

THE
AUSTRALASIAN

NOV. 2, 1936
VOL. 1—NO. 7
PRICE, 1/-

Radio World

Registered at the G.P.O.
Sydney, for transmission
by post as a periodical.



—See page 6.

● "OUTDOOR PORTABLE FOUR": "BEGINNER'S BATTERY TWO": MAKING
● A REISS MICROPHONE: FIVE-METRE RECEIVER: OUTPUT METER:
● WORLD S.W. STATIONS: SYDNEY AMBULANCES TO CARRY RADIO.



6.3 VOLT A.C. METAL CLAD SERIES

ENGINEERED by Philips—Leaders of the Radio valve industry—The new Redcoat, 6.3 volt range of Metal-clad valves represents another important step in Radio progress. Smaller in dimensions than any previous European type, and employing "P" type base, the range embodies advantages for the set designer which cannot be overlooked, including the

exceptionally low heater current consumption of 1.2 W. per valve.

100% gas tight glass, perfect electrical shielding, and high slope are other features of Philips Redcoat Series, whilst the special technique of manufacture, pioneered by Philips, and based on many years of experience, is a guarantee of faultless performance.

EQUIP WITH PHILIPS REDCOATS — A SPECIAL VALVE FOR EVERY FUNCTION IN THE SET.



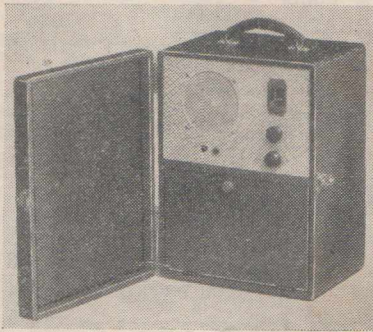
PHILIPS

METAL CLAD VALVES

For Better Radio

Take an "Outdoor Portable" On That Xmas Trip

**AND DOUBLE
YOUR HOLIDAY
ENJOYMENT!**



To the bush, city or seaside—shooting, camping, fishing or yachting—wherever you're going or whatever you're planning to do, you'll find an Outdoor Portable makes the ideal companion. Light, compact and powerful, at the turn of a switch, news and entertainment is instantly available from a variety of stations. Don't miss those special Xmas broadcasts, but keep in touch with an "Outdoor."

Every component supplied in our kit is of the highest quality, and is exactly as specified.

Complete Kit of Parts **£10-5-0**

THE "AIR-ACE DUAL WAVE FIVE"

For those wanting a reasonably-priced dual-wave receiver that can be depended on to bring in the main broadcast and shortwave stations at good speaker volume, and with little or no fading, we can recommend the "Air-Ace Dual-Wave Five" described in this issue.

Complete kit of parts . . . **£14-5-0**

AMAZING NEW SHORTWAVE CONVERTER

Write for details of our latest single-valve shortwave converter. Can be used with any set—superhet or t.r.f.—having four or more valves, to bring in the world's leading shortwave stations.

SAME DAY SERVICE FOR COUNTRY CLIENTS

For years we have specialised in fulfilling country orders promptly and accurately, until to-day we have thousands of satisfied customers in all parts of the Dominion who regularly use our Same Day Service.

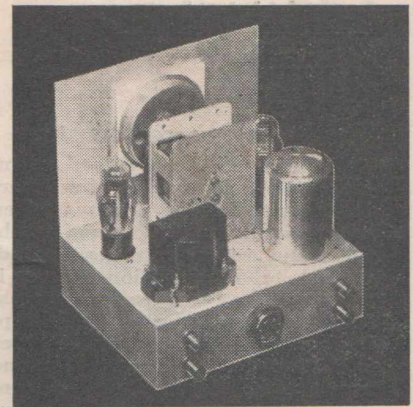
FEAR'S

FOR EVERYTHING IN RADIO

An advertisement of

F. J. W. FEAR & CO., "The Radio Pioneers"
63 Willis Street, Wellington, New Zealand.

Telegrams: "Fear."



"BEGINNER'S BATTERY TWO"

The ideal small set for headphone reception of broadcast stations. Our kit is supplied complete in every detail—including valves, headphones, and batteries.

Complete **£6-5-0**
Kit

5-METRE RECEIVER

Build the special 4-valve receiver described in this issue, and be the first to hear Australia on 5 metres. Complete Kit Price will be sent on application.

"MIKE" AND OUTPUT METER

We can also supply the parts needed for building the Reiss Microphone and Output Meter described this month. A post-card will bring you full details by return mail.

"ALL-WAVE BANDSPREAD TWO"

Described in the September "Radio World," this little kit is proving widely popular with set-builders who want worldwide reception at the cheapest cost. Plenty of broadcast band stations can be tuned in, too. Complete kit of parts (everything except batteries) £5/5/-.

"SUPER-COMET ALL-METAL FIVE"

1936 version of the famous "Comet," this new kit gives astounding results. Sensitivity and selectivity as found in most sixes and many sevens. (See September "Radio World" for full description, or write us for full details.) Complete kit of parts, including valves and speaker, £13/5/-.

NINE-RANGE D.C. MULTI-TESTER

Has 4 voltage, 3 current, and 2 resistance ranges, and is highly accurate. Uses a 0-1 m.a. meter (sensitivity, 1,000 ohms per volt), and laboratory-wound shunts. Has universal scale, and can be easily converted to read A.C. as well. See August "Radio World," or write us for details. Complete kit of parts £4.
(Case 9/- extra.)

Note: All prices in this advertisement are for N.Z. readers only. We regret that Australian orders are subject to duty.

Editorial Notes

The Radio Service Industry

In step with the tremendous increase during the past few years in the number of licenses taken out annually in the Commonwealth, the radio service business has advanced to the position where it now must be recognised as a separate industry. The task of keeping over 300,000 receivers in order is a tremendous one, that alone would make the men who perform it a force to be reckoned with, but there are other reasons why servicing as a profession is becoming increasingly more important.

Of everyone in the chain between set manufacturer and buyer, the serviceman has perhaps the closest and most constant contact with the latter. Once he has obtained the confidence of his clients as a result of his experience and integrity, his recommendations regarding valve or set purchases are generally followed without question. Manufacturers who realise this can build up valuable goodwill among servicemen, and thus among listeners, simply by "servicing the serviceman"—by keeping him supplied with plenty of service data on their receivers and valves.

A second reason why radio servicing is now forging ahead is that the serviceman of today must of necessity be equipped with a wide and thorough knowledge of radio from both the practical and theoretical angles. With improved methods of manufacturing, sets are being made more and more "breakdown proof," but against this they are far more complex than they were a few years ago, which means that service calls per set average little fewer today than they did before the advent of dual-wave receivers, with their host of modern refinements.

This increase in complexity also means that the day is well past when radio repair work can be performed by experimenters or electricians with a voltmeter, soldering iron, and a pair of pliers. Elaborate service equipment, plus a thoroughly sound and up-to-date knowledge of radio are essentials for anyone in the service game today. The equipment needed is expensive, and the training required means years of concentrated and costly study, but for good men the opportunities offering are endless. As an established profession, radio servicing is only in its infancy.

THE AUSTRALASIAN RADIO WORLD

Incorporating The
ALL-WAVE ALL-WORLD DX NEWS.

Managing Editor:
A. EARL READ, B.Sc.

Vol. 1.

NOVEMBER, 1936.

No 7.

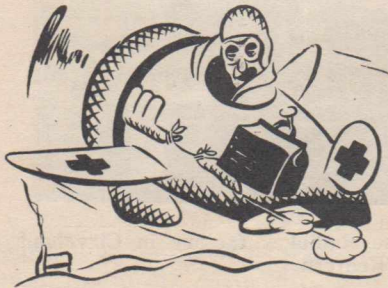
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The "Australasian Radio World" is published monthly by Trade Publications Proprietary, Ltd. Editorial offices, 214 George Street, Sydney, N.S.W. Telephone BW 6577. Cable address: "Repress," Sydney. Advertisers please note that copy should reach office of publication by 15th of month preceding that specified for insertion.

Subscription rates: 1/- per copy, 10/6 per year (12 issues) post free to Australia and New Zealand. Subscribers in New Zealand can remit by Postal Note or Money Order.

Pick - Ups . . .



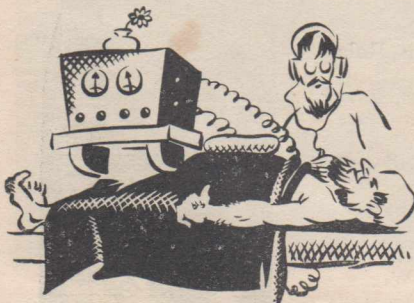
At a meeting of the executive council of the Australian Aero-Medical Services held last month, it was resolved to increase the power of the proposed "Flying Doctor" radio station at Broken Hill to 500 watts, thus giving greater range for effective signals. Of the £5000 for which a public appeal was being made, £2000 was earmarked for flying costs and doctor's salary, and £3000 for radio plant.



According to a communication to hand from the Honorary Secretary of the Radio and Telephone Manufacturers' Association, there appear to be only two radio manufacturers who are in favour of exhibiting radio receivers at the annual Electrical and Radio Exhibition, usually held in the Sydney Town Hall. No less than 23 companies and firms have signed the following declaration:—

"We, the undersigned, being of the opinion that the holding of an annual Electrical and Radio Exhibition is undesirable, express our intention not to rent space, directly or indirectly, for the display of our radio receivers at the forthcoming Exhibition."

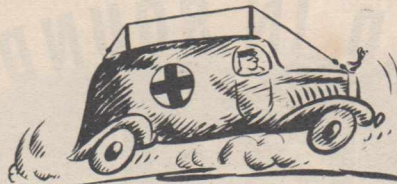
In addition to the foregoing, nine other radio companies have signified their intention not to exhibit.



In Macquarie Street, Sydney, Mr. Van Boss, a Dutch scientist, has installed for the treatment of various diseases the most

comprehensive thermo-ray equipment of its kind in the world. The installation uses two Philips type TA3/500 KI valves in a push-pull oscillator circuit, with 3500 volts on the plates. The output from the oscillator, which has a tuning range extending from 23 to 60 megacycles, is fed by Lecher wires to the "control unit" located over the patient's bed. This unit is in the form of an inverted "U," and along each side are taps which assist in controlling the power applied to the electrodes. The latter, which are applied to the patient, are rubber pads with the radiators well insulated in the centre.

An interesting point is that the length of the connecting leads between the electrodes and taps resonate at the oscillator frequency, thus resulting in maximum transfer of energy. The frequency and power used, as well as the size and position of the pads, are governed by the nature of the patient's disability.



When the twenty ambulances maintained by the Central District Ambulance in Sydney are fitted with two-way radio equipment, the city will possess the first fully equipped radio ambulance service in the British Empire, according to Superintendent H. J. Mitchell. Since the initial experiments in connection with the service were carried out, other public services both in Sydney and in other States throughout Australia have shown keen interest in the possibilities of radio, and several of them are already planning to instal similar equipment.



Sydney Howard, the well-known English comedian, tells this story as an example of American radio advertising: He was resting in the hotel one afternoon and his wife turned the radio on. A quartet party were singing "Far Above in Highest Heaven." They finished, and a raucous voice began: "It must be very beautiful . . . My firm has had the honour of officiating at over 40,000 burials in South California alone. So why not make arrangements now. A postcard to Blank, Morticians, will bring one of our

representatives to your home." This little speech was actually followed up by the playing of "Wagon Wheels" and "The Last Round-up."



Because the B.B.C.'s new television service is conducted on the ultra short waves, the height of aerial used is all-important. To ensure effective coverage, the station has been built on a hill top 306 feet above sea level. A tapering lattice mast 220 feet high surmounts an 80-foot tower, so that the aerial array for vision transmissions mounted at the summit of the mast is 600 feet above sea level. Immediately below the vision aerial is a second aerial for the accompanying sound transmission. Provision has been made for alternate experimental transmissions by the systems developed by the Baird Television Company and the Marconi-E.M.I. Television Company respectively. Each company has provided a complete television system, including both vision and sound pick-up apparatus and the television transmitter itself.



Station WEE, world's tiniest broadcasting station, attracted plenty of attention during an electrical exhibition at Baltimore (U.S.A.) recently. Standing only 20 inches high, the station is complete in every detail, down to elaborately furnished miniature studios. Power output is four-hundredths of a watt, and the broadcast range is about 200 feet. The towers, which are equipped with aeroplane warning lights, stand 24 inches high.



An application for a power increase from 50 to 500 kilowatts for KDKA, world pioneer radio station at Pittsburgh, U.S.A., is now under consideration by the Federal Communications Commission. If granted, it will make KDKA equal in power to WLW, now the most powerful station in the United States. A new 700-foot vertical aerial is now under construction, incorporating features so far unused in broadcasting, which will provide a high degree of sky wave suppression and greatly enlarge the no-fading service area.

Radiokes Factory Makes Thousands Of Parts Weekly

NINE YEARS OF DEVELOPMENT

ESTABLISHED for some years now as one of the leading radio factories in Australia, the well-known firm of Radiokes Ltd. today employs over 120 operatives to keep pace with the constant demand for its kit-sets and components. Yet it was less than nine years ago that Managing Director Keith Stokes registered the trade name "Radiokes" for his products.

The firm came into being as the Keith Stokes Proprietary early in 1923, and was formed primarily to handle imported American and English radio lines for which Mr. Stokes had secured the agencies while on a world tour.

In 1927 the manufacture of honeycomb coils was commenced, and the firm was formed into the Metropolitan Electric Company, Ltd. At that time the factory floor space was under 5,000 square feet, while

the staff consisted of about a dozen youths and a foreman.

Since that time the company has never looked back. The demand for Radiokes products grew steadily, and regular increases in staff and plant became essential to keep up with orders. In 1930 the company was forced to look around for larger premises, and a move was made to the up-to-date factory it now occupies in Cleveland St., Redfern.

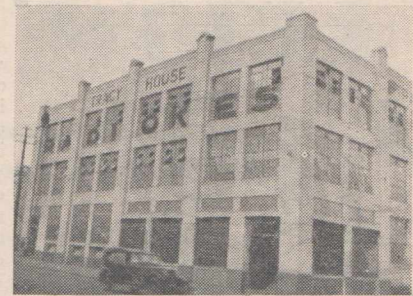
Variety Of Components Made.

From coils of all types, the manufacture of other components has been undertaken, until now the factory produces, besides complete kit-sets, intermediate frequency transformers, power and audio transformers, chokes of all kinds, padders and i.f. bases, potentiometers, wirewound resistors, voltage dividers, trimmers, midget variable

condensers, transposition blocks, and lightning arresters.

Thousands Of Parts Made Weekly.

In the factory shown in the photograph, the floor space occupied



The Radiokes factory in Cleveland St., Redfern.

by Radiokes Ltd. exceeds 10,000 square feet. Both layout and lighting are excellent, with ideal working conditions for the 125 operatives who handle the factory's output. In 1927 a very healthy turnover was enjoyed, but it is six times as great today. The widespread popularity of Radiokes components can be

(Continued on page 8)

LEADING THE WORLD IN SOUND REPRODUCTION



8-20-8in.
Speaker,
1in. Voice
Coil.



DP-5B-6 $\frac{3}{4}$ in. Speaker,
 $\frac{3}{4}$ in. Voice Coil.



K8-8in.
Speaker,
1in. Voice
Coil.

Rola

Manufacturers the world over look to, and expect from Rola the very latest speaker developments. Rola Speakers, by their constant addition of new features, have always satisfied this demand, with the result that they are known as the finest in the world. Your customers realise this and you can profit by it. Sell and recommend ROLA.

Distributors and Factory Service for New South Wales:

Geo. BROWN AND CO. LTD., 267 CLARENCE STREET, SYDNEY, N.S.W.

Distributors for Victoria:

A. J. VEALL PTY. LTD.,
243-249 SWANSTON ST., MELBOURNE.

Manufactured by

ROLA COMPANY (AUST.) PTY. LTD.

31-33 CITY ROAD,
SOUTH MELBOURNE, VICTORIA.



G12-12 $\frac{1}{2}$ in. Speaker
1 $\frac{3}{4}$ in. Voice Coil.



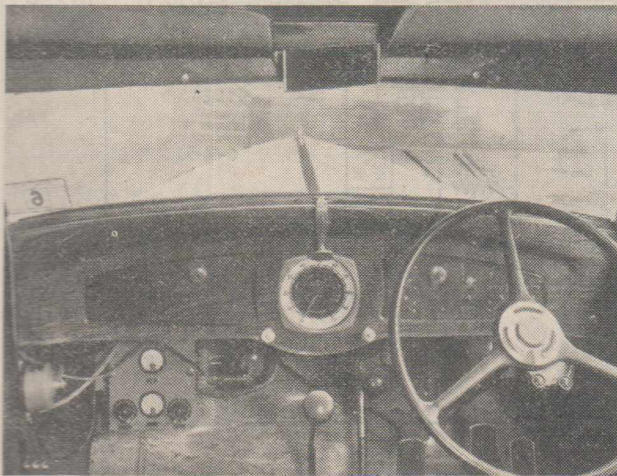
K-7-9 $\frac{1}{4}$ in. Speaker,
1in. Voice Coil.

Sydney Ambulances To Carry Radio

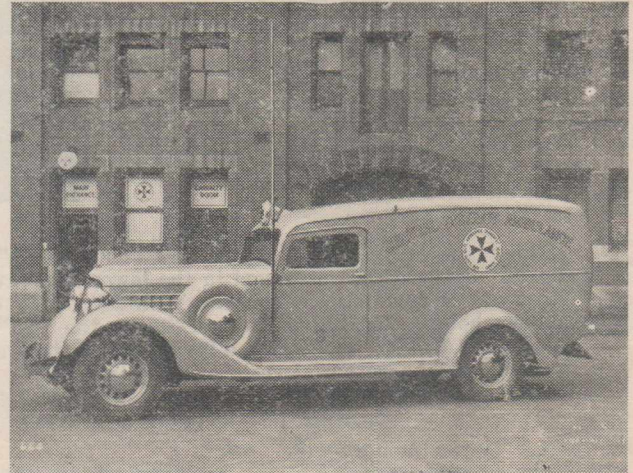
Twenty ambulances maintained by the Central District Ambulance in Sydney serve a million and a half people in an area of 700 square miles. By fitting all ambulances with two-way radio equipment, Superintendent H. J. Mitchell estimates that an additional 50 lives at least will be saved each year.

"WE have been planning to equip our ambulances with radio for nearly a year now," said Mr. Mitchell, "and since the authorities granted us the necessary licence we have been going right ahead with the scheme. The headquarters transmitter has been installed for some time and exhaustive tests carried out with an experimental car, so that within a few weeks our entire fleet of ambulances should be carrying radio.

"As a matter of fact, the wonderful help radio is going to be to us was illustrated by an incident that occurred while tests were being conducted. The radio-equipped ambulance was travelling north of the city when an urgent call was received by telephone from the officer in charge of the Gosford Ambulance. He explained that a woman was critically ill at Terrigal, but that the call could not be answered by the local ambulance, because one ambulance was absent in Newcastle and the other had broken down. Within a minute the wireless ambulance was speeding towards Gosford. After directions had been received, the sick woman was picked up at Terrigal and was brought to hospital in Sydney.



This interior view of the driver's cabin shows the transmitter mounted under the dashboard. The control panel is mounted on the dashboard in front of the driver, while the operating key is on the left.



One of the radio-equipped ambulances, showing the transmitting aerial erected in the operating position. The receiving aerial is strung along the cabin top.

1,500,000 People in 700 Square Miles

"The following figures will illustrate the urgent need for radio in a service such as ours. The Central District Ambulance now serves the needs of one and a half million people within an area of seven hundred square miles. Last year our cars attended to more than 31,000 calls and travelled more than 250,000 miles. To provide this service we maintain 20 cars and 11 stations, and employ a staff of 43.

"The incalculable value that radio is going to be both to us and to patients is apparent to anyone studying these figures. From the economic point of view alone, however, it would be well worth while. Already because of it we have decided not to purchase three more cars, which will mean a saving of close on £3,000.

"As well, the saving in petrol and tyres is going to be appreciable, because mileage will be reduced considerably, and every car can be put to maximum use.

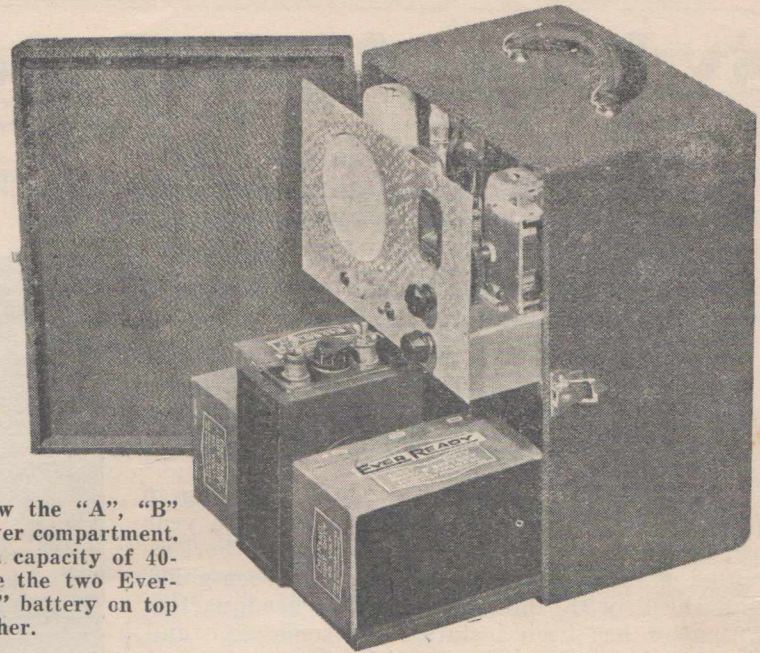
"We had an instance of this recently. An ambulance had to take a case to a distant hospital in one of the suburbs, a journey of about 7 miles. It had just left when a 'phone message came through that a child had been run over by a lorry only about a quarter of a mile from the hospital. A radio call would have saved the kiddy a lot of suffering and avoided a special trip for another ambulance.

Will Save Many Lives

"Apart from the considerable financial saving, however, the radio telephone service will be the
(Continued on page 47)

The . . . Outdoor Portable

Some further hints on the assembly and operation of the four-valve portable described last month.



This view of the "Outdoor" shows how the "A", "B" and "C" batteries are arranged in the lower compartment. The 2-volt accumulator is a Clyde, with a capacity of 40-ampere hours. On either side of it are the two Ever-Ready 60-volt "B" units, with a 9-volt "C" battery on top of one. The spare aerial rests on the other.

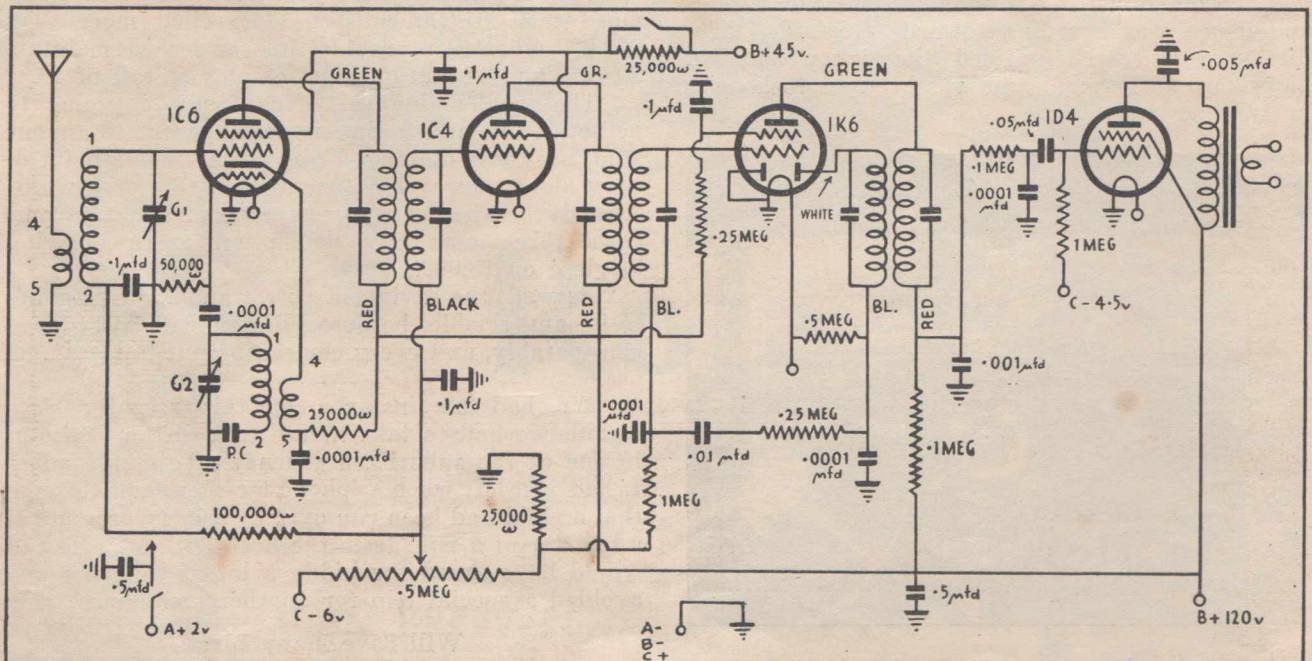
THE description of the "Outdoor Portable Four" in last month's "Radio World" has aroused such widespread interest among readers that it is evident a set of this type has been badly needed in this country. And there is certainly no reason why portables should not be widely popular, as they are invaluable on many occasions, even apart from holiday trips.

For example, the original "Outdoor" came in very handy in a Sydney office on the occasion of

Jean Batten's arrival at Mascot aerodrome. Proceedings were relayed by the national stations, and in no time most of the staff were clustered round the set waiting for Miss Batten to speak. The "Outdoor" was also in action on the occasion of the famous aviatrix's arrival at Mangere aerodrome, Auckland, when the speeches at the official welcome were broadcast on shortwave and relayed by 2BL.

Modified Volume Control Circuit

Since the "Outdoor" was described last month, two minor circuit alterations have been made, and



A pair of 25,000 ohm resistors and a single-pole single-throw switch are all that is required to amend the volume control circuit, and to provide a 2-position sensitivity control as described in the accompanying article. Both are optional.

both have proved well worth while. If the original circuit is compared with that shown below, it will be seen that the bias arrangement for the 1K6 has been modified slightly in the latter.

With a bias of -1.5 volts on the 1K6, a tendency was present for the set to block at loudest volume. To cure this a 25,000-ohm resistor was interposed between the positive end of the volume control potentiometer and earth, and the 1-megohm grid leak of the 1K6 returned to the junction between the two. The full voltage (9v.) of the bias battery is placed across the potentiometer (instead of 6v., as before).

The 25,000-ohm limiting resistor not only applies a small bias to the 1K6, but also ensures that the same bias will always be present on the 1C6 and 1C4. This saves about half a mill. of "B" current without affecting the gain to any appreciable extent, and so is a worth while saving where light duty batteries have to be used.

Optional Sensitivity Control.

Another minor refinement that will be found useful on occasions where extreme sensitivity is required is the fitting of a single-pole single-throw toggle switch on the front panel. By wiring a 25,000-ohm resistor across

it, and taking the original "B+30v." screen lead to the "B+45v." tapping on the "B" battery, then either 45 volts or approximately 30 volts is applied to the screens of the first two valves, depending on whether the switch is open, leaving the 25,000-ohm resistor in the screen lead, or closed, shorting the resistor out.

With the higher screen voltage, however, the total "B" drain increases to 8.5 mills., and so the switch should be used only when the occasion demands.

By plugging in the spare aerial carried in the case and throwing it along the floor, the set's range can be extended just as much as it can by using the built-in aerial alone, and with the sensitivity switch set for highest gain.

Rola Midget Speaker Gives Excellent Results.

Since the "Outdoor" was described last month, a sample Rola 5in. midget speaker (type 5-6) has been received from the Rola Pty. (Aust.) Co. Ltd., of Melbourne.

It is even more compact than the Amplion used in the original model, and when mounted in place there is about half an inch clearance between the magnet and the output valve. For so small a speaker it has very high sensitivity, and gives really

good tone. Also, it is reasonably priced, retailing at a figure that at the moment is not available, though it is appreciably below 30/-.

Alternative "A" Supply.

The Fuller block accumulator specified last month has a capacity of 25 amp. hours, and with an "A" drain of .6 amp., gives approximately 40 hours service from a single charge. If desired, two cells can be bought, so that a fresh one, fully charged, is always available. Also, when the set is being taken away on a long trip, both cells could be put in the cabinet, and connected in parallel to give 80 hours of operation.

A far cheaper alternative, however, is to use the Clyde 40 amp. hour accumulator illustrated on the front cover this month. It fits the case very well, gives nearly 70 hours of service from a single charge, and retails at only 17/-. A 25 amp. hour model is also available at 16/-.

Dry Cells For "A" Supply.

A correspondent asks if $1\frac{1}{2}$ -volt dry cells could be used in place of the accumulator. The ordinary type of standard cell definitely could not, if economical running is wanted. The new Impex square "A" cell, type 6-80, could be used with every satisfaction, however, as it has been built to give economical service at "A"

DRY BATTERIES give a smoother, more reliable flow of power—ensure freedom from background noise—and cannot break down because of mechanical defects. Proven over the years, they are still the main source of power for thousands of country radio receivers. See that *your* new set is equipped with

**EVER-READY
BATTERIES**



AUSTRALIA'S BEST BATTERIES

EVER-READY

TORCHES REFILLS & RADIO BATTERIES



EX6

Manufactured by the
EVER-READY CO. (Aust.) Ltd.
Sydney and London.

Chosen for the OUTDOOR PORTABLE FOUR!



The CLYDE Type 2vs7 2-volt Battery

will give you years of trouble-free service. Has a capacity of 40 ampere hours, and will give nearly 70 hours of service from one single charge.

Price 17/-

[Note: The 2VS7 is also ideal for the "Beginner's Battery Two," also described in this issue.]

Clyde Batteries for Vibrator Sets

For vibrator-operated receivers, all the power must come from the accumulator. Follow the lead given you by Australia's leading set manufacturers, and specify CLYDE for your new battery-less receiver. Types we recommend are:—

6CR9 ...6-volt... 80 amp. hours.
6CR11...6-volt...100 amp. hours.
6CR13...6-volt...130 amp. hours.

For extra Power, Reliability,
and endurance.

Specify CLYDE

Famous for their sturdy strength and for their proved efficiency, Clyde Radio Batteries are the first choice of battery-set owners everywhere. Special thick plates of exceptionally high capacity and life. Enclosed in hard rubber containers, leak-proof, and practically indestructible.

Clyde Radio Batteries are Guaranteed for Eighteen Months.

Obtainable from all leading Radio and Electrical Stores throughout Australasia.

The CLYDE ENGINEERING Co. Ltd., Granville, N.S.W.

drains even greater than that taken by the "Outdoor".

By standing the two Ever-Ready 60-volt "B" batteries on end at the back of the battery compartment, these cells will fit in at the front. With two connected in series, giving 3 volts, a resistance of 1.7 ohms is needed to drop the voltage to 2v.—that required by the valves.

Special Complete Coil Kit.

Messrs. Radiokes Ltd. advise that they are making available a special complete coil kit for the "Outdoor." It comprises aerial and oscillator coils, three intermediates, and padding, and retails at £1-17-6.

Manufacturing Radiokes Products.

(Continued from page 4.)

gauged from this table, showing the present approximate weekly production:

Padders, i.f. bases	2,000
I.F. transformers	1,000
R.F. coils	500
D.W. coil boxes	70
Audio transformers	50
Voltage dividers	1,000
Potentiometers	1,000
Kitsets	50

In all, several million radio components of all kinds have been produced by Radiokes Ltd. during the nine years the company has concentrated on manufacture—a record that few other radio manufacturers in Australasia can equal.

Hints And Tips For Set Designers.

By "OLD TIMER"

IN the design of any receiver, layout is one of the main features to be considered, becoming more and more important as the number of valves, and hence the overall amplification, is increased. With a powerful receiver, it is quite possible that the changing of location of a single component could make a perfectly stable set hopelessly unstable.

In some cases, careless wiring alone is sufficient to cause instability, but generally speaking, layout is the main factor in ensuring good performance in this respect. For example, it would be possible to build up a five-valve superhet that would give great results with a well-planned layout, but with a poor one, would give nothing but howls and squeals, due to instability. The cause of the difference in performance would be solely in the layouts.

Two Rules For Set Designers.

The two golden rules to bear in mind when designing a set are, firstly to ensure that all leads are kept as short as possible, and secondly, to avoid doubling back so that the output from one stage runs close to the input to, or output from, an earlier one. If these precautions are not taken feed-back will result, causing either poor sensitivity or oscillation.

The "short leads" rule applies particularly to leads carrying radio frequency (including intermediate frequency) currents. All plate and grid leads, particularly, should be short and well spaced, though if proximity is unavoidable, the leads should either be crossed at right angles or shielded. The latter should be avoided wherever possible, as, because of the by-passing effect of the small condenser formed by the metal shield and the wire it surrounds, some gain is lost. This loss varies directly with the frequency of the r.f. currents carried by the shielded lead, with the amount of shielding used, and with the proximity of the outer shield casing to the wire within. For example, there will be far more loss if the lead is carrying signal currents from a station operating on 20 metres (15,000 k.c.) than there will be with a signal from a transmitter operating on the broadcast band. Similarly, there will be still less loss if the lead in question is carrying a signal of an intermediate frequency of 175 k.c. instead of one at a broadcast frequency.

The loss obviously varies with the amount of shielding and with its proximity to the lead within, as the by-pass capacity formed between the shield and lead depends directly upon both. Hence, if its use is unavoidable, shielding should be sparingly used, and where it is employed it should be spaced from the wire within by slipping a length of spaghetti over the lead before the shielding is put on.

Precautions Against "Doubling Back".

The necessity for avoiding "doubling back" becomes more important the higher the frequency at which tuner portion of the set operates. This explains why sensitive, stable shortwave receivers are more difficult to design than broadcast sets.

A well planned layout in itself does not ensure there will be no doubling back or long leads. Both coils and valve sockets need to be carefully arranged so that the lugs face in directions giving the shortest, most direct leads.



The most vital part of a broadcast receiver is its valve equipment. No radio can give good performance without good valves. Radiotrons conform to the world's highest standards in design, material, construction and performance.

RADIOTRONS

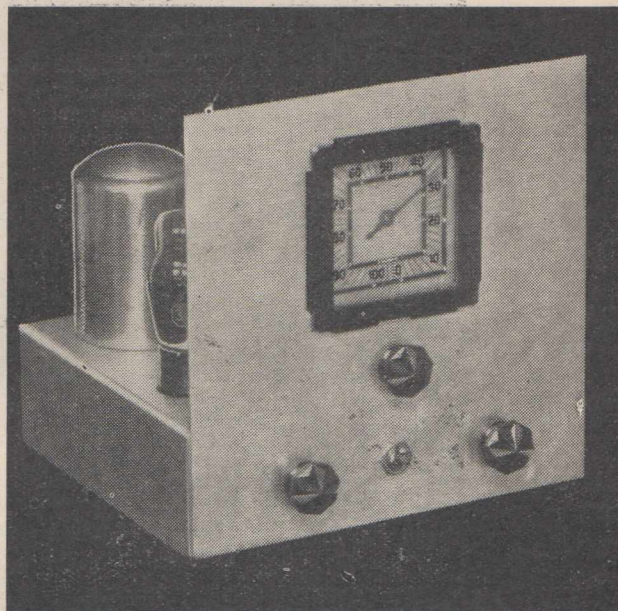
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The . . . Beginner's Battery Two

An easy-to-build two-valver, using a type 30 detector, with reaction, transformer-coupled to a 30 audio stage.



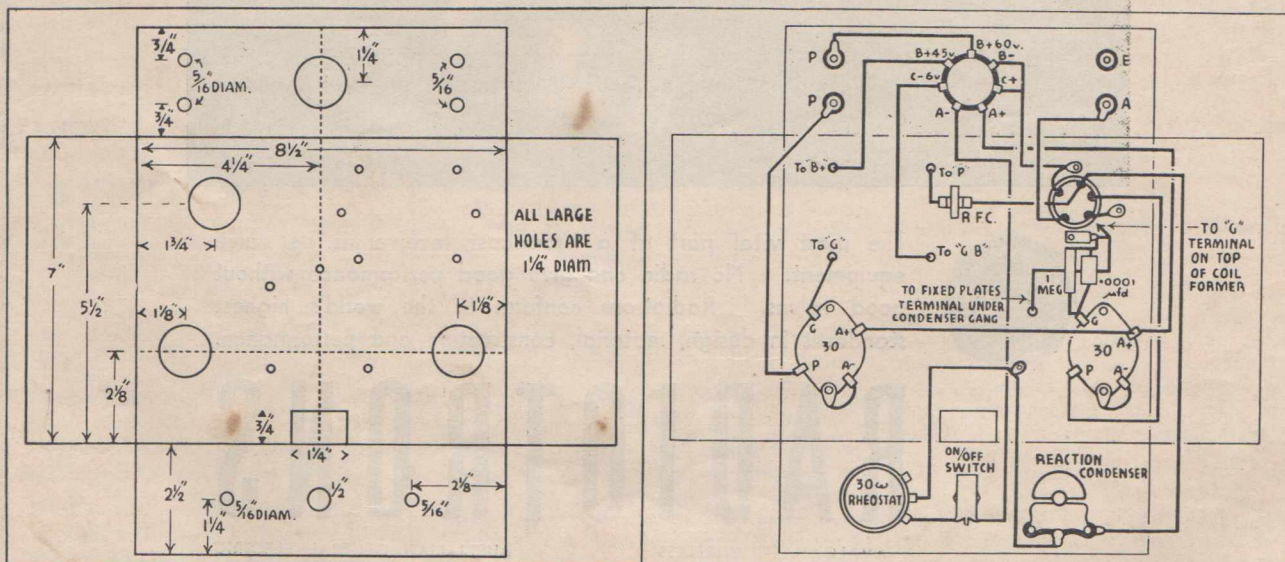
THE "Beginner's Battery Two" makes an ideal set for those just starting in radio to build, because it could scarcely be simpler in design or more straightforward in assembly. As well, it is very cheap to build, and is economical to run, as it requires only .12 amp. filament current and several milliamps. of "B" current. Nevertheless, for a small set it is very sensitive, and if used with an efficient aerial and earth system should bring in several dozen stations at good headphone strength.

All the parts needed are standard, and if a larger and more powerful set is built later on, almost every one of them can be used again.

Detector and One Audio

A type 30 valve is used as a leaky grid detector, with reaction, and is transformer-coupled to another 30. An audio stage is not absolutely necessary, but as it lifts weak, scarcely readable signals to good headphone volume it is well worth while.

A small output pentode could have been used in place of the second 30, but it would be dearer both to buy and to run, and as well far more than 60 volts of "B" supply would be needed to get anything like maximum output from it. Finally, it would not give enough volume to operate even a sensitive magnetic speaker except perhaps from powerful locals, and so the 30 is easily the better choice.



The sketch on the left shows dimensions for preparing the chassis, while that on the right shows the complete wiring.

The "OUTDOOR PORTABLE FOUR"

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For £10 Vealls will supply everything necessary to build the complete "Outdoor Portable Four" as described in last issue. Positively nothing else to buy and—Vealls pay freight to your nearest railway station.

Read the full description in the October issue—build this portable before the holidays.

£10 buys the complete kit, including valves, batteries, speaker and case.



Build the Beginner's Battery Two

For the beginner or those desiring headphone reception, this Battery Two will fill a long-felt want. See the complete constructional details in this issue—learn how easily and simply you may build it.

PARTS REQUIRED.

1 16 gauge aluminium chassis, 7in. x 8½in. x 2½in., stamped & drilled, at 10/-	0 10 0	1 r.f. choke (Radiokes) at 1/6	0 1 6	2 1½ v. "A" cells (Ever-Ready, Diamond) at 2/7 each	0 5 2
1 14 gauge aluminium front panel, 8½in. square, at 5/6	0 5 6	1 7-pin plug and 7-wire cable, 1 yd.	0 1 8	1 4½ v. "C" battery (Ever-Ready, Diamond) at 2/3	0 2 3
1 single gang condenser, .000385 mfd. (Saxon), at 6/-	0 6 0	1 2 megohm carbon resistor, at 1/9	0 1 9		
1 r.f. coil, with reaction, at 3/6	0 3 6	1 .0001 mfd. mica condenser at 1/-	0 1 0		£6 17 6
1 full-vision dial (Radiokes) at 12/6	0 12 6	4 terminals, 2 red, 2 black, at 4d. ea.	0 1 4		
2 4-pin wafer sockets, 1 7-pin Dalton	0 1 7	3 small knobs at 7d. ea.	0 1 9	MISCELLANEOUS:	
1 audio transformer, 3½ : 1 or 5 : 1, at 10/6 ea.	0 10 6	1 pair headphones at 18/6	0 18 6	½in. bakelite strip ¾in. wide x ¾in. long, with solder tag on one end; 3 yards	
1 30 ohm rheostat at 2/6	0 2 6	VALVES:		16 or 18 gauge tinned copper wire; 1 yd. spaghetti;	
1 23 plate midget condenser at 4/6	0 4 6	2 type 30 valves (Radiotron, Ken-Rad, Philips) at 16/- each	1 12 0	1½ doz. ¾in. bolts and nuts	0 2 6
		BATTERIES:			
		1 60 v. light duty "B" battery (Ever-Ready, Diamond) at 11/6	0 11 6		

£7/0/0

WRITE TO VEALLS FOR SPECIAL QUOTATIONS.

See the OUTPUT METER described in this issue

Vealls 4 Big Stores are packed with thousands of Radio and Electrical items—everything for the Radio Fan, Set Builder, Dealer and Serviceman.

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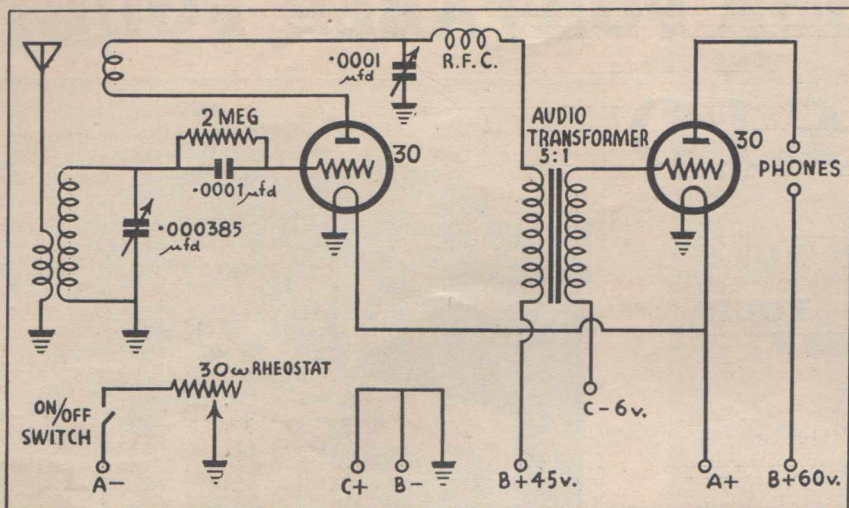
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Wind. 1605.

168 SWANSTON ST., MELBOURNE.
Cent. 10524.
3-5 RIVERSDALE RD., CAMBERWELL, VIC.
W 1188.



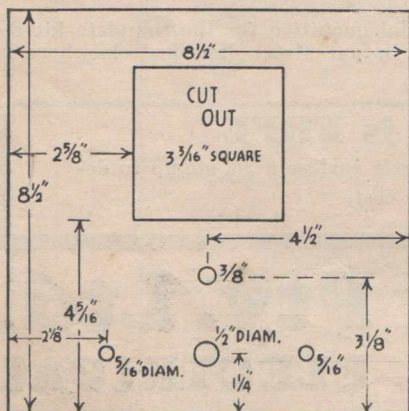
The circuit of the "Beginner's Two" is about as simple as it possibly could be, but at the same time it is highly sensitive.

Commencing The Construction.

After the chassis, panel, and all the parts have been obtained, the assembly can be commenced by mounting the valve and battery sockets, coil, "A", "E" and 'phone terminals, and audio transformer. Insulate all terminals, with the exception of the earth terminal, from the chassis by means of the insulating washers provided.

The single-gang condenser can be mounted next, but before bolting it down, solder to the fixed plates terminal lug underneath it, a six inch length of flexible push-back. This passes through a hole in the chassis and connects to the top of the grid winding on the coil.

Next mount the dial, and then, after placing the front panel against the front of the chassis, mount the rheostat, on/off switch, and 21-plate reaction condenser. None of these components requires to be insulated from the metal chassis.



Dimensions for preparing the panel.

Putting In The Wiring.

Now the wiring can be put in. Solid push-back can be used, or alternatively 16 or 18 gauge tinned copper wire, covered with spaghetti sleeving. Wire the filament circuit first. To do this, solder a lead to the "A+" terminal on the battery socket and take the other end to the filament terminal nearest the back of the chassis.

Next run a lead from this terminal to the corresponding one on the other socket. The remaining filament terminal on each socket is then earthed by connecting it to a solder lug mounted under the nut of the nearest mounting bolt. All earth connections are made in this manner, by the way.

The negative portion of the filament circuit can be completed by running a lead from the "A—" terminal on the battery socket to one side of the on/off switch, taking a lead from the other side to one side of the rheostat (see wiring diagram) and by running a lead from the centre terminal of this component to a convenient solder lug bolted to the chassis.

Next, starting at the aerial terminal, wire the coil. That used in the original set was a Velco, and if a similar coil is used it should be wired exactly as shown. With other commercial coils the connections are generally given on a slip of paper inside the carton.

The remainder of the wiring is quite straightforward, and can be put in according to the wiring sketch. In order to support the grid leak and condenser and the wiring associated with it, the coil mounting

bolt nearest the front of the chassis is used to support a bakelite strip $\frac{3}{8}$ in. wide and $\frac{3}{4}$ in. long, with a single solder tag riveted to one end. A 1 in. bolt and three nuts are needed for this position.

One side of the grid leak and condenser combination is taken to the grid of the detector, and the other side to the solder tag on the bakelite strip. The lead from the tuning condenser is also soldered to this tag, together with one end of another lead, the other end of which is soldered to the terminal at the top of the coil former connected to the top end of the grid winding.

After the wiring has been completed and checked, the battery plug can be wired. As each lead in the battery cable is soldered to a pin, jot down its colour and designation to avoid the possibility of a mistake being made when the batteries are being connected.

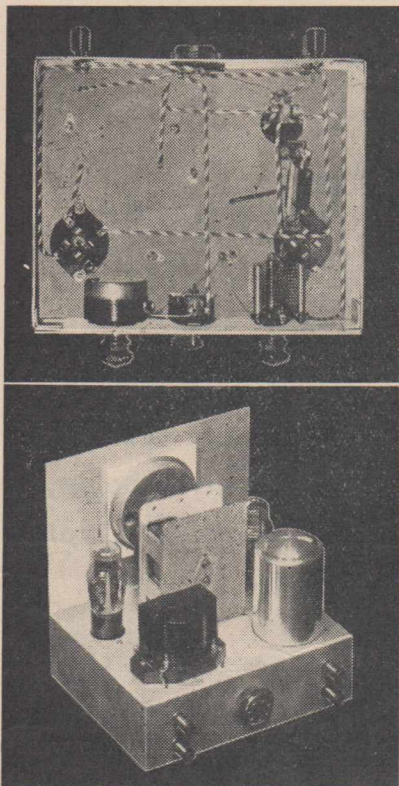
The Batteries Required.

As the "B" drain is only a few mills., a single 60 volt light duty "B" battery will give many months of service. A 9-volt "C" battery is also required, while the "A" current, amounting to only .12 amp., can be supplied either by a 2-volt accumulator or by two $1\frac{1}{2}$ -volt dry cells connected in series. A 3-volt supply is too much for 2-volt filaments, however, so the rheostat should be used to provide the necessary amount of resistance to break the voltage down

BEGINNER'S BATTERY TWO

List of Parts

- 1—16 gauge aluminium chassis, 7 in. x 8 $\frac{1}{2}$ in. x 2 $\frac{3}{8}$ in., stamped and drilled as shown in sketch.
 - 1—14 or 16-gauge aluminium front panel, 8 $\frac{1}{2}$ in. square.
 - 1—single gang condenser, .000385 mfd. (Saxon).
 - 1—r.f. coil, with reaction.
 - 1—full-vision dial (Radiokes).
 - 2—4-pin wafer sockets, 1—7-pin Dalton.
 - 1—audio transformer, 3 $\frac{1}{2}$: 1 or 5 : 1.
 - 1—30 ohm rheostat (Radiokes).
 - 1—23-plate midget condenser (Radiokes).
 - 1—r.f. choke (Radiokes).
 - 1—toggle switch.
 - 1—7-pin plug and 7-wire cable.
 - 1—2 megohm carbon resistor (Allen-Bradley).
 - 1—.0001 mfd. mica condenser (T.C.C.).
 - 4—terminals, 2 red, 2 black.
 - 3—small knobs.
 - 1—pair headphones.
- VALVES :
- 2—type 30 valves (Radiotron, Ken-Rad, Philips).
- BATTERIES :
- 1—60 v. light duty "B" battery (Ever-Ready).
 - 2—1 $\frac{1}{2}$ v. "A" cells (Ever-Ready) or 1 2v. accumulator.
 - 1—9 v. "C" battery (Ever-Ready).
- MISCELLANEOUS :
- $\frac{3}{8}$ in. bakelite strip $\frac{3}{8}$ in. wide x $\frac{3}{4}$ in. long, with solder tag on one end; 3 yards 16 or 18-gauge tinned copper wire; 1 yard spaghetti; 1 $\frac{1}{2}$ doz. $\frac{3}{16}$ in. bolts and nuts.



Two more views of the completed receiver are shown above.

to 2. From Ohm's Law, the resistance required equals:—

$$\frac{1}{.12} = 8.3 \text{ ohms.}$$

Hence the rheostat should never be turned more than three-quarters of the way on while the cells are new. After they have had several months'

use, however, it can be advanced a little more. The way the batteries are connected up is shown in a sketch on this page.

Some Operating Hints.

When the aerial and earth leads, batteries and headphones have been connected, and the valves plugged in, the set is ready for its first tryout. Switch on and advance the rheostat. Next advance the reaction control until the set is on the verge of oscillation, rotate the tuning dial, and a station should soon be picked up.

Never advance the reaction control so far that the set oscillates, or in other words so that a whistle is heard as a station is passed over. In this condition the set is not only interfering with the reception of other nearby listeners, but also it is comparatively insensitive. Best results are obtained with the reaction control "backed off" a trifle from the oscillation point.

The Month on Shortwave

By Alan H. Graham

CONDITIONS on all bands continue to be first-class, quite a number of new transmitters having made their appearance.

"Radio Saigon" has been causing plenty of interest on 25.7 metres. This station opens at approximately 9 p.m., and continues its transmission till 12.30 a.m. On October 8, signals reached R7 at 9.40 p.m. Announcements are made in French and English, giving the address as P.O. Box 295, Saigon, French Indo-China.

Another new station has been reported on the 31-metre band. This is CB9600, Santiago, Chile, on 31.25

metres, which has been reported on Sunday afternoons.

Another Cuban On The Air

Yet another Cuban has appeared on the air. The fact that these newcomers are on wave-lengths below 32 metres makes their reception a comparatively easy matter. The latest Cuban is COCX on 26 metres, "La Voz de la Radio Philco." It comes on the air around 11 p.m.

The Hongkong shortwave station has also moved to the 31m. band, which is becoming absolutely overcrowded. The allocations for Hongkong are as follows:—ZBW2, 34.2 m.; ZBW3, 31.4 m.; ZBW4, 19.7 m.; and ZBW5, 16.9 m. Listen for the 31 m. transmitter around 9 p.m.

Other stations on the air at present, which will repay a few minutes' attention are:—ZJH, Penang, on 49.34 m.; VUC, Calcutta, on 49.1 m.; TWG, Guatemala City, on 31.75 m.; HJIABP, Cartagena, on 31.25 m.; ORK, Ruysselede, on 29.04 m.; LSX, Buenos Aires, on 28.98 m.; TJF, Iceland, on 24.5 m.

Latest Russian S.W. Schedules

Latest information from Radio Centre, Moscow, contains the following facts:—

Transmissions are through RAN (31.25 m.), RNE (25 m.), RKI (19.81 m.) and RV96 (19.76 m.).

The schedule for these transmitters is:—

Sunday	10—10.30 a.m.	RAN
	9—10 p.m.	RNE
Monday	1—2 a.m.	RKI & RNE
	4.30—5 a.m.	RV96
	7—8 a.m.	RNE
Tuesday	10—10.30 a.m.	RAN
	7—8 a.m.	RNE
	10—10.30 a.m.	RAN
Wednesday	10—10.30 a.m.	RAN
	9—10 p.m.	RNE
Thursday	10—10.30 a.m.	RAN
Friday	10—10.30 a.m.	RAN
Saturday	7—8 a.m.	RNE
	10—10.30 a.m.	RAN

All times given in these notes are A.E.S.T.

A verification from PCJ, N.V. Philips Radio, Eindhoven, Holland, gives this schedule for that station's experimental transmissions—

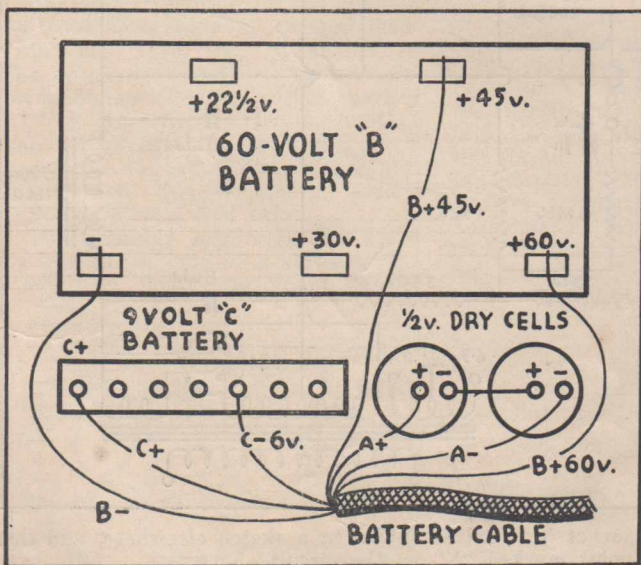
- Tuesday—7—9 p.m. on 19.7 m.
- Wednesday—10 p.m.—2 a.m. (Thursday) on 19.7 m.
- Thursday—10 a.m.—1 p.m. on 31.28 m.

ZBW4, Hongkong, was heard at splendid strength on 19.75 m. on Oct. 13, at 9.30 p.m.

A new Spanish station EAH, Madrid, has been reported on 31.65 m.

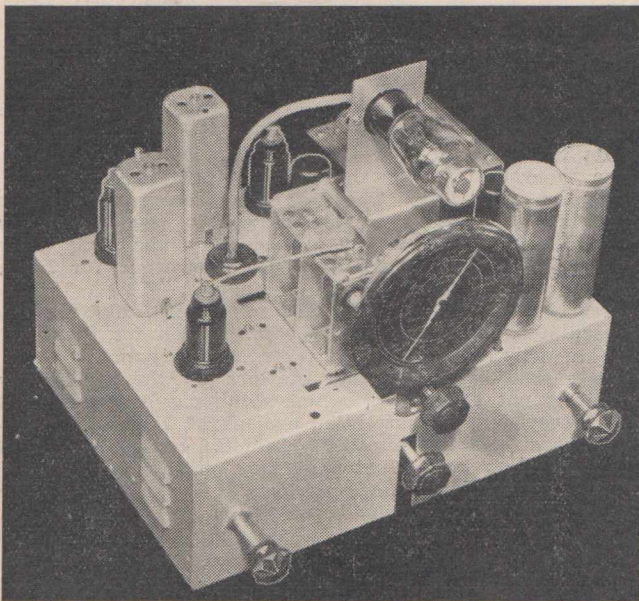
The call-sign of the Prague transmitter is OLR.

The 20 m. amateur band is still remarkably good. Outstanding "hams" recently logged include the following: PK1MX, Batavia; KA1BH, Manila; HK1Z, Colombia; VU2BG, India; VS2AK, Malaya; VS6AH, Hongkong; F8DR, Paris; and a number of G's.



This sketch shows the way to connect up the "A", "B", and "C" batteries. If desired a 2-volt accumulator can be substituted for the 1 1/2-volt dry cells.

Adding Magic Eye Tuning To The



Air-Ace Dual-Wave Five

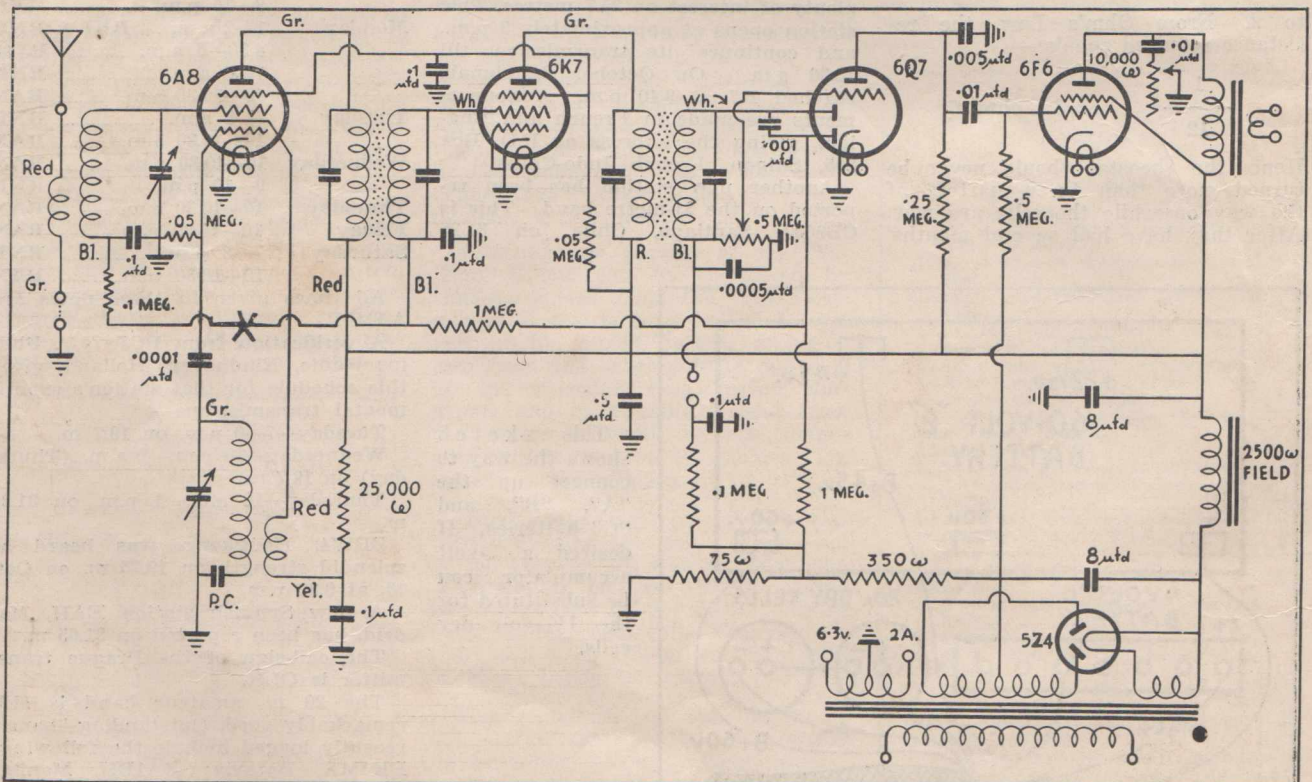
This month some further assembly hints are given below, together with instructions for adding Magic Eye tuning.

THE first task in the assembly of the "Air-Ace" is to mount all the sockets, followed by the six terminals on the back of the chassis, electrolytics, power transformer, volume and tone controls,

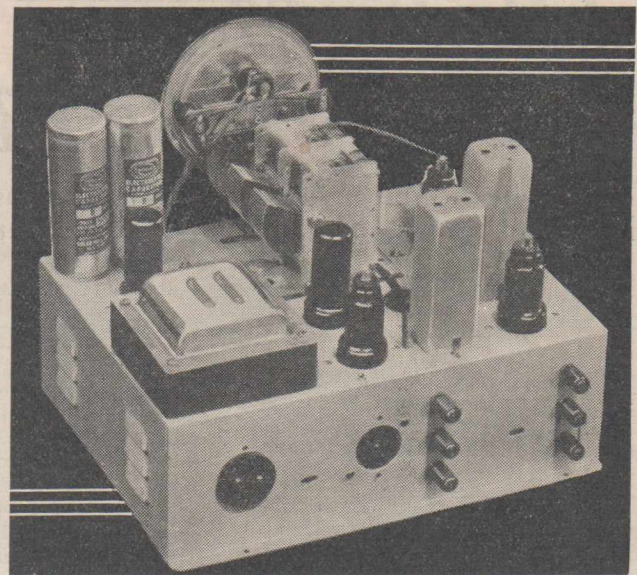
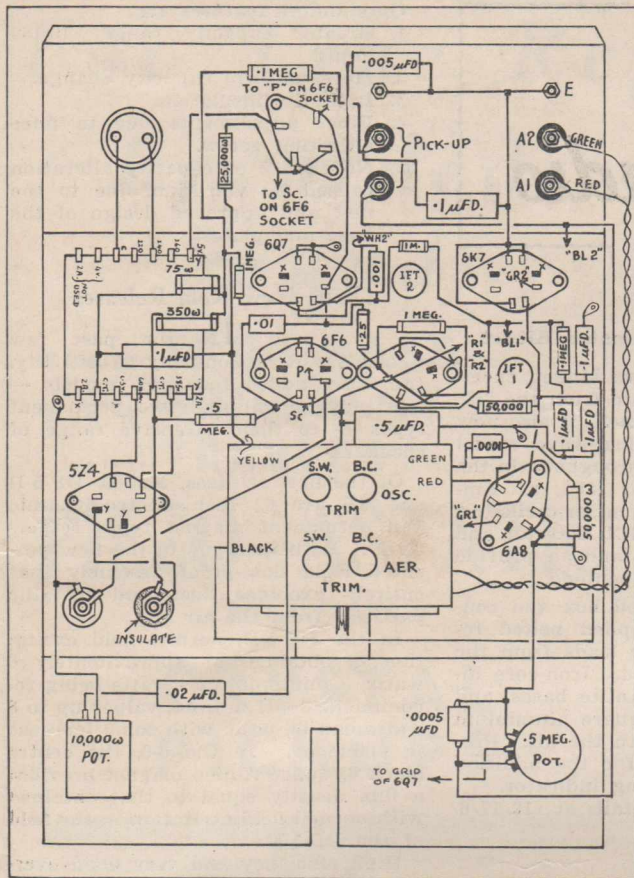
and power socket (on back wall of chassis). Insulate all terminals from the chassis, and place solder lugs under the nuts locking them in position. Also, the outer electrolytic should be carefully insulated from

the chassis by means of the washers provided.

A length of 16 or 18-gauge tinned copper wire can now be run around the chassis, one end being soldered to the earth terminal (which is also



To add Magic Eye tuning to the "Air Ace," the 6G5 socket is wired as shown in a sketch elsewhere, and then a lead is run from the grid terminal on the socket to the point marked "X" on the circuit above.



This sketch shows the under-chassis wiring. The leads to the intermediates are indicated by colours and numbers. For instance, "Gr. 1" means the green lead from I.F.T.1, while "R. 1" and "R. 2" indicate the red leads from both I.F.T.1 and I.F.T.2. A rear view of the completed receiver is shown above.

joined to the lowest of the row of three terminals nearest the centre of the back wall of the chassis). The earth line of tinned copper wire is tied down at various points by soldering it to solder tags placed under the nuts of convenient mounting bolts.

The Heater Wiring.

The heater wiring is now put in by running a pair of twisted leads from the "6.3v. 2A." terminals on the power transformer panel to the terminals on the 6Q7 socket marked "X" on the wiring diagram. Another pair of leads is run from these two terminals to the corresponding terminals on the remaining sockets (6F6, 6K7, 6A8, and 6G5).

The rectifier can next be wired by running a pair of leads from the "385v. 60 m.a." terminals on the

power transformer panel to the plate terminals of the rectifier, and a second pair from the "5v. 2A." terminals to the 5Z4 heater terminals.

Completing The Wiring.

Next, starting from the aerial end, as much of the wiring as it is possible to complete without the coil box should be put in. Full details of the wiring are given in the accompanying sketch, which also includes the wiring of the 6G5 Magic Eye tuning indicator. Thus, after the wiring has been completed, the 6G5 will operate when plugged into the six-pin socket provided for it on the chassis. The extension to the bracket supporting the Magic Eye horizontally above the condenser gang is made by means of a second six-pin socket, a six-pin plug and about eight inches of six-wire cable.

Finally, the coil assembly box can be mounted and wired, and the colour-vision tuning dial bolted in place and the pilot lamps wired according to the instructions.

The Magic Eye Circuit.

The circuit used with the 6G5 tuning indicator is shown elsewhere. After it has been wired in accordance with this, a lead is run from

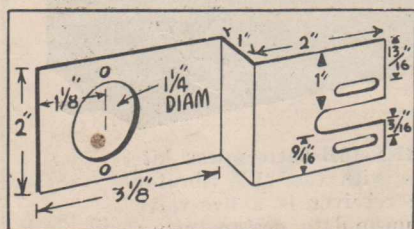
the grid terminal on the 6G5 socket to the point marked "X" on the main circuit diagram.

Dimensions of the steel bracket used for supporting the 6G5 above the gang are also given in a sketch on this page.

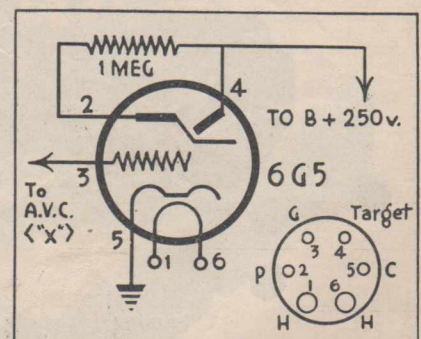
Aligning The Receiver.

The coil assembly and I.F. transformers have been aligned and tested at the factory, and should require very little adjustment. The simplest method is to align the set on noise

(continued on page 45)



Dimensions of the Magic Eye bracket.



Circuit and under-socket connections for adding a 6G5 Magic Eye to the "Air Ace".

What's New In Radio

A monthly review of latest releases
in sets, kit-sets, and components

Radiokes Vibrator Unit and Special Kit-set

A COMPLETE vibrator "B" battery eliminator, with a built-in smoothing system, has lately been released by Radiokes Ltd.

The unit is completely enclosed in a black crystalline case measuring 9 in. x 5½ in. x 4 in., fitted with ventilating louvres and mounting brackets. It is designed to operate from a 6-volt accumulator, and is completely silent in operation. Currents up to 40 m.a. at 150 volts can be supplied by the unit.

The power transformer, vibrator unit, filter choke and condensers are all mounted on a cadmium-plated chassis, which is fitted inside the case. The single cable provided is completely shielded, and is wired to a five-pin plug in such a way that the switch on the receiver also controls the vibrator. This arrangement, incidentally, obviates the danger of the vibrator unit being operated without a load.

A separate voltage divider unit is supplied with each eliminator, but is required only when the unit is being used to replace "B" batteries, or when extra voltage tapings are required.

The eliminator complete retails at £6/6/-, and the voltage divider unit at 15/-.

Radiokes "B" Eliminator Kit-set

A Radiokes five-valve kit-set, specially designed to operate from the "B" eliminator reviewed above, is also now available. It is a dual-wave model using Philips valves throughout, in the following combination: KF3, r.f. amplifier, KK2, Octode mixer-oscillator, KF3, i.f. amplifier, KBC1, detector and first audio amplifier (and to provide A.V.C.), KL4, output pentode.

The three-section coil box and condenser gang are supplied bolted together and wired, the leads from the box being colour-coded. Iron-core intermediates with isolantite bases, and housed in compact square aluminium cans, are included with the kit. Provision is also made for the addition of a Magic Eye tuning indicator.

The complete kit retails at £12/17/6.

New Radiokes Trimmer Base

A square trimmer base of entirely new design has also just been announced by Radiokes. In appearance it resembles the old square base—in fact, it is of the same size and has the same mounting and trimming arrangements. Thus it can be used in every position previously occupied by the earlier base.

Outstanding features are:

1. Greater capacity range: 10-160 mmfd.
2. More uniform capacity change.
3. Isolantite insulation.
4. Finer adjustments due to finer adjusting screw.
5. No chance of capacity alteration caused by vibration, due to the new and improved design of the base and plates.

★

Four New Rola Releases

IN the past few weeks, the Rola Company (Aust.) Pty. Ltd. have added four new models — two moving coil and two permanent types — to their extensive range of speakers.

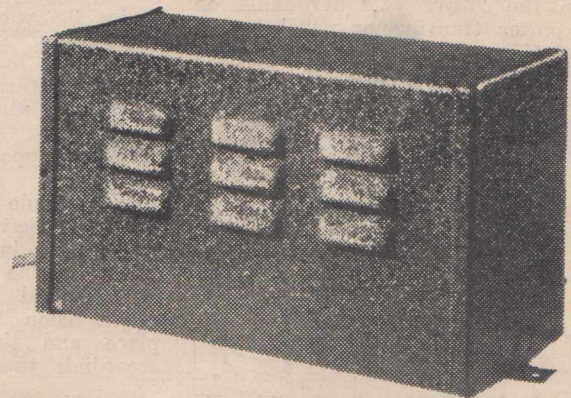
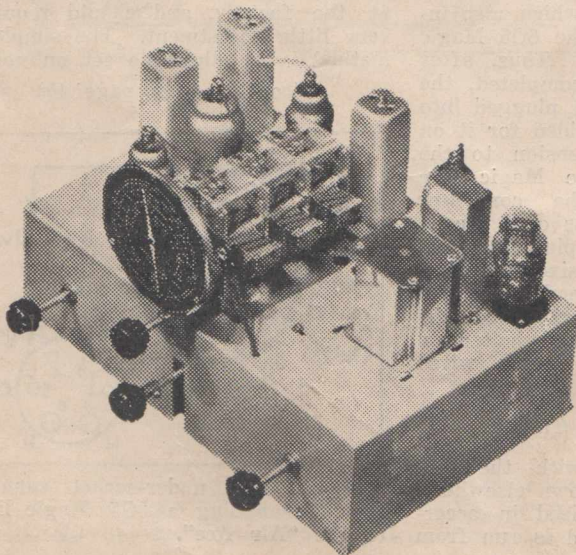
Of the new releases, Models DP-5-B and 6-6 are 6½ inch electro-dynamic and permanent magnet types respectively. Both incorporate the new patented Rola dust-proof assembly that entirely excludes dust and metallic particles from the air gap.

In the DP-5-B, normal field excitation is obtained at approximately 6 watts, a minimum of 4 watts being recommended. If desired, values up to 8 watts can be used, with some increase in efficiency. In the 6-6, the centre block 6½-ounce Alnico magnet provides a flux density equal to that obtained with normal field excitation in the field of the DP-5-B.

High efficiency and very good overall response is obtainable from both models, even in small mantel or automobile receivers, as they have been specially designed to give first-class results even when used with baffles of limited area.

Also, while designed for use with a single output valve, both speakers have a sufficient reserve of power-handling capacity to enable them to be used with push-pull combinations giving

(Continued on page 38)



Left: The Radiokes RKS-10B battery-less kit-set, designed to operate with the "B" vibrator unit shown above. The receiver is a five-valve dual-wave superhet of up-to-date design, using Philips valves throughout.

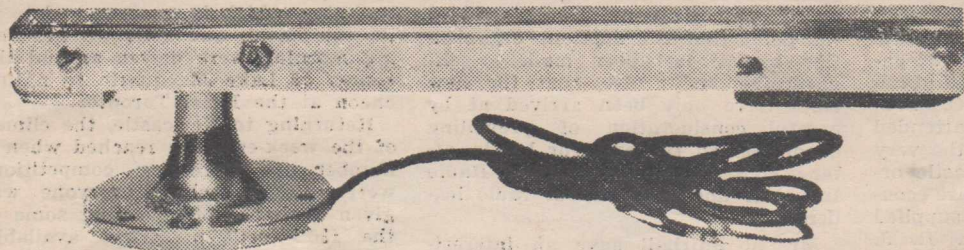
For True Reproduction of Recorded Sounds

- TRUE BASS
- BRILLIANT TREBLES

PIEZO - ASTATIC

High Fidelity

CRYSTAL PICKUPS

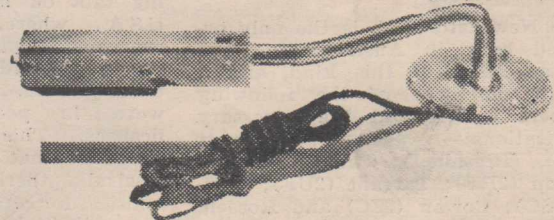


Three Standard Models finished in Chromium.

Type S8 Straight Arm, for 10 and 12 inch records. Price, - £4/10/-
Type S8 Bent Arm, for perfect tracking. Price - - - £4/10/-

Type S12 Studio Model Straight Arm, 15 inch overall length, £5/5/-

Where normally records are weakest, in the bass notes, the Astatic Crystal Pickup is strongest. The result is a fidelity of response that is amazingly uniform, with no pronounced peaks throughout the entire audible range. Being about one-half as light on the record as the conventional magnetic pickup, it is extremely kind to the life of records. Only 2 1/2 ounces of pressure bear on the needle point.



Piezo



Pickups

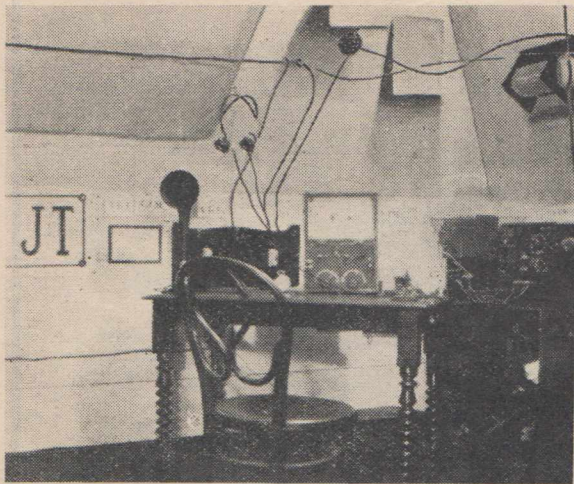
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Newcastle Hamfest a Great Success



A receiving station in 1920. The loose-coupled receivers on the right were the "last word" in sets in those days.

THE Newcastle Amateur Radio Club held its Second Annual Hamfest on the week-end dated September 26 and 27, 80 amateur experimenters, together with many other visitors from all parts of N.S.W. being present. The delegation from the Lakemba Radio Club consisted of 2CY, 2EH, 2IC, 2JT, 2QX and 2XM. Those who attended were high in their praise of the very excellent efforts of the Newcastle organisers, details of which are contained in the following notes supplied by the Club Secretary, Mr. R. J. Glassop (2RF).

The Newcastle Club is the only organised body in Australia to have held an affair of this kind, and a special committee of the following members carried out the necessary organisations:— Messrs. Grimmett (2ZW), (President); Fairhall (2KB); Glassop (2RF); Tarrant (2UF); Cowell (2SO); Cowan (2ZC) and Rossell. Visitors first commenced to arrive at Newcastle on the Saturday afternoon, and after being booked in at various city hotels, were driven to Sandgate to inspect "B" class station 2KO.

At 8 p.m. a dinner was held at the Orient Hotel. Many leading officials, together with well-known experimenters of the W.I.A., were present, including Messrs. Moore (2HZ), (Federal President); Peterson (2HP), (State President); Caldecott (2DA), Bischoff (2LZ) and Colyer (2EL). Representatives of all the Sydney Radio Clubs also attended.

The New Regulations

In the speeches which followed,

Mr. Grimmett welcomed all those present and expressed himself as being extremely gratified at the very large attendance. Mr. W. M. Moore spoke about the new regulations imposed on amateurs, and stressed the point that the amateur organisation has at last been made a self-governing body; also, that the new rules have only been arrived at by careful consideration of prevailing conditions on the amateur bands, after a conference with the Chief Radio Inspector and the amateur radio leaders.

Mr. A. Fairhall gave an interesting talk on his recent tour of the U.S.A., where, he stated, almost everyone engaged in such occupations as broadcast engineering, electrical trades, sound recording, etc., were in possession of amateur licenses. This certainly pointed to the fact that as radio develops in Australia, there will be ample opportunities for amateurs who desire to carry their hobbies further.

Lecture on New Phillips Valves

An illuminating lecture was delivered by Mr. W. Stewart (of Messrs. Philips Lamps A/sia Ltd.) on the new series of valves brought out by his company, as applied to short-wave reception. A vote of thanks was proposed to donors of prizes by Mr. R. J. Glassop, who requested all present to deal as far as possible with the firms concerned. Mr. Stewart also spoke, and touched on a number of subjects, chiefly the urgent need for the imposition of the new regulations.

At 9 a.m. on Sunday morning visitors and local members assembled, and were driven off in two parties,

Amateurs Spend Enjoyable Week-end :
Trips and Competitions for Everybody :
Week-end Tests on 5 Metres : "Hams" of
Yesterday : Lakemba Radio Club Notes
and News.

By W. J. P.

one to go direct to Belmont to visit the John Darley mine, and the other to follow the same procedure after an inspection of local amateur stations 2ZC and 2KB. The frequency measuring equipment at 2KB is claimed to be the most accurate in Australia. Visitors were impressed by their inspection of the John Darley mine, which is most up-to-date in its equipment, and after an interesting morning were driven around the shores of Lake Macquarie to a luncheon at the Hotel Toronto.

Returning to Newcastle, the climax of the week-end was reached when a number of interesting competitions were held, in which everyone was given a chance of collecting some of the £36 worth of prizes available. The prize list, besides being large, consisted of articles which are dear to the heart of all "hams."

The following is a list of the donors, who by their generosity, greatly assisted in making the hamfest the outstanding success it was:—Colville Equipment Co.; David Jones; Electricity Specialty Mfg. Co. Ltd.; Electronic Communications; Ever-Ready; Elsum Printing Co. (Melb.); Fox & MacGillycuddy; Lekmek; Lawrence & Hanson Elect. Co. Ltd.; Mullard; Philips; Price's Radio Service; R.C.S.; Stromberg-Carlson; Slade's; W. G. Watson & Co. Ltd.; also Messrs. Chapman (2OC); Howden (3BQ); Levensliel (2TX); and VK2LZ, QSL Service.

Variety of Competitions

In the first competition a superhet circuit was handed to each person, and those finding the most mistakes were G. Young (2FN) 1st; L. T. Swain (2CS) 2nd. This was followed by three code receiving contests, the first being a speed test at about 30 words per minute. (2AV 1st, 2XP 2nd, and 2QR 3rd). The second consisted of

receiving through heavy interference, (2ZK 1st, 2EL 2nd, 2OR 3rd), and the third, of "alphabet soup," or jumbled letters (2WU 1st, 2QR 2nd, and 2BZ 3rd). The next competition was an epitaph to a dead "ham." This was won by J. Honman, with 2QX 2nd and 2DA 3rd.

A simple transmitter was then partly dismantled, and those making it work in the quickest time were 2OU 1st, 2WU 2nd, and 2MT 3rd. Visitors were then allowed half a minute to gaze at a box containing small radio parts. 2FN won by remembering the most articles, with 2CS 2nd, and 2BZ 3rd. A prize for the "ham" coming the furthest distance was awarded to Mr. A. Doolan of Orange.

Two sentences were then shown containing hidden country prefixes. The most were found by 2YL, with 2DG 2nd and 2XT 3rd. An announcing competition for those fancying their ability before the "mike" was won by 2EH (Lakemba) with 2AT, 2nd. 2JX was the closest in selecting the frequency to which an L/C circuit was tuned, 2EL being 2nd and 2BJ 3rd.

Prizes were presented during tea, and the hamfest finally concluded. All visitors voted it a splendid weekend in every way, and commended the Newcastle Club on its initiative and organisation.

.3 Watt Telephony

Some rather surprising results were obtained with low-powered receiving and transmitting apparatus by 2CL, 2OD and 2DL at a recent week-end camp at Cattai Creek, Glenorie (near Windsor, N.S.W.). A portable 'phone transmitter was installed in the camp, while a tapped hertz aerial was strung between two trees.

Despite the fact that there were hills all around, VK2, 3 and 4 stations were worked with the greatest ease, using .3 of a watt input on telephony on 40 metres, the maximum "B" voltage being 90 volts. The various "hams" worked expressed great surprise at the strength of the signal for such low power.

Furthermore, the campers themselves were astounded with the early morning DX audible on their two-valve receiver. North and South African stations were heard at remarkable strength, while the band was alive with European and foreign 'phone. Many of these bush locations are excellent for receiving and transmitting, the trouble being that the power available for transmitting is usually very limited.

★

The "Hams" of Yesterday By Chas. Luckman, VK2JT

In continuing with some further

sidelights on the old-timers of the "ham" game it would be well to mention that many of the calls given, in these notes are not held by the original owners to-day. This is mentioned in order to eliminate any misunderstanding which may arise.

In the first of these articles last month, I mentioned 2SH of Newcastle and his good DX. I would like to couple both 2CS, **Lionel Swain**, and 2MS, **Max Spitzkowsky**, to the Newcastle gang. 2CS is not so active these days, but says he will be making a noise shortly. 2MS, when he first started about 10 or 12 years ago, worked some very good DX on 40 and 80 metres. Max is now engineering at "B" class station 2KO, and in his spare time is building, in conjunction with **Alan Fairhall**, 2KB, a very fine standard frequency outfit. It was the writer's pleasure to view this apparatus on the occasion of the recent Newcastle Hamfest. "Hams" generally will soon have their frequencies checked gratis to an accuracy of two parts in one million.

2IJ. Some years ago **Jack Gray** was a raw high school lad just in possession of his call sign—and a rather squeaky voice on 'phone! Nevertheless, he carried out some very interesting experiments in DX. After a long absence, Jack can now be heard chasing DX on 20 metres.

(To be continued next month)

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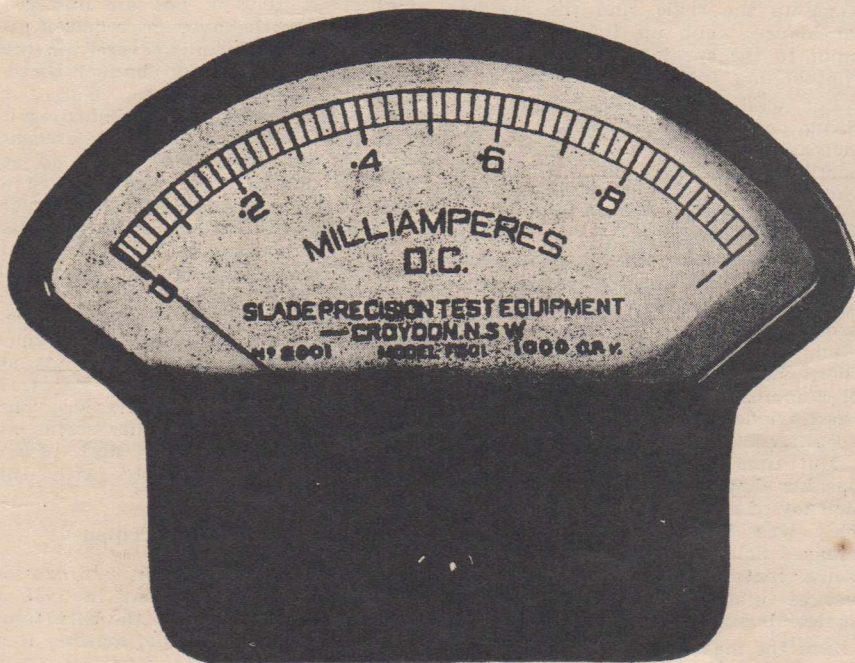
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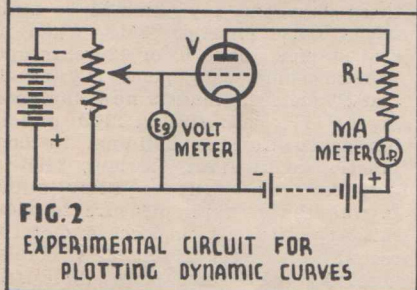
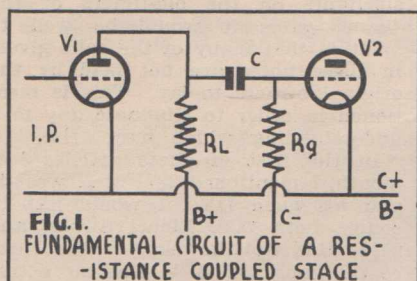


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This Pentode Business

A new light is thrown on the old pentode versus triode controversy by this article, which proves that where distortionless amplification is required, there are applications in which pentodes are definitely superior to triodes.

By "THIRD GRID"

A SHORT time ago the writer was chatting with the chief engineer of a well-known broadcasting station, about some new speech amplifying equipment which he intended to instal. Cost was, of course, a primary consideration in its design, and he had decided to use high gain triode valves with resistance-capacity coupling where possible, to retain fidelity without the expense of high quality transformers. I was bold enough to suggest the application of pentode valves under the same conditions. He replied that all his experience with pentodes had shown them to over-accentuate the higher frequencies, and introduce strong harmonics up to the nth!

The story is typical. Most practical engineers have regarded all pentodes with grave suspicion since their introduction about eight years ago. There is much justification for the point of view. Triple grid valves were originally offered to the trade to provide more milliwatts of audio output for a limited few watts input of battery power.

Most of us remember those early moving coil speakers, so lacking in top end response. Much of their high note loss was due to their very high impedance at higher frequencies. This itself, was due, in part, to the great mass of moving parts; the heavy cone and coil assembly. Electrically it represents a highly inductive load, whose reactance becomes inordinately high at high frequencies. Elementary electrical theory teaches us that for greatest power output, the impedance of the load must be equal to the impedance of the source, whether it be a battery, generator, alternator, rotary converter, transformer, valve, or any other power converting device. (Note that generators convert mechanical to electrical power, batteries convert chemical to electrical power, valves con-

vert D.C. to A.C. power, and so on).

The familiar old triode was generally chosen to work into a nominal load impedance of about twice its internal, A.C., or plate resistance. As the impedance of the load increased, it departed more and more from being equal to the valve impedance, and the power fed to the speaker fell off at higher frequencies.

Then came the pentode. Its impedance was much higher than that of the speaker, but it was found that the greatest undistorted power output was realised with a load impedance about 1/10th of its plate resistance. As one went up the scale, and the speaker impedance went up too, the power input to the speaker rose, for it was approaching the valve impedance.

But while the speaker input was rising, so was the distortion, and with increasing proportion. However, the poor old speaker cone was too fat and lazy to bob about so quickly, and its sound output, rather than rising, fell off somewhat, but not as severely as was the case with the triode. The distortion didn't worry us much either because the speaker wasn't able to reproduce the high harmonics generated. The result of it all was that those early pentode-moving coil speaker combinations sounded much better than triodes with the same type of speaker.

But time marched on, and so did speaker development. The acoustic efficiency of speakers at higher frequencies was improved greatly by increased field excitations, smaller gaps, better matching transformers, and the use of lighter, and equally stiff cone materials.

But the mass of material, while less, was still sufficient to cause a steeply rising impedance characteristic against frequency. The net result of course, was that the high notes sounded out of balance, and the distortion

of the middle frequencies, now reproduced, made them sound reedy and harsh. Triodes became accepted as ideal valves for output stages. "Pentode Tone." Ugh! America scorned it—would not use it at any price. It took R.C.A. four years to decide for or against that "bottle of distortion," as it had been dubbed. But its relatively large output at ordinary plate voltages pulled it through, and its high power sensitivity made it the popular choice for the output stage in receivers, even to this day.

With ordinary domestic speakers, it still tends to over-accentuate the highs, but that is not an unmixed blessing, for the average receiver attenuates the sidebands severely in the intermediate frequency channel, thereby suppressing the highs.

Its worst feature is the distortion it causes on higher frequencies. Recent experiments have shown there to be as much as forty per cent. of second harmonic present at 1000 cycles per second when the output was at its nominal maximum (5% distortion) level. There are however, some loudspeakers with almost level impedance characteristics. One English model has a voice coil impedance of 36 ohms at 400 cycles, and only 50 ohms at 8000 cycles. Its price, however (£17 in U.K.) prohibits its popular use. The most direct route to fidelity seems, at present to lie along the high power triode course, preferably with the push-pull arrangement.

High Resistance Pentodes

We must not forget in our consideration of pentodes, that in 1931 a third grid was added to the then familiar screen grid tetrode, making it a pentode.

The superiority of the new type was accepted immediately by all engineers. The gain had been increased, the plate to grid capacity had been reduced,

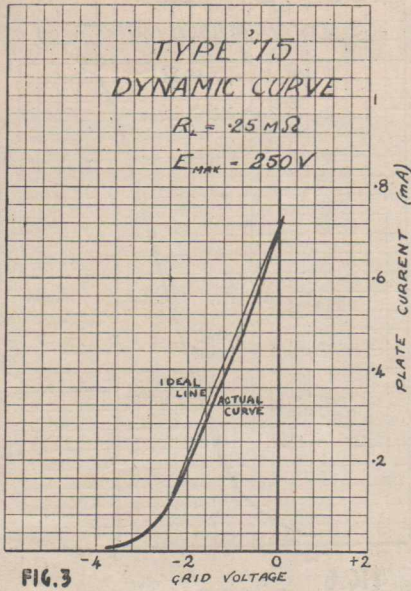


FIG.3

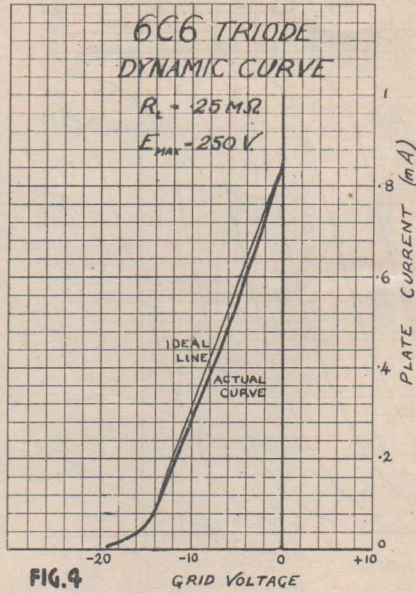


FIG.4

and the higher plate resistance had reduced damping, thereby enhancing selectivity—all in one sweep. We all realised that by resistance coupling such valves we could realise higher audio frequency gains than were possible with transformer coupled triodes, and we began to apply 57's in audio stages. The introduction of diode pentodes was a further help, and 2B7's found their way into many commercial receivers.

Where Pentodes Are Superior To Triodes

But there remained that old "pentode tone" complex, and many designers hesitated to use pentode resistance coupled stages in high fidelity equipment. Resistance coupling? Yes, but pentodes? No! Why not? Working into a straight resistive load, as a voltage amplifier, a pentode has no right to boost the highs any more than a triode should. Experimental results bear out that fact.

Actually, it is possible to prove, both mathematically and experimentally, that the fidelity of frequency is better with the pentode than with the triode. Some of you won't believe me, I know, but I shall try to prove it.

The proof. Most of you have seen the formula that the stage gain:

$$m = \frac{\mu}{1 + \frac{R_p}{R_l}}$$

- where m = stage gain
- R_p = Plate resistance of valve
- R_l = Load resistance

And since μ , the amplification factor

is the product $G_m R_p$, where G_m is the "slope," then

$$m = \frac{G_m}{1 + \frac{R_p}{R_l}} \tag{1}$$

In fig. 1 is shown the skeleton circuit of a single resistance coupled stage. At high and medium frequencies the condenser C offers practically no barrier to the current, and the load on the valve is represented by the resistors R_l and R_g in parallel.

At low frequencies, the reactance of the condenser becomes considerable, and only a portion of the voltage across R_l is applied to the grid of V₂. Also, the total load impedance becomes greater.

Returning now to the equation (1), if R_l is much greater than R_p, as in the case of triode amplifiers, small changes in R_l make very little difference to the stage gain. On the other hand, in the pentode amplifier, R_p is much greater than R_l, and small changes in R_l make quite a difference to the gain. If you don't believe it, try it with ordinary numbers for yourself.

Thus, when the reactance of C rises at low frequencies, the audio frequency plate voltage, while remaining practically constant in the case of the triode, increases considerably in the pentode amplifier. Such a reinforcement can never completely compensate for the loss in the condenser C, but it does help, and it helps more with pentodes than with triodes.

Pentodes Best on Highs, Too

At the higher end of the frequency

spectrum, other factors enter the field. There are capacities within the valve from plate to cathode, from grid to cathode and from grid to plate, and outside the valve, between socket contacts, wiring, etc., all of which tend to by-pass some of the power produced, and reduce the voltage across R_g.

Of them all, the capacity between grid and plate is the worst offender, as it tends to hand back to the grid some of the plate power in the wrong direction, thereby reducing the actual grid signal voltage. It can be proved that the shunting capacity at the grid, within the valve, is equal to the sum of the grid to plate capacity multiplied by one less than the actual gain of the stage, and the grid to cathode capacity. That is

$$C_{input} = C_{gk} + (m-1)C_{gp}$$

where C_{gk} = grid-cathode capacity
and C_{gp} = grid to plate capacity.

In pentode valves, the term (m-1)C_{gp} is much less than that of triode valves, and it is much higher in high gain (high resistance) triodes than in low gain (low resistance) triodes.

So it appears then that the high impedance pentode of the 6C6 class is definitely superior to any triode on grounds of its better (wider and flatter) frequency response.

The Question of Distortion

Let us now consider the distortion question. A perfect amplifier would produce a voltage at the grid of its succeeding stage in exact proportion to the voltage applied to its own grid. As we are dealing with almost purely resistive loads, according to Ohm's law, the plate current should also change in direct proportion. If then, we draw a curve showing the relation between grid voltage and plate current with a resistance as the plate load (see fig. 2), we are able to see just how much our amplifier departs from the ideal.

Fig. 3 and fig. 4 show the relationship for the types 75 and 6C6 (triode working) with .25 megohm loads. The permissible plate current swing is seen to be much greater in the case of the low gain triode, with a consequential increase in output voltage. The departure from the ideal (straight) line, is seen to be much the same in each case, but it is important to remember that more stages of low gain amplification are necessary to obtain the same lift as the high gain amplifier, and as each introduces its own share of distortion, the 75, for low output may be superior.

When we try to draw out a similar curve for a pentode stage, we find that there is another voltage which we may alter—the screen potential.

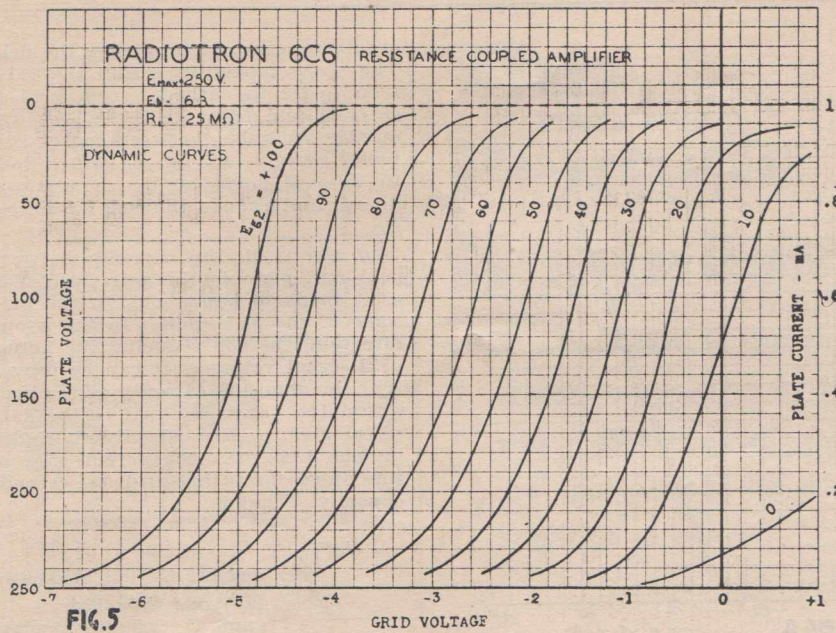


FIG. 5

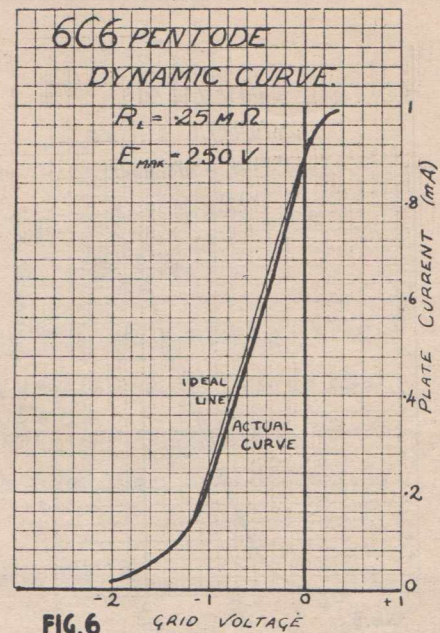


FIG. 6

Fig. 5 (reproduced by courtesy Amalgamated Wireless Valve Co. Ltd.) shows a set of curves each taken at different screen voltages, for a 6C6 (pentode working).

Cost Considerations

It is always economical to keep the bias voltage as low as possible, for it has to be supplied in some way, either by battery, separate power supply, or by some self-biasing arrangement. Batteries cost money, and smaller batteries cost less. Self-bias reduces the effective plate voltage. The most likely curve, then, is that at 20 volts screen potential, when one may realise the full benefit of the straight part of the line, with minimum bias.* It must also be made clear that the bias requirements for pentode valves are less than those of triodes—another saving.

Fig. 6 shows a straight line superimposed on the 20-volt curve. The departure is no more than that of the triodes, and the output is equal to that of the low gain amplifier. Furthermore, the gain is greater than that of the high gain triode, so there are very few faults to find in any argument.

The screen voltage must be dropped by some resistor arrangement, which must be by-passed. The cost of the two extra parts is indeed offset by the multitude of advantages of the system.

Thus, it has been proved that the pentode bogey exists only in output stages; it is fictitious in all other applications. Where high fidelity is required, resistance coupled pentode stages are well worthy of consideration.

* Editor's Note.—Care should be taken to avoid grid current, and so slightly higher screen and bias voltages may be advisable.

Improved Speaker Plug

An excellent speaker plug can soon be improvised by sawing down a valve base having the necessary number of

pins. Solder the leads in the pins and finish the job off neatly with some sealing wax, covering the solder joints.

“PALEC” VALVE TESTER

A.C. Portable Type

Tests all standard valves, English and Octode types. Subjects each element of A HOT valve to a micro leak test. Portable type - £11/10/-

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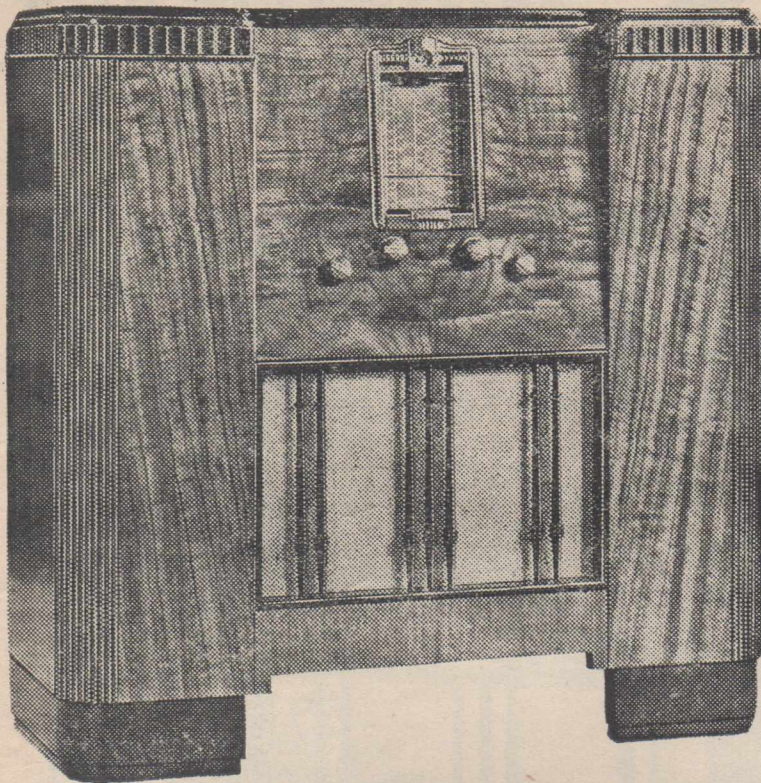
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Acoustical Labyrinth in New Stromberg Carlson Release



The new Stromberg-Carlson Model 837—an eight-valve dual-wave superhet fitted with an acoustical labyrinth.

THE editorial prediction made in the July "Radio World" that Australian set manufacturers would be concentrating on better tone in next season's sets has already been borne out by several latest releases, which have obviously been designed for high quality reproduction. Prominent among them is the new Stromberg-Carlson Model 837 eight-valve console dual-wave superheterodyne.

Apart from many other new features that on their own would place this set among the leaders for general all-round performance, the Model 837 is fitted with a special acoustical speaker labyrinth, for which Messrs. Stromberg-Carlson hold the exclusive Australian rights.

Tone Exceptionally Good.

Demonstrated alongside the well-known Model 736, one of last season's best-sellers in the console class, the superiority of the new labyrinth-equipped 837 is very marked. There is a complete absence of cavity resonance in any form, every note in the low, middle and high registers being reproduced with a richness and fidelity that is startling in its naturalness.

A Well Tested Development.

The acoustical labyrinth is not a new development, as it was announced in America several years ago, and has been fitted as standard equipment in the higher-priced Stromberg-Carlson receivers over there for some time.

Its introduction in this country in the Australian-built Stromberg-Carlsons represents an important step forward towards the attainment in locally-made sets of the ideal in radio reproduction.

How The Labyrinth Works.

It is well known that if a speaker is played without any baffle at all, reproduction becomes lacking in bass. To reproduce low audio frequencies, some form of baffle is necessary to act as a partition between the front of the speaker diaphragm and the back in order to increase the length of path the sound waves generated by either side of the diaphragm must travel to reach the opposite side. Otherwise a neutralising action takes place, resulting in loss of bass response.

The larger the baffle, the lower becomes the limit of audio frequen-

Exclusive Feature in Console Model 837 ensures High Fidelity Reproduction with Entire Lack of Cabinet Resonance.

Here is where the first important factors that can be reproduced. For example, for effective 100-cycle reproduction, a baffle approximately 5 feet square is needed, while for full 80-cycle response, a baffle over 6 feet square becomes necessary.

advantages of the acoustical labyrinth over the baffle represented by the usual console cabinet, becomes apparent. In effect, the labyrinth is like a big baffle board folded over and over into a small space (see Fig. 2). It increases the shortest path by which air can travel from front to back of the loud speaker approximately three times over console and five times over table models. It packs the equivalent sound path length of a 7ft. x 7ft. baffle into the space only of a 13in. cube.

Elimination Of Cavity Resonance.

Just as important as the increase in effective baffle area provided by the labyrinth is the entire elimination of cavity resonance. The sides, top and bottom of the average radio cabinet form a box-like cavity into which the rear of the loud speaker discharges sound. This enclosure has a modifying effect on the sound, giving it a "boomy" or "tubby" character. The effect is accentuated when a radio is placed in its usual position against a wall, thus more completely boxing up the back of the loud speaker.

The labyrinth, however, fills up the usual space behind the speaker, absorbs most of the sound waves generated by the back of the diaphragm, and conducts the rest out of the bottom of the cabinet without cavity resonance. Actually, bass response from a set employing a

(continued on page 26)

Amazing
AS THE MIRACLE
OF RADIO ITSELF

Stromberg



*...with wonderful new features
exclusive to Stromberg-Carlson*

In this new model, Stromberg-Carlson present the finest reproduction of speech and music ever made available outside of acoustical laboratories. In addition this wonderful instrument brings to you all the programmes from Australia and New Zealand and countless foreign stations operating on the 16-, 19-, 25-, 31- and 49-meter short-wave bands. Its features include:—

1. The Acoustical Labyrinth for tonal fidelity, such as has never before been possible.
2. Concert Grand Cabinet.
3. Isolector Tuning Unit for amazingly simple tuning and dead line selectivity.
4. Special type Tone Control.
5. Tru-tone Compensation.

6. Magic Eye, with special circuit to operate on any station the set will receive both on the broadcast or the shortwave band.
7. Edge-lit Rectangular Vertical Non-slip Dial.
8. Special speaker designed for the Acoustical Labyrinth.
9. Iron-cored Tuning Coil for extra-high efficiency.
10. Gramophone pick-up terminals and three-way switch—Broadcast, Short-wave and Radio-Gramophone.
11. Specially imported Condor Valves.
12. 8-valve Superheterodyne circuit for Dual-wave operation.

PRICE

39 GNS.



Carlson announce

MODEL 837 incorporating the sensational

ACOUSTICAL LABYRINTH

INCORPORATED in the magnificent new Stromberg-Carlson world-range receiver—**THE CONCERT GRAND**—is radio's most important invention—the amazing Acoustical Labyrinth.

It brings you perfect Tonal Faithfulness for the first time in the history of Radio—thrilling realism in all registers and at all volumes. It is as if a familiar photograph were suddenly reproduced in full colours, giving new life to the portrait, bringing out new perspectives, new and delicate shading. Only in this simple way—without going into technical language—can an impression of the full marvel of this great invention be conveyed.

The Acoustical Labyrinth is an invention developed in the American and Canadian laboratories of Stromberg-Carlson, and it overcomes, for the first time, the distortions introduced into radio reproduction by cabinet resonances and speaker deficiencies.

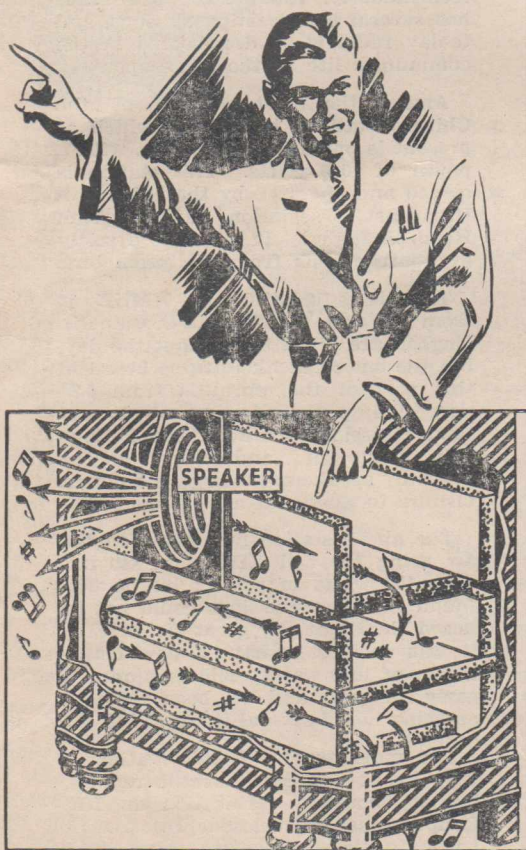
The specially-designed and patented Labyrinth controls sounds coming from the back of the loud-speaker, prevents them from spreading all over the back of the cabinet, and actually guides them out of the cabinet, through the bottom. When they mingle with the sounds from the FRONT of the loud-speaker they produce a perfect balance of the high and bass notes.

When listening to the Concert Grand

note particularly the rare brilliance of high frequency (treble) tones which brings out qualities in instrumental reproduction that you have not heard before in radio without sounding high pitched. At no time do the bass notes sound "tubby" or "boomy."

Ample, undistorted volume gives vivid living colour to the reproduction without sounding too loud, and each note is heard perfectly in every part of the room.

Ask your nearest authorised Stromberg-Carlson dealer to demonstrate the Concert Grand in your own home and judge for yourself the improvement this great invention makes. You'll be truly amazed that a receiver of such accomplishment can be obtained for only 39 guineas.



THERE IS NOTHING FINER THAN A STROMBERG-CARLSON

labyrinth is improved by placing the receiver against a wall.

Reinforced "Lows" And "Highs"

Still another interesting feature of the labyrinth lies in the fact that it permits the design of a single speaker to give a fidelity of reproduction that with an ordinary baffle, no matter how large, cannot be obtained without the use of two or three speakers, each designed to give faithful reproduction over a different range of audio frequencies.

With the ordinary speaker, the air load on the diaphragm is very small at low frequencies. Unfortunately, this is just where the greatest load is needed, and so it has to be artificially supplied by making the cone suspension fairly stiff. Otherwise, on low notes the voice coil would strike the pole piece and rattling would result. At the same time, this stiffening of the suspen-

sion to take care of low note response restricts reproduction of the high frequencies, where freedom of movement of the diaphragm is essential for faithful reproduction.

When a labyrinth is used, however, it provides a large air load of the resistance or energy-absorbing type somewhat similar in action to the shock absorbers of an automobile. This permits a flexibly suspended cone to be employed without danger of striking on low notes, and also makes it practical to use high output power, driving the loud speaker far beyond the volume at which it would otherwise overload and rattle.

In the labyrinth used in the latest Stromberg-Carlson consoles, the "lows" are specially reinforced by designing the labyrinth to resonate like a broadly tuned organ pipe at the bottom of the register.

Again, because the air column load on the speaker cone relieves the speaker designer from the necessity of providing unnecessary mechanical damping in the moving parts of the speaker, the latter can be designed to respond accurately and smoothly to the high frequencies.

Elimination Of Microphonic Effects,

One final advantage of the acoustical labyrinth is that it eliminates all microphonic effects, due to sound waves from the speaker causing mechanical vibration of the chassis, valves and condenser gang.

XMHD—a Popular Chinese Broadcaster

By J. R. Bain

BROADCASTING in

China is still in its infancy, though since 1932 great progress has been made. At that time there were about 20,000 receiving sets in China, and since then the number has increased tremendously. Each of the main cities has several broadcasting stations, and to-day radio is as deep-rooted in the community life as the newspaper.

Among the most popular of the Chinese stations is XMHD, which at present is operating on 840 k.c. with a power of 1000 watts. This station is owned and operated by the "Christian Broadcast Association," 128 Museum Road, Shanghai. It is financed solely by contributions from the promoters.

The daily schedule of XMHD is from 7.30 a.m. till 10 p.m. Sessions in English are given throughout the day, but the one most likely to be heard in this part of the world is from 9.30 p.m. till 10 p.m., their time. This particular session is called "The Fellowship of the Air," and as well as the regular speakers, many prominent visitors to Shanghai are introduced.

The above station first came on the air using the call XHHA on 840 k.c. with 150 watts of power; but it was found that transmissions could not be heard clearly at any great distance, so it was decided to have a new transmitter of 1000 watts. This was opened early this year and has been reported as being heard several times in N.Z.

The management of this station is very keen to receive distant reports, but to ensure a verification an I.R. Coupon must be enclosed. In a recent letter to the writer they state that they intend changing to 1420 k.c. within a few months, so it would be advisable to watch both frequencies.

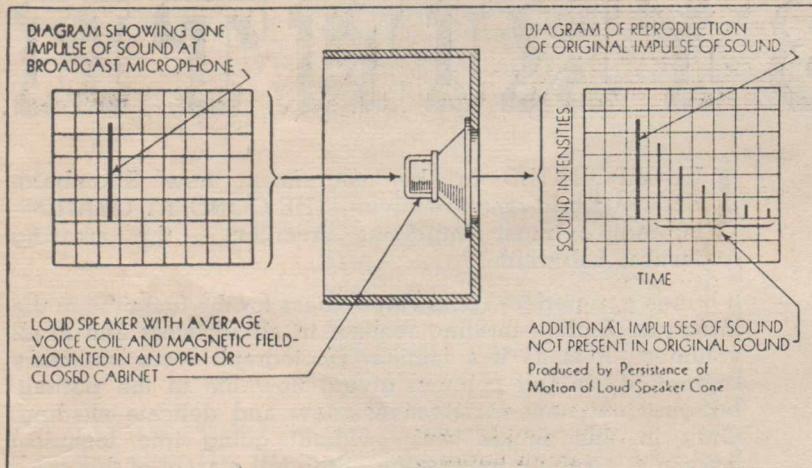


Fig. 1—This diagram illustrates the type of distortion given by ordinary radio receivers, due to persistence of motion of the speaker cone. Reproduction in consequence tends to become blurred.

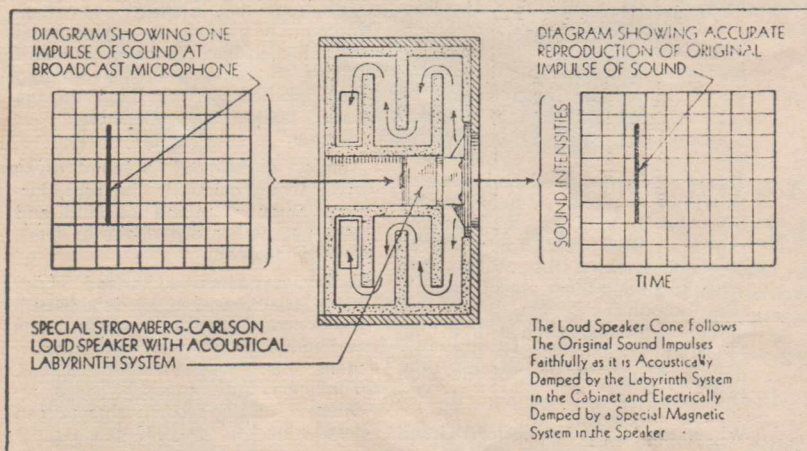
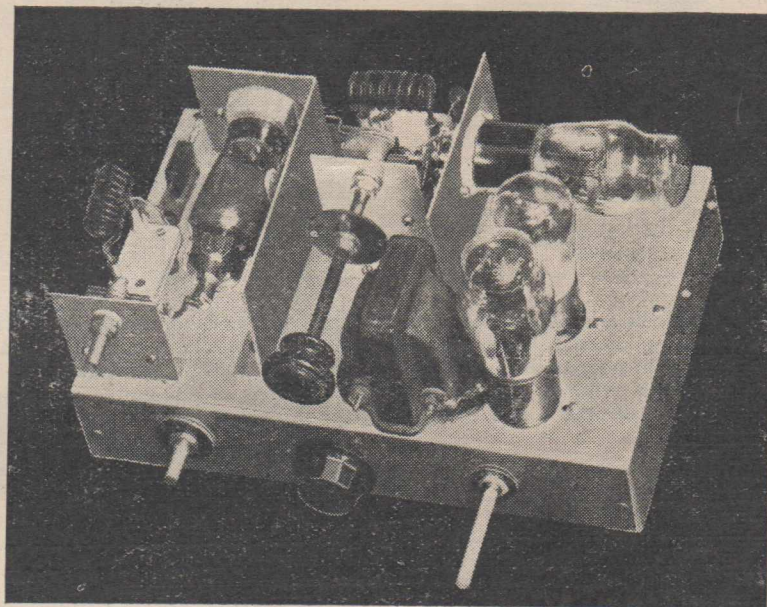


Fig. 2—This sketch illustrates the natural, clear-cut reproduction given by a receiver fitted with an acoustical labyrinth and special speaker. Persistence of motion is entirely eliminated.

A Super-Regenerative Five-Metre Receiver

Join the rush down to 5 metres this summer by building this 4-valve, which because of its regenerative r.f. stage has far more punch and selectivity than the average five-metre receiver of its type. Designed and described by

VK2MQ.



THE design of ultra-high frequency equipment always requires elaborate care, because at these frequencies, tiny stray capacities that can be disregarded in ordinary shortwave and broadcast receivers become all important. A long, poorly-spaced plate or grid lead can mean heavy signal loss, due to the tiny by-pass capacities formed between the lead and others nearby, and the chassis.

This fact was kept fully in mind while the four-valve 5-metre receiver described below was being designed, so that on the r.f. side there is not a single lead that is more than an inch in length! The result is that even though a regenerative r.f. stage is used, the set is perfectly stable, and gives excellent gain.

The Circuit Outlined.

So far, the super-regenerative detector has proved its superiority over

all other forms of detection for the ultra-high frequencies, and so it was incorporated in this set, one section of a 53 being employed to provide detection and the other to act as a separate quench oscillator.

Stable Super-Regeneration.

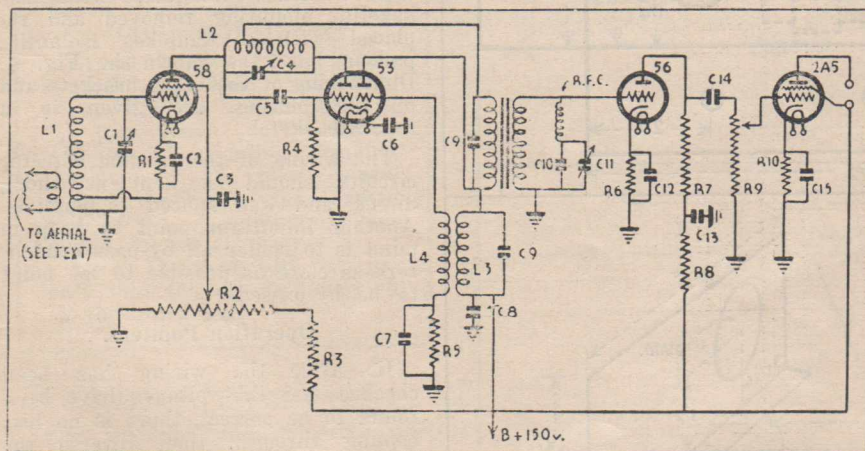
Anyone who has built a super-regenerative receiver is acquainted with the various forms of instability which may result from improper adjustment of the circuits. It has been found that instability in the plate quenched detector is very frequently caused by a self-quenching action of the detector at a sub-harmonic of the plate quenching frequency.

This phenomenon can be demonstrated usually with the super-regenerative circuits using split tank input tuning with a variable condenser between coil sections. However, the Hartley oscillator used in the receiver illustrated was found to be essentially free from this trouble.

R.F. Regeneration Useful.

The single regenerative r.f. stage is a valuable feature of this receiver. It improves signal-to-hiss ratio for weak signals, isolates the detector tuning circuit from the aerial, thus preventing radiation and eliminating tuning difficulties, and finally greatly improves selectivity. Regeneration in the r.f. stage is controlled by varying the voltage on the screen of the 58.

In the circuit diagram, L3 and L4 are the windings of the interrupter



The circuit of the super-regenerative 5-metre receiver. R1=500 ohms, R2=50,000 ohm potentiometer, R3=25,000 ohms, R4=2 megohms, R5=10,000 ohms, R6=3,000 ohms, R7=100,000 ohms, R8=10,000 ohms, R9=100,000 ohms potentiometer, R10=400 ohms wirewound. C1=15 mmfd. variable, C2 and C3=.006 mfd., C4=15 mmfd. variable, C5=.00005 mfd., C6 and C7=.006 mfd., C8=4 mfd., C9=.002 mfd., C10=.00025 mfd., C11=7 plate padder, C12=1 mfd., C13=.5 mfd., C14=.01 mfd. mica, C15=10 mfd.

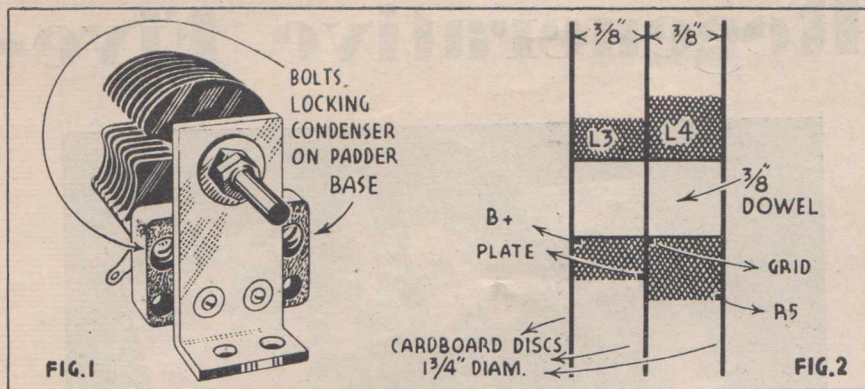


Fig. 1—This sketch illustrates a simple way of assembling an isolantite-insulated tuning condenser from an ordinary Radiokes midjet variable condenser and a padder base of the same make. Fig. 2 shows how the interrupter coil is wound. L3 consists of 800 turns of 36 gauge d.s.c, and L4, 1,400 turns of the same gauge wire. Both windings are put on in the same direction.

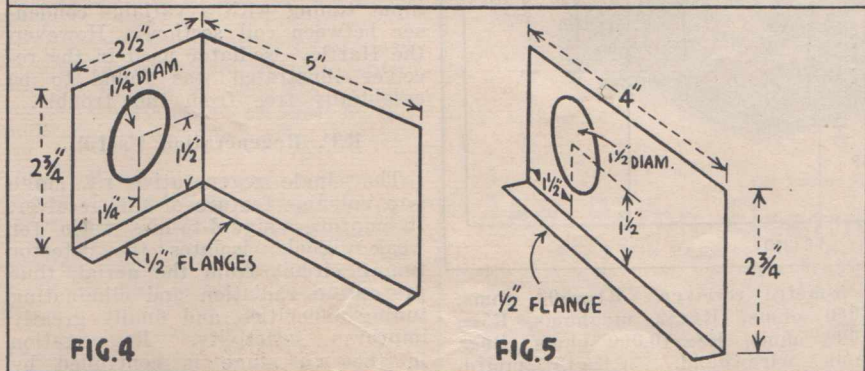
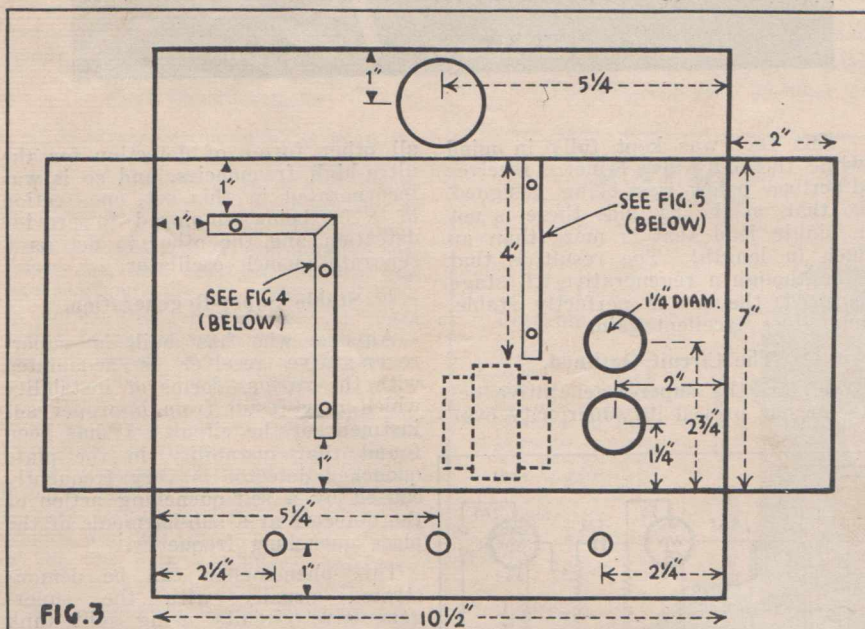


Fig. 3—Full dimensions for preparing the chassis are shown in this sketch. Details of the two brackets are given in Figs. 4 and 5.

coil, and details of its assembly are shown in Fig. 2.

Trap Circuit For Hiss.

The r.f. choke connected across the secondary of the audio transformer, in series with the two condensers C10 and C11 in parallel, comprise a trap circuit operating at the quenching frequency. It is a worthwhile improvement for reducing hiss, though it is not absolutely essential. The choke should have an inductance of at least 90 millihenries, while C10 has a capacity of .00025 mfd. and C11 is a 7-plate padder. The padder is set for minimum hiss level.

A point worth mentioning here is that after a very careful test, it was found that there was no noticeable change in sensitivity with or without utilising the separate interrupter frequency oscillation, but with it the hiss level is very low and can be adjusted to the desired level without any apparent loss in sensitivity.

The audio amplifier is quite conventional, and comprises a 56 resistance coupled to a 2A5 to provide speaker operation. If headphone operation only is required, then the 2A5 can be dispensed with.

Some Assembly Hints.

Details of the assembly are contained in the photographs and diagrams accompanying this article. Steatite sockets are used for the 58 and 53 because of their excellent insulation, which is a vital point in ultra high frequency work. Ordinary sockets can of course be used for the two audio stages.

Isolantite Tuning Condensers.

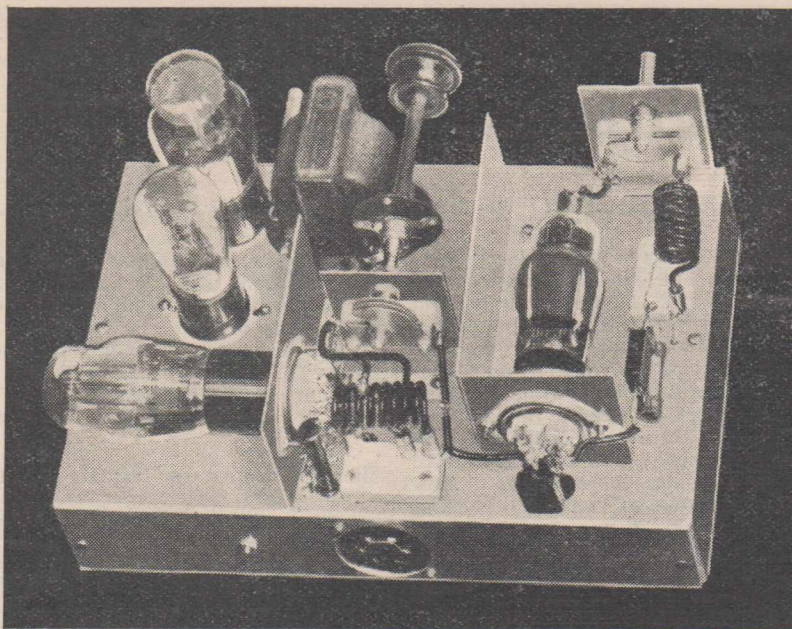
The tuning condensers are ordinary Radiokes midjets, with the bakelite mounting removed and replaced with a Radiokes isolantite padder base, as shown in Fig. 1. Dimensions of the other brackets and of the chassis are given in a separate sketch.

The wiring of the r.f. and detector circuits should be kept as short, direct, and well spaced as possible. Another important point to keep in mind is to solder all by-pass condensers as close as possible to the point to be by-passed.

Operation Pointers.

If, after the wiring has been checked and the voltages have been found to be correct, there is no hiss coming through, then reverse the connections to one of the windings on the interrupter coil (the inside of one winding goes to grid, and the inside of the other to plate, provided both windings are put on in the same direction).

The r.f. stage should never be allowed actually to oscillate, as block-



A rear view of the completed set is shown above.

ing of the detector will result. Instead for greatest sensitivity, the r.f. regeneration control should be adjusted so that the 58 is just on the verge of oscillation.

Three of these receivers have been built and are now operating around Sydney. All have easily outperformed any other sets using super-regenerative detectors.

If there are any details readers are not sure of regarding the assembly or operation of the set, then any queries sent to the Editor will be answered in a further article next month.

COIL DETAILS.

L1=8 turns 12 gauge enamel 1/2 in. diam., spaced to occupy 1 1/4 in. and tapped at 1/2 turn from earthed end. The aerial coupling winding consists of 6 turns spiral wound, coupled to the earthed end of L1. Coupling is adjusted for best results.

L2 is identical with L1, except that the tap is taken off at the third turn.

A Special 5-Metre Aerial

The matched impedance doublet aerial described by 2EH in the August "Radio World" gives excellent results with this receiver. It consists of an 8-foot length of 16-gauge enamelled copper wire, fed with a transmission line of any convenient length. The feeders are spaced 3 in. apart with wooden dowels boiled in

paraffin wax. The end of the transmission line that is connected to the aerial, is "fanned out" to 28 inches commencing 30 inches from the end. The ends are soldered 14 inches each side of the centre of the aerial.

Mount the aerial vertically and as high as possible. An excellent scheme is to mount it on a frame as shown in the sketch to preserve its correct shape, or else the impedance match-

ing will be upset. The frame is made from 3/4 in. x 3/4 in. timber and then suspended from another aerial 50 feet high.

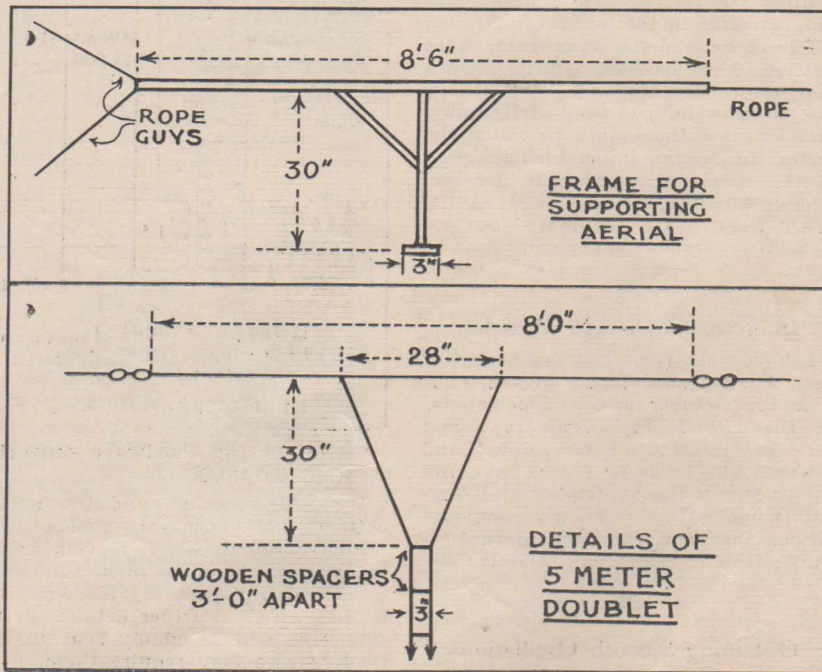
Making an Electric Drill

While forwarding this little tip for the "Radio Ramblings" page in the November issue of the "Radio World," I would like to take the opportunity to congratulate you on your very successful magazine. The "Radio World" is certainly the goods, and I intend to get the issues bound up in volumes of twelve.

Perhaps many set builders have wanted an electric drill but funds wouldn't permit it. Here is a good, cheap way of making an electric drill. I had an old vacuum cleaner motor cleaned, and the spindle threaded to take an old drill chuck. A steel tenon saw handle makes an excellent pistol-grip type handle when bolted to the outer casing. A trigger-grip type switch built into the handle finishes the drill. Do not use a very small motor, such as an electric fan motor, for it may stop when drilling very tough steel—D. S. Oliver (Lindfield, N.S.W.).

List of VK Calls Appreciated

I am a regular contributor to your excellent magazine, and I can tell you I enjoy reading it. Keep up the excellent work and I feel sure the "Radio World" will always be eagerly looked for. The list of VK calls was a godsend.—W. Sievers (East Richmond, Vic.).



Details of a 5-metre doublet aerial, with support, are shown in the above sketch. Both are mounted vertically.

Radio Ramblings

A page for letters from readers.
A prize of 2/6 will be awarded
for every technical tip published.

Lightning Charges a Reader's Aerial

On reading W.J.P.'s article in last month's issue re lightning jumping a six-inch air gap, I was reminded that last week during a sultry day on which there were a few storms about, I heard a loud clicking coming from the set through the speaker while the set was running. It was so annoying that I switched the receiver off, putting the interference down to the power lines although the set is a "B" battery-less Astor.

Later in the day the same noise occurred, so I disconnected the aerial to see if the set itself was O.K. When re-connecting the aerial a spark jumped quite a quarter of an inch to the terminal. I earthed the aerial then, and could hear the sparks jumping across a large block condenser I have in the aerial (I use a "B" eliminator sometimes). The aerial, by the way, is quite clear of any wires on the roof.

There was a storm passing some miles away and I heard only one roll of thunder, but I put the sparks down to the air being charged with electricity at that time, as when the storm passed everything was O.K. again. I have not at present a lightning arrester in the aerial.

I have noticed the same thing once during a very bad dust storm when a high wind was blowing. The sparks in that case jumped across a lightning arrester, and the higher the wind the faster the sparks jumped. The speed of the sparks was about 10 per second, gradually getting slower as the storm went away.—Graham Cumming, (AW1DX), Donald, Vic.

Interested in Service Articles

I have just seen my first copy of the "Australasian Radio World," but it is the October issue. The articles on the cathode ray oscillograph and servicing interest me very much, and I would like to know if you have any copies left of the September and August issues. May I add my congratulations on your excellent journal?—G. W. Robins (Brisbane, Q'land).

Obtaining Smooth Oscillation

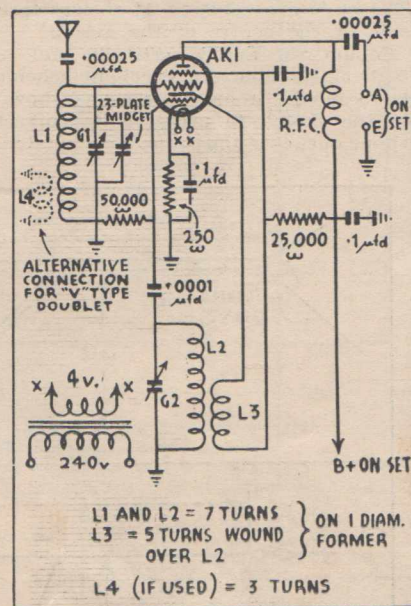
As I have always had trouble with my coils, I finally decided upon this idea to get correct oscillation. The

reaction winding is put on in the ordinary way, but one end only is soldered to its pin. The other is held in position by twisting it round the coil. To the free pin solder one end of a short length of wire, and solder the other end to a sewing machine needle. Dig the needle in the spot where you think oscillation will be best, and repeat this operation until optimum results are obtained. Now remove the unused turns and connect the remaining pin up.

I have a QSL card of my own and am willing to exchange it with anyone else.—Ken Scott (AW10DX), 12 Mitchell St., Stockton, via Newcastle, N.S.W.

One-Valve S.W. Converter

All my DX in the past 12 months has been done on an AK1 converter (circuit enclosed) coupled to a five-



Circuit of the shortwave converter used by AW18DX.

valve B.C. superhet, and the results obtained have been very good.

I have found that it is very handy to have on hand, as it is simple to use for dxing while my S.W. receiver is "hay-wire." Further details on this converter will be gladly sent to any readers who may require them.

Since I mentioned in my last letter that I would be only too pleased to exchange QSL cards with anyone.

many cards have been received from New Zealand and all over Australia—which proves the "Radio World" certainly gets out!

Best of luck to the Club and members.—D. Pearsall (AW18DX), 512 Macauley St., Albury, N.S.W.

Booster Improves Signal Strength

I have not done any real dxing of late, as I have been trying out a few aerials and have at present a 20-metre doublet, 16 feet high with twisted feeders and have found it the best for 20-metre work so far. I have also a "V" doublet which works splendidly from 31 metres up to 100 metres and on the broadcast band, but it is of little use down on 20 metres. I have made quite a few experiments with aerials, and the two I now have are the best.

I am getting some dope from some friends of mine in U.S.A., Canada, Scotland and England on directional antennas, and when I receive the information I will try them all out and let the DX Club members have a report on results.

My set is a five-valve super, using a 2A7 mixer, 58 i.f. amplifier, 2B7 i.f. amplifier, second detector and first audio amplifier followed by a 2A5 pentode, with a 5Z3 rectifier. Power supply is on a separate chassis. I also use a 58 as a Jones' regenerative booster in front of the super. The super and booster are home-made and are American circuits. Members not using a booster are certainly missing something. The circuit and details will be sent along for next month's issue.

After I had assembled it, I tuned in a signal on the super (without the booster) and it was about R3 to 4, but with the booster attached signal strength came up to a good R8.

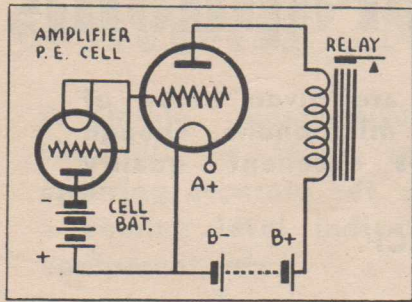
Wishing the club, its members, and the magazine the best of luck—
—Joseph Biscoep (AW5DX), Cronulla, N.S.W.

Home-Made Photo Electric Cell

A photo-electric cell may be adapted for many uses, such as opening doors etc. However, it is rather dear to buy, but here is a simple method of home manufacture.

Hold an old well-silvered 201A valve over a gas or candle flame, so that the glass is heated at a point op-

posite the flat side of the plate; in a few seconds it will be noticed that some of the silver has been driven off the glass, and can be seen settled



on the plate. Continue until about one square inch has been driven on to the plate, when the P.E. cell is ready for operation. The silvering is light-sensitive, and emits electrons when a beam of light is focussed on the plate. The filament and grid are connected and serve as an anode when a positive charge is placed on them.

The accompanying circuit shows an amplifier which operates a relay, and is controlled by a home-made cell of the above type. In order to measure relative light intensities a milliammeter is substituted for the relay. The cell will operate on any voltage between 4 and about 120.—Eric Webb (AW14DX), Mitcham, Vic.

★

“All Wave Two” a Set of Sets!

Well, I have completed my “All-Wave Bandsread Two” described in the September “Radio World,” and believe me it is a set of sets. I would like to ask a question about the rheostat. As I always use an accumulator, could I take the rheostat out and put the 13-plate midget condenser in its place?—H. M. Downes (AW7DX), Macarthur, Vic.

[Yes, this would be quite in order. Glad to know you're getting good results.—Ed.]

★

Reiss “Mike” Details Wanted

In this month's issue of your excellent paper you say that if you are requested to give constructional details of a Reiss “mike” as used at VK2CP you will publish same. Well, here's my vote in favour of it. Apart from being a good idea for we potential amateurs, it should find plenty of uses in amplifying systems in which subject I am also interested, having one using two E442's R.C. coupled to a 45. As well, I have nearly completed one with two 42's P.P. output.

While on the subject of 2CP's transmitter, a constructional article on his transmitter and power supply would be a good feature.

Conditions on 20 metres are pretty

good here, but there is not much doing above 40.

Wishing the mag. all the best.—H. M. Lindsay (AW94DX), Nambour, Queensland.

(Details of 2CP's Reiss microphone appear elsewhere in this issue.—Ed.)

★

Single Valve Converter

The 100 report forms were received O.K. and I have been very busy sending out reports on them. Conditions have been very good here on all bands for the past few weeks, with the 31-metre band at its best. Here are a few stations that can be heard almost every night at excellent strength:—VPD2, 3LR, 3ME, YBD, PLP, ZBW and W2XAF. They are all very entertaining.

On the 25-metre band conditions in the morning are very favourable, and many stations can be heard including the following:—2RO, TPA3, DJD, GSD and W8XK. The 19 and 20-metre bands are also very good now for DX, and quite a number of new stations have been heard operating on them.

Since sending in the circuit of the converter I have made a few alterations. By placing a can over the AK1 valve, making sure it does not touch the valve itself, and by using a shield wire for the aerial output, the performance is improved appreciably. The accompanying photo of



Doug. Pearsall's DX shack. On the left is a dynamic speaker, next a two valve e.c. shortwaver, then his single-valve converter, 5-valve b.c. super. and an A.C. dynamic speaker.

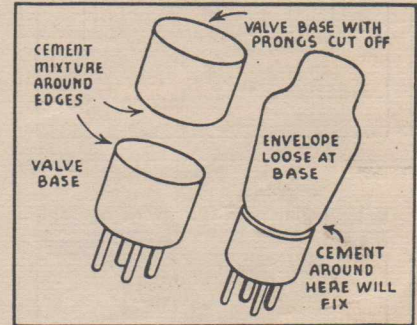
my shack may give the boys an idea of how small the converter is.

Wishing the Club every success—Doug. Pearsall (AW18DX), Albury, N.S.W.

★

A Useful Celluloid Cement

Here is a very helpful hint for set builders who wish to use plug-in coils. The following cement can be used in many ways, of which two are shown in accompanying sketches. A third use is for “doping” space-wound coils to keep the turns in place. The mix-



ture consists of two parts of ether to one part alcohol. [Equal parts of acetone and amyl acetate can be used as well.—Ed.] Add to it celluloid chips and allow to stand in a corked bottle overnight. If solution is still watery, add more celluloid chips and let stand until it becomes thick. It is then ready for use.

Here is another tip. To make a small coil into one of the plug-in type, drill a 3/8 in. hole through the centre of a valve base, and obtain a piece of 3/8 in. rod with thread each end and two nuts to suit. Next make a cap larger in diameter than the small coil and drill an 3/8 in. hole through the centre. The rod is then placed in position, and wires from the coil brought down inside the former to the pins on the base. After soldering them, nuts are screwed on to the rod, clamping the coil to the base.

I am interested in 2CP's Reiss “mike” and would be very pleased to see details in next issue of the “Radio World.” — Keith Craig (Stockton, N.S.W.)

[The Reiss “mike” is described elsewhere in this issue.—Ed.]

★

All the Best to “R.W.”

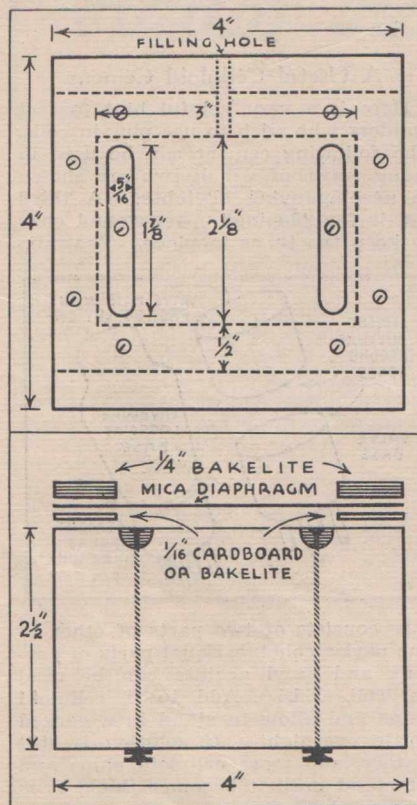
The “Radio World” is certainly a very fine paper, and you can well be proud of it. I feel sure you have felt compensated for all the hard work in getting it into circulation by the huge success it is enjoying. You have given Australian radio fans their own DX Club and official organ, the “Radio World,” and here's wishing you the best of success to both.—Ray Bramwell (AW126DX), Bowen, N. Queensland).

Making A Reiss

Microphone

Full constructional details are given below of the assembly of a carbon microphone. Though simple to build, it gives excellent quality reproduction.

By VK2CP.



Full dimensions of the block and bakelite frames are given in the top sketch, while the lower one shows a sectional plan view of the assembly.

It is a surprising fact that many amateur 'phone stations are still using solid-back microphones, giving indifferent quality, particularly as a "mike" giving excellent response can be easily put together for a few shillings. The Reiss, or transverse current, microphone described below requires only few inexpensive parts, and is so simple in design and construction it could be put together successfully by anybody.

The Parts Required.

The materials needed consist of:— a block of wood, two carbon pole pieces, 1 ounce of carbon granules, a mica diaphragm, two small sheets of bakelite (one may be of cardboard) and some small wood screws.

The block may be either of hardwood or marble. If the former is used all the work can be done in the shack, but if marble is preferred then the best scheme is to have the block prepared by a stone-mason. In any case the block measures 4in. by 4in. by 2½in., the face being 4in.

square. Actually the thickness does not play an important part in the operation of the microphone, provided, of course, that the block is not so thin as to resonate within the audio spectrum.

Preparing The Carbon Rods.

The carbon rods can be cut down from the carbon pole pieces taken from a bias battery, or for that matter from any kind of "B" battery, as long as eventually each rod measures 1½in. long and ⅜in. wide. Also, a ½in. hole should be carefully drilled through the centre of each. It is essential to use a sharp drill, as the rods are very brittle and break easily.

After the holes have been drilled, a "flat" should be filed on each rod so that it has a semi-circular cross-section. Then, when the rods have been let into the slots prepared for them in the block, their surfaces lie flush with that of the block. A ¼in. gouge is used to make the slots.

Mounting The Carbon Rods.

Next, the rods are fitted in the slots, and ½in. holes drilled through

List of Parts

- 1—hardwood block, 4in. x 4in. x 2½in.
- 1—1/16in. bakelite sheet, 3½in. x 4in.
- 1—½in. bakelite sheet, 3½in. x 4in.
- 1—oz. carbon granules.
- 2—½in. bolts, 2½in. long, with 4 nuts.
- 1—mica diaphragm, 3½in. x 4in. x .001 in. thick.
- 8—small wood screws.

the block to correspond with those in the rods. Remove the latter while drilling these holes, by the way, or they are liable to be broken. Two 2½in. bolts pass through the rods and block to the back, and are locked in place with nuts. The connections to the microphone are taken to these, and so a solder tag placed between two nuts screwed on each of the bolts will facilitate connection of the leads.

The carbon granules are placed in a pit ⅜in. deep between the two rods. Usually this pit is gouged out,

but an alternative way of making it that is much simpler, while being just as effective, is to cut a rectangular frame from a piece of ¼in. bakelite or cardboard and screw it to the face of the block. The dotted lines in the sketch of the front view indicate the position and dimensions of this frame.

At this stage a hole should be drilled from the top of the block to the top of the pit for the purpose of filling the microphone with carbon granules after the assembly has been completed.

The mica diaphragm, which measures 4in. by 3½in. and is approximately one thousandth of an inch thick, is held in place by a frame of bakelite, ¼in. thick, and of exactly the same dimensions as the first frame.

The diaphragm is very fragile, and so should be handled with every care. It is essential that it should be perfectly flat and not sag in the centre. If any difficulty is experienced in mounting it, then secotine, slightly warmed to make it flow readily by immersing the tube in warm water, can be smeared thinly over the outer face of the ¼in. cardboard or bakelite frame.

Mounting screws pass through the entire assembly—through both frames and the diaphragm—into the block, and ensure the tight fit that is necessary to prevent the carbon granules from leaking out. If desired, to protect the diaphragm and to make a finished job, the front can be covered with copper or brass gauze, held in position by a third frame, either of metal or bakelite. A coat of varnish or duco ran also be applied to the block if desired.

Putting In The Granules.

The final step is to pour in the carbon granules through the filling hole, using a funnel made from stout paper. As the granules are poured in, the microphone is tilted and tapped gently to ensure that the pit is filled. The granules should be

Building An Output Meter

A simple, inexpensive instrument that will be found invaluable for ensuring accurate set alignment, as a volume level indicator for P.A. equipment, etc.

By C. W. SLADE, A.M.I.R.E. (America)
Engineer, Slade's Precision Test Equipment.

RADIO dealers and servicemen must have at their disposal sufficient testing equipment to enable them to carry out any test quickly and efficiently. At the same time the equipment must be thoroughly reliable, have a low initial cost, and be portable.

A sensitive output meter is among the cheapest and most useful of all test instruments. It is often necessary to know exactly how much output a receiver is producing, as for example when a set is being aligned. The human ear cannot detect small changes in volume—a fact that can easily be proved by attempting to line up a receiver first by ear, and then with an output meter attached. It will be found that a slight alteration to a trimmer, while not producing any audible change in volume, nevertheless will result in a definite, and sometimes an appreciable, change in the output meter setting.

The main drawback about alignment by ear, however, is not that

This photograph shows the finished instrument, mounted in its case. The test leads are carried in the separate compartment on the left.



it might result in a single trimmer being half a turn or so off its correct setting, but that as each trimmer is adjusted in turn, there is a real danger that the alignment will become progressively more inaccurate, resulting in a serious loss of both sensitivity and selectivity.

With an output meter as a guide this danger is eliminated, as a positive indication is given even of slight changes in output.

The best and most accurate

“meter type” of output meter is nothing more or less than an A.C. voltmeter using a 0-1 m.a. meter in conjunction with a copper oxide rectifier. An instrument of this type is highly sensitive, and has a very low power consumption. Only a few parts are required, and as the description below of a meter of this type will show, the assembly is very simple.

Four Ranges Provided.

To obtain greatest sensitivity over a fairly wide range of output, it is well worth while to provide for several ranges—preferably up to 100 volts. Four were incorporated in this instrument—0-10, 0-25, 0-50, and 0-100 volts—by providing for the inclusion of the correct value of multiplier in series with the meter. A four-position single-deck rotary switch enables any desired range to be selected at will.

The 2 mfd. condenser shown in the circuit stops D.C. from flowing through the output meter, while permitting the alternating, or pulsating component of the signal voltage to be measured.

Assembling The Meter.

Elsewhere will be found a list of the parts needed to build the instrument, while the photographs illus-

Making a Reiss “Mike”

(Continued from opposite page)

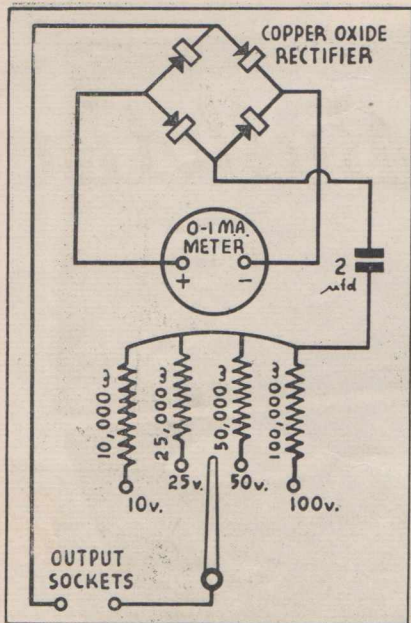
kept perfectly dry, by the way, as if damp they will pack and spoil the performance. When the filling is complete, plug the hole with a small cork cut to size with a razor blade.

A word of warning about the Reiss. The battery voltage should be around 6 or 8 volts; anything in excess of this will damage the granules. At 6 volts, the current through this microphone is about 12 m.a. This should be tested occasionally, and if not normal, the current should be switched off and the microphone tapped lightly several

times, until a further test indicates correct current.

In use, the microphone should be held about 6 or 8 inches from the mouth for speech at ordinary conversational level. If the “mike” is too close, objectionable blasting will take place.

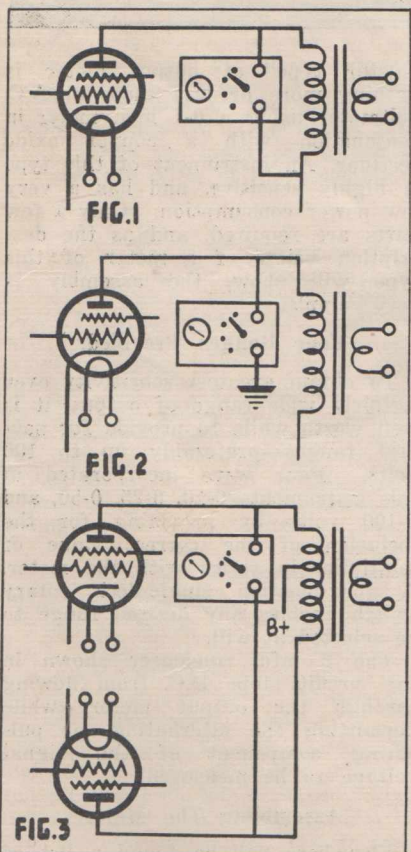
The impedance of the microphone is of the order of 500 ohms, and requires a transformer with a primary to secondary ratio of about 20 or 25 to 1. An improvised transformer that gives very good results can be made up by winding 300 to 350 turns of any convenient gauge wire over the secondary of an ordinary audio transformer.



Circuit of the output meter.

trate the assembly. Also, the circuit diagram actually shows the wiring as well, as it appears in the finished instrument.

The meter used is one of the



These sketches show methods of connecting the meter to single and pushpull output stages.

latest Calstan fan-shaped 0-1 milliammeters, a rugged but highly accurate meter that is provided with a greatly enlarged sector scale, ensuring ease and accuracy in reading.

The case used measures 6in.x6in.x4in., with an ebonite panel 6in.x6in. A separate compartment is provided for the leads.

Connecting The Output Meter.

Figures 1 to 3 illustrate various ways of connecting the meter to a receiver. In sets provided with single output stages, the connection can be made either across the speaker input transformer (Fig. 1) or from plate to chassis. Connection could also be made across the secondary of the transformer, or across the voice coil, but the readings obtained are low and small changes are not readily discernible.

For sets with pushpull output, the connection can either be from

List of Parts

- 1—0-1 m.a. meter (Calstan).
- 1—copper oxide rectifier (Westinghouse type MBS1).
- 1—2 mfd. tubular condenser (Solar).
- 4 multipliers, 10,000 ohms, 25,000 ohms, 50,000 ohms, 100,000 ohms (Calstan).
- 1—Bakelite strip, with mounting pillars.
- 1—Four-position single-deck rotary switch.
- 1—Case and panel.
- Output sockets, test leads, hook-up wire, nuts and bolts, solder tags, pointer.

plate to plate or from one plate to chassis. The latter provides the larger deflection.

Making The Connections.

If the chassis is out of the cabinet, small crocodile clips on the ends of the meter leads provide the simplest way of hooking up the meter. Another handy method of connection that is useful if the set is left in the cabinet is to fit the flexible meter leads with small eyelets. These can be slipped over the correct pins of the speaker plug so that the meter is across the speaker transformer primary.

The correct pins, incidentally, can be easily identified with an ohmmeter, as the d.c. resistance of the primary will never be more than 500 ohms.

Shortwave Ramblings

By J. Harrower (AW60DX)

THE address of the new Mexican "ham" XEIQ is the same as that of XBJQ (27.27 m.)—Box 2825, Mexico City, Mexico, D.F.

From the beginning of October PHI has been on its winter frequency of 11.73 m.c. All reports should be addressed to: PHOHI Studios, Hilversum, Holland.

The Wellington 'phone station ZLT (27.27 and 40.59 m.) commenced operation in 1930. It is owned by Domin-

ion Post and Telegraph Dept., and uses a power of 1 k.w.

The British Empire telephone stations are really located at Hillmorton, near Rugby, not Rugby, as is generally thought. The aerial masts are 820 ft. high and are mounted on a ball and socket joint which allows them to sway in the breeze. The tops are usually hidden by clouds. In U.S.A. the trans-Atlantic stations are located at Lawrenceville, New Jersey; the trans-Pacific stations at Dixon, California; and the South American at Florida.

Since last writing most of my dxing has been done on the 20 m. amateur band, as conditions have been excellent down there. The best loggings have been: SM5SX, Sweden; F8VP, France; OE1FP, Austria; SP1BA, Poland; PAOSD, PAOUN, Holland; LA4K, Norway; OK2OP, Czecho-Slovakia; ON4FE, ON4HC, Belgium; D4GJC, Germany; HB9AW, Switzerland; OH3OI, Finland; U1AP, Russia; KA1MD, 1BH, and 1ER, Manila; PK1MX and 1JR, Java; K6KKP, K6JPD, K6MEM, K6AKP, Hawaii; OA4AK, OA4R, Peru; HJ3JD, Colombia; LU4BH, Argentina; PY2DC, 5BO, Brazil; NY1AA, NY2AE, K5AG, K5AM, Canal Zone; VP6YB, Barbados; XEIG, XE2AH, Mexico; VE's 2AX, 3ADM, 3UGF, Canada. Also scores of VK's, W's, G's and ZL's of all districts.

Of the commercials, COCQ (Box 98, Havana, Cuba) has been the best catch. I am still using my 2 v. battery receiver described in the "Radio World" recently, and my log now stands at 747 stations.

Identifying Foreign Calls

On the 20 metre band the French and Dutch stations are coming in very well—the latter chiefly on account of our close proximity to the East Indies—but as most of these stations give their calls only in their own language, it is not an easy matter to identify them. For example, PK1HG would announce: Pay-kah-eeen-hah-ghay. French station F8HY would give his call as: ef-huit-ash-ee greg.

The month May is spelt—Mai, in French; June, Juin; July, Juillet; August, Aout; and September, Septembre.

Phonetic Pronunciations

	Fr.	Dut.		Fr.	Dut.
A	ah	ah	N	en	en
B	bay	bay	O	o	oh
C	say	say	P	pay	pay
D	day	day	Q	keeu	keeu
E	ay	ay	R	eer	err
F	ef	eff	S	ess	es
G	zay	ghay	T	tay	tay
H	ash	hay	U	eeu	eeu
I	ee	ee	V	vay	vay
J	zee	ja	W	doobleway	way
K	kah	kah	X	iks	iks
L	el	el	Y	eegrec	aai
M	em	em	Z	zett	zett



The . . .

A. J. R. S. Bulletin

Conducted by the
Secretary, 287 Clarence
Street, Sydney, N.S.W.

Aims and Objects of The A.T.R.S.

To the Editor,

Sir—While thanking you on behalf of the Associated Trained Radio Servicemen for publishing my letter in last month's issue, we would further appreciate the publication of the following, giving a short outline of the history, policy and the reason for forming this organisation.

In the past, radio set owners have been forced to rely on the claimed ability and honesty of the individual in whose hands the set had been placed for service. This practice led to a deal of misunderstanding and the demoralisation of the serviceman's profession. Hence, our goal is to make the set-owning public "Trained Man" conscious.

Fully convinced that only an organisation of trained servicemen would be able to clear up this misunderstanding, three individuals after an hour's discussion resolved to form an organisation of trained servicemen.

As already published in your last issue, we were successful in establishing the organisation. With a head office at 287 Clarence Street, Sydney, (near the Town Hall) we are enrolling members daily, and at time of writing are thirty strong.

Realising the valuable work that your magazine has been doing among radio amateurs, experimenters, and DX fans, as well as the high standard of your technical write-ups, we are seeking your co-operation by allowing us a little of your valuable space to assist us in our mission, which it must be admitted is no easy task. If at all possible, we would like discussions and articles to appear in your magazine monthly to reach the public who would be interested from the technical viewpoint in our proposition.

We intend to obtain from our members a regular supply of practical tips and wrinkles that will not only appeal to the many servicemen among your readers, but also to set-builders and experimenters generally, as well. Other technical features will also be included, and further details regarding

these will be published next month.

In the meantime, we hope that readers professionally interested in radio will join up and assist us to better the lot of the serviceman. Full particulars regarding membership fees, benefits, etc., will be mailed by return post to anyone writing me at 29 Blairgowrie Street, Dulwich Hill, N.S.W.—C. Y. Hook (Acting Hon. Sec.).

[Because it is believed that there is an urgent need in this country for a live organisation for qualified servicemen, the "Radio World" is willing to co-operate in every way in assisting any movement in this direction. For one thing, there is a scarcity of service data on Australian-built sets that an organisation of this sort could do much to remedy. For another, any movement that aims at establishing radio servicing as a recognised profession for highly-skilled men, with a commensurate rate of pay, is worthy of every support. At the same time, it should be remembered that the success of any organisation of this nature depends solely on the support that is forthcoming from members.—Ed.]

A.T.R.S. Radio Kinks and Wrinkles

Using Suppressors for Auto Radio Installations

By W. A. Wildash

FOR some years now, quite a controversy has raged round the question as to whether the use of spark plug suppressors materially affects the performance of a motor car. I can only give my own opinion, based on my experience as an auto radio specialist, with 15 years experience as an automotive engineer.

If the car engine is 100 per cent. efficient before the installation of the suppressors, then definitely a slight loss of efficiency occurs which can be only partially corrected. But due to the fact that very few motors indeed are delivering peak efficiency at the time of installation, these cars can then by means of a thorough "tuning" after installation, be made to improve their performance. However, when installing modern auto radios in modern automobiles, I seldom find it necessary to use any suppressors except one in the centre of the distributor cap, the effect of which is negligible.

By carefully checking the electrical system and by applying some of the many methods of curing this high tension interference at its source, I am usually able to overcome this trouble, resorting to suppressors only in the most stubborn cases or in installing older sets in which the filter system is not too good.

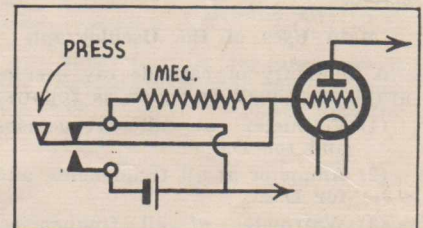
Space will not allow me to delve into the causes and remedies for high tension interference now, but I hope to deal with some of these in future articles.

Handy Soldering Iron Rest

A handy soldering-iron rack may be made from two wardrobe hanger hooks. These should be bent over and screwed in the side of the bench at a convenient distance apart, according to the length of the iron.

Adding "Gas Test" to Analysers

Connect a 1 meg. $\frac{1}{2}$ watt resistor in the manner shown in the sketch, to add to analysers a test for gassy valves. Make certain that the push-button breaks one circuit before mak-



ing the other. Only one change in plate current should be noted. If the tube is gassy the plate current will change twice, first because of the gas content and the consequent grid current, and second because of the usual change in grid bias.

A Valve-Noise Indicator

It is easy to sell a customer a new valve to replace a noisy one that tests O.K. otherwise, if you can duplicate the noise that the customer hears in the set. Here is a simple but effective noise indicator that can be easily added to any valve tester that measures

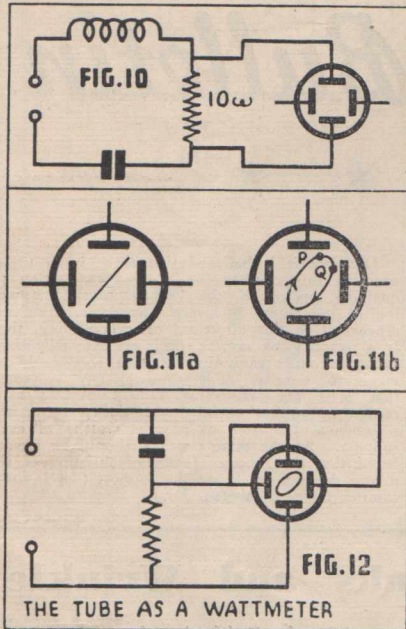
(continued on page 37)

The Cathode Ray Oscillograph At Work . . . 3

In this instalment some further applications of the cathode ray oscillograph are explained.

By A. H. MUTTON, B.E.

Paton Electrical Instrument Company



IN previous articles explanations have been given of how the cathode ray tube functions, and how accessories are added to give it great flexibility for radio work generally. The units found in the commercial oscillograph were discussed from a functional point of view. In this article it is proposed to deal with the tests that can be performed with a normal commercial model oscillograph such as that produced by the company with which the writer is associated.

Main Uses of the Oscillograph

A summary of cathode ray oscillograph uses may be made as follows:

- (1) Voltmeter at all frequencies and for D.C.
- (2) Ammeter at all frequencies, and for D.C.
- (3) Wattmeter at all frequencies, and for D.C.
- (4) Power factor meter at all frequencies and for D.C.
- (5) Frequency Comparometer at all frequencies and for D.C.
- (6) Wave-form delineator, 5 c/s. to 1,000,000 c/s.
- (7) Innumerable uses by combining two or more of the above-mentioned.
- (8) The cathode ray oscillograph may be used in still further applications in connection with other apparatus such as Heaviside Layer height recorders, frequency bases, mechanical or electronic switches, etc.

(1) As a voltmeter.

This has been treated in the course of previous articles, and is the simplest use. It is merely necessary to connect the oscillograph "Y plate" terminals to the E.M.F. to be measured, and to read off the voltage on a calibrated transparent scale placed in front of the tube. The calibration is quite uniform. For small voltages the Y plate amplifier may be cut into circuit and an enlarged picture obtained. Measurements are then made using a "multiplier factor" (i.e., the gain of the amplifier must be known) much as in an ordinary voltmeter.

Suggested measurements are: Superhet oscillator voltage, I.F. output voltage, audio voltage at any point in a set, D.C. voltages such as screen, plate, bias, and A.V.C. A.C. transformer voltages may also be measured.

(2) As an Ammeter.

It is in using the cathode ray oscillograph in this way that the amplifier becomes of great value. Without an amplifier the sensitivity of the screen is about 75 volts per inch, so that as the voltage for operating the tube as an ammeter is obtained across a resistance in the circuit, it will be seen that the tube is only capable of reading high currents. For instance, if a 10 ohm resistance were introduced in a circuit as in Fig. 10, the oscillograph spot would deflect one inch per 7.5 amperes. The power required to operate the oscillograph would thus be 10 watts per ampere read on the scale! This could only be tolerated in high-power transmitters or in A.C. power work.

However, when the amplifier is cut in, a big improvement occurs. Suppose we wish to measure 7.5 amperes as before, but that the amplifier, with a gain of 100, is in use. To get a picture 1 inch high as before for 7.5 amperes, the input voltage will be 1/100 of 75 volts or .75 volt. In a circuit where 7.5 amperes is flowing, the resistance that must be selected in the circuit (or introduced if not already there), will be only 1/10 ohm and the power consumed per ampere read on the scale, only 1/100 watt. Thus the resistance is reduced to 1/100th, and the power to 1/1,000th, of former values.

The oscillograph amplifier is only useful in the A.F. range without special calibration, as above 25,000 c/s. its amplification drops, so for R.F. and I.F. use an external calibrated amplifier would be required for the oscillograph.

(3 & 4) Wattmeter and Power Factor Use.

If two A.C. voltages from the same source are applied to the X and Y plates of an oscillograph, the spot will move as in Fig. 11 (a). If, however, A.C. voltages of the same frequency but of different phase are supplied to the plates, the figure traced out will be, in general, like that shown in figure 11 (b). This is because, although the frequencies are the same, the times at which each reaches its maximum will be different.

Thus, in the figure, although the Y plate voltage reached its maximum at P, the X plate voltage did not reach its maximum until the Y plate voltage had dropped again somewhat, as at Q. Thus the moving spot was moved to the right by the X plate voltage before dropping appreciably.

Considering this process throughout the cycle, it should be seen that the spot must trace out an ellipse, and that the width of this ellipse is some measure of the extent to which the two voltages are out of phase. This means that the oscillograph gives a means of measuring power factor.

The area of the ellipse can be used as a means of measuring wattage, since it involves two voltages and their power factor. Thus if one pair of plates is connected across a pure capacity and the other pair across a pure resistance as in fig. 12, the area of the ellipse measures the power wasted in the resistance, irrespective of other circuit conditions such as inductance, frequency, etc.

No formulae will be given here for power factor and power measurements, as they are somewhat involved, and these measurements are not commonly made. However, it is easy to see how useful the cathode ray oscillograph can be for comparative wattage and power factor measurements.

The quality of circuit components is easily checked using the circuit given in Fig. 12, by always comparing the picture obtained to that obtained with

a standard condenser, inductance or resistance, as the case may be. It should be plain, of course, that the condenser, inductance or resistance to be checked is merely substituted for the condenser shown in the figure.

(5) Frequency Comparometer

For this work the cathode ray oscillograph is supreme. The method of tackling the problem (shown in figure 13) is extremely simple.

Voltage from a source of known frequency is applied to one pair of plates, while voltage from the source of unknown frequency is applied to the other pair of plates. One or the other is adjusted when an ellipse is obtained on the screen, the two frequencies are exactly the same.

If the ellipse appears to "turn over" once a second, then the two frequencies differ by one cycle a second. Thus if a 10,000,000 c/s. E.M.F. from, say, a quartz-crystal oscillator were applied to the X plates, another crystal could be compared to it and adjusted, correct to one part in ten millions, by applying voltage from an oscillator controlled by this crystal, to the Y plates. It is in this way that quartz crystals for broadcasting station use are ground and checked.

Another similar method of frequency checking is to compare a frequency meter with a broadcast station. Thus if the output from a set tuned to a station is compared with the output from a frequency (wave) meter, the latter may be checked very closely at this particular frequency.

By carrying out a similar check at other station frequencies a calibration of the meter may be completed with extremely high accuracy. The effects of mains voltage fluctuations and temperature can be checked easily. The ellipse will rotate when these variations occur, and, if its speed of rotation is observed, the effect of the variations may be worked out as a percentage frequency alteration.

Frequencies differing in the ratios 2:1, 3:1, etc., may also be easily checked. Patterns known as Lissajou Figures then appear on the screen, and if these are recognised and used, frequency comparisons can be made at widely differing frequencies. However, by far the easiest method to use is the rotating ellipse method.

(6) Waveform Delineator.

This is the use to which oscillographs are most generally put, and they give the only practical way of obtaining a waveform check at high frequencies.

In the previous article the manner in which a waveform is obtained was explained, and it should suffice to say now, that the voltage to be examined is applied to the Y plates, while the "time base" saw-tooth wave is applied to the X plates. Its frequency is then adjusted to be the same as that of the

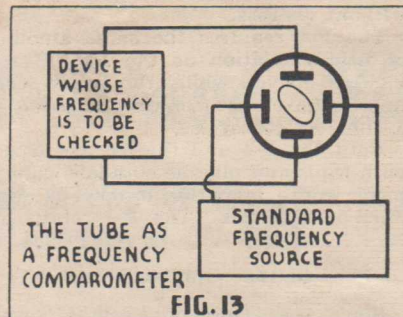


FIG. 13

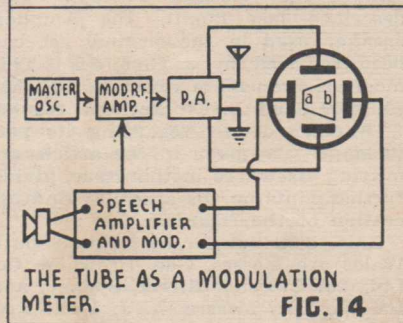


FIG. 14

voltage on the Y plates, and the waveform appears on the screen.

Using the amplifier and oscillograph, a radio set can be checked at numerous points. Connect the amplifier input terminals to the ends of the voltage divider, lock the time base to 50 c/s., and the hum across the divider will be shown. If the amplifier is calibrated, hum can be measured accurately, and a suitable figure obtained for it by improving the filtering. The effect of tuning the filter choke by a condenser connected across it can be observed in this way.

Connect the amplifier and oscillograph across the input to the power valve, and one can measure the hum fed into the grid of this stage. Also, by connecting across the bias resistor for the power valve, and the hum present there can be found.

Connect a pick-up coil of about 1,000 turns on a 1/2 inch diameter iron core to the amplifier, move it over the chassis, and any leakage magnetic fields from the power transformer can be found and measured.

Supply a signal modulated at 400 c/s. to a set and examine the waveform of the voltage obtained across the diode load resistor. If the waveform is shown but the trace is very wide (1/4 inch for example), then R.F. is present across the load resistance and better filtering is required.

Connect the oscillator direct to the oscillograph, or use the amplifier if required, and by setting the time base to a suitable high frequency, get a number of waves on the screen. The effect of heavy grid current, high L/C ratio, motor-boating and harmonic content generally can be seen on the screen and undesirable conditions cor-

rected. Audio distortion, as mentioned before, is quickly checked.

(7) Combining Two of the Foregoing

As an example, take the use of the cathode ray oscillograph as a modulation meter for a radio transmitter. The connections are as shown in figure 14, so that A.F. is applied to the X plates and R.F. modulated with this A.F. is applied to the Y plates.

A trapezium picture is obtained, and the percentage modulation is given by—

$$\% \text{ Modulation} = \left[\frac{b - a}{b + a} \times 100 \right] \%$$

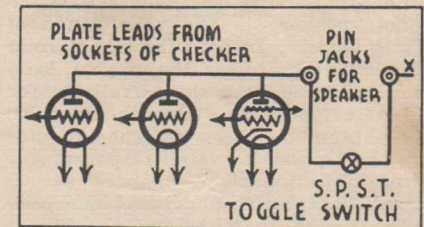
—where a and b are the parallel sides of the trapezium, as shown in fig. 14. For 100% modulation, the figure becomes a triangle, while for no modulation a straight line only is drawn.

A.R.T.S. Radio Kinks and Wrinkles

(Continued from page 35).

the plate current in the valve. It will give an audible demonstration of valves that have become noisy due to defects of a mechanical nature.

A valve that has loose elements, erratic opens or shorts will cause variation in plate current when it is tapped. If a speaker is connected in series with the plate lead of the noisy

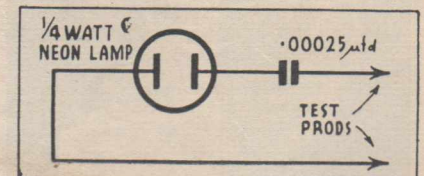


valve under test (in the analyser) it will produce static that will convince the most skeptical customer that the valve is defective.

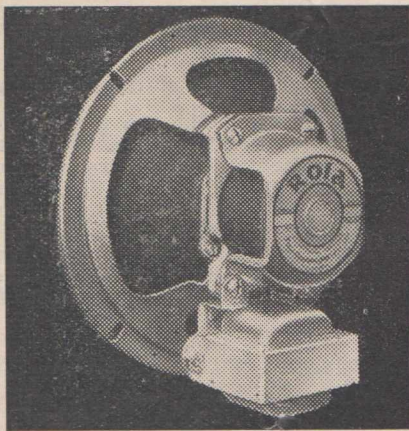


Superhet Oscillation Tester

Here is a practical tool for servicing supers. It indicates if the set oscilla-



tor is working or not. The hook-up is shown above. In order to test for oscillation, place one test prod on the crassis, and if the oscillator is working the neon bulb will light.



Rola model DP-5-B electro dynamic.

What's New in Radio

(cont'ued from page 16)

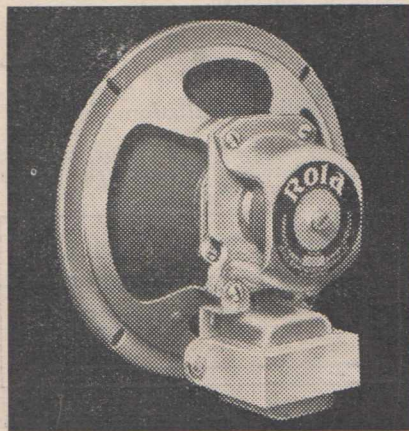
ing moderate outputs.

Transformers can be supplied for any type of output valve, used either singly or in push-pull. The voice coil diameter of both models is $\frac{3}{4}$ in., while the voice coil impedance at 400 cycles is 3 ohms.

The DP-5-B retails at 26/-, and the 6-6 at 29/6. Both are fitted with leads and plug as standard equipment, and if required can be supplied with brackets for chassis mounting.

Two Five-Inch Models

Models F-4 and 5-6 are 5 in. types, and are the smallest and most compact speakers in the wide range of Rola models. In both the transformer fits snugly on top of the magnet, leaving space on both sides available for other components. Also, the moulded diaphragm has been designed to give the best possible overall response, free from objectionable resonances, with a small baffle area, and has been specially treated to withstand the higher temperatures usually prevailing in small, compact cabinets. Despite their small size, both models are very sen-



The model 6-6 permanent magnet Rola.

sitive and will handle large overloads without distress.

The F-4 requires the same amount of field excitation as the DP-5-B reviewed above, while the voice coil impedance of both is also the same—3 ohms at 400 cycles.

Both the F-4 and the 5-6 are fitted with leads and plug as standard equipment, and a mounting bracket is supplied if required. The F-4 retails at 24/-.

Used in the "Outdoor Portable"

Since the "Outdoor Portable" was described last month, the Amplion speaker used in the original set has been replaced by a Rola 56. This model is even more compact than the Amplion, and gives excellent results.

(Further details regarding its performance are given in the article appearing elsewhere in this issue, giving further hints on the assembly and operation of the "Outdoor.")

Rola distributors for New South Wales are Messrs. Geo. Brown & Co. Ltd., 267 Clarence Street, Sydney, and for Victoria, Messrs. A. J. Veall Pty. Ltd., 243-249 Swanston Street, Melbourne.

★

Latest Palec Valve Tester—A.C. and D.C. Models Available

THE acute need among dealers and servicemen in country districts for an entirely self-contained tester for checking battery type valves has now been filled by the Paton Electrical Instrument Company, with the release of their D.C. Model Valve Tester.

The instrument is extremely portable—it is housed in a standard Palec case measuring $7\frac{1}{2}$ in. x $8\frac{3}{4}$ in. x 6 in.—and checks both American and Continental type valves. A "B" battery is provided within the case, and all that is necessary to put the tester into operation is to connect up a 6-volt accumulator, or, in fact, any type of 6-volt "A" supply available at time of testing. A direct test for merit is provided by a "Good-Bad" scale, while by rotating a switch every element can be tested for shorts or leakages.

In addition, three voltage ranges (0-3.5v., 0-7v., and 0-70v.) are provided for testing all types of batteries. Also, resistors and condensers can be tested, and continuity checked, by switching over to the "Shorts and Ohms" position, when resistance values up to 250,000 ohms can be read off directly on the meter scale.

A.C. Model Also Available

The A.C. model, like the D.C., will test all types of valves, in American and Continental makes.

A rotary "Line Adjust" switch takes care of any variations in line voltage,

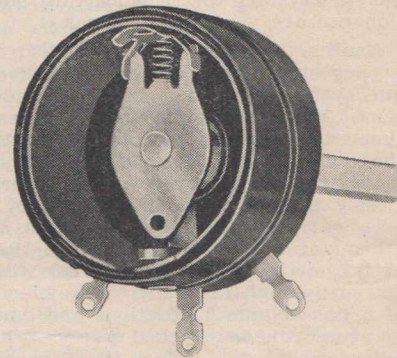
and thus ensures the highest accuracy in all tests. Visual indication of interelement shorts or leaks is given by a neon tube, which will glow distinctly even when a leakage as high in resistance as 500,000 ohms is present. By pressing a push-button, a merit test is provided in which the meter gives on a "Good-Bad" scale a positive indication of the condition of the valve. As well, the meter dial is calibrated to show the percentage efficiency of the valve under test.

With both A.C. and D.C. models a booklet is provided listing Philips, Mullard, Osram, and American type valves, and showing filament (or heater) voltages, as well as selector switch and range degree control settings for all types. Full operating instructions are also given.

★

Microhm Wirewound Potentiometer

A NEW line of wirewound potentiometers, marketed under the trade name of Microhm,



has recently been released by the manufacturers, the Sydney Magneto and Electrical Company.

The sample received is well-engineered throughout, and should stand up to plenty of hard wear without damage. The resistance strip consists of nichrome wire, wound on fibre, and the two nickel silver pressure plates bearing on it ensure efficient electrical connection, negligible wear, and smooth mechanical movement. A hardened nickel silver spring maintains an even tension during rotation of the contact.

A point worth mentioning is that the contact has been staggered to ensure a minimum of "jump" between turns on the resistance strip, ensuring a very even variation of resistance from half turn to half turn.

An attractive bakelite case, with a pressed metal dust-proof cover, complete the potentiometer (shown in the photograph above).



The All-Wave All-World

Official Organ of the
All-Wave All-World DX Club

DX News



Ever-Ready Batteries for DX Contest

Two more attractive and valuable prizes for the All-Wave DX Contest have been donated by the Ever-Ready Co. (Aust.) Ltd., in the form of two sets of three 45-volt Ever-Ready Superdyne "B" batteries (value 54/- per set). Built for large receivers taking "B" current in excess of 20 milliamperes, the Superdyne is the highest capacity "B" battery manufactured by the Ever-Ready Co. The two sets of batteries will form the fourth and second prizes respectively in the Australian and New Zealand Sections of the Contest, the Noisemaster Aerial Kits thus becoming fifth and third prizes respectively.

Anybody Can Enter

A reader in Dubbo who is planning to join the DX Club has raised a point concerning the contest that may be puzzling other intending entrants. His set covers the broadcast band only, and he asks whether his entry would stand a chance alongside the logs sent in by owners of dual-wave sets. The answer is that it would. Every entry is, as far as is humanly possible, going to be judged exactly according to its merits. Thus dxers who operate broadcast sets only, or who perhaps use a special shortwaver for all their dxing, will stand as good a chance as anybody of carrying off a prize.

To make the contest as interesting as possible, every Club member is asked to enter. There is no entry fee, and if you have only half a dozen "veries," send them along—the more the merrier. It's impossible to know whether you're going to win a prize or not. The rule barring verifications dated or post-marked before August 1, 1936, not only gives everyone an equal chance, but also means that there will be no very big logs entered.

Club Seals Now Available

Members who have been enquiring for Club seals to attach to QSL cards, correspondence, etc., will be glad to know that supplies are now available. Slightly larger than the badge repro-

duced at the head of this page, the seal is an exact replica, embossed in blue and silver, of the Club badge. For those having QSL cards printed, the space occupied by the seal is 1 1/4 inches across. The price is 1/6 for 5 dozen, post free.

Schedules of S.W. Stations VK2ME and VK3ME

ACCORDING to advice from Amalgamated Wireless (A'sia) Ltd., transmission schedules for VK2ME (Sydney) and VK3ME

(Melbourne) for November are as follows:

VK2ME
(31.28 metres, 9,590 k.c.)
Sydney Time GMT
Sundays: 4 p.m.—6 p.m., 0600—0800
" 7.30 p.m.—11.30 p.m., 0930—1330
Mondays: Midnight—2 a.m., 1400—1600

VK3ME
(31.5m., 9,510 k.c.)
Melbourne Time GMT.
Nightly
Monday to
Saturday 7 p.m.—10 p.m., 0900—1200
(inclusive)

ALL-WAVE ALL-WORLD DX CLUB

Application for Membership

The Secretary,
All-Wave All-World DX Club,
214 George Street,
Sydney, N.S.W.

Dear Sir,

I am very interested in dxing, and am keen to join your Club.
The details you require are given below:

Name.....

Address.....

[Please print both plainly.]

My set is a.....

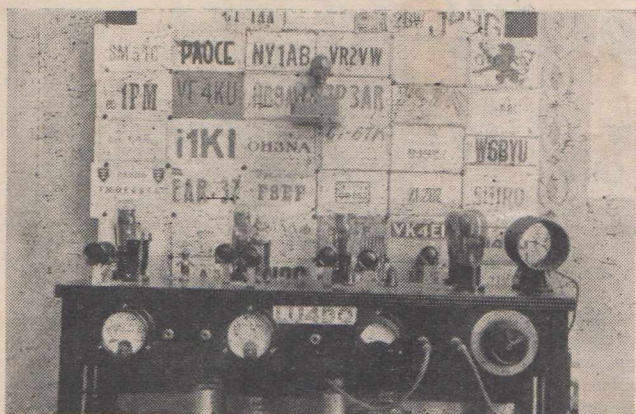
[Give make or type, number of valves, and state whether battery or mains operated.]

I enclose herewith the Life Membership fee of 3/6 [Postal Notes or Money Order], for which I will receive, post free, a Club badge and a Membership Certificate showing my Official Club Number.

(Signed).....

[Note: Readers who do not want to mutilate their copies of the "Radio World" by cutting out this form can write out the details required.]

Shortwave Stations Of The World 3



A photograph received by the author from amateur station LU4DO, in the Argentine.

United States And The West Indies

The third of a series of articles on world shortwave stations, written for the "Radio World" by

ALAN. H. GRAHAM.

United States of America

THE majority of the American shortwave transmitters are well-known to all dxers, and require little more than a passing reference. For this reason details as to frequency, power and hours of transmission are summarised in the list given below.

For those S.W. fans whose receivers tune down to 9 metres, a little concentration on 31,600 k.c., or 9,494 m., may prove worth while. On this frequency there are now five regular transmitters, of which one, W6XKG, has been logged this year. The five stations are:—

W2XDU, Atlantic Broadcasting Corporation, Madison Avenue, New York City. Relays WABC daily from 8 a.m.—1 p.m. and on Sundays and Mondays from 3.30—8 a.m. and 9 a.m.—noon.

W4XCA, Memphis, Tenn. Relays WMC daily.

W6XKG, 1417 South Figueroa St., Los Angeles, relays KGFJ for 24 hours daily.

W8XAL, Stromberg - Carlson Co., Rochester, N.Y., relays WHAM daily from 10.30 p.m.—3.05 a.m.

W8XWJ, Penobscot Tower, Detroit, Mich., is on the air daily from 9 p.m.—3.30 a.m.; also on Sundays from 11 p.m.—3 a.m. (Monday).

As these stations use very little power (W6XKG uses only 100 watts) their reception is a feat of which any dxer may well be proud.

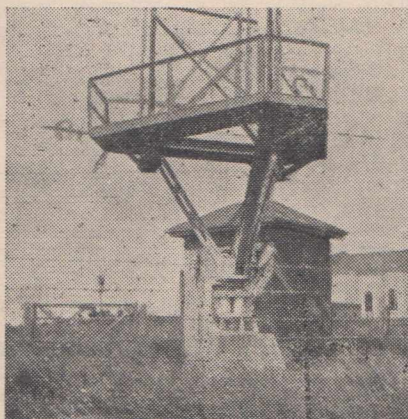
The American 'phone stations are much too numerous to mention in detail. Moreover, they will not verify unless reports are especially requested,

Canada

There are not nearly as many S-W stations in Canada as in the United States, nor are they spread over the dial to such an extent. Only one of the well-known Canadian transmitters is not on the 48.49-metre band. That is CJRX, Winnipeg on 11,720 k.c. (25.6 m.), just below "Radio Coloniale," Paris. CJRX is on the air daily from 11 a.m.—3 p.m. It is fairly difficult to log, and even when heard its transmission often is rather poor.

It is around 49 metres that we find the other Canadians. Just below W8XK we find CJRO on 6150 k.c. (48.78 m.). Situated in Winnipeg, this station transmits on the same schedule as CJRX—11 a.m.—3 p.m.; with an additional session on Mondays from 6 a.m.—1.30 p.m.

In Toronto is located CRCX, 6090 k.c., 49.26 m., whose hours of trans-



The base of the single aerial mast used by 1YA, Auckland, N.Z.—which operates on 650 k.c. with a power of 10 k.w.,

mission are: — Daily, 8.30 a.m.—2.30 p.m.; Mondays, 2.45 a.m.—2.45 p.m.

The other Canadian transmitters use the VE9 prefix. VE9HX, Box 998, Halifax, Nova Scotia, relays CHNS from midnight till 3.30 a.m. and from 7 a.m. till 1 p.m.

Also on the East coast is VE9BJ, Saint John, New Brunswick. It transmits on 6090 k.c. (49.26 m.), which is the same frequency as that allocated to CRCX. Moreover, their hours of transmission clash, as VE9BJ is on the air from 10—11.30 a.m.

The third East coast transmitter is VE9DR, the station of the Canadian Marconi Co., in Montreal. It relays the programmes of CFCF on 6005 k.c., or 49.96 m., between 10 p.m. and 2 p.m. daily.

VE9CA is in Calgary, Alberta (frequency 6030 kc. or 49.7 m.). Its schedule is not quite regular, but it is usually on the air from midnight till 3 p.m.

The last of the regular Canadian transmitters is the West coast station VE9CS in Vancouver, British Columbia. It transmits on 6070 k.c. (49.4 m.). Full schedule for this station is:—

Mondays: 4.45 a.m.—noon; 1.30—4 p.m.

Wednesdays: 9—10.30 a.m.; 2.30—4.30 p.m.

Other days: 9—10.30 a.m.

In addition to these "broadcast" stations, there are several Canadian 'phone stations which are heard regularly in Australasia. They are operated by the Canadian Marconi Co., Drummondville, Quebec, which promptly verifies all reports. The station most likely to be heard is CJA4, on 26.28m., which is frequently logged during tests with V1Z3. Other stations in this group are CGA3

(22.58 m.), tests with London, and CGA4 (32.1 m.).

West Indies

On the two main islands of the West Indies group are located quite a surprising number of short-wave stations, many of which are particularly well heard in Australia, despite the fact that the majority of them are on the higher wavelengths where the noise level is often very high. However, it is pleasing to note that several Cuban stations have appeared lately below 31 m., with quite splendid results as far as reception in Australia is concerned.

Cuba

As Cuba is the largest and most important island, we will deal with it first.

On the 49 m. band proper there are two important Cuban stations,

COCO and COCD. COCO on 6010 k.c. (49.9 m.) has sought to encourage listeners to write to them by awarding a monthly prize of 12 bottles of wine for the best letter received. The address of the station is P.O. Box 98, Habana. Hours of transmission: 12.30—4 a.m., 7—10 a.m., 11 a.m.—1 p.m.; also 2.30—5 p.m. on Sundays.

COCD, "La Voy del Aire," Calle G y 25, Vedado, Habana, is on 6130 k.c., 48.9 m. This station relays CMCD from 2—3 a.m. and from 10 a.m.—1 p.m., with an additional session on Mondays from 3—7 a.m.

Just below COCD is COKG (ex-CO9GC) on 6150 k.c., 48.7 m. Schedule is midnight—1 a.m., 2.30—4.30 a.m., 6—7.30 a.m., 1—2 p.m., 3—5 p.m. Address is Box 137, Santiago de Cuba.

Lower down the dial again is CO9WR, Box 85, Sancti, Spiritus. It transmits on 47.76 m. from 7—9 a.m. and from noon—2 p.m. daily.

CO9JQ works on the unusual frequency of 8665 k.c., 34.6 m. The station is an experimental one, but keeps to a fairly regular schedule, i.e., 8.30—9.30 a.m. and 11—noon daily, except Sunday and Monday. Send reports to 4 General Gomez, Camaguey, Cuba.

On 31.8 m. COCH is being received regularly in Australia at the present time during its night session—11 p.m.—10 a.m. daily. It is also on the air from 2 a.m.—3 a.m., and from 11.30 a.m.—12.30 p.m. on Mondays. Address of the station is 2 B Street, Vedado, Havana.

Not far below COCH is another Cuban, which is being logged at good strength at present—COCQ on 30.8 m. This Habana station's schedule is not definitely known at present, but it can be heard at 10 p.m., and in the early afternoon.

The most recent Cuban on the air is a station on 26.2 m. The call is

UNITED STATES OF AMERICA --- Main Shortwave Stations

CALL	K.C. & M.	ADDRESS	OTHER DETAILS	SCHEDULE (E.A.S.T.)
W1XAL	15,250 k.c.: 19.67m. 11,790 k.c.: 25.45m. 6,040 k.c.: 49.67m.	University Club, Boston, Mass.	World-wide Broadcasting Corporation. Programmes are devoted almost entirely to educational talks:—The "International University of the Air."	19m.: Irregular. Daily, 8.15—9.15 a.m.; Mondays 8—10 a.m. Wed., Fri., 10.15 a.m.—12.15 p.m.; Mondays, 8—10 a.m.
W1XK (ex W1XAZ)	9,570 k.c.: 31.35m.	C/o Westinghouse & Mfg. Co., Springfield, Mass.	Electric Relays WBZ and WBZA. 10 k.w.	Daily, 9 p.m.—3 p.m. Sun., 10 p.m.—3 p.m.
W2XAD } W2XAF }	15,330 k.c.: 19.56m. 9,530 k.c.: 31.48m.	C/o General Electric Co., 1 River Road, Schenectady, N.Y.	"The Voice of Electricity." WGY. W2XAD, 20 W2XAF, 25 k.w.	Relay 19m.: 1—4.45 a.m. 31m.: 7 a.m.—3 p.m.; Sun., 3 a.m.—3 p.m.
W2XE	21,520 k.c.: 13.94m. 17,760 k.c.: 16.89m. 15,270 k.c.: 19.65m. 11,830 k.c.: 25.36m. 6,120 k.c.: 49.02m.	Atlantic Broadcasting Corporation, 485 Madison Ave., New York.	Relays WABC.	13m.: 9.30 p.m.—3 a.m. 16m.: No regular schedule 19m.: 3—7 a.m. 25m.: 7 a.m.—Noon. 49m.: Noon—1 p.m.
W3XAL	17,780 k.c.: 16.87m. 6,100 k.c.: 49.18m.	National Broadcasting Corp., 30 Rockefeller Plaza, New York.	Relays WJZ.	16m.: Daily (exc. Sun.), 11 p.m.—7 a.m. 49m.: Tues., Thurs., Sun., 7—8 a.m.; Sun., 2—3 p.m.
W3XAU	9,590 k.c.: 31.28m. 6,060 k.c.: 49.5m.	WCAU Building, 1622 Chestnut Street, Philadelphia, Pa.	Relays WCAU. Lately off air to increase power to 10 k.w.	31m.: 2—10 a.m. 49m.: 10 a.m.—1 p.m.
W3XL	17,310 k.c.: 17.33m.	National Broadcasting Corp., 30 Rockefeller Plaza, New York.	Experimental transmitter.	Irregular tests.
W4XB W8XAL	6,040 k.c.: 49.67m. 6,060 k.c.: 49.5m.	Miami Beach, Florida. Crosley Radio Corp., Cincinnati, Ohio.	Relays WIOD. Relays WLW, "The Nation's Station."	3—5 a.m. and 8.30—3 p.m. 8.30 p.m.—10 a.m. and 1—4 p.m.
W8XK	21,540 k.c.: 13.93m. 15,210 k.c.: 19.71m. 11,870 k.c.: 25.2m. 6,140 k.c.: 48.86m.	C/o Westinghouse El. Mfg. Co., Pittsburgh, Pa.	Relays KDKA. Power 40 k.w.	13m.: 10 p.m.—Midnight. 19m.: Midnight—10 a.m. 25m.: 8 a.m.—Noon (or 1.30 p.m.) 48m.: Noon—4 p.m.
W9XAA	11,830 k.c.: 25.36m. 6,080 k.c.: 49.34m.	666 Lake Shore Drive, Chicago, Ill.	Relays WCFL. "The Short Wave Voice of Labor and Farmer." Power 500 watts.	25m.: 9.30 p.m.—7 a.m.; Noon—3 p.m. 49m.: Mon., 2.30 a.m.—12.30 p.m.; Wed., Fri., Sun., 7 a.m.—3 p.m.
W9XBS	6,425 k.c.: 46.7m.	National Broadcasting Corp., 30 Rockefeller Plaza, New York.	Experimental transmitter (used to be W3XL).	Irregular.
W9XF	6,100 k.c.: 49.18m.	National Broadcasting Co., Chicago, Ill.	Relays WENR. Power 10 k.w.	Mon., Wed., Fri., Sat., 11 a.m.—3 p.m. Daily, 3—4 p.m.

variously reported as COCX (or COCE). The station opens just before 11 p.m., and can also be heard around 8 a.m. The address is believed to be Box 32, Havana.

Dominican Republic

In recent years stations have sprung up in this tiny Republic with amazing rapidity. A few years ago there were no Dominican stations included in reliable station lists, but to-day there are a host of HI's between 44 and 51 m.

As very little is known of these stations, apart from address, frequency and schedule, these bare facts are given in the table below.

Haiti

There are only two stations of importance in Haiti—HH2S on 50.72 m. and HH3W on 31.27 m.

The former, Box A103, Port-au-Prince, transmits from 10.30 a.m.—1.30 p.m., which makes reception here almost impossible. The latter, Box A117, Port-au-Prince, is on the air from 4—5 a.m., and again from 10—11.30 a.m.

Manly Radio Club Notes

By "SECOND OP."

EIGHT HOUR week-end saw the first serious work done on 5 metres by the Manly Radio Club. 2IV (Bill Smith), with two other members—C. Wilkin and J. Haining—travelled up to Blackheath with a 5-metre superhet receiver, and camped a mile this side of Blackheath. They were up bright and early to see what was to be heard and found that there was not much activity on 40 metres.

The first 5-metre signals heard were from VK2HL at 5.35 p.m., who was testing and playing recordings. Later he hooked up with VK2BJ, but the latter could not be heard. After an interval for tea and a rest they began again at 7.15 p.m., and at 7.30 p.m. heard VK2WJ on I.C.W. at QRA5, R6, calling CQ. At 7.45 p.m. he was

again heard on 'phone, which was very clear. He was working VK2ZN and remarked on the number of stations operating that evening on the 56 m.c. band. At 8.20 p.m. we changed over the filament battery and that brought his signals up to QRA5, R8.

A little later—at 8.50 p.m.—2HL was again heard, at QRA5, R7, in contact with VK2BJ. At this stage 2IV and Jim decided to walk into the town and ring up Don Knock, of 2NO. This was done in due course, but the latter could not come on as he was re-building his rig, but he took the report and said he would 'phone VK2WJ and let him know how his signals were getting up to Blackheath.

The boys arrived back at the camp in time to hear 2WJ calling them and thanking them for the report, this time his signals were QRA5, R max. on the 'phones.

Supper was the next item on the programme, and was to have been followed by an all-night session at the receiver, each of the party keeping a two-hour watch. However, unfortunately the filament battery petered out, and so everyone turned in.

DOMINICAN REPUBLIC S.W. STATIONS

CALL METRES	ADDRESS, Etc.	SCHEDULE
HI1J 51.15:	Box 204, San Pedro de Macoris.	3—5 a.m., 9.30 a.m.—Noon
HI3U 49.88:	Santiago de los Calalleros.	1.40—4.40 a.m., 7.40 a.m.—12.40 p.m.
HI9B 49.63:	Santiago.	9 a.m.—2 p.m. (irregular)
HI3C 49.2:	"La Voy de Rio Dulce," La Ramona.	2.55—4.25 a.m., 9.10 a.m.—3 p.m.
HI5N 48.9:	Santiago.	9.40 a.m.—12.10 p.m.
HI1A 48.5:	Box 423 Santiago.	2.40—4.40 a.m., 10.40 a.m.—12.40 p.m.
HIG 47.7:	Ciudad Trujillo.	10.10 p.m.—11.40 p.m., 3.40—5.10 a.m., 11.10 a.m.—Noon.
HIZ 47.5:	Ciudad Trujillo.	Daily 2.10—4.25 a.m., 8.10—11.40 a.m., Sun., 8.10 a.m.—2.10 p.m., Mon., 2.40—4.40 a.m.
HIIS 46.7:	Puerto Plata.	2.40—4.40 a.m., 8.40—10.40 a.m., 12.40—2.40 p.m.
HIX 48.9:	Ciudad Trujillo.	Daily 3.40—4.10 a.m., 7.40—8.40 a.m., Wed. Sat., 11.10 a.m.—1.10 p.m., Mon. 10.40 a.m.—1.10 p.m.
HI4V 46.3:	"La Voz de la Marina," Ciudad. Trujillo.	2.40—4.40 a.m., 8.10 a.m.—12.40 p.m.
HIL 46.15:	Box 623, Ciudad Trujillo.	3.10—4.40 a.m., 8.40—10.40 a.m.
HI4D 45.7:	Ciudad Trujillo.	2.55—4.40 a.m., 7.40—10.40 a.m., Daily Exc. Mon. Irregular.
HI8A 45.45:	Ciudad Trujillo.	3.10—4.40 a.m., 8.40—11.40 a.m., Sun. 1.40 p.m.—3.40 p.m.
HIT 45.2:	"La Voz de la RCA Victor," Box 1105, Ciudad, Trujillo.	3.10—4.40 a.m., 10.30 a.m.—Noon, Sun. 6-7 p.m., Mon. 7.15—9 a.m.
HIH 44.2:	San Pedro de Macoris.	Daily 3.40—4.40, 9.40—11.40 a.m., Sun. 3.40—4.40 a.m., Mon. 1.40—2.40 a.m.
HI7P 44.1:	"Emisoría Diaria de Comercio," Ciudad, Trujillo.	

Club Chatter.

2IV is busy building 5-metre rig; promises big things when it is finished. 2MR is on 40 metres with 3 watts of 'phone; is doing very well—R9 from VK3. 2NG is down on 20 metres—when not playing tennis!

2QK, on 40 and 20 metres, is chasing DX; also doing a bit of 'phone on 40 metres. 2HF, still working DX, is now in new location. Says it is fine. 2EL down on 20 metres mostly, says that the club has R max. harmonic down there at his shack. 2KX not on much of late. Same old reason!

2NB is back again after a long rest—glad to hear you, Norm. 2DA is now chasing DX on 20 metres and dodging 2MR's harmonic. 2ZF has just returned from a trip to VK4. Have not heard you on the air much, George. Let's hear from you. 2ON also just back from Tamworth where he spent most of his time on the air—now studying at the University. 2FF has not been heard for a long time.

The local "gang" had a fine night out at the Zero Beat's Club Dinner on September 10. After the usual toasts, two of the gang came to light with guitars and started the fun with community singing. H. Whyte-Meach gave an exhibition of tap and sword dancing—who were the two "hams" that thought they could dance as well?

Anyone interested in radio in Manly is invited to come along to the new club rooms, next to the Manly Baths, on Monday nights at 8 p.m. or during the week-ends, where they will be made very welcome.

News and Entertainment From World's Leading Broadcasters

DX Doings on The Short Waves

By H. J. BRENNON

OF the B.B.C. Group, **GSB**, 31.55 m., is heard at full speaker strength during the whole of Transmission 1 from 5.15 to 7.15 p.m., **GSD**, 25.53 m., at half to full speaker strength between 12.30 and 2.45 a.m., with **GSB** and **GSD** at full speaker strength from 7.00 to 8.45 a.m. Several of the Rugby 'phone stations working on wavelengths between 21.44 m. and 34.25 m. are also heard almost daily.

The most outstanding of the Radio Coloniale Group are: **TPA4**, 25.60 m., at varying strength during morning sessions and full strength early afternoon session; **TPA3**, 25.23 m., full speaker at late afternoons. Another French station on 32.15 m.—**TYA2**, I believe—is at half to full speaker strength between 4.30 and 6.5 p.m.

Of the United States Group, the following are the best heard here: **W2XAF**, 31.35 m., is heard distinctly between 8.00 and 9.15 a.m. This station is sometimes heard at half speaker strength between 1.45 and 2.30 p.m., and occasionally around 10 p.m.

W3XAU, 31.28 m., is sometimes heard about 8.30 a.m. at rather good volume. **W1XK**, 31.35 m., is on the air from 9.00 to 9.30 p.m., but the broadcast is interfered with by **VK3LR**, Vic., which is only 25 miles away. **W8XK**, 25.26 m., relays a session in the mornings from **KDKA** at half speaker strength. **W1XAL**'s (25.45 m.) transmissions are spoiled by a "repeat" from a station that I have not been able to identify so far. **KWV**, 27.68 m., broadcasts musical items and tests with **JVM**, Japan, 27.98 m. **WNA**, 32.72 m., is often heard testing with musical items and calling England. **KEJ**, 33.3 m., is mostly heard in the mornings relaying a programme from the N.B.C. at varying strengths. **W9XAA**, 25.26 m., was heard on two occasions recently about 7 a.m., broadcasting musical items and a speech at half speaker strength.

Of the German Group, those on the 31 m. band are easily the best, and are heard nearly every day as follows: **DJA**, 31.38 m., and **DJN**, 31.45 m.,—evening sessions from both are very clear. **DJD**'s (25.49 m.) transmission is spoiled by interference. **DZC**, 29.16 m., has been heard broadcasting musical items at 10.15 p.m. Several 'phone systems are also heard daily from Germany.

YDB, 31.09 m., **PMN**, 29.74 m., and **PLP**, 27.27 m., of the Dutch East Indies Group, are all classed as local and can be heard nightly. **PZH**, 42.88 m.,

broadcasts native music and vocal items from 8.00 to 10.45 p.m. at good volume. **PLV**, 31.87 m., is heard in the evenings broadcasting musical items and calling Amsterdam.

ZRO, Rome, 25.4 m., is heard in the mornings and late evening at fair volume. Its broadcast on 31.13 m. has been rendered useless for listening purposes through a "buzzing apparatus" on the same wavelength.

EAQ, Spain, 30.43 m., is heard occasionally around 7.15 p.m. at good listening strength. Believe it is this station I have heard on two occasions during the week at about 9.45 p.m., broadcasting talks on the Spanish situation. A broadcast in English, which I think came from a "rebel" station, was heard on approximately 31.40 m., at 10.55 p.m. on October 12.

JVN, Japan, 28.14 m., is heard regularly from 7.20 to 10.45 p.m. This station has been broadcasting on three Saturday afternoons lately some kind of sport—baseball, I believe.

COCQ, Cuba, 31.28 m., is heard around 3.00 p.m. daily and again at 10 p.m., but has not been heard for the past two days.

A new station is **ZBW**, Hong Kong, 31.42 m., which is heard from 8 to 11 p.m. at full speaker strength each night. Also, **ZCK**, 34.29 m., is to be changed to **ZBW2** and can be heard about 9 p.m. at varying volume. This latter station seems to have lost a lot of interference suffered by it in the past.

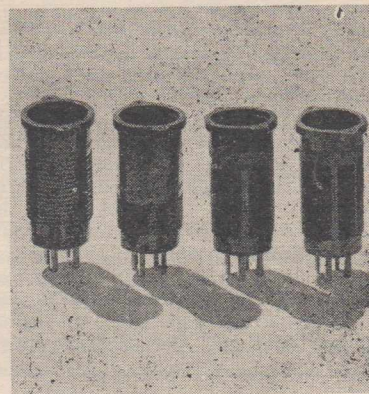
CQN, Macao, China, 31.23 m., whose broadcasts lately have been very poor, can be heard each Monday and Friday from 10.30 to 11 p.m.

HJ1ABC, Colombia, on approximately 31.15 m., broadcasts news in Spanish and musical items around 10 p.m. occasionally. Also, **HJ1ABE** (A for America, B for Boston and E for England) on 31.41 m., is heard calling, speaking and testing around 5 p.m. very often. **HJ1ABB**, 25.4 m., has been heard in the evenings around 9 p.m. testing at full speaker strength.

Of the other broadcasts heard and identified, the best are as follows: **RNE**, 25 m., Russia, broadcasts musical and vocal items and propaganda—heard generally in the mornings. Sometimes works 'phone systems around 9 p.m.

KKH, Hawaii (KIO), 25.68 m., is heard occasionally about 4 p.m. broadcasting musical and vocal items. It has been working with an unidentified station at Dixon, California, U.S.A.

HBJ, Radio Nations, has been testing on 26.33 m., with **VK3LR**, Vic.



This photograph shows four of the five coils wound for the "All-Wave Bandsread Two," described in the September "Radio World."

S.W. Fans And Amateurs!

We specialise in winding coils of all types for set-builders and amateurs. Every coil is precision-wound on threaded plug-in formers of a special moulded material that is extremely low-loss, exactly to specifications supplied. 1½ in. or 1¼ in. diameter formers available, with any number of pins.

A poor set of coils can ruin any set's performance. Use a Standardised Coil Kit, and note the improvement in results!

"RADIO WORLD" SHORTWAVE SETS

We can supply single coils or complete kits for any of the following receivers:—

"ALL-WAVE ALL-WORLD TWO,"
"EAGLET SHORTWAVE TWO,"
"EMPIRE SHORTWAVE THREE,"
"ALL-WAVE BANDSPREAD TWO."

Price: 2/6 per coil
(1¼ in. former)

Price: 3/6 per coil
(1½ in. former)

Postage 2d. per coil extra, 5 coils 8d.

**STANDARDISED
PRODUCTS,
14 HEDGER AVENUE,
ASHFIELD, N.S.W.
Phone - - - - U3957**

VP3MR, 42.68 m., British Guiana, broadcasts native and English programmes between 8 and 11 p.m. at varying speaker strength. **COCX**, Cuba, 26.4 m., has been heard from 8 to 11 p.m. at half to full speaker strength.

CTIAA, 31.09 m., Lisbon, Portugal, is heard frequently at 8 a.m. **KKZ**, 21.91 m., Bolinas, California, heard testing at full speaker strength about 7.30 p.m. **VPD2**, Suva, 31.51 m., is heard around 10 p.m. Prior to that time is practically useless for listening purposes because of "blanketing" by **VK3ME**, Vic. **VK3LR**, 31.32 m., is also badly interfered with by some unknown station. **VK2ME**, Sydney,

can be heard clearly on Sunday evenings and early Monday mornings.

Several new signals are being heard daily, but so far I have not been able to identify them.

Of the amateurs heard, the **VK4**, 7, 2 and 5's are the best. To those people wishing to keep in touch with up-to-date happenings in the world, a good station to listen to is **ZBW3**, and if Spanish is understood, then **COCQ**, and the Spanish morning session from **W2XAF** usually heard about 9 a.m.

There has been a noticeable improvement in the musical programmes of **JVN**, Japan, and of the Radio Coloniale Group, and also increase of apparent propaganda from German and

Russian stations. Another striking feature is the absence of news in Australia of important happenings in other parts of the world.—H. J. Brennon, Packville, Victoria.

Do You Know?

That a larger value of grid leak than usual often gives best results on the short waves? Values as high as 6 megohms may be tried.

That an unscreened r.f. choke can cause instability, due to its external field, if it is not carefully positioned.

VK AMATEUR STATIONS . . . Additions and Amendments

Additions.

CALL SIGN	LICENSEE	ADDRESS
3WL	Nye, W. L.	16 Berry Street, Coburg, N.13, Vic.
6AB	Buckie, A. C.	141 Adelaide Terrace, Perth, W.A.
6BR	Randell, B. F. H.	15 Lawley Crescent, Mount Lawley, W.A.
3SO	McCubbin, B. L.	41 Chestnut Street, Richmond, E.1, Vic.
4TW	Tarling, A. W.	Henry Street, West End, Townsville, Qld.
3EK	Bell, R. J.	10 Banks Avenue, Hampton, S.7, Vic.
3WT	Milledge, R. A.	33 Wyndham Street, Shepparton, Vic.
3EH	Foot, E. H. S.	19 Knutsford Street, Balwyn, E.8, Vic.
3SE	Widgery, S. E.	515 Lydiard Street North, Ballarat, Vic.
3NB	Nickson, A. F. B.	58 Wattletree Road, Malvern, S.E.3, Vic.
5SM	South Australian School of Mines and Industries,	North Terrace, Adelaide, S.A.
3BG	Jones, R. B.	11 Mitchell Street, Bendigo, Vic.
2ADD	Rooks, J.	7 Selmon Street, Sans Souci, N.S.W.
3UO	Harvey, C. G.	43 Dandenong Road, Malvern, S.E.3, Vic.
3FA	Falkenberg, B.	"Bonnie Hills," Byaduk, Vic.
2FM	Murray, F. A.	21 Reginald Street, Cremorne, N.S.W.
2ADC	Wreford, R. N.	230 Mica Street, Broken Hill, N.S.W.
2ADF	North Suburban Radio Club,	cnr. Brown Street and Pacific Highway, Chatswood, N.S.W.
3GF	Auld, J. R.	76 Parker Street, Williamstown, W.16, Vic.
3VB	Hughes, E. W.	26 The Right, Eaglemont, N.21, Vic.
4JT	Boileau, J. G.	Port Moresby, Papua.
2ADG	Finlayson, F.	61 Gosford Road, Broadmeadow, Newcastle, N.S.W.
3DE	Hale, D. E.	Buninyong, Vic.
3FF	Speer, J. F.	"Viewfield," Corop, Vic.
3GO	McGowan, R. C. G.	Foster Street, Sale, Vic.
2ADH	Deaman, F. C.	2 Martin Street, Haberfield, N.S.W.
2ADI	Williams, J. B.	"Carberry," Blair St., Bondi North, N.S.W.
2ADJ	Nestrom, O. L.	419 Morgan Street, Broken Hill, N.S.W.
5MC	Coulter, J. M.	36 Brighton Road, Glenelg, S.A.
2ADK	Pugh, E. G.	Moonee Street, Coff's Harbour, N.S.W.
2ADR	Roy, A. R. J.	26 Macquarie Street, Mascot, N.S.W.
5ZU	Phillips, A. M.	68 Kintore Avenue, Prospect, S.A.
4PW	Wood, P.	Nicholas Street, Ipswich, Qld.
3XG	Page, B. F. D.	Strachan Street, Birregurra, Vic.
5JS	Strafford, J. J.	71 Ann Street, Stepney, S.A.
2ADL	Kinscher, E. W. D.	Hope Street, Bourke, N.S.W.
7WJ	Lithgow, J. C.	174 George Street, Launceston, Tas.
6EI	Grogan, A. W.	29 Clifton Crescent, Mount Lawley, W.A.
2ADM	Radclyffe, L. E.	Alt Crescent, Ainslie, F.C.T.
4RF	Lubach, F. J.	90 Prince Street, Thompson Estate, South Brisbane, S.3, Qld.
2ADN	Gerard, J. W.	Lister Street, Coff's Harbour, N.S.W.
5RK	Deane, R. K.	121 Wattle Street, Fullarton, S.A.
4MI	Goford, T. W.	Camooweal Street, Mount Isa, Qld.
5CY	Henry, R. C.	Cook, S.A.
4TK	Stack, R. P. C.	Owen Street, Innisfail, Qld.
2CL	Taylor, L. H.	45 Hardy Street, Ashfield, N.S.W.
2VU	Partridge, G. D.	16 Hunter Street, Singleton, N.S.W.
2ADO	Arthur, R. W.	96 Hudson Street, Hurstville, N.S.W.
2ADP	Richter, R. W.	15 Macquarie Road, Auburn, N.S.W.
2ADQ	Park, E. J.	5 Grace Street, Lane Cove, N.S.W.
3DA	Webber, H. P.	37 Lucerne Crescent, Alphington, N.20, Vic.
2ADS	Davies, T. J.	58 King Street, Rockdale, N.S.W.
2QI	Davies, L. E.	10 Russell Street, Vacluse, N.S.W.
7GD	Dineen, G. J.	2 Brougham Street, Launceston, Tas.
2ADT	Hill, J. H.	17 Allen Street, Lismore, N.S.W.
2ADU	Cooper, F. C.	83 Orion Street, Lismore, N.S.W.
2ADV	Phillips, S. J.	28 Murdoch Street, Cremorne, N.S.W.
3GD	Downing, W. G.	Stanhope, Vic.
6YZ	Samphier, R. L.	14 Stuart Street, Perth, W.A.
4VZ	Garth, R.	Mackay, Qld.

Alterations To Call-Signs.

CALL SIGN	LICENSEE	ADDRESS
3BD	Cox, E. H.	384 Wattletree Road, East Malvern, S.E.5, Vic. Now VK2GU. (See also Changes of Address.)
2ACY	Rickaby, L. D.	C/o Mrs. C. C. Hopkins, 44 Gillies Street, Lakemba, N.S.W. Now VK4VR. (See also Changes of Address.)

Changes of Address.

CALL SIGN	LICENSEE	ADDRESS
3DR	Bennett, W. J. J.	Alexandra Street, Mooroopna, Vic.
5RJ	Hancock, D. M.	86 Taylor Street, Kadina, S.A.
2HH	Sandel, O.	101 William Street, Sydney, N.S.W.
3JU	Phillips, H. E. J.	389 Victoria Street, Abbotsford, N.9, Vic.
4HK	Kinzbrunner, H. C.	Tully, Qld.
7KR	Robinson, C. J.	8 Howick Street, Launceston, Tas.
4WW	Radford, W. D.	Elimatta Drive, Ashgrove, W.3, Qld.
4LO	Nolan, Mrs. V. E.	110 Wharf Street, Brisbane, Qld.
2LP	Bean, L. P. R.	"Rochester," Orana Avenue, Pymble, N.S.W.
2GK	Le Cornu, O. C.	64 Spring Street, Lismore, N.S.W.
3UX	Smith, A.	203 Nicholson Street, Abbotsford, N.9, Vic.
3BD	Cox, E. H.	Barkly Crescent, Forest, F.C.T. (See also Alterations to Call Signs.)
2YI	Blue, H. W.	328 Parramatta Road, Petersham, N.S.W.
2FI	Ferguson, J.	111 Hewlett Street, Waverley, N.S.W.
2RF	Glassop, R. J.	5 Stewart Avenue, Hamilton East, N.S.W.
2MZ	Hurstville Radio Club,	27 Neirbo Avenue, Hurstville, N.S.W.
3LQ	Sheppard, W. H.	25 Florizel Street, Burwood, E.13, Vic.
3JE	Alder, W.	C/o Mr. W. Collins, Commercial Rd., Yarram, Vic.
2OA	Winch, R. M.	13 Albion Street, Harris Park, N.S.W.
2XU	Pollock, G.	"The Chalet," Medlow Bath, N.S.W.
2ACF	Welzel, K.	23 Woonona Road, Northbridge, N.S.W.
2TN	Bailue, I.	"Osborne," Albert Street, Randwick, N.S.W.
2MJ	Crisp, A. J. S.	41 Abercorn Street, Bexley, N.S.W.
2ACY	Rickaby, L. D.	57 Shakespeare Street, Coorparoo, S.E.2, Qld. (See also Alterations to Call Sign.)
4ES	Sprenger, H. E.	32 Burnett Street, South Bundaberg, Qld.
3CW	Walters, C. A.	18 Cape Street, Heidelberg, N.22, Vic.
3MK	Vale, L. H.	90 Orange Avenue, Mildura, Vic.
3UJ	Roudie, A.	6 Arthur Street, Fairfield, N.20, Vic.
7WI	Wireless Institute of Australia (Tas. Division),	95 Arthur Street, North Hobart, Tas.
2FI	Wells, A. J.	45 Bon Accord Avenue, Waverley, N.S.W.
4UU	Chitham, W. N.	32 Doggett Street, Valley, Qld.
3AM	Forecast, A. M.	16A Ellington Street, Caulfield, S.E.8, Vic.
3ZL	Thomas, D. E.	13A Rowe Street, Ballarat East, Vic.
2XA	James, H. K.	Flat 4, "Branxton," Arden St., Coogee, N.S.W.
6FH	Hull, F. A.	Port Hedland, W.A.
2FT	Tregurtha, F. C.	72 Upper Pitt Street, Kirribilli, N.S.W.

Cancelations.

CALL SIGN	LICENSEE	ADDRESS
40B	Burmester, O. C.	Stanley Terrace, East Brisbane, Qld.
2GV	Cook, F. L.	C/o Mrs. Tilly, 8 Francis Street, Dee Why, N.S.W. (Portable).
2JX	Adams, P. H.	129 Cremorne Road, Cremorne, N.S.W.
2LQ	Griffin, T. N.	40 William Street, Hornsby, N.S.W.
3ZS	Forster, M. M.	78 Leopold Street, South Yarra, S.E.1, Vic.
5WG	Huppertz, W. C.	39 Turner Street, Cowandilla, S.A.
4AT	Bauer, A. T.	C/o G. J. Grice, Shields Street, Cairns, Qld.
2JM	Macbeth, I. J.	37 Henry Street, Punchbowl, N.S.W.
2MW	Manley, W. M.	112 Victoria Road, Parramatta, N.S.W.
4AJ	Allison, A. C.	Warraba Avenue, Chermiside, Qld.
2OX	Barnes, G. E.	233 Keen Street, Lismore, N.S.W.

Amendment.

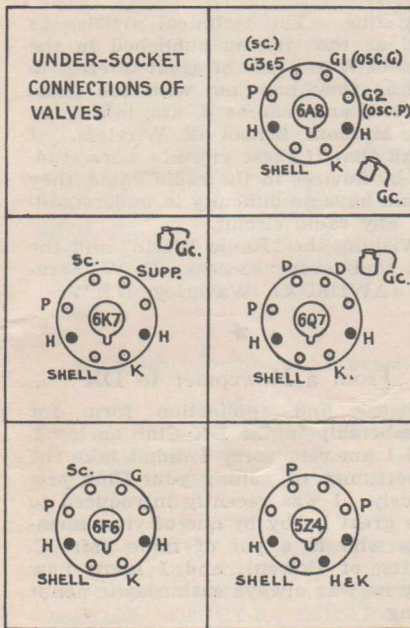
2EP	Watson, E.	80 Stanley Street, Burwood, N.S.W. Now Pastor E. Watson.
-----	------------	--

Air-Ace Dual-Wave Five

(continued from page 15)

—by using actual noise level instead of a station or oscillator signal.

To align the set on the broadcast band, commence by tuning the set to about 200 metres and adjust the aerial trimmer only. The correct



position for this trimmer is when the "noise" attains its highest volume. Now tune the set above 2FC and adjust the padder in the same way as the aerial trimmer. (These adjustments should be made in daylight, or Interstate stations will interfere with adjustments.) When the padding is finished, retune to about 200 metres and adjust the aerial trimmer again. The aerial trimmer should only be adjusted on approximately 200 and the padder only on about 500 metres.

The Shortwave Band.

The broadcast band alignment being finished, the shortwave trimmers can be adjusted next.

Tune the set to about 19 metres; it should be possible to pick up noise and static, but failing this a station should be used. When ready, turn the aerial trimmer slowly until maximum noise or signal strength is attained. The shortwave padder or oscillator trimmer should not be altered, as each of these has previously been adjusted at the factory laboratory for best results.

The Best Aerial.

If an ordinary "L" type aerial is used, the flat top should be as high as possible, with a direct lead-in, but the overall length should not be

much in excess of 40 feet. A suit-
Foundation Kit Now Available.
Though every component used throughout the "Air Ace" is already available at leading radio stores throughout Australasia, Messrs. Radiokes Ltd. advise that they have prepared a special Foundation Kit, type FK-3, for this receiver.

Shortwave Station Addresses

By H. I. JOHNS

(Continued from last month.)

GSA, GSB, etc.—British Broadcasting Corp., Broadcasting House, London, W.1, England.

G6RX—Mr. G. A. Struthers, Rugby Radio Station, Hillmorton, England.

HAS, HAT—A Magyar Kir. Posta. Kiserleti Allomasa, Gayali-ut, 22, Budapest, Hungary.

HBJ, HBF, HBO, HBQ, HBL, HBP—M. G. Gallarati, Information Section, League of Nations, Geneva, Switzerland.

HB9AQ—Lausanne, Switzerland.

HB9B—Radio Club Basle, Postfach, Basle 1, Switzerland.

HCETC.—Casilla 134, Quito, Ecuador.

HCJB—Radio Station HCJB, Casilla 691, Quito, Ecuador.

HC2CW.—P.O. Box 1166, Guayaquil, Ecuador.

HC2ET—Radiodifusora, HC2ET, Box 249, Guagaguil, Ecuador.

HC2JSB.—Guayaquil, Ecuador.

HH2S—Mr. Armand, Mallebranche, P.O. Box A103, Port au Prince, Haiti.

HH3W.—P.O. Box A-117, Port-au-Prince, Haiti.

HIG.—Trujillo, D.R.

HIH.—"La Voz del Higuamo," San Pedro, de Macoris, D.R.

HIH.—"La Voz de Iguano," San Pedro de Macoris, Dominican Republic.

HIL.—Box 623, Trujillo, D.R.

HI1S.—Puerto, Plata, D.R.

HIT.—Box 1105, Trujillo, D.R.

HI3U.—Santiago, de los Caballeros, D.R.

HI4V.—Calle Duarte, 48 Trujillo, D.R.

HI9B.—P.O. Box 95, Santiago de los Caballeros, D.R.

HI1A—Rafael Western, Box 423, Santiago de los Caballeros, Dominican Republic.

HI1J—P.O. Box 204, San Pedro de Macoris, Dominican Republic.

HI3C—"La Voz del Rio Dulec," La Romana, Dominican Republic.

HI4D—"La Voz de Quisueya," Santo Domingo, Dominican Republic.

HIZ—Secretaria de Estado, De Trabajo y Comunicaciones, Santo Domingo, Dominican Republic.

HJ1ABB—Elias J. Pellett, Box 715, Barranquilla, Colombia.

HJ1ABD—Sr. Ignacio de Villareal,

Three-Valve Battery Set Next Month

One of the constructional features of the December "Radio World" will be the description of a three-valve t.r.f. battery set for country use. Using iron-cored coils and latest type valves, it will have excellent range, and at the same time will be very cheap both to build and operate. Make sure of next month's copy by ordering it NOW—it's going to be a "winner"!

Radio Station HJ1ABD, Cartagena, Colombia.

HJ1ABE—Sr. Jose M. Furentes, P.O. Box 31, Cartagena, Colombia.

HJ1ABG—"La Voz del Atlantico," Apartado 445, Barranguilla, Colombia.

HJ1ABH—Sr. Sergio Martinez, Aparicio, Cienaga, Colombia.

HJ2ABA—Pompilio, Sanchez, C. Tanja Boyaca, Colombia.

HJ3ABD—Colombia Broadcasting, Calle 16, No. 5-40, Bogota, Colombia.

DX News Contest The Prize List

In this month's DX News Competition, Alan H. Graham and "The Southlander" each receive 12/6, H. C. Brennon 7/6, and J. Harrower, A. Graham, and N. J. McMinn, 5/-. Further contributions are also to hand from G. Hayman, L. Stone, and "Vic Ham," but owing to heavy pressure on space it is regretted that it is not possible to publish them this month.

HJ3ABH—"La Voz de la Victor," Apartado 565, Bogota, Colombia.

HJ4ABA—Medellin, Colombia.

HJ4ABC—Pereira, Colombia.

HJ4ABE—Cia Radiodifusora de Medellin, Medellin, Colombia.

HJ4ABL—HJ4ABB: "Ecos del Occidente," P.O. Box 79, Manizales, Colombia.

HJ4ABN—Manizales, Colombia.

HJ5ABC—R. Angulo, Radiodifusora, HJ5ABC, Cali, Colombia.

HJ5ABD—Cali, Colombia.

(To be continued next month.)

DX Club Report Forms Great Time-Saver For Dxers

Every experienced dxer knows that the simplest and surest way of ensuring a verification from a station is to prepare the report on a form specially designed for the purpose. The Official Report Form of the All-Wave All-World DX Club is ideal. All the information appreciated by stations is given, and all that is necessary to complete a report is to fill in the blanks provided.

By using these forms, dxers can not only be certain of supplying every detail wanted by the station, but also they are identifying themselves with an established Club, and so are far more likely to receive back replies than if an ordinary letter were sent.

These forms are sold to members only at a price of 1/6 for 50, post free.

DX News and Views

A page for
letters from
DX readers

Has Logged Hundreds of Amateurs

I received my certificate and badge some weeks ago and am very pleased with them. I think the badge is an excellent turn-out and the report forms are A1, so am sending 1/6 postal note for 50 of them. I showed a friend of mine here the badge and certificate and he immediately applied for membership.

I have not had much experience of dxing on the broadcast band, but have done a fair bit on the 10, 20, 40 and 80-metre amateur bands. I recently received verifications from K6CMC, ON4VK, ZL3BK, W6BKY and W1ARC, and have logged hundreds of other amateurs on 'phone in 14 different countries.

Wishing the club and magazine the best of luck. — T. D. Dowling (AW97DX), Geelong, Vic.

★

Wants to Swop QSL's

I wish to let you know that your book, the "Radio World," is absolutely the finest radio magazine I have yet read and I find that each copy is a little better than the one preceding it.

I am not a member of your Club but I intend to join in the next couple of weeks. I have over 700 station and SWL cards here, and I also have my own QSL card and will be only too pleased to exchange with any other SWL's who have cards.

I am 19 years of age and have been keen on radio for four years. I am a picture projectionist at our local theatre.—B. G. Hewerdine, (Electra St., Bundaberg, Q'land).

★

Mean Looks from The R.I.!

Station VK9GM expired peacefully about two years ago, and since your (and other) letters arrived addressed "Operator Station VK9GM," the R.I. has been giving me a series of very mean looks!

However, as I have at last achieved fame, would you please send me the "Radio World" for one year, commencing with the September, 1936, issue. 10/6 enclosed. Best wishes.—G. M. Hill, c/o Police, Rabaul, New Guinea.

★

Article Arouses Great Interest

The "set-up" of my article in last month's issue was perfect in my estimation, and has aroused great interest

here. Several of our Club members have already written me and are going to pay me a visit, while a Dubbo dxer also wrote me requesting full details of the card system, aerial, diagram, and circuit of two-valver. These have been sent to him. I have also already had several other inquiries for circuits, etc.

Regarding the formation of branches of our Club, I will be pleased to



J. V. McMinn, a well-known New Zealand shortwave enthusiast, in his DX "den." He offers to exchange station photographs with other "Radio World" readers, his QRA being 12 Edge Hill, Wellington, N.Z.

receive North Shore members at my home any Tuesday or Thursday night to form a local branch.—H. Whyte-Meach (AW69DX), Artarmon, N.S.W.

★

A Fine S.W. Log

My aerial, which I am constantly changing, is at present 70 feet long and 40 feet high. It passes over a garden, and is about 30 feet away from any building or trees. My receiver is the "Paris Two," a battery-operated shortwaver using a 30 detector and a 33 pentode as output.

With this receiver I have picked up the following amateurs: VK's 2NO, 2ABS, 2YF, 2HS, 2XS, 2ZO, 5CM, 2FV, 2EQ, 2DK, 2QV, 5WI, 5SL, 2CR, 5LC, 2BT, 2ES, 4RG, 3ZZ, 2QS, 2AT, 2JI, 2MM, 2KR, 2DV, 2ML and the A.B.C. station, 3LR. I have also received the Americans W2CYZ and W1SZ. I have only one of these stations verified as my second report did not bring a reply, though I am sure the address and contents were both correct. As I now have a supply of the Club's Report Forms I intend to verify most of the stations I receive in the future.

As for the "Radio World," I am glad that Australians can now boast of a 100 per cent. technical radio

magazine. The technical articles as well as the circuits published in the "Radio World" are of great interest to me as they help me with the radio serviceman's course I am taking at the Marconi School of Wireless. I think that if these circuits were studied by novices in the radio game, they would have no difficulty in understanding any radio circuit.

Wishing the "Radio World" and the DX Club every success.—P. W. Stanley (AW118DX), Waverley, N.S.W.

★

From a Newcomer to DX

Please find application form for membership in the DX Club enclosed, and I am very sorry I didn't take the opportunity of joining your Club previously. I was recently introduced to this great hobby by one of your members who is a pal of mine (Mr. C. Watts, of Bowen), and I know now why he was always enthusiastic about dxing.

I have two aerial masts both 65 feet high with a transposed lead-in to a 5-valve Airzone dual-wave superhet, which gives great results. I have logged a few foreign stations and amateurs, but am waiting till I become a fully fledged member of your club before sending in a detailed report.

Wishing the Club every success.—R. Cook (AW122DX), Bowen, N. Queensland.

★

Three Weeks' Dxing

I have only been dxing for three weeks, and have "veries" from New Zealand stations as follows: 1YA, 1ZM, 1ZE, 2YB, 2YC, 2YA, 3YL, 3YA, 4YA, 2ZH, 2ZR, 1YX, 3ZR and 2ZO. Reports are out to 2WL, 2UE, VK2ME, VK3ME, 4ZP, 2FC, 2KY, 2KO, 2ZF, 2ZJ, 2GZ, 4YO, 5GL, 3ZM, ZBW, VK2CJ and W5CCB.

The location here is not very good as we are troubled by power noises. I also am very pleased with the "Radio World," which I have been getting since May last. I always look forward to receiving my copy each month.—Charles Pepperell, (AW131DX), Rahu-tu, Taranaki, N.Z.

★

Some Local VK News

Just a short note re the radio mag—it's sure a great little book, and is

just what "hams" and listeners need. Everyone here buys your mag. and we all say it's the goods. Have enclosed the local doings around the "ham" shacks just as I found them. — T. Bailue, (Randwick, N.S.W.).

Eastern Suburb News

VK2KH—Bill is still trying to get his 801 to perk. Let's hope he doesn't—I live too close to him! **VK2PY** still works all the W's about the place at any old time. He intends putting in 'phone soon. **VK2ABF** puts out nice quality 'phone with his 2A5's as modulators and high-class "mike." **VK2ABH** is in trouble. His antenna won't take any soup, but his super scoops them in—so why worry, Peter? **VK2ABE**—Les has packed up and moved, I don't know where, but it means less QRM for me! **VK2UV**—Bill still works duplex with his cobber Ray (2VB). **VK2TN** (7020 k.c.) going to rebuild with a 53, 46 and maybe a 210.



A Month's Dxing on Shortwave

HERE is a list of calls heard during September, using a 1-v-1 receiver. The numeral suffix indicates signal strength by the "R" system (R1-9):—

14 M.C. BAND (CW):

CE3AR-7, CT1ZZ-5, CX1BG-6, CN8MI-6, CR9AB-5, CP1AA-7, CP1GB-7, D3GKR-5, D3DSR-5, D3DFN-5, D3GRH-5, D3BRT-5, D3BMP-5, D3DHN-5, D4MOL-5, D4XOD-5, D4LDM-5, D4KRJ-6, D4ENH-5, D4QFT-5, D4VRR-5, D4OFT-5, D4YJI-5, D4GFF-5, D4BHA-5, ES2C-6, F3EB-5, F3AM-5, F3GS-6, F3EQ-6, F3CY-6, FA8BG-5, F8RC-6, F8UK-5, F8SZ-6, F8EA-4, F8DC-7, F8VP-5, F8LG-5, F8WK-5, F8NR-6, F8IZ-5, F8ZZ-4, F8NY-5, F8CP-5, F8NN-7, F8IG-6, F8FG-6, F8GG-5, F8SD-5, F8TM-5, F8VD-5, F8QY-6, F8OO-5, F8RR-5, FT4AA-7, FT4AG-6, FK8AA-5, G2PL-5, G2TM-7, G2ZY-5, G2XN-5, G2IM-5, G2LC-5, G2NQ-5, G2NF-5, G2JX-6, G2HF-5, G5MA-5, G5YH-4, G5KG-5, G5UX-4, G5JO-5, G5GQ-5, G5VB-4, G5VQ-4, G5CJ-5, G5JX-4, G5PP-5, G5NQ-5, G5KJ-6, G5IV-5, G6FQ-5, G6VP-4, G6YU-6, G6GH-5, G6IF-4, G6BS-5, G6XM-4, G6CL-5, G6WY-6, G6QS-5, HAF1YL-5, HAF3D-7, HAF4K-5, HAF4H-5, HAF5C-6, HAF6G-5, HAF7D-7, HAF7G-5, HB9M-6, HB9AC-6, HB9AL-6, HB9AX-4, HB9AW-5, HB9BD-5, HB9BC-5, HB9BT-5, HS1PJ-7, HP1A-6, I1EY-5, I1KN-6, I1ZZ-5, J6CZ-6, J6DK-6, J8CF-5, J9CA-5, K5AG-5, K5AY-5, K7PQ-7, KA1MD-6, LY1J-5, LY1ZZ-5, LA1V-5, LU5AQ-6, LU8AU-6, NY2AE-6, OE1EK-5, OE1FP-6, OE3FL-5, OE7JH-5, OH3OI-6, OH3NP-5, OH5NG-4, OK1ZB-5, OK1LX-5, OK1CX-4, OK1RU-5, OK1JZ-5, OK2OP-5, OK2MV-6, OK2RS-5, OK2PN-5, OK2RM-6, OK2LO-5, ON4JB-5, ON4DX-5, ON4HC-6, ON4HV-5, ON4GK-5, ON4FEC-5, ON4JAK-5, OZ2M-5, OZ3FL-5, OZ7CC-5, OZ8JB-5, OZ8A-5, XOZ5UB-

5, PAOQZ-5, PAOSS-5, PAOTB-4, PAOSD-6, PAOUN-5, PAONP-4, PAOMG-5, PAOMDW-5, PK1BX-5, PK3LC-7, PK4RK-6, PY2AG-6, PY2AJ-6, PY1DK-5, PY2DC-7, PY3BY-7, PY5QD-5, PY5QG-6, PY5BO-6, SM5UD-5, SM6QN-6, SP1LM-5, SP1BA-7, SP1IH-5, SP1KM-4, SP1DE-5, SU1AC-5, SU1CH-6, SU1RO-6, U1BL-5, U3BC-5, U3AG-5, U3AS-5, U3DQ-6, U9AL-6, U9MF-6, VE1DQ-5, VE1EA-5, VE1CI-4, VE1ET-6, VE1AK-6, VE2IF-6, VE2BN-6, VP5AB-6, VS7RF-6, VS7MB-6, VS7LT-6, VS1AA-7, XE1H-7, XE1DD-6, XE1AG-5, XU3GC-5, XU8HR-5, YR5EV-6, YR5AT-6, YU7DX-5, YU7VX-6, YN1AA-5.

14 M.C. BAND (Phone):—

CE3DW-8, CO2KY-7, CO5RY-6, CO2SV-6, CP1AA-3, CP1GB-6, F3JD-5, F8II-6, F8VP-6, G6LK-6, HB9Y-6, HB9AY-6, HK1Z-6, K6NTV-8, K6ENR-7, K6BTT-6, KA1AP-5, KA1ER-6, LU1DJ-6, LU2BG-7, LU4BH-8, LU6KE-7, LU9BV-6, OA4R-7, ON4VK-8, PK1MX-7, PK3ST-7, PK3WI-7, PK4VI-7, PY2CK-6, SU1KG-6, TI2FG-6, VE1DY-5, VE5ES-5, VE5OT-7, W1COJ-7, W1BBA-7, W1AXA-7, W1ARC-6, W1ENE-7, W1CCZ-7, W1UH-7, W1GED-7, W1IYI-6, W1GEB-6, W1IFD-7, W2HFS-6, W2BBI-5, W2GOQ-7, W2QZ-7, W2MJ-6, W2EQG-6, W2AKK-7, W2HUQ-6, W2CYK-7, W2HN-7, W2JME-6, W3JEH-5, W3DPC-6, W3CHE-7, W3EWW-7, W3EQZ-8, W3CWG-6, W3LP-7, W4ADV-7, W5AKZ-6, W7ADH-6, W7EXK-6, W8HFU-8, W8ANO-6, W8BPY-7, W8IKE-7, W8OLT-7, W8LIR-6, W8ALT-7, W9ORL-

7, W9GIC-7, W9PCT-7, W9BDE-5, W9UVC-6, XE1G-8.

7 M.C. BAND (CW):—

D4NAP-7, D4RPU-5, F3CY-6, F8EA-4, F8OO-5, J4CP-6, KA1NR-7, PAOMJ-6, PAODS-5, PAOMG-5, PK1MD-7, SP1KR-5, U3BM-5.

7 M.C. BAND (Phone):

LU8AB-8.

I am willing to exchange station photographs (no QSL's) with readers.

—J. V. McMinn.

Radio-Equipped Ambulances

(Continued from page 5.)

means of saving many lives and of preventing, in a large number of cases, permanent injury to victims of accidents. Minutes saved by an ambulance sometimes mean the difference between life and death. Time is a vital factor in cases of immersion or gassing, but often time is now lost because we, at head office, have to ring police or fire stations to ask them to pass on a message to our cars, sending them to the spot where the accident has occurred.

"With radio equipment it will also be possible while the ambulance is speeding to the hospital, for the ambulance officer to describe the nature of injuries received by his patient, and in the hospital necessary preparation can be made for immediate treatment.

"Another vital point is that, as

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THE AUSTRALASIAN RADIO WORLD,
214 George Street, Sydney,
N.S.W., Australia.

every car will be able to communicate continuously with the Central Station, drivers can be informed at once of emergencies. With radio control it will be possible to divert ambulances when they happen to be near the scene of accidents, and in the event of a serious emergency, a large fleet of cars can be brought to any given point with a minimum of delay.

"Often several of the cars will be en route to pick up cases for the hospital—an ordinary routine job that in many instances is not urgent. Say word comes through of a serious railway or tram-car smash—naturally such a disaster takes precedent over less urgent calls, and perhaps ten or twelve ambulances may be urgently needed. Without radio we would have to wait for them to come in, but with radio, a "calling all cars" message could be flashed to every ambulance on the road and would send them flying to the scene of the accident.

"Altogether, it is no exaggeration to say that with two-way telephone equipment installed in our ambulances, we will be able to save at least an additional 50 lives a year in the metropolitan district.

30 Miles Range On Telephony.

"Experimental tests conducted several months ago, prove that two-way telephony communication between ambulance cars and a central station is quite satisfactory up to a distance of about 30 miles, even while the cars are travelling at high speed. By switching over to telegraphy the range is extended to 70 miles.

"The equipment which was temporarily installed in the ambulance headquarters at the Central Railway Station, is a standard A.W.A telephony-telegraphy transmitter. The aerial is located on top of the building, a feeder passing from it down a chimney to the transmitter in the ambulance office several floors below. The equipment used in the ambulances is a standard A.W.A. car transmitter and receiver, suitable for transmission and reception of both speech and code.

"The equipment is built into a case housed under the dashboard, and can be removed in a few seconds for servicing or general overhaul. Power is supplied either from the car battery or by a motor generator driven by the engine.

"The control panel is fitted into the glove box in front of the driver, while the speaker is located in the cabin just above the driver's head.

"The receiving aerial is strung along the roof, while the transmitting aerial is a hinged pole that normally lies flat along the roof. For transmitting messages it can be erected vertically in a few seconds."

All-Wave All-World DX Club List of Life Members

(Continued from August issue)

CLUB No.	NAME AND ADDRESS
AW59DX	Robert R. Thomson, "Blair Adam," 11 Clarence St., Hilton, Adelaide, S.A.
AW60DX	Jack Harrower, 14 Tongue St., Seddon, W.13, Melbourne, Victoria.
AW61DX	W. T. Choppen, 4 Marston Rd., Timaru, New Zealand.
AW62DX	Mervyn M. Macknamara, Robbs Rd., Werribee Sth., Victoria.
AW63DX	Ivan R. Moyle, "Leriwa," Perekerten, N.S.W.
AW64DX	Ern Neill, Smith St., Ipswich, Queensland.
AW65DX	J. M. Klein, Cromwell St., Cooma, N.S.W.
AW66DX	W. V. Carroll, 109 Nicholson St., Coburg, N.13, Melbourne, Vict.
AW67DX	C. D. Moller, Temora Rd., Coolamon, N.S.W.
AW68DX	J. L. Sullivan, Alpha St., Cambridge, N.Z.
AW69DX	Harry Whyte-Meach, "Leith," 55 Godfrey St., Artarmon, N.S.W.
AW70DX	Leon S. Stone, Elgin St., Gordon, N.S.W.
AW71DX	J. H. Edney, 82 Queen St., Regent, N.19, Melbourne, Victoria.
AW72DX	Mrs. E. M. A. A. Heathorn, Glenheath, P.O. Box 34, Smithton, Tas.
AW73DX	Robert W. Hudson, c/o Post Office, Quorn, South Australia.
AW74DX	R. A. McGhee, 1 Kyabra St., Valley, Brisbane, N.1, Queensland.
AW75DX	Alan Walkley, 37 Northcote St., Haberfield, N.S.W.
AW76DX	Joseph B. Guest, 13 Hillside, Yallourn, Gippsland, Victoria.
AW77DX	Maurice Tierney, 62 Connemarra St., Bexley, N.S.W.
AW78DX	Jeffrey P. Rosewarne, "Widgiewa," Kardina East, South Australia.
AW79DX	Harry D. Hibberd, 462 Hargreaves St., Bendigo, Victoria.
AW80DX	J. E. Shrubbs, "Eleanora," Sea View St., Byron Bay, N.S.W.
AW81DX	Ronald E. Keegan, 69 Palm Avenue, Leeton, N.S.W.
AW82DX	Angus D. Macdonald, Kadina, South Australia.
AW82DX	Angus D. Macdonald, Kadina, South Australia.
AW83DX	David E. Evans, T.S.M.V. "Manoora," c/o Adelaide S.S. Co. Ltd., Bridge Street, Sydney.
AW84DX	Harold Rogers, 28 Edward Street, North Geelong, Victoria.
AW85DX	Thomas C. Dalziel, 69 Palm Avenue, Leeton, N.S.W.
AW86DX	William Brown, Panmure, Auckland, N.Z.
AW87DX	H. W. Lane, Rous Mill, via Alstonville, Richmond River, N.S.W.
AW88DX	Robert R. Thomas, 127 Tramway Road, Invercargill, N.Z.
AW89DX	Ian Hamilton Drysdale, "Invermay," Loch Park Road, Traralgon, Victoria.
AW90DX	Les McIntyre, Box 36, Murtoa, Victoria.
AW91DX	K. Longfield, 52 Henry Street, West Kogarah, N.S.W.
AW92DX	Norman E. Booth, Gungal, N.S.W.
AW93DX	Walter J. P. Matthews, Tailm Bend, S.A.
AW94DX	H. M. Lindsay, c/o The E.S. & A. Bank Ltd., Nambour, Queensland.
AW95DX	Don Gray, 5 Sussex Street, Middle Brighton, Melbourne, Victoria.
AW96DX	John E. Corlis, "Laurel Vale," Garah, N.S.W.
AW97DX	Tom D. Dowling, "Glensk," via Swan Hill, Victoria.
AW98DX	Charles R. Nelson, 33 Dean Street, Ararat, Victoria.
AW99DX	E. H. S. Foot, "Reumah," 19 Knutsford Street, Balwyn, E.8, Victoria.
AW100DX	Henry C. Pickard, Patterson Street, Ainslie, Canberra, F.C.T.
AW101DX	Joseph Holschier, "Oakvale," Moira, N.S.W.
AW102DX	R. G. O. Connor, c/o P. McKeirnan, Tyalgah, Murwillumbah, Tweed River, N.S.W.
AW103DX	John T. Smith, P.O. Box 26, Glen Innes, N.S.W.
AW104DX	T. Ross Cuttle, Canterbury Road, Forest Hill, Victoria.
AW105DX	Robert Raw, 62 Oakley Avenue, Avondale, S.W.3, Auckland, N.Z.
AW106DX	H. G. Manson, c/o The Radio House, Taumarunui, King Country, N.Z.
AW107DX	Harry Melrose, Glenroy Station, via Bellata, N.S.W.
AW108DX	R. R. Harris, Opaki Road, Masterton, N.Z.

New Wonder Aerial

"NOISEMASTER"

improves Short - Wave Reception 70%

Cuts out Local Interference



The Kit comprises 200 feet of special aerial wire, a dozen specially designed Transposition blocks, the exclusive wonder aerial energiser unit, "Antennex," earth clamp, lead-in strips, screws, lightning arresters, etc., with full instructions for installing no less than three highly scientific aerials

Priced at 52/6, the "Noisemaster" represents a great saving in money, as the price of the American "Antennex" unit itself is considerable.

Dixers! Boost up your set . . . cut out those maddening hums, crackles and roars . . . get that EXTRA punch that means greater distance, more stations, and clear, undistorted reception.

No matter how sensitive or selective a short-wave receiver may be, best results can be obtained only with a scientifically designed aerial. In fact, MORE noise will be picked up by a highly sensitive receiver unless used with this specially tuned aerial system.

The "Noisemaster" Aerial works perfectly with ANY receiver, and is guaranteed to improve reception from 23 to 76 per cent. "Noisemaster" not only increases signal strength, but entirely eliminates the background of local interference (such as electrical noises caused by trams, cars, electrical household appliances, etc.), which ordinarily ruin reception.

Instal the marvellous "Noisemaster" Engineered Aerial TO-DAY and enjoy glorious trouble-free entertainment ever after.

Exclusive
use of

"ANTENNEX"

The "Noisemaster" Aerial Kit is the only one authorised to use the wonderful American invention "Antennex," which was recently introduced into Australia, after millions had been sold in America. It acts like a purifier and cleans out every trace of locally-created noise, and leaves the Stations beautifully clear and astoundingly strong. If you already have sufficient aerial wire, insulators, etc., you can construct a "Noisemaster" Aerial system yourself. The "Antennex" Unit, together with a dozen transposition blocks, can be obtained separately for 30/-, with detailed instructions for constructing and installing a "Noisemaster" Aerial.

If you have any difficulty in obtaining a "Noisemaster" Aerial Kit, write to Antennex (A'sia) Agencies, Box 3695 SS, G.P.O., Sydney, N.S.W.

Easy to Install

Detailed instructions and drawings with each "Noisemaster" Kit means that you can put up the "Noisemaster" aerial in a very short time. No testing, no doubt, no delay. Once "Noisemaster" is fitted, your noise troubles end. Don't delay in ordering "NOISEMASTER."

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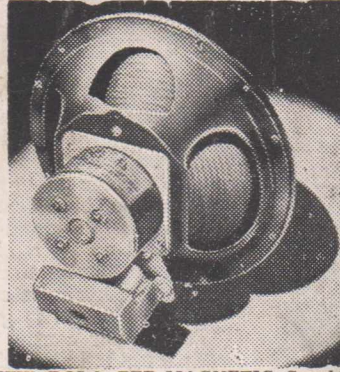
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A new shipment of the famous "Harlie" Microphone. Complete with transformer. On nickel plated stand, with bakelite base. Price £5/5/-, or Portable type in case, £5/10/6.

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This PM6-6 is a new 6 3/4 in. Per-magnetic Speaker, similar in design and equal in performance to its electro-dynamic prototype, DP5B.

"RECEPTICON" AERIAL WIRE

Fit a RECEPTICON AERIAL and note the difference. Ideal for either indoor or outdoor use. Seven strands copper wire in braided and weatherproof covering.

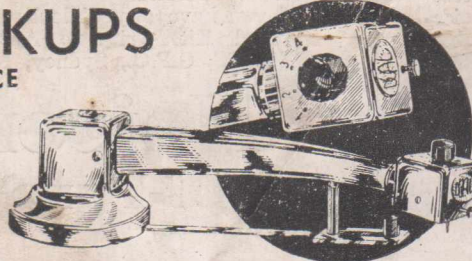
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No "B" or "C" Batteries required—the Van Leyden works direct from any 6 volt accumulator and gives results in tone, volume and distance equal to any 5-valve electric set. Fully described in the Listener In last issue. Write to Vealls for Full Constructional Details.

Complete Kit Set, £7/15/-, or with Van Ruyten Vibrator, £12/15/-.

Safety First

A good Head and Tail Lamp is essential for your protection in night riding.



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Outfits comprise generator with head and tail lamps complete with bulbs.

"National" Cycle Outfits. Complete, similar to illustration **8/6**
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RADSONNE CYCLE GENERATOR, the best made. 17/6, 22/6 and 27/6 each complete.

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40G..	4ozs. . . 1/3	24G..	1lb. . . 3/-
32G..	1lb. . . 2/3	26G..	1lb. . . 3/9
34G..	1lb. . . 2/6	28G..	1lb. . . 4/3
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30G..	2oz. . . 9d.	32G..	1lb. . . 3/-
32G..	2oz. . . 10d.	28G..	8oz. . . 2/2
34G..	2oz. . . 1/-	32G..	4oz. . . 1/6
36G..	2oz. . . 1/6	34G..	4oz. . . 1/7
20G..	4oz. . . 9d.	36G..	4oz. . . 2/-
28G..	4oz. . . 1/4	38G..	4oz. . . 2/6
22G..	1lb. . . 3/3	40G..	4oz. . . 4/-

IMPROVE RECEPTION WITH "NOISEMASTER"

The "Noisemaster" Kit has wires cut to length. Insulators fitted. Aerial filter, Transposer Blocks, etc. Price, 52/6.

2, 4 or 6 volt at 1/2 amp.

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