

THE  
AUSTRALASIAN

AUGUST 2, 1937  
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# Radio World

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



—See Page 8.

- "SKY-KING DUAL-WAVE FIVE": "JONES' SUPER-GAINER TWO":
- 7-WATT LOW-COST HIGH-FIDELITY AMPLIFIER: MULTI-BAND
- CRYSTAL-CONTROLLED TRANSMITTER: LATEST SHORTWAVE NEWS



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JOB YOU WON'T  
HAVE TO DO...**

*if you buy an*

No more recharging of a heavy accumulator—with consequent blank periods while this is being done—if your new set is "AIR CELL OPERATED."

Fitted with an Eveready Air Cell, which with normal use gives you over a year of uninterrupted reception—does not deteriorate when not in use but maintains constant voltage at the correct level for perfect reception—needs no attention at all and is no more trouble than an all-electric set.

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CELL** ★  
OPERATED  
RADIO



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| TASMA      | S.T.C.    |
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| STROMBERG- | SYMFONA   |
| CARLSON    | VELCO     |
| ARISTOCRAT | PARAMOUNT |
| (E.S.M.)   | STERLING  |

★ **EQUIPPED WITH AN**

**EVEREADY  
AIR CELL**

THE  
RADIO  
PIONEERS

# Fear's Radio News

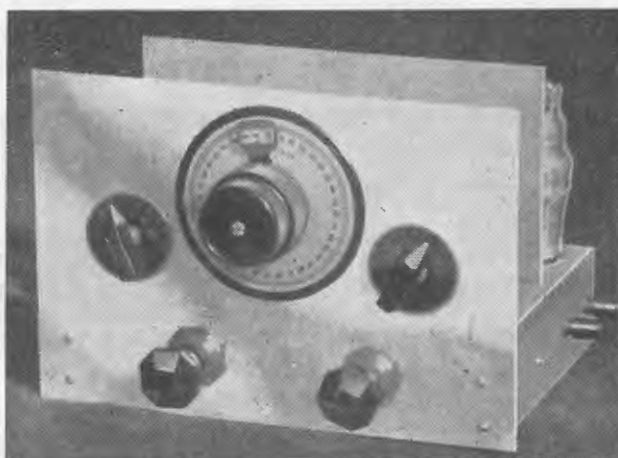
F. J. W. FEAR & CO. - - - - 31 Willis Street, Wellington  
New Zealand :: Telegrams: "FEAR"

FEAR'S  
FOR  
EVERYTHING  
IN RADIO

An Advertisement inserted by F. J. W. FEAR & CO., New Zealand.

## World-Famous Two-Valve Superhet A Wonderful DX Getter

★  
"JONES  
SUPER-  
GAINER  
TWO"  
★



Although only a brief description of the "Super-Gainer" was given in last month's "Radio World," hundreds of amateurs and set-builders have already decided to build this amazing performer.

Using a 6F7 as combined regenerative first detector and r.f. oscillator, and a 79 twin triode as second detector, B.F.O., and audio amplifier, the "Super-Gainer" has adequate sensitivity and selectivity for world-wide DX.

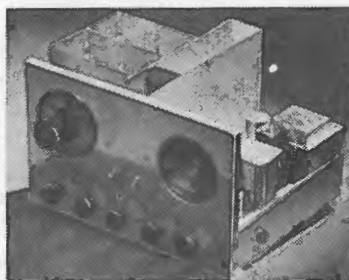
Its straightforward, simple construction and excellent results will appeal to those who have been looking for a high performance receiver that is inexpensive to build.

Get busy now! Order your parts from Fears'. Our price for the complete kit, including 'phones, valves, and coil formers, £7/10/-

### "AMATEUR COMMUNICATIONS EIGHT"

For those who require high performance with comfort, this receiver is ideal.

The "Amateur Communications Eight" possesses many attractive features for dxing, such as:—A high



degree of selectivity, high useable sensitivity (i.e., minimum noise level), good frequency stability, and ample band-spread.

A full description and a list of parts appeared in the "Radio World," June and July issues. Our kit of parts is exactly as specified. Price, complete with valves, speaker and coil formers .... £15/15/-

### "SKY-KING DUAL-WAVE FIVE"

The "Sky-King," a newcomer to the dual-wave field, is fully described in this issue of the "Radio World." For a receiver costing so little, it has many desirable features for the home builder. Construction is extremely simple, using an inexpensive coil kit, and first-class results are guaranteed.

In the original "Sky-King," performance left nothing to be desired; selectivity is excellent, and sensitivity is equal to that of many commercial "sixes." We can supply a complete kit of parts, with valves and speaker for .... £9/15/-

### "EAGLET ALL-WAVE TWO"

This fine little receiver (described in the "Radio World," June issue) is just the set for the shortwave enthusiast. It is an excellent performer, yet it is simple and inexpensive to build; in fact, it can be easily put together in an evening. Every part supplied in our kit is of first quality, and is exactly as specified by the Editor. Our price for the complete kit, including valves, 'phones .... £5/-/-

### WE CAN HELP YOU

For many years now we have specialised in catering for set-builders, amateurs, experimenters—in fact, for everyone and anyone interested in radio. But our interest in you doesn't end after supplying your requirements—we will help you through with the job until you're one hundred per cent. satisfied. A staff of qualified technicians is maintained to give you service—to advise where necessary, perhaps to design receivers or transmitters to suit your needs, maybe to help you smooth out "bugs" in sets you've built and cannot get operating satisfactorily. Whatever you want, or whatever your problems, write us. WE CAN HELP YOU!

## Editorial Notes . . . .

The unexpected death of Mar-  
chese Marconi on July 20 last came  
as a tragic surprise to the whole  
world. As the man who pioneered  
radio as we know it to-day, Marconi  
has done incalculable good for hu-  
manity, and the gigantic network of  
broadcasting stations and radio com-  
munications systems that covers the  
globe to-day will form an everlast-  
ing monument to his memory.

A brilliant thinker, Marconi was  
at the same time far more than a  
man of exceptional scholastic attain-  
ments. A visionary, he had as well  
the ability to apply his ideas in  
practical form, and in this combina-  
tion of the theoretical and practical  
lay his genius.

One of Marconi's early associates  
and lifelong friend was Sir Ernest  
Fisk, chairman of directors of  
Amalgamated Wireless (A/sia) Ltd.,  
who, speaking from London by radio  
telephone the day following Mar-  
coni's death, paid the following  
tribute to the great inventor's  
memory:—

"By the death of Marconi the  
world has lost one of the most illus-  
trious figures and one of the great-  
est benefactors of our generation. I  
have also lost a beloved friend and  
leader of many years' standing.

"It is astonishing to contemplate  
the enormous range of human ac-  
tivity in which Marconi's work has  
become applied during his lifetime,  
and perhaps even more remarkable  
to consider the fruits yet to be  
gathered from the great science and  
industry pioneered by Marconi. He  
was a great scientific visionary, who  
always saw ahead the possibilities  
and the means for developing bene-  
ficially the use of electro-magnetic  
waves in the ether. First to protect  
human life and property at sea and  
to overcome the isolation previously  
associated with seafaring life, he  
then attempted, in the face of scien-  
tific opposition, to span the oceans,  
and succeeded magnificently, and  
later he caused his waves of intelli-  
gence and goodwill to cover the  
great distance between the Old  
Country and Australia and then to  
encircle the world.

"He discovered the principles which  
enable thousands of wireless sta-  
tions to work simultaneously with-  
out mutual interference, and then  
proceeded to develop that most ef-  
ficient system known as the Wireless  
Beam, by which we can send electro-  
magnetic waves in any direction we  
choose.

(Continued on page 47)

# THE AUSTRALASIAN RADIO WORLD

Incorporating the  
**ALL-WAVE ALL-WORLD DX NEWS.**

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

Vol. 2.

AUGUST, 1937.

No. 4.

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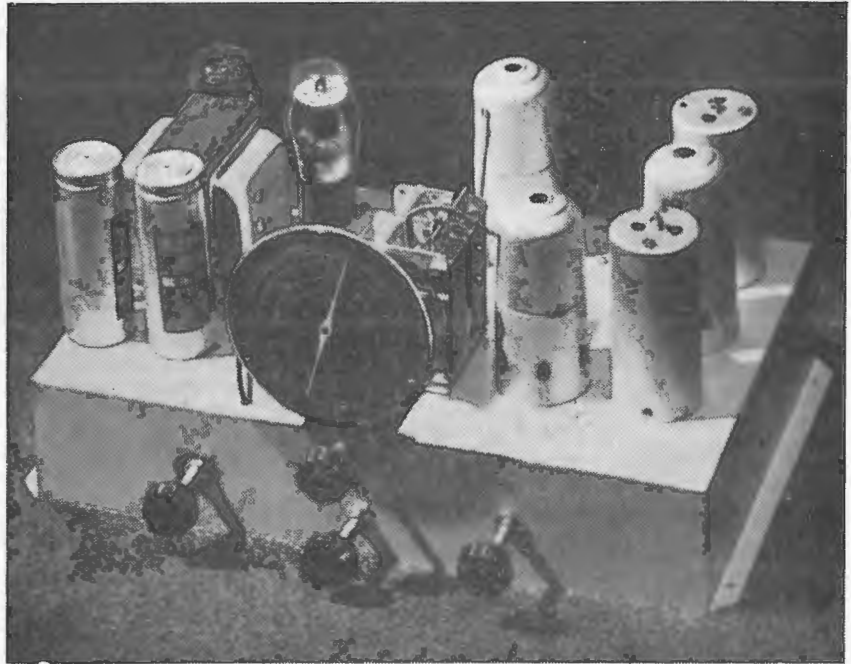
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★

An a.c. dual-wave superhet designed for maximum performance from five valves. A new type of coil kit, with iron-cored i.f.'s., gives high gain on both bands, while excellent tone is ensured by the use of inverse feedback.

★



The . . .

## “Sky King Dual-Wave Five”

DESIGNED along the lines of the best-selling type of receiver in Australia to-day—the 4/5 dual-wave superhet—the “Sky King Dual-Wave Five” is certain to be widely popular among set-builders. An excellent performer on both bands, it is nevertheless particularly cheap to build, as a complete kit of parts, including valves and speaker, can be bought for £10/19/6.

The “Sky King” is not “just another 4/5 dual”; correctly built and aligned, it will out-perform most commercial sets in its class. As well, due to the use of inverse feedback applied to the output stage, tone is far superior to that given by receivers using the usual single pentode output arrangement.

### New Foxradio Coil Kit

The “Sky King” was designed around the new Foxradio coil kit

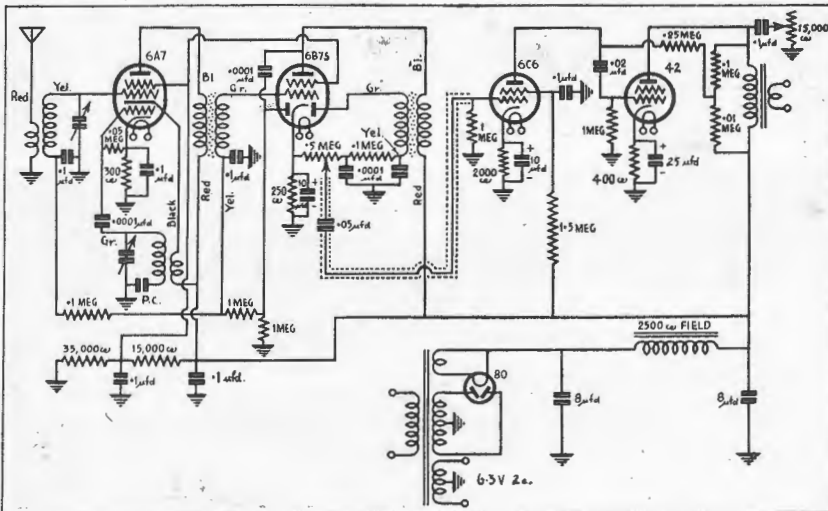
lately released by Messrs. Fox & MacGillycuddy, of Sydney. The kit, which is illustrated elsewhere, comprises a dual wave unit and two iron core i.f. transformers. The coil unit consists of dual-wave aerial and oscillator coils mounted on a steel bracket, together with padder, trimmers and wavechange switch.

Simple in construction, yet mechanically rigid, the unit has been designed for a minimum amount of shielding consistent with stable performance, thus keeping the efficiency high. Silver-plated contacts ensuring positive connections are a feature of the wavechange switch (also used for automatic dial light switching).

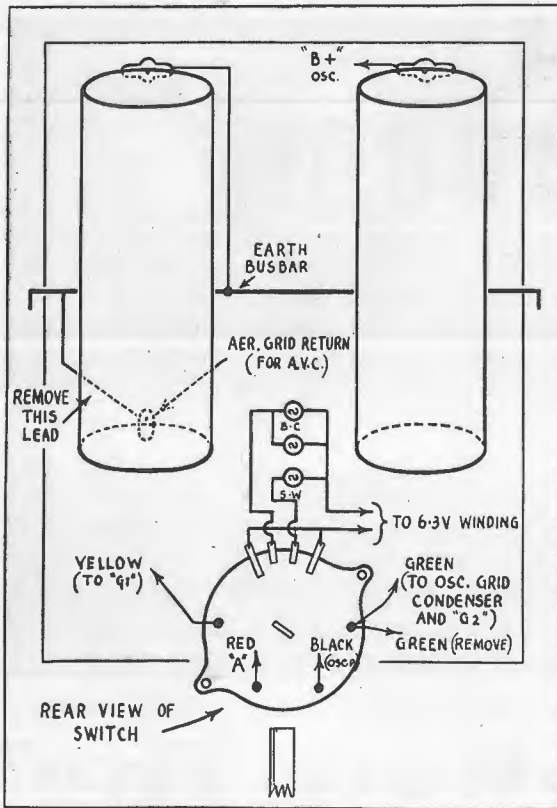
The unit is very simple to mount and wire, as the connecting leads provided are all colour-coded. Four mounting bolts are supplied, but if desired these can be removed (as in the “Sky King”) and single-hole mounting employed. The iron cored i.f. transformers are also colour-coded, the coding being indicated on the circuit diagram.

### Circuit Uses Inverse Feedback In The Output.

The circuit used follows very closely that of the “Fidelity Broadcast Five” (described in the Jan-



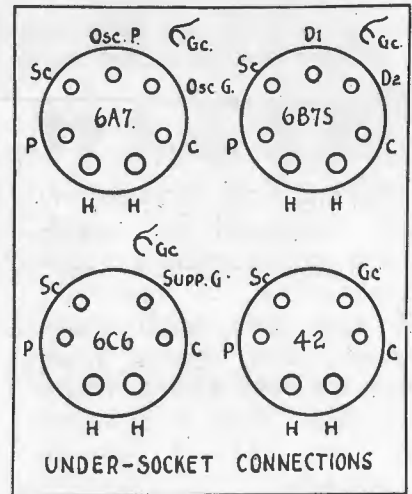
The circuit of the “Sky King Dual-Wave Five.”



★

The sketch on the left shows the wiring of the dual-wave coil unit, including that for the automatic dial light switching. "G1" and "G2" represent the fixed plates terminals on the aerial and oscillator sections of the condenser gang. Under-socket connections for the valves are shown on the right, while below is a rear view of the completed receiver.

★



always useful, in that it enables a fair amount of "mush" to be eliminated.

**The Construction Outlined**

The components to mount first are the power transformer and power socket, together with the valve and speaker sockets. The heater wiring can then be put in, as follows:— From the "6.3v. 2a." terminals on the power transformer panel, run a pair of twisted leads to the heater terminals of the 42 socket. From here, run a further pair of leads to the 6B7S, then to the 6A7, and lastly to the 6A7.

Next, the rectifier socket is wired by running one pair of twisted leads from the "5v., 2a." lugs on the p.t. (continued on page 8)

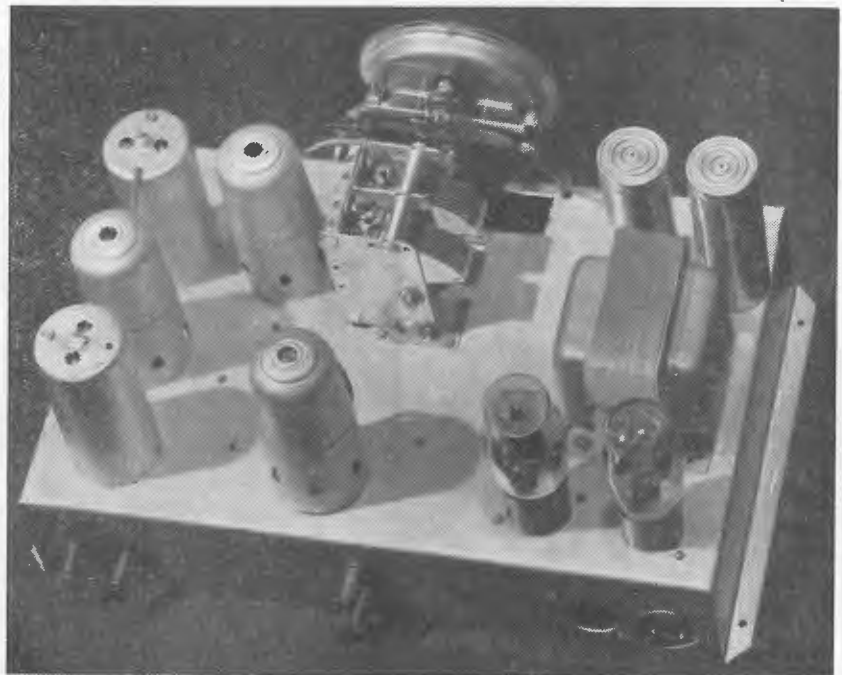
uary issue), except that the single 2A3 used in the output of this receiver has been replaced in the "Sky King" with a 42 using inverse feedback.

The valve line-up of the "Sky King" is as follows:—6A7 mixer-oscillator, 6B7S combined i.f. amplifier, diode second detector, and a.v.c. voltage generator, 6C6 first audio stage, 42 output pentode with inverse feedback and 80 rectifier.

Circuit features include the use of iron-cored i.f. transformers (for greatest gain and highest selectivity), delayed automatic volume control (applied to the 6A7 and pentode section of the 6B7S), and a single pentode output circuit using inverse feedback.

The advantages of inverse feedback as applied to circuits of this type were fully covered in an article in the May issue. Briefly, the main advantages are a considerable reduction in the comparatively high percentage of distortion given by single output pentodes, and improved stability. Actually, the quality of reproduction given by the "Sky King" is far superior to that obtainable from the usual "straight" pentode arrangement, and to many listeners would be regarded as indistinguishable from the output of a receiver using a single 2A3 in the output.

The tone control provided is an optional refinement, in that reproduction normally is well-balanced, with no trace of harshness. However, for DX work a tone control is





An attractive QSL card from VE5HA, owned and operated by Fred Taylor, of New Westminster, British Columbia.

# HAM JARGON . . .

In the March "Radio World" an article was published listing and explaining some of the more commonly-used "ham" abbreviations. A further list is given below.

By D. E. EVANS

THESE are many technical or semi-technical words and phrases employed in amateur 'phone communication that are mystifying to the uninitiated. For instance, if you hear a "ham" say he is using a "Johnson Q," a "half wave vertical," a "zepp," a "signal squirter," a "Hertz," etc., you'll know he is referring to the type of antenna he employs for transmitting.

The numbers you hear are types of transmitting tubes which are used in

the various stages of the complete transmitter — the speech amplifier, the modulator, the oscillator, the doubler, the buffer, and the final amplifier. The "final" is connected to the antenna "feeders" or "transmission line" through a "tank" coil. One tube is said to "feed" or "drive" another, and that's exactly what they do.

The complete transmitter is called the "rig," and, as you have probably observed, the location of the station is

always referred to as "the shack," no matter whether it is in the cellar, an upstairs room, the garage, sun parlour or the best room in the house. Then there is that mystifying word "skip." It is an abbreviation of "skip distance," the area on the surface of the earth over which a signal jumps. A signal with a short "skip" returns to earth within a short distance; one with a long skip may not hit the earth for a distance of 1,000 miles or more.

(continued on page 48)

## Some Commonly-Used "Ham" Abbreviations

AGN	Again	ES	And	MTR	Meter	TKS	Thanks
ANI	Any	EVY	Every	N	No.	TNX	Thanks
ANT	Antenna	EZ	Easy	NITE	Night	TR	Their, there, or prefix for position report
ARL	Aerial	FM	From	NO	Know	T	The
AUD	Audible	FONE	Phone	NR	Number, near	TS	This
B	Be	FR	For	NT	Not	TT	That
B4	Before	FREQ	Frequency	NTG	Nothing	TU	Thank you
BCL	Broadcast listener	FREAK	Frequency	NW	Now	U	You
BD	Bad	GA	Go ahead	OB	Old boy	UR	Your
BI	By	GB	Good-bye	OM	Old man	URS	Yours
BK	Break	GE	Good evening	OW	Old woman	VY	Very
BLV	Believe	GG	Going	OPR	Operator	WD	Word, would
BN	Been	GM	Good morning	PSE	Please	WDS	Words
BTR	Better	GN	Gone, or good night	PUR	Poor	WEN	When
C	See, Correct or yes	GND	Ground, earth	PWR	Power	WID	With
CANS	Headphones	GUD	Good	PX	Press, news	WK	Work, weak, week, well known
CHGS	Charges	GUV	Giving	R	Received	WKD	Worked
CKS	Chokes	GVG	Giving	RAC	Rectified A.C.	WKG	Working
CKT	Circuit	HAM	Amateur	RCD	Received	WL	Will, wavelength
CL	Call	HD	Had	RCVR	Receiver	WN	When
CLD	Called	HI	Laughter, Exclamation	RX	Receiver	WO	Who
CLG	Calling, or closing	HR	Here, hear	RDO	Radio	WT	Wait, what, watt
CN	Can	HRD	Heard	RITE	Write, right	WUD	Would
CNT	Cannot	HV	Have	RPT	Report, repeat	WV	Wave
CPSE	Counterpoise	I	I understand	SA	Say	WX	Weather
CUD	Could	ICW	Interrupted c.w.	SEC	Second	XMTR	Transmitter
CUAGN	See you again	INPT	Input	SED	Said	XPLN	Explain
CUL	See you later	KNW	Know	SEZ	Says	YDA	Yesterday
CUM	Come	LTR	Later, letter	SHUD	Should	YF	Young female
CW	Continuous wave	MANI	Many	SIGS	Signals	YL	Young lady
DA	Day	MG	Motor generator	SKED	Schedule	YR	Your
DNT	Do not	MI	My	SRI	Sorry	YRS	Yours
DX	Distance	MK	Make	SPK	Speak, spark	73	Kind regards
ERE	Here	MO	Master oscillator	SUM	Some	88	Love and kisses
EM	Them			TDA	To-day		

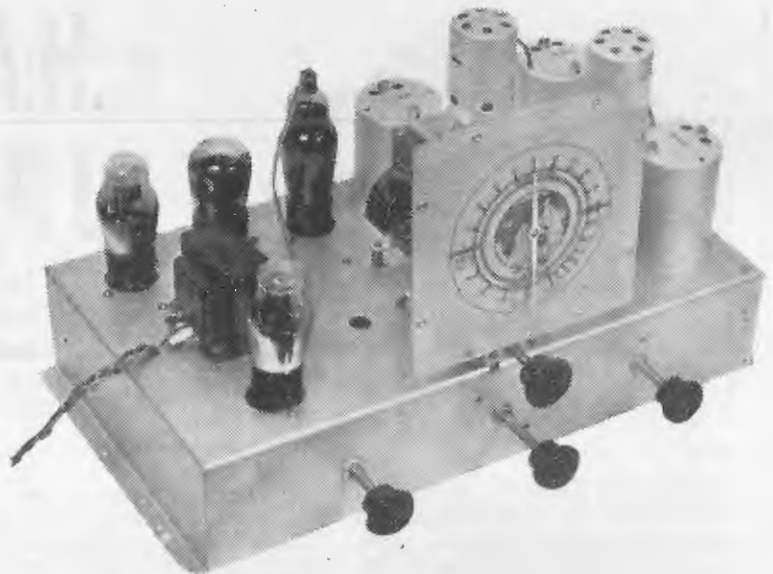
The Crown ...

**Air-Cell**

**PENTAGRID**

**SEVEN**

**A powerful dual-wave battery-operated superhet specially designed for Air-Cell operation.**



**T**HE Crown "Air-Cell Pentagrid Seven" is a receiver that is undoubtedly destined to become one of the best sellers for 1937, for apart from many other attractive features, it has been specially designed for operation from the new Ever-Ready Air-cell. Introduced to this country early this year, the Air-cell has rapidly jumped into popular favour as an economic and trouble-free source of filament supply for country radio set owners.

#### Useful Life Of 1,000 Hours

With a drain of .65 ampere, the Air-cell has a useful life of 1,000 hours, increasing proportionately with lower drain. The current rating quoted above is the maximum per-

missible, but with present-day low consumption valves, the margin is ample.

For example, this new Crown kit-set, using seven valves, draws a total filament current of only .59 ampere, which is well within the limit specified. On this drain, a life of about 1,100 hours can be expected from the Air-cell.

#### Two-Stage High-Gain I.F. Amplifier

The Crown kit illustrated uses the following valve combination:—KK2 octode frequency changer, two 1A4's in a two-stage i.f. amplifier, a 1K6 diode detector, a.v.c. and first audio amplifier, resistance-coupled to a B217 or PM2DX triode, driving a

pair of 30's in class "B" push-pull. Automatic volume control is incorporated, and is applied to the two 1A4's in the i.f. amplifier.

#### Economical Running Cost

Despite the extremely high overall sensitivity of the "Pentagrid Seven" and its powerful class "B" output stage, it is particularly economical to run, as at average volume the total "B" drain is only 15 mills. As well, the kit is very reasonably priced, the complete kit of parts (less valves and speaker) retailing at £11/10/-. For maximum gain and selectivity on the broadcast band, the coil kit incorporates iron core broadcast coils.

#### Foundation Kit Available

As an alternative for those builders not requiring the complete kit-set, or who are planning to re-build an existing receiver, the Crown Foundation Kit, type KO-2B, is ideal. This is priced at £6/12/6, and consists of the following:—

- 1 Dual-Wave Coil Unit.
- 3 Intermediate Transformers.
- 1 D/W Dial Calibrated to suit Kit.
- 1 Ready Punched Chassis, as used in KS-D7B Kit Set.
- 1 Stromberg-Carlson F2 Gang Condenser.

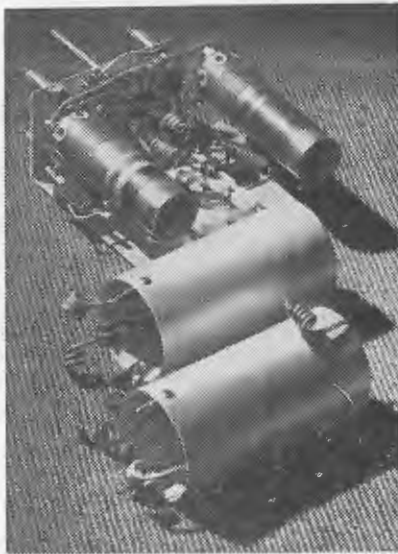
The Crown "Pentagrid Seven" can be recommended as a receiver that will give an excellent all-round performance, equivalent to that of many commercial a.c.-operated receivers. Those interested can obtain complete details, comprising circuit, photographs and full assembly instructions, by writing to the Crown Radio Manufacturing Co. Pty. Ltd., 51 Murray St., Pyrmont, Sydney, N.S.W.

The latest catalogue of Crown products will shortly be available, and readers are also invited to send for a copy to the above address, enclosing a 2d. stamp to cover return postage.



A cut-away view of the Ever Ready Air - Cell, showing the internal construction. The oxygen needed as a depolariser is absorbed from the air and supplied to the cell by the two carbon "breathers."





**NEW**  
**FOXRADIO**  
**COIL KIT**  
 MAKES  
**SKY-KING**  
 POSSIBLE !

An improved type of dual-wave coil kit using a minimum of shielding, resulting in greatly increased all-round efficiency. Designed to fit directly under the mixer-oscillator socket, all leads are kept short and direct, ensuring best possible performance on the short waves.

FOXRADIO type DKI 465 K.C. Coil Kit comprises Dual-Wave Aerial and Oscillator Coils, with two iron-core 465 k.c. intermediates. **65/-**  
 Retail Price .....

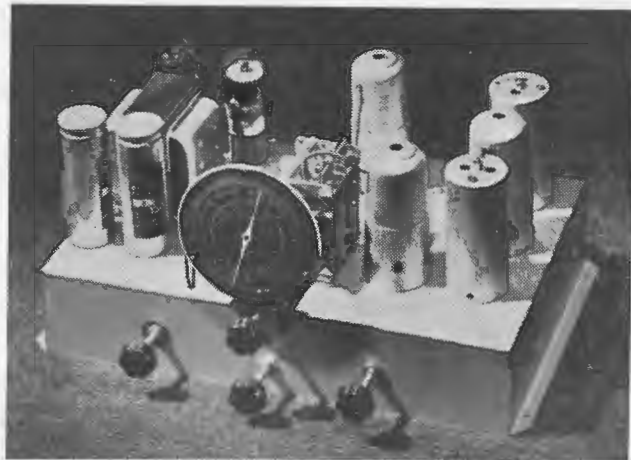
**SKY-KING**  
**DUAL-WAVE FIVE**  
*makes kit-set history!*

Breaking all records for ease and economy of construction, coupled with amazing all-round performance, the "Sky-King Dual-Wave Five" is a set anyone can build . . . with perfect results.

Using the new FOXRADIO Coil Kit, wiring is greatly simplified—in fact, the set can be completed in only a few hours. Despite its advanced design and outstanding features, the "Sky-King" can be built for only £10/19/6 (valves and speaker included). Take advantage of our speedy mail order service — goods packed and despatched within 24 hours of receipt of your order.

**Retail Price - £10-19-6**

SEND NOW FOR THE  
**1937 FOXRADIO CATALOGUE**



**FOXRADIO**

**FOX & MacGILLYCUDDY LTD.**

MERINO HOUSE, 57 YORK ST., SYDNEY. Tel.: B 2409.

**"SKY KING DUAL-WAVE FIVE"—List of Parts.**

- 1—steel chassis, 15in. x 9½in. x 3in., stamped and drilled as shown.
- 1—power transformer, 60 mill. upright 5v.2a., 6.3v.2a., 385v./385v. (Radiokes)
- 1—d.w. coil kit, with 2—465 k.c. i.f.'s. (Fox-radio).
- 1—2-gang condenser (Stromberg-Carlson).
- 1—dial (Radiokes).
- 4—knobs.
- 3—valve shields.
- 2—7-pin wafers, 2-6-pin, 2-4-pin (Stromberg-Carlson).
- 4—terminals, 2 red, 2 black (Dalton spring type).
- 1—power socket and plug.
- 1—power cable and plug.
- 3—grid clips.
- CONDENSERS :
- 4—0001 mfd. midget mica (Simplex)
- 1—.02 " tubular "
- 1—.05 " " "
- 7—.1 " " "
- 2—10 dry "electrolytics, 25v. working
- 1—.25 " " "
- 2—.8 mfd. wet "electrolytics, 450v. working.

- RESISTORS :
- 1—250 1-watt carbon (Bifrost)
- 1—300 " " "
- 1—400 " " "
- 1—2,000 " " "
- 1—10,000 " " "
- 1—15,000 " " "
- 1—35,000 " " "
- 1—50,000 " " "
- 3—.1 meg. 1-watt carbon (Bifrost)
- 4—.1 meg. 1-watt carbon "
- 1—1.5 meg. " " "
- 1—15,000 ohm potentiometer (Microhm, Radiokes).
- 1—.5 megohm potentiometer (Microhm).
- SPEAKER :
- 1—2,500 ohm field, to match single 42. (Rola).
- VALVES :
- 1—6A7, 1—6B7S, 1—606, 1—42, 1—80. (Radiotron, Philips, Raytheon, Mullard).
- MISCELLANEOUS :
- Push-back, 2 doz. ⅜in. bolts and nuts, sheilding, solder lugs, 3—6.3v. dial lights.

**"Sky King Dual-Wave Five"**  
(continued from page 4)

panel to the filament terminals of the 80 socket, and another pair from the "385v., 60m.a." lugs to the remaining two terminals (plates) on the 80 socket. Next, a pair of leads is taken from the power socket to the "C" and "240v." lugs. The "E" and all "C.T." lugs are connected together and earthed to the chassis.

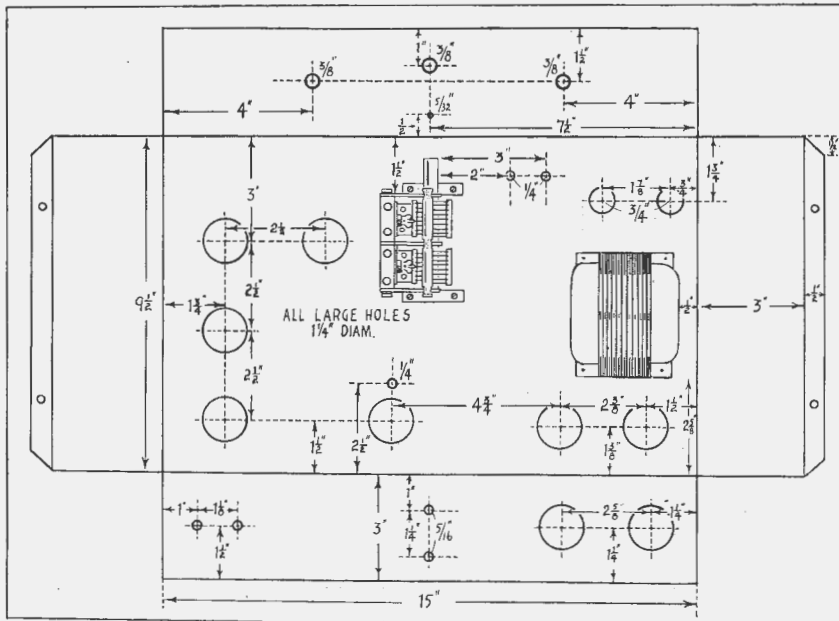
The remainder of the components, with the exception of the dual-wave coil unit, can now be mounted, and the wiring completed. The last stage of the assembly is the mounting and wiring of the coil unit (connections for the latter are shown in a separate sketch).

Experienced builders will have no difficulty in completing the receiver

from the data given. However, for those who are not confident of their ability to wire the set from a circuit diagram, a sketch showing the wiring in full will be published next month, together with further instructions in regard to the assembly, wiring and alignment.

**This Month's Front Cover**

This month's front cover photograph shows a No. 1 W/T R/T radio station of Cavalry Divisional Signals, Australian Corps of Signals, in action. These portable stations can be set up and put into operation by two men in three minutes.



Dimensions for preparing the chassis are given in this sketch.

**"Fluttering" On The Short Waves**

**Cause And Suggested Cures**

THE cause, together with an effective cure, of the peculiar "fluttering" effects sometimes experienced during shortwave reception are outlined in an article published in Philips Technical Communication (No. 59).

Relaxation oscillations, it is stated, occur in many cases on the short-wave band when the volume is increased, whereas broadcast reception may be quite satisfactory. This phenomenon is usually due to frequency drift in the converter valve, and it occurs more or less in almost every mixer arrangement.

**Voltage Fluctuation Is Cause**

Relaxation oscillations can be attributed to the following cause:—When a strong signal is impressed on the power valve, the average plate current rises a little, this being the unavoidable result of the curvature in the valve characteristic. This additional current drain brings about a slight drop in the voltage from the power pack, with a consequent change in the voltages applied to the various electrodes of the mixer valve. The voltage drop does not occur at the same time as the increase in current drain, because the buffer action of the filter system brings about a slight delay.

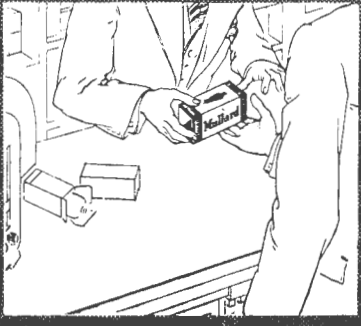
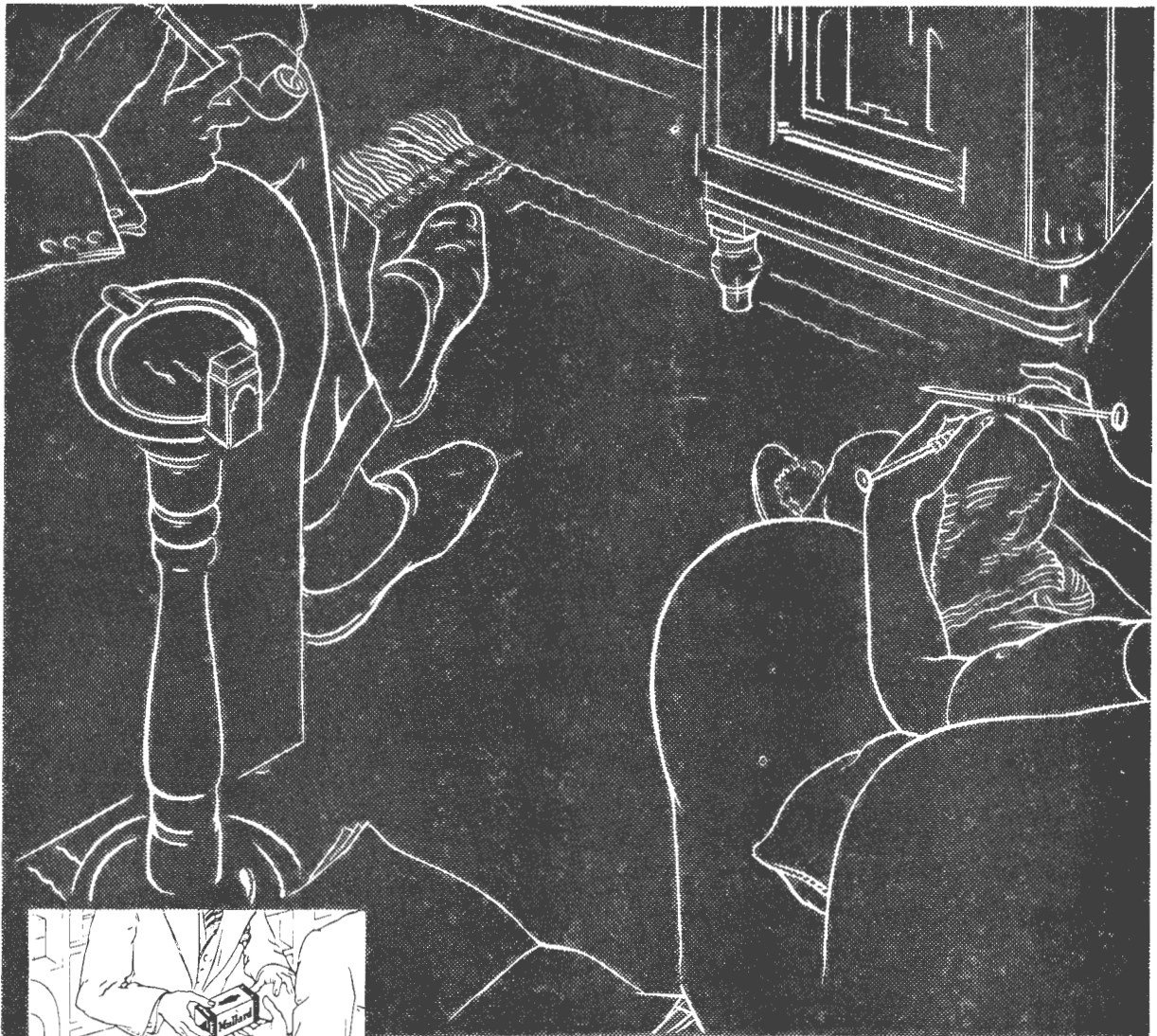
The alteration in voltages applied to the oscillator causes a change in oscillator frequency (frequency drift) so that the frequency passed to the plate circuit is no longer exactly equivalent to the intermediate frequency (assuming that this was originally the case). This change in output frequency at the converter causes a reduction in the amplitude of the signal delivered to the power valve, i.e., provided that the frequency drift is of sufficient magnitude in comparison with the normally flat peak of the I.F. resonance curve.

Reduced signal strength at the power valve allows the plate current to return to its original value, and after a time the D.C. voltages at the converter follow suit. The oscillator then re-adjusts itself to the correct frequency and the same process is repeated all over again, so that the plate current of the output valve rises and falls periodically and the volume fluctuates at the same time.

**Avoiding Frequency Drift**

The question is: What are the important factors that determine whether this effect will occur or not? A mixing circuit which is not prone to frequency drift will obviously have little tendency to generate relaxation oscillations. The use of an output valve with as straight a characteris-

(continued on page 48)



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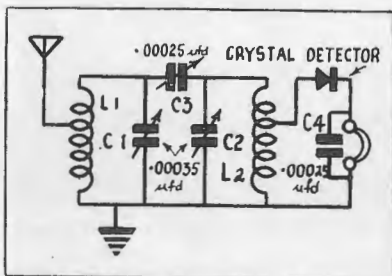
18M7

# Radio Ramblings

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

## Crystal Set With Bandpass Tuning

I received my certificate and badge in good order, and am enclosing postal note for 50 report forms. Although I can make plenty of time to



read your admirable magazine, the "Australasian Radio World," each month, I don't seem to be able to devote much time to dxing lately.

I am enclosing a circuit of a really selective crystal set. It will be noticed that two coils and condensers are used, the coils being separated as far as possible and placed at right angles to keep the coupling at a minimum. The coils are then coupled together by a small semi-variable condenser, which controls the selectivity of the set. A 2-gang condenser simplifies tuning the set.

The coils are wound on cardboard tubes 2 in. in diameter and 3 in. long. Each coil is wound with 75 turns of No. 28 enamel-covered wire, and a tap is made at the 55th turn from the earthed end.

The values of other parts and their positions are shown in the diagram, and follow standard practice. I think this circuit should interest some of the many readers of the "A.R.W."—M. W. Eglington (AW268DX), Murwillumbah, N.S.W.

## Handy Trouble-Shooting Torch

First I wish to congratulate you on the high standard you have maintained through your first 12 months of publishing your very fine magazine. As all other readers have said, it is a magazine we have been waiting for.

I have built the "All-Wave Bandspread Two" described in the September issue of your magazine. The first week I had it I logged 120 stations, all amateurs, including VK's 2, 3, 4, 6, 7, W's, K6's, KA's, and PK3WI.

I like the "Radio Ramblings" very much, and also VK2NO's "25 Years In Amateur Radio." Here's an idea for "Radio Ramblings."

Take an electric gas-lighter and remove the heating element supplied.

Insert a 2.5 volt globe in its place. This arrangement allows one to probe into dark recesses in a chassis for stray bits of solder, nuts and bolts, etc.

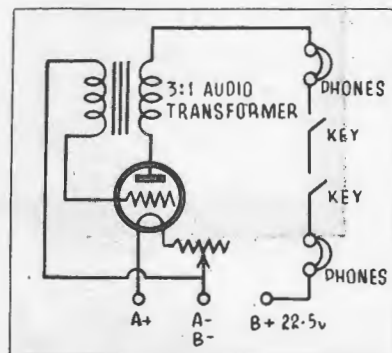
Here's wishing the "Radio World" another successful year.—Thomas P. Gardner, Broken Hill, N.S.W.

## "Break-In" Code Oscillator

I was very pleased with the July issue of the "Australasian Radio World" and enjoyed reading every page of it.

I was very interested in the "Amateur Communications Eight" and also in the "Jones Super-Gainer Two," which is more in my line, and I have already made enquiries in regard to a kit of parts for this fine receiver. I am enclosing a small hint which may be suitable for publication. It is a two-way code practice set, using a conventional one-valve audio oscillator.

By employing two sets of headphones and two keys, two-way communication and "break-in" may be



had. The operator standing by should close his key, and the message will then be heard by both operators. Should the operator standing by wish to break-in, it is only necessary for him to open his key, then nothing will be heard in either set of headphones and the transmitting operator will know that the receiving operator has opened the circuit in order to break him.—C. W. Marley (AW-150DX), Sth. Brisbane, Q'land.

## NEW Cabinets from U.R.D.

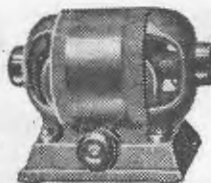


Above—The Model 602 . . . Height 37½ in., Width 36 in., Depth 13½ in.  
A. Typical U.R.D. Cabinet.

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### S.W. Converter Uses 224 And 227

I am enclosing a circuit and data on a two-valve converter which I have used for some time, and have found to be excellent. Perhaps some "Radio World" readers would like to build a converter—if so, I can recommend this job. I have used it for a considerable time now, and have heard 32 countries with it.

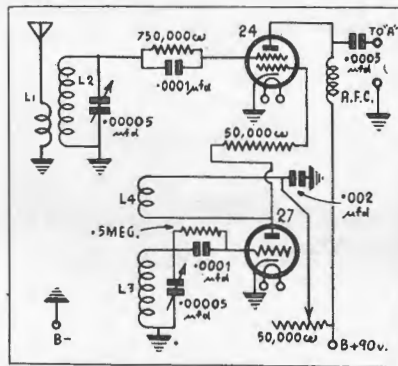
Although the valves are of the older variety, they function just as well as the latest types, such as the 57 and 56. (The 24 detector functions in a space-charge arrangement). If 6-volt valves are used, the 77 and 76 are just as good.

I built this job on an aluminium chassis and front panel, which eliminates hand capacity, especially on the higher frequencies, although hand capacity is not noticeable above the 20-metre "ham" band if a wooden front panel is used.

The chassis is 7 in. wide and 9 in. long, and the panel 7 in. wide and 8 in. high, both being made out of 16-gauge aluminium. The coil sockets are mounted at the back (detector coil to the left, oscillator coil to the right) and the valve sockets to the front (224, left, 227, right).

The most critical tuning condenser is the oscillator, which is mounted in the middle of the panel and is con-

trolled by a good vernier dial. The other tuning condenser and the potentiometer are mounted underneath the chassis (former on the left, latter on the right). The tuning of



these controls is not critical, and plain knobs can be used.

There is a 4-pin UX valve socket situated at the back of the chassis, and the leads from the heaters, "B+" and "B-" are connected to the lugs. A four-pin plug is needed, with four leads to convey the supply to the converter. If a separate power supply is not used, the required "juice" can be taken from the receiver. I used a separate filament transformer for the heaters, which can be procured for about 6/- from

any leading radio house. For the "B" supply I used a Philips eliminator, 3002 type. Three terminals are also needed, one for antenna to converter and two for connecting the converter to the receiver.

Keep wiring in converter as short as possible, and bring all earth leads to a common point. All coils are close-wound with 22 gauge D.C.C. wire, the spacing between the windings being about 1/4 in. The 13,000, 8,000 and 7,000 k.c. coils are wound on old 4-pin valve bases, but the 5,000 and 3,500 k.c. coils are wound on standard 1 1/4 in. coil formers.

Following is the coil data:—

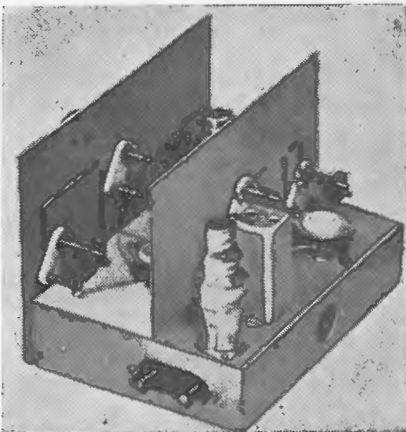
Band.	Number of Turns.			
	L1	L2	L3	L4
3,500—4,000 k.c.	15	30	30	10
5,000—7,000 k.c.	12	16	20	9
7,000—7,300 k.c.	7	12	13	6
8,000—13,000 k.c.	7	8	9	4
13,000—19,000 k.c.	5	5	5	3

The r.f. choke is an ordinary broadcast choke.—Cecil Howard (AW-29DX), Maryborough, Q'land.



### High Fidelity Circuit Wanted

I am looking for a real high fidelity circuit for a set that I am going to build, and would like to know if you have ever published a suitable circuit in any of the past issues of your



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## “Jones’ Super-gainer Two”

Designed by Frank Jones, of "Radio," who has been responsible for several excellent s.w. sets during the last few years. Uses a 6F7 as combined 1st detector and oscillator, a 79 acts as 2nd detector, B.F.O. and audio stage. The "Super-Gainer" can be operated off either batteries or a power supply.

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book, or will be in the next couple of months, or if you could give me a circuit and a few details of a set as follows.

It must be a musical instrument with absolute fidelity first, with triode valves (no pentodes) in class "A" or "AB" push-pull, with no less than 12 watts output. Magic eye tuning, automatic volume control, no knife-edge tuning as this ruins reproduction, any number of valves up to about eight, and it does not matter about long-distance reception, so long as I can get all locals with perfect reproduction. Pick-up connections are wanted, as I intend the set to be used as a gramo-radio combination. I shall be using a Rola G12 high fidelity speaker, and also, if it improves results in the output stage by way of reducing harmonic distortion, I would like the circuit to use fixed bias with a separate rectifier. On looking through the Radiotron valve book, I find that by using 2A3 valves in push-pull and with fixed bias, an output of 15 watts with only 2½ per cent. harmonic distortion can be obtained, and this output arrangement is about what I want.

If you are unable to supply me with a complete circuit and details, I would be pleased if you would give me the circuit of a completely high fidelity radio frequency end of a set, as this is the main end that is giving me trouble.

About a month ago I bought the January issue of your magazine, and it is the article on the "Fidelity Broadcast Five" that prompted me to write this letter.—C. V. Jessel, Coburg, Victoria.

[The circuit of an amplifier using push-pull 2A3's, giving 7 watts output with negligible total harmonic distortion, is published elsewhere this month, while reference is made in the article accompanying it to a 15-watt amplifier using fixed bias. The tuner portion of the "Fidelity Broadcast Five" can be recommended for use in front of either of the above audio channels.—Ed.]



### Relaxation Type B.F.O. Unit

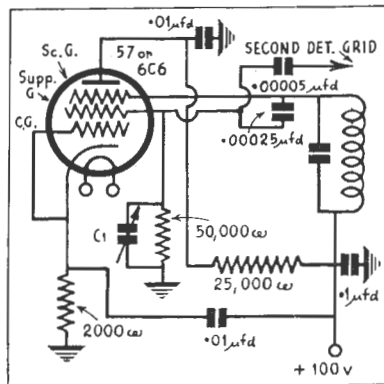
I am enclosing a circuit of a beat frequency oscillator unit that can be recommended to amateurs and short-wave enthusiasts. It is a relaxation type of oscillator and has the advantage of simplicity, in that no separate reaction winding or cathode tap is necessary in the tuned circuit. The arrangement is also very stable, and has low harmonic content.

It will be noticed that the screen grid is more positive than the plate. The latter should have about 22½ volts applied to it, and the former from 75 to 100 volts.

The I.F. coil and condenser are tuned approximately to the I.F. frequency, and should preferably be

shielded. Front panel control of the b.f.o. frequency can be obtained by the 5-plate midget condenser "C1" connected across the 50,000-ohm suppressor grid leak to earth. Bending a corner on a rotor plate makes a convenient switch to cut out the b.f.o. for 'phone reception.

Output from the unit can be taken from the suppressor grid in the form of a short length of hook-up wire, with its free end twisted once or

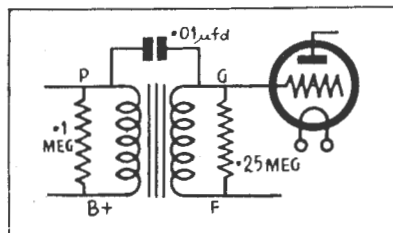


twice around the second detector grid lead.—J. C. Thomas, Newcastle, N.S.W.



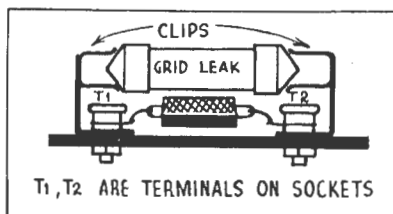
### Three Handy Wrinkles

Here are a few tips for the "Radio Ramblings" page. If the primary of an audio transformer burns out, an easy way to effect a repair is by the



use of a .25 meg. resistor, a .1 meg. resistor, and a .01 mfd. condenser. All are connected as shown in the sketch.

Grid clips can be put to a useful purpose such as holding grid leaks, as shown in diagram. The clips are



fitted on to the valve socket at a convenient position and the grid leak is placed in between them.

To re-sensitize a crystal, soak it in a saturated solution of alum and

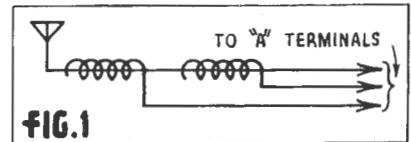
water for about 20 minutes. Then take out and allow to dry.

I get the "Radio World" every month, and it is the very best magazine I have seen. I enjoy the "Radio Ramblings" page best of all.—A. G. Bird, Pennant Hills, Sydney.



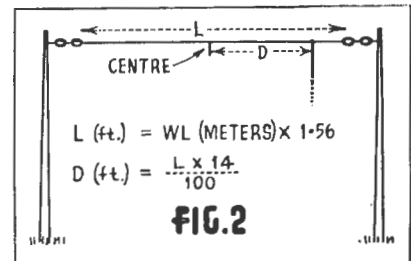
### Two Aerial Tips

Here are two "wrinkles" on aerials that readers will perhaps be in-



terested in. The first is a method to connect any number of receivers, tuned to different frequencies, on to the same aerial. The lead-in is taken direct to the least sensitive set (in our case a crystal receiver).

Then over the lead-in at the various points closest to the other re-



ceivers, a layer of adhesive tape is wound on. On top of each, a coil of 12 to 20 turns is placed, one end going to the aerial terminal of the set. This is done for as many sets as are desired to be hooked in. Complete the job by winding a further layer of tape on top of the coil. With such an aerial it will be found that the signal to noise ratio is improved. The diagram should make things clear (fig. 1).

The second "kink" shows a way to construct an aerial that is resonant to any particular frequency. The aerial is an ordinary "T" shape. The length (in feet) is found by multiplying the wavelength in metres by 1.56. The distance of the lead-in (D) from the centre = 14% of "L", e.g., the 49-metre aerial has "L" = 76.44 feet and "D" = 10.7 (see fig. 2).

I hope that you will keep up the good work you are doing. I am particularly interested in the Jones' "Super-Gainer."—K. P. Mackinnon (AW189DX), Watson's Bay, Sydney.



### Stamp-Collecting Dxters Should Exchange With Overseas Listeners

With the present "boom" in stamp-collecting and the apparent dearth of foreign stamps in Sydney, it has occurred to me that a good medium

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for procuring foreign stamps can be established through radio. It is not often that two hobbies can be brought together, but here is a definite case.

Being an ardent collector myself and knowing the fancy prices one has to pay for good stamps in Sydney, I hit upon the plan of including in my reports to foreign amateurs an invitation to exchange foreign stamps with me; also meters or franking machine stamps.

Stamps that were hard to procure here were asked for in exchange for Australian stamps, and the response so far has been very gratifying. Through this medium I have added to my collection many copies that would otherwise probably never be seen here. This applies particularly to American stamps. As our stamps are fairly expensive in America, the American collectors are only too glad of a chance of exchanging a set, or a mixture, of their own stamps for a set of Australians. For instance, one amateur in U.S.A. sent me 100 meter stamps and a variety of commemoratives.

As an alternative, if the amateur is not a philatelist he may know of someone who is, and a gentle hint in this direction will often bring results—I obtained an exhibition set by this method from the "YL" friend of a "ham" to whom I sent a report.

One of my amateur friends in New

Zealand has been sending me stamps for the past twelve months, and I have him to thank for my good collection of New Zealand stamps. He is not a philatelist himself, but he collects every stamp he can for me and posts them across. The duplicates I "trade," or exchange, for other stamps, and so my collection continues to expand at practically no cost.

Each new "ham" logged can be approached in the same manner, so that DX hunting becomes doubly interesting, in that one is enjoying two hobbies at the one time. The more DX stations that are logged, the more chances you have of obtaining a reliable correspondent who will supply your needs in philately when new issues of stamps are released.

In conclusion, I would be pleased to hear from any reader who would care to exchange stamps with me, or who has duplicates for sale. I hope this article may create a desire on the part of readers to follow my example in this regard, and so derive a double pleasure while listening in to exclusive DX stations.—H. Whvte-Meach (AW69DX), Artarmon, N.S.W.

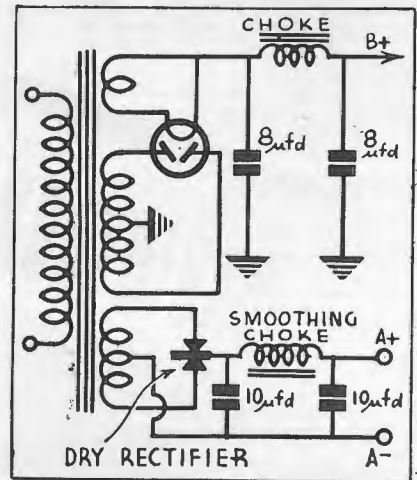


**"A" And "B" Eliminator**

I am sending a tip which I think will be of interest to other readers

of your fine radio magazine.

Battery-set owners who would like to use A.C. mains for their sets without having to re-wire can use the circuit shown. By using a heavy



duty dry rectifier with an "A" choke and filter, it is possible to get approximately 2v. D.C. from a centre tap, 6.3v. secondary, while for plate supply 175v. can be easily obtained. In my case I used an American type B-12 rectifier.—George Brown, 21 Opoia Road, Hamilton, N.Z.

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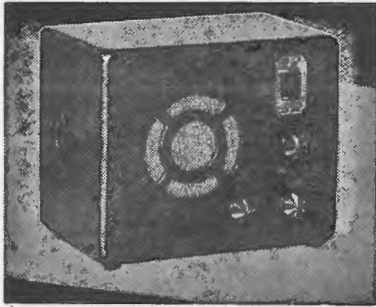
N.S.W.: Radio House Pty., Ltd., Sydney; Martin de Launay, Ltd., Sydney; Bloch and Gerber, Ltd., Sydney; Fox and Macgillycuddy, Ltd., Sydney; John Martin, Ltd., Sydney; Electric Service Co., Newcastle.  
Victoria: Australian General Electric Ltd., Melbourne; Arthur J. Veall Pty., Ltd.

Queensland: J. B. Chandler and Co., Brisbane.  
South Australia: Radio Wholesalers, Ltd., Adelaide.  
West Australia: Carlyle and Co., Perth.  
Tasmania: Noyes Bros. (Melbourne) Ltd., Launceston.

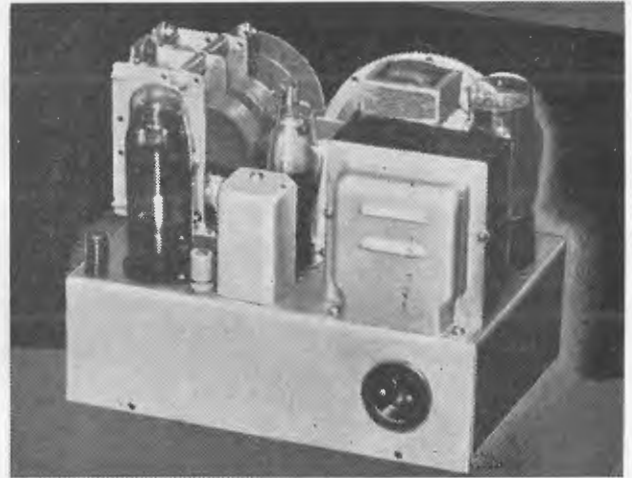


New Zealand: New Zealand Electrical Equipment Co. Stocks available from Turnbull and Jones, all branches.





★  
Two views of the "Companionette Three" described in the March "Radio World." This compact three-valver is housed in a midget cabinet measuring only 10 in. x 8 in. x 6¼ in.



## Trans-Tasman Reception With "Companionette"

### "R.W." Reader's Report

By D. E. EVANS

THE "Companionette Three," featured in the "Radio World," is an excellent little receiver—I have built four of them to date. Perhaps the following pointers gained by experience may be of use to others.

Difficulty will be experienced in obtaining the Efco Cameo midget dial for which the cabinet is cut. [Further stocks will be available shortly.—Ed.]. However, the Radiokes Royale dial fulfils requirements. To cover the hole intended for the Efco dial with the Radiokes Royale, it is necessary to move the gang condenser ½ in. towards the front of the chassis, and lift it ⅞ in. When completed, leave the pointer behind the scale, this gives the effect of a shadow moving round the scale, and is very effective.

The speaker should be mounted early to facilitate wiring in the shielded lead running from the speaker transformer to the plate terminal of the EL3. A great deal of trouble will be avoided if the "B+" insulated pillar is mounted early—a suggested position for this is on one of the mounting bolts for the condenser gang. The fixed tone control condenser on the plate of the EL3 will be found most suitable if left at .01 mfd.

An additional embellishment for the "Companionette" is the substitution of the Yaxley potentiometer as listed by a pot. with switch combined. The switch should be wired in one of the mains leads going to the primary of the power transformer.

This idea will be particularly appreciated where the receiver is to be used in a sick room.

In aligning the "Companionette," the midget semi-variable coupling condenser on the r.f. coil will be found at peak efficiency when screwed right in for maximum gain—the improvement in selectivity which is available by opening the condenser in most locations is not sufficient to justify the loss in gain sustained. The selectivity of this little set is far better than that found with any other t.r.f. receiver of similar type.

#### Some Test Results

When tested at Cairns, North Queensland, at 7 p.m., with an aerial stretched from the back verandah to the garden fence, about fifty feet away, and with a maximum height of fifteen feet from the ground and using no earth, the following results were obtained. The local station 4CA spread over approximately 35 degrees of the dial, but as the receiving location was only a couple of hundred yards away from 4CA, this was only to be expected.

Interstate reception had not been expected until darkness had fallen, but the following stations (signal strengths indicated) were received quite easily on the speaker. Adelaide, 5CK and 5CL (R7); Melbourne, 3LO and 3AR (R7); Sydney, 2BL (R8); Brisbane, 4QG (R9+); Wellington, N.Z., 2YA (R7).

This check was made in daylight in an area noted for its static troubles, but the noise level was exceedingly

low, scarcely any interference being noticed. At 10.30 p.m., when the local station had closed down, it was possible to log about twenty interstate "B" class stations at strengths varying from R5 to R max.

Tested at Brisbane at 10.30 p.m., the receiver duplicated its Cairns performance minus 2YA, which was not on the air at that time. The aerial used in this test was a transmitting antenna, 40 m. half-wave Zepp., and using an earth connection. With the local stations at a greater distance than at Cairns, quite a galaxy of programmes was available, Adelaide "A" class pushing through with the volume control turned well back.

The tests at Sydney and Melbourne duplicated the Brisbane results.

The "Companionette," correctly lined up to a suitable antenna, will out-perform any commercial t.r.f. receiver of its own class, and definitely out-classes many of the so-called "bargain" superhets of three to five valves.

#### Zero Beat Radio Club Notes

By "Ragle"

During this month the activities of the club have been hampered by very bad weather conditions. The proposed Field Day at Carramar was postponed, and a series of wet week-ends prevented work on the club antenna system. However, in the shack the transmitter for 20 and 40 metres is taking shape, and will be on the air in the near future.

YL's are now admitted as members of the club, and lectures on radio theory and morse code practice are given at the special class for A.O.C.P. candidates, held each Tuesday evening at the club rooms, 54 Station Street, Newtown. The General Secretary, Mr. T. R. Priestly, will be pleased to give further details.

# YL Radio Enthusiast Builds 15-Valve S.S. Super

## Cathode Ray Oscillograph and 40-Watt P.A. System Form Part of Lavishly-Equipped Workshop.

ONE of the latest members to join the All-Wave All-World DX Club, conducted by the "Radio World," is Miss Evelyn Curnow, of Surrey Hills, Melbourne, Vic.

Feminine radio enthusiasts are few and far between, but Miss Curnow is not only a keen dxer; as well, she is an experienced technician, and builds her own receivers. Furthermore, these are not simple one and two-valvers, but nothing less than 12 and 15-valve single signal superhets. As well, she has designed and built a 40-watt rack-and-panel P.A. system and cathode ray oscillograph, and, as the accompanying photographs show, has a workshop packed with advanced equipment of all kinds.

In a recent letter to the "Radio World," she writes:—

My new 15-tube receiver, which is almost completed, uses two 6K7 r.f., 6L7, 6K7 osc., two 6K7 i.f. 6H6 det., 6F5, 6F5, 6F6 P.P. class "A", 5Z3 rect., 6K7 B.F.O., 6K7 a.v.c. amp., 6H6 a.v.c. rect., 6K7 signal meter tube. The circuit follows that in the A.R.R.L. Handbook. My present set is a 12-tube S.S. super, which uses a 6D6 r.f.; 6A7 mixer, 6C6 oscillator, crystal filter to 6D6 i.f. and signal meter tube (meter calibrated from R1 to R9), 6D6 2nd i.f., 75 2nd detector and A.V.C., 6C6 beat oscillator, 75 driver, 42 as triode to 42's in push-pull class AB as triodes (fixed bias) delivering 20 watts to Rola G12 speaker.

### Severe QRM Mars Reception

We are situated about 8 miles from Melbourne City, and as the name of the suburb implies, we are in among the hills—in a valley. This, combined with the fact that our shack is completely surrounded by trees, and that the QRM from local power machines, refrigerators, etc., is of higher noise level than local stations on the average 5-valve superhet, shows that we are up against a big problem when chasing DX. Naturally, therefore, the only solution is a large "super" with extreme sensitivity and variable intermediate selectivity.

With the receiver adjusted correctly I have no difficulty in receiving the majority of DX stations barely audible in any part of Australia. My log for the past three years shows reception of about 30 W1's, 80 W2's, 60 W3's, 120 W4's, 75 W5's, 160 W6's, 45 W7's, 95 W8's, 35 W9's, 15 W10's, 50% of all VK's, 155 ZL's, 85 VE's, 40K's, 30Z's, 18 F's, 3 CX's, 15 Z's, ZT and ZU's, 8 PK's, 4 CN's, 85 XE's, 75 J's, 17 G's, 12 D's, 1 VRI, 2 VS's, 3XU's, 15 CM and CO's, 1 VS7, 2 K7's, 2 LU's. All these figures refer to amateurs only.

### 40-Watt P.A. System

For the past three years I have been operating my receivers and equipment from a business and entertainment angle only, but as I now have more time at my disposal, I feel the DX bug creeping into my veins, so I am anticipating many happy hours chasing that elusive DX.

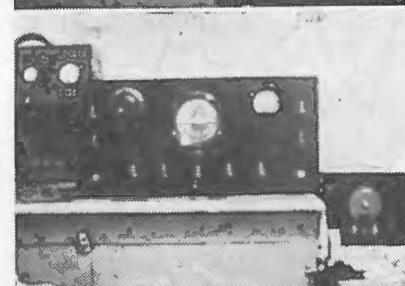
Readers may be interested in the 30-watt rack and panel which appears in one photograph. This is a conservative rating, as it is capable of 40 watts with 5 per cent. harmonic distortion, and is substantially flat in frequency response from 35 to 13,000 cycles. Valves used are two 75's, as crystal, velocity and dynamic pre-amplifier, which feeds into the

(Continued on page 46)

Some views of Miss Curnow's workshop. In the top photograph can be seen her 12-valve "s.s. super" with its 20-watt amplifier and speaker field supply. On the right is a 7-valve communications t.r.f. receiver.

In the next photograph is the 40-watt rack-and-panel P.A. system, with crystal, Reiss and dynamic microphones on top. There are five platforms: Top half of top panel, A.C. gramo motor and piezo pick-up; lower half of top panel, fader controls. Second panel, R.F. portion (5v. dual-wave superhet). Third panel (with plate meter) amplifier. Fourth panel, pre-amplifiers. Bottom panel, three power packs for speaker fields.

The centre photograph shows (left to right) an analyser, 15-valve s.s. super, signal generator, c.r. oscillo-



graph and power amplifier for the 12-valve s.s. super. The photo below shows a close-up of the 15-valve receiver.

The bottom photograph shows Miss Curnow at the controls of her 12-valve s.s. super.

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If the very best costs you no more and is just as easy to get everywhere, why bother with unknown, unbranded, unguaranteed lines? Insist on Radiokes.

These popular Radiokes Components for "Wireless Weekly's" PENTAGRID SEVEN are components that will automatically guarantee easy assembly and brilliant performance. There is not the slightest doubt that Radiokes Components set the standard of excellence unapproached in Australia. Their technical perfection and ex-

pert manufacture are a permanent guarantee of trouble-free service and constant satisfaction.

Follow the lead of Australia's largest radio manufacturers. Standardise your assembly on Radiokes. Even the smallest set is improved. You'll get MORE FOR YOUR MONEY with the Pentagrid Seven . . . better value, better performance, better appearance, and all-round improvement in everything. There is no substitute for Radiokes quality. ASK for and SEE that you get Radiokes.

## COIL ASSEMBLY

Radiokes type DWA-10B. A special type dual-wave coil assembly supplied without gang condenser. The broadcast coils are Litz wound in "Pi" sections. For operation on 16-50 and 200-550 metres. Aerial and oscillator coils only are included. Easy to wire in. Quickly and simply aligned. Completely guaranteed. Adjudged by radio engineers as the finest coil assembly of its kind in Australia.

## DIAL

Radiokes D.C.1 Colourvision World-range Dial Scale calibrated in metres for broadcast and short-wave bands with the principle Australian stations and International Short-Wave Bands clearly indicated.

## I.F.'s

Radiokes type P7/465B. High efficiency I.F. transformers, designed for high selectivity and extra efficiency. Coils are Litz wound on low-loss tubing, and the large can diameter makes this a very efficient air core unit. Tuning condensers are of the low-loss Isolantite type. The Pentagrid Seven uses three of these fine I.F. transformers.

## AUDIO

Radiokes type AFB. Extensive research into alloy cores and transformer designs, coupled with the fact that Radiokes have been making audio equipment for 12 years, has enabled the production of this transformer—second to none for performance and reliability. Expert knowledge and long experience is built into every unit.

**AUSTRALIA'S LARGEST FACTORIES STANDARDISE ON RADIOKES**

# High Fidelity Amplifier Uses Pushpull 2A3's

WHEN highest fidelity is required in an audio amplifier, it will generally be found that triode power valves are chosen, and this is the reason why the "Fidelity Broadcast Five," described in the January "Radio World," used in the audio section a 6C6 high gain amplifier driving a single 2A3 in the output. By combining pentode sensitivity and triode fidelity in this way, an amplifier giving an output of 3.5 watts with negligible distortion was obtained.

However, it can be appreciated that there are certain applications in receivers where a larger output is desirable, and in this respect a pair of 2A3's in pushpull form a very attractive combination. It has generally been found that an audio transformer is necessary in order to provide sufficient grid swing for this arrangement, but as a result of development work recently completed in the laboratory of Amalgamated Wireless Co. Pty. Ltd., it is now possible to use a resistance-coupled arrangement throughout which gives an excellent frequency response with a minimum of distortion.

The circuit given below was taken from the latest issue of "Radioelectronics" (Technical Bulletin No. 77), issued by A.W. Valve Co. Pty. Ltd., while an extract from the article accompanying it is given below.

## 7 Watts With Low Distortion

Tests made over the complete amplifier operating from an input of 0.24 volt into a loud speaker load gave a power output of 7 watts with a total harmonic distortion not rising above 2.5% under all conditions. A considerable part of this distortion is second harmonic; the higher audio harmonics are almost completely absent and the circuit may be regarded as giving, under all conditions, less distortion than is audible to the human ear.

Due to the use of Radiotron 6C6 as a high gain resistance coupled pentode, together with a similar valve operating as a triode phase splitter, it has been found possible to operate over a very wide range of audio frequencies extending from below 30 to over 10,000 cycles per second.

## Economical Class A Arrangement Adopted

When experiments first commenced, Class AB1 operating conditions were investigated, but it was found necessary with this arrangement to feed the loud speaker field coil in shunt with the receiver and to adopt a very good regulation power supply and filter. These difficulties led to the

Details of an inexpensive amplifier that will deliver 7 watts of high fidelity output (total distortion below 2.5 per cent.) are given in the accompanying article.

adoption of a pure Class A condition in which the loud speaker field can be used for filtering purposes, and a very economical design is therefore possible.

Another advantage of Class A operation is that the audio harmonics are extremely low and barely measurable. Further advantages are that self-bias can be used without the necessity for a cathode by-pass capacity, as is necessary in self-bias Class AB1, and that the power stage is much more easily excited, since it needs a smaller voltage from grid to grid.

## 15-Watt Amplifier Planned

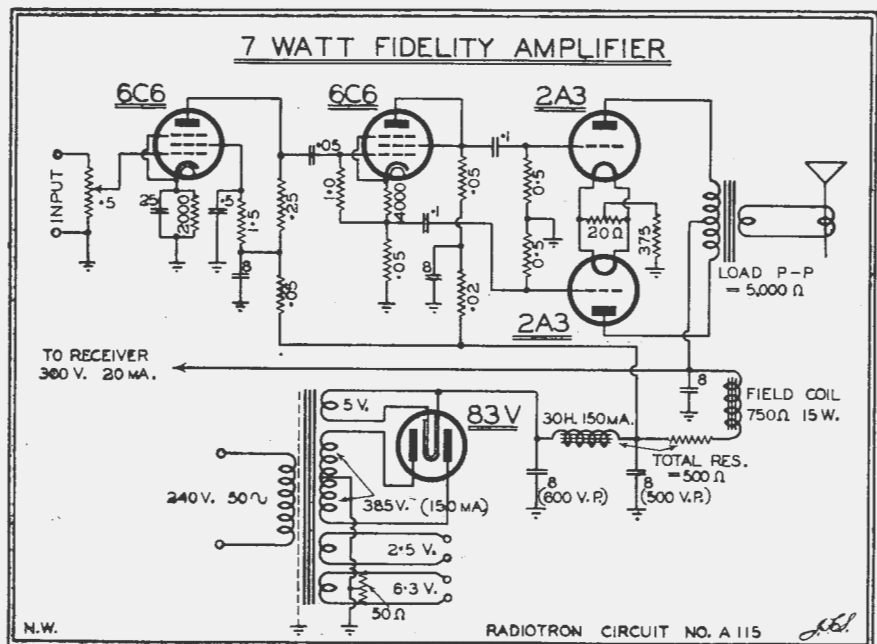
It is hoped that at some later date it may be possible to describe a push-pull 2A3 amplifier giving 15 watts output on fixed bias and incorporating a special method of driving the output stages without exceeding their maximum grid resistance of 50,000 ohms for fixed bias. In the present amplifier only 250 volts are required on the plates and 45 volts for grid bias, which, together with the drop

in the speaker transformer, only amounts to slightly over 300 volts supply voltage. Radiotron 83V has been adopted as a rectifier valve, since it enables a standard transformer 385-385 volts 150 m.a. to be used, together with standard electrolytic condensers, while still permitting the loud speaker field to be connected in the plate circuit.

Since the amplifier is capable of responding to very low audio frequencies, it is essential that the power supply should be adequately filtered, and a two stage filter is used in which the loud speaker field forms one of the chokes and a separate power choke the other. Additional smoothing is obtained for the earlier stages by the use of dropping resistors and separate 8 mfd. condensers.

## 6C6 Triode Is Phase-Splitter

In order to obtain sufficient voltage for the grids of the 2A3's it was decided to use a phase splitting valve with equal resistors in the plate and cathode circuits. The input to this stage is, between grid and earth, and



Though resistance coupling is used throughout this amplifier, a signal input of only .24 volt will fully load the grids of the 2A3's in the output stage.

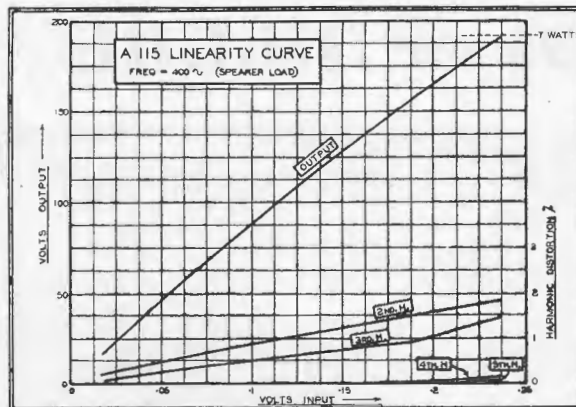
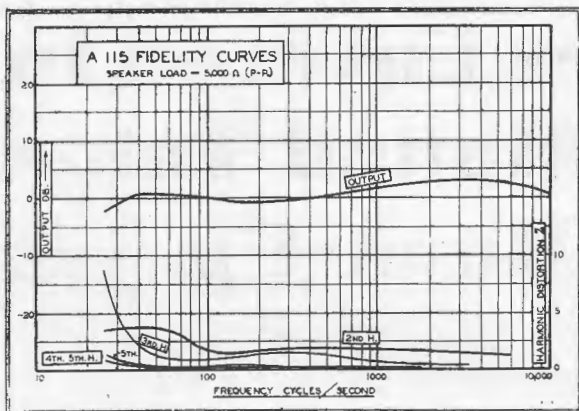


Fig. 2 (left) and Fig. 3 (right) illustrate the excellent overall response of the amplifier.

the stage gain is approximately 1.8 times from input to total output grid to grid. The 2A3 valves require a peak voltage from grid to grid of 90 volts for full output, and in order to obtain this swing without any appreciable distortion, the voltage supply of both earlier stages was derived from the first stage of the filter, giving over 400 volts.

The amplifier as a whole thus uses standard components without involving any heavy expense for high fidelity audio transformers. The sensitivity is ample for it to operate from any radio receiver or from any pick-up. The frequency response is wider than that given by any broadcast station or gramophone record. The harmonic distortion is lower than that given by a broadcast station or sound film recording. The power output is ample for home use with a loud speaker of ordinary sensitivity, and it is generally agreed that a higher output is not normally required.

It is hoped that at some future date a fidelity superhet receiver circuit will be described incorporating this amplifier, and the complete assembly should be capable of giving a response coming well within the highest standards of fidelity in all respects.

It is emphasised that variations from the circuit diagram may involve overloading and distortion, together with a reduction of power output, and constructors are urged to adhere exactly to the values of resistances, condensers and voltages given in the circuit diagram.

Owing to the use of Class A operation and self-bias, there is no necessity for the output valves to be specially matched. Measurements of hum level showed that the hum was more than 50 db. below maximum output, the range being - 13 to + 38.5 db.

**Curves Illustrate Practical Performance**

The circuit diagram is shown in Fig. 1, while the output is plotted against frequency and input voltage

in Figs. 2 and 3 respectively. Both Figs. 2 and 3 are the results obtained on a typical 12 in. loudspeaker load, and this was done purposely so as to demonstrate the results under practical operating conditions. The distortion and frequency response on a resistive load are distinctly superior to those shown, which are limited by the characteristics of the loudspeaker.

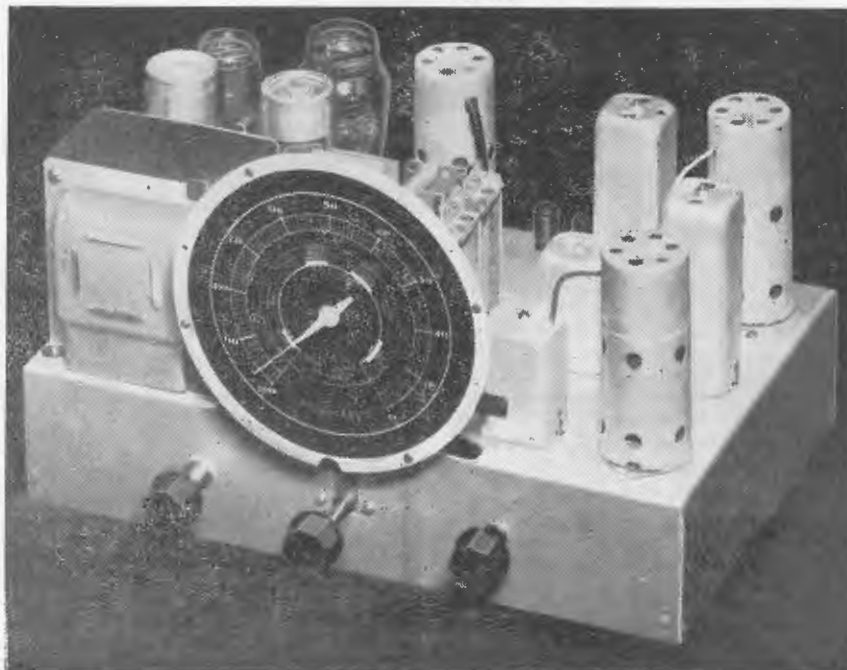
**Simple Home-Made Relay**

A "gadget" which is very useful in the "ham" shack is the relay. These are not so widely used, as their cost is supposed to be prohibitive. Commercial ones certainly are, but relays can easily be made from old telegraph sounders and electric

bells, and will be found to work very satisfactorily. They are intended for a.c. operation of about ten volts or so.

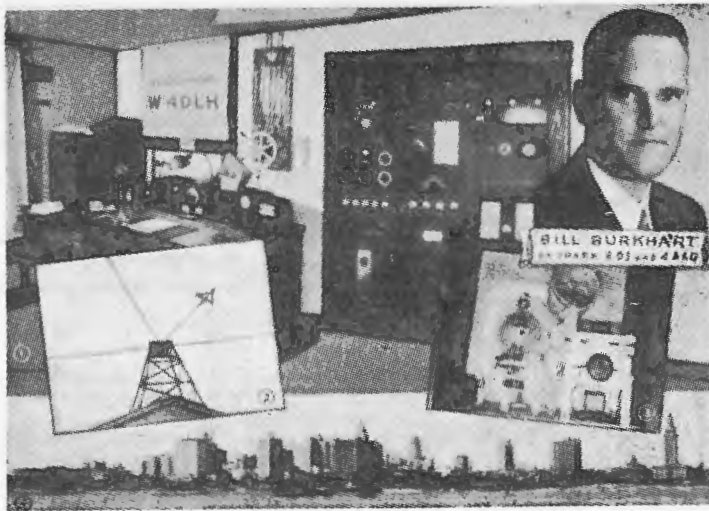
Take the original windings off the sounder or bell and wind on sufficient turns of about 34-36 s.w.g. wire to saturate the core when the current is applied. This is necessary to get a positive action, free from the vibration of the a.c. supply. It is quite a simple matter to fix the contacts for the external circuit.

These relays can be used for switching on stages in the transmitter and also switching the antenna from the transmitter to the receiver, thus simplifying the number of controls in the shack.—John M. White, Epsom, Auckland, N.Z.



A high fidelity audio amplifier using a single 2A3 in the output stage is a feature of the "Fidelity Broadcast Five," described in the January "Radio World" (and referred to in the accompanying article).

# Over 30,000 Miles Covered In Round Table Hook-Up



**American Participants Send Details Of How QSO Was Planned . . . . .**

Left: "Bill" Burkhart, owner-operator of W4DLH, with views of his station and aerial equipment.

In the May "Radio World" an article was published describing the unique amateur record in which five amateurs, one in each of the five continents, held an All-Continent QSO on telephony in the remarkably short time of eight minutes ten seconds. Details were supplied by Mr. Frank Nolan (VK4JU), who represented Australia in the "hook-up."

Copies of this issue of the "Radio World" were sent to all who took part, and the latest American mail has brought replies from two of the participants—"Bill" Burkhart (W4DLH), of Goulds, Florida, and Antonio J. Restrepo (HK1Z), of Columbia, South America. They enclosed the photographs reproduced on this page, and gave further details of the Round Table Hook-up.

## A Letter From W4DLH

W4DLH writes:—"I wish to thank you for your nice letter of March 11 in which you show interest in the All-Continent Round Table Hook-up on radiophone.

"Enclosed you will find complete details and also photos of my station and the O.M. I hope that in the maze of enclosed information you will find a suitable story.

"Thanking you again for your interest and for the sample copy of 'Radio World' you sent me."

Following are the details concerning the QSO mentioned by W4DLH.

## W2IXY Records And Re-broadcasts Round Table Transmissions

A highlight in the morning's exciting escapade of "world girdling" in breath-taking time was a happy surprise from (Dorothy) W2IXY, of New York City. Dorothy has been greatly interested in the outcome of

the proposed "All-Continent Round Table" on 'phone. She has watched every schedule and every attempt, and has been "standing-by" with recording equipment to make a permanent record should success be achieved.

Successful recordings of several transmissions were made, and at the conclusion of the hook-up, W2IXY re-broadcast to G5ML, HK1Z and W4DLH their transmissions recorded while the round table was in progress. Imagine G5ML's surprise when he heard his own voice come

bouncing back from the States in the few minutes after it left his own transmitter. When will the wonders of shortwave radio end?

## Wonderful Co-operation From All Stations Made Success Possible

Too much cannot be said about the wonderful co-operation received from all stations. Every operator must have been greatly inconvenienced more than once before success was achieved.

HK1Z and W4DLH both were on the job at daybreak daily for nearly two weeks. VK4LO must have lost plenty of sleep, because the contacts always ran him past midnight in Australia. The VU2CQ "sked" must have, more than once, broken into his evening dinner hour, while SU1CH must have had a "sweet" time making excuses with the "boss" for going on the air at two p.m. in the afternoon. I'll bet G5ML, ate several very cold noon-day lunches.

Careful study had to be made of the proper time of day to make the "sked." All continents had to hear each other, if success was to be expected. The proper station and operator had to be chosen, his receiving equipment and transmitter had to be efficient. No! — the "All-Continent Round Table QSO" did not just happen. It took the finest kind of co-operation, confidence, equipment, planning and work.

## 39,148 Miles Covered By "Knights Of Round Table"

W4DLH's voice had to travel 9,062 statute miles to reach Bombay, India, if it went the short route . . . which it didn't. VU2CQ had to transmit 4,712 miles to get into Cairo, Egypt, while SU1CH had to send his voice



Antonio J. Restrepo (HK1Z), who represented South America in the Round Table QSO.

7,612 miles to get into Colombia, South America.

HK1Z had to transmit 5,437 miles to get over to Kenilworth, England, and last, but not least, G5ML had to get a lot of r.f. into his antenna to shoot it over to VK4LO, 12,325 miles away.

**Cairo And Bombay Reach W4DLH**

Many tests have been made with the "Mims Signal Squirter" rotary beam antenna with reflector. There is no question in the mind of W4DLH that the Indian and Egyptian stations came to Goulds, Florida, over the long route, and not over the Great Circle route.

SU1CH tested W4DLH's "Mims Squirter" broadside to all points on the compass. Here was the report: "As soon as you turned your antenna off S.W. path, I did not hear you any more until you again got back into the S.W." Bombay, India, seems to have a weak signal coming in over the Great Circle route, but a R8 signal over the long route, so if any of you "beam antenna hounds" want to get into Bombay, India and Cairo, Egypt, you had better shoot toward the South-West.

At times Cairo, Egypt, comes in R9 at 2000 G.M.T. (3:00 p.m. E.S.T.).

At this time of day he comes over the Great Circle short route.

**Details Of South American Station**

Antonio J. Restrepo (owner-operator of HK1Z) writes from Cali, Colombia, South America, as follows:—

"I am in receipt of your letter dated March 12, 1937, asking for additional information on the 'All-Continent Round Table Hook-up,' in which I took part through my amateur radio station HK1Z. Also received the February issue of the 'Radio World' you had the kindness to send me, for which I am very much obliged.

"I believe that in the February issue of 'QST' appeared a very complete and detailed description of the first 'Round Table,' and I do not think that anything of particular interest can be added on this subject. However, I am going to give you the following information on HK1Z, which may be of some interest for your readers:—

"HK1Z came into the air in November, 1935. The power used is 85 watts input into the final Class C amplifier, and the tube line-up is a 47 xtal. osc., pair of 46's in parallel,

doubler, and one 830 final, modulated by pair of 210's in class B with 850 volts on plates. The microphone is an Astatic 104D. The antenna is a Johnson 'Q' coupled to the final amplifier by means of a 'Pi' network. Inductive coupling is used, and the receiver is a Patterson PR10 with a home-made regenerative preselector.

"HK1Z has worked all continents on 'phone many times. C.W. is very seldom used, and 99% of the work is done between 11 and 13 G.M.T. A great number of Australian stations have been worked, and many reports from S.W.L. in Australia and New Zealand are received, but they are only acknowledged when accompanied by reply coupon.

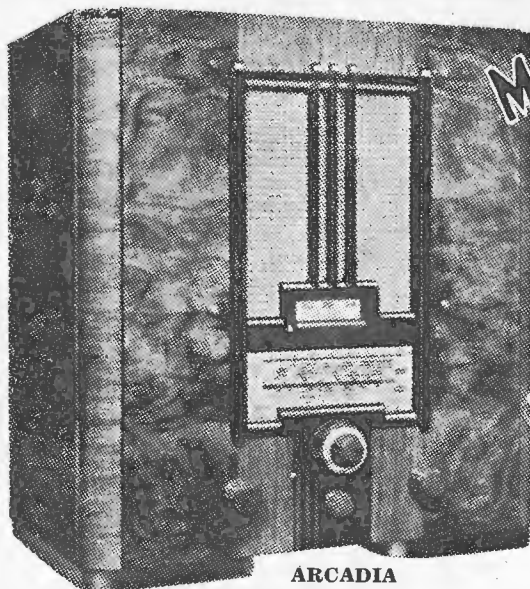
"Accordingly with your desire, I am including a photograph of the rig and myself. Before 'signing off,' permit me to thank you very much for your interest in my station."

**Will Never Miss Getting "R.W."**

I would just like to say how I appreciate your publication, the "Australasian Radio World." I can honestly say I will never miss getting my copy, even though we have so-called "wonderful American mags" on the market. Wishing your magazine every success.—G. J. Watson,

**FERRANTI ALL WAVE RECEIVERS**

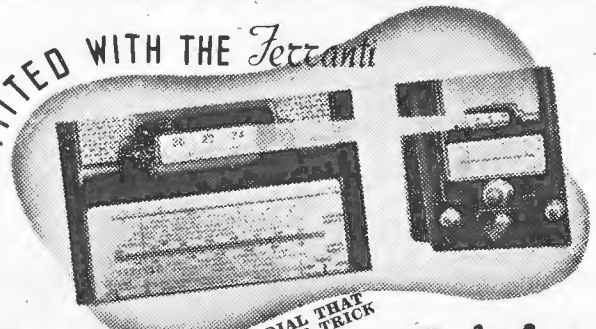
This Magnascopic Dial is incorporated in all the new Ferranti All-Wave Superhets. It makes short-wave tuning as simple and easy as tuning on the Medium or Long Waves.



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It is a carefully designed though simple optical device where a scale is magnified to an effective length of over 6 FEET. The enlarged readings are seen through a window just above the main Dial with such size that the precise point at which each station is received can be seen exactly.

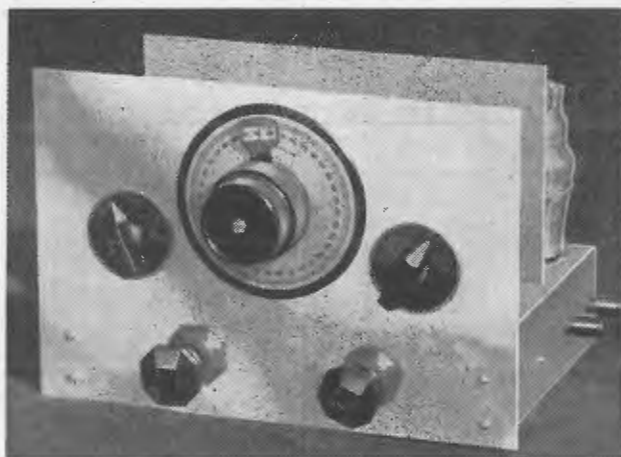
**RECEPTION FROM THE ENDS OF THE EARTH**

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115 CLARENCE STREET, SYDNEY. 'Phone: B7581 (10 Lines) and at Newcastle and Brisbane.



# The Jones' Super-Gainer Two

The assembly and wiring of the "Jones' Super-Gainer," featured in last month's issue, is outlined below.

LAST month preliminary details were published of the "Jones' Super-Gainer Two," a shortwave superhet designed to give the utmost in results from two valves. In the "Super-Gainer," the high inherent selectivity of the superhet is combined with the extreme sensitivity of the regenerative t.r.f. receiver, resulting in a set that for a two-valver puts up an excellent all-round performance.

## The Construction Outlined

The parts listed elsewhere should be assembled before a start is made on the construction. The chassis, front panel and shield partition are all made of 16-gauge aluminium, and are prepared according to the sketches shown. The shield partition is located  $4\frac{1}{8}$  in. behind the front panel, and runs parallel with it. Its purpose is to provide screening between the first detector and oscillator tuning circuits, and to provide a support for the first detector band-spreading and band-setting condensers.

The two band-spreaders are ganged by means of two flexible couplers and a  $1\frac{1}{4}$  in. length of bakelite rod, and are controlled by the main tuning dial. The first detector band-setter mounted on the shield partition is also provided with a flexible coupler and extension rod, so that it can be controlled from the front panel.

The construction is commenced by mounting the coil, valve and power sockets, together with the aerial, earth and 'phone terminals. The Isolantite coil sockets are mounted 1 in. above the chassis by means of mounting pillars, and the aerial and 'phone terminals should be insulated from the chassis. Next, the i.f. regeneration coil can be mounted on the right-hand wall of the chassis, and lastly the Radiokes iron-cored i.f. transformer can be bolted in position.

Two insulating pillars 1 in. long are now mounted on the shield par-

tion, in the positions shown in the rear view of the completed receiver. These pillars form a support for the second detector grid leak and condenser.

## The Front Panel Controls

The panel can now be bolted to the front of the chassis, and the potentiometers mounted. Note that the shaft of the potentiometer controlling the 6F7 screen voltage should be insulated from the chassis if it is of the type that requires insulating. The mounting of the components is completed by bolting in position the two ganged band-spreaders and the band-setters.

The wiring is commenced by putting in an earth line of 16 or 18-gauge tinned copper wire, running underneath the chassis between solder tags placed under the nuts of the two bolts holding down the shield partition. This line is joined directly to the earth terminal.

The heater wiring is put in next, and then, commencing at the aerial terminal, wire the first detector coil

socket, pentode section of the 6F7, oscillator coil socket, triode section of the 6F7, i.f. transformer, and so on, until the wiring is completed. The under-socket connections of the 6F7 and 79 are given in a separate sketch.

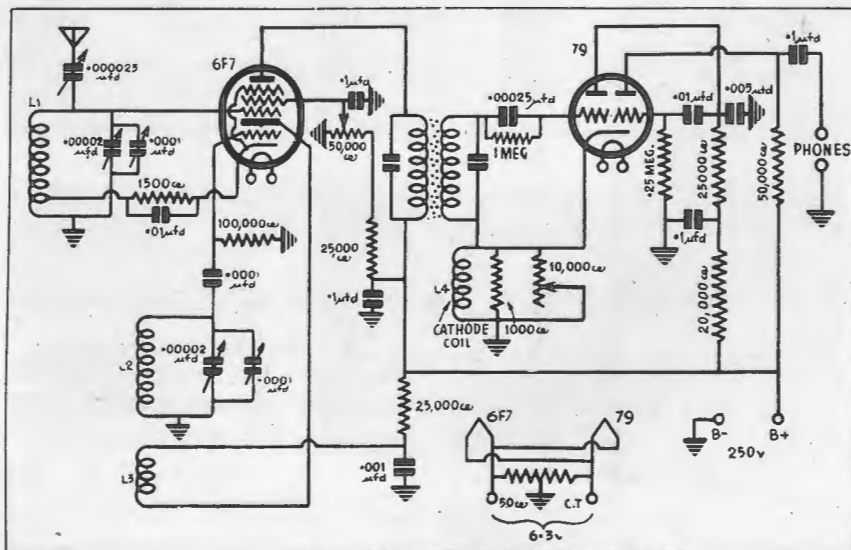
## Winding The Coils

When the wiring has been completed and checked, the coils can be wound. For those who prefer not to wind their own, a special "Rayway" coil kit is available, manufactured to the designer's specifications by Standardised Products.

All coils are wound on  $1\frac{1}{2}$  in. diameter formers, the first detector coils on 4-pin, and the oscillator coils on 5-pin. Five pairs of coils are required to cover the 10, 20, 40, 80 and 160-metre amateur bands. Turn details, etc., are given in a separate panel, while a sketch is also published showing how the windings are put on.

## The Power Supply

The "Super-Gainer" can be operated either from a separate power



The circuit of the "Super-Gainer Two," with full constants.



## RUSH YOUR ORDER

### VEALL'S SUPER FAST MAIL ORDER SERVICE WILL THEN DO THEIR PART

See the full constructional details elsewhere in this issue—and build this economical two-valve receiver—you will be amazed with the results.

#### "THE JONES SUPER-GAINER TWO"

##### List of Parts

- 1 aluminium chassis, front panel, and shield partition.
- 1 vernier dial (Utility).
- 1 midjet mica trimmer (Radiokes).
- 1 465 K.C. iron core I.F. transformer (Radiokes).
- 2 .0001 mfd. midjet variables (Radiokes).
- 2 .00002 mfd. midjet variables (Radiokes).
- 1 4-pin, 1/6-pin, 1/7-pin wafer socket.
- 1 4-pin, 1/5-pin isolantite coil sockets, with mounting pillars.
- 1 10,000 ohm potentiometer (Microhm, Radiokes).
- 1 50,000 ohm potentiometer (Microhm, Radiokes).
- 4 terminals, 2 red, 2 black (spring type).
- 3 flexible couplers, with 4-in. and 6-in. lengths of 1/2-in. bakelite rod.
- 2 control knobs.
- 2 pointers, with 2 0-180 degree indicator plates.
- 2 Goat Valve Shields.
- 2 grid clips.
- 1 coil kit, comprising 5 aerial and 5 oscillator coils, wound to specifications.
- 1 4-pin plug with length of 4-wire cable.
- 1 pair headphones.
- 1 B.C. secondary winding, wound on 1-in. former 2-in. long with mounting brackets.
- 8 fixed condensers as specified.
- 10 fixed resistors as specified.
- VALVES.
- 1—79, 1—6F7 (Radiotron, Ken-Rad).
- MISCELLANEOUS.
- Push back, solder tags, bolts and nuts, etc.

#### Complete Kit £6/19/6

Write to-day for Vealls' new 1937 Radio and Electrical Catalogue. 88 pages, 575 illustrations. Send 2d. stamp for postage.

See the full constructional details in this issue. Vealls can supply the complete Kit to enable you to listen to the world's short-wave and local broadcasting stations.

#### "THE SKY-KING DUAL WAVE FIVE"

- 1 Power Transformer (60 mill. upright 5v.-2a., 6.3v.-2a., 385v.-385).
- 1 D.W. coil kit with I.F.'s. (iron core).
- 1 2-gang condenser.
- 1 dial DC2.
- 3 knobs.
- 3 valve shields (Goat).
- 2 7-pin wafers, 2—6-pin, 2—4-pin.
- "A" and "E" terminals (spring type).
- 1 power socket and plug (Marquis).
- 1 power cable and plug (IBC adaptor).
- 3 grid clips.
- CONDENSERS.
- 4 .0001 mfd. midjet mica T.C.C.
- 1 .02 mfd. tubular.
- 1 .05 mfd. tubular.
- 6 .1 mfd. tubular.
- 2 10 mfd. dry electrolytics, 25v. working.
- 1 25 mfd. dry electrolytics, 25v. working.
- 2 8 mfd. wet electrolytics, 450v. working.
- 13 1-watt carbon resistors as specified.
- 1 20,000 ohm. Potentiometer.
- 1 .5 megohm Potentiometer (Yaxley).
- SPEAKER.
- 1 2,500 ohm. field to match single 42-K.8.
- VALVES.
- 1 6A7, 1 6B7S, 1 6C6, 1 42, 1 80.
- MISCELLANEOUS.
- Push-back, nuts and bolts, shielding, solder lugs.

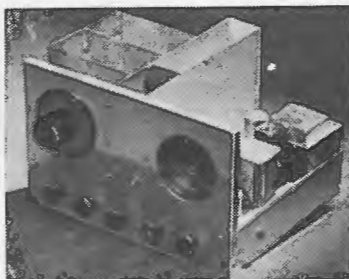
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| 1 Midget mica trimmer (Radiokes).   | 1 Pair headphones (S.T.C.)  |
| 1 465 k.c. iron core i.f. transformer (Radiokes).   | 1 b.c. secondary winding, wound on 1in. former 2in. long, with mounting brackets. |
| 2 .0001 mfd. midget variables (Radiokes).   | <b>FIXED CONDENSERS:</b>  |
| 2 .0002 mfd. midget variables (Radiokes).   | 1 .0001 mfd. (Simplex)  |
| 1 4-pin, 1 6-pin, 1 7-pin wafer sockets.  | 1 .00025 mfd. (Simplex)   |
| 1 4-pin, 1 5-pin isolantite coil sockets, with 1in. mounting pillars (Amphenol).  | 1 .005 mfd. (Simplex)   |
| 1 10,000 ohm potentiometer (Microhm, Radiokes).   | 2 .01 mfd. (Simplex)  |
| 1 50,000 ohm potentiometer (Microhm, Radiokes).   | 3 .1 mfd. (Simplex)   |
| 4 Terminals, 2 red, 2 black (Dalton spring type).   | <b>FIXED RESISTORS:</b>   |
| 3 Flexible couplers, with 1 1/2in. and 4in. lengths of 3/4-inch bakelite rod.   | 1 1,000 ohm 1-watt carbon (Bifrost)   |
| 2 Control knobs.  | 1 1,500 " " " "   |
| 2 Pointers, with two 0-180 degree indicator plates.   | 1 20,000 " " " "  |
| 2 Goat valve shields.   | 3 25,000 " " " "  |
| 2 Grid clips.   | 1 50,000 " " " "  |
| 1 Coil kit, comprising 5 aerial and 5 oscillator coils, wound to specifications (Rayway Low-Loss). (Alternatively, 5-4 and 5-5 pin plug-in formers are required, with | 1 100,000 " " " "   |
|   | 1 .25 megohm " " " "  |
|   | 1 1 " " " "   |
|   | <b>VALVES:</b>  |
|   | 1 79, 1 6F7 (Radiotron, Raytheon, Mullard, Philips).                              |
|   | <b>MISCELLANEOUS:</b>   |
|   | Push-back, solder tags, 3/16in. bolts and nuts, etc.                              |

pack or else can be powered from an ordinary broadcast or dual-wave receiver using 6.3-volt valves. Note that if one side of the heater circuit in the broadcast receiver is earthed, this connection will either have to be broken, or the centre-tap heater resistor in the "Super-Gainer" will have to be omitted.

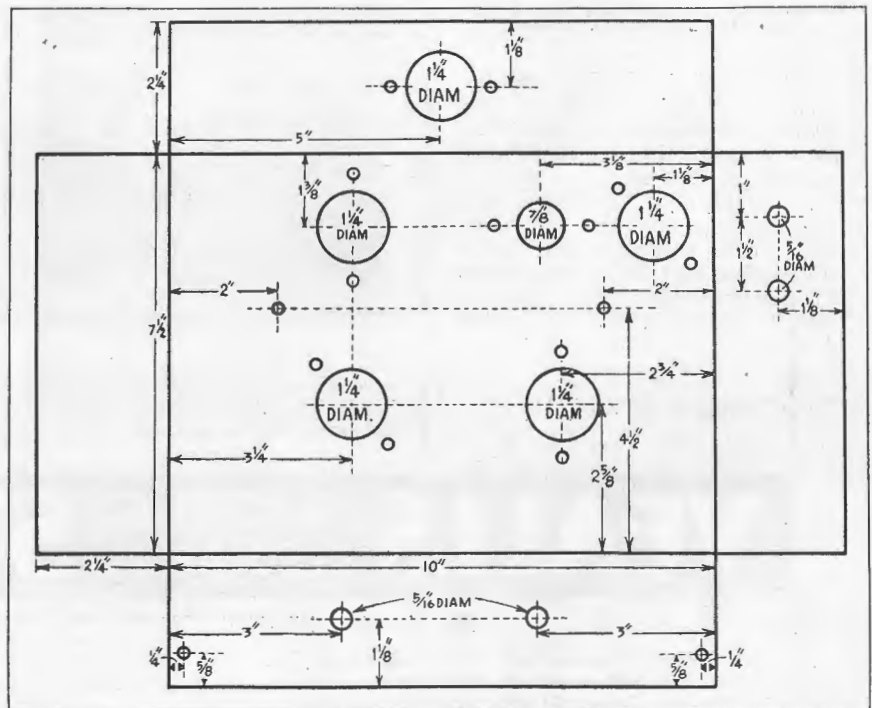
Alternatively, as the "B" drain of the "Super-Gainer" is not excessive, a 6-volt storage battery and 180 to 225 volts of "B" battery can be substituted for the A.C. power supply.

**Operating Adjustments**

The high gain and selectivity of

the "Super-Gainer" is due in a large measure to the iron-cored i.f. transformer used. However, it is essential that the coupling between the primary and secondary windings of this transformer is not too tight, or second detector regeneration will not be smooth. If difficulty is experienced in getting fairly smooth control, the coupling can be loosened by cutting through the former and using a small length of wooden dowel as an extension.

The broadcast winding connected between the i.f. transformer secondary and earth constitutes an external cathode tap. Feedback is con-



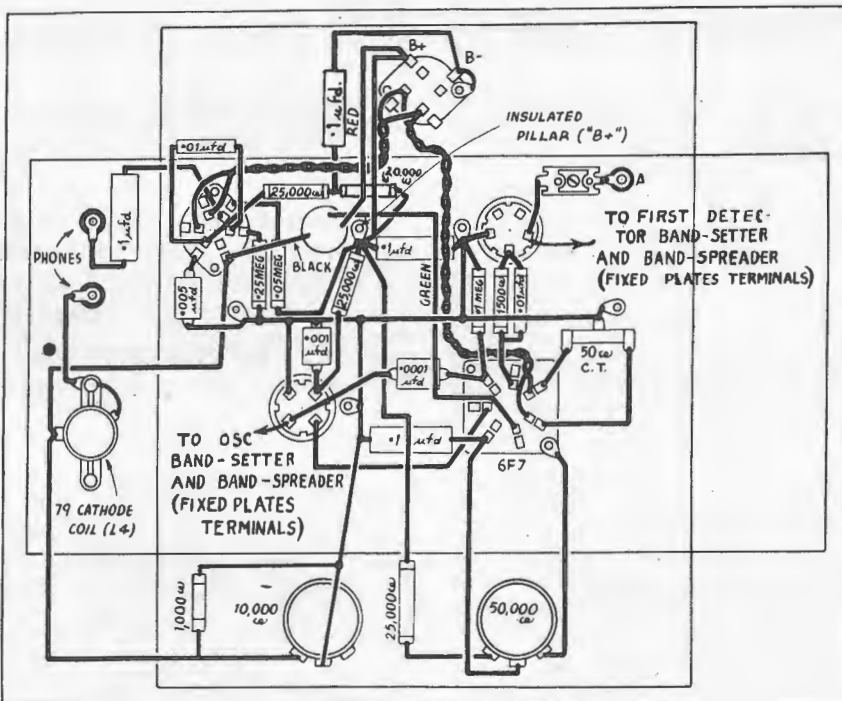
This sketch gives all dimensions needed for preparing the chassis.

This sketch shows the under-chassis wiring of the "Super-Gainer." Under-socket connections of the two valves are given elsewhere.

trolled by the 10,000 ohm potentiometer connected across the winding. This control is shunted by a fixed 1,000 ohm resistor, the two combining to provide very smooth control of regeneration.

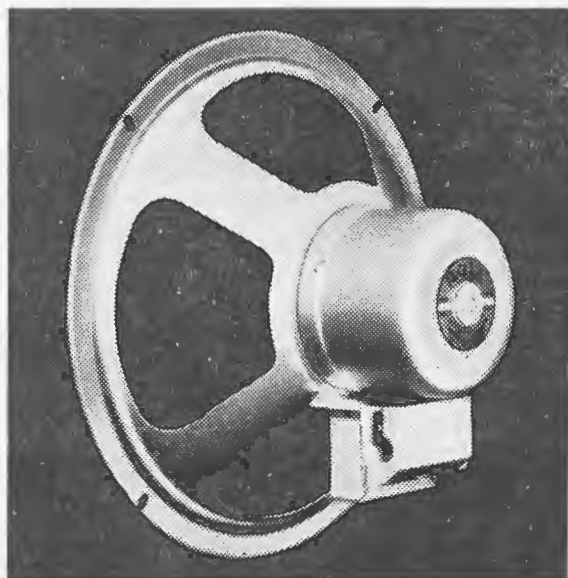
For greatest sensitivity on 'phone reception, this regeneration control should be adjusted until the second detector is just on the point of oscillation, while for c.w. reception, the control is turned up slightly beyond the point of oscillation.

The set can now be connected to the power supply and a pair of coils plugged in. Now advance the second detector regeneration control until a hissing sound is heard in the 'phones, denoting that the second detector is on the verge of oscillation. Next, adjust the trimmer tuning the primary of the i.f. transformer until a point is found where the hiss is at a minimum, or disappears altogether. In the latter case the coupling between the i.f. windings should be loosened slightly, so that when the primary is in resonance with the secondary, the second detector will just oscillate with the regeneration control full on.



The two band-setters can now be adjusted until an increase in the noise level denotes that they are in resonance. With some coils it will be found that the oscillator band-setter will have two points at which any

given signal can be heard. The correct setting is that giving minimum capacity. It will be found that the first detector regeneration control provides a tremendous improvement (Continued on page 46)



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# Breaking Into The Amateur Game . . . 7

**D**URING the past six months, sufficient of the fundamentals of radio has been given to permit us to proceed with the actual building of transmitters, and this instalment will deal with a transmitter designed specifically for C.W. only. Within certain limits, this installation will form the essential basis of a 'phone transmitter also, but that subject will be dealt with fully next month.

Let us first discuss the very simplest form of transmitter that will suffice for the present-day standard of a satisfactory signal. Perhaps it would be well to touch very lightly upon this subject of signal quality, as a preface to the building of the actual transmitter.

## Clear-Cut Signal Essential

1937 practice demands a clean-cut signal, which means sharply tuned, steady in frequency, and cleanly keyed, i.e., without "tails," etc. These features are not only ideals which make the station a pleasure to operate, but also will meet with the approval of the Wireless Inspectors Department, which expects amateur stations to maintain such a standard.

For the construction of the simple transmitter, we may choose either a self-controlled oscillator driving an amplifier which feeds the antenna, or a crystal-controlled oscillator directly feeding the antenna. In the first case the oscillator must be carefully designed and still more carefully constructed in order to maintain a sufficiently high degree of frequency stability.

## Variety Of Circuits Available

When deciding upon the circuit arrangement, one is confronted with

**This instalment deals with the design of a simple c.w. transmitter, and explains the procedure for neutralising a single-ended amplifier stage.**

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

dozens of differing kinds, all apparently containing special features which make any particular one out-class others. Actually, if we reduce this maze of circuits to their fundamental elements, we find there are comparatively few with different principles.

Oscillator circuits from the angle of mode of operation have already been fairly fully discussed. They are namely, Colpitts, ultra-audion, T.G.T.P. (tuned grid, tuned plate), Hartley, T.N.T., and electron-coupled. Any of these will be satisfactory, providing care is exercised, the final choice being usually one of convenience according to the valves on hand or those that it is intended to try, plus personal taste to a greater or lesser extent.

Let us choose the electron-coupled system, since modern valves, with their indirectly-heated cathodes, are particularly suited to this arrangement. Possibly the most commonly-used valve for this system is the 42.

## Electron-Coupled Oscillator

A glance at figure 1 will almost complete the explanation without

further words. However, from the circuit we see that "L1" is tapped at a point about a quarter to one-third from the earth end. This position depends mainly upon the particular valve in use, and is a control of excitation; as the tap is moved toward the centre of the coil, so excitation increases, and vice versa. The optimum point is where the excitation just commences to fall off as the tap is being moved toward the earth end of the coil.

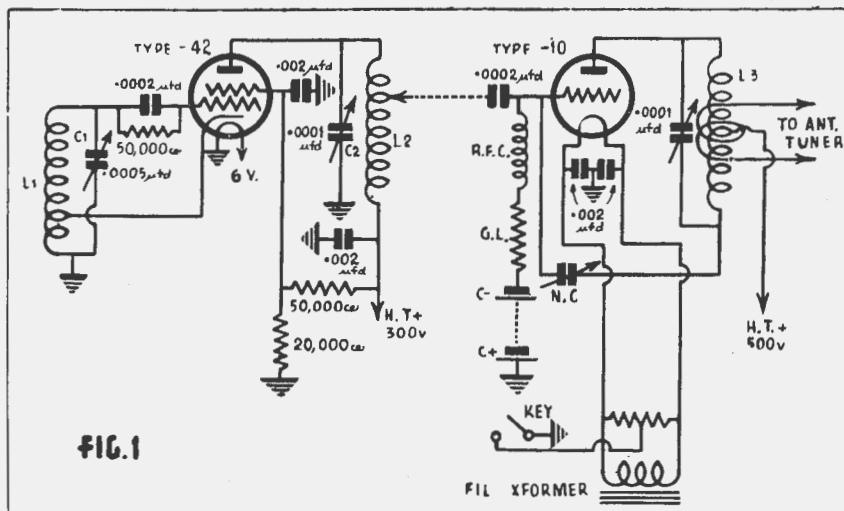
Condenser values as indicated on the circuit diagram are for average layouts at frequencies from 1,600 k.c. to 14 m.c. The coils, of course, have the appropriate numbers of turns to correspond to the frequencies to which they, with their respective condensers, are tuned. L1 will be smaller than L2 if both are operating at the same frequency, since C1 is of a higher capacity than C2.

The use of a high capacity in this L1, C1 circuit provides for greater stability, whereas with L2, C2, the low-capacity combination improves the output, and by making the plate impedance high, improves the efficiency in the type 10 amplifier grid circuit.

## Single-Ended Amplifier Chosen

Having reached the amplifier stage of this suggested transmitter, the circuit diagram shows only one of many ways that this unit may be made up. Since we are dwelling mainly on simplicity at the moment, the single-ended system will do, and push-pull and parallel ideas disregarded temporarily. For the sake of ultra simplicity, the amplifier grid circuit is the old condenser-choke method of coupling to the preceding stage. Link coupling would be far superior, but that will be incorporated in a more elaborate array.

Radio frequency (r.f.) voltages generated in the oscillator appear across the tank circuit L2, C2, and are fed along the line via the grid condenser to the grid of the 10 amplifier. This is all that is necessary for the r.f. coupling.



**FIG. 1**

Fig 1. A simple c.w. transmitter, using a 42 as electron-coupled oscillator, condenser-choke coupled to a type 10 amplifier.

It is now necessary to complete the D.C. grid circuit of the amplifier, and so an r.f. choke joins the grid, via the grid leak and "C" battery, to earth. Any convenient "C" battery is satisfactory if, in conjunction with the bias developed by the grid leak, it amounts to approximately 135 volts. If, as an example, the battery is 45 volts, we need a grid leak of about 9,000 ohms in order to develop 90 volts if the grid current is of the average value for these valves—usually around 10 m.a.

The plate tank circuit L3 and its condenser are in the conventional low "C" arrangement, meaning sufficient turns in L3 so that the plates of the condenser are just sufficiently in mesh to tune the circuit over the range desired. The positive H.T. is fed to L3 at the centre. The mechanical centre (half the number of turns) is usually near enough to the electrical centre for all practical purposes. An r.f. choke and by-pass condenser should be included in this H.T. lead.

While one end of the amplifier tank connects directly to the valve plate, the other end goes to the grid through the neutralizing condenser. The capacity of this condenser (N.C. fig. 1) should be slightly greater at maximum setting than the grid-to-plate capacity of the valve. Where the filament centre tap usually returns to earth and h.t. negative, the key is inserted, and provides a very handy and efficient means of keying the amplifier.

**Rigidity Essential In Layout**

This covers the essential parts of transmitter No. 1. As regards the mechanical construction, this is best left to personal choice, but whichever layout is followed, mechanical and electrical solidity should always be rigidly adhered to, as by so doing maximum stability of the emitted signal will be assured.

Should the layout demand that the oscillator and amplifier be in very close proximity to each other, then complete shielding of the oscillator right up to the coupling line is an absolute necessity. Shielding of the amplifier is neither necessary nor recommended, and unless great spacing between shield and coils is possible, the loss in efficiency by damping is very high.

The diagram shows a link coil coupled at the low potential point of L3 (centre)—this low impedance line may be run any medium distance, say 3 to 10 feet, to an antenna tuning coil, which should be similar to the amplifier plate tank. By coupling the antenna on to this coil, we may make any adjustments to the aerial without throwing the amplifier out of tune or neutralization.

**47 As Crystal-Controlled Oscillator**

The second suggestion for a simple transmitter incorporates a crystal, controlling the frequency. Due to the controlling factor of the crystal, it is not so essential to have the plate tank circuit so rigid, since any change in the associated valve circuits will have negligible effect on the frequency, and a decrease in output is the most apparent result.

Fig. 2 shows a type 47 in the usual pentode oscillator circuit. It will be noticed that a pentode has been chosen for the crystal oscillator; this is mainly on account of its low grid impedance and easy excitation, these factors resulting in correspondingly low r.f. current flowing in the crystal circuit. The strain placed on the crystal is proportional to the r.f. current it must handle, hence the popularity of the pentode.

The crystal, which must be chosen to suit the exact frequency on which

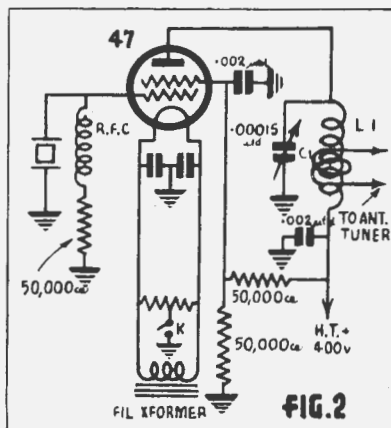


Fig. 2.—A widely popular arrangement, employing a 47 pentode as crystal-controlled oscillator.

ing plug-in type coils in the 6L6G the transmitter is to operate, is connected between grid and earth of the type 47 valve. The grid must be completed as far as the d.c. circuit is concerned, of course, and an r.f. choke is incorporated for this purpose.

**Bias Considerations**

Some means of bias is necessary, and we can obtain this from either a resistor in the filament centre-tap-to-earth circuit, or from the voltage drop across a resistor connected in the grid circuit, due to grid current of the oscillator. The latter method is more popular, since there is a certain amount of automatic control; when the grid current rises, the bias will rise in proportion, and vice versa.

The grid leak value is shown in Fig. 2 as 50,000 ohms. It is quite within the bounds of possibility that this will be too high for some makes

of 47's and also some degrees of activity of different crystals.

The screen is fed from a voltage divider placed across the h.t. supply. Although this is really a wasteful method (power waste) due to the anchoring effect of the divider, the oscillator behaves in a more stable manner, and when the key is placed in the filament centre-tap-to-earth lead, "tails" on the signal are avoided which would otherwise appear, due to the charging and discharging of the necessary screen by-pass condenser.

R.f. energy is generated in the plate inductance condenser circuit, known as the "tank." In operation, the L1, C1 tank is tuned to a slightly higher frequency than that of the crystal, and this actual point of adjustment is the only one. As the tank circuit approaches the crystal frequency (on the h.f. side), the output continues to rise until a maximum peak is reached, when oscillations will cease at the actual point of resonance with the crystal.

Oscillations will again commence on the low frequency side of resonance, but it is usual practice to operate on the h.f. side, and greater stability will result. It is distinctly advantageous to keep the tuning capacity as low as possible, since greater efficiency is obtained.

**Link Coupling To Antenna Preferable**

Link coupling to an antenna tuner is highly desirable, since it is necessary to have complete control of the loading on an oscillator of this type. Were the antenna to be coupled by means of a coupling coil to the oscillator tank, or through a condenser directly to the tank, any movement or tuning of the aerial would affect the tuning of the oscillator, with disastrous results to its performance.

When an aerial tuner is used, link-coupled to the oscillator tank, adjustments to the antenna tuning arrangements, whatever they may be, will have little or no effect on the tuning of the oscillator, but will simply vary the load value. Needless to say, it is not by any means impossible to couple the antenna directly to the oscillator, but in this case we are confronted with two necessary adjustments, either of which will have a major effect on the other. A consequent "see-saw" performance will be the result, with its attendant exasperating difficulties.

The amplifier as given in Fig. 1 is quite as suitable to operate from the crystal-controlled oscillator as the self-excited one. The amplifier grid may be coupled in precisely the same way to the oscillator tank as in Fig. 1, or a grid tuning coil arranged to replace the grid choke. We would then have a form of link coupling,

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Where the oscillator link (at h.t. end of oscillator tank) went to the antenna tuner, we could link on to the amplifier grid tuned circuit. This part of the amplifier would then have a coil, shunted by a tuning condenser (to resonate at the desired frequency) to connect from junction of grid and one side of the neutralizing condenser, to grid leak, thence to earth via “C” battery.

When link coupling is employed in any amplifier stage, intermediate or final, the inclusion of a 0-20 m.a. meter in the grid return circuit is of great value in tuning and neutralizing.

### How Neutralising Is Effected

The neutralizing of such a stage is effected as follows:—With oscillator running and the amplifier filament heated, but WITHOUT H.T. on the amplifier, tune grid condenser until maximum current shows at the grid current meter (connected between “C+” and earth). The neutralizing condenser should previously have been set at zero, and the amplifier plate tank condenser about half-way out.

Swing the amplifier tank condenser through its range, and at the point of resonance a decided dip will be noticed in the grid current. Turn neutralizing condenser plates in about an eighth to a quarter of its range. Re-set grid tuning condenser to maximum grid current, and check tuning of oscillator plate tank, in case the change of load has affected the tuning. Proceed as before with amplifier plate tank condenser, and again advance neutralizing condenser.

Eventually a position will be reached on the neutralizing condenser whereby the amplifier plate tank condenser may be swung through the resonance point with little or no effect on the grid meter reading.

### Checking The Neutralising Adjustment

To prove the neutralizing point, it is a good plan to mark the reading, advance the condenser further, and note the effect the plate tank condenser has on the grid current reading of the amplifier. By this means it is a simple procedure to return to the optimum setting of the neutralizing condenser. All amplifier stages, either single ended or push-pull, may be neutralized in this manner.

The amplifier here discussed is similar in fundamentals to practically any radio frequency amplification stage of a transmitter. Screen-grid valves make an exception, in that they seldom require neutralization.

Transmitters for key work only do not necessarily require a buffer stage or stages—this applies more to a telephone transmitter. However, such

buffers are often installed to ensure ample driving power to the final stage.

Where we have a crystal ground to the frequency on which it is desired to operate, all is well, and a stage or two after the oscillator will suffice. These stages will be identical with the one discussed.

When the crystal oscillates at 3.5 m.c. and it is desired to operate on 14 m.c., the intermediate amplifier stages between oscillator and final become frequency “doubblers.” These are similar to buffer stages (or intermediate stages) except that the bias is raised beyond the former value, and since the grid circuit may be tuned to 7 m.c. and the plate to 14 m.c., neutralizing is unnecessary.

### A Warning To Readers

It is desired to point out that before a person may be in possession of apparatus capable of emitting a radio frequency signal, he must at least be the holder of an experimenter's licence. Failure to comply with this law renders the offender liable to prosecution, which may debar him from ever holding such a licence.

Next month we shall enlarge on the stage choice and design when applied to telephone transmitters.

### Former For 5-Metre Choke

Experimenters are often at a loss to know just what to wind 5-metre r.f. chokes on. I have found a piece of glass combustion tubing having a small bore quite satisfactory. It may be obtained cheaply from any chemical supplies depot, and may be easily mounted by slipping a long bolt through it with a leather washer on each end. Do not tighten the nut too much or the tube is likely to crack.

I was also interested in AW169DX's method of improvising coil formers. Here is another method I have sometimes used.

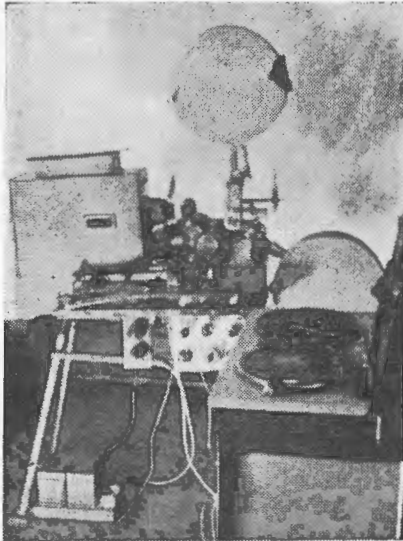
Take two old valve bases and remove all the pins from one. In the centre of the bottom of each drill a 5/32 in. hole. Fasten the two together by means of an 1/8 in. flat-headed bolt passed through the holes.

Broadcast formers may be made in a similar way by removing the pins from both bases and using the resulting holes for mounting holes.—W. N. Black, Chelsea, Victoria.

# Home-Built Talkie Plant Gives Excellent Performance

**Successful Demonstration Before Lakemba Club Members : Trolley Bus Field Day : First Inter-School Broadcast.**

**By W.J.P.**



**T**HE above photograph shows a talking-picture machine owned and operated by Mr. Jack Peckman, of Hurlstone Park. On various occasions Mr. Peckman has given silent picture demonstrations at the meeting rooms of the above club, and has also invited members to his home to see and hear his talkie apparatus.

The actual projection unit is a standard silent projector, but the electrical sound unit was constructed by Mr. Peckman and added to the machine. This portion of the equipment is known as the sound head. A photograph of the complete talkie unit is shown above.

The sound track on a talking film is located at the side of the picture portion, the density of this track varying according to the nature and volume of the sound recorded.

It is necessary for the film to pass through the sound head at a constant speed of 90 feet per minute, or 24 picture frames per second. Inside this sound box is a small exciter lamp, the light from which is condensed on a slit two-thousandths of an inch wide. It is further reduced by a lens to a strip one-thousandth of an inch in width. This light is directed on to the film sound track, then to a photo-electric cell. The film in passing through the sound head thus causes a variation in the density of the light falling on the photo-electric cell, the latter having the ability of converting the variations of light back into sound energy. In order to increase its audio output to a level equal to the average gramophone pick-up, a two-stage resistance coupled amplifier using 6C6's is employed.

The main amplifier consists of a 57 used as a triode, two 56's in push-pull, feeding two 250's in push-pull,

resistance-coupled throughout. A 12 in. dynamic speaker is used, and is located behind the screen. Dual turntables and dual pick-ups for various other sound effects complete the installation.

Although talking picture projection is now commonplace, nevertheless we were highly impressed by the quality of both sight and sound from the machine shown above, and considered it equal to many of the larger public talkie installations. The fact of having a complete talkie unit in one's own home most certainly adds to its fascination.

★

## The Trolley Bus "Field Day"

Interesting experiments with portable radio apparatus were conducted by members of the Lakemba Radio Club on the occasion of the opening of the Kogarah-Sans-Souci trolley bus service mentioned in these notes last month.

During past months, one of our oldest club members, Mr. C. Luckman (2JT) has been engaged in the testing of the electrical circuits of these fine buses, while Mr. G. Junk (2EY) is employed on the actual transport service. The "hams" being so well represented, it was decided to conduct a kind of "field day" in conjunction with the official opening, procession and sports. The Mayor of Kogarah (Ald. J. C. Battye) gave his fullest support to the experiment, and granted a position right near the official stand for the control transmitter, VK2LR. The police also allowed our radio-equipped cars to take up selected positions.

At different stages the transmission and description from a car was picked up and relayed over the main transmitter, while at other times it was amplified for the benefit of the crowds. Considerable interest was taken in the description by 2EY of the "passing" of the old steam trams (which had been in use for about 50 years) and the introduction of the new electric buses, and also in the commentary by 2CL from a car.

Briefly, the whole experiment was highly successful, and certainly demonstrated the extent to which portable apparatus may be utilised on such occasions. Amateurs participating were as follows:—2CL, 2DL, 2EY, 2IC, 2JT and 2OD.

★

## First Inter-School Broadcast

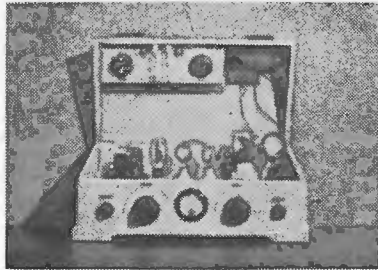
An interesting inter-school experimental broadcast was conducted last month between the Enmore Activity School and the Manly Intermediate High School. The shortwave transmitter at Enmore (VK2EH) was installed and operated by Mr. E. P. Hodgkins (President, Lakemba Radio Club) and that at Manly (VK2AFQ) by Mr. E. Treharne, son of Mr. A. F. Treharne, Director of Music to the Education Department. Speeches, greetings and messages of a similar nature were exchanged between the two schools, the Director of Education (Mr. Ross Thomas) being present at Enmore.

Last year, Lakemba members gave the first two-way telephony school demonstration at the Canterbury High School, but the transmission last month was the first time in Australia that a school-to-school broadcast of this nature has taken place.

Undoubtedly, radio is the finest of all hobbies, and its introduction to young boys is to be highly commended. We have heard it stated, unofficially, that as a school teacher and radio amateur, Mr. Hodgkins is very popular with the boys, as he does all he can to encourage and assist their adoption of wireless as a pastime.

Broadcasting is destined to play a big part as an addition to the educational system of the future. This is demonstrated by the fact that "B" class station 2SM, of Sydney, has introduced a new educational session, besides that of the National Station, while every Catholic school throughout the metropolis is to be fitted with radio receiving equipment.

# Multi-Band Transmitter Uses Unique Assembly



In an effort to get away from conventional layouts, this three-stage multi-band transmitter was built by VK2EH into the unique and attractive cabinet shown. Designed and described by . . .



**E. P. HODGKINS**

THE planning and construction of the transmitter shown in the accompanying circuit diagram has been most interesting, and has presented many problems.

There are several reasons for building it in the form shown. Something new was required: something that would be a change from the conventional American commercial-looking rig that one has become so accustomed to see, mounted in a black and grey rack and panel unit.

Dust is an enemy of efficiency at high frequencies, hence the lid. Compactness was desirable, since the rig

must occupy a position on the operating table.

Finally, portable operation was essential for holiday trips while on vacation, so a valve line-up that would give reasonable output, a 53 and 6L6G, and doubly-filtered power supply were built in. Simplicity and ease of adjustment were required, so capacity coupling was employed up to the 6L6G output.

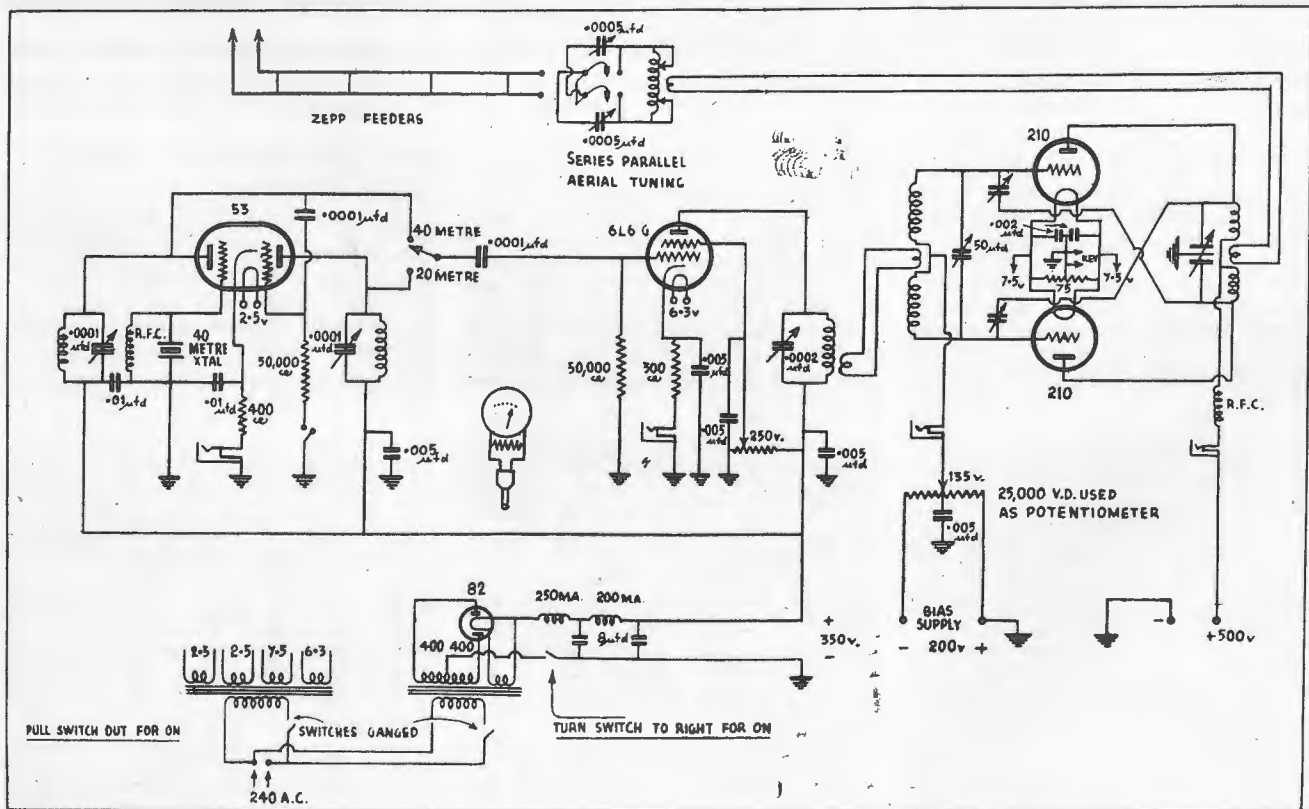
**Operates On 40, 20, And 10**

These problems were tackled and one by one overcome. The accompanying circuit diagram shows a

three-band, three-stage, crystal-controlled transmitter using a 40-metre crystal. It will operate on the 40, 20 and 10-metre bands by changing plug-in type coils in the 6L6G and 210 stages.

A 53 functions as either an oscillator or oscillator-doubler, depending upon the position of a D.P.D.T. toggle switch and a D.P.S.T. switch. The former gives 40 or 20-metre operation and input to the next valve. The D.P.S.T. switch open-circuits the grid of the doubler section for operation on 40 metres.

The new beam power valve, the 6L6G, is used in the next stage, and the 53 provides ample grid excitation for it. Capacity coupling is used between these stages. The output of





this 6L6G stage, when used as a doubler, is quite sufficient for driving the following power amplifier stage, giving upwards of 20 milliamps grid current.

Link coupling is employed to the tuned and balanced grid circuit of a pair of 210's in a permanently neutralized push-pull power amplifier circuit. The P.A. output is link-coupled through a transmission line to a special antenna tuning unit, housed in the lid of the cabinet. Provision for either series or parallel tuning of a zeppelin antenna have been made in this unit, and two switches open or close the antenna circuit so that the load may be removed from the P.A. and a dummy antenna used when adjustments are being made.

Careful planning was necessary in order that efficiency should not be sacrificed to achieve compactness. The advantages of breadboard mounting and panel mounting are included in the construction. The layout follows the circuit naturally from left to right—from oscillator to antenna.

**Two Stages Used For Portable Work**

When used as a portable rig, the 6L6G functions as the output valve, giving either 40 or 20-metre operation; 25 watts of power are available. This portion of the transmitter is powered from a well-filtered power supply, using an 82 mercury vapour rectifier with choke input. A two-section filter gives ample smoothing for 'phone operation. A filament transformer is also mounted on the same chassis, which, measuring 23 in. x 4½ in., is mounted under the baseboard in the bottom of the cabinet.

The whole of the apparatus shown in the circuit diagram is housed in an attractively-finished cabinet and occupies only two cubic feet of space. When in operation the lid is open, and when not in use the lid closes to exclude dust.

**Principal Construction Features**

Other features of the construction are:—

(i) The way in which the layout has been made to allow the antenna tuning unit to close down without fouling any of the other gear.

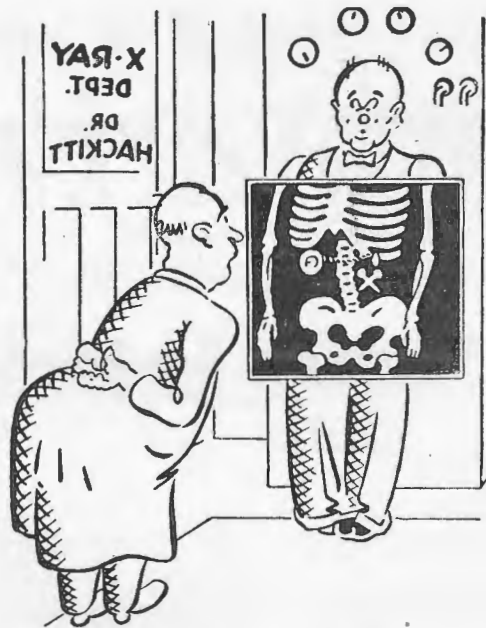
(ii) The antenna series and parallel tuning and antenna-loading device.

(iii) The use of porcelain stand-off insulators and banana plugs and sockets to make plug-in coil supports and lead through insulators for 20 and 10-metre operation.

(iv) The P.A. tank coil plug-in system.

(v) The coil former socket plug-in system for 40-metre operation, which automatically connects the link from the 6L6G output to 210 grids.

(vi) The provision of an attractive tuning indicator dial for the variable condensers, made by taking the scales from old type dials and using suitable knobs in conjunction.



**Inside information is best**

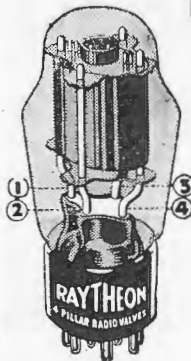
There's nothing like an X-ray for diagnosing defects in the human mechanism.

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**A. J. R. S. Bulletin**

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# The Month In Review

## Service Kinks And Wrinkles

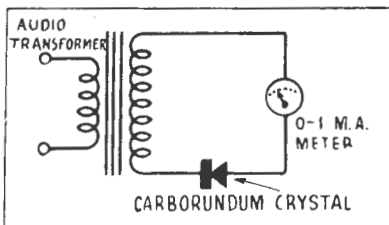
By E. Y. HOOK (A.T.R.S. Head Office).

**T**HIS month's notes will include several hints which may result in a little extra income for servicemen.

Have you tried including in your business an efficient amplifying service—that is, hiring out amplifiers for dances, political meetings, agriculture shows, etc.? The initial cost is high, but the equipment should pay for itself within a few months.

### Simple Output Meter

A simple but effective output meter that can be used in conjunction with an oscillator for the accu-



rate aligning of receivers can be built from only three components, an audio transformer, carborundum crystal, and a 0-1 milliammeter. These are hooked up as shown in the circuit.

### Profitable Service Side-Line

Lately the writer has persuaded a few of his clients to have inverse feedback incorporated in their receivers, to improve the tonal response. In every case the customer was highly delighted with results.

### Rejuvenating Old Pick-Ups

Often during my servicing experience I have come across pick-ups that have lost half of their volume, and have become harsh in tone. This trouble is generally due to the fact that the rubber used to damp the pick-up movement has perished, and has lost its resiliency. The best cure in such cases is to dismantle the pick-up and replace the rubber—a piece cut from a cycle tube is quite suitable. If this fails, the permanent magnet has evidently lost its magnetism and needs re-magnetising.

### Amplifier In Butcher's Shop

Here is an unusual use for an amplifier. Near Porte Champerret, Paris, is a butcher's shop in which the customers and the salesmen communicate through the medium of loud speakers and microphones. The explanation is that the "shop" is a glass-walled refrigerator, and customers choose their requirements through the glass.

### Record Of Service Calls

Further to the hint published last month in reference to leaving a card in the client's cabinet after a call, it is often of great help to have a record of the customer's name and address and of the work performed on

the set. This can be done by numbering the card attached inside the receiver cabinet, and introducing in the shop filing system a job card system numbered in the same way. Samples of the job cards used by the writer are reproduced below.

### Card for Client's Receiver:

Associated Trained Radio Service  
287 Clarence Street  
Sydney.  
MA 7055—or after hours Pet. 3272  
"Anywhere at Anytime"

Please Quote No.....

### SERVICE JOB CARD

Name .....  
Address .....  
No. ....

### Details of Set:—

Valves .....  
Speaker .....  
Make .....

Remarks: .....  
Date                      Trouble                      Parts

# Tracking Down Distortion

## Common Causes And Cures

By G. SIDLER (Memb. A.T.R.S.)

**T**HE subject of tonal quality in radio receivers is being given a considerable amount of attention at present. Commercial receiver design now tends towards better tone than previously, and this is really about the only essential improvement required in the modern set.

Much has been written on the subject of inverse feedback and its applications, and so it will not be dealt with here. These notes are more or less intended for the serviceman as a guide to tracing down distortion in a faulty receiver, to restore the original tonal quality.

### Fault Generally In Output Stage

The stage in which distortion most commonly occurs is the output stage. If the output valve's emission has fallen off, this produces distortion when the set is turned up to levels much higher than a whisper. However, an analyser will verify the presence of this fault in a moment; the steady plate current will be very low, while the mutual conductance

swing will be very slight. Replacement is, of course, the only remedy.

If the valve is comparatively new and has expired, or nearly so, in a fairly short time, a cause should be looked for. This will most likely be found to be a faulty coupling condenser or a grid resistor of too high a value. In the latter case a 1/2-meg. resistor of reliable quality should be substituted. A leaky coupling condenser will have the effect of reducing the bias on the output valve; actually it could nullify it altogether, and result in a positive voltage on the grid. Severe distortion would take place, and the life of the valve would be greatly shortened.

### Common Speaker Defects

The voice coil of the speaker sometimes fouls the pole-piece of the magnet and produces rattling, while dust or fine particles of dirt between the voice coil and electro-magnet could also cause this trouble. In some cases, due to atmospheric conditions such as high humidity, etc., the cone

will twist or warp, and the voice coil will be actually jammed on the pole-piece, thus causing, not a rattle, but a very weak, distorted signal. To the ear this may sound like receiver distortion, resulting in time spent in tracing distortion in the amplifier which actually is not present.

Coming now to the driver stage, if any, the value of the plate resistor should be checked. It is of little use measuring the plate voltage in a resistance-capacity-coupled circuit with the average voltmeter, as the internal resistance of the meter will upset the reading, giving a much lower reading than the true one. This also applies to the de-coupling resistor, if one is used.

If the de-coupling by-pass condenser is faulty and is short-circuiting, or partly so, the voltage on the plate will be either nil or a few volts. In this latter case distortion will result which could perhaps be described as a "cracking up" of the music or speech. The bias resistor on this valve is usually of the carbon type, and is therefore liable to change its value. Hence a check on the bias voltage is advisable. The grid leak in the case of the driver valve is not so liable to cause distortion as in the output stage, as a high value is permissible. (Up to 1.5 or 2 meg. is sometimes suitable). If, however, the value of this resistor is too high, or if it is open-circuited, the defect can be recognised, as the distorted speech or music will completely block out for a moment or two, on a strong signal or burst of static.

Working back towards the detector stage, the coupling condenser between detector and driver should be checked. In the case of diode, diode-triode, or screen-grid detectors, the remarks made above apply to the bias, plate, and de-coupling resistors, and to any by-pass condensers.

**Self-Biased Diode-Triodes**

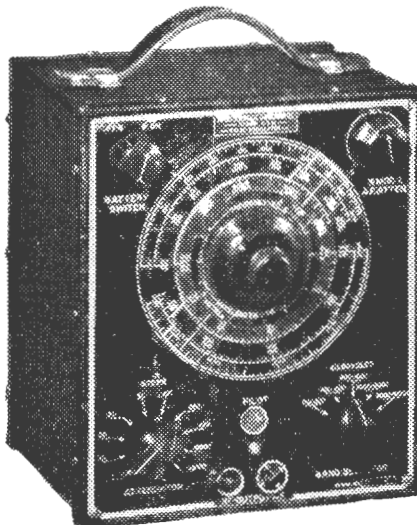
In diodes and diode-triodes, the bias resistor is often absent, biasing being accomplished by the signal voltage across the diode load resistor, which if open-circuited or of too high a value, will cause distortion. In some of the earlier circuits, the triode grid of the diode-triode was connected through an r.f. choke to the diode detector plate or plates. If distortion is traced to somewhere near this point, a blocking or coupling condenser should be used to feed the signal to the grid, with a 1/2 meg. grid leak from grid to earth. This eliminates self-biasing action, and so correct cathode bias should be applied.

In a leaky-grid detector, a high value of grid leak will mean high sensitivity, but poor tone, and vice versa. 2 megs. is the usual value and should not be exceeded for local station reception.

(To be continued next month)



**THE SYMBOL OF SOUND TESTING EQUIPMENT!**



**Model D.R. All-Wave OSCILLATOR**

Ideal for service and factory use. Features Direct Reading Dial in five ranges from 150K.-1,600K. (2,000-19) metres. Reads simultaneously in K.C.'s and Metres, fitted with differential slow motion drive.

The attenuator incorporated is particularly effective, having the negligible leakage necessary for the alignment of a super-sensitive set with A.V.C.

Heavy batteries, pilot light, variable modulation, and variable A.F. output are added features.

Price, complete with two valves and batteries, £10/15/-. Plus tax.

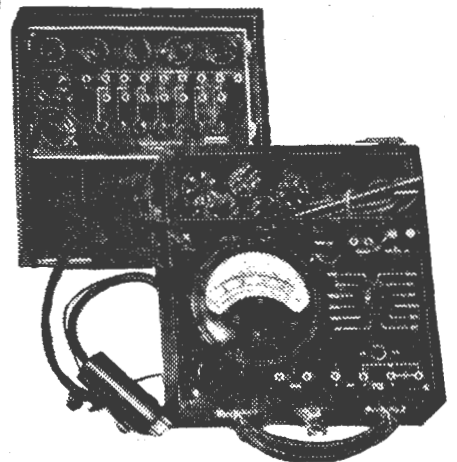
**And now a NEW Service MULTITESTER**

Moderately priced and incorporating the new "Patec 5" type meter (model 475), the new Model M5 Multitester is housed in a smart leatherette case complete with test prods.

Ranges D.C. VOLTS: 10-50-250-1,000 MAS 1-10-50-100 OHMS 0-2,000 - 20,000 - 200,000 - 2,000,000. (The latter range is obtained by connecting an external 45 volt battery to terminals provided).

ANALYSER SELECTOR, which is easily fitted in the removable lid (see illustration) can also be supplied for voltage and current reading at all points of a valve.

Model M5 (ranges as above) ..... £5/17/6  
 Complete with Analyser Selector ..... £8/12/6  
 A.C. Volts extra ..... £2/2/-



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A.R.W. H2.

# What's New In Radio

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

## English High-Fidelity Speakers Imported By U.R.D.

Those who regard quality of reproduction as the most important feature of a radio receiver or amplifier will be interested in two sample Hartley-Turner speakers just landed from England by United Radio Distributors, of Sydney. Designed with the sole object of giving the highest fidelity of reproduction, these speakers are recognised in England as being among the finest available anywhere in the world.

The samples mentioned above are available for inspection and demonstration at the U.R.D. showrooms, located at 234 Clarence St., Sydney, while readers who cannot call are invited to write for further details.

★

## Noyes Bros. Release Latest Ferranti All-Wave Radio

Recently imported from England by Messrs. Noyes Bros., the tonal qualities of the new all-British Ferranti radio receivers will delight discriminating buyers whose desire it is to hear music reproduced at its best.

### Improved "Magnascopic" Dial

In addition to the superior tonal qualities, the next most outstanding feature is the Ferranti "Magnascopic" dial. This device makes shortwave tuning as simple and easy as tuning in local stations, and is definitely not a "gadget."

Briefly, it is a carefully-designed though simple optical device whereby a scale is magnified to an effective length of over six feet. The enlarged readings of the scale are seen through a window above the main dial, and are so easily discernable that the precise point at which each station is received can be read exactly. Hitherto this has been an impossibility with the types of dials available.

### Variable Selectivity Incorporated

There are separate controls for wave-range and tone, and a combined volume control and "on-off" switch. An electric tuning indicator is provided, as well as the magnascopic dial, and in operation the receiver is tuned till this electric indicator dips to its lowest point, when the tone control, which also varies the selec-

tivity, is adjusted until the band width is as wide as broadcasting conditions permit. When the tuning control is adjusted to receive another station, the receiver returns automatically to its highest selectivity position.

The range available at present includes the "Arcadia" table model, console model, and the radiogram receiver. The latter is provided with a high-grade induction gramophone motor and electric pick-up.

Noyes Bros. (Sydney) Ltd., sole agents for all Ferranti products, will be pleased to demonstrate these outstanding receivers in their sound-proof audition room at 115 Clarence Street, Sydney. The trade are specially invited to avail themselves of this invitation.

★

## Stromberg-Carlson Vibrator- Powered Dual-Wave Six

Recently one of the latest model 617 vibrator-powered Stromberg-Carlson consoles was received for test in the "Radio World" laboratory. According to the manufacturers, this receiver represents the result of eleven months' research by one of their engineers, which explains the



The Stromberg-Carlson model 617 vibrator-powered six-valve dual-wave superhet.

late entry by Stromberg-Carlson into the vibrator-powered field. The Model 617, it is stated, is not merely a battery receiver with a vibrator unit added; it is specially designed throughout for vibrator operation, to give a performance equal to that of an all-electric receiver.

The model 617 is a six-valve dual-wave receiver using three 1C4's, one KK2, one 1B5, and one 1D4. Wave-band coverage is from 195 to 570 metres on broadcast, and from 16.8 to 51 metres on shortwave, giving coverage of the five international shortwave channels.

Noiseless operation is claimed by the makers, and this claim was amply borne out during tests. Even down to the lower limit of the shortwave band there is not the slightest trace of vibrator noise—indisputable evidence of the careful design employed throughout both power supply and receiver.

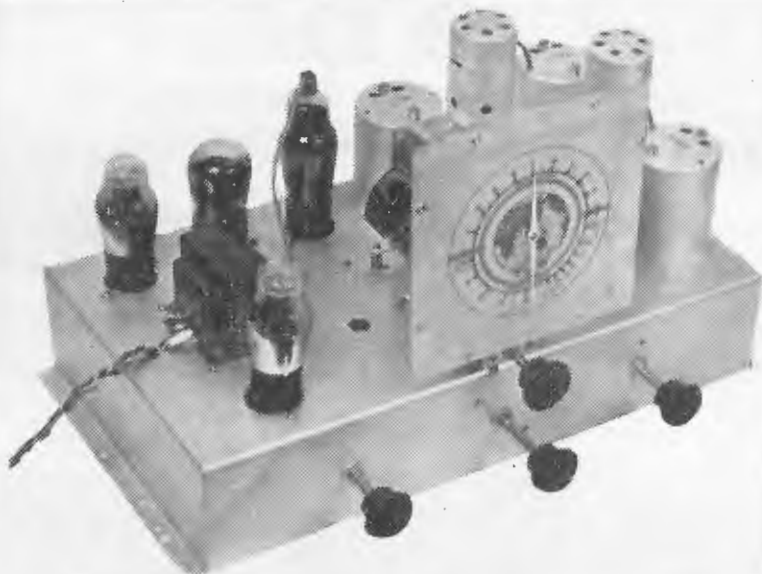
In operation, the 617 gives an all-round performance easily equal to that of many commercial dual-wave a.c. receivers using an equivalent number of valves. Excellent sensitivity, combined with low noise level and high selectivity, have been ensured by the use of an r.f. stage and iron core coils. An important point is with the extremely low noise level, full advantage can be taken of the high sensitivity available with a circuit of this type. In fact, the main shortwave stations of the world can be tuned in with local volume using only a few yards of indoor aerial and with the volume control turned well back.

### Vertical Straight-Line Tuning

Vertical straight-line tuning, as used for all Stromberg-Carlson models, is incorporated in the 617. The dual ratio tuning dial (ratios, 60:1 and 10:1) makes the set a pleasure to handle, particularly on the short waves. The movement is velvet-smooth, without a trace of back-lash. The dial is of the edgelit type and with stations divided into States.

As shown in the photograph, four controls are provided. That on the extreme left is a five-position switch, the positions being:—"Off," "on with pilot lamps," "on without pilot lamps," tone control 1, tone control 2. The pilot lamps switch is a useful feature, as it permits of an appreciable saving in "A" current. Actually, the dial is so clearly calibrated that in a normally-lighted room, pilot lamps are not necessary. The two-position tone control enables all tastes in the matter of reproduction to be catered for, though normally the tone is clear and well-balanced. The remaining controls (left to right) are volume, tuning and wave-change switch.

The model 617 is housed in the well-known Stromberg-Carlson Up-



# CROWN

## "AIR-CELL PENTAGRID SEVEN" KIT-SET

TYPE KS-D7B, featuring:-  
**IRON-CORE**  
Broadcast Coils

Price . . . . £11-10-0

Bring the entertainment centres of the entire world to your home with guaranteed certainty, with the Crown KS-D7B D/W Pentagrid Seven.

We confidently guarantee the absolute ultimate in country reception with this latest release of the Crown Radio Laboratories, featuring as it does the very latest development in Iron Core Coils, and specially designed Intermediate Transformers.

Valves, Cabinet and Speaker are the only additional items required with the KS-D7B, everything else, including full instructions, being supplied, down to the last nut and bolt.

New Catalogue of "Crown" Products will shortly be available. Send for your copy, enclosing 2d. stamp for postage.

### CROWN FOUNDATION KIT

Type KO-2B £6/12/6

For those builders not requiring the complete Kit Set, or who may require to rebuild an existing receiver, the Crown Foundation Kit, type KO-2B is ideal. Obtain the superb performance that only Iron Core Coils can give, and be sure of perfect dial tracking, by using the essential components co-ordinated in the form of the Crown Foundation Kit, type KO-2B, comprising:

- 1 Dual-Wave Coil Unit.
- 3 Intermediate Transformers.
- 1 D/W Dial Calibrated to suit Kit.
- 1 Ready Punched Chassis, as used in KS-D7B Kit Set.
- 1 Stromberg-Carlson F2 Gang Condenser.

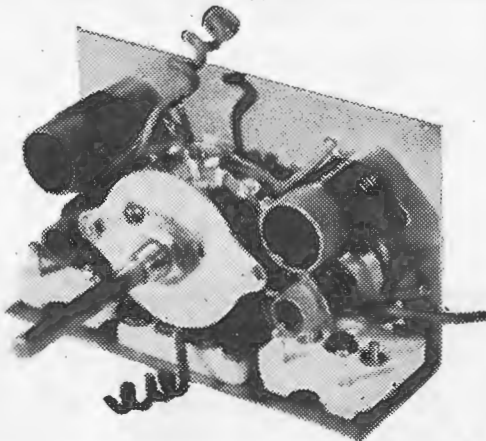
### CROWN DUAL WAVE COIL KIT

Type IDO-2B £2/9/6

As supplied with KS-D7B Kit Set.

#### FEATURES:—

- Iron Core B/C Coils.
- 16/52 metre S/W Coils.
- Frequentite Insulated Trimmers and Padder.
- Yaxley DW and Dial Switch.
- Completely wired and tested on the air before despatch.
- 3 I.F. transformers (type IRS 465, Nos. 1, 2 and 3), specially designed for the IDO-2B .... PRICE, 5/9 ea.



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# CROWN RADIO MANUFACTURING CO. PTY. LTD.

51/53 Murray St., Pyrmont, Sydney, N.S.W. MW 2628 (3 lines).

right Grand console cabinet, which is not only very attractive in appearance, but is solidly-built throughout, eliminating cabinet resonance and providing effective baffling for the 8-inch Magnavox speaker used. Other features of the 617 are provision for the use of a noise-reducing aerial with transposed lead-in, and for the attachment of a pick-up. The receiver is particularly economical to operate, as the battery drain is only .9 ampere.

The model 617 can also be supplied for use on a 32 or other low voltage D.C. house lighting system.

#### Other New S.C. Releases

Other Stromberg-Carlson models that have just been released comprise four receivers designed for air-cell operation: 4-valve broadcast mantel and upright models, 5-valve broadcast upright model, and a 6-valve dual-wave upright grand. As well, there are two further mantel models, an a.c./d.c. dual-wave 5-valve, and a 4-valve battery broadcast receiver. Housed in attractive Du-perite plastic cabinets, these receivers are available in many attractive colour schemes.

#### Philips Engineer Honoured

The winner of the 1936 Gold Plaque awarded for the first time by the Institution of Radio Engineers (Aust.)—and in future to be presented annually—was Mr. V. H. Dudman, M. Inst. R.E. (Aust.), manager of the transmitting and industrial department, Philips Lamps (A/asia) Ltd.

The award was made for the best paper delivered by a full member of



Mr. V. H. Dudman, M. Inst. R.E. (Aust.).

the Institution during the 1936-1937 period, and Mr. Dudman's paper, which dealt in two sections with "Transmitters—Some Observations

On Their Design," was judged by the Federal Council of the Institution as the most valuable contribution made during the year.

## New 5-Metre Records Sydney-Newcastle QSO

THE occasion of the W.I.A. (N.S.W. Division) field day held on June 27 last was a signal success in two directions, although a hoped-for tie-up over an all-sea route did not eventuate.

Stations VK2NO and VK2ZC, operated by Don B. Knock in Sydney, and Jim Cowan in Newcastle respectively, communicated direct in daylight and darkness, and a report was received by the W.I.A. that the I.C.W. signals from VK2NO on a scheduled test transmission had been heard by VK2DN at Deniliquin, 360 miles away on the N.S.W.-Vic. border. The latter is most encouraging for future tests between Sydney and distant places, and special schedules are to be arranged for country experimenters. Sydney stations will be working on 5 metres on pre-arranged dates and times for the benefit of zoned districts, with beam aerials aimed in the various directions.

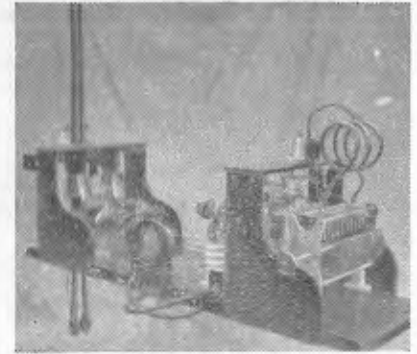
The contacts between VK2NO and 2ZC were noteworthy for the fact that this was no occasion when mountain tops were resorted to in an effort to cover the distance. Both stations worked from ordinary residential locations in the two cities. At both ends the signals were subject to severe high-speed fading in the night transmission, the fading occurring about nine times during the period of a single morse dash.

In the test transmission between 11.45 and noon, VK2ZC was heard between R6 and 98 plus on I.C.W. and speech, and even when he had his beam aimed across the Tasman for New Zealand, he was still audible at R5 in Waverley.

#### Transmitters And Aerials Used

The transmitter at VK2ZC consisted of a two stage M.O.P.A. with long lines 800's as the oscillator, and 800's in the power amplifier. Input was 60 watts. At VK2NO the transmitter is a three-stage arrangement, using a 6L6 e.c. oscillator from 28 to 56 M.C. driving an RK 25 buffer, with two 35T's in the final.

VK2ZC used an "H" array aerial with reflectors, and VK2NO was using an end-fire twin dipole array. Being bi-directional and aimed N.E., the signal from the S.W. side was the one reaching VK2DN at Deniliquin. Here the signal was observed



The 5-metre transmitter used by 2ZC consists of a two-stage M.O.P.A., with a pair of 800's as long-line oscillators driving a pair of 800's.

for a few seconds at two intervals between noon and 12.15 p.m., at the time VK2NO was transmitting the test schedule.

VK2NO believes that the cyclonic weather conditions were responsible for the presence of a reflected wave at this range. Such conditions have been noted by W2JCY, who is able, when the weather permits, to work 400 miles along the Eastern U.S.A. coast. In addition, G5BY and G6DH have been heard by W2JCY.

#### Is Consistent Communication Possible?

The question of working between Sydney and Newcastle on 5 metres has long been a bone of contention for 2NO and 2ZC, and at last they have laid the bogey. It appears that with the correct kind of apparatus and aerials at both ends, there is no reason why consistent communication should not be possible between 5-metre experimenters in these two cities. The airline distance is 70 miles, but high hills intervene.

VK2NO is using the receiver which won first prize in the U.H.F. section at the 1937 Amateur Radio Exhibition. It has a 956 acorn T.R.F. stage, 6K7 e.c. detector, 76 interruptor, and 41 audio. A new Bruce aerial with a curtain reflector is planned for working in one direction with greatly increased gain, but this presents quite a few structural difficulties.

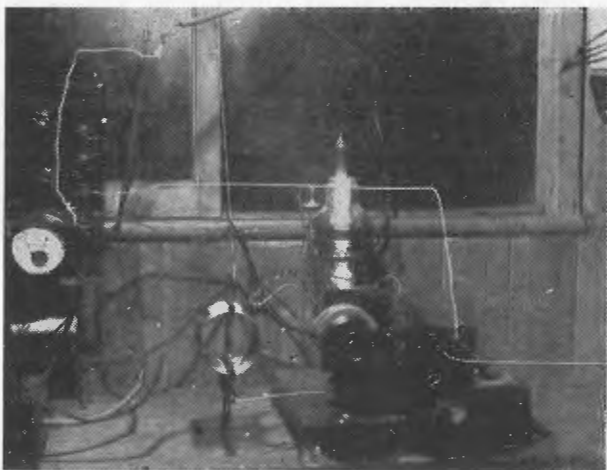
# 25 Years In Amateur

## Radio . . . (4)

The fourth instalment of a biography dealing with radio in the early days, written for the "Radio World" by

**DON B. KNOCK**

Radio Editor, "The Bulletin."



A station operated by the author in England in 1924. Undoubtedly "haywire," but a good station as they went in those days.

MUCH could be told of both unpleasant and congenial war experiences, but as they would occupy a volume, it is sufficient to say here that from the Bulgarian theatre of war we returned to Mudros, and carried on with the bombing of Constantinople.

It was during these operations that I had a very near shave in connection with an aerial. Two of us armourers were preparing a DH9 with 65-pound "pills" under the wings and a 230-pounder under the fuselage. Seated on the ground with my back to the tail, and with another fellow lifting the nose of the bomb, I almost had it in position in the frame when things happened.

Just behind my neck dangled the lead weight of the wireless aerial from the observer's cockpit. A W/T mechanic proceeded to test the gear, and pressed the key. A biting, excruciating spark hit me in the neck, and both of us handling that bomb got the full benefit. When we had recovered sufficiently to realise that we were still part and parcel of this world, we chased that W/T man in anger out of the cockpit.

Beyond a few bruises on the legs and cuts on the hands where the heavy bomb had dropped on us, no damage was done, but how easily it might have been otherwise! A solid spark from detonator to bomb casing would have been all necessary, but fortunately most of the spark discharge went to earth through our bodies.

### Experiences In South Russia

When Johnny Turk threw in the towel, we kicked our heels for a few weeks in anticipation of England, home, and beauty. That wasn't to come for another year, for the

squadron was suddenly re-formed, and in short order I found myself willy-nilly in Southern Russia as a cog in the wheel of the Caspian "police force," ostensibly to protect British interests against the revolutionary onslaught. Here I made closer contact with the wireless section again, and have vivid memories of the work done by our little quarter K.W. spark outfit with Douglas engine and rotary gap.

Outside the port of Petrovsk, where we were stationed, stood a massive wireless tower and the buildings of a Russian station. In a previous retreat before Denikin's white armies, the revolutionaries had completely destroyed what had been an excellent telefunken station of the 5 K.W. variety. Nothing could be used. Even the winch at the base of the tower had been wrecked, the cables released, and the foundations on one side dynamited. It was too tough a job to attempt re-construction under circumstances of swift action, and so our own 80-foot masts were erected, and an aeroplane packing case used for a "shack."

### "Souvenired" Radio Gear

Much happened in that year, and in the end swift evacuation was imperative. The revolutionaries were sweeping all before them, and it was a case of "get out quick or take the consequences." British armed intervention in Russia came to an end. There was only time to remove a little equipment—most of it was destroyed. With all the instinct of a "ham," however, I scrounged a nice pair of Ericsson high resistance headphones and some useful gadgets, stowed them at the bottom of my kit, and in due course these treasures

reached England safely with me (despite kit inspections).

It was as an older young man that I left London for home, once again a civilian, and wondering what to do in future. Like most returned men, I possessed a neat war gratuity, and after a hectic week or two of celebration with old service pals, my thoughts turned to a motor cycle and, of course—wireless.

The old London Wireless Society was formed; the P.M.G. lifted the ban on amateur wireless, and clubs began to spring up all over England. I became a foundation member of the Southport (Lancashire) Wireless Experimental Society, met kindred spirits, and "ham" radio started in earnest.

### Valves Selling At £2/10/-

With the war over, government surplus stores were selling ex-service wireless gear at ridiculous prices, and I obtained a C MK III trench amplifier for £3. This was a wonderful thing in those times, with three stages of transformer-coupled "note magnification"! The price of valves was another matter. The French R valves were the only ones available, and at what a price! They cost £2/10/- each, had greedy filaments, and lasted about six weeks before burning out.

I made up a massive loose-coupler tuner (honeycombs weren't thought of then) with a galena detector, and hitched the amplifier after them. One of the Ericsson 'phones went behind a long brass phonograph horn to make what must have been one of the first loudspeakers in England.

### Melba Broadcast From Chelmsford

That year occurred the epic broadcast from Chelmsford (on 2,500

metres) of Madam Melba; and myself, family and friends listened entranced to that historic broadcast. I shudder to think of the quality of reproduction now, but wireless broadcasting of any kind was a miracle then, and the fact that anything even resembling a voice could be heard and understood was marvellous.

Then came the tests from the liner "Victorian" as she crossed the Atlantic, and after this the famous "2MT Writtle" station opened up, with a versatile announcer in charge named Eckersley. That announcer was destined a little later to become England's number 1 radio man, first Chief Engineer of the early B.B.C.

Meanwhile I had to start work, and the "gub'nor" insisted that I continue engineering. I got a job as improver-apprentice in a big Liverpool shipyard, but again wireless took up all my interest. Improving time finished, needs must that I justify myself, and before I realised it I was engineer afloat with the P. and O. Company.

#### My First Visit To Sydney

In 1922 I first visited Sydney as junior engineer on the Naldera. Most of my time off watch was spent in the company of "sparks," and it was while tied up at Circular Quay that I first heard old 2CM's programme (Chas. Maclurcan) on 440 metres.

Two years at sea were sufficient to prove to me that my interests lay elsewhere, and against the wishes of an angry parent, I "came ashore" and secured a position as sales representative with a large North of England motor manufacturer. Selling cars and trucks came easy to me, and I flourished, but all my spare cash went in radio.

All this time broadcasting had been getting a hold, and the wireless business was growing rapidly. From being a hobby of young men looked upon as fanatics, it had grown to an industry for which the public was clamouring. It was time to make another move, and so I joined the Sterling Telephone Company as sales engineer, moving thence to the old Burndept Co., on the servicing side.

Naturally, being employed commercially in radio, the amateur game at last came into its own, and unhampered I entered the phase of real DX, under the call-sign G6XG. The method of licensing "hams" in England is quite different to that obtaining in Australia. Firstly, an artificial (dummy) aerial licence is given, and when the experimenter is considered advanced enough, he applies for a "radiating" licence. Mere reasons of DX and suchlike are not enough. The actual technical reasons as to why the transmission licence is needed must be given.

#### A Transmitting Licence At Last

It took quite a long time before my well-thought-up reasons satisfied the P.M.G., and after many months of correspondence, backed up by representation from the R.S.G.B., the Department eventually succumbed. Quite a difference to pre-war affairs, but wireless was no longer a "will-o'-the-wisp," and the race was on.

It was in 1924, in London, that I established my first post-war station, which ran entirely from accumulator power. The house had no electrical power, and I had to do the best I could. Around 200 metres was the order of things, and G6XG of 1924 sprouted a massive multi-wire cage "T" aerial, a ten-wire counterpoise, a single DE5 valve in a "reversed feedback" circuit, an ex-army "TVT" unit (spark coil power supply), and a three-coil receiver with "swinging coil" reaction.

#### DX Club Report Forms Great Time-Saver For Dxers

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

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

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

I made an awful noise around London N.W.8., but I reached out. A great thrill was the working of old Finnish 2NM as my best DX on 200 metres, and Frenchmen, Belgians and Dutchmen I worked by the score. I still have dozens of old original 200-metre QSL cards from those days, and they are among my treasured possessions.

Gradually the B.C.L.'s around my district became aware of the fact that the terrific noise all across their dials came from a "ham." A petition went in to the P.M.G. to stop me transmitting, and the Department descended in just wrath. Result—out with the spark-coil I.C.W., and in with pure C.W. The M.L. Magneto Co., of Coventry, lent me a dinky little rotary converter that gave 500 volts D.C. at 40 m.a., and then things began really to happen.

John Reinartz (then U1XAM) had launched his famous "Reinartz" receiver on an interested "ham" world,

and I duplicated laboriously a faithful copy. How that receiver perked!

#### Getting Down To The Short Waves

Meanwhile, the famous U1MO-F8AB contact across the Atlantic on 100 metres had taken place, and "200" was relegated to the discard. All the G's got busy on 100 metres, and with the "Yanks" on 85 metres, what a great time we had. It was quite an effort to get "down" to 100, too! There was no 10-watts regulation for G's in those days, and most of the gang, Marcuse (G2NM); Partridge (G2KF), Hogg (G2SH), Simmonds (G2OD) and Goyder (G2SZ) were using power, and plenty of it, on Marconi T250's and similar valves. I had to be content with my little DE5 (similar to a 201A).

#### My First American Contact

Nevertheless, my puny little D.C. converter got me "across the pond" for my first American contact with U1BHM, and the high-power gang couldn't believe their ears! It had been worth lugging my heavy accumulators to the charging station a mile up the road after all, as this was the first trans-Atlantic low-power QSO. The possibilities of QRP began to be realised, and some marvellous work was done by old G5SI and G6TD with similar equipment to my own.

At this stage I recall an historic event. Listening around 85 metres at about 7 p.m. one foggy winter's night, I heard a weak but perfectly readable signal calling "ICCM de Fisk." That signal (as I heard in later years) originated from the experimental station of Mr. E. T. Fisk, at Vaucluse, in Sydney, and he was calling the Elettra, Marconi's yacht.

#### Z4AA Was First ZL Worked

Then came the Antipodean era! Most G's had worked with a station in Buenos Aires signing CB8, and it was considered that Australia or New Zealand couldn't be too much to hope for. Cecil Goyder, of Mill Hill school, staggered the world by working early one morning with Z4AA (Frank Bell) of Palmerston South, in New Zealand. This was on 95 metres at the English end. Goyder (now chief engineer of "All India Radio") couldn't believe that it was genuine until a cable arrived from Bell in confirmation.

What a rush! The air was filled with "T-E-S-T NZ, AUST de G—." Then the Australians broke through. Simmonds, of G2OD, worked Max Howden (A3BQ), and Chas. Maclurcan (A2CM) appeared on the scene. The globe was encircled—there seemed little else to do. Considering the then comparatively inefficient gear of those times, this amateur work around the 100-metre mark was no small achievement.





# The All-Wave All-World

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

# DX News



### S.W. Stations VK2ME, VK-3ME, And VK6ME — Transmission Schedules for August, 1937.

According to advice just to hand from Amalgamated Wireless (A'sia.) Ltd., the following transmission schedules will be observed by short-wave stations VK2ME, VK3ME, and VK6ME during August:—

**VK2ME (31.28 m., 9590 k.c.)**  
Sydney Time G.M.T.  
Sundays: 3 p.m.-5 p.m. 0500-0700  
7.30-11.30 p.m. 0930-1330  
Mondays: 1.30-3.30 a.m. 1530-1730

**VK3ME (31.5 m., 9510 k.c.)**  
Melbourne Time G.M.T.  
Nightly  
Monday to 7 p.m.-10 p.m. 0900-1200  
Saturday (inclusive)

**VK6ME, Perth (31.28 m., 9590 k.c.)**  
Perth Time G.M.T.  
Nightly  
Monday to 7 p.m.-9 p.m. 1100-1300  
Saturday (inclusive)

### W.I.A. (N.S.W. Division) 56 M.C. Field Day

THE 56 m.c. Field Day and DX Test arranged by the Ultra-High Frequency Section of the Division on June 27 resulted in two-way communication being established between VK2NO at Bronte, Sydney, and VK2ZC at Shepherd's Hill, Newcastle. The distance, 75 miles, between these stations constitutes a record for 56 m.c. in N.S.W.

The transmitter at 2ZC consists of a pair of 800's as "long line" oscillators driving a pair of 800's, and the signals were heard at R9 by 2LZ on his special superhet, operated at Manly. 2ZC's receiver was a 955-76 super-regen.

2NO was using a 3-stage M.O.P.A. with P.P. 35T's in the final, the receiver being a 4-valve super-regen. with a 956 r.f. stage.

2WI was operating from Port Kembla with a pair of 802's crystal-controlled, but apparently the location was not suitable, as 2NO was the only station heard over any appreciable distance.

An interesting report was sent in by VK2DN at Deniliquin, who heard

a buzzer-modulated VK signal, but could not identify the station owing to rapid fading. It is believed that the station heard was 2NO.

It is intended that for the future the last Sunday in each month will be devoted to 56 m.c. tests of a similar nature, so all interested in U.H.F. work are requested to listen on those days and report results to the W.I.A., Box 1734 JJ, G.P.O., Sydney. —R. A. Priddle (Publicity Officer, W.I.A.—N.S.W. Division).

### Multi-Lingual VK2ME Announcer

When a Frenchman, Dutchman, German or Italian listens to VK2ME, the world-range broadcasting station

of Amalgamated Wireless, at the week-end, he is certain before long to hear his own language.

Mr. Philip Geeves, the announcer on VK2ME, informs various foreigners in their own tongues that this is the voice of Australia speaking; that he hopes they are enjoying the programme and the talks on the tourist attractions and industries of Australia; and he remarks that if they care to write to the station regarding reception or programmes, A.W.A. will be pleased to return them an acknowledgment card.

These multi-lingual announcements have brought a very substantial response. Every month something like 500 letters are received from overseas listeners of various nationalities.

## 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.]



# Short-wave Review

CONDUCTED BY

**ALAN H. GRAHAM**

## More About Police Transmitters ★ Patchy Conditions On High Frequencies ★ More South Americans On The Air ★ Chinese 'Phone Stations ★ Latest Schedules.

SINCE last month's issue an official verification of the report forwarded to Police Radio W2XEM, Newark, has been received from Mr. Michael P. Duffy, Director of the Department of Public Safety in that city.

In his letter, the following interesting information concerning W2XEM's equipment is given:—

### Newark Police Equipment

"Our transmitter now in use is a Western Electric 500-watt, fully capable of being modulated up to and over 100%. The transmitter consists of two units: a 50-watt modulated amplifier feeding a 500-watt linear class 'B' amplifier, and a similar 50-watt unit included in our set-up to be used as an emergency or stand-by transmitter. Either 50-watt unit is capable of being put on the air individually or coupled to the amplifier.

"Frequency is maintained to better than 100 cycles by use of a precision 'A' cut piezo quartz. Doubling the third harmonic of the crystal stage gives us our transmitting frequency.

"The transmitter is housed on the 34th floor of Newark's tallest building, the National Newark and Essex Bank Building. The antenna consists of a half-wave vertical 'Chaffee Impedance' atop of a hollow steel flag mast 100 feet long on the top of the building. The antenna is energized by a concentric feed some 200 feet long. Starting at the transmitter, this feed goes through a concrete floor, up a hollow tile wall, through the flag mast, and finally connects to the antenna. This places the antenna about 650 feet above street level.

"The transmitter is completely powered by A.C. voltage network, three phase 208 volts, supplied by

the local power and light company.

"Alarms are dispatched from a central room at Police Headquarters about half a mile from the transmitter. Telephone lines and microphone facilities make the transmitter proper an emergency point for the transmission of alarms.

"Receivers are Western Electric

superheterodynes, powered by six-volt dynamotors, drawing power from the car batteries."

Conditions have been most disappointing as far as high-frequency reception has been concerned. Only on isolated occasions have readable signals been audible below 16 metres.

### Los Angeles Police Testing

The police bands seemed to have collapsed completely, as even the two most consistent stations, W2XEM and W5XB, Fort Worth, had not been heard for some weeks prior to July 13. However, on that day the Los Angeles police station was heard testing on 30.1 megs. (or 9.9 metres) with a power of approximately 100 watts. Signals were steady at fair speaker strength.

### W9XPD Again On 9 M.

The 31.6 meg. broadcast channel has also been very poor—dead silence obtaining for day after day until W9XPD, St. Louis, made a most sudden and unexpected appearance just before noon on July 19. Signals were surprisingly loud—R7.

Even on 11 metres conditions have been very patchy. W6XKG, previously one of the most consistent stations on the air, has been most erratic, and only on several occasions have their signals been worth while. W9XAZ has been logged only once during the past month.

### "Latin-American" Stations Now Plentiful

A feature of this year's reception has been the number of new "Latin-American" stations heard (if we can use the term "Latin-American" to cover South and Central America and the West Indies).

### Two New Cubans

The Cuban trio, COCH, COCQ and COCX, continue to be heard regularly. In addition to these stations, there appear to be two new Cuban stations audible on 25 and 32 metres. They are located in Matanyas and Habana respectively, and the calls are believed to be COGF and COBP.

### HJ4ABD, Colombia

A Colombian station heard at 9 p.m. on June 3, and not positively identified at that time on account of very bad C.W. interference, now seems likely to have been HJ4ABD, Medellin, on 5,780 k.c., or 51.9 metres,

## Official Observers For Shortwave Review

The Shortwave Editor is pleased to announce the appointment of Mr. G. O. La Roche, of Perth, West Australia, as the first Official S.W. Observer of the "Australasian Radio World."

In order that the shortwave review may be as up to date and comprehensive as possible, it is the intention of the "A.R.W." to appoint a series of Official Observers (for each State and New Zealand), whose monthly reports will be incorporated in the Shortwave Review.

Dxers interested in this matter are asked to communicate with the S.W. Editor (C/o. "Radio World") as soon as possible, briefly setting out the experience they have had in the sphere of shortwave DX, and also giving details of their receiving equipment.

Watch these columns for further announcements regarding appointments.

—The Shortwave Editor.

## Latest List Of Mexicans

Mexican stations have been rather more prominent than usual of late, and for this reason the following list of official Mexican calls may be of interest:—

Call	Location	K.C.	Metres
XEBM	Mazatlan	15,440	19.43
XEWI	Mexico City	11,900	25.21
XEXR	" "	11,895	25.22
XEXA	" "	11,880	25.25
XEBR	Hermosillo	11,820	25.38
XEYU	Mexico City	9,600	31.25
XEDQ	Guadalajara	9,520	31.51
XEFT	Vera Cruz	9,510	31.55
XEWW	Mexico City	9,500	31.58
XECR	" "	7,380	40.65
XEXS	" "	6,200	48.39
XEXA	" "	6,171	48.61
XEFT	Vera Cruz	6,120	49.02
XEUZ	Mexico City	6,117	49.02
XEPW	" "	6,110	49.1
XECU	Guadalajara	6,075	49.38
XEXR	Mexico City	6,065	49.46
XEBQ	Mazatlan	6,030	49.75
XEUW	Vera Cruz	6,020	49.83
XEWI	Mexico City	6,015	49.88
XEBT	" "	5,990	50.08

Several of the above stations have been logged recently. Dxers who can listen during the late afternoons should look out for XEUZ, Mexico City, on 49.02 m. They are often on the air till after 5 p.m. Their slogan is "Radio Nacionales," and the address P.O. Box 2641.

XEBR, P.O. Box 68, Hermosillo, have also been reported recently. They relay XEBH on a frequency of 11,820 k.c. (just below I2RO). The best time for reception appears to be just before they close between 2.30 and 3 p.m.

XEWI, XEWW and XEBT, all in Mexico City, are also audible at the present time on 25, 31 and 50 metres respectively.

## Chinese 'Phone Stations

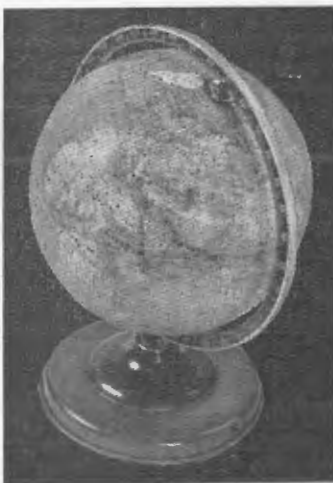
In previous reviews frequent references have been made to a number of Chinese 'phone stations which have been heard at good strength on a number of frequencies. For the convenience of readers, a complete list of these Chinese stations now on the air is given below:—

Call	Location	K.C.	Metres
XGM	Shanghai	17,650	17.0
XOJ	Shanghai	15,800	18.9
XGW	Shanghai	10,420	28.79
XGW	Shanghai	9,500	31.58
XTV	Canton	9,490	31.6
XTC	Shanghai	9,300	32.2
XTK	Hankow	9,080	33.2
XTL	Hankow	5,490	54.5

XTK, Hanhow, is the latest of these stations to be logged here. As was the case with all the other Chinese 'phones, signals were very loud. A knowledge of code is a great help in identifying these stations, as they usually call in code before going over to speech.

## Has Anyone Heard These "Rare" 'Phones?

Reports from overseas indicate that a number of interesting 'phone stations are being heard. Have any dxers logged the following?



## REPLOGLE WORLD GLOBES AS PRIZES IN DX CONTESTS

In the "Shortwave Review" section of last month's "Radio World," an announcement was made regarding a series of DX Contests for shortwave enthusiasts.

The rules are re-published elsewhere this month, but, briefly, there are to be three contests held at two-monthly intervals, the prize for each being awarded to the dxer sending in the best verification from any shortwave station operating between 3 and 60 megacycles (100-5 metres).

The prize for each contest is a 12-inch Replogle World Globe (Australian agents, Messrs. Reg. Rose & Co. Pty. Ltd., Kembla Bldg., 58 Margaret St., Sydney). Attractively coloured, and showing over 5,000 cities and towns, as well as the main shortwave stations of the world, these globes have been designed especially for shortwave listeners, and would form a handsome and useful addition to any dxer's "shack." A time converter is built into the base, so that time differences can be read off at a glance.

FZE8, Gibouti, French Somaliland, which operates on 17,280 k.c. (17.3 m.), calling Paris. It is understood that reports sent to the following address will be verified:—Le Chef de la Sta Radiotelegraphique Djibouti,

Ministere des PTT, Service de la Telegrafique sans Fil, Gibouti, French Somaliland.

VWY2, Poona, India, which calls London at 11 p.m. on either 17,480 or 17,540 k.c. (17.16 or 17.11 m.). Send reports to Indian Radio and Cable Comm. Co. Ltd., Beam Wireless Station, Poona, 6, India.

JIB, Formosa, calling Tokyo on 10,535 k.c. (28.48 m.). This station can be heard just above JVN, whom it contacts around 9 p.m. JIB will verify reports sent to the International Wireless Telephone Co. of Japan in Tokyo.

JDY, Daiven, Manchukuo, also contacts Tokyo. Time, around 6 p.m.; frequency, 9,925 k.c.

## Latest News And Schedules

## From Europe

It is understood that the Danish station OXY has been testing on 11,800 k.c. (25.4 m.) in addition to its regular transmissions on the 49-metre band, which can be heard best around 8 a.m. OXY is best identified by the midnight chimes which are heard at 9 a.m. (Aust. E.S.T.).

Apart from the amateur station SM5SX, which broadcasts on 25.6 m., Sweden has had no broadcast shortwave station. This has been remedied since SBG, Motala, has commenced transmissions on 6,065 k.c., 49.4 m. SBG relays the Stockholm broadcast band station from 4.30-9 a.m. daily. As yet no reports of its reception in Australia have been noticed.

One of the less commonly-known Europeans reported lately is SPW, Warsaw, Poland. It operates on 22 m.

## Latest S.W. Schedules

Prague seems to have decided to confine its transmissions to OLR4A and OLR5A on 25.34 and 19.7 metres respectively. Hours of transmission given in the latest communication from the station are:—

## No. 1 (American) Transmission:

Daily 5-5.15 a.m. on OLR5A.

Tuesday and Fridays: 10 a.m.-12.10 p.m. on OLR4A.

## No. 2 (Oriental) Transmission:

Daily 12.25-2.30 a.m. on OLR5A.

## No. 3 (European and African)

Transmission:

Daily 5.30-7.30 a.m. on OLR4A.

CT1AA, Radio Colonial, Lisbon, Portugal, gives its latest schedule for its 9,650 k.c. transmissions as being from 7-10 a.m. every Wednesday, Friday and Sunday.

Radio Sofia, LZA, relays the National Transmitter "Radio Sofia" from 9-10.30 p.m. and from 4-6.45 a.m. daily; and from 4 p.m. Sunday till 9.30 a.m. Monday. The full address of LZA is Radio Sofia, 19 Moskovska Str, Sofia, Bulgaria.

Radio Belgrade (and at last we know the correct call letters of this station—YUA) sends the following information re its hours of trans-

## DX Contests Arouse Wide-spread Interest

### Next Closes on October 1

The shortwave DX Contests announced in last month's "Radio World" have aroused considerable interest among Club members, and entries are steadily coming to hand for the first Contest, closing on August 1. The closing date for the second Contest is October 1, and entries can be forwarded at any time up to that date. The rules governing the Contests are re-published below from last month's issue:—

1. Every two months a trophy (a Repligle World Globe with time converter, value 39/6) will be awarded to the reader who submits the best individual verification.

2. Verifications from any short-wave station between 5 and 100 metres may be submitted. Thus cards from broadcast, commercial, radiophone and amateur transmitters are all eligible.

3. All verifications must bear a date (a post-mark on the card or envelope will suffice where no date is given on the actual verification); and the frequency on

which the station has been received must be clearly indicated.

4. Entries for the second competition will close on October 1, and only verifications of reception between January 1 and August 31 will be eligible.

5. In judging the entries, the judges will take into account the power of the station received, the frequency on which the station was heard, and the type of receiver used.

6. There is no limit on the number of verifications which may be submitted by any entrant.

7. The decision of the judges will be final; and the result of the first competition will be announced in the September issue of "A.R.W."

8. All entries should be addressed to the Shortwave Editor, and should be endorsed "DX Competition." All verifications submitted will be returned as soon as possible after the closing date.

—The Shortwave Editor.

mission. It is on the air from 4-9 a.m.; from 3.45-5.30 p.m.; and from 7-11 p.m.

#### Does Daventry Verify?

Readers will recall that it was stated in last month's notes that the B.B.C. were rumoured to be verifying reports. As yet we have no confirmation of this. Perhaps it is just a false alarm after all!

#### Latest Amateur News

Listeners on the amateur bands should note that the prefixes for Great Britain have undergone a change—"G" is now confined to England, "GM" being used by Scottish amateurs and "GW" by Welsh. "GI" has been retained for Northern Ireland.

#### Calls Heard During The Month

On 10 m.:—Very few indeed. Band is not so good now. Mainly W6's.

On 20 m.:—G8AZ, G2HK, G5TZ, G5ML, G5OV, G5NI, G6AG, GM6RG, GW8CT; ON4PA; F3JD, F3IX; CX-2AK; PY2EJ; OA4AL; LU8AB; CO7CX; HI7G; CE1AO; XE2FX, XE2AH, XE2BJ; HK1Z; PK3SB; K4SA; KA1MM and KA1RB.

#### Verifications Received

Broadcast Stations:—LZA, Radio Sophia; CT1AA; OLR4A; XGOX (44 m.); HJ1ABP, Cartagena; HBL; HBO and HBP; COCX; SM5SX; YUA, Radio Belgrade.

Amateurs:—VK6FL; ZL2BI, ZL-4GM and ZL3AS (10 m. 'phone); K7FBE, Alaska (10 m. 'phone); OA4AB and OA4R; XE1LK; G6DH; LU1QA; VE5EF and VE3HX.

#### A Mystery Station

Has any dixer heard a Spanish-speaking station on approximately 47.7 m., closing at 6 p.m. with "Anchors Aweigh"? Two stations are known to use this number as a signature tune, namely HI1A and HIT, but these stations operate on 48.5 and 45.2 m. Any assistance in

solving this problem would be appreciated.

### ★ Stop-Press Notes

The latest station on the 25-metre band is HP5A, Radio Miramar, Panama City. HP5A has been heard testing on 11,700 k.c., 25.64 metres; it reaches its maximum strength just before closing, usually around 1.30 p.m. Announcements are made in several languages after each item. Reports are asked for, and should be sent to Box 910, Panama City.

W2XE, New York, was heard on 25.36 metres at an usual time on July 22. Between 1.30 and 2 p.m. it was heard describing a boxing contest. Signals were weak, and fading exceptionally bad.

Latest loggings of 20-metre amateurs include:—OA4AI, Lima, Peru; HK3JA, Bogota, Colombia; CE1AR, Chuquicamata, Chile; VE1DQ and VE1LR; XE2JK; G2AK and G8BP.

A series of national talks will be broadcast at 7 a.m. every Saturday through Argentine stations LRX (31.06 m.) and LSX (28.98 m.).

### S.W. News From S. Africa.

Here are a few items regarding radio in S. Africa that may prove of interest. Station ZNB, located at Mafeking in British Bechuanaland, 50.12 metres, has returned to its regular transmissions, 7.30-8 a.m. G.M.T.; 10.30-10.45 a.m. G.M.T.; 6 p.m.-7.30 p.m. G.M.T. The first two transmissions are used exclusively for commercial work, and during them the station may be heard contacting ZNC, Maun, Ngamiland, 50.12 metres. The 6-7.30 p.m. transmission consists chiefly of recorded dance music.

The Chairman of the Lourenco Marques Radio Club announced recently that CR7BH, on the 25 m. band, and CR7AA, on 48.8 m., will soon have sister stations on the 19 m. and 31 m. bands.—R. Alexander, Transvaal, South Africa.

### SHORTWAVE STATION OF THE MONTH . . . . 1

#### OXY, COPENHAGEN, DENMARK.

METRES: 49.5.

KILOCYCLES: 6,060.

DISTANCE FROM SYDNEY: 9,900 miles—approximately.

STANDARD TIME: C.E.T. (9 hours behind A.E.S.T.).

ANNOUNCER: Man.

LANGUAGE: Danish.

TIMES OF TRANSMISSION: Daily 1900-0030 C.E.T.—corresponding to 0400-0930 A.E.S.T.

REPORTS TO: Station OXY, Statsradioforien, Heibergsgade 7, Copenhagen.

REMARKS: Heard best during winter months. Station also reported as testing on 11,800 k.c., 25.42 m.

IDENTIFICATION: Midnight chimes from Copenhagen Town Hall heard at 0900 A.E.S.T.

# DX News and Views

A page for  
letters from  
DX readers

## Latest DX Loggings

I have a two-valve battery operated receiver which gives excellent results on broadcast and shortwave. I have verified the following broadcast stations:—2GZ, 3DB and 3TR. On s.w., I have cards from VPD2 and 44 amateurs:—VE5OT, VK's 2HEV, 5RK, 5RL, 7YL, 7KR, 3WE, 4HR, 6MW, 4BB, 2AOV, 2NY, 3OQ, 3AS, 2DI, 3ZK, 5AI, 3KP, 3DQ, 4LW, 3LY, 3EP, 5ML, 5XB, 2ABT, 4RG, 3OQ, 6WS, 3HX, 3FL, 3TL, and a few others. DX is very good on C.W. between 8-9 a.m. I have heard OZ7A, D3DRF, G2LA, LU2AM, LU4BL, LU4CB, HB9V, GM6RV, VP4JA and ON4BW, besides a good few Americans, W's 3DQ, 6ITH, 6BKY, 8AND, 3AHR, 5BEE.

I use the club report forms for my reports and they are very successful.

I would greatly appreciate full details of an indoor rotatable frame aerial from any member of the club who would supply them.—Alan G. Brown (AW216DX), Geelong.

## Operates 7-Valve Battery Superhet

I have lately become very interested in dxing, largely through reading that excellent publication, "The Australasian Radio World." I operate a 1936 model 7-valve battery-operated superheterodyne, and get excellent results on shortwave and broadcast up here, even with a very poor aerial. I am installing a permanent aerial shortly, and hope for improvement then.

Enclosed please find postal note to cover cost of membership fee to the DX Club, 50 report forms, and also issues containing articles "Radio Step By Step." I might say that the "Radio World" is, in my opinion, an excellent magazine, and I would not miss my monthly "treat" for any money—I only wish it was published every week.

Wishing your fine publication every success.—Ken Wallis (AW-276DX), Marlee, via Wingham, N.S.W.

## 20m. Band Erratic For DX.

Conditions on shortwave have been rather erratic here, the 20 m. band being very poor most nights and good on others. This month QSL's have been much better than loggings, being G's 2NM, 5TZ, CP1AA, VE's 5EF, HWJ, ON4SS, W's 9SYD, 5BCU, PK1SK (first reports from N.Z.), K7FST, and SM7YA, 14,030 k.c., who is on the air at 23.00 and 6.00 G.M.T. This "ham" is especially

keen to work VK's and ZL's, as he has had no success so far in working them on 'phone. Loggings (outside of W's, VE's, etc.) have been F's 8MX, 8XB, LU6OA, SM6AJ, PY's 2ET, 2AQ, FA3FF. It is very seldom I desert the 20 m. band, as there is nearly always plenty of DX to be heard there. Best 73's to fellow-readers.—Bob Russell (AW201DX), Taumarunui, N.Z.

## Club Stationery Now Available

In accordance with many requests from members of the All-Wave All-World DX Club, a supply of headed club stationery has been made available. Printed on good quality note paper, the price is 1/6 for 50 quarto sheets, post free.

## "Getting Better Every Issue"

Please accept my congratulations on your most excellent magazine—I really look forward to it every month and consider it is getting better every issue, the s.w. notes being especially interesting.

Conditions this month have eased off somewhat, although there is still some good DX to be heard on 20 metres. The best new loggings here have been K's 7FQE, 7ESK; XU8WX, G5AC, G5NR, PAONP, SM5SD; F's 3KA, 3VG, 8KR, 3KH, 8DI; FA8DA, YI2PA, HR2A, V5IAD, J2MJ and J3FK. European amateurs on 20 m. can be heard here from 4 to 6.30 p.m., and about the same time in the mornings.

QSL's have arrived from W's 2IXY, 4DGS, 9DMF, 9LTY; HK3JA; LU's 1HL, 7BK; VE's 9AL, 4GD, 4CW, 4JJ; F3JD, G6XN and G5SA. If any "R.W." reader who exchanges s.w.l. cards would like lists of QRA's, I would be only too pleased to supply same.

Has anyone identified the Eastern station on approximately 540 k.c. which can be heard over here at R8 every evening from 9.30 (N.Z.S.T.)? —Bob Russell (AW201DX), Taupo Rd., Taumarunui, N.Z.

## Making Club Pen-Friends

As usual, the club news pages in this month's "Radio World" are full of interest. The idea of AW77DX

regarding club stationery is a good one.

The list of new club members being published is excellent, and I suggest that members peruse the lists regularly and write to other members, thus making the club an all-world one. Overseas members especially we can make feel at home by friendly correspondence, and with this view I have selected three, so here goes!—Gordon Young (AW-245DX), Brisbane, Q'land.

## Has Over One Thousand QSL's

Some of my recent loggings include:—W4DSY, W5YH, W6DEP, W6LI, W9GIC, W5EQM, W5BEE, W6MLG, W9FSY, K6GLV, PCJ, ZJV; VK's 6GB, 3FT, 2AFS, 2LD, 5ML, 2DO, 3CX and 2YD (N.Z.-B.C.).

Latest cards to hand are:—W6MLG, W6BKY, W9EPD, G8FZ, OH3OI, ZMBJ, 2ZB (B.C.); VK's 2QK, 5AI, 3YS, 2AFA, 5LP, 6GB, 3CX, 2RX, 3SG, 4WL.

I have been dxing for five years now, and QSL's total over 1,080. I use a 6v. superhet for B.C. DX, and on O-V-1 for S.W., using a 78 det. and 42 audio. I have a QSL card and would like to exchange with other dxers (also photos). I am enclosing a snap of my shack. Thanks for publishing such a fine magazine as "R.W."—Noel Thornion (AW254DX), 88 Main Rd., Redcliffs, Christchurch, N.Z.

## Another QSL For Exchange

Although I haven't written to the club for some time, I am still interested and look forward to the "Radio World" every month.

Please find enclosed application form and postal note from my friend in New Zealand; he wishes to become a member of the club. I should be very pleased if you would send the badge and certificate direct to him.

Am still interested in "ham" radio and have a listener's QSL card of my own to exchange.—F. Keirnsnowski (AW16DX), Acheson Street, Rockhampton, Q'land.

## Will Exchange QSL's

Thomas P. Gardner, 527 Lane Street, Broken Hill, N.S.W. is willing to exchange QSL cards with other dxers.

## Address Wanted

Would D. Hogan, Taree, please forward his address to the editor?

**"Radio World" Covers For Vols. 1 And 2**

The special "Radio World" binding covers made available several months ago are proving widely popular with readers who wish to keep their copies in a handy and permanent form.

Using a strong, durable leather board covered in dark blue book-cloth, the covers are attractively printed in gold with the title of the magazine, volume number and dates of issue. Twelve strings are attached along the inside back portion of the cover, so that each issue of the magazine as

it is bought can be slipped into place in a few moments. This method of binding is cheap, effective and very convenient, as any issue can be instantly removed if desired.

Readers are asked to note that an increase in the cost of materials used for these covers has necessitated a slight increase in the selling price. Single covers now cost 3/6 each, and two covers (for volumes 1 and 2) 6/-, both post free, from the "Radio World," 214 George St., Sydney.

**Round The Shacks . . . . . 1**

**VK3HE**

By "REPORTER"

**T**HIS station first entered active life on August 1, 1934, with a 59 in a tritet with crystal control and a power input of about six watts. The receiver of those days was a simple two-tuber drawing power from the same source as the transmitter.

After the usual period of experimenting, VK3HE's rig has grown to the stage illustrated in the photographs. The 3-stage transmitter at present comprises a 59 tritet crystal oscillator, 46 buffer doubler, 210 P.A. Three separate power supplies are used, 400-volt, 550-volt and a 200-volt eliminator for bias supply.

The usual b.c.l. QRM caused innumerable headaches until overcome by the installation of a keying tube on the oscillator. This method gives a clean, clickless signal, and has the additional advantage that, as the P.A. has fixed bias, it is possible to leave the whole rig running continuously. It is necessary only to punch the key to go on the air.

**Six-Valve Super Used**

Alongside the key is a switch which cuts the plate supply from the receiver and throws the 'phones either to an audio oscillator for c.w. monitoring, or to a diode 'phone monitor. The present receiver is a superhet using 2A7, 58 r.f. amp., 57 2nd detector, 56 (for 'phones), 59 output and a 57 beat oscillator. A regenerative pre-selector, using a 58, is used on a 20 and 40-metre bands.

A Reiss microphone is used, while the modulation employs a 57, 56, and 47's in parallel.

3HE's latest aerial is a 40-metre half-wave Zepp with 45-foot series tuned feeders. In the near future a Collins Multi-band antenna is to be installed.

At different periods the station has been operated on 160, 80, 40 and 20 metres, but of late has been con-



A neat shack, owned by Noel Thornton (AW254DX) of Christchurch, N.Z.

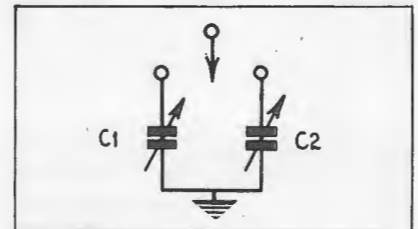
fining activities to the 40 and 20-metre bands. Twenty-six countries have been worked, but South America is still required for W.A.C.

VK3HE QSL's when requested, and he takes this opportunity of advising that if any of his cards have missed their destination, he will gladly remedy the deficiency if advised.

**Listening To Two-Way QSO's**

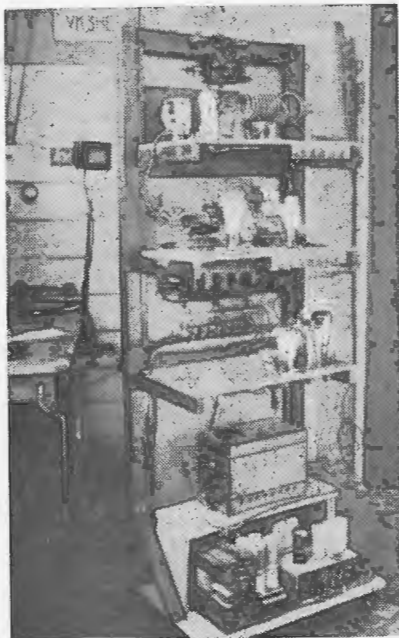
I must write and tell you how I appreciate your excellent publication, "Radio World." I have only had two copies, but have already agreed that there is no other magazine near its standard. I particularly enjoy the articles by VK3TH, VK3DH, and VK2NO; the latter's autobiography makes very interesting reading indeed.

Here is my contribution to "Radio Ramblings." If you are interested in hearing the two ends of a radio com-



munication between two amateurs or ships, mount two tuning condensers and a S.P.D.T. switch on the panel; fig. 1 shows the arrangement. Thus a condenser can be tuned to each station, and by a flick of a switch one can transfer from one station to the other without the bother of having to re-tune.

Well, here's wishing the best of luck to your fine magazine.—T. D. Gott, Melbourne, Vic.



The photographs above show (left) a rear view of 3HE's rig, and (right) 3HE at his operating desk.



★  
Left: The main studio at Station 4ZM, Dunedin.

★  
Right: Mr. J. P. Pickerill, station engineer, who designed the transmitter now being used.



## Round the N.Z. "B" Stations . . . . 4 4ZM . . . . "Voice Of Dunedin"

The fourth of a series of articles on N.Z. "B" class stations, written by . . .  
"The SOUTHLANDER"

and Walls, entered the field of broadcasting. Mr. John Walls, manager and chief announcer, has introduced many popular innovations to broadcasting in this southern city of New Zealand.

### First Heard In 1927

It was in September, 1927, that the Post and Telegraph Department allotted the call-sign 4ZM to Mr. J. D. McKewen at 418, Anderson's Bay Road, Dunedin, and about one month after this date the station, with Mr.

J. Stone as operator, commenced activities.

In September, 1929, the owner, for business reasons, transferred the station to the premises of Messrs. Chas. Begg & Co., of Prince's Street, Dunedin. Here its broadcasts attracted an ever-increasing number of listeners, perhaps the most appreciated session being the programme of popular recordings broadcast each Sunday evening.

### Present Owners Took Over In 1932

4ZM continued a regular schedule of transmissions from the same location until September, 1932, when Messrs. McCracken & Walls acquired from the original owner the whole of the plant and accessories. A new chapter in the life of Radio 4ZM, Dunedin, had begun.

The transmitter at 4ZM remained in its original condition for some time, but coincident with the appointment of Mr. J. P. Pickerill as station engineer, it was decided to dismantle the old plant entirely and build a new transmitter of as modern a design as possible. A small stand-by transmitter was placed in commission to carry on while the main constructional work was being completed, and in due course the new 4ZM commenced broadcasting. To-day a new high fidelity transmitter is being heard from 4ZM, the entire equipment having been designed and built by the staff.

### Details Of The Transmitter

The transmitter is a M.O.P.A. type, push-pull stages throughout, the an-

**S**TATION 4ZM, in Dunedin, New Zealand, is one of the most modern of the medium-power "B" stations now operating in New Zealand.

Associated with the station ever since its owners, Messrs. McCracken

*"The Voice of Dunedin."*  
**McCRACKEN & WALLS'**  
**RADIO BROADCASTING STATION**

17 GEORGE STREET

100 WATTS      1080 KILOCYCLES

**J. P. PICKERILL**  
ENGINEER

Telephone, 18143  
XMITTR MOPA

**J. W. WALLS**  
MANAGER

Telephone, 18143  
2855 Metres

Dear Listener,  
We thank you for your recent report on our TRANSMISSION of 15:3:37 which checks correctly with our station log T5S  
Yours faithfully,  
J. W. Walls  
Station Director.

Dxers forwarding correct reports on reception of 4ZM will receive this verification card in exchange.

tenna power being 100 watts (100% modulation). Owing to the push-pull construction, the transmitter is exceedingly stable, and has a day-light range of 150 miles, expanding to 500 miles at night.

#### Service Of The Helping Hand

The Radio Church Service of the Helping Hand was inaugurated in April, 1934, by the Rev. L. B. Neale, known to listeners as Uncle Leslie, and this fine session is probably the most popular church service broadcast in the South Island. The membership of this organisation is over 4,000, and Uncle Leslie conducts these services daily, between 10.30 and 11 a.m. To listeners in all

#### Facts About 4ZM

Call and Location: 4ZM Dunedin. 17, George Street, Dunedin, N.Z.

Owners: Messrs. McCracken and Walls.  
Frequency: 1010 k.c.  
Power: 100 watts.

Transmission Times (N.Z.S.T.): Sun., 2 p.m. to 10 p.m.; Mon., 9 a.m. to 11.45 a.m., 1 p.m. to 2 p.m.; Tues., 9 a.m. to 11.45 a.m., 1 p.m. to 2 p.m., 6 p.m. to 11 p.m.; Wed., 9 a.m. to 11.45 a.m., 1 p.m. to 2 p.m.; Thurs., 9 a.m. to 11.45 a.m., 1 p.m. to 2 p.m.; Fri., 9 a.m. to 11.45 a.m., 1 p.m. to 2 p.m.; Sat., 9 a.m. to 12.0, 5 p.m. to 10 p.m.

Longest Distance Verified Report: Mr. A. McGregor, Brogo, New South Wales, Australia.

Manager and Chief Announcer: Mr. J. W. Walls.

walks of life Uncle Leslie's addresses are most helpful, inspiring and comforting, and his voice over the microphone is eagerly awaited by his Radio Church audience every morning:

"I take no thought of my neighbour's birth  
Or the way he makes his prayer,  
I grant him a white man's place on earth  
If his game is on the square.  
So here's my mite for truth and right  
And the 'Church of the Helping Hand'."

He is the right man in the right place, and his broadcasts are acclaimed on all sides. Each member has a small box, and all that is asked is one penny per week. The contents of the boxes are collected quarterly, and go entirely towards the relief of distress in the city.

#### YL Radio Enthusiast

(Continued from page 16)

fader system, consisting of 4 "T" type pads. The outputs from the R.F. portion (which is a "5 super dual"), the pick-up, and the Reiss microphone also feed into the fader system.

The output from this feeds into a 75 driver resistance coupled to a 42

### JONES' TWO-VALVE SUPER-GAINER COIL DATA

All coils wound on 1½" diameter formers; detector coils wound on 5-pin formers, oscillator coils wound on 4-pin formers.

Wave Length	L1 Detector	L2 Oscillator	L3 Tickler
160 Metre	79 turns 28e. Tapped at 4 turns Closewound.	58 Turns 28e. Closewound. Grid on top end.	20 turns 28e., Closewound ½in. from L2. Same direction as L2 with plate on far end. 10t. 28 d.s.c. Closewound 1-16 in. from L2.
80 Metre	40t. 20 d.s.c. Spaced to cover 1½in. Tap at 2 turns.	33t. 20 d.s.c., Spaced to cover 1½in.	7t. 24e. Closewound. Spaced ½in. from L2.
40 Metre	12t. 20 d.s.c. Spaced to cover 1½in. Tap at 1½ turn.	11t. 20 d.s.c. Spaced to cover 1½in.	4t. 20 d.s.c. Closewound. Spaced ½in. from L2.
20 Metre	7t. 20 d.s.c., Spaced to cover 1½in. Tapped at one turn.	7t. 20 d.s.c. Spaced to cover 1½in.	3t. 20 d.s.c. ½in from L2 and 1-16in. between turns.
10 Metre	3½t., 20 d.s.c., Spaced to cover 1in. Tap at 1-3rd turn.	3½t. 20 d.s.c. Spaced to cover 1in.	

as driver, class AB, transformer-coupled to 4-42's as triodes with fixed bias supplied by a separate 226. Rectifiers for high tension, which is 600/600, are two 5Z3's. The three

the same frequency response is used in the 12-valve superhet, with the exception that it has only two 42's in the final.

#### Rola Speakers Used Throughout

Rola K12's are used on every job with the exception of the 12-valve, which employs a G12. The cathode ray oscillograph and the signal generator are really standard A.W.A. circuits, therefore requiring no description. A point which may be of use to intending builders of a ribbon or velocity microphone is that the magnets out of a Philips Peter Pan or Baby Grand speaker are the correct size for a commercial-looking job. Additional information on my sets is that they all have band-switching, no plug-in coils being used.

#### Silent Key

Following the recent tragic loss of their son Ernest (late VK3KE), Mr. and Mrs. Kilborn and family desire to thank amateurs and radio enthusiasts for their kind expressions of sympathy, and especially the amateurs on the 200-metre band, who, as a mark of respect, observed a two minutes' silence in each session on the Sunday following their bereavement.

power supplies for the speakers have an output of 250 volts at ½ amp., therefore supplying power up to eight 3,500 ohm speakers.

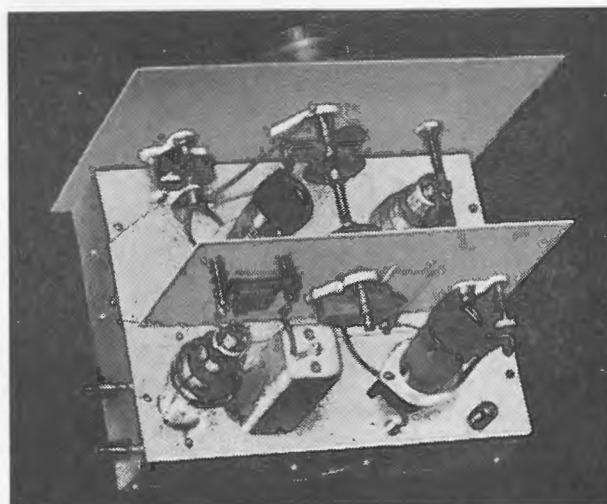
The same type of amplifier with

#### "Jones' Super-Gainer Two"

(Continued from page 25)

in both gain and selectivity when it is adjusted just below the oscillation

A rear view of the completed "Super - Gainer." Note the way in which the second detector grid leak and condenser are supported on the shield partition by means of insulating pillars.



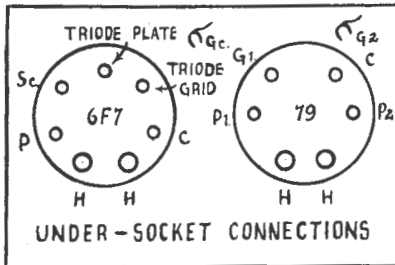


point. The first detector should never be allowed actually to oscillate.

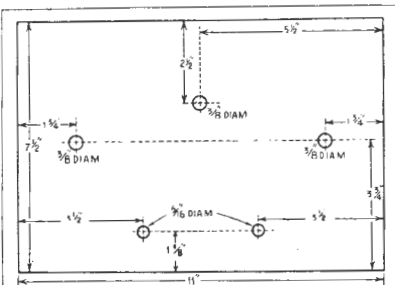
For smoothest regeneration in the first detector, the aerial coupling should be fairly loose, which means that the midjet aerial coupling condenser should be adjusted until

smooth regeneration is attained up to the point of oscillation.

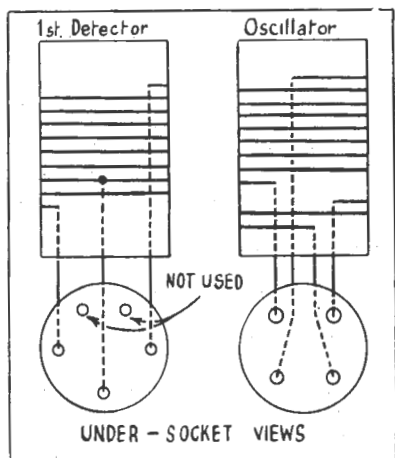
A simple check on oscillation in the 6F7 triode circuit is given by connecting an 0-250 volt voltmeter between the chassis and the "B+" side of "L3." A temporary short-circuit across the plates of the oscillator tuning condenser should produce a change in the voltmeter reading.



Under-socket connections of the 6F7 and 79 are shown above.



Dimensions for preparing the aluminium front panel and shield partition are given in these sketches.



Pin connections for the first detector and oscillator coils.

### Crown Radio Shift To Larger Factory

Last year factory output of the Crown Radio Manufacturing Co. increased so rapidly that, early this year, a shift to larger premises became imperative.

In April last the company was reformed as the Crown Radio Manufacturing Co. Pty. Ltd., with greatly increased capital. A larger factory in Murray Street, Pyrmont, was taken, and a shift was made recently under the supervision of the Managing Director, Mr. J. B. Phillips.

Mr. Phillips and Mr. Frank Jones (general manager and secretary) are very optimistic regarding the company's future, and have every reason to be with the efficient factory plant and staff organisation to support their efforts.

### Marconi Passes

(Continued from page 2)

"In more recent years Marconi applied his research in the field of those ultra short waves which will eventually make television practicable, and in the new field of micro waves, the enormous possibilities of which will be demonstrated in years to come.

"He was a modest gentleman who always recognised that as his work developed it required and utilised the co-operation of innumerable other inventors and scientists who were attracted by the beacon light which he carried forward.

"Although born an Italian, and remaining constantly loyal to his native country, Marconi became essentially an international figure and world possession. His great achievements were recognized by Governments and scientific bodies and endorsed by many decorations granted to him in the principal countries of the world.

"The British people will always recognize the debt of gratitude to Marconi for his great work, which has enabled all parts of our widespread Empire to be linked with means for instantaneous communication. They are proud of the fact that Marconi's mother was British, and

that most of his early experimental work was carried out in Great Britain by the British Company which he established.

Direct communication between Australia and Great Britain is an outstanding result of Marconi's work—as also is the linking by wireless of half a million telephone subscribers in Australia with more than thirty million telephone subscribers of the outside world. Our broadcasting stations, which convey information and entertainment to every home in the country—no matter how near or remote—constitute a further tribute to this great man. In the Navy, in the Mercantile Marine, in the Commercial and Defence Air Services, in the vast interchange of commodities known as international trade, and in the transmission to hundreds of millions of people of news and information through broadcasting, and in the new field of the use of wireless waves for healing purposes, in the saving of life, and in spreading understanding among the peoples of the world, Marconi lived to see the fruits of his great faith and imagination, his wide knowledge, and his untiring work.

"The newspapers of Great Britain to-day are unanimous in paying tribute to the most outstanding man of our time.

"As President of the Institution of Radio Engineers of Australia, and on behalf of its Council, I had invited Marconi to attend our World Radio Convention in Australia next year, and he had enthusiastically accepted. Only a few days ago I received a telegram from him inviting me to go to Rome to discuss this and other matters of mutual interest."

### Directing Films By Radio

An innovation has been introduced into the producing of motion pictures by the use of radio-telephony during the "shooting" of scenes of "Lovers and Luggers," which is being made by Cinesound in Botany Bay. The radio equipment was manufactured by Amalgamated Wireless, and consists of two "transceivers" which are small portable combination transmitting and receiving sets. One set is located on a wharf and is operated by a sound engineer for the director. The other is aboard a lugger.

The equipment has proved a most effective means of communication, and Mr. Ken Hall, the director, states that he would have been at a loss without it in controlling the movements of the luggers in the bay and the artists on board them.

This type of radio equipment operates on the 5-metre ultra-wave band, upon which the research engineers of A.W.A. have in recent years carried out considerable investigation.

**Fluttering On Shortwave**

(continued from page 8)

tic curve as possible will also limit the effect, and furthermore the phenomenon will only occur when strong signals are applied to the power valve.

The extent to which the intermediate frequency signal is detuned (by oscillator frequency drift) is also a very important factor. As already pointed out, a definite minimum detuning (so many kilocycles) is necessary before relaxation oscillations will take place. A certain voltage alteration will always result in certain specific percentage of oscillator frequency drift and this detuning will be most marked (so many more k.c.) when the oscillator frequency is greatest. The effect will therefore be more prevalent at very high frequencies, this theory being confirmed by experience.

Finally, there will be less likelihood of relaxation oscillations occurring if the resonance curve of the i.f. has a fairly broad, flat peak, or when the selectivity of the set is inferior, so that certain specific detuning will have less influence on the signal applied to the output valve.

**Ensuring Constant Oscillator Plate Voltage**

Unfortunately, practical limitations prevent us from securing any appreciable aid from the above-mentioned factors, and the best method for the suppression of relaxation oscillations is to maintain a constant D.C. voltage condition at the oscillator. This may be accomplished, for example, by decoupling

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the voltage supply to grid 2 (the anode grid or oscillator plate) by the use of an electrolytic condenser. A capacity value of 8 or 16  $\mu$ F will suffice. Voltage for grids 3 and 5 (the screen) can also be tapped from this point with suitable voltage reduction arrangements so that this voltage is also decoupled from the main power supply.

The method outlined is undoubtedly the most effective and convenient means of overcoming the difficulty and is therefore frequently employed. There is another method by which relaxation oscillations may be eliminated, but it is not generally recommended. If means are adopted to prevent very low frequencies from reaching the power valve (by using small value coupling condensers) the oscillations cannot persist, but at the same time there is a corresponding falling-off in bass response.

**Ham Jargon**

(continued from page 5)

The length of the "skip" is dependent upon natural conditions, and when "short skip" conditions prevail nearby stations are heard.

And then there are references to "crossband" or "crosschannel" operation, "duplex" operation and "break-in," also to "working through." In "crossband" operation an amateur in, say, the 20-metre band talks to an amateur in the 75-metre band. Amateur No. 1 transmits on 20 metres and tunes his receiver on 75 metres, while amateur No. 2 transmits on 75 metres and keeps his receiver tuned on 20 metres. The two can then leave their carriers on the air and talk to each other as they would on the telephone. Duplex operation is carried out in the same manner, except that both amateurs work in the same band with transmitters and receivers in continuous action.

**What "Break-In" Means**

In break-in operation, both receivers are left in action (one between pauses) but only the carrier of the station transmitting is on the air. This leaves the listening amateur free to "break in" through a hole in the transmission at any time if he misses a part of the message.

The system of "working through" is a form of re-broadcasting. For instance, one amateur will pick up the signals of a second amateur operating on say 5 metres, and re-transmit them on a different frequency to a third amateur. Since signals on 5 metres do not normally travel over great distances, the advantages of the system are obvious.

In conclusion, in case club members claim that there are other abbreviations which have not been mentioned, a more or less complete list is given which has by common use, become practically internationally standardised.

In terminating this dissertation on the lingo and jargon of the ham I must acknowledge the assistance I have received from articles written by Messrs. G. S. Granger and W. Oliver in "All Wave Radio" and "Short Wave Reception" respectively.

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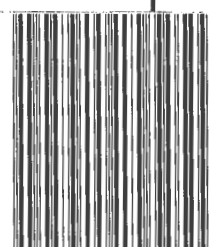
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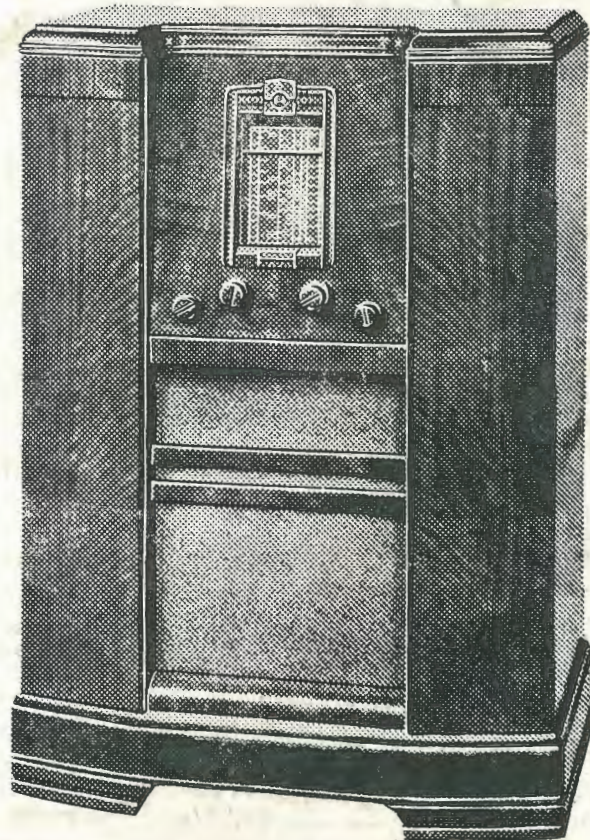


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