvements are still needed, especially when outside broadcasters are being undertaken. Here it is essential for the viewer to capture the whole atmosphere of the scene where the event is taking place. The associated noises should therefore predominate, and not the voice of a commentator describing what is happening in the scene. The sound is so frequently lost by the verbal description, and the speaker is apt to forget that the average viewer with good signals is seeing just as much (and often more) than those privileged to be eye-witnesses on the spot. In the case of studio transmissions this sound is much better appreciated, but too often the microphone or its shadow has been brought into evidence. It is appreciated that the handling of boom is a difficult matter, but special attention should be given to this at rehearsals, for it tends to destroy the illusion which is so essential when watching television pictures in the comfort of the home.

Ultra-short-wave Power

One of the main difficulties which has been experienced so far in connection with the use of ultra-short waves for the propagation of television signals is associated with the fact that the rated output power of the transmitter is relatively low when compared with that employed on medium and long-wave broadcasting stations. There are many technical reasons involved in this problem, but perhaps the most important is the peculiar effects which occur in the high power valves themselves.

Hundreds of motorists who escape to the country each Sunday recently had the eyes of thirty thousand people watching for their slightest driving faults. A television camera with a squad of courtesy caps took shots of bad driving whilst a police superintendent gave a running commentary on the faults. Jasmine Bligh, the television hostess, was present at the demonstration which was held at Bignall's Corner, where St. Albans Road crosses the Barnet By Pass. Our illustration shows Miss Bligh let off with a caution. She is being interviewed by a mobile police officer for careless driving.

IT was a happy thought on the part of the authorities to inaugurate the campaign for making the public more television minded by a special morning transmission from Alexandra Palace. Both Mr. Ogilvie and Mr. Stanley made short speeches, pointing out how the organisation was being undertaken, and stressing that this was the first real cooperative effort of a young and growing industry which bids fair to outstrip many of its rivals. From the show but little change for a long time. Too often have rumours been spread that prices would tumble down, but if one examines the contents of a modern television set it will be realised that serious price reductions are an economic impossibility unless quality is sacrificed very materially, and picture size reduced. The American boast that even although their own public television service would not start until May, they would sell more television sets by the end of 1938 than Britain would in the whole year, was taken up by the R.M.A. television development committee. There are many technical reasons involved in this problem, but perhaps the most important is the peculiar effects which occur in the high power valves themselves.
A REVIEW OF THE LATEST GRAMOPHONE RECORDS

Light Orchestral

The London Palladium Orchestra, conducted by Clifford Greenwood, provide a new recording of the Suite from Rossini's Incidental Music to the "Merchant of Venice." This consists of two Preludes, an Intermezzo, an Oriental March and the Doge's March. This last is well known from having been used so often as Pageant Music." H.M.V. C 2072-3.

Louis Levy's excellent selection from the "Mikado" on H.M.V. BD 853 will be welcomed by those who have seen the recent film of the Gilbert and Sullivan opera.

A record that will have a wide appeal is Toscanini's conducting of the B.B.C. Orchestra in the Overture to Mozart's "Magic Flute." On H.M.V. DB 8550. It is a great recording of one of the finest Overtures, and ranks with his earlier and quite sensational recording of one of the finest Overtures, "Royal Air Force Overture." H.M.V. BD 8847.

For his latest recording on Parlophone R 2615, Tommy Dorsey's "Second Waltz Medley" (two parts), played by the Valentine State Opera Orchestra, conducted by Prof. Leopold Reinhart, in English.

There are two big hits from "Under Your Hat," the Courtneidge-Hulbert success now running at the Palace Theatre. One side is Cicely Courtneidge singing "The Empire Depends on You" in English. The other side is "The Best Kind of Bad Girls," on Parlophone R 2617.

Fats Waller in the H.M.V. February list, in this great "swing" pianist's den, called "Keep It Under Your Hat." H.M.V. B 8845.

The following review is of records by brass bands for dance time. Whilst one of the best valve bands for dance time is the Band of the Coldstream Guards, "Passing Through," on H.M.V. BD 643, this band has been playing for many years and has obtained more consistent high awards than any other of the regular competitors.

A "Second Waltz Medley" (two parts) is recorded on Parlophone R 2617 by the Orchestra Mascotte, whilst Herbert E. Croft, the German tenor, sings "Undine" (father, mother, sisters, brothers), and "The Trumpeter of Sakkingen" on Parlophone R 2613.

Harry Roy and his orchestra have coupled two popular tunes of the moment on Parlophone F 1330. They are "The Cherub" (from the film "These Foolish Things") and "Ferdinand the Bull," from the film of that name. His other numbers are "Joseph, Joseph," "Day After Day," on Parlophone F 1349, and "Goodnight Little Skipper," coupled with "I'm Singing a Song for the Old Folks," on Parlophone F 1329.

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Impressions on the Wax

Light Orchestral

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ELECTRADIX BARGAINS

TELEVISIONS

February 18th, 1939

Using Electronic Principles

From time to time attention has been drawn to the importance of applying electronic principles to microscopic work. There is no doubt that this is a direct outcome of research which has been undertaken for television in the field of electron optics. It is as well to remember, however, that the electron microscope has developed to-day can take one of two general forms, according to the particular purpose it is called upon to serve. In the first type the electron beams are furnished by radiation from a cathode surface is made to irradiate the object undergoing investigation, so that its form can be quite clearly defined on a fluorescent screen or photographic plate mounted in the path of the beam. The apparatus resembles very much the familiar simple microscope, but the optical glass lenses are, of course, replaced by their electron equivalents and the electron beam is used in lieu of the light rays. It is with this form of the instrument that the extremely high magnifications mentioned before have been achieved. These have already been recognised by the medical and biological sciences and have been gained by cruder methods. Very often the earlier work depended on colouring matter or the use of intense light. This in many cases killed the bacteria and so rendered the work void.

Another Case

The actual industrial form of this type of apparatus, complicated and expensive, but when smaller degrees of magnification are necessary the actual subject to be examined is focused optically on to a uniform cathode surface. This in electron emitting, and the resulting electron image brought into being is either electrostatically or electromagnetically focused and manipulated directly by means of the deflection system. Complete control over the position and size of this image is obtained by the cathode-ray tubes, and is brought about by cruder methods. Wherever television's development is being undertaken on any large scale some attention is being directed towards the achievement of good colour television pictures. The cinema industry has long realised a highquality, are what the public really call upon to serve. The cinema industry has long realised the provision of natural colour is of great advantage, giving way to colour in his received picture. Wherever television's development is being undertaken on any large scale some attention is being directed towards the achievement of good colour television pictures. The cinema industry has long realised the provision of natural colour is of great advantage, giving way to colour in his received picture.

PRACTICAL AND AMATEUR WIRELESS

ELIZABETH STREET, LONDON E.C.2

W HEN watching television transmissions from Alexandra Palace, an image of the cathode surface will then be projected on to the normal front screen and may be enlarged where necessary. If a single anode magnetically-operated type of tube is to be used in this manner, then the modulation electrode is used as an anode and has a positive potential applied to it so that it gives an electrostatic focusing system in conjunction with the original anode. Magnification is then undertaken by altering the direct current flowing through the external solenoidal focusing coil.

A Colour Advantage

A novel multi-point distributing system giving over 100 lines for communication at the New York World's Fair.
THE "COLT" ALL-WAVE THREE
(Continued from page 574)

To avoid cutting the spindle of the volume control, and to enable the control knobs all to remain at an equal distance from the panel, the bracket for this component should be mounted slightly back from the front edge of the baseboard. Mount the valveholders first and carry out the wiring to the legs, as this may prove inaccessible when the transformer and remaining components have been fitted. A single length of wire is employed for each filament run, and lengths of sleeving are cut off to slip over between the valveholders, passing the wire through the centre holder and finishing off at the other end. Attach the grid lead to the first valveholder, and lengths of wire to the remaining legs, after which the remaining components can be attached in the positions shown in the wiring diagram.

Testing Out

Complete the wiring and attach the battery leads, making quite certain that the correct indicating lamps are attached to them. When the receiver is checked and ready for test, the L.T. leads should be attached to the accumulator and the H.T. and G.B. leads be inserted into the appropriate sockets on these batteries. G.B.-1 should be inserted temporarily in the 450-volt socket of the grid-box, or the grid-box G.B. and G.B.-2 in the 7.5-volt socket, whilst for preliminary tests H.T.1 should be inserted into the 150-volt socket. Rotate the right-hand control in a clockwise direction and the switch will be heard to snap over after a short movement, in which condition the set is on but not a gift; with G.B.-1 the volume control is in the position for medium waves, and the wave-change switch set to the medium-wave position. As the local should to minimum for preliminary tests, the following wavelengths have been lengthened from the foreign news bulletins on medium waves, and the accompanying commentary of the proceedings will be broadcast from the National transmitter, beginning at half an hour to forty-five minutes each evening. The King to Launch H.M.S. George V

His Majesty the King will journey to Tyneside, on February 21st, to launch the new battleship George V. The entire ceremony will be broadcast.

KING GEORGE V.

The Arabic and the Spanish-Portuguese services, also included in the Overseas News Section, remain under the same editors as hitherto. Since the end of last month, the foreign news bulletins on medium wavelengths have been lengthened from half an hour to forty-five minutes each evening.

Every department is a complete college; every student is a class to himself. If you attend to this now it may make a wonderful difference to your future.

THE "COLT" ALL-WAVE THREE

STUDY AT HOME IN YOUR SPARE TIME

JOURNALISM

Short Story, Novel and Play Writing.

There is money and pleasure in Journalism and in Story Writing. No apprenticeship, no paypillage, no examinations, no outfit necessary. Writing for newspapers, novels or pictures, is not a gift; it is a science that can be acquired by diligent application and proper guidance. It is the most fascinating way of making pastime profitable. Trained ability only is required, do the training by post. Let us tell you all about it.

DEPARTMENT OF LITERATURE 104.

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PRACTICAL AND AMATEUR WIRELESS

KING GEORGE V.

He has been appointed.

To this post, Mr. A. E. Barker, hitherto Foreign Language Service News Editor, has been brought together in an enlarged Service, previously under separate editors, within the reorganised Overseas News Section, under an Overseas News Editor. To this post, Mr. A. E. Barker, hitherto Foreign Language Service News Editor, has been appointed.

Within the reorganised Overseas News Section, the following new appointments have been made:

As Empire News Editor, Mr. Michael Barkway; as Assistant Empire News Editor, Mr. Clifford Hulme; and as Euro-
Wind-driven Charging Plant

SIR,—I should like to thank you for the very helpful book "Cords, Chokes and Transformers," received in connection with Problem No. 320, and also for Sixty Tested Wireless Circuits," awarded me for solving Problem No. 297.

As I am in a country district some distance from a charging station and not on the mains, batteries are still rather a problem. Could you publish some information about wind-generators, about proprietary models (including American), and for amateur construction, with details of types of dynamos, speed, shape of propellers, best angle of vanes, etc.

I realise that in normal times this subject might appeal to many readers, but, in the present rather unsettled conditions, with the possibility of mains supply being cut off, I think readers would be glad to have information on the subject.

Remember some time ago you published a photo of equipment presented by Messrs. E. K. Cole, to Tristan da Cunha, which included a wind-generator.

Apparatus of this sort has, I believe, been available for some time in the U.S.A., but very little is going on generally, as the news was in English regarding the Sino-Japanese war, and so make a "four-way" or more of it.

I use a seven-valve commercial superhet, and so make a "four-way" or more of it.

SIR,—When I made a mistake in your "sour grapes," I think the component readings have been stressed in Practical and Amateur Wireless, but a small slip a beginner might make, as 250-0-250 volt secondary; a reading across the anodes of the rectifying valve (full wave), will be 500 volts A.C. and not 250 volts A.C., as it might be thought by a beginner to radio, resulting in probable damage to their meter through setting it at the wrong range.—John W. Leech (Llandudno).

Station XGOY—Nanking

SIR,—In regard to a paragraph published in your short-wave notes of January 28th, I wish to inform you that I tuned in the Chinese station—XQY—quite clearly on Sunday evening last, at 9 p.m. The news was in English regarding the Sino-Japanese war, and so make a "four-way" or more of it.

I have been stressing in Practical and Amateur Wireless, that an H.F. choke may sometimes be used as a voltage-limiting device, and so make a "four-way" or more of it.

A Good Log from North London

SIR,—As there seems to be considerable interest in seeing "what the other fellow gets," I thought that other readers would be interested to see my log, so make a "four-way" or more of it.

I use a seven-valve commercial superhet, and so make a "four-way" or more of it.

I have a written to two of your correspondents, namely, F. D. Dyus, and Derrick Walker, but I should be pleased to hear from any other short-wave experimenters, and so make a "four-way" or more of it.

I especially should like to get in touch with any E.L.D.C. members in this district.—P. L. Everette (4, Clifton Road, Alexandra Park, London, N.22).

Amateur Transmitting—the Friendly Spirit!

To: "A Genuine Guy Still,"

Dear O. M.—I was pleased to see that your letter had been accepted by you in such a friendly spirit. Believe me, I had no intention of implying that you had made a mistake in your facts.

There is a world of differences between amateur and "hams." You were unlucky in only meeting amateurs. I cannot say what the ratio is for the south, but here in the north, amateurs who are not also "hams" are few and far between. As regards my pet corn, I hold no brief for transmitting, would like to pass this small piece of information on to you. I should like to know what I took to be a wholesale condemnation pass without some attempt to state the other side of the question; and as for the "harmful" words with which I ended it, I think they would be read both on your letters will agree that it is in case of the kettle calling the pan black! I could not allow what I took to be a wholesale condemnation pass without some attempt to state the other side of the question; and as for the "harmful" words with which I ended it, I think they would be read both on your letters will agree that it is in...
I. - II Thursday, February 16th. - Midland, Maya - Friday, February 17th. - Amenity Maketh One.

**Radio, Physical and Television Society.**
Headquarters: 724, North End Road, West Kensington, W.14.

Meetings: Friday evenings at 8.30 p.m.

**The Croydon Radio Society.**
Headquarters: 59, Post Office Road, Croydon.

Meetings: Every Tuesday at 8 p.m.

**Hon. Sec.: Mr. E. L. Campers, 24, Camden Road, Croydon.**

When Mr. P. G. A. H. Voigt visited the Croydon Radio Society on Tuesday, January 31st, standing room only resulted for his lecture in St. Peter's Hall, Leaside Road, S. Croydon. Mr. P. G. Clarke presided, and welcomed the large number of visitors, including many readers of *Practical and Amateur Wireless.* Mr. Voigt and we had to thank the B.I.C. and its transmission from Alexandra Palace for the success of the meeting. On the ultra-short waves used, of course, the frequencies were considerably extended on the spectrum. Of no little interest to the society as a quality seeker was Mr. Voigt's corrector circuit, effective in the impendence's speech circuit. He described his method, which was fully discussed on the blackboard, was a better solution for top-notch work. The corrector circuit was designed by some set manufacturers.

No wires intermingled with results, as on the television sound transmission, the reproduction was exact. Mr. Voigt's own standard and the blackboard improved the improved too, response due to his new tube diafragans. Many records were played, particularly interesting being a recording by Mr. Stuart's Davins of Sir Thomas Beecham conducting the London Symphony Orchestra, with David Willcocks as soloist. Next Tuesday, February 21st, the Milliard Wireless Service Co., Ltd., will lecture on the latest valve and television developments.

**Forthcoming events include lectures by representatives of The Marconi Company, Ltd., Midland Wireless Service Co., Ltd., and Bissett, Neecey and Zambesi.**

Further particulars may be obtained from the Hon. secretary.

**The East Surrey Short-Wave Club.**
Headquarters: 111, Station Road, Redhill, Surrey.

Meetings: Alternate Thursdays, 8 p.m.

**Hon. Sec.: Mrs. V. T. Watkin, 12, Welbeck Road, Croydon.**

On January 16th, G6GF gave a talk and demonstration of his home-recording apparatus. After making one or two individual records, all members present were invited to attempt to make a record. Great support was given, many of which contained extremely interesting pieces.

The club, which is nearing its first birthday, now boasts of sixteen fully licensed transmitters, and 2 A. S. A.

**IMPORTANT BROADCASTS OF THE WEEK.**

**NATIONAL (261.6 m. and 1,500 m.)**
Wednesday, February 16th. - Symphony Concert from Queen's Hall, London.
Thursday, February 16th. - Military Band programme.
Friday, February 17th. - Mono, an opera by F. J. Mendelssohn, from London.
Saturday, February 18th. - Music Hall.

**REGIONAL (342.1 m.)**
Wednesday, February 16th. - Drama at thermal, Newsgate, from Midland (Broadcast in November, 1938).
Thursday, February 16th. - The Huddersfield Choral Society, a gala for the radio by Arthur Wadsworth, from Welsh.
Friday, February 17th. - Theatre, Royal, Cheltenham, a page of theatrical history, 1783-1839, specially written for broadcasting by Wilfrid Brooke Ley, from Midland (First broadcast on January 9th, 1938).
Saturday, February 18th. - The Siege, an incident of the Spanish Civil War, by Geoffrey Moss.

**ENGLAND (297.2 m.)**
Wednesday, February 15th. - Drama at Devreery by Neil Tyson (Broadcast in November, 1938).
Thursday, February 16th. - Midland Magazine, February Number.
Friday, February 17th. - Theatre, Royal, Cheltenham, a page of theatrical history, 1783-1839, specially written for broadcasting by Wilfrid Brooke Ley (First broadcast on January 9th, 1938).
Saturday, February 18th. - Sport in the Midlands.

**WEST OF ENGLAND (285.7 m.)**
Wednesday, February 15th. - Made in the West 5, Cornish Pitheads.

**RADIO, PHYSICAL AND TELEVISION SOCIETY.**
Headquarters: 724, North End Road, West Kensington, W.14.

Meetings: Friday evenings at 8.30 p.m.

**Hon. Sec.: Mr. C. W. Edginton, 15, Cambridge Road, North Hampstead, N.W.2.**

On Friday, February 3rd, Mr. Wilkins, of the Automatic Coil Estimator and Electrical Equipment Co., Ltd., lectured on "Electrical Measuring Instruments." In the course of Mr. Wilkins' lecture draftsmen were given an interesting account of the various instruments, particular attention being paid to methods of protecting them from accidental overloads. Many means of fuses or by mechanical devices, such as are employed with the well-known Type 5 Ammeter. Details were given of methods of valve-testing, and of the difficulties encountered in the design of an instrument capable of testing all kinds of valves, the new type of ohmmeter which had been on the Royal Physical Society's Exhibition, but which was not yet on the market, was also described.

This small and perfectly cheap instrument works on an entirely new principle, and is designed for measuring contact resistances, and other resistances of extremely low value.

Forthcoming events include lectures by representatives of The Marconi Company, Ltd., Midland Wireless Service Co., Ltd., and Bissett, Neecey and Zambesi. Further particulars may be obtained from the Hon. secretary.

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TELEVISION.—Baird Television, Ltd., and John Pye, Ltd., No. 23,281.

Line synchronizing pulses are derived by frequency multiplication at 2, 4, from a source 1 while frame impulses are derived by a different frequency multiplication; due to the circuits 3, 5, (e.g. band-pass filters), the time of inception of the first line will be different from that of the first frame pulse and this difference will vary with variation of frequency of the source 1. Such variation is prevented by...

the introduction of a circuit 6 whose time delay varies with frequency in the same degree as that of circuits 3 and 4 combined. The source 6 is preferably band-pass filter identical in configuration with the filters 3, 5, and the reciprocal of its percentage bandwidth is equal to the sum of the reciprocals of the percentage bandwidths of the filters 3, 5 (Fig. 1). Specification 479005 is referred to.

VARIABLE CONDENSERS ; SOLDERING. —Naamloze Vennootschap Philips' Gloedlampenfabrieken, No. 49440.

An electrode, for a variable condenser, adapted for longitudinal movement, is made by lifting a resilient metal strip to engage along one edge in a matrix or 1g suitably recessed, the other edge being secured. In the example, a disc by soldering. In the example, a disc is formed by winding about a core 5.

NEW PATENTS

These particulars of New Patents of interest to readers have been selected from the Official Journal of Patents and are published by permission of the Controller of H.M. Stationery Office. The Official Journal of Patents can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 los.).


1933.—Jones, W., and Pye, Ltd.—Television, etc., systems. January 26.


Specifications Published.


498927.—Marconi's Wireless Telegraph Co., Ltd., Rust, N. M., and Hills, E. F.—Tuning-control systems for radio receivers and the like.

49946.—General Electric Co., Ltd., and Espley, D. C.—Apparatus for the transmission of television and the like.

49900.—Naamloze Vennootschap Philips' Gloedlampenfabrieken.—Wireless receiving-sets.

49018.—Naamloze Vennootschap Philips' Gloedlampenfabrieken. Signal apparatus, such as radio receivers, for converting acoustically-modulated oscillations into sound oscillations.

49939.—Naamloze Vennootschap Philips' Gloedlampenfabrieken.—Radio receiving apparatus comprising means for facilitating tuning. (Addition to 418858).

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 1s. each.

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TELEVISION IN THE PROVINCES

The large provincial cities are certainly taking this television question seriously and anticipating the day when they will have their own service of signals within radio-receiving apparatus and as they are at present maintaining receiving equipment installed on a convenient position, generally on the roof of the building, this is known for hotel in this country there is talk of making it available for public use in the provinces.

A main aerial and receiving set connected to a distribution amplifier ensures that at each plug terminal signal strength is adequate to operate a normal form of television receiver. In Germany they have gone one stage farther for flat working. One company has developed a scheme whereby in each suite of rooms a plug is inserted into a distribution amplifier unit which is supplied with power by means of a transformer for local use, under which it is possible to plug in a loudspeaker in any room, leaving the main receiving set in one fixed position, a television picture unit is provided which is shown on almost all equipment except for a cathode-ray tube and loudspeaker. For this to be done satisfactorily the local circuit containing the receiving equipment installed in a convenient position, generally on the roof of the building.

Into the rear of the receiver is a set of connections to the loudspeaker extension. Just as it is possible to look in and listen in to any television installation which comprises a complete system of receiving equipment, the receiving equipment in each plug terminal signal strength is adequate to operate a normal form of television receiver.
**One-valve Transmitter**

"I wonder if I could use a 'Home Broadcaster' mike in place of your recommended component in the one-valve battery transmitter for volume control and superhet, as in the circuit? Also, what would be the best low F.P. choke in this set?"

F. H. (Dublin).

**You** could use the microphone in question, and if this has a built-in transformer, then the output should be taken to the two points normally connected to the secondary of the transformer in the circuit, as shown. The choke required is the Varty D.P. 11.

**Accumulator Charging**

"The mains here are D.C. and I wish to charge my accumulator. Is it true that by putting a lamp in series with the accumulator it will charge, and if so, which does the lamp go between—negative or positive. Also, which is it that bubbles when placed in water?"—A. W. (Norwich).

It is quite in order to utilise your D.C. mains for charging, providing a lamp of the same mains voltage is in series with the leads to the accumulator. For most satisfactory results an ammeter should be included in series to ascertain the current which is flowing. When testing mains polarity with the leads in water a lamp or bulb could be fitted in the live lead to avoid the risk of a short-circuit, and the negative lead will give rise to the bubbles.

**Battery Short-circuit**

"Please can you tell me the cause of my H.T. battery and accumulator running away so quickly? The battery is 120 volts purchased only two weeks ago and is now finished. The accumulator only lasts about three days. The set is three or two valves (detector and two L.F.). The grid battery is quite in order."—F. G. (Glasgow, S.E.1).

It would appear that there is a short-circuit in some part of the receiver and this may be confirmed by connecting a multimeter in the H.T. negative lead. This will give the total current flowing and you can then compare this with the total of the valves and test whether there is an additional drain on the battery. A stage-by-stage test will be necessary to locate the source of the trouble but we suspect a faulty by-pass condenser or crossed leads. If all the valves are removed there should be no current reading on the meter and no current should be taken from the accumulator.

**Volume Control and Superhet**

"I have a superhet with double-diode triode secondary detector and L.F. circuit and, unfortunately, there is no provision for pick-up connections. I have tried my pick-up joined to the grid circuit of the output valve but this gives insufficient amplification. What is the simplest way of adding it to the set to get more amplification without altering the wiring too much?"

H. E. (Perth).

**No** doubt the receiver is provided with a volume control which is connected so that the arm of the control is joined to the grid of the triode of the D.T. valve. In that case the simplest way of adding the pick-up is to join it across the volume control. If the valve output may be joined to the grid circuit of the triode section.

### RULES

We wish to draw the reader's attention to the fact that we are always very glad to receive queries, but only for the solution of problems or difficulties arising from the construction of receivers described in our pages, or on general wireless matters. We regret that we cannot, for obvious reasons—

1. Supply circuit diagrams of complete mains circuit.
2. Suggest alterations or modifications of receivers described in our columns.
3. Supply alterations or modifications to commercial receivers.
4. Ask questions about the operation of the telephone.
5. Give the supply voltage and frequency to which the equipment is connected.

We do not receive answers to incomplete or questions which are not clearly stated. You must supply the missing parts of the diagram. In our columns we have shown the main features of a receiver, but we cannot give all the details. You are expected to know the principles of operation.

### Reprints in Brief

The following reply to queries are given in abbreviated form with our apologies for any omissions of course, or because the point raised is not of general interest.

H. B. (Beckenham). We recommend the Record Alto Three, and parts may be obtained from Messrs. Peto-Sgoals.

R. J. (Glasgow). We have not taken over any details, and if your paper is no longer published we regret that we are unable to assist you.

E. M. L. (Repton). The gauge is in 36 W.G., but it appears to be a special resistance wire, probably nickel-iron.

P. N. (Richmond). Write to Messrs. Bulgin who may be able to supply a replacement.

W. G. (Dulce). There is no blueprint, but the call connections are quite standard, and you should find no difficulty. Any good choice may be made.

**Chassis Materials**

"Would you please advise me on the comparative merits of aluminium, brass and copper (sheet) respectively as covering for the wood baseboard and front panel of (a) a short-wave receiver, and (b) a two-valve transmitter?"—H. G. C. (Nottingham).

Of the materials mentioned copper is the best, brass is second, and aluminium is third. The material chosen must depend on the cost, but it is more expensive and not so noisy as 'work' as aluminium. Brass would not be as satisfactory as either the aluminium or copper and therefore we suggest the aluminium as being the most suitable for all ordinary purposes.
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