THE AUSTRALASIAN

Radio World

MARCH 1, 1937
VOL. 1—NO. 11
PRICE, 1/-

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

—See Story Page 4.

- "COMPANIONETTE THREE": REGENERATIVE S.W. PRE-SELECTOR UNIT: BIG W.I.A. FIVE-METRE FIELD DAY ON MARCH 7: WORLD SHORTWAVE STATIONS—LATEST ADDITIONS: STORY OF THE AIR-CELL

AUSTRALIAN VALVE MERCHANTS ASSOCIATION — THIS VALVE HAS BEEN LICENSED UNDER VARIOUS PATENTS FOR USE IN BROADCAST RECEIVERS

RADIOTRONS

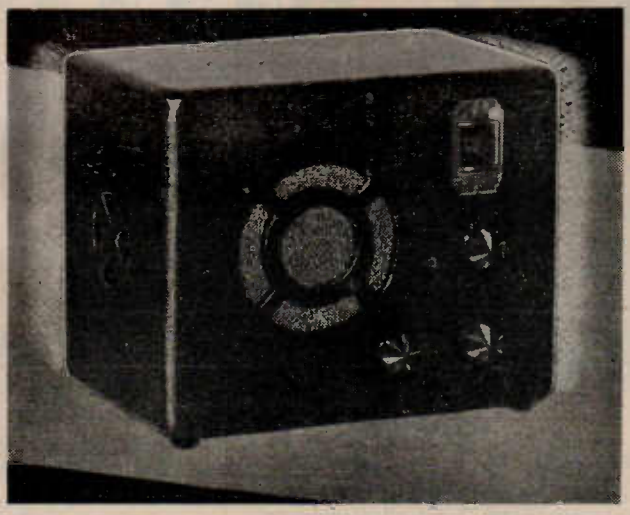
AMALGAMATED WIRELESS (AUSTRALASIA) LTD.
47 York Street, Sydney
167-169 Queen Street, Melbourne

AUSTRALIAN GENERAL ELECTRIC LIMITED
Sydney Melbourne Brisbane
Adelaide Hobart

V24.6

(Advertisement of Amalgamated Wireless Valve Co. Ltd.)

WE CAN SUPPLY ALL YOUR RADIO NEEDS



The "COMPANIONETTE THREE"

The "Companionette Three" illustrated above makes the ideal "personal" receiver. Light and compact, it is easy to pack. Can be carried anywhere, and used wherever power is available. A midget in size, but an exceptional performer.

Complete Kit of Parts..... **£7-0-0**
(With Cabinet—includes everything as specified)

We stock the finest and most comprehensive range of American, English and Australian radio components available in New Zealand. Only quality parts stocked, and every order receives prompt and careful attention. Mail order business a speciality. Send for a free copy of our 1937 illustrated catalogue, listing hundreds of components for set-builders, amateurs and servicemen.

HAMS! - These New VARIMATCH MODULATION TRANSFORMERS Will Interest You

The new American UTC Varimatch Modulation Transformer supplies the complete answer to your modulation problem. Providing a very wide range of load impedances for any modulator, the accurate matching that is essential for minimum distortion is always ensured.
Universal in application, the Varimatch Transformer will never become obsolete. Five types are available, as follows:

- VM–1 Will handle any power tubes to modulate a 20 to 60 watt Class C stage.
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- VM–4 Will handle any power tubes to modulate a 200 to 600 watt Class C stage.
- VM–5 Will handle any power tubes to modulate a 450 watt to 1 K.W. plus, Class C stage.

Further details with price list will be sent free on application.

THE MICROMATIC ALL-WAVE TUNER

Our new MICROMATIC ALL-WAVE TUNER represents the greatest single advance made in radio ever since dual-wave receivers came into vogue a few years ago. It definitely means the end of alignment troubles, which cause instability and poor sensitivity. Using the MICROMATIC ALL-WAVE TUNER, you know, before mounting a single component, that the completed receiver will be aligned as accurately as laboratory-built test equipment can make it.
Supplied with completely-wired and aligned r.f. and mixer-oscillator stages, with I.F. transformers (one iron-cored type) and accurately-calibrated all-wave dial **£9-15-0**

MICROMATIC ALL-WAVE MIRACLE SIX

The "MICROMATIC MIRACLE SIX," a metal-valve all-wave superhet of latest design featuring the amazing new Micromatic All-wave Tuner. Seven simple connections to a terminal strip mounted on the Tuner, and what in other sets is the most difficult and critical portion of the wiring is complete!

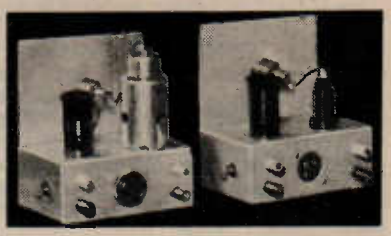
The remainder of the wiring is simpler than that of a four-valve broadcast set. No coil connections to worry about, no wave-change switch to wire, and best of all, NO ALIGNMENT DIFFICULTIES!

Super-selective, exceptionally powerful, and giving all-wave coverage, the "MICROMATIC MIRACLE ALL-WAVE SIX" is a set you'll be proud to own.

Complete Kit of Parts less valves and speaker **£13-15-0**

Complete Kit, with valves and Magnavox speaker **£19-10-0**

(Detailed assembly instructions, with photographs and diagrams, are supplied with every kit)



REGENERATIVE BOOSTER UNITS

"Pep up" your DX reception by building one of these booster units designed to operate with any 4/5 superhet. Improves both sensitivity and selectivity, and reduces noise.
COMPLETE KIT OF PARTS **55/-**
(Battery or A.C. Model) .....

FEAR'S

FOR EVERYTHING IN RADIO

AN ADVERTISEMENT OF
F. J. W. FEAR & CO., "The Radio Pioneers."
31 Willis Street, Wellington, New Zealand.
Telegrams: "Fear."

Editorial Notes....

The terrible disaster that overtook the Sydney-Brisbane airliner last month affords a tragic instance of how far Australia lags behind other countries in developing her air services. That 'planes providing a daily mail and passenger service both ways between Sydney and Brisbane, flying about 400 miles each trip over country that is subject to sudden cyclonic disturbances, do not carry the latest in two-way radio telephony equipment is difficult to understand. Actually, the Stinson that crashed did not carry radio at all. Two others flying the same route carry radio telegraphy equipment, but it is evidently unsuitable for the job.

While speaking to the "Radio World" recently about the value of radio in aviation, Pilot Rex Boyden, who was in charge of the liner that was lost, remarked that in the radio-equipped Stinsons, heavy static more often than not completely obliterated signals for the greater part of the trip. Apart from the fact of not being able to receive messages, the tremendous strain that pilots must be under in trying to decipher signals and pilot the 'plane at the same time is not hard to imagine.

Evidently one fault with the equipment lies in the long wavelength used; surely the short waves would provide a far better service in every way. Secondly, no pilot should be asked to divide his attentions between piloting his ship and straining to decipher code signals with static crashing in the 'phones practically all the time. Suitable equipment to provide reliable two-way communication on telephony should not be hard to develop—especially as the Stinson and Douglas air-liners in America are carrying it.

Along the air routes of other countries, and especially in the States, where commercial aviation is so far developed, radio has time and again proved its worth as a saver of human lives. It is quite possible that the latest tragic air disaster in this country could have been averted if the 'plane had carried radio, and from now on no effort or expense should be spared to so equip every air-liner, and to provide the necessary radio beacons and ground stations. The cost will be heavy, but it will ensure as far as humanly possible the safety of both passengers and pilots.

THE AUSTRALASIAN RADIO WORLD

Incorporating the

ALL-WAVE ALL-WORLD DX NEWS.

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

Vol. 1. MARCH, 1937. No. 11.

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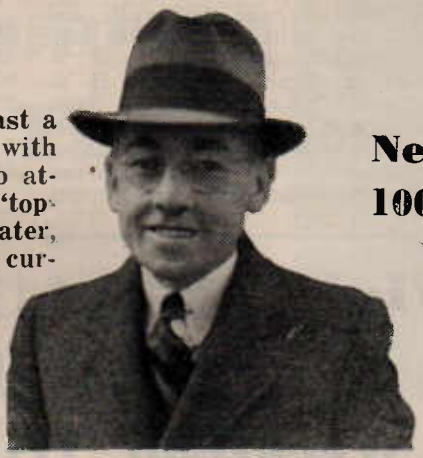
The "Australasian Radio World" is published monthly by Trade Publications Proprietary, Ltd. Editorial offices, 214 George Street, Sydney, N.S.W. Telephone BW 6577. Cable address: "Repress," Sydney. Advertisers please note that copy should reach office of publication by 14th of month preceding that specified 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.

The Story Of The Ever Ready Air Cell

New "A" Supply Gives 1000 Hours Of Service With No Re-Charging



Left: Mr. R. W. Erwin, who in this article describes how the Ever Ready Air Cell was perfected.

AN "A" cell that gives at least a thousand hours of service with no re-charging, that requires no attention except for an occasional "topping up" with ordinary tap-water, that provides steady, noiseless current at constant voltage right up to the moment its life ends . . . . such is the Air Cell, just introduced into this country by the Ever Ready Co. (Aust.), Ltd. Tried and proved during the past six years in America, where this season no less than 26 manufacturers are marketing Air Cell receivers, this special cell represents one of the most important advances made for many years in the development of battery-operated receivers.

Basically it is an ordinary primary cell, but as such it had several serious defects that rendered it useless as a satisfactory "A" supply. The intensive research that was necessary before the Air Cell was finally perfected is outlined in the story below, given to the "Radio World" by Mr. R. W. Erwin, an American consulting engineer at present with the Ever Ready Company in Australia.

MOST people seem to think that the air cell is an entirely new development, that is, new in recent years. Actually its history goes back to the 1880's, when a French scientist named Lalande discovered the caustic soda cell. It used zinc as the metallic negative electrode, copper oxide as the positive, and a caustic soda solution as the electrolyte.

A Spanish contemporary of Lalande's also developed the cell independently and announced it the same year, but the Frenchman is generally given all the credit for it. Anyway, it is known as the Lalande Cell.

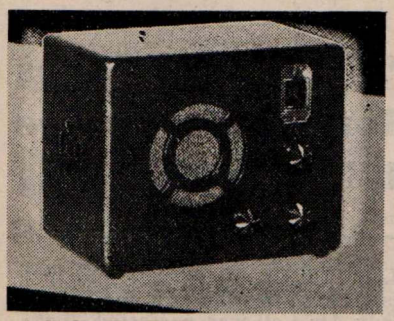
Well, from a scientific point of view this early soda cell was interesting enough, but from the commercial viewpoint it had two serious drawbacks. So nothing much was done with it until the 90's, when Edison in America set about trying to improve it. And he did, too.

His idea was to make the elements more compact by combining the zinc and copper oxide in a unit assembly. Copper oxide is a dark brown flaky powder which is a very good oxidising agent. In its powder form it wasn't much good to Edison, and so he solved this difficulty by pressing it into plates.

This improvement made the cell a commercial success, and it has been used for many years by railroad companies throughout the States for operating their automatic railroad signalling systems. These work on a simple principle. A section of the railroad track, about half a mile long,

This cut-away view of the Air Cell shows its construction, and the location of the two special oxygen-absorbing carbon "breathers."

The Special Midget Cabinet for the . . .



"Companionette Three"

was built by us to the Technical Editor's specifications, so that builders of this exceptional little receiver can ensure a perfect fit for the chassis by purchasing the case from us. Neat and strongly-built, with speaker and end frets as shown, and finished in smart mottled leatherette (red, blue, green, black, brown, or snake-skin). Every cabinet is guaranteed a first-class job.

Price (f.o.r. Sydney) 17/6

BUILT YOUR OUTDOOR PORTABLE YET?

The "Outdoor Portable Four" (described in the October and November "Radio World") is still proving exceptionally popular — to date we have supplied nearly 200 cabinets, as built for the original model. Compact, light and strong, each cabinet is fitted with plated hinges and catch, and finished in smart mottled leatherette (red, blue, green, black, brown, or snake-skin).

Price (f.o.r. Sydney) 26/-

Western Manufacturing Co.
18 Third Avenue
Fivedock, Sydney
'Phone - - U3444

is completely insulated from the sections on either side. A tough fibre material is placed between the ends of the insulated section and the steel rails on either side of it, between the fish-plates and the rails, and around the bolts locking the fish-plates to the rails.

Next, a circuit is hooked up so that a small current can flow down one rail in the insulated section, through a relay, and then back along the parallel rail to the cell. When a train comes along it short-circuits the rails and so shorts out the relay, automatically actuating the latter, which controls a second circuit to operate the signal arm.

These soda cells are excellent for the job, because they are simple, reliable and easily maintained. As a matter of fact, all the maintainance needed is to replace the solution and electrodes once or maybe twice a year. There is no loss by evaporation from the electrolyte, as a film

(continued on page 42).

Field Tests On First Air Cell Receivers

Week-End Trip To Parkes

THE front cover photograph this month was taken early in Februat a country location not far from Parkes, during field tests on the first special Air Cell receivers to be manufactured in Australia.

In the photograph are (left to right): Messrs. Murphy and West (radio dealers, of Parkes), N. Buchanan (kneeling—chief engineer Sterling Radio), J. M. Tait (managing director Sterling Radio), D. W. Erwin (consulting engineer of the Ever Ready Co.), D. B. Knock (Radio Editor "The Bulletin"), and G. H. Herring (general sales manager Ever Ready Co.). Also with the party were Messrs. R. Edwards (technical editor "Radio Retailer") and A. E. Read (editor "Radio World").

First Test At Bathurst.

The special week-end trip was made at the invitation of the Ever Ready Co. (Aust.) Ltd. in conjunction with Sterling Radio Ltd., in order to conduct tests on the new Sterling Air Cell receivers in different country locations, and to introduce the new Ever Ready Air Cell to dealers en route. The party left Sydney in two cars on Friday, February 5, reaching Bathurst late the same night, where the first test was conducted.

Three chassis were used, two five-valve models and a four, all of them designed for broadcast band operation only. Both fives used the same valve combination (KF3, R.F.; 1C6 mixer; KF3, I.F.; 1K6, second detector, A.V.C. and first audio; KL4, output pentode), the sets differing only in the I.F. amplifier. One model used air-core 175 k.c. intermediates, and the other, Sirufer-cored 465 k.c. I.F's.

Despite the presence of heavy static which made comparative listening tests a little difficult, the superiority of the 465 k.c. model was undoubted, both sensitivity and selectivity being excellent.

An Economical "Four."

The next receiver tested was a four-valve using Sirufer-cored 465 k.c. intermediates. The valve line-up was the same as that of the five-valve models, except that no R.F. stage was employed. For so small a set it put up an impressive performance, background noise being particularly low. Taking just over .5 amp. "A" (including dial lights) and less than 15 mills. "B," this particular receiver should be an excellent proposition for country listeners who want a powerful, economical set.

Further Tests In Country.

At Parkes, dealers West (VK2EI) of West's Radio and Murphy of the Parkes Electric Co., accepted an invitation to accompany the party for further tests at a country location away from power interference.

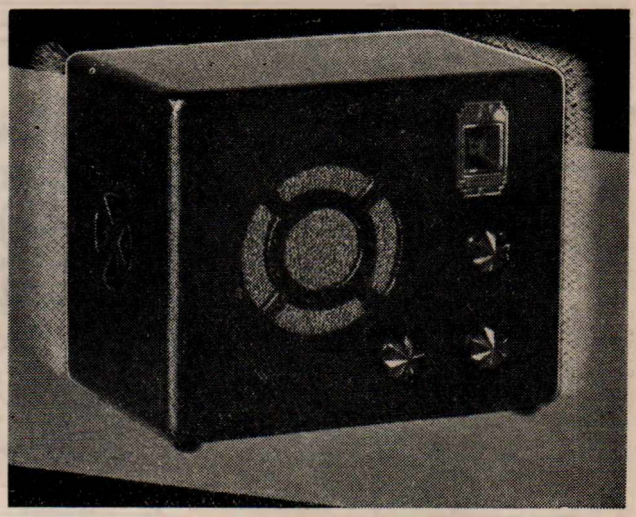
Using an aerial slung between two gum trees and a length of piping driven into the ground for an earth, further tests were made. The Sirufer-cored 465 k.c. model performed particularly well, many Sydney and inter-State stations being brought in at fine volume.

On the Sunday morning the party left for home, well satisfied both with the results of the tests on the special Sterling receivers and with the keen interest shown in the Air Cell by every dealer called upon.

This new form of "A" supply is undoubtedly destined for an important future in Australia, as its convenience and long life offers battery-set users the closest approximation yet to the mains-operated receiver.

The ... Companionette Three

A three-valve receiver with the gain and selectivity of a "four.' Uses a 6F7 as combined r.f. and detector stages, EL3 output pentode, and 80 rectifier. Employs regeneration, with latest iron-core coils.



The "Companionette" is housed in a specially designed leatherette-covered cabinet measuring only 10 in. x 8in. x 6¼in.

ONE of the main drawbacks of the console type of receiver, and also of some of the larger table models, is that once they are installed they are more or less a fixture. Due to their size and weight, they cannot conveniently be carried around from room to room.

The "Companionette Three" illustrated above has been designed to overcome this difficulty. Housed in a cabinet measuring only 10in. x 8in. x 6¼in., it can be carried around easily, and operated anywhere there is a light or power outlet available.

Ideal For Week-end Cottages

While not intended to take the place of the main receiver, the "Companionette" will be found invaluable on many occasions, and in many locations. For instance, anyone owning a week-end cottage with mains supply laid on can slip it in a suit-case or into the back of a car.

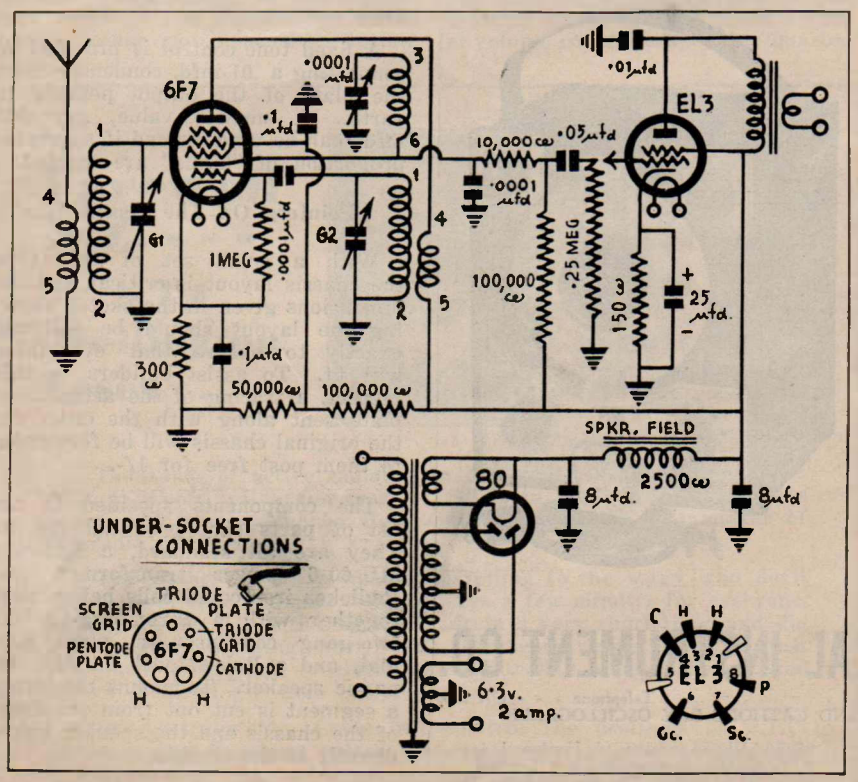
Again, in the average family, occasions often arise when two sets are badly needed. Different members will want to listen to different broadcasts taking place at the same time, and only one set is available. With a supplementary receiver such as the "Companionette," no one need be disappointed.

Excellent Results At Low Cost.

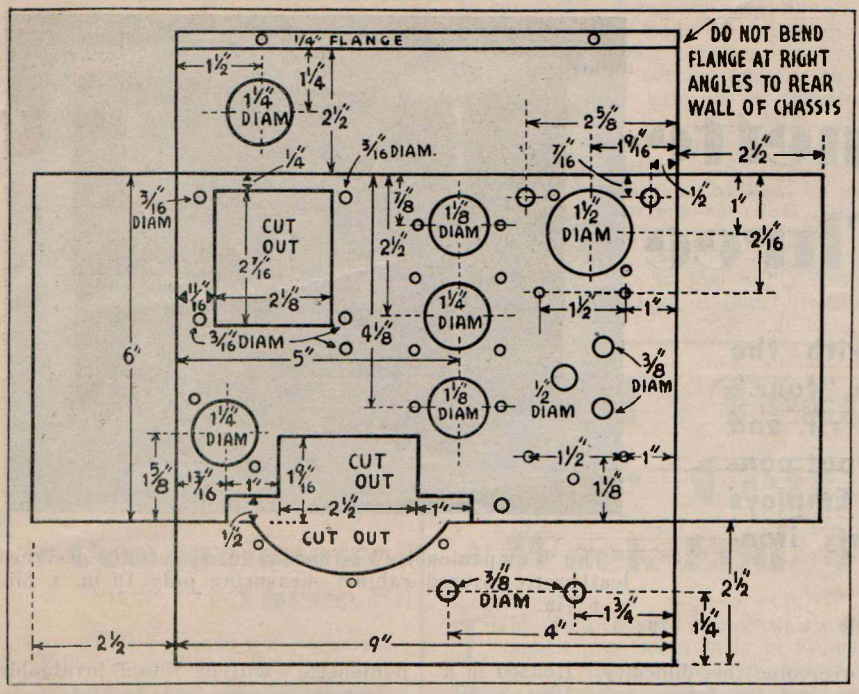
In designing a set of this type, cost is the main consideration, especially as it is intended to be a "second set" only. Hence it was decided to make the "Companionette" a t.r.f. rather than a superhet.

To ensure sufficient selectivity and fairly high sensitivity, so that full speaker volume can be obtained from locals using only a few feet of wire as an aerial, an r.f. stage, together with a regenerative detector, are needed. Normally this means using four valves, but by employing a 6F7 as combined r.f. amplifier and detector, both the space occupied by an extra valve, and its cost can be saved.

The 6F7 triode pentode comprises two separate valves in the one glass envelope, the two component sections being entirely separate except for a common cathode. Thus the "Companionette" can be regarded as a four-valve set, with a screen-grid



The circuit of the "Companion ette," which uses the pentode section of a 6F7 as r.f. amplifier, and the triode section as detector.



Dimensions for preparing the chassis are given in this sketch.

A FINER OSCILLATOR - AT A LOWER PRICE

Announcing the 1937 "PALEC" MODEL DR.—an Oscillator of advanced design, incorporating every modern technical development and including many exclusive features.

Specifications:—

DIRECT READING DIAL (Vernier Drive)

Calibrated to read simultaneously Kilocycles and Metres. Five ranges from 150 Kc.—16,000 Kc. (2,000-19 metres).

CONSTANT IMPEDANCE ATTENUATOR (Pad Type)

Each arm of the 10 step network is individually shielded. The whole unit in turn is triple shielded, resulting in positive attenuation of the generated signal at all frequencies.

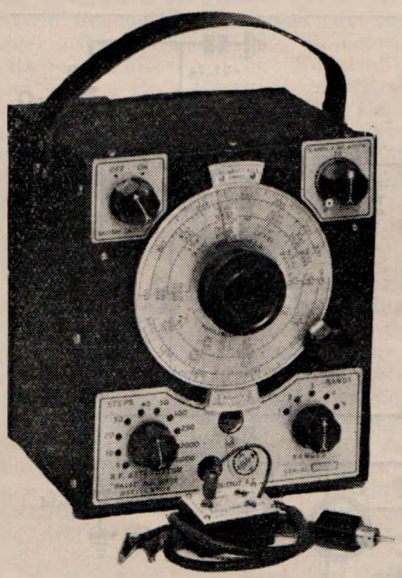
The above is a unique feature in a low priced Oscillator, and enables one to make many reliable tests.

Other features are VARIABLE MODULATION 0-100%;
A separate AUDIO OUTPUT 0-2 volts at 400 c.p.s.;
A PILOT LIGHT to ensure long battery life;
A tapped DUMMY ANTENNA for Int. B.C. and S.W. Bands.

The instrument is of attractive appearance and is supplied complete with Valves (2), batteries and full instructions detailing SYSTEMATIC LINING UP PROCEDURE ON ALL TYPES OF SETS.

Trade price ..... £10/15/- plus tax

Send for particulars and illustrated catalogue of full range of test equipment.



THE PATON ELECTRICAL INSTRUMENT CO.

90 Victoria Street, Ashfield, Sydney. Telephone - - - UA 1960

Manufacturers of the well-known PALEC METER AND CATHODE RAY OSCILLOGRAPH

Obtainable from:—

SYDNEY:—Lawrence & Hanson Ltd., Bloch & Gerber, Fox & MacGillycuddy.
MELBOURNE.—Lawrence & Hanson Ltd., A. H. Gibson (Elect.) Co. Pty. Ltd.
BRISBANE:—Lawrence & Hanson Ltd.
ADELAIDE:—Newton McLaren Limited.
NEW ZEALAND:—The Electric Lamp House Ltd., Wellington.

r.f. stage, triode detector, pentode output, and 80 rectifier.

The signal picked up by the aerial is applied in the usual way via the first tuned circuit to the grid of the 6F7 pentode section. After amplification it appears in the plate circuit and is transferred from the primary to the grid winding of the detector coil. The triode section of the 6F7 is connected as a leaky grid detector with reaction, which is controlled by a .0001 mfd. midget variable condenser.

High Mu Output Pentode Used.

To get the utmost in output from a small set of this type, a sensitive output pentode is needed, and the Philips EL3 is ideal for the purpose. Remarkably sensitive, it provides high output together with good quality of reproduction.

Only 3.9 volts of audio signal are required to swing fully the grid of this valve, and fully loaded, it will give approximately 4 watts output with a plate load impedance of 7,000 ohms.

Volume Control On Audio Side.

The detector is resistance capacity coupled to the EL3 output pentode, volume being controlled by using a .25 megohm potentiometer as the grid resistor for the latter valve, and by connecting the moving arm to the grid.

A fixed tone control is provided by connecting a .01 mfd. condenser from the plate of the output pentode to earth. A smaller value, say .005 mfd., can be used instead if a greater proportion of "highs" are wanted.

Pointers On The Assembly.

With a small set of this type the chassis layout is critical, and the dimensions given in the sketch showing the layout should be followed exactly to ensure that everything will fit. To assist builders in this respect, a tracing of the actual template sent along with the order for the original chassis will be forwarded to them post free for 1/-.

The components specified in the list of parts should be adhered to. They are all standard, a Radiokes MU-60-6 power transformer and Radiokes iron-cored coils being used, together with a Stromberg-Carlson two-gang condenser, a small Efco dial, and a Rola Model F4 5in. dynamic speaker. To mount the latter, a segment is cut out from the front of the chassis and the speaker bolted directly to the chassis.

The leatherette-covered cabinet illustrated was built for the "Com-

panionette" by the Western Mfg. Co., 18 Third Avenue, Fivedock, Sydney, and can be supplied in a variety of colours.

Wiring Diagram Next Month.

Enough data has been supplied in the above and by the diagrams and photographs to enable those who have had some experience in set-building to go ahead and complete the receiver. However, for those who are not too sure of their ability to wire a set from a circuit, an under-chassis wiring diagram will be published next month, together with a further article outlining the construction of the receiver in detail.

"COMPANIONETTE THREE"

List of Parts

1—steel chassis, 9in. x 6in. x 2½in., stamped and drilled as shown.
1—special cabinet (Western Manufacturing).
2—iron-core coils, 1 aerial, 1 r.f. with reaction (Radiokes, type BIC).
1—2-gang condenser (Stromberg-Carlson).
1—midget dial and escutcheon (Efco).
1—power transformer (Radiokes MU-60-6).
4—sockets, 1 small, 7-pin, 1 universal "P" type, 1—4-pin. wafer, 1—4-pin Renrade.
1—.0001 mfd. midget variable condenser (Radiokes).
1—.25 megohm potentiometer (Yaxley).
3—small knobs.
2—terminals, red and black (Dalton).
1—power socket and plug (Dalton).

RESISTORS.
1—150 ohm 1-watt carbon (Bradley).
1—300 ohm 1-watt carbon (Bradley).
1—10,000 ohm 1-watt carbon (Bradley).
1—50,000 ohm 1-watt carbon (Bradley).
2—100,000 ohm 1-watt carbon (Bradley).
1—1 megohm 1-watt carbon (Bradley).

CONDENSERS.
2—.0001 mfd. (Solar).
1—.01 mfd. (Solar).
1—.05 mfd. (Solar).
2—.1 mfd. (Solar).
1—25 mfd. dry electrolytic, 25v. working (Solar).
2—8 mfd. dry electrolytic, 450v. working (Solar).

SPEAKER.
1—5-in. midget dynamic speaker, 2,500 ohm field, input transformer to match single pentode (Rola type F-4).

VALVES.
1—6F7, 1—80 (Radiotron, Ken-Rad, Mullard, Philips), 1—EL3 (Philips).

MISCELLANEOUS.
6.3 dial light, power flex and plug, push-back (3 yards solid and ½ yard flexible), 2 dozen ⅛-in. nuts and bolts, 4—1in. nuts and bolts, 1 dozen solder tags, grid clip.
1—.02 mfd. tubular (Solar)

Fidelity Broadcast Five

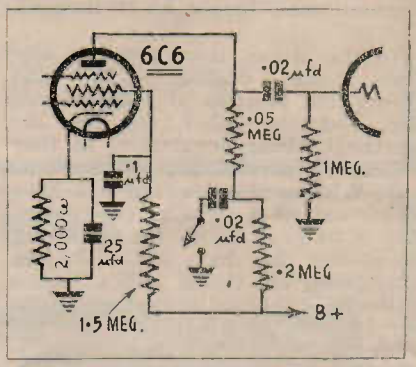
How To Add Bass Boosting

IN Technical Bulletin No. 72, issued by Amalgamated Wireless Valve Co. Ltd., details are given of two methods of providing tone compensation at low volume levels in receivers such as the "Fidelity Broadcast Five," described recently in the "Radio World."

The need for tone compensation arises from a failing of the human ear, which at low volume levels becomes rather more insensitive to low frequencies than to high. The result is that when a receiver that at normal volume sounds well-balanced is turned down, an apparent lack of bass response becomes evident. One way of overcoming this effect is to apply tone compensation in the form of bass boosting.

Of the two methods of applying this correction outlined in the Bulletin mentioned, one needs a special volume control tapped one quarter way from the earthed end, but unfortunately such a control is not available at present.

The circuit used in the second method is illustrated in the accompanying sketch. The single .3 megohm plate load resistor used for the 6C6 in the original circuit of the "Fidelity" is replaced by two resistors in series, with values of .05 and .2 megohm. From the junction of the two a condenser of .02 mfd. is taken to earth through a switch. With the switch open, all frequencies are amplified uniformly, but with it closed the higher audio frequencies are by-passed, thus giving greater response to low than to high frequencies.



In the original receiver provision has been made on the front of the chassis for the mounting of a single-pole single-throw switch of the rotary type.

The important point to notice is that this refinement should be brought into use only at low volume levels, where it provides more correctly balanced tone than would otherwise be obtained. With outputs from about 500 milliwatts upwards, the bass boosting should be removed by rotating the switch, or reproduction will be seriously out of

(continued on page 42).

Farewell N.Z. - - - S.T.C. Wellington Loses . . .

Hello Australia S.T.C. Australia Gains . . .

Thousands of active radioites in N.Z. will miss the cheery face of J. L. Coote, sales manager for S.T.C. in New Zealand for nine years, who has just joined Head Office in Australia as manager of the radio division.

The virtues of J.L.C. need no extolling to the many who dealt with him in New Zealand. With always a few minutes for everyone, he rose to No. 1 position in the trade in a very short time, and did spectacular marketing work with Raytheon valves, Weston test equipment and S.T.C. receivers. An Australian himself, he married a New Zealand girl and has one son.

In Australia Mr. Coote will control the destinies of S.T.C. receivers and Raytheon valves, and we predict a bright future for both products.

The . . . A.T.R.S. Bulletin

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

From The Secretary's Pen

WITH the opening of the new 60-kilowatt transmitter in New Zealand, we have been hearing quite a lot about the control of broadcasting in the land of the Maori. But how much is known of the serviceman in New Zealand? Well, we can certainly take one leaf out of their book to our advantage: In New Zealand the serviceman has to pass an examination and serve an apprenticeship before he is licensed.

In this exam. there are two sections, one dealing with the theory and practice of radio servicing, and the other covering the electrical wiring regulations as they affect the serviceman. Those who pass this examination, and who have either served a term as an apprentice or who can satisfy the examining board that they have had equivalent experience, are issued with a licence authorising them to perform radio service work. All others are not allowed even to fit a power plug.

In New South Wales, anyone possessing a pair of pliers and a screwdriver can masquerade as a fully-fledged serviceman. Only the other day I came across a case where a "serviceman" had "repaired" a dried-up electrolytic by filling it with water. Why should this sort of thing go on? There are hundreds of trained radio servicemen, and yet the public are baffled as to how they can get reliable men to repair their receivers.

That this problem exists elsewhere than in Sydney is shown by this letter from a prospective member living at Barellan, N.S.W.:—

"In common with your many correspondents, I feel that there is a pressing need for licensing of radio servicemen, and furthermore for the making known to the radio user his own need of properly trained and equipped men.

"To keep abreast of the times one must experiment, buy publications, new instruments, etc., and to be able to do this one must be appreciated by the public. Only a law to prevent "gate crashing" into the sphere of the radio serviceman can bring about a justification for the heavy expense he is put to.

"I would appreciate the opportunity of becoming a member of your organisation, and you may register my name as that of one who will give you every possible support in your endeavours."

Queensland Branch Established.

The Queensland branch of A.T.R.S. is now established, Mr. W. Hudson (Queensland College of Science, Old Town Hall Chambers, Queen Street, Brisbane), having been appointed as acting secretary. Queensland applicants for membership are invited to forward all enquiries to him.

We are now looking forward to the other states to follow suit. The day our organisation is established on a national footing we will approach the P.M.G. with a view of securing the recognition the profession deserves.—C. Y. Hook, Acting Hon. Sec.

Licensing Servicemen

P.M.G. Certificates Best Solution

By W. Hudson, Acting Secretary, Queensland Branch.

IN my present occupation of marine wireless operator, I have had opportunity to investigate radio servicing in the different coastal cities.

At present radio men are divided into three divisions, broadcast station technicians, marine wireless operators, and finally the radio service engineer or serviceman. In the first two divisions a P.M.G. Certificate is necessary to qualify, but, in the most technical department of all, anyone can call himself a radio engineer, and even set up a school to teach others. In many instances it is a case of the blind leading the blind.

In Queensland a firm must employ a radio mechanic at an award wage of £4-18-6. In N.S.W., except for junior process workers in factories, there is no award in operation at all. There is no need for me to quote examples of the "gyp" merchant or the "back yarder"—they have been dealt with before in this journal.

As acting sec. of the Queensland branch of A.T.R.S. (c/o Queensland College of Science, Old Town Hall Chambers, Queen Street, Brisbane), I shall be pleased to meet all interested in the A.T.R.S. I also visit regularly the following towns:—Newcastle, Brisbane, Rockhampton, Townsville and Cairns.

Queensland members have decided that we endeavour to persuade the P.M.G. Dept. to hold examinations for servicemen as in New Zealand. This, we think, is the first step.

The Electrical Workers' Boards of the various states issue electrician's licenses only to those who have served apprenticeship to the electrical trade. No one in Australia has served an apprenticeship in wireless, so we think the P.M.G. certificate the best move. However, we are open to suggestions, so let's hear from you.

[The apprenticeship problem as applied to practising servicemen who passed the examination when licensing came into force in N.Z. was successfully overcome by considering every case on its merits. In some cases, where servicemen proved they had had experience at least equal to that which would be gained during an apprenticeship period, licenses were issued immediately. Other applicants whose experience was more limited had short apprenticeship periods to serve, and so on. Thus in five years from the time when licensing came into force, the position will have straightened itself out, with no unfairness to anybody.—Ed.]

AMAZINGLY LOW PRICES AT VEALLS

REGENERATIVE PRE-SELECTOR UNITS

A.C. Model

List of Parts

1—16 gauge aluminium chassis, 6in. x 4in. x 2½in., stamped and drilled as shown.
1—16 gauge aluminium panel, 6in. x 7in., drilled as shown.
3—Wafer sockets, 2—4-pin, 1—octal.
1—23-plate midget variable condenser (Radiokes).
1—7-plate midget variable condenser (Radiokes).
1—15,000 ohm wirewound potentiometer.
1—Double-pole double-throw toggle switch.
4—Terminals, 2 red, 2 black.
1—s.w. r.f. choke (Radiokes).
1—4-pin socket and length of 4-wire battery cable.
3—Small knobs.
1—Small vernier dial (Ormond).
3—4-pin coil formers.

RESISTORS (as specified).
CONDENSERS (as specified)

VALVE
1—6J7 (Radiotron, Ken-Rad, Philips, Mullard).

MISCELLANEOUS (as specified)

COMPLETE PARTS AS SPECIFIED **58/-**

Battery Model

List of Parts

1—16-gauge aluminium chassis, 6in. x 4in. x 2½in., stamped and drilled as shown.
1—16-gauge aluminium panel, 6in. x 7in., drilled as shown.
3—Wafer sockets, 1—4-pin, 2—5-pin.
1—23 plate midget variable condenser (Radiokes).
1—7-plate midget variable condenser (Radiokes).
1—100,000 ohm potentiometer, with switch (Yaxley).
1—Double-pole double-throw toggle switch.
4—Terminals, 2 red, 2 black (Dalton).
1—s.w. r.f. choke (Radiokes).
1—5-pin socket and length of 5-wire battery cable.
3—Small knobs.
1—Small vernier dial (Ormond).
3—4-pin coil formers.
1—Type 58 valve shield.

RESISTOR.
1—1,000 ohm 1-watt resistor.
CONDENSERS (as specified)
VALVE
1—Type 15 valve (Ken-Rad)

MISCELLANEOUS (as specified)

COMPLETE PARTS AS SPECIFIED **59/-**

The "COMPANIONETTE" THREE

1—steel chassis, 9in. x 6in. x 2½in, stamped and drilled as shown.
2—iron-core coils, 1 aerial, 1 r.f. with reaction (Radiokes type BIC)
1—2-gang condenser (Stromberg-Carlson)
1—midget dial and escutcheon (Efco)
1—power transformer (Radiokes MU-60-6)
4—sockets, 1 small 7-pin, 1 universal "P" type, 1—4-pin wafer, 1—4-pin Tasma
1—.0001 mfd. midget variable condenser (Radiokes)
1—.25 megohm potentiometer
3—small knobs
2—terminals, red and black (Marquis)
1—power socket and plug (Marquis)

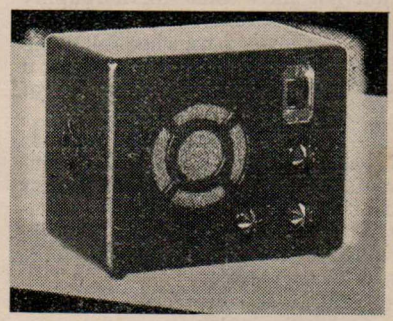
RESISTORS—
1—150 ohm 1-watt carbon
1—300 ohm 1-watt carbon
1—10,000 ohm 1-watt carbon
1—50.000 ohm 1-watt carbon
2—100,000 ohm 1-watt carbon
1—1 megohm 1-watt carbon

CONDENSERS—
2—.0001 mfd.
1—.01 mfd.
1—.05 mfd.
2—.1 mfd.
1—25 mfd. dry electrolytic, 25v. working (Solar)
2—8 mfd. dry electrolytic, 450v. working (Solar)

SPEAKER—
1—5in. midget dynamic speaker, 2,500 ohm field, input transformer to match single pentode (Rola type F-4)

VALVES—
1—6F7, 1—80 (Radiotron. Ken-Rad, Mullard, Philips), 1—EL3 (Philips)

MISCELLANEOUS—
6.3 dial light, power flex and plug, push-back (3 yards solid and ½ yard flexible), 2 dozen nuts and bolts, 4—1in. nuts and bolts, 1 dozen solder tags, grid clip.



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299-301 Chapel Street, Prahran.
3-5 Riversdale Road, Camberwell.

Radio Ramblings

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

★ ★ ★

More "Old Timer" Articles Wanted.

I note with interest that the notes kindly supplied by VK2JP for our club page have apparently created quite a lot of interest, as, apart from remarks in the Feb. issue of "R.W.," I personally have received several suggestions to make the notes longer in view of their outstanding interest. It is not possible to do this in our club notes, as these are intended to cover a variety of topics and not adhere to one particular subject, and so might I suggest the publication of a more detailed article on the early days, written by a "ham" such as 2JP who has "grown up" with radio in Australia?

Strangely enough, it is usually most difficult to extract information from the majority of old timers on any outstanding work they themselves have personally performed. However, I am sure that Jack Pike will oblige, as extracts from records he allowed us to inspect on the occasion of our visit (all of which we did not have time to thoroughly sift), would prove of exceptional interest to those of us who, following in later years, appear to wander a little from the traditional path of amateur radio.

Your readers will be sorry to learn that Chas. Luckman, 2JT, the originator of the notes on old timers, has been in hospital undergoing an operation, and will join with us in wishing him a speedy recovery.—W. J. P., Canterbury, N.S.W.

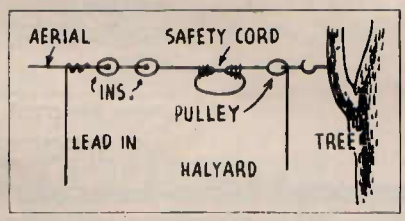
★

Safety Device For Aerials Supported By Trees.

The "Radio World" is an extremely fine magazine—the best in Australia today. Here are a few tips for "Radio Ramblings"—possibly the most interesting part of the magazine.

Trees when used for supporting an aerial have the disadvantage that they sway in a high wind and are liable to snap the aerial or halyard if rigidly attached. By making a loop in the halyard as shown in the diagram and securing the ends with a piece of thin cord or a few turns of fuse wire, this trouble is overcome. If a gale springs up in the night the safety cord breaks and automatically slackens the aerial, which, when the weather permits, can be lowered and the safety cord renewed.

A useful adjunct to the wireless experimenter's equipment is a tinning bath for soldering tags, etc. This may conveniently take the following form. A steel thimble is used as the container for the solder, and is supported on a tripod cut from sheet brass of a fairly heavy gauge. The height of the tripod should be so adjusted that the bottom of the thimble is just above the wick of



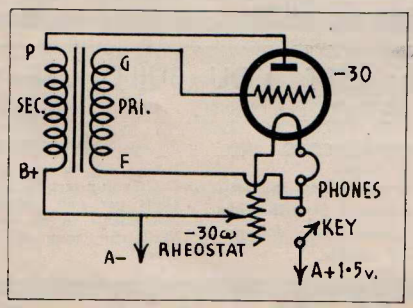
a spirit lamp, which is used to melt the solder. To ensure success, the surface of the solder should be skimmed before immersing part to be tinned, which should be previously cleaned and treated with flux.—....., Kilburn, South Australia.

[Many thanks for your appreciative remarks, and for your very useful tips—but you didn't sign your letter. Send your name along—there's a prize waiting for you for your contribution—Ed.]

★

Three-Valve Superhet Or T.R.F. Wanted.

I would like you to publish at some convenient time a circuit for a broadcast superhet or T.R.F., using



a 6C6, 6D6 and 76 for headphone reception. I have built the "Eaglet S.W. 2" with great success.

As articles on transmitting and oscillators are being published, the audio oscillator circuit shown may be of great value, as only a pair of 1.5 volt dry cells are required to operate the '30. I use an old Marconi type English valve run from my power transformer filament winding. The A.C. gives a good note with the aid of a rheostat.—Dal. S. Oliver, Lindfield.

[A circuit to use the valves you mention has been posted to you. Glad to know the "Eaglet" is giving good results.—Ed.]

★

Home-Made World Time Clock.

I have tried most of the American radio publications and I do not think any of them even compare with the "Radio World." I recently procured the first six issues, which completes my set up-to-date. I hope that when volume one is complete you will make available, cheaply, a cover into which the magazines can be bound.

The only improvement that I can suggest is that you should provide a "Question Box" where circuits could be drawn and questions answered. A small charge could be made for each query. I personally would like to see the circuit of a portable using a VP2, SP2, PM22A and a 19. Perhaps some reader could help me.

Here is a kink I have found very helpful. It somewhat resembles one published in the December issue. Through the back on an old 8-day clock (or better still, an electric one), have a watchmaker project a shaft connected to the hour-hand shaft through a 2-to-1 reduction gear. Build a box (open back and with the numeral half of the Time Chart presented in the August "Radio World" forming the front) and mount the mechanism so that the projecting shaft goes through the centre of the front. Mount the other portion of the time chart on this. Thus an all-world clock is made. It can be wound from the back, and the time correctly set by altering the original hour hand.—K. P. Mackinnon (AW189DX), Sydney, N.S.W.

[Many thanks for your suggestions and appreciative remarks re "R.W." A "Questions and Answers" column will be started next month, and a suitable cover for binding a complete volume of the "Radio World" will be made available when Volume 1 is completed.—Ed.]

★

An Appreciation From N.Z.

I have not written before because I have had my set to pieces so as to add reflex to the circuit. I have been getting copies of the "Radio

World" since July last, and I find that it is definitely the most interesting radio magazine that I have ever come in contact with.

The big thing with the "Radio World" is that it is well laid out, so that even persons without any experience in radio can read and enjoy all the articles published in it. It caters for the man who is just starting off in radio, and it also has articles which are very interesting to highly qualified radiotricians.

I hope to start dxing by the beginning of February, and will let you know how I am getting on with it.

From different reports I have heard, the "Outdoor Portable Four" which was described in the "Radio World" is a very good circuit, so I am thinking seriously of building one up myself. Anyhow, I will let you know as soon as I do. Wishing the Club every success,—H. G. Manson (AW106DX), King Country, N.Z.

[Glad to know you find "R.W." interesting. Yes, the "Outdoor" is an exceptionally fine set —you'll be more than pleased with its performance.—Ed.]

★

"Best Radio Mag. Available."

Just a few words to let you know how much I appreciate the "Radio World." It sure is the best radio magazine available, and I enjoy all the articles. Please find enclosed P.N. for 1/6 for 50 report forms, and I would like then as soon as possible as I have some interesting reports to send out. Below is a list of S.W. loggings:—

PCJ, Holland, 19.71m., QSA4-R7, SM5SX, Sweden, 25.63m., QSA4-R6, 9MI, S.S. "Kanimbla" on 49.917m., QSA5-Rmax., 20-metre amateur, W4DLH, Florida, was heard at QSA3-R6, calling VO1KK, Newfoundland, DJB is always QSA5-R8 after 10 p.m., VPD2 on 31.45m., is QSA4-R6, TPA3, 25.23m., is QSA3-R5, and I2RO, 25.4m., is QSA4-R5-7.—Robert King (AW147DX), Mordialloc, Vic.

★

Amateur Articles Appreciated.

I am very pleased to note in the January issue that "Breaking Into The Amateur Game" is starting next month. This is what I have been looking for for some time, as due to being in the country I am unable to attend any lectures for A.O.P.C.

The "Radio World" is a wonderful book for anyone at all interested in radio, so keep the good work going. I am binding all my "Radio Worlds" into yearly lots, thereby keeping each year separate and at the same time indexing on the cover any particular item so that any one wanted can be found easily.—W. H. G. Dawson (AW121DX), Tailem Bend, S.A.

[With regard to the indexing of articles in "R.W.," in the April issue (Vol. 1, No. 12), a comprehensive index covering all technical articles in the 12 issues will be published on the last page.—Ed.]

★

Telephone Systems For Comparing DX Notes.

Can any reader let me know how to complete the following piece of apparatus? The completed article is meant to record on a thin tape a series of morse messages—it is something similar to the paper tape telegraph machine.

In this case the paper tape is drawn by means of a clockwork motor; two wires come from the speaker of the radio set (I presume from the voice coil) and connect to two brass fingers or contacts which are set at a certain distance apart from each other, and lightly touch the paper tape which in turn has been drawn through an acid bath (I think this is correct). The principle seems to be electrolytic action between the contacts on the acid-treated paper tape

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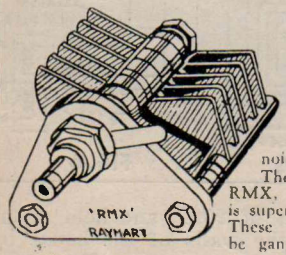
The best midget condenser available, at any price. The construction will meet with the approval of all "HAMS." All metal parts are brass, and a large surface bearing with special short-circuited ball thrust race means long noise — free life. The insulation is RMX, a ceramic which is superior to isolantite. These condensers can be ganged.



VC15Y 15 mmf. 3/9
VC40Y 40 mmf. 4/-
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NC15 15 mmf. double spaced 6/-
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Improve your Short-Wave Reception

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will increase your short-wave signals. Give you better selectivity and reduce the noise level. Just the outfit the enthusiast wants.

A.C. Kit £2-18-0.
Battery Kit £2-19-0.

BUILD IT YOURSELF!

"COMPANIONETTE 3"

This little machine has been developed for those who desire something compact yet giving the tonal quality of a larger receiver. It is a very easy set to build and the novice is invited to call on the assistance of our technical staff, should any point not be clear.

Complete Kit, as specified in this issue "Radio World" £6-12-6 Cabinet Extra

SPECIAL OFFER!

Best quality glazed porcelain stand-off insulators, 3¾in. high with terminals. 1/- EACH

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18in. high 17/6
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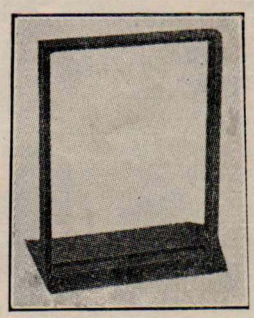
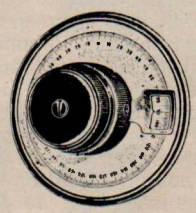




UTILITY MICRO DIALS

The best dial for short-wave or instrument use. Radio 100/1.

10/9

MAY WE RESERVE A COPY OF OUR 1937 CATALOGUE FOR YOU? IT WILL BE READY SHORTLY.

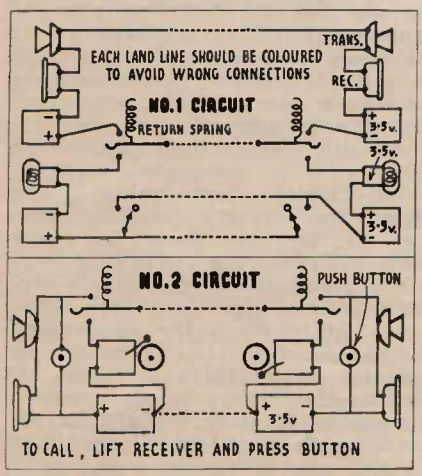
PRICE'S RADIO SERVICE

D. G. McINTYRE

5 & 6 ANGEL PLACE —— —— —— SYDNEY

leaving a recorded dot or dash by means of a chemical change due to the electrolysis. The variety of acid is unknown to me; also the details of connecting to the speaker. Perhaps some reader has seen the idea.

Shown in the accompanying sketch are two telephone circuits for short distances. Of these I recommend No. 1. Although this circuit has two extra batteries and more land-line, it is better to operate and will give good service with low battery consumption. My friend and I used these 'phones



(No. 1 circuit) for some time, and had wonderful use from them.

The system was used for:— 1. Checking up on general conditions for DX work. 2. Informing each other of a new station and checking the announcements and frequency. 3. By listening to amateurs working ordinary "fone," we could hear them in duplex i.e.:— If VK2— was working W6—, I would tune W6— and my friend tuned VK2—. If both stations were at reasonable strength we would not miss a word from either side, as each set was left tuned to the one station and I would hear the VK replying to the W when I listened at the telephone from my friend's house. There are hundreds of uses for these 'phones and I was very sorry when my friend shifted.

I may add that I went to the telephone authorities and they gave me permission to use these 'phones on the following conditions:— That no wires crossed over or under any road, footpath, or right of way. Where the wires crossed a private property the owners consent is of course needed. Another condition is that our land-lines were not to go near any other telephone line.

Operation of No. 1 Circuit:— Leave 'phones on hooks and turn switch till lamp glows. When other party sees light he lifts receiver and lamps go out. Caller now lifts receiver and converses. When finished, replace receivers and the caller switches off lights. Design of small cabinet is left to constructor; in my case I enclosed the lot and fixed a red reflector in front of the globe, gauze before the mouthpiece, and fitted the receiver hook at the back. The cabinet rested on the top of the radio.

P.M.G. obsolete 'phones at P.M.G. Stores are 5/- pair; 4 flat type torch batteries at 9d. ea. cost 3/-; and two 3.5-volt torch globes at 3d. ea. cost 6d., making a total of 8/6. The wire depends on the distance.— G. O. La Roche (AW155DX), 62 Gladstone Av., South Perth, W.A.

[With regard to your morse recording outfit, one way is to use a tape passing through a potassium iodide solution. Perhaps some reader could let you have constructional details.—Ed.]

★

Aerials For All-Wave Work.

The type of aerial system used with a receiver makes a tremendous difference to the latter's DX capabilities, and so the following may assist beginners in getting the most from their sets.

Inverted "L"—The name is self-explanatory. This is the most commonly-used aerial and if well constructed gives satisfactory results. Within limits, the efficiency increases considerably with the height, which should not be less than thirty feet above grounded objects. The length is also an important factor, and should be decided upon only after the type of set and locality have been taken into consideration, the main point to remember being that length tends to decrease the selectivity of the set.

The average man does not consider the directional properties of this aerial, but though only slight, they do exist. With the lead-in end higher than the far end, stations are best received from the direction in which the lead-in end is pointing.

"T" Aerial.—is of similar construction, except that the lead-in is taken from the centre instead of one end.

Still referring to outdoor aerials, we now consider two simple short-wave aerials. The first is a doublet in which the two lead-in conductors are twisted together. Fig. 1 shows the essential points, and the following details should be noted. The actual aerial wire should be of 14 gauge hard drawn enamelled copper, while the feeders may consist of 18-gauge rubber-covered wire. Two porcelain strain insulators would be used at either end and two in the centre.

For quarter-wave doublets resonating at 25, 30 and 40-metres, the dimensions are as follows:—

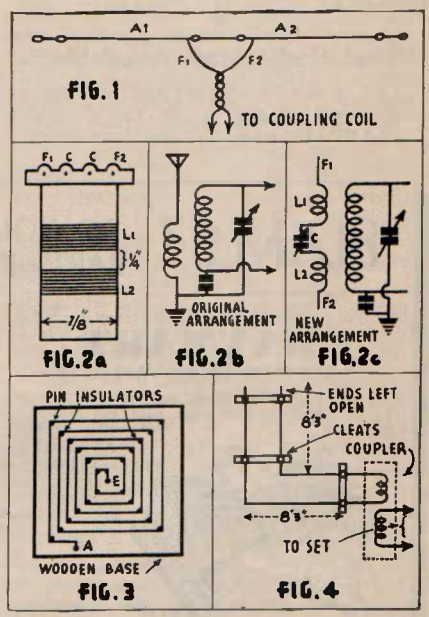
W.L.	A1-A2	F1-F2	L1-L2
40m.	33½ft.	66½ft.	12 turns
30m.	25ft.	50ft.	10 turns
25m.	21ft.	42ft.	8 turns

Fig. 2 shows the method of coupling the aerial to the set. To enable the coil to slip inside a standard Marquis S.W. coil former, L1 and L2 are wound on a ⅜in. former, and 26-gauge enamelled wire is used. Condenser C may be of .0005 mfd. capacity, although any capacity of not less than .00025 mfd. can be used.

The aerial tuning will not be sharp, but rotation of "C" from zero to full capacity will show a definite peak when the receiving frequency is tuned over.

If possible, it is advisable to build the 40-metre aerial, thus effecting a compromise for the five main S.W. bands. The harmonic on 20 metres gives the 19-metre band, the harmonic on 80 metres obtains the 80-metre band, and we can rely on the tuning of L1, C and L2 to peak the aerial to the 25, 31 and 49-metre bands. This aerial is to be highly recommended.

The other S.W. aerial consists of a vertical arrangement built from reducing sections of copper tubing

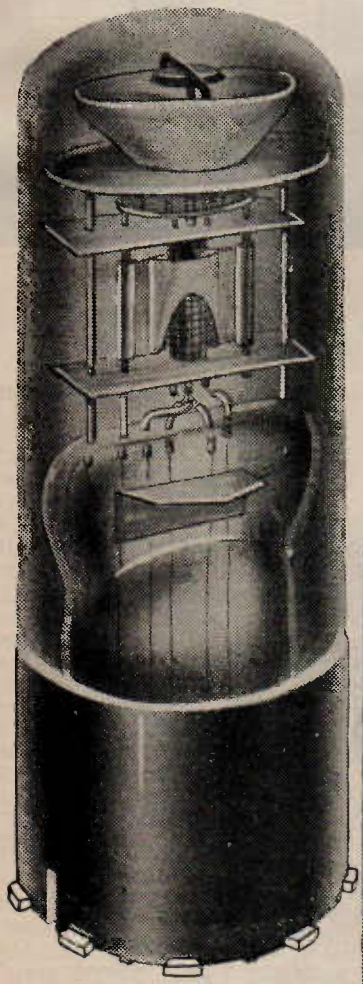


to a height of 20ft., and held about 2ft. from the walls of the house by well-insulated supports. By some this type of aerial is considered productive of the best all-round results.

We will now briefly discuss some indoor aerials. The loop aerial is convenient, because it eliminates the need of any complicated construction and enhances a set's portable possibilities. Added to these are the advantages of directional properties and the avoidance of an earth wire. No set construction can be placed upon the loop aerial, owing to the experimental nature of this type. Fig. 3 shows one of the many possibilities. There is of course the indoor aerial

(continued on page 46)

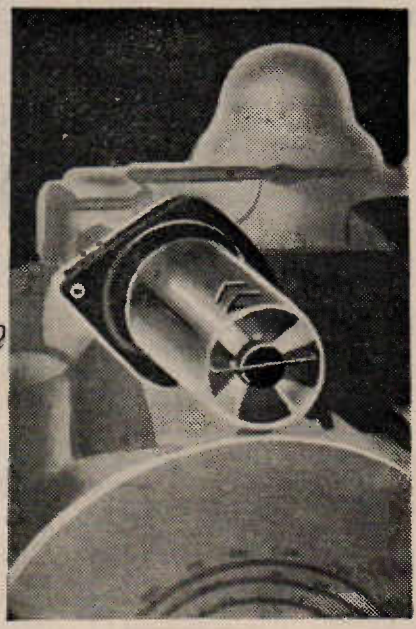
INSIST ON "ELECTRON STAR".. TUNING

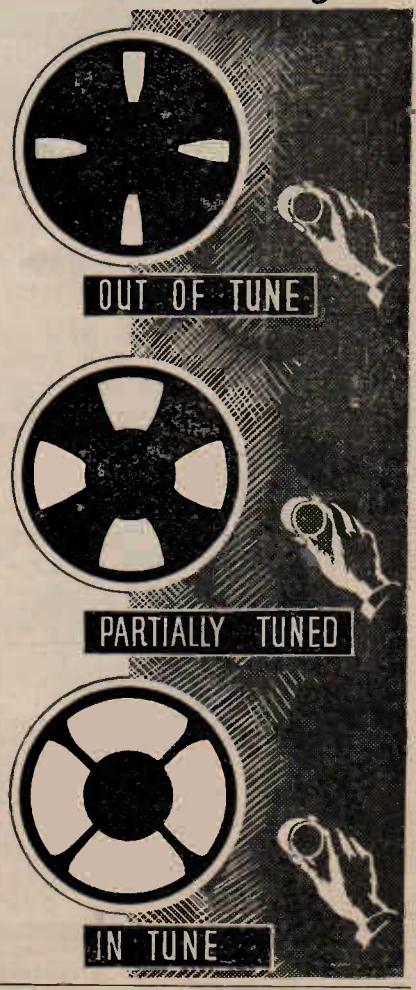


DEVELOPED by the Philips Laboratories, the "Electron Star" Tuning Indicator is the latest scientific aid to the correct tuning of a radio receiver, thus eliminating distortion from this source.

For radio that is truly modern, be sure that your new receiver is equipped with the Philips "Electron Star" !

Look for the distinctive clover-leaf design.

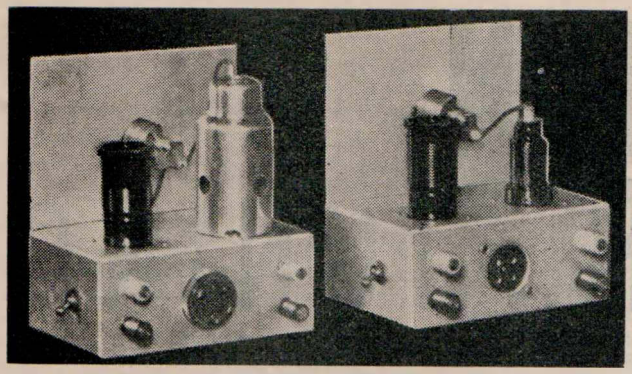




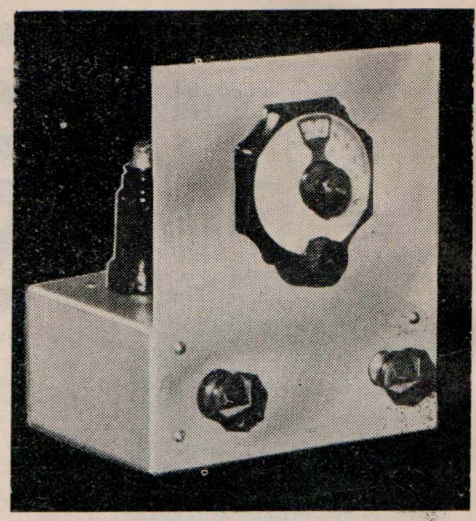
The "Electron Star" (Philips type EM1) is in reality a miniature Cathode Ray Tube, utilised as a tuning indicator — visible through an aperture in the cabinet.

PHILIPS

VALVES, LAMPS, RADIOS, TRANSMITTING & X-RAY APPARATUS



Rear views of both the battery and a.c. models are shown on the left, while on the right is a front view of the a.c. booster. The two controls are, left, regeneration, and right, aerial coupling.



Building A Regenerative S.W. Pre-Selector Unit..

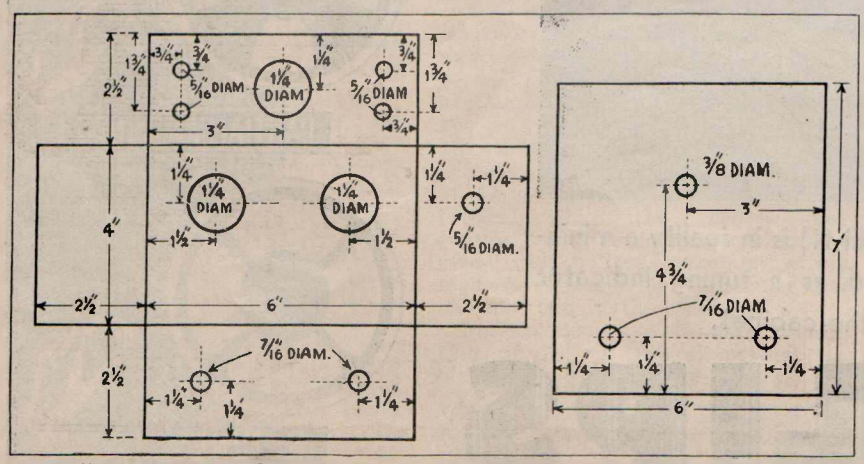
Much higher sensitivity and an improved signal-to-noise ratio can be obtained on the short waves from any 4/5 dual-wave superhet, by using this regenerative booster unit. Designed and described by

"SUPER-GAINER"

THE average 4/5 dual-wave superhet will normally bring in the main shortwave stations throughout the world at satisfactory volume, but the average DX enthusiast is rarely satisfied with the restricted amount of gain given by a set of this type.

The cheapest way of boosting up its DX capabilities is to use a regenerative pre-selector unit, which, except for the fact that regeneration is applied, is nothing more or less than a separate tuned R.F. stage. Regeneration is not essential, in fact, without it a noticeable improvement in gain is obtained, but with it sensitivity is increased considerably, and what is more important, the signal-to-noise ratio is also greatly improved, so that signals that normally are almost lost in the noise are lifted by the booster to provide fairly readable signals at good volume.

The two models illustrated are for battery and A.C. operation, a type 15 valve being used in the battery model and a 6J7 in the A.C. Cathode regeneration with potentiometer control of screen voltage is employed in both, while the same coils are used for both models.



Full dimensions for preparing the chassis and panel are shown in this sketch.

Booster can be Switched In Or Out At Will.

So that the unit can be cut in and out of circuit at will, a double-pole double-throw switch has been incorporated. In the A.C. model, one section of this transfers the aerial from the booster to the aerial input of the main receiver (see circuit), while the other breaks "B+." In the battery version the second section of the switch breaks "A—," while the switch on the 100,000-ohm potentiometer controlling the screen voltage breaks the circuit between "B+ 67.5 volts" and chassis. If this were not done the tiny current flowing through the potentiometer would be present whether the booster was on or off, and this would shorten the life of the "B" batteries.

Full details of the construction of both units, together with coil winding data, are given elsewhere. In both units the 7-plate midget aerial condenser needs to be insulated from the chassis with washers, and the same applies to the 15,000-ohm potentiometer used in the A.C. model.

Looking at the rear of the chassis, the two terminals on the left are for the aerial and earth leads and those on the right for the aerial and earth leads from the booster to the receiver.

About The Power Supply.

In the A.C. model the power supply is obtained from the main receiver by means of a 4-wire cable carrying the two heater leads (6.3v., .3 amp.), "B+250v." and "B—."

For the battery model a 5-wire cable is needed—for "B—," "B+-

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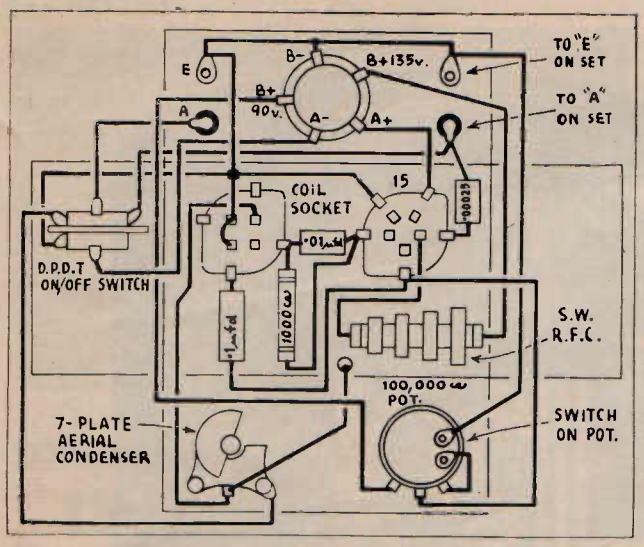
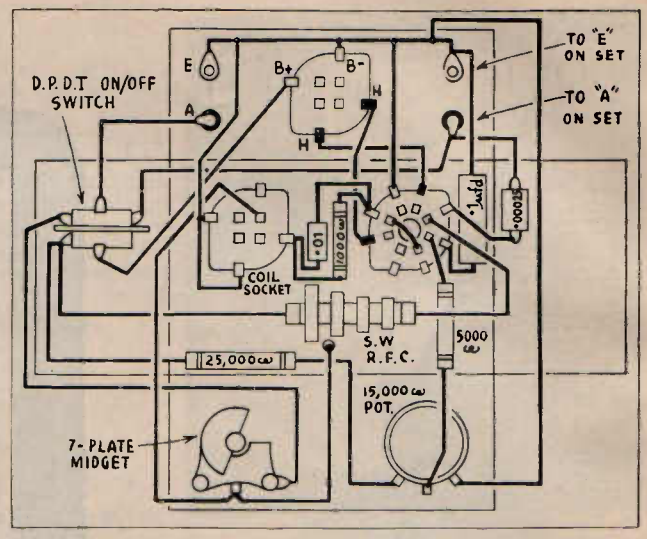




The sub-chassis wiring for the a.c. unit is shown on the left, with that for the battery model on the right. In each case there is only one lead passing up through the chassis—that from one side of the aerial coupling condenser to the fixed plates terminal of the tuning condenser.

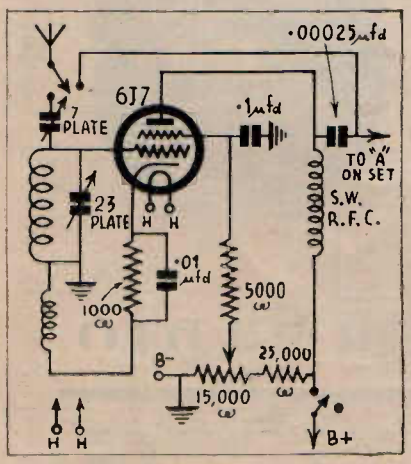
Coil Winding Details.

BAND	Grid	Reaction
17—30 metres	7	2
28—51 metres	15	3
48—90 metres	22	4

Use 24 gauge enamelled for all grid windings, and 28 enamelled for reaction. Space between windings, ⅛in. Reaction windings should be put on in opposite direction to grid windings. Two smallest grid windings should be double space-wound, i.e., so that the turns are separated by a distance approximately equal to twice the diameter of the wire. The largest grid winding is close-wound.

67.5v.," "B+135v.," "A—" and "A+2v."

When the unit is completed it is placed alongside the main set, as close as possible to the aerial and earth terminals on the latter. The aerial and earth leads are then transferred from the main receiver to the corresponding terminals on the unit, and a pair of leads, which should be as short and direct as possible, run from the output terminals of the unit to the aerial and earth terminals of the main set.



Operation Pointers.

The regeneration control is affected slightly by the plate circuit load, requiring in some cases a little juggling with the reaction winding on each coil in order to obtain smoothest results. With the aerial coupling condenser set approximately half way in, the unit should slide smoothly into oscillation when the reaction control is almost full on. The point at which regeneration occurs can be controlled to a certain extent by moving the reaction winding closer to or further away from the grid winding.

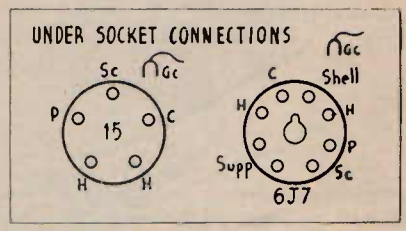
Uuit Should Not Oscillate.

When the unit is switched in or out of circuit, it may be necessary with some receivers to make a slight adjustment to the main tuning control.

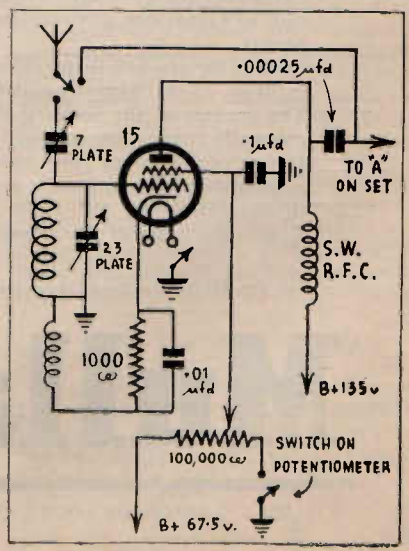
It will be found that the booster operates best, giving greatest gain and selectivity, with the regeneration control set just below the oscillation

(continued on page 46)

Circuit of the a.c. model (left) and battery model (right). In the former, the D.P.D.T. switch is used to break "B+" and to switch over the aerial from the booster to the main set; in the latter, it breaks "A—" and switches over the aerial.



Under-socket connections of the type 15 valve used in the battery model, and of the 6J7 used in the a.c., are given above.



9 IN 1

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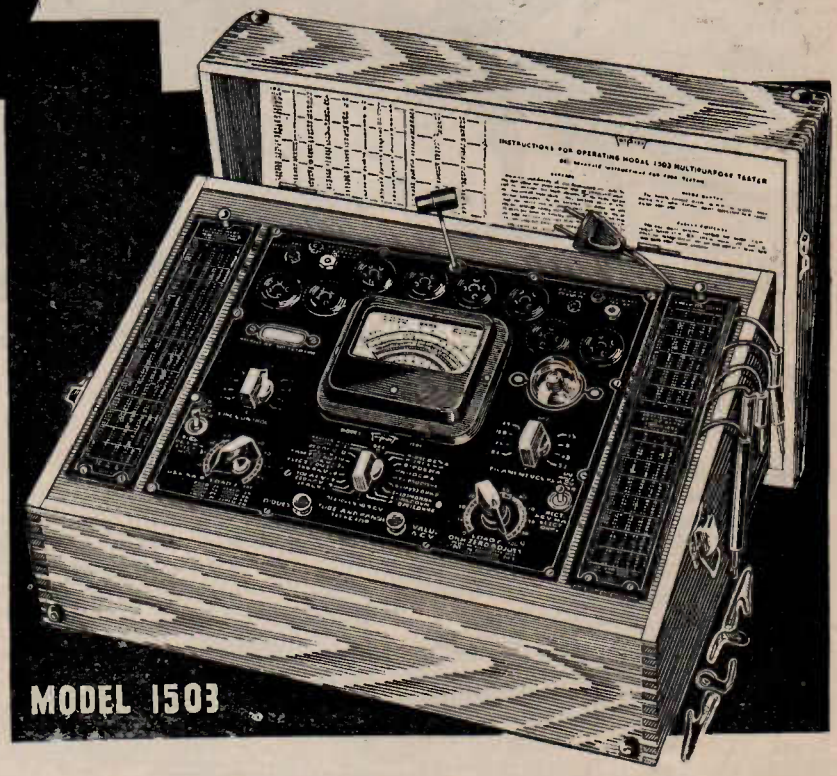

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8. Ohmmeter.
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Amateur Transmits From Bed In Hospital

More Static Electricity Experiences: Slow Morse Schedules For March: Lakemba Radio Club Notes And News.

By W.J.P.

This is how they listen to the test matches at VID (Darwin Radio Station). The op. with the 'phones on is known as "Smiffie," and is said to be the "hardest doer" in the service.

VK2ZP, Arthur Yates from Inverell, was recently involved in a glider accident. He suffered very bad fractures to his legs, necessitating his being transferred to the Royal Prince Alfred Hospital, Camperdown, Sydney.

On receipt of advice to this effect from Mr. Ryan (Secretary of the W.I.A.), members from Lakemba Club visited the hospital, where they found 2ZP in a very jovial mood, despite the fact that both his legs were set in plaster and irons. To Mr. Picknell he expressed a keen desire to be back on the air again (but not in the air!). The result was that we managed to fit a small transmitter and receiver in a box 10in x 8in. With the addition of a few dry batteries, key and phones, the apparatus was finally installed at the bedside, and put into operation on 40 metres. The present range is somewhat limited, as the aerial consists of a piece of wire 33 feet long and only about 8 feet high, strung around the verandah.

Arthur often has to give his address a few times when working other amateurs, as when he says "QRA here is Vic. 3 Ward, Prince Alfred Hospital," most hams query it and request a full explanation. Upon the arrival of a nurse, the QSO sometimes has to be cut short with a "Sorry OM. Nurse QRM here. c u later."

Static Electricity.

Since the publication of our recent notes in these columns on static-charged antennas, it appears as though other readers have had similar experiences. It might be mentioned that it is quite normal for elevated conductors to acquire heavy charges even though there is no sign of a storm. Several cases are on record of severe shocks resulting from contact with the lead-in of a highly-erected aerial. These effects are sometimes observed in stormy weather, hot or dusty days, or may result from a low travelling cloud.

Another rather amusing example of static electricity may be of interest to readers. Sydney residents will no doubt recall that after the opening of the Sydney Harbour Bridge, motorists complained that they received shocks when handing their toll to the collectors.

At the time we very much doubted the truth of these statements, until one day when we ourselves were crossing the bridge, a loud crackle, accompanied by a tingling sensation in the fingers, was produced when the driver's hand touched that of the toll collector. The driver was so keen to withdraw his hand that the toll money fell to the roadway and rolled under the car, much to the amusement of the collector. If readers interested would like a brief explanation of the cause and method used to overcome the trouble, then we will include it in later notes.

★

Morse Schedules For March.

The following schedules of morse practice for beginners will be observed during March.

VK2DL. Every Sunday (excluding holiday week-ends), 8 to 9 p.m. 41.1 metres (7,300 k.c.). Speed of code varies between 7 and 18 words per minute, each passage being checked on telephony, the speed being also given. Texts transmitted will consist of questions taken from A.O.P.C. examination papers.

The operator of the above station would like to take this opportunity of thanking the numerous aspirants in practically every state, including members of the A.W.A.W. DX Club, who have made use of, and reported consistently on these transmissions over the past 11 months.

Wednesdays.

VK2CL. March 3 and 10, 8 to 8.45 p.m., c.w. only, with 5 minutes test call at 7.55 p.m.

VK2ZR. March 17 and 24, 8 to 8.45 p.m., c.w. only, with 5 minutes test call at 7.55 p.m.

VK2KS. March 31, 8 to 8.45 p.m., telephony check and speed also given. All times are Eastern Standard time; 2CL, 2ZR, and 2KS will operate in the 41.1-42.8 metre amateur band.

The continuance and success of these transmissions rests entirely with those for whom they are intended. Interested readers are asked to send reports either direct to the

(continued on page 22).

★

The ever-increasing popularity of Ever-Ready Radio Batteries has led to lower production costs which the manufacturers, in keeping with their usual policy, are pleased to pass on to the public in the form of the following reduced prices:—

NEW PRICES EFFECTIVE FEB. 15.

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Superdyne 60 volt B Battery	25/-	**22/6**
Heavy Duty 22½ volt B or C Battery	7/6	**6/9**
Heavy Duty 45 volt Vert. B Battery	14/6	**12/6**
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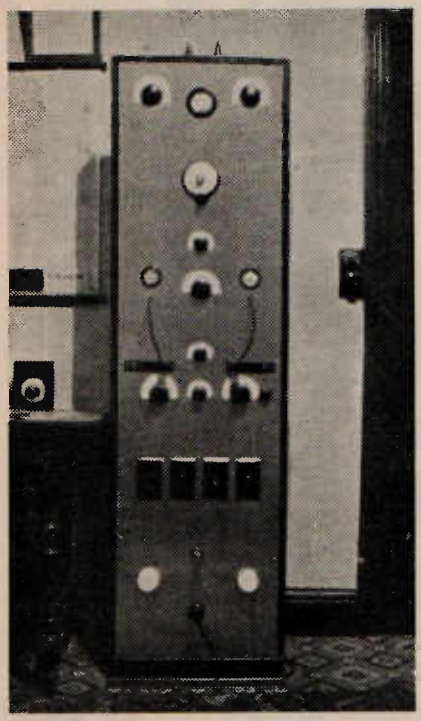
E.P.1

Breaking Into The Amateur Game . (2)



This transmitter, built by Mr. Bert Dimmock (VK2OW) of Hurlstone Park, Sydney, carried off first prize in the transmitting section of last year's amateur radio show.

R.F. and A.F. coupling arrangements, radio wave fundamentals, and the elements of valve operation are covered in this instalment.

By GEORGE THOMPSON (VK3TH) and IVOR MORGAN (VK3DH)

WHEN a wire carrying alternating current is wound into a a coil, a magnetic field is set up around it. This field rises and falls in direct accordance with the variations in the current flowing. It is possible, as a result of this, to induce currents in another coil placed near the original one, and the induced current variations will correspond with the original.

Also, when a condenser is connected to a voltage supply, a charge will be built up in the plates of the condenser. Now, a conductor connected across the condenser will pass an electric current. If a coil is connected across the condenser, the energy present originally in the condenser becomes the magnetic field around the coil, established by the flow of current through the coil from the condenser.

When the condenser has discharged all energy to the coil, the magnetic field around the latter commences to collapse, causing a current flow in the coil continuing in the same direction, thus again charging the condenser but in the opposite polarity. This constitutes a half cycle of oscillation. The energy is alternatively stored in the coil and condenser twice in one complete cycle.

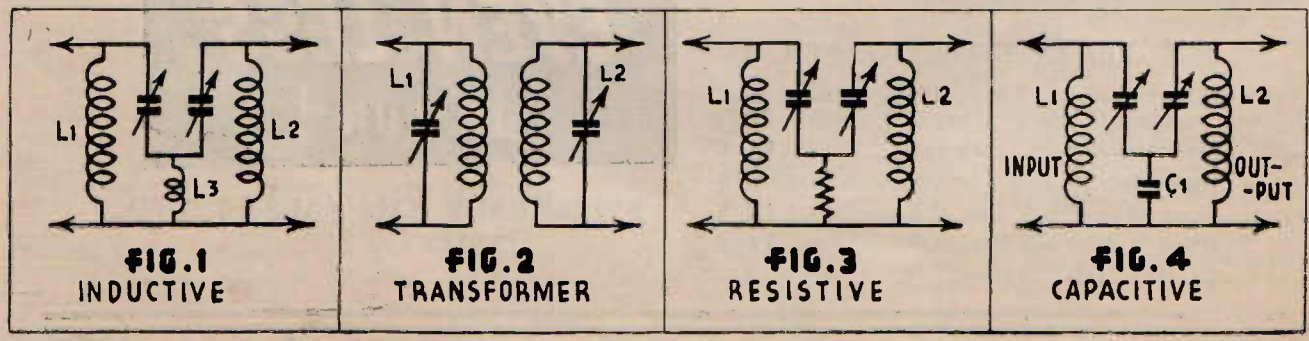
This process would continue indefinitely if no resistance were present in the circuit, but there always is resistance. It is sometimes known as damping, and its presence causes the oscillations to die down more or less quickly, depending on the degree of damping. Should the condenser be large it will naturally take longer to charge; likewise if the coil be large it will store up more energy. From this we see that the smaller the coil and condenser, the higher the frequency of oscillation and vice versa. Also, that for any combination of inductance and capacity there will be one particular frequency of applied voltage at which current will flow with the greatest ease. This is known as the resonant frequency.

Coming now to "coupling" arrangements, in Figs. 1, 3 and 4 the coupling methods shown are known as direct inductive, direct resistive and direct capacitative. By increasing the value of inductance (L3 in Fig. 1), the coupling between L1 and L2 is increased. In Fig. 4 the coupling between L1 and L2 is increased by a reduction of the capacity of C1.

Inversely, if C1 is made a comparatively high capacity, i.e., .01 mfd. for broadcast frequencies, the degree of coupling between L1 and L2 is decreased. This system, together with that of Fig. 1, is commonly found in the pre-selector circuit of a broadcast band (200 to 550 m.) receiver.

Transformer coupling (Fig. 2) is simple to understand. The coils L1 and L2 are placed in inductive relation to each other and the degree of coupling is varied by moving L1 to and from L2.

A word here on inductive capacitance and capitance bridge circuits will be of great value later, when the neutralising of transmitters is being discussed. Taking Fig. 5 first, when C1 equals C2 and "Ca" equals "Cb," we



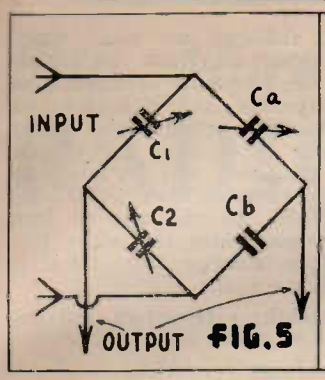


FIG.5

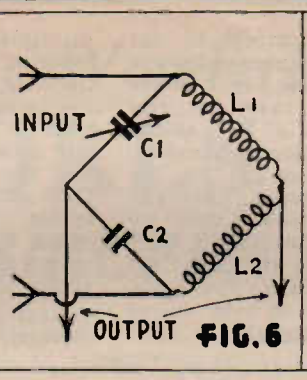


FIG.6

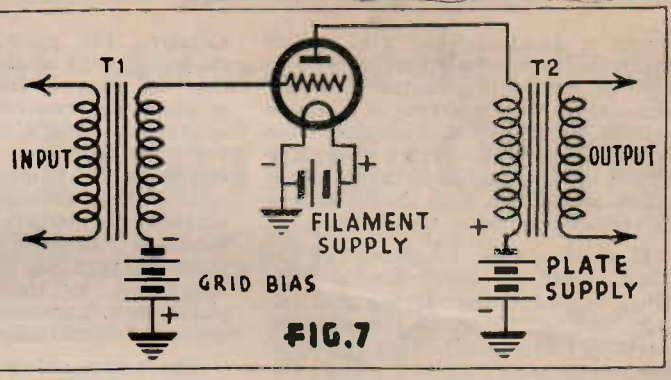


FIG.7

can apply a voltage across the points marked "input," and no voltage will appear at the output points.

In the case of Fig. 6, when C1 equals C2 and L1 equals L2 a condition of balance is created, and the application of a voltage at the input will not affect the output terminals.

Applying this knowledge to the neutralising of a radio frequency amplifier, we may assume that C2 (Fig. 6) is the inter-electrode capacity of the valve. L1 and L2 constitute the plate inductance. By an adjustment of C1 to make its effective capacity equal to that of C2 (the fixed capacity of the valve elements) we produce the desired balance electrically, and there will be no coupling between the input and output of the amplifier. Therefore, as we shall see when dealing with oscillators later, there will be an absence of oscillations in the amplifier, this being the correct condition of a straight radio frequency amplifier.

Radio waves are best likened to the effect obtained in a pool of water when a stone is dropped into its centre. Like the water wave thus created, radio waves progress outwards from the transmitting aerial. The wavelength is the distance from the crest of one wave to the next. The frequency is the number of waves passing a fixed point in a certain length of time. From this it is easily seen how as the wavelength is decreased, the frequency is increased, and conversely.

Not all the radiation from a transmitting antenna is on a horizontal plane, but that part radiated up away from the earth's surface is called the sky wave. These waves would travel on into space were it not for the ionised atmosphere region named after the American and Englishman who first proved its existence, "the Kennelly-Heavyside layer." The existence of this layer or radio ceiling explains the theory of long-distance communication. Also, the reflection which takes place is continuously varying, because the height of the Kennelly-Heavyside layer, which may be likened to a radio wave mirror, is changing from time to time. Thus we can see how the reflected wave will strike the earth's surface in a certain spot, but when the reflector is moved up or down, then the reflected wave will reach the earth again at a point further from the transmitter when the layer is high, and nearer to it when the layer is low. Fading is thus explained, as the reflected wave may be directed at the receiver one minute, and then at a point some distance from the receiver the next.

In this instance, of course, we are considering only the reception of the sky wave, and not of the ground wave. Ground waves are the waves radiated horizontally from the transmitting aerial and received direct by the receiver. Skip distance is that area in between the point where the ground wave has become too weak for practical purposes and the point where the sky wave reaches the earth's surface after reflection from the Kennelly-Heavyside layer.

How The Valve Works.

Valves, or vacuum tubes as our American friends style them, are produced and utilised in many different forms these days, but fundamentally they all depend on the simple diode, consisting of an electron-emitting element and a plate. The latter is a metal or carbon cylinder or sheet so placed in the evacuated glass envelope to be in the position to attract negative electrons emitted from the hot cathode. This cathode is either a filament heated by A.C. or D.C. and made to emit electrons directly from its surface, or a metal sleeve, or cathode, is placed around a filament which heats it to a temperature sufficient to produce an electron emission from the external surface of the cathode.

By connecting a battery with the positive terminal to plate and negative to the cathode, and energising the cathode with some other source of A.C. or D.C. supply a continuous electron flow will emanate from the hot cathode to the positive plate. Should the plate supply battery be replaced by an A.C. supply of any frequency at all, "rectification" will take place. This is because the current will flow only in one direction, namely when plate is positive to cathode. No electron flow will take place when the plate is negative in respect to the filament or cathode.

When no voltage is applied to the plate, the electrons from the filament remain in a cloud around it. This emission is called the "space charge."

When a positive voltage is applied to the plate, electron flow immediately commences, and as the plate potential is raised the electron flow will increase until a point is reached when all the electrons emitted from the cathode are attracted to the plate. This is known as the saturation point and represents the total emission of the valve, which would rapidly become ruined were such condition allowed to continue for any length of time.

A third element, named the grid, may be placed between the plate and cathode of a diode which then be-

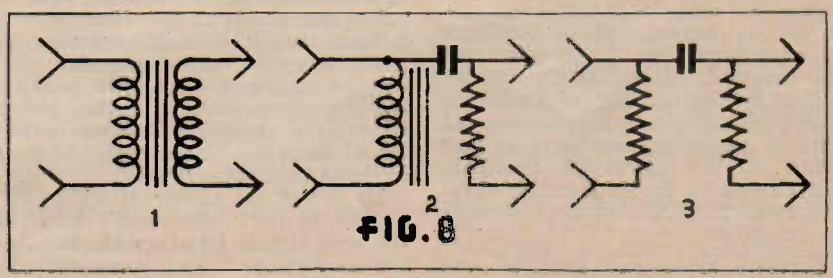


FIG.8

comes a triode. This grid, which takes the form of a spiral of wire. is used to control the electron flow. By connecting it to a source of variable voltage. the steady electron flow from cathode to plate which normally occurs in the diode, will then vary in direct accordance with the variations of voltage applied to the control grid.

If a resistance be placed in the plate circuit of our triode, a magnified replica of the varying grid voltage will appear across the plate resistance (plate load). This theory is known as amplification. The diagram (Fig 7) is that of a single-stage audio frequency amplifier.

All valves have a "characteristic curve," that is, with a given negative bias voltage applied to the grid the plate current will have a steady value. This curve is plotted by a number of tests made over a range of varying bias voltages. The curve will be found to bend at the high bias voltage point, then remain straight over a fair range, and again bend as the bias voltage reaches zero.

A point is chosen on the straight portion of the curve and the bias voltage is then set to give the maximum grid voltage range at a reasonable plate voltage without going into the bended part of the characteristic curve. When an audio frequency voltage (speech or music) is applied to the primary of the audio frequency transformer (T1. Fig. 7) a voltage appears across the secondary, and is applied to the control grid of the of the valve.

If this voltage does not exceed that of the grid bias voltage (e.g., grid bias —9v., grid voltage peaks —7v.) then, as the audio frequency signal produces a fluctuating voltage at the grid, this element will be more or less negative, from —16 volts to —2 volts at peaks. Because of the resulting fluctuation of the electron stream, as explained earlier, a replica of this voltage variation will appear across the plate load (T2 primary). Then, since T2 secondary is inductively coupled to the primary, we will obtain our magnified voltage in the output circuit exactly corresponding with the original waveform of the voltage applied to T1.

Push-pull amplifiers are constructed on the same principle, but have the advantage over the single-ended type diagrammed in that the current flowing in the primary of T2 is fed in through a centre-tap, splits up and flows in opposite directions to the plates of the valves in pushpull. This eliminates the detrimental saturation effects of this current through the primary.

Further, since the grid of one valve is positive when the other is negative, the plate current of one valve is falling at the precise instant that the other is rising. In a power amplifier we require twice the grid excitation voltage in a P.P. amplifier, but since the second harmonic distortion is balanced out by the symmetrical arrangement, we can obtain more output power than we would if the same two valves were wired in parallel. In the latter arrangement, by the way, the grids, plates and filaments of both valves are each connected together.

Fig. 8 (a), (b) and (c) show different methods of audio frequency

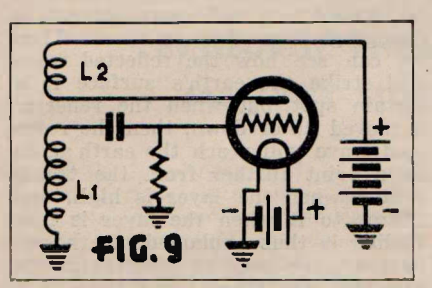


FIG. 9

coupling, viz., (1) transformer, (2) impedance or choke and (3) resistance. Fig. 7 also illustrates what is known as a class "A" amplifier, i.e.,—when the valve is biased to operate on the straight portion of its curve. When the bias is increased so that the valve plate circuit works on the lower bend, we have what is known as a class "AB" system.

Class "B" is the third method of audio frequency amplification, and is a condition when the bias voltage is such that the plate current is almost zero until an exciting voltage is applied to the grid. Sufficient power is supplied from the driver valve (stage before the class "B") to make the grid of our class "B" amplifier go positive in respect to the cathode. At this point plate current increases enormously, and power output in the plate load is very high compared with class "A." Pushpull is always used because of the distortion incidental with the functioning of the valve on the lower curve of class "B."

Generation of Radio Frequency Oscillations.

We have the knowledge that a valve can amplify, and from this it follows that it is only necessary to feed energy back from the plate circuit to the grid circuit to produce continuous oscillations. The power to sustain these oscillations is obtained from the plate supply. (Fig. 9 explains this quite clearly).

L2 is the coil taking SOME of the energy in the plate circuit back to the grid circuit L1, thereby sustaining oscillations. Most oscillator circuits depend on this fundamental principle, although we meet many differing circuit diagrams. By tuning the coils, the frequency of oscillations can be controlled,, and with air-cored coils we could say roughly, by choosing suitable inductances and capacities, the frequency may be anything from 60 megacycles down to 50 kilocycles. Then, by the use of iron cores, we may enter the audio frequency scale and go from 20 kilocycles to one cycle.

Next month:— Detectors and Receivers, S.W., B.C. and U.H.F.

Lakemba Radio Club Notes.

(continued from page 18).

stations concerned, or to the Lakemba Radio Club, 308 Canterbury Road, Hurlstone Park, N.S.W.

★

How I Became An Amateur.

No. 2 . . . . VK2EV.

I first became interested in radio in 1923, when I obtained possession of a single slider crystal set, and spent my spare time trying to find the most sensitive spot on a piece of galena crystal so as to hear 2CM's Sunday evening test programmes.

I soon tired of the crystal set, so a 201A valve was purchased for £2-5-0, and my first valve set came into existence. The increased sensitivity of this receiver resulted in my hearing several interstate amateurs, but only after careful tuning, sleepless nights and a good deal of patience. The fact of hearing these amateurs in communication with each other made me desirous of obtaining my own call-sign. However, any ideas in this direction had to be put off for some years owing to certain examinations which had to be passed, and which were more important than my hobby.

Then with the help of 2JT I was soon able to pass the A.O.P.C. exam., and finally joined in with the "hams" under the call sign of VK2EV.

Detecting Unmatched Valves

Push-pull valves must be matched in order to obtain good quality, lack of hum, and plenty of punch. A perfect match will be shown by zero reading when a voltmeter is connected between the plate prongs of the output valves. If the meter reads backwards, reverse the connections. A reading of more than several volts indicates that a new valve is needed to provide a more accurate match.

Still More Wonderful Advances in New
RADIOKES Tuning Coils
— *SIRUFER IRON CORES!*

LABORATORY tests convincingly prove that the new Radiokes Iron Core Coils — using "Sirufer" cross type cores — are an improvement of approximately FOUR to SIX TIMES over an average air-cored coil! This tremendous improvement in gain is responsible for a complete swing by most leading set manufacturers to these new Radiokes releases.

Without a doubt they are the finest components of their type now available in Australia, being designed and finished with the care and workmanship that has long been responsible for Radiokes "leading in Australia, competing with the world."

Allied to the remarkable selectivity and sensitivity of these coils, is their wide application in all types of receivers, being available in Dual-Wave (DIC) and Broadcast (BIC) types.

Radiokes Type BIC Broadcast Iron Core Coils using 'Sirufer' Cross Type Cores

There is no doubt that the use of an iron core in coils operating at radio frequencies presents many advantages. There are many types of iron cores available in Australia, but so far the "Sirufer" Cross type core is in every possible way the most efficient.

It is natural, therefore, that Radiokes Limited should make available to constructors type BIC aerial and R.F. coils using these new Sirufer cores. The advantages gained by the use of Sirufer cores are apparent when we consider a standard five tube superheterodyne and compare the performance when using air core and iron core coils. The receiver in question using air core honeycomb wound coils (Litz) yielded the following figures:—

Gain between aerial terminal and grid of mixer tube:

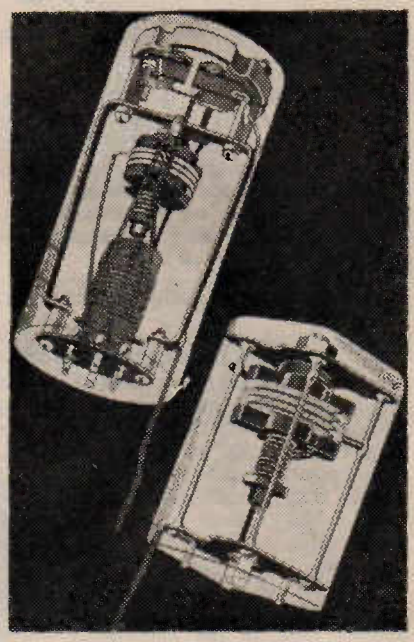
1500 k.c.	2.6
1000 k.c.	3.9
600 k.c.	4.3

Overall selectivity—60 k.c. at 10^4 at 1000 k.c. Image ratio 250.

These figures are typical of the average better class five tube superhets. at present available.

Substituting the aerial coil for one using a Sirufer core, the following figures were obtained, using a high impedance aerial primary:—

Gain from aerial terminal to grid of mixer tube:



1500 k.c.	15
1000 k.c.	15
600 k.c.	15

This shows an improvement over an air core coil of approximately four to six times.

Overall Selectivity: 45 k.c. at 10^4 (1000 k.c.).

Image Ratio: 1,000.

These figures show an improvement in overall selectivity of 14 k.c. and a 4 to 1 gain on image frequency ratio.

Using the same receiver, but with a "Sirufer" aerial coil with a comparatively low impedance primary winding, aerial stage gains of 25 to 30 were obtained. The increased performance made possible by "Sirufer" iron cores will be readily understood when "Q" values are compared.

The "Q" value of an aerial coil, honeycomb wound in two Pi sections:

1500 k.c.	55
1000 k.c.	75
600 k.c.	90

"Q" of Sirufer aerial coil:—

1500 k.c.	125
1000 k.c.	185
600 k.c.	220

Undoubtedly the Radiokes type BIC coils using "Sirufer" cores will improve the performance of any receiver.

The value of the high gain obtained in the aerial coil cannot be over-estimated, as any increase in gain in this section of the receiver will substantially help to reduce background noise. In addition the use of an R.F. coil with a "Sirufer" core, in superhets. employing a radio frequency stage, will further increase gain and selectivity.

It should also be apparent that if the use of these high gain coils produces instability, the tube voltage may be reduced and the circuit constants so altered that sensitivity is reduced to a normal level, in which case background noise will almost entirely disappear.

RADIOKES TYPE DIC — DUAL WAVE IRON CORE COILS USING "SIRUFER" IRON CORES.

In addition to the type BIC broadcast coils, Radiokes' engineers have released type DIC dual wave coils of the same type, using the new "Sirufer" cores.

These coils present all the advantages of the type BIC on the broadcast band, and, in addition, are remarkably efficient on the short wave band.

The DIC coils are housed in a large, drawn aluminium can, 2¾in. in diameter and 4¾in. high. This large can diameter, with the small diameter of the coils, makes an attractive coil to can ratio and an absolute minimum of loss.

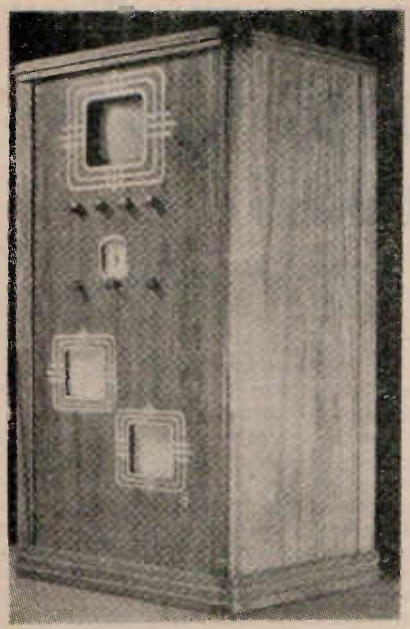
Trimmers are mounted in the top of the can and are Isolantite insulated to keep losses low at the high frequencies.

The short wave coils are space wound on ground tubing, and primaries are interwound for maximum coupling.

Particular attention has been paid to the tracking of the short wave coils which require a fixed padder of .009 mfd.

The coil is completed with a coil base with colour coded lugs.

For efficiency on both broadcast and short wave the Radiokes DIC coils will be hard to beat.



The Farnsworth television and sound receiver uses a special cathode ray tube known as the oscillight.

The Story Of Television 4

In this instalment the author explains the meaning of interlaced scanning, and the many important advantages it possesses over sequential scanning.

By G. BROWN

Secretary, Lakemba Radio Club.

The Intermediate Film, Image-dissector And Farnsworth Camera.

In order to transmit a picture by the intermediate film method, it is necessary to photograph the subject or event with a camera similar to the moving picture camera, develop the film, and scan it for transmission.

Some people will maintain that this method is not real television, since the occurrence of an event and its appearance on the receiver screen is not simultaneous. The actual delay is about 30 seconds, but it is doubtful whether the home televiewer really cares whether an image is instantaneous or 30 seconds late.

A person was photographed in the Baird studios and spoke a few words into the microphone. There was just enough time for him to walk across the studio to the control room, where on the monitoring receiver his image was just appearing. This was not a special demonstration for the benefit of the Press, but is the normal rate of working. The film is exposed, developed, washed, fixed and scanned in just half-a-minute. After the film has been scanned, it is stored away ready for some future programme

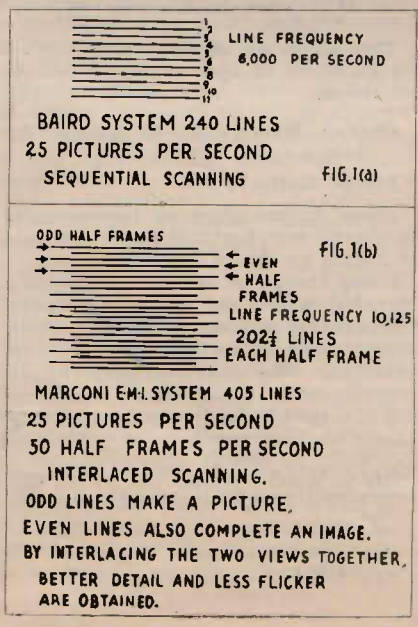
The definition obtainable with the two systems is a point on which few observers are agreed. It might be said that the definition of a Baird picture is sharper than that of an E.M.I., but the latter is decidedly easier to look at for longer periods, there is no flicker, and the reproduction of the half-tones appear to be better.

The Baird Company will also have a device known as the Farnsworth Camera, which is somewhat similar to the Emitron Camera. This has not yet been installed at the Palace, but it is understood that Baird engineers are working on the instrument, with a view to its subsequent incorporation in the system.

Sequential And Interlaced Scanning.

The Baird System will use 240 lines, (sequential scanning), 25 pictures (or frames) per second, while Marconi—E.M.I. will use 405 lines, 25 frames per second, interlaced scanning to give 50 frames per second, each frame of 202½ lines.

This may sound somewhat complicated, but before giving a brief explanation of interlaced scanning we will make a few short references to the second of this series of articles. It was explained how, in the process of scanning, a picture or subject is "broken up" into a number of lines. It was shown how the electron beam in the cathode ray tube scans each line of the picture. It should not be difficult to understand that the greater the number of lines used, the better will be the definition of the reproduced image.



The electron beam was shown to have traversed the lines in the following order, 1, 2, 3, 4, etc. until the whole 240 were scanned, and the process repeated 25 times per second. This is known as **Sequential** scanning.

With **Interlaced** scanning, the lines may be considered to be scanned in the following order, 1, 3, 5, 7, 9, etc. and then 2, 4, 6, 8, 10, etc. If the odd half frames alone were scanned, a picture would still be reproduced, just as if the even half frames alone were scanned we would also get a picture. However, with the odd half frames and the even half frames together, in other words "interlaced," a much sharper image is reproduced. (See sketch.) The line frequency is obtained by multiplying the number of lines by the number of pictures per second. Thus 240×25=6,000.

The Importance Of Interlaced Scanning.

Interlaced scanning is a subject about which we today hear a great deal. Those who have not pioneered television would be inclined to think that this is something new, but interlacing has been investigated over a period of many years, and in fact, the principle has been rather well established.

Those engineers who have concentrated chiefly upon some of the electrical phases of television, without much consideration of the scanning system, are naturally surprised to find an improvement when the scanning lines are interlaced alternately with each successive scan.

Advantages Of Interlaced Scanning.

Interlaced scanning systems, when properly used, contribute much to the art of television. The chief advantages are listed below.

(1) A much lower scanning speed. (2) A smaller eye strain. (3) A faster permissible motion of the image being televised. (4) The elimination of the picture "flash" when the eye winks. (5) A higher fidelity of the image when using a condenser-coupled electrical amplifying system.

In other words, interlacing is an engineering science. It is a very important part of a profound knowledge of television. It cannot possibly be casually adopted if it is expected to yield suitable results.

High Fidelity Images.

A noticeable improvement in picture fidelity is immediately effected when every other line on one scan is omitted and inserted with the next scan. Thus, in televising say the head and shoulders of a subject, the number of repetitions of "forehead signal" or "hair signal" or "mouth signal," are reduced by 50% and interlaced with other signals. The process of course is very rapid, because the scanning system has to trace very quickly to effect a pleasant optical sensation.

Visible improvement in fidelity continues as the number of interlaces is increased, but the actual optical advantages decrease if too-rhythmic interlacing is followed, for then an apparent motion is observed between the coarse-grained pictures that are inter-woven. The best optical and electrical effect is obtained when sections of the picture as widely separated as possible are scanned with each successive tracing of a line of the picture.

"Rhythmic-Un-Rhythmic" Scanning.

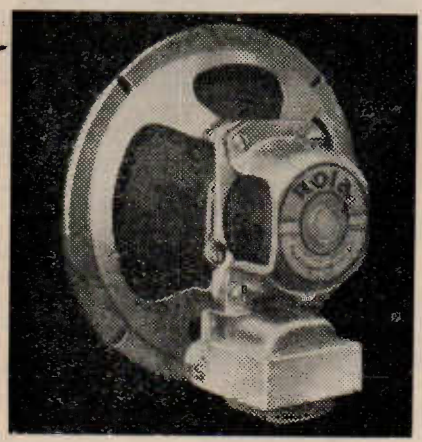
Thus, a line at the top of the picture is first of all scanned, then a line at the bottom; but now, if we should alternately go back to the top, then the bottom, and weave towards the centre, the effect would be good in eliminating electrical fog shadows, but the apparent visible motion would be rather poor, because at low scanning speeds, the picture would appear to close in at the centre in mechanical fashion.

Therefore, after the top and bottom line have been scanned, a move is made to the centre of the picture where a further line is scanned. Since there have been two intervals before the upper part of the picture has been approached, a move is made back to a line mid-way between the centre and bottom. The same general effect is repeated until every line of the picture has been scanned by the scanning spot. The effect defeats the eye's tendency to follow the scanning spot, so that flicker and apparent motion are practically nullified at low scanning speeds. The use of very high brilliancy obviates any serious visible flicker, "wiggle" or "crawl" with this "rhythmic-un-rhythmic" arrangement.

Television is a broad science, not wholly represented by any one type of tube or scanner, or any one of

(continued on page 28).

The 6¾in. Rola DP-5-B, shown below, incorporates patented Rola dustproof and acoustic filter assembly and meets the exacting requirements of car-radio and mantel-set construction. The DP-5-B is designed for all except battery-operated receivers.



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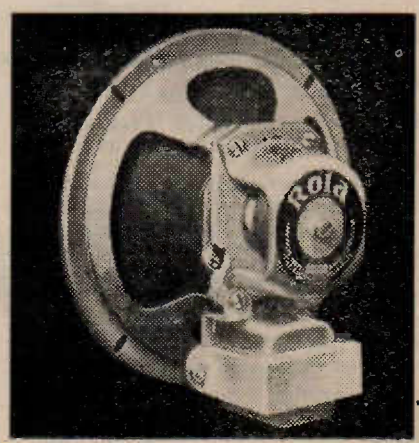

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Shown above is the Rola 6-6, or 6¾in. pcmanent magnet unit providing brilliant performance with battery-operated mantel receiver and portable sets. Effectively protected gainst service troubles by dustproof assembly and moisture sealed transformer.

Background Hiss In Superhets . . . 2

This second and concluding instalment deals with further design pointers on obtaining minimum background hiss in superhets

BY THE TECHNICAL DEPARTMENT, MULLARD RADIO CO. (AUST.) LTD, SYDNEY.

A high-efficiency r.f. pentode such as the EF5, used in an r.f. stage, will do much towards reducing the hiss level in a superhet.

AS the first step toward providing a high signal-to-noise ratio, it seems the obvious thing to erect an aerial which really is an efficient collector of signal energy, yet this most valuable of all remedies is the most neglected.

In certain cases, such as receivers installed in cars, the aerial system is definitely limited, but in the case of up-country receivers, where the daytime signal strength is poor and the noise problem is serious, there is no excuse for a poor aerial.

Enough has been said about the proper installation of aerial systems over the past twenty years or so. The only new point is that whereas in pre-superhet days the size of the aerial was usually limited on account of selectivity considerations, with the modern superheterodyne the selectivity is almost entirely independent of the aerial. Receivers intended for country use are generally designed to use an aerial of rather large dimensions.

High Efficiency Wanted From First Tuned Circuit.

The first tuned circuit, consisting of the secondary winding of the aerial coupler or aerial coil with its associated variable condenser and wiring, is the next thing calling for attention. Increased efficiency here actually increases the noise, but increases the signal voltage a great deal more—which is all that matters.

The variable tuning condenser is nearly always so good, as far as energy losses are concerned, that little improvement can be made here. So long as both sides of the condenser—stator lug and rotor "wiper"—are connected to the aerial coil secondary directly, with well-soldered joints, and no shielding braid is used on the stator lead, the wiring should be O.K.

The All-Important Aerial Coil.

The coil is the important thing; next to the aerial itself, the design of the aerial coil has far more influence on the noise ratio than anything else. Dealing with the secondary first, the use of multi-strand Litz wire makes some improvement, as does winding with a small air space between turns. It is important to bear in mind that the shielding can surrounding the coil (usually) has a great influence on the coil's efficiency. The smaller the can, for a given coil, the more energy it absorbs from the coil, and conversely, for a given can, the more compact the coil the less energy is lost in the can.

To avoid the use of enormous cans, it is becoming common practice to wind the coils in the form of several "pies" or sections, the winding being of the duo-lateral or "honeycomb" type in order to obtain concentration without greatly increasing other forms of energy loss. A well-made honeycomb pie-wound coil with Litz wire in a small can is just about as efficient as a large Litz cylindrical coil in a medium-size can, considering the ordinary broadcast frequencies only—not short waves. The use of an iron core, properly applied, makes for a further increase in efficiency with an even smaller shielding can.

The best of all, however, is a fairly large cylindrical coil wound with Litz wire of at least 9 strands, used without any "can" at all. This is usually impracticable on account of the possibilities of stray couplings with other circuits, but is actually used in some receivers.

Aerial Coupling.

There still remains the primary coil and its coupling to the secondary, and this is of the greatest importance.

The aim is to transfer as much signal energy as possible from the aerial over to the tuned secondary, not at one particular frequency, but more or less uniformly over a frequency range of about three to one. There are practical limits to the degree of coupling between primary and secondary, such as the de-tuning effect on the secondary, resulting in inaccurate tracking, and the possibilities of heterodyne whistles and other peculiarities when used close to powerful stations.

The type of coupling in which a few turns, close to the low-potential end of the secondary, constitute the the primary or aerial winding is not satisfactory in high sensitivity receivers, where the noise ratio is important. If the coupling by this means is made sufficient at the low-frequency end of the band (high wavelengths), it is excessive at the high frequency end, and may even cause the aerial circuit to resonate within the high-frequency end of the tuning range.

The commonly used method employs a primary coil or bobbin having a large number of turns rather loosely coupled to the secondary, plus a very small capacity between the aerial terminal and the grid or "top" end of the secondary. This capacity is often formed by placing over the "top" of the secondary a dead-ended turn of wire connected to aerial. Even the small stray wiring and coil capacities are sometimes sufficient.

The inductance (hence number of turns) of the primary bobbin is made such that its resonant frequency is a little below the lowest frequency in the tuning range when used with a

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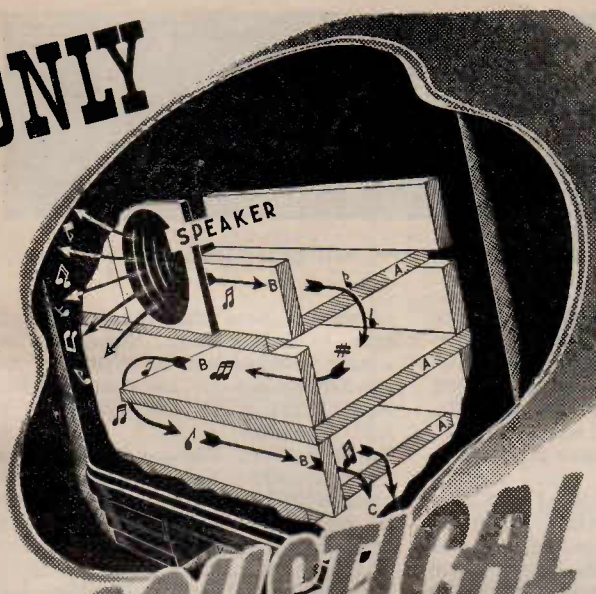

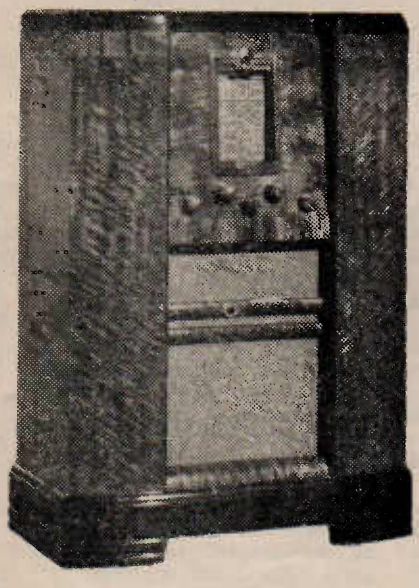

OF all the important developments that STROMBERG-CARLSON have ever pioneered, the ACOUSTICAL LABYRINTH is the most miraculous. Definitely, it is the most startling development since the invention of electro-dynamic loudspeakers!

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normal outdoor aerial. The resonant point must be chosen so as to avoid the intermediate frequency of the receiver and also avoid such frequencies as the ship-to-shore calling wave (500 k.c.).

The action of this form of coupling is that the primary circuit, being close to a broad resonant point at the lower frequencies in the band, gives sufficient energy transfer by magnetic coupling at these frequencies. At the high frequency end of the band, where this action is very slight, the small coupling capacity comes into action. In the middle of the band both forms of coupling work together, so long as the polarity of the primary is such that the two help and not hinder each other. In case of any doubt, the connections of the primary bobbin can be reversed and the effect noted, making sure the capacity coupling device is always connected to aerial.

An aerial coupling of this type can be made to give almost constant transfer over the whole band, especially when a suitable resistance is connected across the primary to broaden its resonant peak. An actual signal voltage step-up or gain of about ten times is provided by such a coupler designed for low-noise performance on the broadcast frequency band.

Other Design Points.

We have dealt with noise reduction in the aerial coupling and in the first valve, and while these are the main things, there are still some further points in receiver design calling for attention.

First there is the important question of whether an R.F. stage is to be used or not. Whenever it is possible for economic reasons to use an R.F. stage, an improved noise ratio is possible, together with other benefits as well. By using an R.F. stage, it is possible to use closer coupling between aerial and first grid than when the aerial is coupled straight into a frequency changer. As pointed out above, this is of great value in reducing noise.

Again, it has been mentioned that a frequency changer is "noisier" than a properly used R.F. valve, therefore if an R.F. valve comes first, the frequency changer will be operated at a point in the circuit where signals are stronger, and the quieter R. F. valve is handling the weaker signals.

Another small point is that of the A.V.C. voltage applied to the R.F. valve. For reasons already obvious, it is desirable to get maximum gain or amplification from the R.F. valve when receiving weak signals. If then the A.V.C. voltage, the object of which is to reduce amplification when a signal is received, is "delayed" more than that of the I.F. valve or valves so that it does not commence until a fairly strong signal is received, a better noise ratio will result than if the R.F. gain is reduced in the presence of even weak signals.

It is possible that with an R.F. stage, some thermal noise will emanate from the second tuned circuit, usually the grid circuit of the frequency changer, particularly when the R.F. gain is low as in the case of very short wavelengths. Under these conditions the shot noise from the frequency changer will probably also be troublesome.

In such cases it is necessary to provide the greatest possible energy transfer in the R.F. and aerial couplers, and above all to use an efficient aerial.

CONCLUSION.

1. Background hiss, noticeable when very weak signals are being received, cannot be eliminated.

2. It is not the amount of noise which matters, but the ratio of signal to noise.

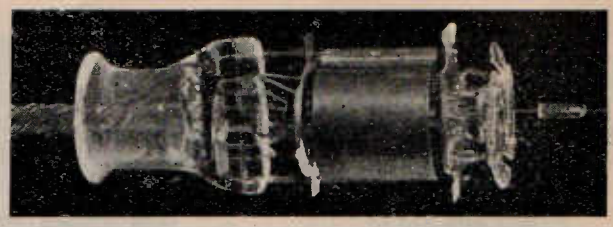
3. The chief aim in reducing noise is to get maximum amplification and minimum losses as near to the input (aerial) as possible.

4. An efficient aerial is the first consideration.

5. In the receiver itself, the aerial coil or coupler is the most important unit.

6. An aerial coil designed for use in the neighbourhood of strong stations is not likely to have a good noise ratio, and vice-versa.

7. The use of an R.F. stage, properly applied, may be of great benefit in reducing noise, and enables a receiver to be made more flexible so as to give satisfactory results under conditions of either strong or weak signals.



Right: This illustration shows the internal construction of the EK2—the latest Mullard self-neutralised Octode. It has been specially designed for efficient and stable shortwave performance, with low self-generated noise.

The Story Of Television.

(continued from page 25).

its component parts. Like other engineering arts, it has many phases.

Since it is yet in its infancy, its enormous scope is inclined to be overlooked. Therefore, a standard of scanning must be chosen with a more scientific attitude than that with which experimental standardisation was approached some years ago, when sequential scanning was adopted. Now the tendency is to turn to interlacing. Standards unwisely selected will be expensive and as distressing as an obsolete D.C. mains system in the midst of an A.C. system.

Baird System Discarded By B.B.C.

Apparently because the direct method of scanning is far superior to mechanical scanning, the B.B.C. have dispensed with the Baird system of television, and at the moment the Marconi E.M.I. will be the only system employed. This will be an exceedingly heavy blow to Baird who has spent the greater part of his life in television experiments. It is reported that he has also suffered ill-health through his ceaseless efforts to perfect the art.

A Tip For Hanging QSL's.

Allow me to congratulate you on your very fine magazine. I have all ten copies and believe me, I wouldn't give them away for their weight in gold. The DX news is something out of the ordinary—it is bright and interestingly written—not the catalogue style, and the VK amateur supplement and monthly additions just shout for themselves. Must congratulate "A.R.W." and VK's 3TH and 3DH on the "ham" articles; these boys certainly know their job.

I've been looking over some of your hook-ups and intend to start soon on the "Eaglet S.W. Two," using 2.5 volt valves. Will add a resistance coupled 2A5 and use single-winding cathode tapped coils.

I have not joined the DX Club yet as my present receiver is not too good. Its been running for years and I'll soon have to pension it off!

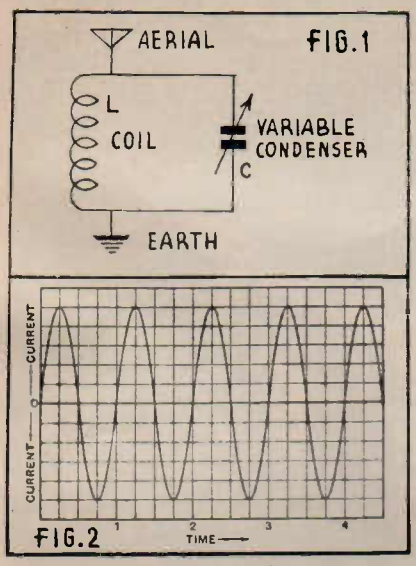
Here's a hint for the "Radio Ramblings" page. I have seen several published for enabling QSL cards to withstand the ravages of time, but as yet I have not noticed the method mentioned which I use. At most stamp dealers, you can purchase fairly reasonably cellophane postcard size envelopes. Put your cards in these, pin the envelopes to the "shack" wall, and there you are. The card can be seen quite O.K. and it does not become covered with dust, etc.

Wishing the "A.R.W." the best of luck and a long life.—John B. Healey, Malvern, Vic.

Radio Step By Step 7

More About The Tuned Circuit

In this instalment the way in which the signal is broadcast by the transmitter and intercepted by the receiving aerial is explained.



NOW that we know the simple mechanics of the tuned circuit, the way in which it works when actually used in a receiver will next be considered.

In a previous article it was shown that there are different kinds of alternating currents, differing in character according to their frequency of alternation. Change of direction may be relatively infrequent, as in A.C. power mains (of the order of 50 cycles per second), fairly rapid as in the case of speech currents (from 50 to about 15,000 cycles per second), or very rapid as in currents of radio frequency, varying from 50,000 to 30,000,000 cycles per second and even higher. It is these last-mentioned currents that we are considering in reference to tuned circuits.

From last month's article we know that if a current of high or radio frequency is applied to an oscillatory circuit as shown in Fig. 1, and the variable condenser adjusted so that the natural frequency of the circuit coincides with that of the signal, resonance takes place, and the voltages across the coil-condenser combination are at maximum.

This is exactly what happens when the signal from the aerial is applied to the first tuned circuit of any receiver. In Fig. 1 the aerial is denoted by the arrow-shaped symbol joined to the top of the coil winding "L," with the tuning condenser "C" in parallel with it. The symbol composed of parallel lines, also arrow-shaped, at the foot of the diagram denotes an earth connection.

How The Signal Is Radiated.

Now, before going any further, we will consider just how the signal is generated, and how the aerial intercepts it and passes it on to the receiver.

The basis of the signal sent out by the transmitting station is a continuous valve-generated radio frequency oscillation, consisting of nothing more or less than a continual surging to and fro of current in a circuit similar to that shown in Fig. 1.

This alternating current can be graphically represented by what is known as a sine curve (see Fig. 2). A good idea of the tremendous rapidity of oscillation can be gained from the fact that if the wavelength of the oscillation shown is 300 metres (i.e. a frequency of 1,000 k.c. per second, or 1,000,000 cycles per second), then the figures one to four along the time scale represent millionths of a second.

In a transmitter these r.f. currents are conveyed to the aerial, and are radiated out into space as an electromagnetic wave consisting of electric and magnetic fields that travel outwards with the speed of light (186,000 miles per second).

The Meaning Of Modulation.

This radiation represents the carrier wave, so named because in itself it does not give us the speech and music we hear, but merely serves to transport it from the transmitting station to our receivers. This transportation is accomplished by means of a process called modulation, and this will now be explained.

The first and one of the most important units in the radio chain is the microphone. There are many different types, but the basic principle common to them all is that of the microphone used in the ordinary telephone—to transform sound into corresponding electrical impulses.

In the carbon type microphone this is accomplished by making the sound impinge on a thin diaphragm, behind which is a cavity housing carbon granules. Current is passing through these granules all the time, even when no sound is present to actuate the microphone.

When sound waves strike the diaphragm, however, as when a person speaks into the microphone, the varying pressure generated by the sound waves causes varying pressure on the granules. This results in a corresponding variation in the electrical resistance of the granules to the current flowing through them, and so the current must also vary. Hence in this varying current we have an exact electrical replica of the sounds impinging on the diaphragm of the microphone.

To simplify matters, we will assume that instead of a complex sound a single, pure 1,000-cycle note is played in front of the microphone. This can be represented by the sine curve shown in Fig. 3 (b). Fig. 3 (a) can be taken to represent the radio frequency current, though to represent it faithfully there should be many more "ups and downs" than are shown.

Now we have the musical note, and the constant radio frequency oscillation. The next step is to mix the two so that when the carrier is radiated it will bear the impress of the audio signal we want to transmit. This process is termed modulation.

Fig. 3 (c) shows what happens when this takes place. It will be noticed that the composite wave consists of the original r.f. oscillation, but that it is no longer constant in amplitude. (This means that whereas a horizontal straight line can be drawn along the peaks of the waves shown in Fig. 3 (a), in Fig. 3 (c) this is no longer possible). Nevertheless, the important point to note is that the frequency of the radio frequency wave remains unaltered. The variations of its amplitude are such that the tips of the modulated wave outline an exact replica of the

low or audio frequency modulating current. Its envelope, as it is called, is outlined in Fig. 3 (c) by a dotted line.

After the receiving set has picked up the carrier and it has been passed on to the detector (second detector in the case of superhets), it is no longer needed, and so it is dispensed with and the audio frequency signal made audible by the process of detection or demodulation. This will be explained later. In the meantime, the way in which the aerial picks up the signal and passes it on to the set has yet to be considered.

Picking Up The Signal.

The vital link between the transmitter and the receiving set is the aerial, which intercepts the signals and hands them on to the set. As the transmitted signal, travelling with the speed of light, crosses the aerial, it induces in the latter an alternating current having a frequency corresponding to that of the transmitter. For example, if the latter operates on 500 metres, or 600 k c. (metres × kilocycles = 300,000) the frequency of the current induced in the aerial equals 600 × 1,000 = 600,000 cycles per second.

Just like the simple oscillatory circuit discussed last month, every aerial has a natural period of vibration, or a natural resonant frequency. This can be found very approximately by multiplying the total length of wire comprising the aerial and lead-in by 4.5. This gives the natural wavelength of the aerial in

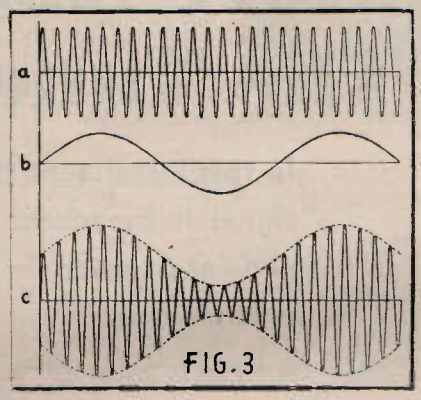


FIG. 3

feet. To convert this to metres, divide by 3.28, and to obtain the resonant frequency in k.c., divide the result into 300,000.

Thus, with an aerial 100 feet long, the natural wavelength = 100 × 4.5 ÷ 3.28 = approximately 137 metres. Thus the resonant frequency equals 300,000 ÷ 137 = 2,183 kilocyles per second.

From the above, it can be seen that the longer an aerial is, the higher is its natural wavelength or the lower its natural frequency. Thus we could actually tune a simple receiver just by altering the length of the aerial for each station required. In practice, though, this would be hopelessly inconvenient, and so another method of tuning is used. The main point to remember is that an aerial, although it is usually strung up in one single length of wire, actually possesses an appreciable amount of inductance and capacity, the amount of each depending on the length and height.

The way in which an aerial is tuned so that it can be made to resonate to any wavelength within any given waveband is to add inductance and capacity in the form of a coil and condenser, as shown in Fig. 1. The amount of inductance, or in other words the number of turns of wire required on a given diameter former, and the amount of capacity, can be calculated when the limits of the waveband it is required to cover are known.

The formula is:—

$$f = \frac{1}{2\pi\sqrt{LC}} \times 10^6$$

where "f" is the frequency in k.c., "L" the inductance in microhenries, and "C" the capacity in micro-microfarads.

Calstan Precision Test Equipment

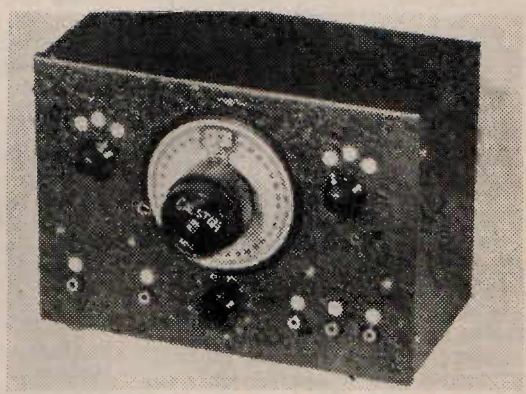
RELIABILITY AT LOW COST

The New CALSTAN fundamental All-Wave Oscillator

● is so designed that it meets perfectly the many demands of the serviceman. It is battery operated, permitting it to be used at any time or in any place independently of power lines.

It covers frequencies from 15 M.C. to 150 K.C. All frequencies are fundamental and fully stabilised. It has perfect attenuation of R.F., modulated R.F., and A.F. signals.

Precision Accuracy, Modern design, and low cost are the salient points of this new Calstan All Wave Oscillator. Built to a very high standard and sold at prices within the reach of all.



CALSTAN All Wave Oscillator Model 305
Price, £9/15/- plus tax. Easy terms available

DISTRIBUTORS:

New Zealand: New Zealand Electrical Equipment Co. Stocks available from Turnbull & Jones, all branches.

Victoria: Australian General Electric Melbourne Ltd. Arthur J. Veall Pty. Ltd.

N.S.W.: Radio House Pty. Ltd., Sydney. Martin De Launay Ltd., Sydney. Bloch and Gerber Ltd., Sydney. Fox and Macgillycuddy Ltd., Sydney. John Martin Ltd., Sydney. Electric Service Co., Newcastle.

Queensland: J. B. Chandler and Co., Brisbane.

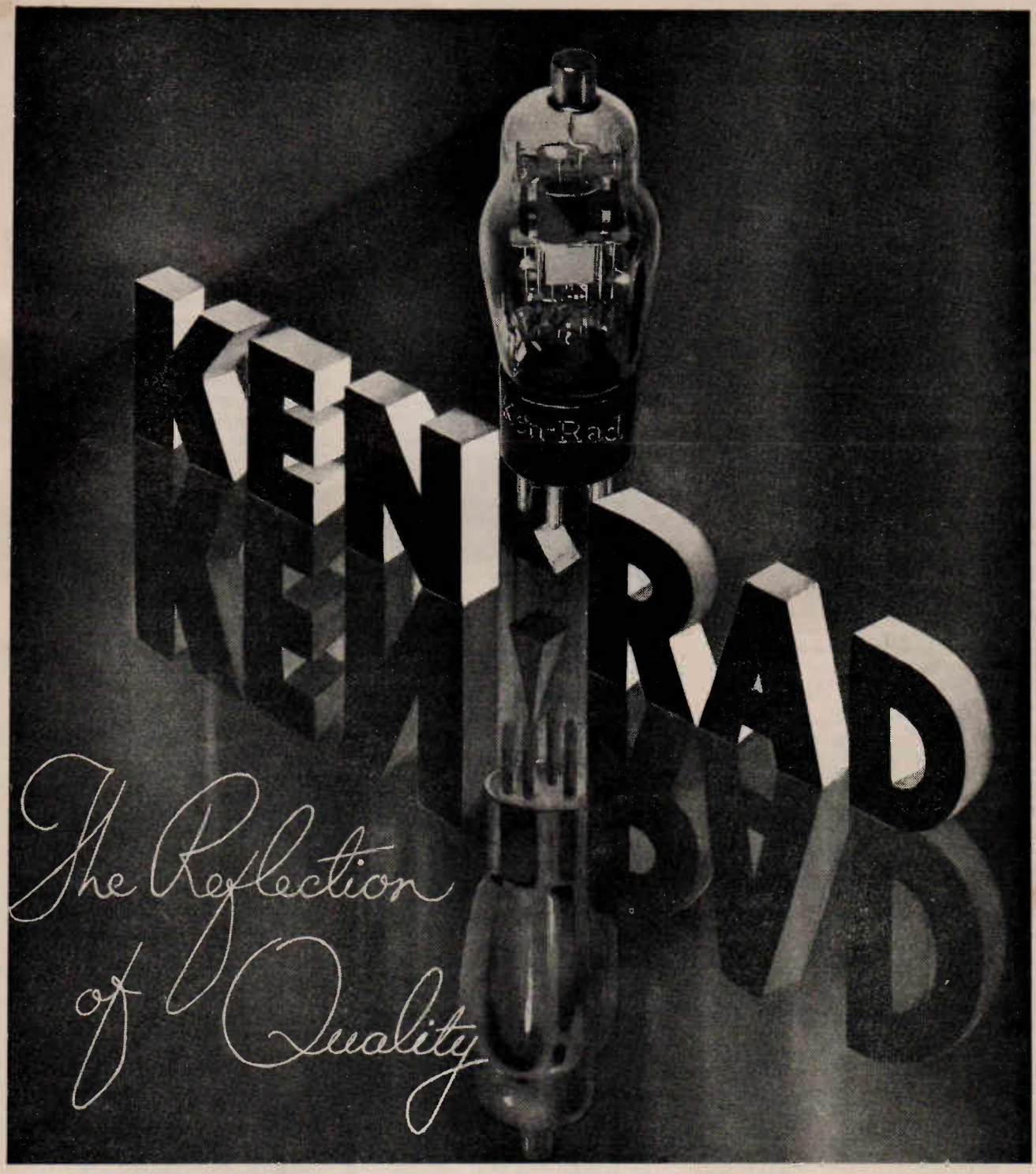
Tasmania: Noyes Bros. (Melbourne) Ltd., Launceston.

South Australia: Radio Wholesalers Ltd., Adelaide.

West Australia: Carlyle and Co., Perth.

SLADE'S PRECISION TEST EQUIPMENT

Phones UJ 5381-5382 LANG STREET, CROYDON, N.S.W.



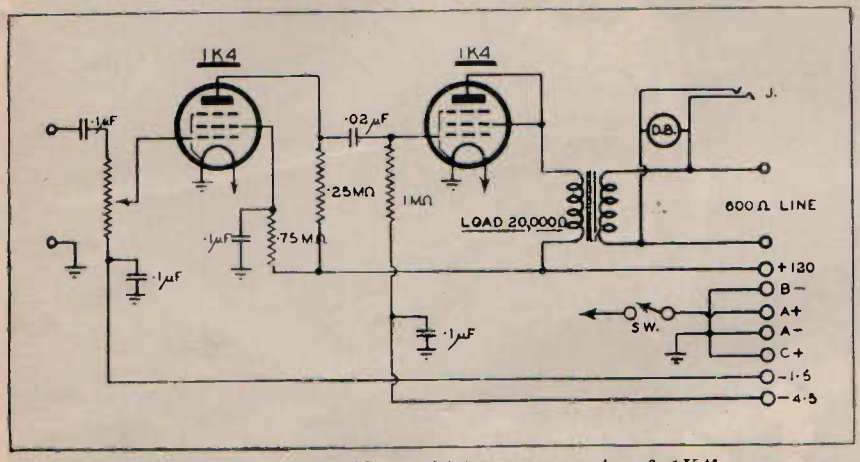
Many years of research and experiment stand behind KEN-RAD Valves as a warranty of their longer life and superior performance. The meticulous care that is unfailingly exercised in the manufacture of "The Fine Valves of Radio" is a guarantee of their implicit dependability and uniformity.

Available in All-Metal, Glass, and G-series.

Factory Reps. . . EASTERN TRADING CO. LTD. Sydney and Melbourne

A Portable Line Amplifier

— For relay, studio, laboratory, or amateur use. Data supplied by Amalgamated Wireless Valve Co. Ltd., Sydney.



Circuit of the amplifier, which uses a pair of 1K4's

The requirements for any portable equipment are compactness, completeness, and light weight. This unit is reasonably compact, measuring 12in. x 15in. x 6¼-in. overall. It is quite complete, being self-contained and battery operated, and having provision to carry a pair of headphones and a spare valve. Its weight complete is less than 15lbs., including all batteries and equipment.

For use in the field, on outside broadcasts etc., the unit had to be rugged to stand up in service, both physically and electrically. The case has been made physically strong, and the valves were chosen partly for their rugged 120 m.a. filaments. The amplifier had to be made accessible, and this was done by making the valves project through a panel which, by unscrewing four wood screws, may be swung forward to reveal the interior.

1K4's Give High Gain.

Electrically, a gain of at least 50 db. was required with an output of at least +6 db. into a 600-ohm line. As P.M.G. lines have only a nominal 600-ohm impedance which is likely to vary within wide limits, the output power must be well regulated if distortion is to be avoided. A triode was required, and the sturdiest triode seemed to be the 1K4 with screen and plate tied. It has a power output at 120 volts plate and —3v. grid of 50 milliwatts, = 9 db., which allows a margin for noisy lines. The gain provided is 23 db.

There is thus 27 db. to be provided. As the first stage need only be a voltage amplifier, and the best voltage amplifier is the high resistance pentode, the 1K4 was chosen again. Its lift of 37 db. allows for operation on partially discharged batteries, etc.

The gain control was put at the input end to obviate the likelihood of the overloading of the first stage. It allows the use of either high or low sensitivity microphones.

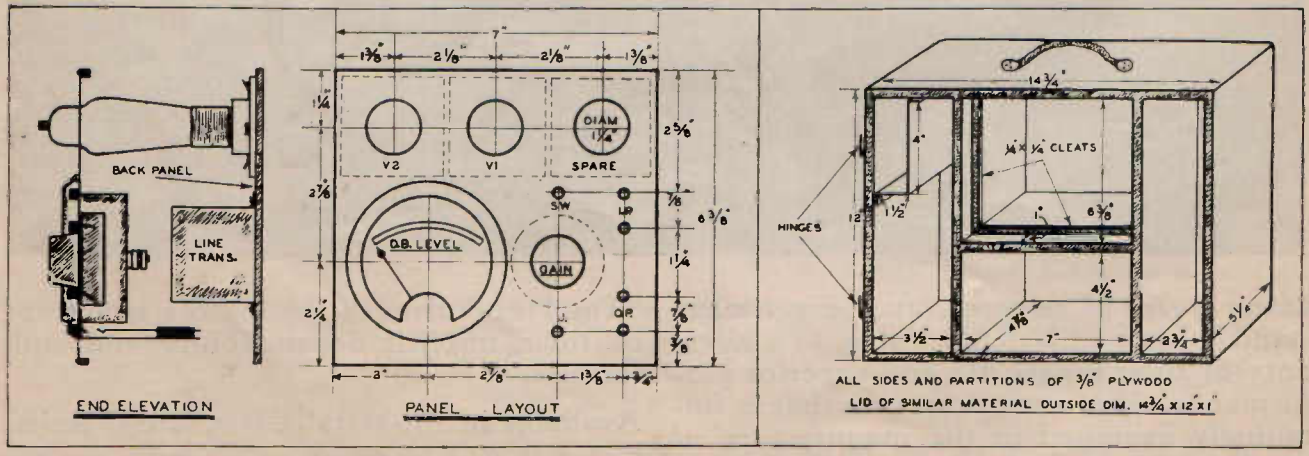
The output line terminals are shunted by a level indicator, a Weston Model 301 decibel meter, general purpose type, and a pair of headphones for monitoring. Its output impedance is thus reduced to 500 ohms, making the ratio of the output transformer 6.3:1. The primary inductance should be at least 60 H., to preserve the bass response.

Low "A" And "B" Current.

The 1K4's have other advantages in their reduced bias and reduced plate consumption, the complete amplifier consuming only 2 milliamps. The two 120 m.a. filaments require little more than the conventional arrangement of three cascaded 30's.

The panel has been set out in such a way that a right-handed operator may control the gain and watch the level indicator without craning his neck. The battery switch is also within easy reach. The overall frequency response of the unit is within 3 db. from 50 to 10,000 c./s., and could be further improved with a

(continued on page 36).



Sketches showing panel layout and dimensions of carrying case. In the latter, the "A" battery is housed in the compartment on the right, the amplifier in the centre (top) with one "B" unit and 'phones (bottom). The second "B" unit fits into the compartment on the left, with a spare valve resting on it, and the "C" battery in the small top compartment.

What's New In Radio

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

New Palec All Wave Modulated Oscillator.

Many engineers and servicemen have, in the past, looked upon the modulated oscillator as merely a poor apology for a signal generator, but a little thought shows that, except for the measured output feature associated with signal generators, there is little to choose between the two.

The new Palec Modulated Oscillator is intended for service and factory work on receivers. To this end, its five frequency bands have been arranged to cover all the used frequencies between 150 and 16,000 k.c. (2,000 to 18.75 metres).

A direct-reading 5-inch dial equipped with a slow motion drive eliminates all graph work, and at the same time is remarkably simple to read, as it only has three lines of calibration for the five bands. By using two zero-markers it has been possible to make this dial read frequency and wavelength simultaneously, so that one need never be confused in changing from one to the other.

A dummy aerial is supplied with the oscillator and complies with I.R.E. (America) specifications for short wave, broadcast and I.F. use.

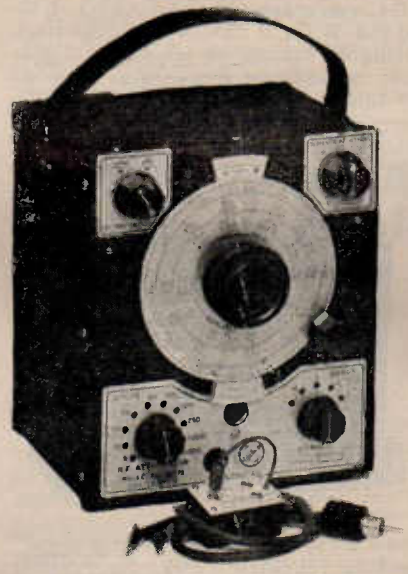
An improved calibrated attenuator gives correct attenuation on short waves as well as on other bands, reaching practically zero output at its 80 db. position.

One remarkable feature of this modulated oscillator is a control giving any percentage of 400 c/s. modulation, up to 100% and down to 0% . Each oscillator is oscillograph-tested for modulation depth, and calibrated at 0, 30 and 100%.

Audio output at 400 c/s. is obtainable at approximately 10 volts, and is attenuatable to any extent.

The circuit uses a KK2 (octode) and a 30 type (triode). Each oscillator coil is individually shielded, and the attenuator is electron-coupled to the oscillator, thus eliminating any effect of setting on frequency. Modulation is obtained electronically, and is guaranteed not to alter frequency by more than .25 k.c. in the broadcast band when the depth is varied from 0 to 100%.

Battery complement is one 1½-volt



standard dry cell and two 22½-volt batteries, all contained in the rear compartment of the shielding case.

★

Palec 5-Inch Meter Has Many Valuable Features.

In the universal-type instruments, one of the weak points to date has been the choice of meters available.

One could use the 2½in. instrument, which was rather small, or go to the portable horizontal galvanometer, which was too delicate for workshop use. The Paton Electrical Instrument Company has remedied this by bringing out a 5-inch meter with a minimum scale length of 4 inches. It will be available in the usual wide range of current values that their 2½-inch instruments have been obtainable in, but is really a very advanced job. The case has been so moulded that it protects the moving coil pivots by a slight "turret" and enables a straight light needle to be used, as well as covering the large glass as much as possible. No mounting screws are visible to spoil the appearance of the flange of this flush-mounting meter, which is affixed with its barrel projecting to the rear through a circular hole in the usual manner of 2½-inch meters.

The straight needle is a feature not to be overlooked. It means easier balancing due to less needle weight. Also due to decreased inertia, quicker action is possible. With better balancing comes greater accuracy in horizontal and vertical positions.

This meter should make a strong appeal to laboratory workers and servicemen, while for broadcast station use it is ideal on account of its large and legible scale.

★

Prices Of Ever-Ready "B" And "C" Batteries Reduced.

A substantial reduction in the prices of popular type "B" and "C" batteries was recently announced by the Ever-Ready Co. (Aust.) Ltd.

In some instances the reduction is appreciable as, for example, with the Superdyne 45-volt unit, which is reduced from 18/- to 15/-, representing a saving of 9/- on three "B" batteries. In conjunction with the release of the new Ever-Ready air cell, this reduction must go a very long way in assuring the continued popularity of "B" battery-operated receivers.

The old and new prices for popular types of Ever-Ready "B" and "C" batteries are listed in an advertisement elsewhere.

★

Varimatch Modulation Transformers For Amateurs.

Amateurs will be interested to know that Messrs. F. J. W. Fear & Co., of Wellington, N.Z., are now handling a complete range of the well-known American U.T.C. Varimatch modulation transformers.

Due to the wide range in operation conditions of R.F. transmitting valves in class "C," the standard type of transformer is limited in its application, because mis-matching can only result in comparatively high distortion levels.

The new Varimatch transformers offer a solution to this problem, as they permit a very wide range of impedance matching. There are 5 types available (types V.M.—1 to 5 inclusive) and respectively they will handle any power valves to modulate a 20 to 60-watt class "C" stage; 40 to 120-watt; 100 to 250-watt; 200 to 600-watt and 450 watt to 1 k.w. The secondaries of all types are designed to carry class "C" plate current.

In a 4-page pamphlet describing these transformers is published a table showing the primary ohms (plate to plate), secondary R.F. load impedances available, and the audio load impedance. Typical application examples are given, as well as tables for each of the five Varimatch trans

formers available, showing operating conditions using different type modulator valves.

Copies of these pamphlets will be supplied free on request by Messrs. Fear & Co., 31 Willis Street, Wellington, N.Z.

★

New Valve Releases Listed In Radiotronics No. 72.

In the Amalgamated Wireless Valve Co. Ltd's. Technical Bulletin No. 72 are listed three new valve releases, comprising Radiotrons 808, 913 and 25L6. The 808 is a triode suitable for operation on frequencies up to 272 megacycles, and having a plate dissipation of 50 watts maximum. To give utmost efficiency on the higher frequencies, the plate is brought out at the top and the grid at the side.

The Radiotron 913 is a metal construction cathode ray tube having a screen approximately 1in. in diameter. It will be very much cheaper than other larger cathode ray tubes, and should enable much wider use to be made of the advantages of cathode ray oscillographs. The 25L6 is a beam amplifier valve for A.C./D.C. operation.

For the radio engineer, articles of interest in the bulletin include notes on the testing for fidelity and harmonic distortion given by fidelity receivers such as the "Fidelity Broadcast Five," described recently in the "Radio World.'" Two methods of applying bass boosting for obtaining tone compensation at low volume levels are also given. One of these is enlarged on at much greater length elsewhere in this issue.

Another article that should be of interest to those designing receivers with single pentode output, outlines a method of obtaining increased power output for decreased battery drain from the Radiotron 1D4 by applying inverse feedback.

Also included with Radiotronics No. 72 is a complete index of the articles published in these bulletins for 1936.

New Radiotron Characteristics Chart.

Every design engineer, amateur and experimenter should make a point of obtaining a copy of the latest Radiotron Characteristic Chart. Thoroughly revised and completely up-to-date, it lists all American and Australian type valves, together with full characteristics. Copies may be obtained free by forwarding 2d. in stamps to cover postage to Amalgamated Wireless Valve Co. Ltd., Box 2516BB, G.P.O., Sydney.

Ranger-Examiner Multi-Meter And Free Point Tester.

In the new American Ranger-Examiner range of portable test equipment, the model 640-740 unit illustrated is a combination volt-ohm-milliammeter and free point tester. It is adaptable for every purpose in voltage, current, or resistance testing by the free point direct contact and the plug-in methods.

The volt-ohm-milliammeter unit is fitted with a Triplett precision instrument, the scale readings being as follows:— 10-50-250-500-1,000 A.C. and D.C. volts at 1,000 ohms per volt; (D.C. accuracy 2%, A.C. 5%) 1-10-50-250 M.A.; 0-300 Low Ohms; High Ohms to 250,000 at 1.5 volts. Rheostat adjustment will take care of 15 volts for ohms readings up to 2.5 megohms, while batteries may be added, permitting readings in 250,000 ohms steps. Low ohms range reads to ½ ohms—the 25 ohms portion

being in the centre of the scale. The back-up method used is without appreciable contact or other errors. The current drain is only 1 M.A.

The free point tester unit is provided with 5 sockets for handling any American type glass, metal-glass, or metal valve. Mounted on the panel are 8 automatic switch type and 10 single action jacks.

The model 640-740 is priced at £11-5-0. Messrs. W. G. Watson & Co. Ltd., 279 Clarence Street, Sydney, are the exclusive factory representatives for Australia and New Zealand for the Ranger-Examiner line of test equipment, and will be pleased to supply on request complete details of the range of instruments carried.

★

New Philips Technical Communication.

The release by Messrs. Philips Lamps (A'sia.) Ltd. several months ago of their Technical Communication No. 55, dealing with power valve matching and symbols and nomenclature relating to cathode ray tubes, completed volume 2 (comprising Communications Nos. 34 to 55 inclusive). The first Communication of volume 3—No. 56—is now to hand, together with a detailed index covering subjects dealt with in volume 2, and an index to valve types.

Electron Star Tuning Indicator.

Bulletin No. 56 deals with the new Philips type EM1 Electron Star tuning indicator, and an application note on the use of the AL2 power pentode in class "AB."

The Philips EM1 (previously called the 4678) tuning indicator is a particularly novel type, in that there are four symmetrically-arranged luminescent sectors giving a clover leaf effect. Tuning is correct when the four illuminated sectors are largest.

The application of the EM1 in various types of A.V.C. circuits is covered in detail, together with several suggested methods for mounting the indicator.

The application note on the AL2 power pentode shows how high output with low distortion can be obtained with two of these valves working in pushpull under class AB operation conditions. Using 250 volts on plates and screens with a fixed bias of —33 volts, it is claimed that a pair of AL2's in class AB will deliver approximately 11 watts output with 2½% distortion.

Useful Capacity Inductance Chart.

Included with Technical Communication No. 56 is a very useful abac showing the relation between capacity, self-inductance and impedance for frequencies from 100 to 1,500 k.c. The impedance of a given condenser or self-inductance at a certain frequency can be obtained, as well as the value of capacity, to give resonance with a given self-inductance at a certain frequency, and vice versa.

★

Radio As A Profession Offers Endless Opportunities.

With radio licences in Australia mounting steadily toward the million mark, the need for qualified radio servicemen is becoming more acute. Today more than at any time in the history of radio in this country, the profession offers almost endless oportunities for the man who really knows his job.

Self-tuition at home, using recognised text-books, is one way of gaining a knowledge of radio, but for the student who plans eventually to get into radio professionally, there is a real danger that a groundwork gained in this way will be patchy, and not nearly as thorough as it should be.

Easily the best plan is to take a course at a recognised radio college, such as the Australian Radio College, either by actually attending classes

(continued at foot of col. 1, opposite)

Radio Book Reviews

1937 Jones Antenna Handbook.

The simplest and cheapest way to obtain maximum results from a transmitter or receiver is to make the aerial system used as highly efficient as possible. At the same time, because of the great diversity of aerial types available and the conflicting opinions as to their relative merits, the amateur is often puzzled as to what is best for his particular needs.

In this respect the "1937 Jones Antenna Handbook" will be found of invaluable assistance in providing a practical guide in the selection and construction of that type of equipment which is best suited for a specified purpose and location.

The subject is covered not only from a theoretical angle, but practical details for the erection of the many and varied aerial systems described are given in full. Antenna coupling systems are described in detail, and useful design charts for special arrays given, while there is a final chapter on measuring equipment, comprising a field strength measuring set and a standing-wave detector.

In his foreword the author states that the book is written to serve those who want to put out a better signal from their transmitters, or

(continued from opposite page).

or by correspondence. These organisations know the radio industry thoroughly, as well as the specialised requirements of all its branches, and hence are fully qualified to advise and train students for the kind of radio career they may decide upon.

"Radio World" readers who would like to make radio their profession, but who are perhaps in doubt as to the best field for them to specialise in, are invited to write Mr. L. B. Graham, Principal of the Australian Radio College (Broadway, Sydney), who has offered to place his many years of experience in training men for the radio industry at their disposal. Finally, those who are already established in some other profession but who would like to build and operate an amateur station of their own are advised that there is a special course available for the A.O.C.P. ticket.

bring clearer signals into their receivers, and he has undoubtedly achieved his object.

{The "1937 Jones Antenna Handbook," by Frank C. Jones. Obtainable shortly from Messrs. Angus & Robertson, 89 Castlereagh Street, Sydney; price, 3/–, postage 3d.}

Wireless Servicing Manual.

In "Wireless Servicing Manual," by W. T. Cocking, a well-known contributor to the English technical weekly, "Wireless World," the author has given servicemen a practical textbook covering some excellent systematic methods of fault-finding. The second edition has been revised and enlarged, and is thoroughly up-to-date.

The design and use of test equipment, current and voltage testing, and the interpretation of meter readings are dealt with in the opening chapters. Then special tests covering specific faults such as hum, motor boating, instability and superhet whistles are analysed in detail. The appendix contains many useful reference charts and tables, and gives the characteristics of British and

Modern Radio Servicing . . An Excellent Book For Servicemen

RECOGNISED as one of the world's leading radio writers, Alfred A. Ghirardi, in his "Modern Radio Servicing," has given servicemen perhaps the finest all-round textbook on their profession that has yet been printed. The book was reviewed briefly in a recent issue of the "Radio World," but it is of such outstanding merit that a more comprehensive outline of its content would not be out of place.

"Modern Radio Servicing" has been written specially to present to every progressive serviceman a comprehensive and up-to-date guide of the proper methods, correct procedures and latest instruments to employ for the rapid and efficient diagnosis and repair of receiver faults.

Containing over 1,300 pages with 706 illustrations, the book is divided into four parts. The first and largest is devoted to a thorough study of all basic forms of electrical measuring instruments and radio test equipment, while the second deals with approved practical methods of servicing receivers and of testing and repairing individual radio components.

The third section, covering specialised servicing problems, deals with auto-radio, all-wave and high fidelity receivers, with a 130-page chapter devoted exclusively to electrical interference and methods of reducing it. Part four comprises a comprehensive and up-to-date valve characteristic chart with under-socket connections, and an unusually complete index, amply cross-referenced so that information on any subject can be quickly located.

Space does not permit of a detailed review on each chapter, but the table of contents reproduced below will serve to give readers some indication of the wonderful wealth of material there is available in this book.

"Modern Radio Servicing"—Table Of Contents.

Milliammeters, ammeters, and voltmeters—Methods and instruments for measuring resistance—How to construct ohmmeters—Typical commercial ohmmeters—Condenser testers and capacity meters—Output meters and V.T. voltmeters—The tube checker—How to construct a modern tube checker—Typical commercial tube checkers—The voltage-current set analyser—Point-to-point testing—How to construct a complete set analyser—Typical commercial set analysers—The service test oscillator—How to construct and calibrate a test oscillator—Typical commercial test oscillators—Preliminary tests for trouble—Peculiarities of A.V.C. and Q.A.V.C. circuits—Receiver analysis by voltage-current tests—Receiver analysis by resistance tests—Testing individual radio components—Obscure troubles not revealed by analysers—Aligning and Neutralising T.R.F. receivers—Aligning and Neutralising superheterodyne receivers—Repairing individual radio components—Installing and servicing auto-radio receivers—Servicing all-wave receivers—Installing and servicing marine radio receivers—Reducing electrical interference—High-fidelity receiver problems—How to sell your service—Vacuum tube charts.

{"Modern Radio Servicing," by A. A. Ghirardi. Obtainable from Messrs. Angus & Robertson, 89 Castlereagh Street, Sydney. Price 27/6, postage 1/–.}

American type valves, together with under-socket connections.

["Wireless Servicing Manual," by W. T. Cocking. Our copy from Messrs. Angus & Robertson, 89 Castlereagh Street, Sydney. Price 7/6, postage 6d.]

★

Television—Technical Terms And Definitions.

The development of the new science of television has resulted in the introduction of dozens of new and unfamiliar technical terms. There is thus a need for a book devoted to explaining the various words in this new vocabulary, and "Television—Technical Terms and Definitions," by E. J. G. Lewis, has been published to fill this need.

There are over 1,000 technical television terms listed, the meaning of every one being fully explained. Illustrations are used where necessary. As a complete, up-to-date, and authorative guide to television terms, those interested in this new science will welcome this publication as an invaluable source of reference.

["Television, Technical Terms and Definitions," by E. J. G. Lewis. Our copy from Messrs. Angus & Robertson, 89 Castlereagh Street, Sydney. Price 7/–, postage 4d.]

★

Two New Amateur Handbooks.

Review copies of the well-known "Radio Antenna Handbook" and of the "1937 Radio Amateur's Handbook" have been received from McGill's Agency, 185-193 Elizabeth Street, Melbourne, Victoria.

Prepared by the engineering staff of "Radio," the "Radio Antenna Handbook" has been written to present a comprehensive and practical outline of the whole antenna problem for amateurs and others using the high frequencies.

"The 1937 Radio Amateur Handbook" presents a complete treatment of every phase of modern radio amateur communication, from elementary theory to advanced application. It was reviewed in detail in last month's issue.

The "Radio Antenna Handbook" is available at McGill's Agency at the price of 4/- plus 3d. postage, and "The 1937 Radio Amateur's Handbook" for 8/6, plus 9d. postage.

Building A Portable Line Amplifier.

(continued from page 32).

better plate to line transformer.

The amplifier should find application in radio and physics laboratories for many purposes, and has a far wider field of application than its more obvious domain of radio broadcast work.

List of Parts.

Resistors.
1—1 megohm ½-watt carbon
1—.25 megohm ½-watt carbon
1—.75 megohm ½-watt carbon
1—.5 megohm potentiometer (Yaxley)
Condensers.
4—.1 mfd. tubular (Solar)
1—.02 mfd. tubular Solar)
1—battery switch
1—plate-to-line transformer (Lekmek)
1—level indicator (Weston 301 Gen. Purp.)
1—Jack, single circuit
4—terminals
3—4-pin sockets
3—1K4 valves one spare—(Radiotron)
Batteries.
2—WP60 "B" batteries (Ever-Ready)
1—126 "C" battery (Ever-Ready)
1—40 amp. hour accumulator (Clyde)

Congratulations From A ZL Reader.

I have all copies of your "Radio World" since its inception, and have a standing order placed with my stationer. I find it a very good radio journal, and I extend my congratulations. From the first the standard has been high, and I trust that such will continue, and that news of interest will be suplied to dxers and all other radio "fans" alike.—A. McJennett (AW163DX), Sth. Wellington, N.Z.

PRACTICAL RADIO COMMUNICATION

Principles — Systems — Equipment — Operation
including
Short-Wave and Ultra-Short-Wave Radio
By ARTHUR NILSON and J. L. HORNUNG

No radio-technician can afford to be without the valuable information packed into the 750 pages and 434 diagrams of this book, because it will give him that thorough technical radio education that is becoming so essential to personal development in modern radio.

Practical Radio Communication leaves no subject required by the practical radio-operator, technician untouched. It explains in clear and concise language, instructs through carefully prepared diagrams, and, in short, covers the requirements of all classes of radio-operator's licence examinations. It treats long, medium short, and ultra-short wave radio, including all classes of radio stations, and, in general, is a complete text on practical radio communication.

The book is divided roughly into two parts: Principles and Practice. The first six chapters are given over to principles, and the remaining nine chapters to practice. High-grade technical skill is always founded on a sound basis of fundamental principles. It has been thought best, therefore, to go into these principles extensively, delving deeply into alternating current, which plays an important part in modern radio. It is on the assumption that these principles have already been mastered that the practical sections of the book have been written.

Particular attention has been given to broadcasting, and much of the material included on this subject appears here for the first time in a radio text-book. Broadcast men will also find the chapters on Studio Acoustics and Apparatus, Control-room Equipment and Operation, and Antennas to be of great value for the ordinarily inaccessible information which they contain. The last three chapters of Practical Radio Communication are given over to a thorough treatment of power-supply apparatus, including rectifiers, generators, and batteries, and their associated equipment.

CONTENTS

1: Direct-current Electricity and Magnetism. 2: Alternating-current Electricity. 3: Introduction to Vacuum Tubes. 4: Transmitting-circuit Principles. 5: Receiving-circuit Principles. 6: Antennas and Wave Propagation. 7: Studio Acoustics and Apparatus. 8: Control-room Equipment and Operation. 9: Broadcast Transmitters. 10: Communication Transmitters. 11: Radio Receivers. 12: Radio Aids to Navigation. 13: Rectifier Units. 14: Dynamo-electric Machinery and Meters. 15: Storage Batteries. 16: Appendix A (Technical Information). 17: Appendix B (Operating Information).

Angus & Robertson Ltd.,
89 Castlereagh Street, Sydney.

ON APPROVAL ORDER FORM

Please send me Practical Radio Communication for 7 days' free examination. If I do not return it after having had it for that time, I shall forward a first payment of 15/– and agree to make two further monthly payments of 10/– each.

NOTE: The price for cash within 30 days is 32/6.

NAME.....

ADDRESS.....

BUSINESS ADDRESS.....

OCCUPATION..... R.W. 3/37.

The All-Wave All-World DX News

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

★ ★ ★

North Suburban Radio Club Notes And News.

By CB-GV.

THE first annual dinner of the North Suburban Radio Club will be held on Tuesday, March 16, at the club rooms (corner of Brown St., and Pacific Highway, Chatswood).

All radio fans are invited, and are assured of a good time by the committee, VK2NN, 2BJ, 2VG, Mr. G. Taylor, and if available, Mr. W. Montieth. No effort will be spared by the committee to make the dinner a great success.

Club Contest In April.

On the first two week-ends in April, the N.S.R.C. are holding their 1937 inter-club transmitting and receiving contest. The hams have to pass a 10-letter cypher to each other on contact, the total score being multiplied by the number of bands on which contacts are made. Those taking part are going to attempt to contact each other on every amateur band, from 5 to 160 metres.

The listeners have to hear as many contacts as possible, and log the cyphers passed.

First prize in the transmitting contest is a Jones 1937 "Radio Handbook," suitably bound and embossed. First prize in the Receiving contest is the "A.R.R.L. Handbook," also bound and embossed.

The contest should prove very popular and will be keenly contested. The prizes have been donated by VK's 2KJ, 2GV, 2CB, 2NN, 2VG, 2ADQ and 2HL.

Club Jottings.

The latest amateurs to join the club are VK2KJ, one of the oldest amateurs on the North Shore, and VK2ADQ, one of the latest.

Owing to pressure of work, VK2VG had to resign his position as Secretary-Treasurer, his resignation being accepted with the deepest regret. The position has been filled by VK2BJ and VK2NN.

The club now has two code classes in progress (fast and slow), and the members are making excellent progress. Anyone interested in radio is invited to join. The club meets every Tuesday at 7.30 p.m. Information can be obtained from the Secretary, VK2NN, 62 William Street, Roseville.

Too Long Between Issues!

Allow me to congratulate you on your fine magazine, which seems to improve with every issue. The articles on amateur radio are going to prove very educating, especially to we fellows who in the near future hope to become successful candidates in an A.O.P.C. examination.

My one and only growl is about the long time in between issues. A month's a mighty long time to wait for such a fine magazine, but still, it is worth waiting for. The pictures on the front covers are very well got up, and I am seriously thinking of purchasing a binder of some sort to keep my back numbers in good condition.

Best of luck to members of the DX Club.—Cedric W. Marley (AW-150DX), Sth. Brisbane, Q'land.

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.]

Round the N.Z. "B" Stations 2

The Rev. C. R. Scrimgeour—"Uncle Scrim" of the Friendly Road, and now controller of commercial broadcasting in New Zealand.

1ZB . . . . AUCKLAND

The "Friendly Road" Station

At present all eyes are turned on 1ZB Auckland, the first "B" station to commence advertising in New Zealand, under the Government's new commercial station scheme. This interesting article is the second from the pen of

"The Southlander"

LET me live in a house by the side of the road, and be a friend to man." The inauguration of the Friendly Road by the Rev. C. G. Scrimgeour, affectionately known to thousands as "Uncle Scrim," has been one of the outstanding events in the history of New Zealand radio. All New Zealand listens to the heart-to-heart talks by the Road-mender of the Friendly Road.

History Of The "Friendly Road."

The Fellowship of the Friendly Road originated from the studio church services conducted by Uncle Scrim over station 1ZR, Auckland. He had been a Methodist mission worker in Auckland, and achieved prominence by his unorthodox methods of conveying God's message. He recognised the value of the air as a means to draw all classes of people together, to tread the "friendly road" in the footsteps of Uncle Scrim.

1ZR came on the air in 1930, but at the end of 1933 was bought out by the N.Z. Broadcasting Board, which under the call of 1YL used it as a subsidiary station to 1YA. The Friendly Road had gained a large hold in the hearts of thousands, and immediate agitation was made for its continuance.

At this time the "B" stations were not in a very happy position. The copyright question, and the then Government's policy, which was moulded on the B.B.C. policy of no "B" stations, both presented serious difficulties to these private broadcasters. However, popular demand prevailed, 1ZM and 1ZB came to the rescue, and the latter station was acquired by the Fellowship of the Friendly Road.

Supported By Public Subscription.

From then on 1ZB was supported entirely by public subscription, but although the programmes were of a high standard and the station was most popular, the technical staff was considerably handicapped in its endeavours to increase power and keep the station up-to-date.

However, with the advent of the Labour Government, the outlook has changed for 1ZB. In October last it was made the first commercial advertising station in New Zealand, with the Rev. C. R. Scrimgeour as Controller of National Commercial Broadcasting.

Station Improved And Staff Increased

Immediately things began to happen at 1ZB. The studios above Queen Street were renovated and enlarged, the station's equipment modernised, the hours increased to 82 a week, several new features incorporated in the programmes, and the personnel of the staff increased. Included in the latter is Miss Dorothy Woods, formerly of 2GB, Sydney, as programme organizer, and Mr. B. T. Sheil, colleague of the late Sir Charles Kingsford-Smith, as advertising manager. John Stannage, also of "Southern Cross" fame, has also been connected with 1ZB on the technical staff.

Listeners have so far found the programmes delightfully attractive. People who formerly criticised commercial broadcasting have been pleasantly surprised. The entertainment has been bright and original, advertisers are anxious to give only the best to the radio audience, and the result is certainly a higher standard of entertainment that will make the "A" stations "keep up to scratch."

Commercial Radio—Greatest Advance In N.Z. Yet.

The new Controller says that "commercial radio spells the greatest advance in New Zealand radio since its inception." No doubt it is a sensational event in N.Z. radio history. A commercial station in each of the other three main centres is to follow.

A Tribute To Uncle Scrim.

In the passage way of 1ZB stands a beautiful piece of Maori art in the

(continued at foot of col. 1, opposite)

SOME FACTS ABOUT 1ZB

Call and Location:—1 Z B—Studios, Queen Street,—Transmitter, Symonds St., Auckland.
Owners:—Government Commercial Station. (The Fellowship of the Friendly Road.)
Frequency:—1090 k.c.
Power:—150 Watts in aerial.
Transmission Times:—Monday to Friday, 5 a.m. to 9 p.m. Saturday, 5 a.m. to 10 p.m. Sunday, 5 a.m. to 8.30 p.m. (All times are A.E.S.T.)
Type of Transmitter:—C.C. Osc. 2 Buffers. 250 Watt final Class "B" Modulator—2/212 D.S.
Antenna:—"L" type.
Special Features:—Devotional Services, sponsored programmes.
Most Notable Transmissions:—Uncle Scrim's Talks.
Manager of Station:—Rev. C. R. Scrimgeour.
Operator of station:—R. E. Grainger.
Announcers of Station:—A. Collyns, Ed. Silver, Marcus Toger.

Shortwave Stations Of The World 7

Dxers forwarding a correct reception report to station WDAF, Kansas City, U.S., are made members of the Nighthawk's Club.

Europe (Part 3) Africa, And India

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

ALAN. H. GRAHAM

Poland.

The Polish shortwave transmitter SPW is not heard regularly in Australia, but is occasionally to be logged on 13,635 k.c. (22m.). Located in Warsaw, the station is on the air from 2.30-3.30 a.m. daily

Denmark.

The midnight bells from the town hall in Copenhagen may be heard at 9 a.m. through the Danish station OXY during the winter months. Transmitting on 6,060 k.c. (49.5m.), OXY maintains a daily schedule from 4-9.30 a.m. Address your reports to Statsradiofonien, Heibergsgade 7, Kobenhavn, and they will be speedily answered.

Iceland.

Reception of the Reykjavik stations must be regarded as the ultimate in DX, for this represents the longest reception possible in Australia. As far as is known there are three freqnencies in use, and of these TFJ on 12,235 k.c. (24.52m.) is comparatively easily logged. TFJ is used for telephonic communication with England; and also broadcasts every Monday from 4.40 to 5.30 a.m.

TFK (9,060 k..c.; 33.1m.) and TFI. (5,000 k.c.. 60m.) are also used for telephony work, and occasionally broadcast special programmes.

Sweden.

Until fairly recently Sweden was not represented in the shortwave field, but this gap has been filled by SM5SX, the station of the Roval Technical University, Stockholm. SM5SX was first heard on the 20m. amateur band—but soon began regular transmissions on approximately 11,700 k.c. (25.63m.). No definite schedule is available, but SM5SX has usually been reported in the early morning.

U.S.S.R.

It is sometimes a rather difficult matter to obtain up-to-date information concerning the Russian stations, but the following list of transmitters may be regarded as reasonably accurate.

CALL	K.C.	M.	LOCATION
RIM	15,252	19.67	Tachkent
RV96	15,180	19.76	Moscow
RKI	15,090	19.88	Moscow
	(occasionally relays RNE).		
RNE	12,000	25	Moscow
RIO	10,170	29.5	Bakou
RIR	10,080	29.76	Tiflis
RAN	9,600	31.25	Moscow
	9,520	31.5	
RIM	7,626	39.34	Tachkent
RKI	7,500	40	Moscow
RV59	6,000	50	Moscow
RV15	4,273	70.2	Khabarovsk

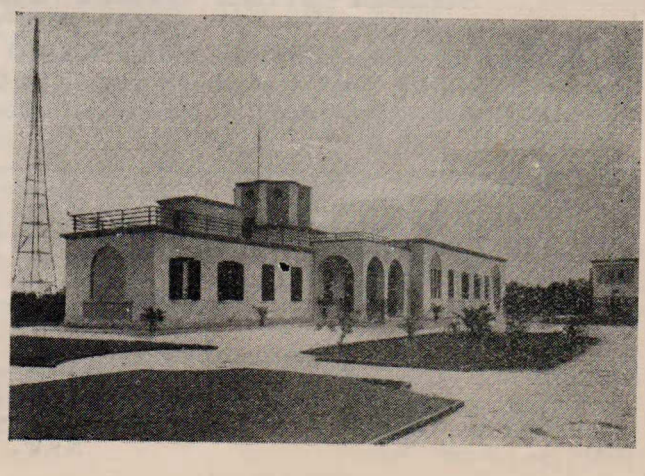
It is recently reported that RV15 has commenced a special English session at 7 p.m. nightly. Reports of reception and letters of criticism are sought. All reports will be verified, and should be addressed to Rowena Meyer, Radio Committee, Khabarovsk, U.S.S.R.

As the Russian schedule and wavelengths on which the regular broadcasts take place are undergoing fre-

(continued from opposite page).

form of a carved Maori warrior. Inscribed thereon is the following:—'Presented to the Rev. C. G. Scrimgeour (Uncle Scrim), Director of the Friendly Road, by the Rt. Hon. M. J. Savage, P.C., M.P., Prime Minister, on behalf of the people of New Zealand who have benefited by Friendly Road Services. This is a token of their high esteem for and gratitude to Uncle Scrim, for services given in fellowship on the Friendly Road. August 23, 1936." It is a fitting tribute to one of New Zealand's outstanding radio personalities.

★



This modernistic building houses the 20 k.w. transmitter used by the Italian broadcast station at Bari.

★

quent changes, no schedules are given here.

Africa—Morocco.

The most interesting of the North African stations is undoubtedly the Spanish "rebel" station, EA9AH, Radio Tetuan, which was widely heard last year on 42.6m.

CNR are the call letters assigned to the transmitters of the Director of Telegraph and Telephone Stations in Rabat. On 12,825 k.c. (23.39m.) CNR is scheduled to be on the air from 10.30 p.m.-midnight on Sundays—but has been heard somewhat earlier, around 7 p.m.

CNR's other frequency is 8036 k.c. (37.33m.). The schedule here is Mondays 5.30-8 a.m.

Egypt.

The three Egyptian stations at Abou Zabal are used mainly for communication with Europe, but occasionally undertake special broadcast programmes. The call letters and frequencies of these stations are SUV (10,055 k.c.:29.84m.), SUX (7,860 k.c.:38.17m) and SUZ (13,820 k.c.: 21.71m.).

Eritrea.

IDU, the Italian colonial station at Asmara, is heard working Rome on 13,380 k.c., or 22.42m.

Abyssinia.

Addis Ababa is still on the air, but the station is now of course controlled by the Italians. It operates on approximately 15,450 k.c. (19.4m.); and is usually heard working Rome.

Kenya.

Probably the best known of the African stations is VQ7LO, which is located in Nairobi, Kenya. It transmits on 6,083 k.c. (49.31m.) and is widely heard in Australasia. Its schedule is as follows:—

Mon.-Fri. 8.45-9.15 p.m.; Sat. 2.30-5.30 a.m.; Tues. 11.30 p.m.-12.30 a.m.; Thurs. 11.30 p.m.-12.30 a.m.; Sun. 2.30-6.30 a.m.; Mon. 2-5 a.m.

Belgian Congo.

Although seldom reported in Australia, OPL and OPM may possibly be heard in 'phone communication with Belgium.

OPL (20,040 k.c.:14.97m.) works with ORG in the evening, and OPM (10,140 k.c.:29.59m.) is usually on the air around 6 p.m. and in the early mornings. Both stations are in Leopoldville.

South Africa.

ZTJ, the shortwave station of the African Broadcasting Company, in Johannesburg, operates on a frequency of 6,097 k.c. (or 49.2m.). Schedule is given as:—

Mon.-Sat. 2.45-3.30 p.m., also 6.30-10 p.m. and midnight-7 a.m.; Sun. 11 p.m.-1.15 a.m.; Mon. 3.30-6 a.m.

The phone station ZSS on 18,890 k.c. (15.88m.) in Klipheuvel, works with Rugby from 9.30 p.m.-3 a.m. daily.

In the February issue of the "Radio World" reference was made in "The Month on Shortwave" column to several South African Stations. Details given there are briefly summarised below.

ZNB, Mafeking. Owned by British Bechuanaland Government. Frequency 5,900 k.c. (50.48m). Schedule (rather irregular). Week-days 4-5 a.m.; Sundays 5-8 p.m.

ZEB, Bulauayo, 48.8m. and ZEC. Salisbury, 50m., are now operating on regular schedules, thus:— Sundays 6.30-8 p.m.; Tuesdays 2-3 a.m.; Wednesdays 4.15-6 p.m.; Fridays 1-1.45 a.m. and 2-3 a.m.; Saturdays 4.15-6.15 a.m.

Madagascar.

For convenience, the Madagascan station FIU is included under the African list. It operates on 49.92m. from 12.45 p.m.-1.30 a.m. daily.

FIQA (52.6m.) in Tananarive is another Madagascan. This station may be identified by the playing of "Ramona" when it comes on the air; and of course it signs off with the "Marseillaise."

India and Ceylon.

The last zone to be dealt with in this review of shortwave stations of the world is that comprising India and Ceylon.

Bombay broadcasts on 31.36m. (9,565 k.c.) using the call VUB. Because of the fact that W1XK is only separated from VUB by 5 k.c., the latter is rather difficult to log. The best time to get them is around 2 30 a.m. Their schedule is Thurs., Fri., Sun., 2-3.30 a.m.

VUC is located in Calcutta, and transmits on 6,110 k.c. (49.1m.). Its hours of transmission are:— Daily (exc. Sat.) 6-8.30 p.m.; Daily (exc. Sun.) 12.30-3 a.m.; Sundays 2.45-6 a.m.

Two 'phone stations at Kirkee are often heard in contact with England. They are VWY (33.43m.) and VWY2 (17.13m.).

In Ceylon we find the Colombo shortwave station (VPB) on 49.6m. its exact schedule is not known.

Have Your "RADIO WORLD" Posted To You Direct

Readers who want to take the "Radio World" on a subscription basis and have their copies posted to them direct each month are invited to complete the coupon below and send it in. Also, as a special offer to those wanting to complete their file of copies, the first 10 issues will be forwarded for 6/6 or single copies for 10d. each, post free.

Subscription Order Form

Kindly send me THE AUSTRALASIAN RADIO WORLD for one year (12 issues), post free, beginning with the April number The "Cash with order price" of 10/6 is attached.

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Country.....

NOTE.—N.Z. subscribers can remit by Money Order or Postal Note.

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

DX News and Views

A page for letters from DX readers

★ ★ ★

"Eaglet Two" Gives Fine Results.

I take the "Radio World" regularly, and it's just the book we have been waiting for across the Tasman.

I built the "Eaglet Shortwave Two" using 2.5v. glass valves, and on 80 metres in two weeks I received 60 stations on an indoor aerial. I wound a broadcast coil that normally covers from 1,000-1,500 k.c., but by shorting out the pre-set aerial condenser, 1YA can be brought in at speaker volume. On Saturday night I picked up 2SM at R3, QSA3-4, while on shortwave I logged about 12 foreign stations.

On a 5-valve B.C. superhet I logged some 90 stations, and verifications have been received from XENT, KFBK, KSL, KGMB, VK2QY and about 12 other Australians.

Enclosed please find 1/6 for 50 club report forms—I think they are a great idea. Have received the badge and certificate in good order, and believe me, I'm proud of them. Best of luck to our Club—Bob Allard (AW194DX), Auckland, N.Z.

★

Verification From TI4NRH—"The Voice Of Costa Rica."

In reply to a report sent to TI4NRH on November 11, 1936, I have received a Diploma No. 44,302, verifying my report on that station's transmission.

The most interesting and thrilling catch for any dxer is TI4NRH, "The Voice of Costa Rica," the smallest and oldest radio station in Herida and the smallest broadcasting station in the world. The Diploma was accompanied by a very interesting letter and a Christmas card with greetings from the "Voice of Costa Rica." Also included was a copy of an article that had appeared in Bulletin No. 177 of C.S.W.R.C. The following extract should be of interest to dxers.

"About eighty reports of reception per week are received by station TI4RNH at Herida, Costa Rica, many of them from Australia, New Zealand, South Africa, England, France, Canada, and other countries. Amando Cespedes Marin, the owner, asks us to remind listeners not to send reports on postal cards. Send letters only, and always enclose at least a five-cent stamp. However, we recommend enclosing either a ten-cent stamp or a dime to help defray the cost of verifying. International Reply Coupons cost 9c. each, and are a nuisance to both station and listener. Besides being good only in certain countries, they do not pay for stationery, QSL cards, time and labour. Neither does a dime."

The station operates on 9,670 and 14,428 k.c., and the hours of transmission are from 7-8 a.m. and 2.30-3 p.m., A.E.S.T. The transmitter is crystal controlled, using 47, 46, 210; modulator, 852.—W. T. Choppen (AW61DX), Timaru, N.Z.

Club Seals Now Available

Embossed In Blue and Silver

Club members who have been inquiring for Club seals to attach to correspondence, Q.S.L. cards etc., are advised that supplies are now available from the Secretary, 214 George Street, Sydney. Slightly larger than the Club badge, the seal is an exact replica of it, embossed in blue and silver. For those having QSL cards printed, the space occupied by the seal is 1¼ inches across. The price is 1/6 for 5 dozen, post free.

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New N.Z. Commercial Stations.

QSL's are slow coming in, caused in my case by the American shipping strike. I am working that country at present and getting good results. A piece of freak DX gave me WLW the other evening. I roped him in through 2NR, Laurence, at R3, rising later to R9, QSA5.

My aerial, which gives excellent results, has a flat top of 190 feet, 80 feet running N.E., 40 feet W., and 70 feet N.W.

QSL's received recently include TPA3, 4QN, VK3GQ and COC9. I will exchange QSL's with other members.

Following are new stations for the National Broadcasting Service in N.Z. (Commercial Dept.). 2ZB, Wellington, 1,120 k.c., power unknown. There is to be one new station at Christchurch (probaby 3ZM, which may change call to 3ZB), and one at Dunedin (probably 4ZM, which may change to 4ZB).

2ZB opens in March and the others are to follow within 6 months, so dxers who have not logged 4ZM or 3ZM should get busy.—Kenneth G. S. Wright (AW177DX), 466 Hereford Street, Christchurch, N.Z.

★

Recent Overseas Verifications.

Since my last report to the "Radio World," reception has been very patchy, owing to the summer conditions here.

I have received quite a number of cards in the last two months, which include, G5NI, NY2AE, SM5SX, W6ITH, HC1FG, VE5OT, HI7G, F8II, VS7RA, ZBW, PLP, PMN, PK1MX, W2XAF, VK6MW, VK6JE, VK6WJ, 9MI and also a card from 2RO, Rome (book and letter also received).—H. Rogers (AW84DX), Nth. Geelong, Vic.

★

Recent Loggings And Verifications.

Following is a list of stations logged recently on the 20-metre band—VK's, 2BQ, 5AI, 7JB, 6WJ, 3GQ, 2HF, 4VD. RNE, LRU, DJQ, COCQ, VS6AB, CE1AH, PK1RA, OA4AI. Several American "hams" have been logged also. The "K" stations are coming through well from 10 p.m. onwards. I have logged over 100 stations and hold some good veries.; here are a few received:—HVJ, DJA, DJN, FYD, VPD(1), VPD(2), ZBW, W2XAD, W1XAL, VJZ, Rabaul (2 veries, logged twice). VK's, 5JB, 2XS, 3MR, 2DL, 2BK (3AT mC.W.), 3WW, 2DW, also 3AW, 2RO and PCJ.

The following details of my outfit may interest dxers in Australia. I use a two-valve all wave job known as the "Tiny Tim," (size 8in. x 8in.) using a 30 det. and 1D4 last stage. Aerial is 70 feet long, 30 feet high, running North and South, "L" type. (No earth used). Poles are resting on glass blocks.

I am keen on exchanging QSL cards—my QRA is A. Green, 16 Chester Street, Mt. Eden, Auckland, N.Z.

★

New S.W. Station At Perth.

I have not seen any mention of anyone having received VK6ME, the

new A.W.A. station at Perth. I received it QSA5, R4 at 10.30 p.m. S.A. Time on Feb. 8, when they were just concluding tests.

Other stations received lately are:—VU2CQ, KA1AK, KA1ER, KA1BH, KA1KY, KA1DL, KA1RB, HKIZ, VS7RA, VS7MB, VS2AK, VU2DY, XU8HW, XU6SW, PK2VD, PK1GL, K6JLV, VS6AB, and all the well-known broadcast stations on short-waves. My receiver is a home-built three-valve straight battery set using A615, A609 and B605 valves and is very satisfactory. I am at present listening to ZBW HongKong, which seems to be back on the 31m. band, at R7.—A. E. Bruce (AW171DX), Millswood, S.A.

The Story Of The Ever Ready Air Cell.

(continued from page 4)

of oil is poured on the top every time it is replaced.

The idea of the air cell was first conceived in about 1926, when the National Carbon Company began playing around with the idea of using the oxygen in the air as a depolariser instead of obtaining it by chemical reaction within the cell itself. The cell was finally perfected by a chemist on the company's staff named Heise, and he certainly had some problems to overcome.

In the first place, a special carbon was required to absorb oxygen from the air and pass it on to the cell. At that time the company had been making carbons for over 30 years, and so they knew as much as anyone else about carbon and its different forms. Even at that, the special "breather" carbon required for the air cell was evolved only after years of intensive research.

The next problem was to manufacture the cell so that it would be inactive until required. Naturally a solution that would spill during transportation could not be nsed—particularly a corrosive one like the soda solution employed. Also, it was realised that users would not want to mess around making up solutions and pouring them into the cell. This left the only remaining alternative of putting the soda into the cell in a solid, inactive form.

This idea also brought with it fresh problems. The first was that if water is poured on caustic soda, the solution becomes so hot that it almost boils. To eliminate this, Heise discovered that partly hydrated caustic soda did not act the same way—if water is poured on it the solution becomes only slightly warm.

The next problem to overcome was the fact that the solid used was hygroscopic, which meant that if left exposed to the air it would absorb water, so putting the cell in action before it is needed. To prevent this the exposed tops of the carbons are sealed with cellophane until the cell is ready to be put into service.

So finally the air cell was perfected. Radio manufacturers began to build special air cell receivers, and now dozens of companies are making this type of set. The cell was finally perfected and marketed in 1930, and in the past six years some millions of them have been sold throughout the states.

Today they are as popular as ever, despite competition from vibrator set manufacturers. Most battery-set owners seem to appreciate that an "A" supply that can be put into service and then forgotten about for nine months or a year is far more convenient than an accumulator which needs fairly frequent re-charging. The latter can not only be very inconvenient, but in many cases it is a very costly item. As well, the air cell gives smooth, noiseless current at constant voltage, which is a very important consideration.

The cell is very simple to put into operation. The cellophane vent covers are removed and water—ordinary tap water is quite suitable—poured in up to the proper level. This immediately places the cell into service and it needs no further attention during its life, except for an occasional topping up with more water.

The capacity of the cell is 600 ampere hours, and the maximum current drain that can be taken from it is .65 ampere. With a receiver taking this current, the service life of the cell is 1,000 hours. With lower drain the cell life is correspondingly longer. For example, with a set drawing half an ampere of "A" current, a service life of 1,200 hours can be expected.

Manly Radio Club Notes.

By "Second Op."

The club has been having a round of social events of late; firstly there was the W.I.A. annual dinner and then the Waverley Radio Club's 18th reunion. Now members are preparing for their own reunion, which is being held in the clubrooms on Saturday, February 27, at 8 p.m.

The 5-metre craze has arrived in Manly, and the gang are busy building receivers and transmitters for some tests. We have had a small rig working, and local reports are fair.

The new rig on 40 metres is nearly completed, and this will also be on the air very soon. Keith and Jim are looking forward to renewing old friendships with the boys on the band.

Club Chatter.

2HF is still working DX on 20 metre 'phone, and is getting out well. 2IP, our member over at Crow's Nest, is on with his new rig, and is working his share of DX on 40 and 20 metres. 2KX was heard once or twice during the month; what is the trouble, O.M.? 2ABK was heard on 'phone on a number of occasions—excellent 'phone, too. Don't forget the reunion, O.M. 2WG was down from the creek last week-end. Cliff Haydon has left for New Guinea, where he will be living for some time. 2NG was heard on 40 and 20 metres with his usual very fine 'phone.

The club would like all 5-metre stations to keep watch for 2MR, and forward us reports.

Three new members have joined the club since the New Year, all being very keen to go for their tickets.

New Radiokes Sirufer-Cored I.F. Transformers.

By using the new Sirufer cross type iron cores, Radiokes engineers have produced an I.F. transformer that in view of its excellent gain and very high selectivity is ideal for dual or all-wave receivers.

In developing these new intermediates, cores were first of all wound, wide values of inductance and capacity being tried and tested for "Q" in order to ascertain the best L/C ratio. The cores are mounted on low-loss high grade bakelite. The can measures 2in. x 2in. x4¼in., and the trimming screws may be adjusted through holes in the side of the can.

The new transformers tune to 465 k.c. with the trimming screw approximately half way out. A range of 10 k.c. on either side of 465 k.c. is obtained with the screw full in or full out.

These Radiokes SIF-465 k.c. intermediates retail at 17/6 each.

Fidelity Broadcast Five—Adding Bass Boosting.

(continued from page 7)

balance, suffering from over-accentuation of the bass.

Curing A Motor-Boating Tendency.

If it is found that there is a tendency towards motor-boating in the "Fidelity Broadcast Five," then this can easily be cured by connecting a 10 or 25 mfd. dry electrolytic condenser in parallel across the .1 mfd. paper condenser by-passing the 6B7S 250-ohm cathode bias resistor. The .1 mfd. will take care of the i.f. while the electrolytic will effectively by-pass the audio frequencies present that otherwise might give rise to motor-boating.

Some DX Highlights

First Wireless Concert

By GILBERT S. HAYMAN

Early Wireless Concert

Believe it or not, the first time I ever heard a radio was at a lodge function, on Saturday night, December 22, 1924, when a wireless concert was given.

To quote "The Oddfellow," January 15, 1924, under the title of "Wireless Concert," the report goes on to say "'The Sons of Independence Lodge' entertained their members and friends at a Christmas gathering on Saturday, December 22, at their hall, Charing Cross.

"One of the main features of the evening was a radio concert kindly given by Bro. Plaice, of Denham St., Bondi. Listening-in and Western Electric Magnavox by kind permission of the wireless authorities."

This is exactly how the report reads —of the first public performance of radio given in the Bronte district. I remember it quite well and enjoyed the demonstration immensely.

Some DX Hints

When making out DX reports time is an important item. Here is a time scale which should be of assistance:

THE WORLD'S TIME

Twelve o'clock noon Standard Time at Sydney, compared with the Clock in the following places :

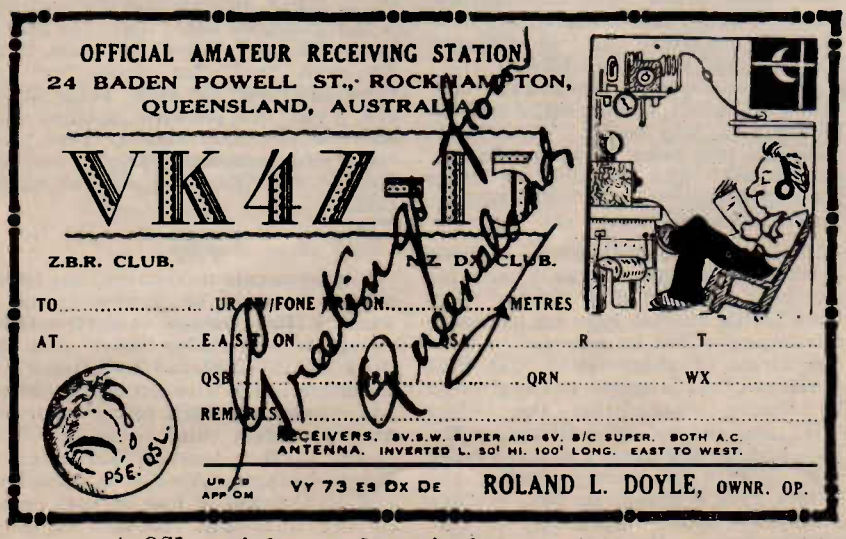
Adelaide	11.30 a.m.
Melbourne	12.00 noon
Berlin	3.00 a.m.
Bombay	7.30 a.m.
Brisbane	12.00 noon
Calcutta	7.53 a.m.
Cape Town	4.00 a.m.
Constantinople	4.00 a.m.
London	2.00 a.m.
Montreal	*9.00 p.m.
Moscow	4.00 a.m.
New York	*9.00 p.m.
New Orleans	*8.00 p.m.
Panama	*9.00 p.m.
Paris	2.00 a.m.
Perth, W.A.	10.00 a.m.
Rome	8.00 a.m.
San Francisco	*6.00 p.m.
Suez	4.00 a.m.
Tokio	11.00 a.m.
Vancouver	*6.00 p.m.
Vienna	3.00 a.m.
Washington, D.C.	*9.00 p.m.
Wellington, N.Z.	1.30 p.m.
Yokohama	11.00 a.m.

* Denotes previous day.

Give your country's standard time as well as that of the country in which the station you are reporting to is located. Distances are often of value in DX reports, so give the station's approximate distance from Australia or New Zealand. Here is a table of distances for local and English reporting:

DISTANCE TABLE BY WATER

	Miles
Sydney to Brisbane	510
Brisbane to Maryborough	180
Maryborough to Gladstone	192
Gladstone to Rockhampton	100
Rockhampton to Mackay	193
Mackay to Townsville	221
Townsville to Cairns	194
Sydney to Melbourne	576
Melbourne to Adelaide	504
Adelaide to Albany	1,020
Albany to Fremantle	350
Sydney to Hobart	628
Melbourne to Hobart	457
Sydney to Auckland, N.Z.	1,277
Sydney to Wellington, N.Z.	1,200
Melbourne to Wellington, N.Z.	1,471
Sydney to London (via Vancouver)	14,077
Sydney to London (via Cape Horn)	13,203
Sydney to London (via Suez)	11,603
Sydney to London (via Cape of Good Hope)	13,379



A QSL card from a Queensland member of the DX Club.

Six Simple Soldering DON'TS!

★

DON'T try to solder with a warm iron; it must be hot.

DON'T try to solder a joint that is not clean.

DON'T fail to tin the iron and the work.

DON'T fail to heat the spot with the iron before applying the solder.

DON'T melt the solder an inch or two above the work and expect it to drop into the joint and make a good job; it won't.

DON'T jar a joint until the solder has had time to cool.

Radiotronics No. 73 Now Available.

A copy of the latest issue of "Radiotronics," published on February 24 (Technical Bulletin No. 73), is just to hand from Amalgamated Wireless Valve Co. Ltd.

Prices of the Radiotrons 807, 808 and 913 are given, and a price reduction to 25/- announced for the Radiotron 866 mercury vapour rectifier.

A common fallacy in radio is the fact that it is generally believed a diode detector is distortionless. Actually it is not, and the way in which appreciable distortion arises in conventional arrangements is outlined in detail in a two-page article.

Further items of interest to the design engineer include an article dealing with precautions to avoid distortion it is necessary to take with the type 75 duo diode triode, due to the limited input voltage that can be applied to the triode section of this valve. Also included is a further article on bass boosting, while another deals with an oscillographic method of testing for absolute sensitivity.

HAM JARGON . . .

As a heritage from the days when the code was universally used by the amateur, today he has a language of his own that to the uninitiated sounds meaningless. The commonest abbreviations are quoted in the article below . . .

By D. E. EVANS

Judging by the cards on the wall, amateur station LU4DO, in the Argentine, has been "getting out" to some effect.

HAM lingo — the language of the radio amateur — is snappy, amusing, and highly descriptive. It is made up of idioms, abbreviations, technical terms and phonetic words. It's Greek to the public and a source of distress to the beginner. It is enough to set anyone on his ear!

Some of the idioms used by the ham have their roots in the field of commercial wire and radio telegraphy. The old-time Morse telegraphists originated the word "bug" as a happy and brief tag for the semi-automatic code keys used then, and now, for high speed transmission.

The early type of hand keys were made of brass, and the operators of such keys were dubbed "brass pounders." If an operator worked his key well, it was said of him that he had a "good fist," just as one might say that a singer had a good voice. Hand key operators were often subject to a temporary or permanent loss of muscle reaction which affected their sending, in which case they were said to have developed "glass arms." Double acting keys were known as "side swipers." These and other idioms originating with the old-timers have been kept alive by the ham.

Many of the abbreviations had their origin in the field of telegraphy. Such short-cuts as "abt" for about, "ck" for check, "fm" for from, "hr" for here, "sig" for signature, and "tks" or "tnx" for thanks, are good examples of a few of the many abbreviations the early amateur radio telegrapher appropriated for his own use. The substitution of the letter "x" for parts of a word, such as "tnx" for thanks, "dx" for distance, "px" for press, and "wx" for weather, had also been taken up by the ham, and he has added a few others of his own, with the "x" tacked on to the front end of the word, such as "xtal" for crystal, and "xmtr" for transmitter. A reversal in form is shown in the use of "rx" for receiver.

The ham also uses the International "Q" Code, together with a few combinations of his own making. He employs such universal signs as "R," meaning okay; "K" meaning to go ahead; "SK" indicating the termination of a transmission; "73" meaning kind regards; and "88" meaning love and kisses.

Amateur Abbreviations

But ham lingo is far from being a borrowed language. When it comes to trick idioms and phonetic spelling, the ham has it all over the commercial crew.

It all started before vacuum tubes were in use, when powerful spark transmitters were called "rock-crushers," synchronous rotary spark gaps were called "sinks," and headphones were called "cans." The first continuous wave (c.w.) tube transmitters were cynically referred to as "peanut whistles" and their operators as ??? ! A particular type of transformer was called a "coffin," and an aerial became known as a "sky hook." When licenses came into being they were known as "tickets," and transmitting tubes were christened "bottles." The District Radio Inspector became the "R.I."

There were no radio-phone stations in those days, and it was a task for one ham to carry on a lengthy "rag-chew" with another ham by means of telegraphy unless he resorted to various forms of abbreviation. It thus developed that laughter was registered by simply transmitting the letters "HI," and the natural enthusiasm the ham had for the game was aired every few minutes by merely sending the letters "FB"—which, to you, is "fine business." Then, surprisingly enough, all hams, no matter their age, became old men, or simply "OM," over the air. Mother was referred to as "OW," which was alright since she couldn't decipher the code, and the girl friend became the "YL." If the ham married she immediately became an "XYL," which has never seemed quite complimentary but the girls lap it up.

And then there was the phonetic spelling interspersed with abbreviations. Typical copy would read something like this: "SA OM IS TT UR YL I SAW U WID LAST NITE? SHES A SWL NO ES HW! HI!" Translated into English, this copy reads: "Say old man, is that your girl friend I saw you with last night? She's a swell number and how! (Laughter)."

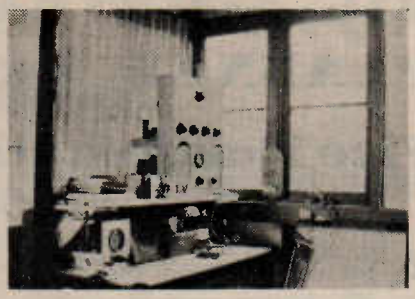
The c.w. ham of to-day continues the use of the abbreviated form in his transmissions, but he is not, as a rule, apt to carry it to extremes. Aside from "es" for and, "tt" for that, "hr" for here, "hw" for how, and a few other straightforward short-cuts, he sticks fairly close to phonetic spelling. A few examples are: "fone" for phone, "gud" for good, "cum" for come, "sez" for says, "cud" for could, "ur" for your, and "sed" for said. Some words are given the phonetic spelling and additionally abbreviated, such as: "sked" for schedule, "freak" for frequency, and "sing" for sign or signature.

New Developments Brought New Terms

Improvements in vacuum tube transmitters brought on a new group of words. High voltage, radio frequency currents were being used, and the word "hot," employed by electricians to denote a live wire circuit, came into use. Later on, high power radio-frequency current came to be known as "soup." This term is also used to denote background noise in reception, and if a signal is lost in such interference it is said that the signal is "down in the soup" or "in the mud."

When the ham commenced using radiophone equipment, such phonetic abbreviations as "mike" for microphone, and "fone" for radiophone, came into use. Some of the lingo of the c.w. ham was carried over, and it is far from uncommon to-day to hear a ham on fone use the abbreviation "HI" when he could just as easily laugh. It's just a case of habit. It's the same with "K" and "SK"; most 'phone hams have resorted to such terms as "take it away," "toss it to you," "come in somebody," "over," or some such phrase when they are turning it back to the other fellow, but some of the fellows hang on to the "K" of their code days, and to "SK" when they are signing off.

The "Q" signals used by the ham are identical with those established by the International Radiotelegraph Convention. Each signal can be formed as a question or an answer. "QRA"? for example, means: What is the name of your station? The answer would be "QRA....." with name of the station. There are a large number of these "Q" signals, many of which are of no use to the ham. Those he does use are often given a slightly different



Amateur radio station VK2VG, owned and operated by F. L. Cook, of the North Suburban Radio Club. The receiver is a t.r.f. four-valver, while the transmitter uses a 53 as crystal oscillator and doubler, with a 45 in the final (with 20 watts input). 2GV generally operates on 40 and 20 metres and has W.A.C. on his present rig.

or broader meaning so that they may better fit conditions.

For instance, the original meaning of QSO? is: "Can you communicate with ..... direct (or through the medium of .....)?" But the ham also uses QSO to mean a two-way contact or conversation. In talking to another ham, he may pass the remark that he had a fine QSO with such-and-such a station, and in this sense the signal has practically the same meaning as the word "talk."

The following list of "Q" signals is not complete, but it contains the letter combinations most frequently used in amateur communications. The interpretations given are those adopted by the hams and are not necessarily identical with the originals. Each one can be used as a question or an answer.

QRA—What is your address?
QRG—What is my frequency?
QRK—Are my signals good?
QRM—Man-made interference.
QRN—Static interference.
QRP—Shall I decrease power?
QRT—Shall I stop sending?
QRX—Stand by.
QSA—What is my signal strength?
QSB—Do my signals fade?
QSL—Please acknowledge our QSO.
QSO—Two-way contact.
QSY—Shall I change frequency?
QTR—What is your time?

Everybody knows the familiar CQ or general call, while the QSA and R signal symbols have appeared regularly in this magazine since the first issue in May of last year.

(to be continued).

VK AMATEUR STATIONS . . . Additions and Amendments

Additions.

CALL SIGN.	NAME.	ADDRESS.
6AW	Watkins, A. P.,	131 Davis St., Boulder, W.A.
2AFC	McDonald, A. H.,	6 Little Villiers St., Grafton, N.S.W.
2AFD	Kerr, A. A.,	Thurgoona, N.S.W.
2AFG	Patterson, J. H.,	54 Birrell St., Waverley, N.S.W.
4WG	Grant, W. P.,	Ward St., Indooroopilly, S.W.2, Qld.
6WZ	Atkinson, R. H.,	27 Rathay St., Victoria Park, W.A.
4NL	Dangerfield, N. G.,	Pioneer Estate, Lower Burdekin, Nth. Qld.
3SZ	Errey R. O.,	48 McGregor St., East Malvern, S.E.5, Vic.
4WM	McNichol, R. W. E.,	37 Florence St., Teneriffe, N.1, Qld.
6GB	Gabbertas, J.,	254 Guildford Road, Maylands, W.A.
2BY	Olds, E. C. M.,	225 Jamieson St., South Broken Hill, N.S.W.
2AFE	Magennis, A. E. A.,	38 Pine Road, Auburn, N.S.W.
4DY	Wright, E. J.,	Ekibin Road, Annerley, S.3, Qld.
2RT	Felton, W. R.,	C/o R. H. Jones, 319 Princes Highway, Kogarah, N.S.W.

Alterations to Call Signs.

3SR	Marriott, R. J., 187 Kooyong Road, Toorak, S.E.2, Vic.,	Now VK3SI.
3OP	Brown, L. A., 16 Park Terrace, Eastwood, S.A.	Now VK3OB (See also Changes of Address).
2ACJ	Rutter, G. A., 28 Muttama Road, Artarmon, N.S.W.	Now VK2CB.
4DE	Ewing, J. D., 5 Cairo St., North Sydney, N.S.W.	Now VK2AFI (See also Changes of Address).
2AEP	Peppercorn, A. E., 33 Regent St., Bexley, N.S.W.	Now VK2QJ.

Changes of Address.

5DB—Berry, L. D., 24 Moulden St., Norwood, S.A.
3YW—Waring, C. C., 1161 Burke Road, Kew, E.4, Vic.

CALL SIGN.	NAME.	ADDRESS.
3OP	Brown, L. A.,	16 Park Terrace, Eastwood, S.A., (See also Alterations to Call Signs).
7CL	Conway, M. L. D.,	33 Welman St., Launceston, Tas.
3FL	Johnson, A. L.,	44 Carramar Avenue, Camberwell, E.6, Vic.
4FN	Nolan, F. M.,	25 Park Road, Wooloowin, N.3, Qld.
2AP	Reynolds, A. P.,	37 Orange Road, Parkes, N.S.W.
4DE	Ewing, J. D.,	5 Cairo St., North Sydney, N.S.W. (See also Alterations to Call Signs).
5LD	Deane, L. A.,	21 Davenport Terrace, Hazelbrook Park, S.A.
7NC	Campbell, N. D.,	25 Joynton Avenue, Hobart, Tas.
6FL	Lambert, F. C.,	9 Gregory St., Wembley, W.A.
2GQ	Barlow, E.,	Flat No. 2, 51 Spit Road, Mosman, N.S.W.
2XQ	Traill, R. J.,	47 Regent St., West Maitland, N.S.W.
2BB	Eastwood Radio Club,	134 Rowe St., Eastwood, N.S.W.
2WR	Shipley, A.,	34 Palmer St., Vaucluse, N.S.W.
2YU	Chessell, J.,	2 Esplan Court, The Esplanade, Ashfield, N.S.W.
2MQ	McGowan, W. E. C.,	120 Queen's Road, Five Dock, N.S.W.
3NA	Gardner, Dr. J. K.,	Royal Melbourne Hospital, Lonsdale St., Melbourne, C.1, Vic.
2ADZ	Wilson, V. H.,	15 Karori Flats, Elizabeth Bay Road, Elizabeth Bay, Sydney, N.S.W.
3FC	Clark, F. T.,	16 Mason Avenue, Elwood, S.3, Vic.
3CX	Brown, A. G.,	8 Mangarra Road, Canterbury, E.7, Vic.
6KM	Saar, A.,	193 Sixth Avenue, Maylands, W.A.

Amendments.

3DH—Morgan, I., C/o Station 3SR, Congupna Road, Shepparton, Vic.
2TI—Ryan, W. G., 21 Tunstall Avenue, Kingsford, N.S.W.

Cancellations.

2HI—Hailstone, F. H., 93 Muston St., Mosman, N.S.W.
5AL—Lum, A. D., 28 First Avenue, Joslin, S.A.
2FT—Tregurtha, F. C., 72 Upper Pitt St., Kirribilli, N.S.W.
3OQ—Pinkney, R. C., 348 Rathdown St., North Carlton, N.4, Vic.
5DQ—Horan, K. J., Prince Albert Hotel, Murray St., Gawler, S.A.
3FH—Melbourne High School Amateur Radio Club, Forrest Hill, South Yarra, S.E.1, Vic.
4WM—McNicol, R. W. E., 37 Florence St., Teneriffe, N.1, Qld.

Radio Ramblings.

(continued from page 12)

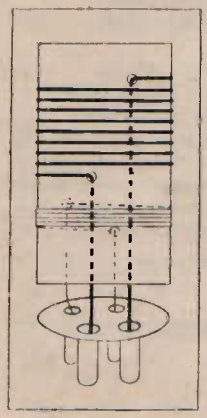
that runs round the picture rail or even under the carpet, but such are not to be recommended.

Fig. 4 shows the design of an indoor S.W. aerial that is capable of amazing results. The coupling transformer consists of two windings each of 10 turns of No. 18 enamelled wire wound on an inch and a half former.—A. G. Murray, Pakington Street, Geelong, Vic.

Regenerative S.W. Boosters.

(continued from page 16)

point. In no circumstances should the unit be allowed actually to oscillate, as in this event not only are results completely spoiled, but radi-



This sketch illustrates how the windings are put on the three plug-in coils that are needed to cover from 19 to 90 metres. Details of the number of turns for each coil are given elsewhere.

ation is likely to take place, interfering with reception of nearby listeners. If the regeneration control is intelligently handled there is no reason at all why this should ever occur.

BIG 5-METRE FIELD DAY PLANNED FOR MARCH 7

Five Mobile Stations Taking Part

By VK2VN

ALL amateurs and others interested in the ultra-high frequencies are advised that on Sunday, March 7, the Ultra-High Frequency Section of the W.I.A. (N.S.W. Division), is staging the biggest 5-metre field day yet held in this state. When arrangements are finalised it is hoped that there will be at least five mobile stations on the air.

The locations have not been definitely decided upon, but there will probably be a station at each of the the following places—Mount Victoria, the Gib at Bowral, Kurragong, Bulli and Mount Elliot. In addition to these, several Sydney stations, including 2LZ and 2NO, will be taking part, while 2BP will be on the air at Hazelbrook.

The occasion will afford amateurs and experimenters a unique opportunity to check up on the performance of equipment over greater distances than are possible under normal circumstances. It is hoped that all stations will be able to contact each other, though a master station will be operated at the most favourable spot to handle traffic if necessary.

Anyone interested should endeavour to attend the next meeting of the U.H.F. Section of the W.I.A., to be held at the Y.M.C.A. Buildings, Pitt Street, on March 4, at 8 p.m. Those who are unable to attend can obtain final details by writing the Section, Box 1734 JJ, G.P.O. Sydney, or by ringing Y 1928 (2VN). Reports would be greatly appreciated, and should be forwarded to the above address.

Activities Of The U.H.F. Section Of The W.I.A.

The Ultra-High Frequency Section of the Wireless Institute of Australia (N.S.W. Division), formed in October last to cater for all members interested in 28 m.c. and higher, has been making excellent progress lately.

Our first field day was held on January 24, when Mr. J. Moyle (2JU), accompanied by 2HZ and 2VN took a portable to Mount Elliot, which is about 800 feet high and 40 miles air-line north of Sydney. 2XP, 2TX and 2XL, of the Northern gang, had chosen the spot, and made the necessary arrangements with the owner.

The first aerial tried was two horizontal half waves in phase, with a stub in the centre and twisted pair feeders. Though this arrangement had worked well in Sydney beforehand, it was definitely not a success. However, changing to a vertical doublet made all the difference.

Immediately the receiver was switched on, 2LZ was heard at R8 with music, but unfortunately, although Con. was on all day for our benefit, contact was not established till late in the afternoon. 2NO was worked at various times throughout the day, his signals, coming from a Bruce array, being very strong.

2XK at Maroubra was also QSO'd, but signals were too weak at both ends. Other stations heard weakly were 2AZ and 2OD.

Monthly Meetings Held.

The general meetings of the Wireless Institute of Australia (N.S.W. Division), are held on the third Thursday in each month at the Y.M.C.A. The U.H.F. Section holds an additional meeting on the first Thursday at the same location. Everyone interested is cordially invited to attend.

A.C. MODEL — LIST OF PARTS

1—16 gauge aluminium chassis, 6in. x 4in. x 2½in., stamped and drilled as shown.
1—16 gauge aluminium panel, 6in. x 7in., drilled as shown.
3—wafer sockets, 2—4-pin, 1—octal.
1—23-plate midget variable condenser (Radiokes).
1—7-plate midget variable condenser (Radiokes).
1—15,000 ohm. wire-wound potentiometer.
1—double-pole double-throw toggle switch.
4—terminals, 2 red, 2 black (Dalton).
1—s.w. r.f. choke (Radiokes).
1—4-pin socket and length of 4-wire battery cable.
3—small knobs.
1—small vernier dial (Ormond).
3—4-pin coil formers.

RESISTORS.

1—1,000 ohm 1-watt carbon (Bradley).
1—5,000 ohm 1-watt carbon (Bradley).
1—25,000 ohm 1-watt carbon (Bradley).

CONDENSERS.

1—.00025 mfd. mica (Solar).
1—.01 mfd. tubular (Solar).
1—.1 mfd. tubular (Solar).

VALVE.

1—6J7 (Radiotron, Ken-Rad, Philips, Mullard).

MISCELLANEOUS.

1 doz. 6in. bolts and nuts; insulating washers for midget aerial condenser and potentiometer; push-back; midget grid clip.

BATTERY MODEL — LIST OF PARTS

1—16-gauge aluminium chassis, 6in. x 4in. x 2½in., stamped and drilled as shown.
1—16-gauge aluminium panel, 6in. x 7in., drilled as shown.
3—wafer sockets, 1—4-pin, 2—5-pin.
1—23-plate midget variable condenser (Radiokes).
1—7-plate midget variable condenser (Radiokes).
1—100,000 ohm potentiometer, with switch (Yaxley).
1—double-pole double-throw toggle switch.
4—terminals, 2 red, 2 black (Dalton).
1—s.w. r.f. choke (Radiokes).
1—5-pin socket and length of 5-wire battery cable.
3—small knobs.
1—small vernier dial (Ormond).
3—4-pin coil formers.
1—type 58 valve shield.

RESISTOR.

1—1,000 ohm 1-watt resistor.

CONDENSERS.

1—.00025 mfd. mica.
1—.01 mfd. tubular.
1—.1 mfd. tubular.

VALVE.

1—type 15 valve (Ken-Rad).

MISCELLANEOUS.

1 dozen 8-in. bolts and nuts; insulating washers for midget aerial condenser; push back; grid clip.

Leaves From A Dxer's Log-Book

World-Wide DX On Shortwave

By ALAN H. GRAHAM

January 22

Conditions just after 6.30 a.m. were quite good on 31m., on which band **I2RO** was putting in the best signal. **W3XAU** was easily the best for some time past—being a good R7. At 7 a.m. **GSC** came on the air with a very strong signal; while **W2XAF** and **GSB** opening at the same time were also at good speaker strength.

Just before 7 a.m. a medium signal was logged on 30.4m., and this proved to be Madrid **(EAQ)**. Just after 7 o'clock a talk in English was heard—the speaker vividly describing the havoc wrought by the aerial bombardments which have devastated the city.

Probably the best quality reception of the morning was from the 26m. Cuban station **COCX**, which gradually gained strength, peaking just after 8 a.m.

On 25m., **W1XAL** was easily the best station. Two other Americans on 19m. were also at good strength, namely **W8XK** and **W2XE.**

During the day conditions were very poor, not a single station being heard until 5.30 p.m., when the German stations **DJA, DJN** and **DJB** were logged. The last-named station's signals were R.max.

After sundown local QRM (an ever-present source of vexation) prevented reception above 16m. On that band, **DJE** was a point louder than **GSG**, while on 13m., **GSH** was R7 with very little fading.

January 23

Up before 6 a.m. this morning, and **ORK** was heard on 29m. at R6. Bad fading, however, marred reception.

Before the other bands could be examined, bad local QRM began, and continued for about an hour. At this time (7 a.m.) **W2XAF, GSC** and **GSB** were again best on 31m.

Again the best signals of the morning were from **COCX**: R9 at 8 a.m. with practically no fading.

W8XK and **W2XE** on 19m. were again very good.

January 24

Conditions on the whole were distinctly poorer than on the two previous days. Strangely enough the loudest signal of the morning was from a 19m. station not often logged here, **W2XAD**, whose programme of dance music was a good R8.

On 19m. **W2XE** and **W8XK**: on 25m. **GSD** and **W1XAL**: and on 31m. **GSB, GSC, W3XAU, W2XAF, DJN** and **I2RO** were only very moderate speaker strength.

Less regular stations logged were **DZC** on 29.16m., and the American 'phone station **WOF**. Located in Lawrenceville, N.J., **WOF** transmits on 30.77m.

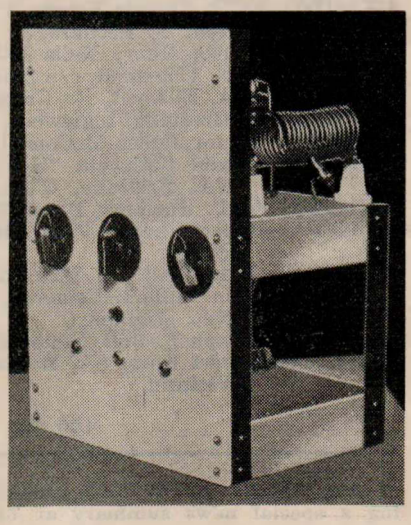
January 25

Reception during the whole day was very patchy. After **W3XAL** was logged on 16.87m., conditions took a very rapid turn for the worse. Only **W8XK** (19.7m.) and a couple of east coast American hams on 20m. were above R2-3.

W3XAL's signals at 6.45 a.m. were very good, and every word of the review of the flood situation in the Ohio valley could be copied.

During the rest of the day the only station audible was **ZMBJ,** the s.s. "Awatea," in communication with Wellington during her trans-Tasman crossing.

After 7 p.m. the noise-level—combination of static and local QRM—was unbearably high.



Special Features For Next Month's "Radio World"

Next month's "Radio World" will contain a complete description of the 53—6P6 two-band crystal-controlled transmitter illustrated above, while for set-builders there will be something outstanding in a three-band superhet designed around the new Radiokes Tri-Wave Coil Assembly.

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January 26

The outstanding feature of the morning was the improved reception on 25m. **W1XAL** was the loudest station there, but **GSD, TPA3** and **JZJ** (25.4m.) were also good. On 31 and 19m. the usual stations were heard, **GSC** and **W8XK** being outstanding.

Again conditions during the day were most disappointing — not a trace of any station was to be found.

A less vicious noise-level permitted an examination of the bands between 13 and 31m. between 7 and 10.15 p.m. **GSO, GSF, DJB, DJQ** and **TPA2** on 19m.: **GSG, DJE** on 16m.: **ZBW, DJA** and **GSB** on 31m.: and **JVN** were all audible. 19m. reception was easily the best.

January 27

W3XAL on 16m. was outstanding. **EAQ** and **COCX** showed a falling-off in strength.

At 9.30 a.m. the D.E.I. station **YDC** opening on 19.8m. with the 7 o'clock chimes (2½ hours behind E.S.T.) were R7.

Apart from this the only notable feature of the day's reception was the chimes (2½ hours behind E.S.T.) was **K6MDX** was heard at 11.30 a.m.

January 28

25m. was easily the best band this morning: **GSD** (R9), **W1XAL** (R7), **TPA3** (R7) and **JZJ** (R5).

19m. continued to deteriorate slowly —**W8XK** and **W2XE** being very poor.

W2XAF, GSC (31m.) and **YDC** (19 m.) held on much longer than usual, and were still audible after 10 a.m.

After 10 p.m. **COCQ** nearly wrecked the speaker with a terrific signal!! Nearly as loud was **JZI** on 31.4m.

January 29

The only feature of this day's reception was the nice signal of **CSW** on 27.2m. between 6.45 and 7.15 a.m. When first heard **CSW** was R7, and gradually improved to R9 just after 7 a.m. After 7.15 the signals rapidly faded out.

JZI, JVN, YDC, PLP (27.2m.), **DJB, DJQ, GSG, GSH** and **DJE** were all logged after 8.30 p.m.—and were all

at good strength except for **GSH** on 13m.

February 1

W2XAD turned up quite unexpectedly on 19m. at 6.40 a.m. Signals were only fair.

February 3

Good conditions on 19m. **W2XE**'s review of the flood situation was of considerable interest. The broadcast was from Memphis, Tenn., which is on the Mississippi, about 100 miles below Cairo, which was the centre of the flood at this time.

After 9 a.m. the 10m. amateur was found to be very fine. An East coast ham **W1DEY** was logged at fair strength — this being the first East coast ham heard on 10m. 'phone. Several other hams were logged, including **W5EZH** at R9.

At 8 p.m. the 20m. amateur band was fairly good, with **KA1ER** and **XU8HW** outstanding.

On 19m. **YDC** was exceptionally good with an entertaining musical programme on opening at 8.30 p.m.

February 4

ZBW on 31m. was easily the best station on the air to-night. On approx. 25.2m. a stranger was heard—was apparently a Japanese or Chinese. Signal strength was weak, and the station had to remain unidentified.

February 5

At 6 p.m., Berlin (**DFB**) was heard calling Bangkok on 17m. The amateur bands were good to-day: both 10 and 20m. **PK1RA** on 20m. was very loud at 9.45 p.m.

February 7

The 10m. amateur band was exceptionally good between 9 a.m. and 1 p.m.

In the evening, **ZMBJ** was heard on 34m. working Wellington: and a little later **GBC** (23.4m.) working **GFJY**, a ship station. Finally just about 10 p.m. **IBC** was heard calling Asmara.

February 8

Outstanding in this day's log was the logging of **CNR**, Rabat, Morocco, on 23.4m.: and the reception of a test programme from **VK6ME**, Perth, on 31.2m. A new amateur on 20m. was the Chinese station **XU3TT**.

February 9

An early surprise was a tremendous signal on 49.75m., originating from **Prague**. They were R9 at 6 a.m. At 7 a.m. **Moscow** opened on 50m. **JZJ** on 25.4m. was also good at 7.15 a.m. Towards noon, **VLZ** was heard calling **ZLT** on a new w/l.—22.4m. **CNR** was again audible at 8 p.m.: and at 10 p.m. the "Kanimbla" (**VK9MI**) presented an entertaining programme on 49.9m.

February 10

Two Americans were outstanding—**W2XE** (19m.) describing the Carnival at New Orleans: and **W1XAL**, presenting a special news summary at 7.45 a.m.

Another "mystery station" was heard on 25.6m.—a foreigner, heard at good strength at 7.30 p.m.

February 11

A nice batch of 20m. amateurs logged included **KA1JD, XU8HW, VS6AB, KA1BH** and **KA1AN.**

On 49.9m., **HPSK** was at good strength, opening at 10 p.m.

February 12

W2XAF's special Red Cross programme was heard at R7 between 4.30 and 6.30 p.m. Numbers were contributed by a large number of famous stage, screen and radio stars.

Two 'phone stations on 18m. were Shanghai (**XOJ**) and **Bangkok.**

February 14

HJ1ABP was heard testing on 31m., endeavouring without success to contact an American amateur, **W2GEZ.**

PHI, GSG and **DJE** were a good 16 m. trio at 10 p.m.

February 15

Another batch of 20m. amateurs—**HI7G, PK1MX, KA1MD, HK1Z, CO7CX, OA4R, PK1GL, CE1AH** and **XU8HW.**

During the afternoon **FZS**, Saigon, was heard calling Tokio on 16m.

February 16

A splendid programme from **PCJ** (19.7m.) was the high-light of the day's reception.

YDC, PLP, and **PMN** were all on the air at 9.15 p.m.

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AW114DX—J. A. Roe, 17 Tyrone Street, South Yarra, S.E.1, Victoria.
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AW129DX—James Ferrier, Winninburn, Coleraine, Vic.
AW130DX—Edward H. Barker, 713 Ferry Rd., Christchurch, N.Z.
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AW135DX—Vincent H. Leonard, 80 Charles St., Abbotsford, N.9, Vic.
AW136DX—Reuben Henry Neils Jolley, 120 Hargreaves St., Castlemaine, Vic.
AW137DX—L. F. Thiemann, c/o Star Theatre, Cunningham St., Dalby, Q'land.
AW138DX—S. A. Ellwood, c/o Chippindall's Pharmacy, Bundaberg, Q'land.
AW139DX—A. Greening, Inglewood, Taranaki, New Zealand.
AW140DX—Hector James McConnell, c/o 104 Grove St., Nelson, N.Z.
AW141DX—Ronald Bothwell, "Henwin," Lower Bowen Terrace, New Farm, N.I., Brisbane, Q'land.
AW142DX—G. P. Hawkins, Deven St., New Plymouth, N.Z.
AW143DX—Robert Charles Viner, 48 Terrace St., Paddington, W.2, Brisbane, Q'land.
AW144DX—A. B. Liedl, 187 Dawson St., Lismore, N.S.W.
AW145DX—John William Cameron, 10 Morrin St., Ellerslie, Auckland, S.E.6, New Zealand.
AW146DX—Joseph F. Bull, State School, Beria, W. A.
AW147DX—Robert King, c/o Mordialloc House, Centreway, Mordialloc, S12, Victoria.

(to be continued).

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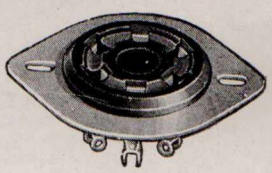

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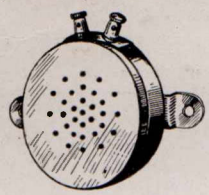

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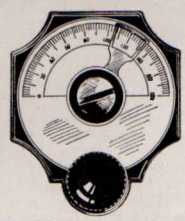

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