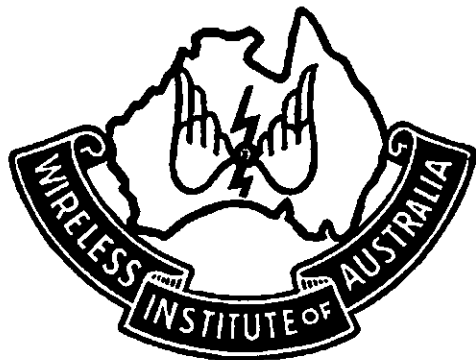


SIXPENCE

MARCH 1941

AMATEUR RADIO

THE
OFFICIAL ORGAN
OF THE
WIRELESS INSTITUTE
OF
AUSTRALIA



Published by the Victorian Division

AMATEUR-RADIO

Vol 9, No 2

March, 1941

EDITORIAL

---oOo---

In 1933 "Amateur Radio" was born--the Child of the Victorian Division's most enthusiastic members, whose foresight saw the need of such a magazine as a further means of communication between its members and the members of other Divisions.

To publish a magazine was no small task, and the enthusiasm with which it was received was more than sufficient reward to those workers who were responsible for the first issue.

The continued success of any magazine lies in the support it receives from its readers and its advertisers. Unfortunately for "Amateur Radio" its advertisers decided, that, as a large number of its readers were "off the air" it was no longer a good advertising medium, and so discontinued advertising.

This, the first issue of "Amateur Radio" in its new form marks another mile-stone in the history of the magazine -- A magazine of the Amateur -- By the Amateur -- For the Amateur.

To our members and readers we appeal for their wholehearted support to enable us to bring you current overseas and local developments together with personal notes of various doings.

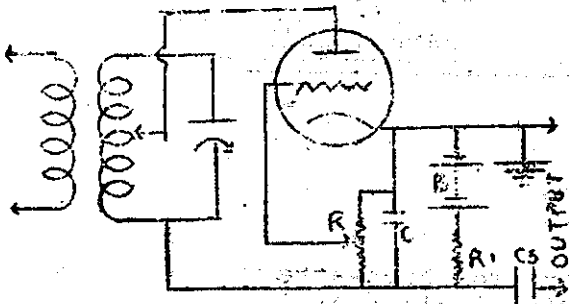
CO-OPERATION is and always will be the keynote of success.

---oOo---

A NEW TYPE OF NOISE LIMITER

-----XXXXXXXXXX-----

Man-made noise has long been one of the "bug-bears" of the amateur, particularly in the region of 14mc and higher frequencies. It has been shown that the majority of this noise consists of peaks of very short duration, but large amplitude. Many systems have been designed to limit these peaks, but the more successful systems have been more or less complicated.



The accompanying circuit shows a new type of limiter, which has been designed by the engineers of RCA laboratories. In addition to acting as a very simple type of noise limiter, this circuit has a definite AVC action on CW and so is doubly useful.

It will be seen that the circuit consists essentially in the use of a triode to replace the usual diode detector, the triode grid being controlled by the signal. The anode cathode path of the triode is used as a diode and is connected with the usual load resistance and bypass condenser.

In the absence of signals the anode potential is kept positive with respect to cathode by the voltage developed across R and the grid is also positive with respect to cathode, but is less positive as it is tapped down R. The valve then works as a form of diode detector and as the signal increases the anode and grid potentials become less positive. With sufficiently strong signals the potentials actually become negative with respect to the cathode. Once this point is reached a further increase in signal hardly increases the output at all.

The limiting action may be controlled by the tapping on R and is greatest when the grid is joined to the junction of R and C3. The higher the voltage the greater is the signal strength at which saturation commences.

It is possible to simplify the circuit by the use of a pentode tube in the place of the triode. R1 and B are no longer required but the screen must be maintained at a suitable positive potential with respect to the cathode; otherwise the circuit operates in a similar manner.

Care should be taken to keep RF off the grid, and it may be found necessary to insert a simple RF filter in the grid lead.

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The Wireless Institute is your Organisation -- help it look
- after your interests by becoming a member -

.....

- FREQUENCY OR AMPLITUDE MODULATION -

-----XXXXXXXXXXXXXX-----

During the last couple of years so much has been published in overseas technical magazines on the subject of frequency modulation that it is of interest to learn of comparative field tests carried out contrasting this type of modulation with amplitude modulation. The results of the tests in question were given in a paper read before the Radio Club of America by Mr. Irwin R. Weir.

The tests were carried out to determine quantitatively the advantages of f.m. over a.m. under identical conditions. Two separate transmitters were used for the test, one frequency modulated and the other amplitude modulated. Both had a carrier output of 50 watts, and were operated on a frequency of 41mc. The receiver used was a portable adapted for the reception of both systems of modulation.

The first observations were made in a district free from outside electrical interference, the object being to determine the ratio between the internal noise of the receiver when dealing with a plain unmodulated carrier wave and when receiving a signal employing first one and then the other form of modulation. It was found that for any desired output ratio of signal--plus noise--to noise alone, which experience may indicate is required for satisfactory service, considerably less signal input, and hence considerably less transmitted field strength is required with frequency than with amplitude modulation.

For the second test the receiver was taken to a district where electrical interference was known to be bad. It was found that under the conditions of external noise met with, the superiority of f.m. was even more marked than in the first test.

Other tests, too numerous to mention in detail were carried out, but it is interesting to list the conclusions finally arrived at by the investigators. These were:-

1. The design, construction and operation of a f.m. transmitter needed no more complicated than that of an a.m. transmitter.
2. The f.m. transmitter can be smaller, lighter and more economical of power than an a.m. transmitter of the same power rating.
3. The f.m. receiver need be no greater in size or weight than the conventional a.m. type.
4. A given area can be satisfactorily served by means of f.m. with considerably less power than by means of a.m.
5. A given transmitter power will provide service to a much larger area, or with a much lower noise level when employing f.m. instead of a.m.
6. F.M. transmitters operating on the same frequency need be less distant from each other than is necessary with the operation of a.m. transmitters on the same frequency channel.
7. The number of f.m. transmitters that might be simultaneously operated within any large area on a given number of f.m. channels and with given permissible interference areas, is so great compared with the number of a.m. transmitters that

might be so operated, as to more than compensate for the width of the frequency band required to take substantial advantage of the superiority of frequency modulation.

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A.R.R.L. HANDBOOK FOR 1941

The organization of the new edition follows that developed for the 1940 volume. The 32 chapters in the new Handbook constitute exposition of practical amateur operating and constructional data. First, there are two introductory chapters, intended for the new-comer first learning about amateur radio. There are four chapters on principles and design, covering the essential elements of radio theory in understandable fashion.

There are fourteen chapters in the construction and adjustment section ranging from workshop practice through to the elimination of broadcast interference. In those chapters dozens of modern, proved units of high performance amateur stations are described in detail.

The antenna section contains five chapters alone covering the field from basic principles to the design and construction of elaborate long-wire and rotary arrays. The ultra-high frequency section, too, contains five chapters. An entirely new section on the important subject of frequency modulation has been added.

Other phases of amateur radio are considered separately. There are chapters on emergency and portable equipment, on measurements and measuring equipment, on station assembly, and on government regulations and related data. There is one chapter devoted to miscellaneous information, the bulk of which is occupied by tables of tube characteristics. These comprise what is probably the most complete single compilation of vacuum-tube data published, covering some 700 types.

This handbook can be thoroughly recommended to either the seasoned "Ham" or the would be Ham.

- TRANSMITTERS AFFECTED BY NEW REGULATIONS -

The news has just been released that all licensed radio transmitters in Australia before the war will be affected by the new regulations concerning radio transmitting equipment, diathermy machines and other high frequency electrical equipment.

The regulation provides that all such equipment shall be held by the owners under licence, and although the Amateurs obligations in this matter are not yet clear, it is thought that they will be advised by the Department by letter of what they will have to do.

QUEENSLAND HAMS SERVING WITH THE DEFENCE FORCES

ARMY

VK4YJ	Lt. Col. Sainsbury.	OIC Signals Northern Command
VK4CF	Lt. Col. Fortescue.	Garrison Commander.
VK4JL	Major J. Love.	A.I.F.
VK4FE	A. R. Burton.	Signals, Tanks, A.I.F.
VK4LT	A. E. Carter.	Signals.
VK4WO	H. Tilse.	Signals.

ROYAL AUSTRALIAN NAVY.

VK4RF	F. J. Lubach	VK4CJ	C. W. Marley
VK4SD	A. H. Sparland	VK4NO	N. Trige
VK4EI	R. Beistead	VK4FJ	S. R. Baxter
VK4SR	T. S. Shering	VK4UR	Richardis

ROYAL AUSTRALIAN AIR FORCE

VK4AM	F. Lt. Minchin	VK4AW	A. E. Walz
VK4CW	E. Welton	VK4AN	J. Allen
VK4CK	J. Makin	VK4KK	K. Bradford
VK4RX	R. Blades	VK4RH	R. Hows
VK4YM	D. Cohen	VK4WF	W. J. Faber
VK4FS	F. Starr	VK4RM	R. Meadows
VK4FR	R. Allen	VK4XY	L. I. McGarry

ESSENTIAL AND ALLIED SERVICES

VK4CK	A. H. MacKenzie	..	Fire Brigade
VK4ES	H. Sprenger	..	Police Force Radio
VK4MR	J. E. Stewart	..	OIC Manpower Register
VK4RY	W. L. Harston	..	Deputy Air Raid Warden Clayfield
VK4FB	C. Alder	..	Air Raid Warden (Dist.)
VK4AH	A. Hadley	..	Civilian Instructor R.A.A.F.

SILENT KEY.

It is with regret that we announce that VK4FS. F. Starr has been lost at sea.

Additional Victorian Hams in the Defence Services.

VK3EG	I. V. Miller	A.I.F.	VK3VG	H. A. Vinning	A.I.F.
VK3WH	A.W.L. Chandler	R.A.A.F.	VK3XZ	R.R. McGregor	A.I.F.
VK3DW	D. W. Tacey	R.A.A.F.	VK3XU	A.G. Weynton	A.I.F.
VK3FU	D. E. Briggs	R.A.A.F.	VK3YB	J.A.P. Boyd	R.A.A.F.
VK3VH	L. W. Hobbins	A.I.F.	VK3YH	F.W. Hand	R.A.A.F.
VK3XB	I. Stafford	R.A.A.F.			

Further names will appear in these pages from time to time, and "Ham" knowing of another serving in the forces, whose name has not appeared is asked to forward details to "Amateur Radio" Box 2611W G.P.O. Melbourne.

D I V I S I O N A L N O T E S

- Victorian Division -

Now more than ever the need for personal notes has become more imperative, and once again I am appealing to readers to think a little of the person who has to write these notes. We are off the air, that everyone knows, so the poor old notes editor is unable to do a little "snooping". Consequently the only means of obtaining notes is by personal contact and per medium of the post office. To those of the "gang" who are in camps either at home or overseas an appeal was also made, asking them to keep us posted of their doings. Unfortunately the response has been practically nil, with the consequent result of very little notes.

As Notes Editor, I extend to those who took the time and trouble to drop me a line, my sincerest thanks, and to those who haven't yet got round to putting pen to paper, do so now and let's have a bumper issue of notes for next month.

VK3HX Notes Editor.

Since the last issue a note arrived from Lee Simpson 3II. Thanks Lee, your note helps out a lot. Lee reports that he is still re-wiring things even though its fences instead of radio. Methinks Lee is going to be an expert wiroman by the time we get back on the air. Let's hear from you again sometime Lee.

Tim, 3TW is still on the air, and the wireless bird has whispered to me that he has a large "fan" mail. Say Tim got any signed photographs? Tim, known as George, is to be heard from 3HA usually of a morning.

Stan, 3SZ is still healing radios at Healings in Hamilton (Did I hear anyone say anything about puns?)

Eric, 2AHY seems to me to be something of a mystery man, and has been visiting VIM rather frequently -- I've got my suspicions --

Ern, 3EG has been reported to be looking for signals which shouldn't be there. The rest of his spare time has been spent in doing a spot of painting around the house.

3JG -- has, I understand, taken unto himself a wife -- Congratulations John. Would like to hear from you sometime.

Ron 3RN spends most of his time keeping the garden in order. I heard something about an amplifier last New Years Eve???

3NY had a visit from the I.I. recently: 3JO had the same experience.

3ZK is now to be located at Coobamundra, I hope?

3WY has been playing around with audio--57 triode resistance coupled to a pair of 45's par, and the noise comes out of a G12.

A visitor to the general meeting was Miss M. E. Couatts VK3KS, and if I may say so a very charming visitor. Its just too bad we're not still on the air ... Careful boys .. watch 3XB.

AC1 Fleming was also another visitor, one of the lucky ones who had his thirty bob refunded???? Best of luck feller.

And then there is the story that comes from one of the RAAF Stations. When 3XH rushed into one of the huts to tell another VK3 that there was a VK6 calling GQ on a tin whistle in the ?x?house????

.....

Next month, April the 6th to be exact, Mr. J. Kling VK3JB will continue his interesting series of lectures, the subject matter will be "PHOTOGRAPHY", so if you're interested come along and join the happy party.

...O.O.O.O...

N.S.W. DIVISIONAL NOTES

by VK2TE

The thirty-first annual General Meeting of the VK2 Division of the Institute was held at Y.M.C.A. Buildings, Pitt Street, Sydney on Thursday 20th February, and the attendance was the largest for some time.

The Chair was occupied by Mr. Frank Goyen VK2UX, Senior Vice-President, in the absence of the President Mr. E. Peterson, through illness and in declaring the meeting open extended a welcome to the guests of the evening, Messrs. Perry, Reed, Stowe, Pike, Renshaw and MacLurean and to two country members, Messrs. Torrington 2TJ Groote Eylandt and F. Blatch, Yeoval.

Before proceeding to business one minute's silence was observed in memory of Corporal V. Jarvis 2VJ, who was killed in action in Libya whilst serving with the R.A.A.F.

Mr. Joe Reed 2JR then proceeded with his display and description of gear used in the very early days, and his collection of various mounted component parts was very instructive to the "young squirts" and the manner of their acquisition proved that "Joe" was a real ham in every way. The collection of Valves was comprehensive and besides types "R" and "S" also included the famous "EXPENSE" type. It would be doing 2JR an injustice if I were to conclude without mentioning Joe's first tuning coil. It was approximately three feet long, six inches in diameter and about 2,000 turns. What an inductance ! What a man !

2JR was followed by Harry Stowe ex-2CX who showed several types of early Audio Transformers. These particular pieces of apparatus were of very neat design and workmanship and were a credit to the builder.

A QUIET BEAT FREQUENCY OSCILLATOR CIRCUIT

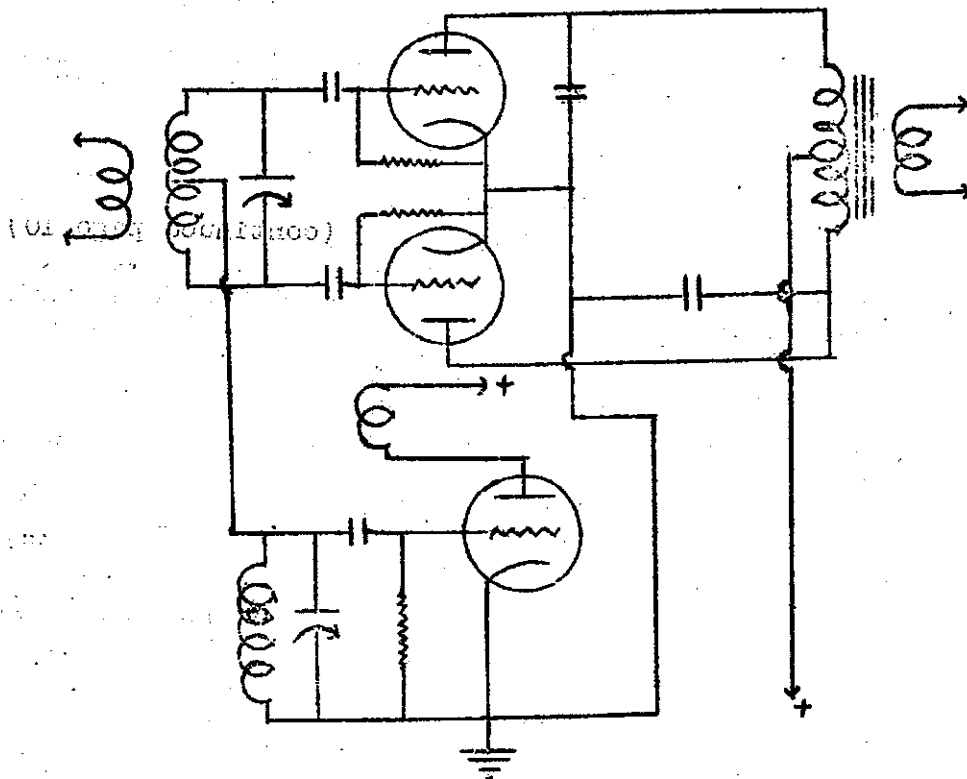
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Adapted from an article by E. I. Gardiner in the T & R Bulletin

NUMBER

Most users of superheterodyne receivers will have noticed the aggressive hiss which so often assails the ear when the B.F.O. is switched on. Admittedly it can be minimized by keeping the B.F.O. very weak and by the selection of a low noise level triode for that stage, but in the former case the remedy prevents the full realisation of the increased signal strength which should result from the addition of a correctly adjusted beat oscillator. A very useful improvement can be attained by the use of the circuit shown.

(U1 0384 D0M1F3H00)



PUSH-PULL DETECTION

The essential requirement of this circuit is the adoption of push-pull detection as shown in the circuit. Here two triodes have been used as the second detector stage, a 6N7 double-triode being very convenient for the purpose. If A.V.C. is required it may then be necessary to add a separate diode.

The advantage of push-pull triodes lies in the ease with which the necessary push-pull output may be obtained by means of a centre-tapped audio transformer. An audio transformer will effectively match the impedance of triodes, but if used to follow diodes a certain amount of distortion is theoretically

to be expected. The simple grid leak and condenser arrangement shown has been found very sensitive on CW and is probably as good as any other for DX reception, whilst the cancellation of direct magnetising current in the primary of the push-pull transformer seems to lead to a very satisfactory impedance matching and pleasing reproduction.

THEORETICAL CONSIDERATIONS.

Considering now the main reason for the arrangement, it will be seen that the B.F.O. is injected into the center tapping of the TF transformer feeding the detector stage. Practically, after trying several forms of coupling, it was found quite satisfactory to take this point to earth through the grid circuit of the oscillator as shown. It is important that the oscillator should not couple into the I.F. channel through stray paths, and it should be adequately screened. Direct coupling, as shown, assists in this respect. The actual strength of oscillation can be kept low whilst still providing an ample voltage at the detector grids.

Now since the B.F.O. is injected into the center tap of the IFT it reaches the grids of the two detectors in phase, the two halves of the secondary winding merely acting as series impedances. But any voltages which are in the same phase at the two grids will cancel out in the anode circuit producing no output from the audio transformer, provided, of course, that the two detectors are balanced. Therefore on switching in the B.F.O. any hiss in the oscillator due to valve noise etc. is not effectively detected, and so produces little or no noise in the audio stages. This argument only applies in the absence of signals. When a carrier arrives from the I.F. amplifier, it is induced into the I.F.T. secondary in the correct manner for push-pull operation, producing voltages in opposite phase at the two grids -- it is thus efficiently rectified. The B.F.O. beats with the carrier in each detector producing two audio beats which are in opposite phase at the respective anodes, and therefore add in the audio transformer to produce an audio signal of double the usual strength. Thus the circuit has the effect of greatly reducing B.F.O. noise in the absence of signals, whilst increasing the audio beat produced when a signal arrives. The vital requirement of a quiet back-ground, is thus assisted.

PRACTICAL RESULTS.

Under practical conditions the circuit described leads to a much improved beat-to-noise ratio. It is found that on switching on the B.F.O. very little hiss is heard, and this can be reduced to a minimum if necessary by careful matching of the two detectors, such as by slight adjustment of grid bias on one of them. It is then possible to increase the amplitude of the oscillator by a factor of perhaps 10 or 20 fold without introducing more than a very slight hiss in the absence of signals. The amplitude of the audio beat is given mathematically by the product of that of the signal and of the beat oscillator, and therefore increases, if, as in this case, it is possible to increase the oscillator amplitude without introducing other defects such as hiss. A weaker I. F. signal will now be required to produce a given beat loudness, and we should expect the loudness of the audio signal to be greater.

Practical tests show the improvement to be striking. The receiver using this circuit was placed beside a well known commercial receiver and the same signal tuned in on both. On switching in the B.F.O. of the commercial receiver, the best note became audible at about S1 to S3, a very doubtful R5 in the presence of interference. In the push-pull receiver however the switching on of the oscillator brought up the carrier from inaudibility to a solid S7 to S8 beat, fully readable under noisy conditions. Since such a marked increase of audio output occurs it would clearly be possible to work with a weaker signal in the earlier stages of the receiver. I.F. gain could be reduced, and with it one would expect to reduce any valve or circuit noise arising in the first R.F. stage, thus improving the signal-to-noise ratio of the receiver as a whole.

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(Continued from page 7) -

2JP, Jack Pike, who incidentally has a son on Active Service overseas, gave a few reminiscences of the early days.

A-2CM Chas. Maclurcan thanked 2JR for the wonderful Sales talk given earlier in the evening and only regretted that he was not now in the Radio trade.

2DE Phil Ronshaw thanked the Division for their action in conferring Life Membership upon him.

Malcolm Perry suggested that the Institute obtain space for the collection and storage of relics.

In the list of VK2 hams on service published in the December issue of "Amateur Radio" appeared the name of N. Southwell 2ZF. This call was inserted in error and any inconvenience caused to Mr. Southwell is regretted.

The March General Meeting of the Division will be held at Y.M.C.A. Buildings Pitt Street Sydney on Thursday 20th, and any ham on service whether he be a Member of the Institute or otherwise is assured of a very hearty welcome. A very interesting talk will be delivered by Mr. A. J. Brown VK2LK. 2LK was in England and on the Continent immediately prior to the outbreak of war and as his talk will be illustrated by a movie camera, Members may look forward to a very interesting night.

Members will regret to learn that the Divisional President Harold Poterson VK2HP has not been enjoying the best of health for some few weeks and will join in wishing him a speedy recovery.

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VICTORIAN DIVISION**

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The Division meets on the Third Thursday of each month at Y.M.C.A. Buildings, Pitt Street, Sydney, and an invitation is accorded to all Amateurs to be present.

H A M S !

**DO YOU WANT TO BE
BACK ON THE AIR?**



**THE WIRELESS INSTITUTE
OF AUSTRALIA**

is the recognized spokesman of the
AUSTRALIAN AMATEUR

If you are not a member—

Join Now !

When the time comes that we can reasonably expect to go back on the air, we want to say that we represent—

EVERY ACTIVE HAM

in the Commonwealth.

Strengthen our hand by writing to The Secretary of the Institute in your State to-day.

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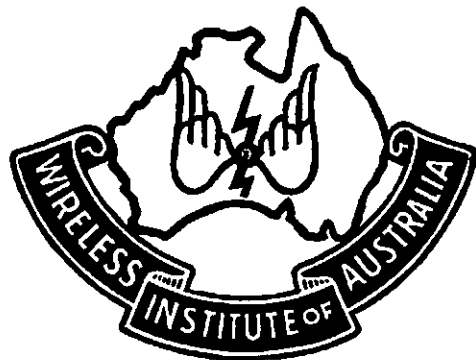
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SIXPENCE

APRIL 1941

AMATEUR RADIO

THE
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WIRELESS INSTITUTE
OF
AUSTRALIA



Published by the Victorian Division

AMATEUR-RADIO

Vol 9. No 3.

April, 1941

- RANDOM REFLECTIONS -

by

COMMENTATOR. (T. & R. BULLETIN)

There are times when it is good to look back. Much that "Ham Radio" meant before the war put QRT to many of its activities, seems now to be a thing of the past. The empty shack, the dispersal of friends, the absence of QSL's in the morning post, the usual sked, which is now no more; these things have for many ended what was for them, the essence of "Ham Radio." As the war continues, where-ever erstwhile "hams" meet, they will sooner or later start reminiscing. "Do you remember the 1938 N.F.D.?" "Were you at the last convention?" "Do you remember..... and so it will go on.

It is only right that this should be so. As the war develops and involves more and more countries in an orgy of destruction, one by one the remaining beacons of amateur radio become extinguished, and one wonders whether some future day may come when the question will be heard, "What was this Ham Radio?" If it does, it will indeed be a sorry day. Whether or not it comes depends on how we conduct our affairs now. But before we say more on this point, let us consider what it is which makes our hobby unique among the activities of mankind. What is it about amateur radio which knits men of every nation together by a band of comradeship in a world stark mad with national hatred? What is it that makes two individuals separated by thousands of miles, who have never met or set eyes on each other, friends for life? What is it that insures hospitality in every foreign land....or did, at any rate before the war....for he who can say, "I'm a fellow radio ham?" What is it about our hobby which attracts thousands of adherents in every civilized country in the world?

For some, no doubt, it is the fascination of communicating with another human being hundreds of miles away. It cannot be denied that there is an almost uncanny fascination in sending a radio signal far out across space and getting an intelligent answer back. For others the fascination lies in experimentation or as an outlet for their creative

instincts. No matter which of the above interests was the initial cause of the prospective amateur "joining up" - when he does get into the "fellowship" he soon finds that there exists a "something" - an indefinable sense of the greatest comradeship he has ever come across. No matter what his social status, what his income, what his creed, what his nationality or color, provided he abides by the unwritten laws of "ham" conduct - which he will soon learn -- he is as good as the best. On the air, at local meetings, at conventions during his travels at home or abroad, where-ever he comes up against others whose passport is a QSL card, he knows he will find hospitality and comradeship. This is the spirit which makes the amateur radio movement distinctive, which places it amongst the highest, most cultured, most uplifting of human activities. It is one of the best "Friendly Societies" the world has ever seen.

Upon what does the success of this comradeship in amateur radio depend? It depends chiefly on free intercourse and communication between its members. An international jargon, and a ready means of communication, have enabled all its members in the most distant parts of the world to keep in touch with one another. Conventions and local meetings have brought together groups of similarly-minded people and the spirit of the thing has spread until now there can hardly be a country where a "ham" isn't to be found.

But the "forces of evil have reared up their heads" - as the preacher would say. Not only do they wish to curtail our freedom in the wider spheres of life, to destroy our Nation, our Democracy, our very country, but they are endeavouring to sow seeds of national hatred and jealousy and so disrupt the countries they wish to attack. International friendship is a thing they fear most. We amateurs know too well that the first signs of dictatorship are the disappearance from the "air" of the call signs of the subjugated country. Free intercourse with the outside world will not suit the dictators. Neither will meetings of groups of people behind closed doors. Neither will free discussion in society and club magazines. By stopping all these things that have managed effectively to turn their people from intelligent free-thinking individuals, with a sense of something worth while in life, into senseless automatons.

And now here is the moral. For obvious reasons the authorities have stopped our activities on the air. But they have not stopped our other activities. Our meetings can go on as before - not quite so conveniently perhaps, but there, the fellow who had the farthest to come always was the most regular! Our friendships can go on. We may be separated - we may not be able to meet on the train, in the cafe or at the "local" as we used, but we can write.

When the very foundations of "Ham Radio" are being shaken, it is up to us (who have watched it working and know it at its best) to see, by gathering together as we did of old, by talking of our hobby over our coffee and sandwiches or whatever it may be, by corresponding regularly with those with whom we should never

have thought of missing a sked, and extending towards other "Hams" the hospitality we would have shown in days gone by, that the spirit of our movement is kept alive, so that the day shall never come when the question is heard "What WAS that ham radio?"

....o00o....

-- A NEW TYPE OF PICK-UP --

The Philco Company in America has announced the production of a new type of pick-up. This new pick-up is novel in that it operates on the reflecting mirror galvanometer principle, which, it is believed, has not hitherto been applied commercially to this purpose.

The stylus has a permanent ball sapphire point, and, instead of moving a crystal or magnetic armature, it actuates a small thin mirror so that the lateral variations in the record grooves oscillate the mirror in accordance with the groove modulations. A pencil of light from a torch bulb type lamp shines on the mirror and, as the mirror oscillates, the light beam is deflected in conformity with the groove modulations. The reflected light is focused upon a photo-electric cell, the output of which is fed to an amplifier.

The small exciter lamp is argon-filled and fed from a high-frequency oscillatory source to avoid modulating the output by mains frequency flicker. As the stylus has to move, nothing but the minute mirror, the moving mass is low and so the needle impedance (stiffness) is small, and the light weight of the pick-up considerably reduces the pressure of the sapphire point on the record.

It is claimed that these two factors in combination markedly reduce record wear and surface noise. The frequency range of the pick-up is from 50 to 5000 c/s, any response above or below this range being purposely diminished to eliminate needle noise.

-----XXXXXXXXXX-----

Even though we are off the air the Institute still looks after your interests. Proof of this is shown by the Institute seeking further information on the recent Wireless possession Order.

Several inquiries had been received in regard to keys and microphones. The advice from the Department was that keys where used for morse practice, and microphones where used for adio purposes need not be included in the gear to be packed for sealing by Officers of the Department.

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IMPROVED PERFORMANCE FROM THE REGENERATIVE

I.F. AMPLIFIER.

By....I. Eby.

Many who have tried regeneration in an I.F. stage in their receivers have discarded it in favor of a crystal filter. A crystal filter provides rejection ordinarily not brought forth in a regenerative I.F. amplifier. However, in the circuit described, the "rejection" of a crystal filter can be approached closely and with gain maintained in the stage. The gain feature is one that the crystal cannot boast. Most crystal filters have considerable loss. If properly shielded and designed, a regenerative I.F. stage will be easy to adjust and will bring those weak signals out of the QRM practically as well as a crystal filter.

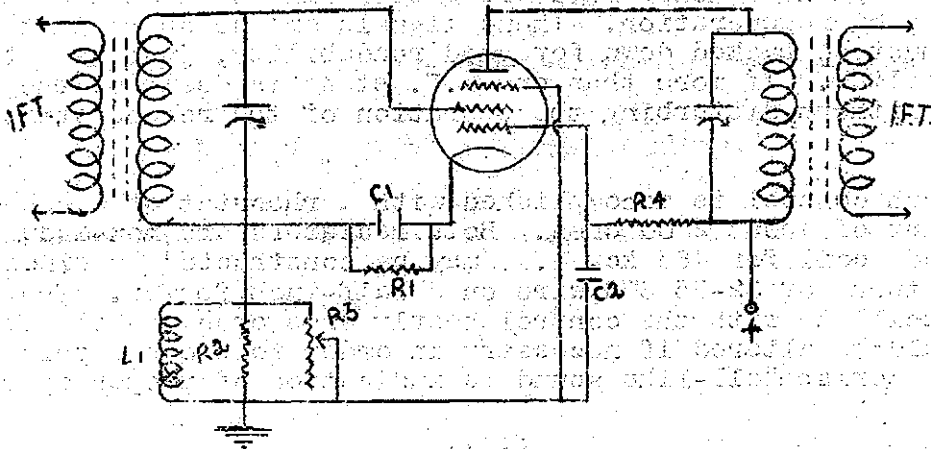
In the first two methods tried regeneration was obtained by (a) a feed back coil coupled to the secondary of the IFT, and (b) by capacity feed back from the plate to the grid of the I.F. tube. It was found that both methods provided good selectivity, but that there was no rejection on the undesired side of the signal. Stability was also not too good.

The circuit as shown was one circuit which at first didn't look particularly promising. It was tried, however, and surprisingly enough it performed to perfection. It is the same circuit as used in the "Jones" Super Gainer second detector.

In the experimental state the whole affair was unshielded and the regeneration control was boosted to the limit. Under these conditions the full capability of the single-signal feature was realized, with a rejection on the undesired side of the signal of about the same as the gain on the desired side.

All of the methods used were tried with both air core and iron core transformers and the circuit shown was the only one wherein the good selectivity and gain of the iron core unit was obvious. The second detector had to be changed immediately, however, because it was of the plate type and it blocked up on loud signals. In the present set a diode type rectifier is used. An infinite impedance detector could be used if desired. The screen voltage of the I.F. tube should be maintained constant, a voltage divider arrangement is suggested.

When aligning the set the usual modulated oscillator may be used on all circuits except the input I.F. transformer. The same method used to line up a Super Gainer should be used, i.e. the



C1, .25 mfd; C2, .1 mfd; R1, 1000 ohms; R2, 200 ohms;
R3, 2000 ohms (var); R4, 50,000 ohms; L1, 70 turns 35 SWG on $\frac{1}{2}$ "
former (for 465kc)

regeneration should be boosted to a point just before the stage oscillates and the secondary trimmer adjusted with the help of the modulated oscillator after the succeeding stages have been lined up. Then the primary of the input transformer is adjusted, with the oscillator off until the I.F. stage drops out of oscillation. The I.F. gain is run up again and the procedure repeated. The reason for this method of alignment is that the cathode coil has a detuning effect on the secondary of the transformer. The B.F.O. is adjusted to whichever side of the signal is desired and also to the frequency pitch desired. Usually a 1,000 cycle note is best for reading weak signals.

Shielding is a good measure towards stability, and the cathode coil should be mounted close to the socket and I.F. transformer. The lead to the regeneration control on the panel should be shielded and a ground wire brought from the cathode coil to the control. The cathode coil itself need not be shielded unless desired, although any means to keep the regeneration solely in the grid -- cathode circuits is a means towards better rejection.

With this circuit full gain may be applied to all stages of the receiver without effecting the I.F. operation. This is an advantage over any of the other circuits tried, as in most of them the R.F. gain had to be backed down to get good I.F. gain with stability.

Good signal to noise ratio is outstanding even at the threshold point of regeneration. Phone signals are so sharp that the control must be backed down for good readability, just as with a crystal filter. If more than one I.F. stage is desired, they may be added without disturbing the operation of the regenerative stage.

Smooth control is accomplished with a rheostat of 2,000 ohms and a shunt of about 200 ohms. Both resistors are non-inductive. The cathode coil for 465 kc. I.F. may be constructed by winding about 70 turns of 32-35 SWG wire on a half-inch former. The stage should oscillate with the control nearly wide open and the cathode coil should be altered if necessary in order to produce this condition. A crisp bell-like sound is indication of proper operation.

.....

- TUBE LIFE -

An interesting discovery regarding tube life

The Bell Telephone Laboratories report a discovery which, if applicable to receiving and transmitting tubes as well as to the repeater tubes on which checks were made, should be of vital interest to every amateur.

Checks on life test records of various repeater tubes operating under unvarying conditions showed that invariably the rate of failure in a group of tubes when expressed in per-cent of the tubes remaining tends to become constant - just as though the tubes failed in random fashion. The same results were obtained in every case where sufficient data was kept on field trials. There is every reason to believe that the same law of probability will apply to receiving tubes and possibly to transmitting tubes, even when being punished in an amateur transmitter.

This means that a used tube, STILL IN PERFECTLY GOOD CONDITION, has a further life expectancy just as great as that of a brand new tube of the same type. At first glance this seems hard to believe, but after a little thought on the subject it is not so hard to accept. The reason is that the life of individual tubes in a large group will be found to vary widely from the average life or "life expectancy." Some will last only a few hours, some a few hundred, some a few thousand and some many thousands of hours. If the average life for the group is say 3,000 hours, it will be found that at the end of 3,000 hours only

37% of the group are still in service. The extra long life of the tubes which exceed the average life makes up for those that fail before 3,000 hours.

It is interesting to note that the practice of replacing all tubes periodically, whether it is done because uninterrupted service is of prime importance or because the tubes are old and they would soon start going out one at a time as their life expectancy is reached, is pure folly. The short lived tubes having already given up the ghost, the tubes remaining in service, even though they may have exceeded the average life expectancy, are likely to last as brand new tubes.

Practically every amateur knows of a case where a brand new transmitting tube, of reputable manufacture, failed after a very short period of service during which the tube was not abused. This should be no reflection on the manufacturer or his product. The tube may have a life expectancy (average for a large group) of possibly 5,000 hours when run at normal ratings. Even so an occasional one is bound to fold up after a few dozen hours, which will be compensated by an occasional one lasting 25,000 hours, or even more. Theoretically all tubes of a certain type should have a definite life span, at the end of which all of them elevate their toes skyward simultaneously. But such is not the case in practice. Manufacturers are doing their best to get at the root of the non-uniformity, but don't seem to be able to do so. They can improve and extend the average life of a certain type of tube, but still some will last ten times as long as others in the same service.

Of course the survival law falls down when carried to the extreme. It is true that according to this law of survival, in which a certain fixed percentage of surviving tubes fail every given number of hours, sooner or later a tube would be found that would last indefinitely. Of course no tube can last for ever, but it would be reasonable to believe that if a tube somehow did manage to survive, say 200,000 hours, it would have just as good a chance of lasting another 1,000 hours as would a new tube. This assumes, of course, a new tube which was made at the same time and on the same equipment. It would be highly probable that after 200,000 hours a manufacturer would have improved his manufacturing technique and would be turning out improved versions with greater life expectancy.

If this law of survival applies even approximately to transmitting tubes, and there appears to be no reason why it shouldn't, used tubes should be worth a lot more than they are. This takes for granted that the tube still checks up to the standards of a new tube and that it has not been rejuvenated in order to make it look good. Oddly, while this peculiar law of survival applies to tubes with oxide coated and thoriated tungsten emitters, it does not apply to pure tungsten filaments. The life of a tube with pure tungsten can be predicted accurately.

D I V I S I O N A L N O T E S

- Victorian Division -

The April meeting of the Division passed with the delivery of a lecture on photography by Mr. Jack Kling, 3JB to a very interested audience. The subject matter of the lecture was mainly concerned with developing of films, the best method of doing so, plus a few hints and kinks.

At the May meeting, which will be held on TUESDAY, 6th MAY (I've got the date right this time) Mr. Kling will continue the lecture advancing into the process of printing....and which reminds me....We're thinking of applying to the Defence Department for the loan of a few machine guns so that we can round up a few more to the meetings.....Surely you are not all QYL...or maybe its OW QRM.....Do what some of the boys do....get 'em to wait for you in the car, or dump 'em at the movies. Sorry if I've walked on anyones toes, but the idea was so good I just had to pass it on....

3DH...was the cause of a stunned silence when he turned up at the April meeting...reports that apart from the same story which everyone will tell about the packing of all RF gear in a secure receptacle, there is very little else. However, the old "bug" of recording which "Bit" way back in 1930 is still biting, and in spare time (and he modestly says "if any") when not toiling at 3AW, he spends in improving his recording technique. Says he's recorded just about every "Sound" the average ham is likely to meet...from thunder claps (during a genuine storm) to birds tweeting (sounds bad....Ed) outside the shack, plus the XYL playing the domestic piano. Has even recorded half a dozen commercial recordings on to one side of a 12" disc at 33 1/3 rpm.....saves a heck of a lot of record changing...and we can quite believe it.

3XJ...has rebuilt his 913 'scope with amplifiers and linear sweep complete in readiness for when someone comes back on fone. Has got the building bug, with the result that he's building a book-case....

3IW...has been playing round with 1.4 tubes. Hooked up a TRF with a 1N5 and 1D8GT with fair results on the BC and short wave bands but the triode of 1D8 lags a little on the regeneration. Reports polishing up his code, but radio is more or less shelved of late in favour of building astronomical telescopes.

3JB...has shifted during the past month. Jack reports that it's not so good when you've got a lot of gear.

3WE....the latest news I've got is that Bill is a drill instructor somewhere in Australia....The "Old Man" has three stripes too.

3WG....is very busy I hear....should know a lot about VK2 by now.

3XB....of the R.A.A.F. is now somewhere....someplace.

3FR....when last seen was driving a red van with lots of gold lettering on the side. Will be in camp next month with the sigs.

3YW....is still playing round with Xtal filters....maybe after you read this Cecil...you'll try and regn I.F. stage.

3MR...was heard from recently....is somewhere in the East. Snow reports that he is attached to the R.A.F.

3RN....after his sterling work on last months magazine Ron was unanimously elected "Official Printer" by the gang present. What he doesn't know about the duplicator now, isn't worth talking about.

Which reminds me....The Magazine Committee and helpers are considering compiling a new dictionary. After the new words used during the printing of the last magazine, they think the existing dictionaries are well and truly out of date....??????.

The congratulatory this month go to Corporal Neil Templeton R.A. A.F. VK3HG, on his marriage to Miss Olive Skead, which took place on Saturday March 29th. Look us up sometime Neil.....

3HX....is wondering if the postman has forgotten all about him or if everyone has got writers cramp. No mail this month so not many notes.

- NEW SOUTH WALES DIVISION -

By.....VK2AJC

The March General Meeting of the Division was held at the Y.M.C.A. Building on the 20th. The Senior Vice-President, Frank Goyen VK2XX officiated in the absence of the President who was still on the sick list. "Amateur Radio" in its new form was examined and discussed, with the result that a motion was passed congratulating the Victorian Division for the job they had produced under difficult circumstances, and assuring them of the support of this division for their enterprise. The meeting also welcomed some old faces which had been missing for some time, and also a couple of new members.

After the business session had been disposed of, the lecturer, Arthur Brown VK2IK set up his film projector and gave a very enjoyable talk about his experiences on a world tour (1938-1940) complete with motor-bike and movie camera.

He showed some fine scenes and incidents in Australia, Colombo, Malta, England, Switzerland and U.S.A. but as his tour had been interrupted by the war, naturally some of the films had been censored. His adventures were many and varied, including working in a television film in England, and an inside view of a Nazi jail in Germany as a guest of Adolph!

A recent visitor to Sydney was Jim Cowan VK2ZC, who with VK2MC made the first 5 metre QSO between Sydney and Newcastle. Jim's hobby these days is bee-keeping. Another caller in VK2 was VK4EL, Eric Lake of 4QG Brisbane, a famous DX hound in happier days before the time of "Sealed in a strong container." Well, perhaps 4QG can be heard in 114 countries....perhaps!!!!

The advertisers in "Amateur Radio" have been very willing Co-operators in making the new magazine a success, and members are asked to give them every support. Country members should write to them for catalogues and order by post from these firms.

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ADDITIONAL NEW SOUTH WALES HAMS IN DEFENCE FORCES

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Sgnlman T. Davis VK2ADS Sgnlman C. Roberts VK2JV
Sgnlman L. Davies VK2QI

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STOP PRESS-----

FLASH----- Congratulations to Mr & Mrs Ron Higginbotham, VK3RN on the arrival of a YL op.....

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The Division meets on the Third Thursday of each month at Y.M.C.A. Buildings, Pitt Street, Sydney, and an invitation is accorded to all Amateurs to be present.

H A M S !

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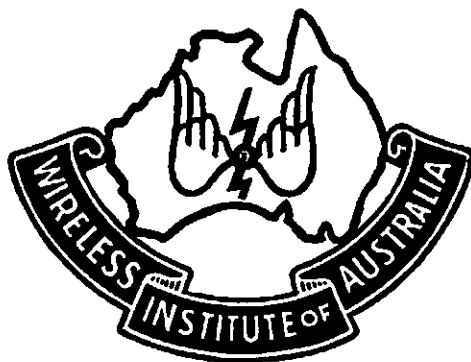
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SIXPENCE

MAY 1941

AMATEUR RADIO

THE
OFFICIAL ORGAN
OF THE
WIRELESS INSTITUTE
OF
AUSTRALIA



Published by the Victorian Division

AMATEUR-RADIO

Vol 9. No. 4.

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A SIMPLE BUT EFFECTIVE RESISTANCE AND CAPACITY

BRIDGE

(Abstracted from an article by G5sY)

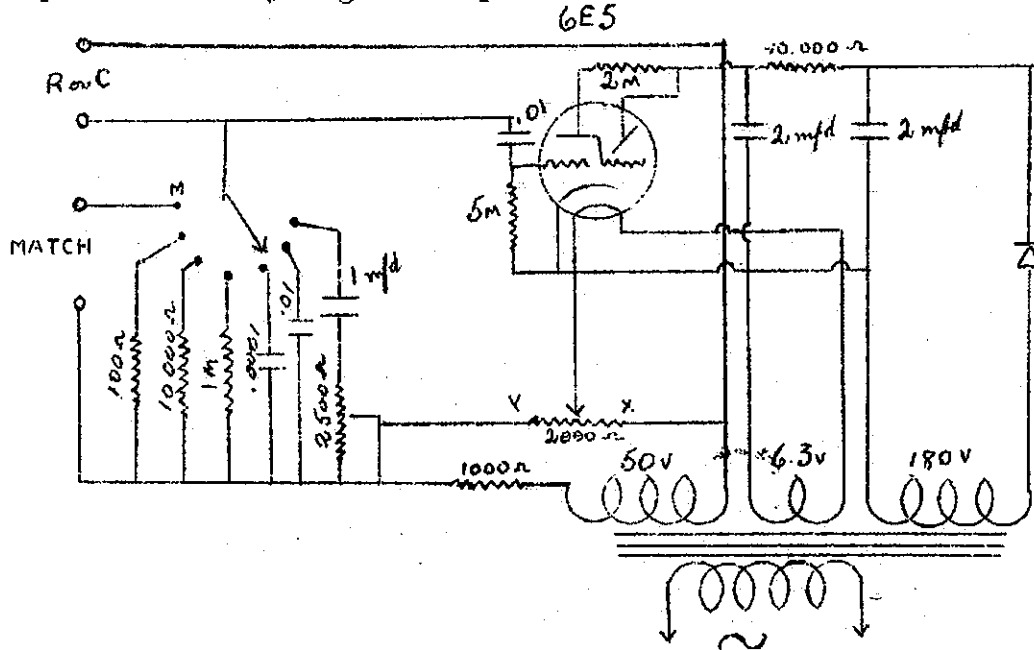
The accompanying circuit shows the arrangement used by the author. An AC potential of about 50 volts (derived from one winding of a small transformer) is applied through a 1000 ohm, 5 watts safety resistor (which also acts as a voltage limiter for the lower impedances) to the ends of a 2000 ohms potentiometer, and also across the outer terminals of either two resistances, or two condensers (depending on which is being tested) arranged in series with each other. One of the latter is the component to be measured, which is connected across the terminals marked R or C. The other, which must be of known and suitable value, is selected by means of the low capacity switch shown, or connected externally across the "Match" terminals, in which case the switch must be moved to the stud marked 'M'. The extra potentiometer shown in the series with the 1 mfd standard condenser is used for power factor measurements and its use will be described later.

The grid of the tuning eye, a 6E5, is connected through a .01 mfd condenser to the junction between the two resistances or condensers, while the cathode is joined to the moving arm of the potentiometer. The precise type of H.T. unit used to supply voltage to the tuning eye is not important, but it is desirable to employ one producing about 200 volts.

It may be considered somewhat difficult and expensive to provide accurate standards of resistance and capacity, such as those shown connected to the selector switch, but this is not the case since it is quite unnecessary to use exactly the values quoted. What is required, however, is that the values used shall go up in multiples of approximately 100, and when purchasing the exact measured value of each should be ascertained. It will be found, however, that for all normal purposes the nominal value is all that is required.

When the slider of the potentiometer is swung during the test, it will be found that the shadow area of the 6E5 varies, the balance being indicated when this is at a maximum. If

the essential leads are kept short, particularly those from the potentiometer to the standards, and a high value of grid leak used, the point of balance should be quite critical, except perhaps on the very highest impedances.



CALIBRATION

It is necessary to calibrate the potentiometer in such a way as to indicate the ratios between the two portions X and Y (see circuit) for different positions of the slider. If the series of standards shown is used, the calibration should be carried out on either side, to beyond the points where one portion is ten times the other. It will then be possible to measure all capacities from 10 mmfd to 10 mfd, and all resistances from 10 ohms to 10 megohms. Two scales, however, must be provided, since the numbering for capacity is in the opposite direction to that for resistance.

The calibration can be carried out in various ways. The one adopted by the author was as follows:- The overall resistance of the potentiometer was first measured by means of an ordinary DC Wheatstone Bridge. One lead from the measuring apparatus was then connected to the potentiometer slider. Having calculated the value of resistance required to produce the ratio sought, the slider was turned until this value was indicated and the pointer marked on a scale attached to the potentiometer.

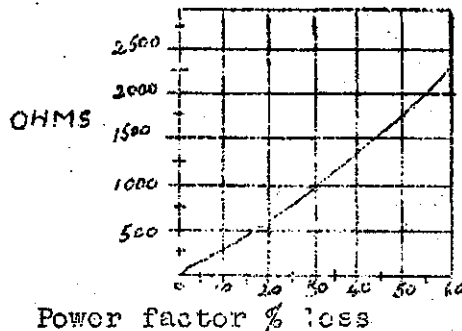
An example will perhaps make this clearer. Suppose the overall resistance to be 1950 ohms and the point for ratio $x/y = 4$ is required; then the actual resistance of the portion x should be $4/5$ of 1950 = 1560 ohms. The slider is therefore

turned until the measuring apparatus indicates this value. Proceed in this way until sufficient points have been marked. The one calibration will serve for both scales since, for example the points marked 10, 2, and .5 on the capacity scale will become .1 .5 and 2 on the resistance scale.

OPERATION

Suppose we are now ready to carry out a trial measurement of capacity. A condenser which appears to be about .01 mfd is connected to the "R or C" terminals and the selector switch placed in the .01 position. When the tuning eye is glowing fully the potentiometer is swung until balance is obtained, and the value on the capacity scale is read. Suppose this reads .85, then the actual value of the specimen is .85 of .01 or .0085 mfd. If balance should come in a very lopsided position another standard value should be tried.

When measuring large paper condensers of poor power factor it will be found that the shadow area will not open out fully. The 2500 ohm potentiometer placed in series with the 1mfd standard is used to balance out this effect, at the same time providing a simple way of measuring the power factor, by indicating the amount of resistance needed to balance the power loss. This potentiometer may be calibrated in percentages according to the graph shown -



CONCLUSION

No hard and fast rules have been laid down regarding components or particular lay-out employed, because those who wish to construct the bridge will no doubt have a number of components available. It can safely be stated, however, that the time spent on the construction will be well worth while, as an extremely useful instrument will be the result.

SPY'S TRANSMITTER

-- Details of the gear used by enemy agents --

It was recently disclosed that three enemy agents, convicted of spying, had been executed in London. Among other things found in their possession was a complete portable short wave transmitter, and representatives of The Wireless World were given facilities by the authorities to prepare a detailed description of the apparatus. For the interest of our readers we are reprinting the description of the apparatus given by the above mentioned journal.

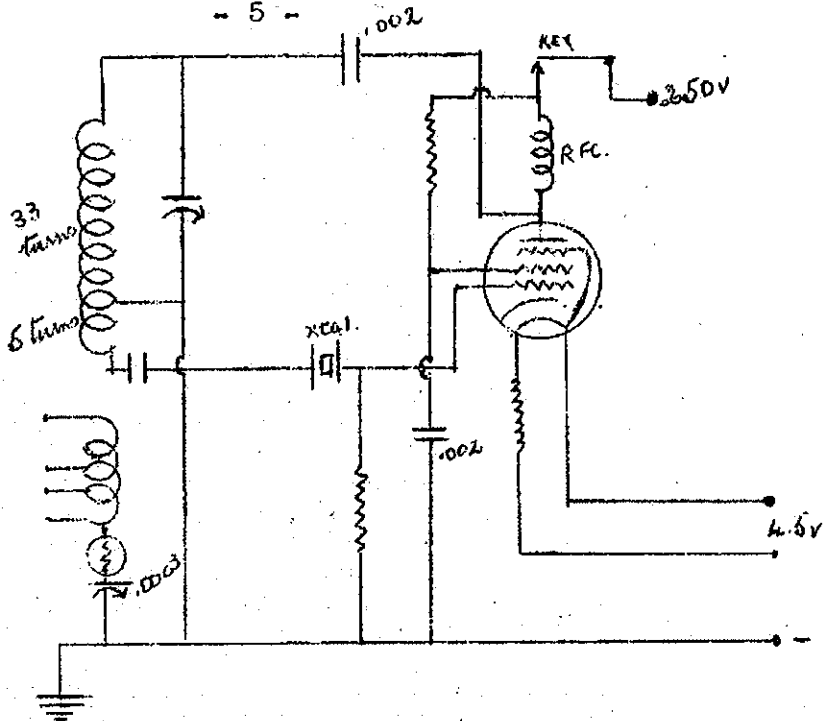
Some mild disappointment will be felt that the transmitter is not of especial technical interest, either mechanically or with regard to its circuit arrangement. The circuit is indeed, except for the use of a quartz crystal and a pentode valve, almost exactly the same as that used by a member of the staff of the Wireless World in 1924, when everything to do with the short waves was brand new, and we were all eager to get some first hand experience of their behaviour. In the matter of mechanical layout and set seems distinctly unhandy, at any rate if, as the fiction writers would have us believe, the enemy agent is always compelled to work his gear under the most difficult of conditions. A rather more finished job might have been expected from the best German technicians, and one is inclined to wonder whether the former owners of the set were, figuratively speaking, free lances, responsible for their own equipment, and merely paid by results.

As shown in the accompanying diagram, the circuit is a modified Hartly Oscillator with crystal control at the fundamental frequency of the crystal, which in the case of the transmitter described was just under 6000 Kcs.

The valve was a directly heated Telefunken battery pentode. It was used with batteries to furnish H.T. supply, and under operating conditions the anode current was 8 ma at 210 volts. Power is thus extremely low, but it must be remembered that Amateurs have often worked several hundred miles or more on even less power.

The complete equipment was carried in two black leather carrying cases with shoulder straps. The first case contained the transmitter, key and aerial equipment while the second contained the batteries and leads.

Two sets of aeriels were provided, and it appears that the usual practice was to use an aerial and counterpoise, for which arrangement the circuit is suitable.



When crystal controlled the set gives a pure CW note. By removing the crystal and short circuiting the plug sockets, the transmitter could be operated as a variable frequency unit. Under these conditions stability was still of a high order, and the note, as heard on a suitable receiver with BFO, is still pure over the useful part of the tuning range.

-----XXXXXXXX-----

SILENT KEY

It is with deep regret that we announce the passing of W. M. Manley, VK2XH, on Friday, 21st of March. "Bill" -- as he was known to everyone, passed away suddenly in the very prime of life, being only 38 years of age. He leaves a widow and three small children.

He was not a newcomer to Amateur Radio by any means, as he held the call of VK2MW before it was taken by a "B" class station. He was associated with several old-timers in early experiments on 5 mx, when the band was a mystery to most Hams. He was also a member of the old Leichhardt Radio Club. Of later years he was President of the newly formed Gladesville Radio Club, and his friendly personality and dry humor will be sadly missed by all his co-members of that Club.

D I V I S I O N A L N O T E S

-- New South Wales Division --

By VK2TI

The April General Meeting of the Division was held at the Y.M.C.A. Buildings, Pitt Street, Sydney, on Thursday 17th April, and quite a large number of members were present.

The Chairman welcomed two interstate visitors in Sergeant Arthur Walz, VK4AW, and L.A.C. Launse Deane VK5LD. Both these amateurs held executive positions in their divisions prior to the outbreak of war: 4AW being Chairman of the VK4 Division, and 5LD a member of the S.A. Division Council and at one time secretary of that division.

The visits of interstate Amateurs, particularly W.I.A. Office Bearers is always of interest and does much to overcome the distance separating the various capitals, as everyone will agree it is much easier to discuss various matters personally rather than by correspondence, hence the value of the Annual conventions held in the piping days of peace. Even in those far off days one would learn per modium of "Amateur Radio" that "So and so had been on a visit to VIM and had spent several days in VIS." "So and so" had never bothered to contact any officer of the Institute and discuss ham radio from an interstate viewpoint.

Under the present circumstances the visit of 4AW and 5LD was of value and they were enabled to discuss with VK2 councillors the future of Amateur Radio and the post war Institute, and it is hoped that as a result of these talks a step forward has been made in meeting the position that will arise when the time comes to once more 'pound brass'. From the April issue of "Amateur Radio" we learn that the Federal President, Bill Gronow 3WG is in New South Wales. Bill, the Division would be pleased if you would contact them so that a formal welcome to VK2 could be extended to you.

During General Business the Radio Inspector's instruction "that gear should be placed in a receptacle suitable for scaling" was discussed, many members expressing annoyance that after having placed their gear in various containers they, and in many cases, wives and mothers were compelled to pull it all out again upon the arrival of the R.I.'s representative.

A very interesting demonstration of an audio amplifier was given by the Divisional Technical Officer, Jack Howes, VK2ABS and a discussion dealing with the merits of triodes and pentodes was of interest.

The next General Meeting of the Division will be held on Thursday 15th of May at the Y.M.C.A. Buildings, Pitt Street, Sydney, and a cordial invitation to all hams on service to be present is made. Messrs. McIntosh and Johnson have kindly offered to provide a demonstration of a home recording unit and members may look forward to an interesting evening,

Friends of Chas. Miller VK2ADE will regret to learn that he failed to "duck" and was the recipient of a piece of shrapnel from a Gorman Ack Ack gun. Chas' main worry though seemed to be the loss of his portable receiver during an air raid in the town where he was convalescing.

-----oOo-----

-- VICTORIAN DIVISION --

I'm afraid that I must start off these notes with an apology. It seems that in the notes last month the reference to 3WG has been misconstrued. To clear it up Bill frequently has trips interstate and as a rule hurried, so he doesn't get much time of his own.

Well another month has flown past with the result that writing these notes is becoming somewhat of repetition. I know what the gang who attend the meetings do, but outside that only what leaks through now and again. However, here goes:-

- 3YK .. was reported sometime ago to be transferring to the Navy, the most up-to-date news is that he is now with the R.A.A.F. stationed at Singapore.
- 3XF .. is another of the gang who is reported to be at Singapore.
- 3HG .. has been seen in Canterbury recently looking very fit.
- 3OW .. We all offer our congratulations, Gordon, on your recent engagement. What else are you doing ????
- 3AI .. is another we must congratulate on the arrival of a Junior op .. I wonder if you will see this Frank ???
- 3WD .. another member of the R.A.A.F. stationed at Cootamundra.

3RN .. has recently added to his gear in the shape of a selfishly-excited oscillator, in this case a YL op. From reports Ron has been playing around with a new type of bottle, at least to him. Its characteristics are particularly good, as it usually stops howling in the audio stages, much, we presume to Ron's relief.

3WE .. has come to light at last. Had a letter from Bill during the month. Bill is doing swell, and is to be located at Darley Camp, where he is teaching the 'young squirts' how to 'pop' 'em off.

3FR .. is now in camp with the signals, or at least we hope so. Just what camp Fred is in isn't clear as yet.

3WY .. spends most of his spare time hunting suitable articles for this mag. Wishes someone else could dig up something now and again.

3BQ .. is I learn still among the living, and hopes to put in an appearance sometime.

3XJ .. has been neglecting the garden...result...OW, QRM; but George had an excellent reason....to finish building a folded horn cabinet to improve the sound of his BC receiver. Fred reports it works very well, and repays the work spent on it.

3RJ .. after a long absence appeared at the last meeting. Seems to be an air of secrecy about Ray 'cause all we could get out of him was that the only excitement he had had was a day prospecting in the hills. He didn't say what hills???

3JB .. caused a sensation at the last meeting by suggesting a field night for lady ops... of course he would be the instructor.

3DH .. once again sneaked quietly in the door, and reports that "recording" still holds the main interest (I guess it always will) garden and household jobs retaining, as Ivor puts it the "rear seat." (Apparantly there's no rear seat driver.) Additions to the recording apparatus include a more effective equalizer and a means of collecting the cuttings. The recorder does a fair job at 33 1/3 rpm with very little "wow" troubles. Has promised to write an article for the mag. in the near future.

R. S. Clarkson .. one of our members without a ticket as yet, has been playing around with a new receiver trying to find what is left on the short wave bands. He is also trying out an equalizer in conjunction with a crystal pick-up the noise end of which are a pair of scarce 2A3 tubes.

3DF .. is another old-timer who turned up at the meeting.

Ben Potter .. ex second op of 3XJ is with the RAE located somewhere down the bay...From all accounts July 5th is going to be Ben's big day...or should I say the day of his misfortune?? Yes, from reports he's going to be married on that day, and it's rumoured that it's going to be in Camberwell..we'll have the band out Ben .. But say Ben, have you got rid of all that "HUM" yet?

The last General meeting saw rather a fair attendance roll up. The subject matter of the lecture delivered by Mr. Jack Kling, 3JB was very interesting as was proved by the lateness of the meeting and the number of questions fired at him. The subject was the printing of photos, and branched off into the subject of colour photography.

Next month at the meeting which will be held on Tuesday, June the 3rd, a demonstration with an amplifier, output meter and frequency recordings, will be the main subject of the evening. From accounts several of the gang are going to bring in various pieces of audio equipment, and their 'pet' disc, so methinks it's going to be a very interesting evening. 3DH has promised to bring in some recordings he has made of some of the boys way back when we were on the air. If you have an amplifier which you consider is the "berries" bring it in and put it through its paces.

During the month a letter was received by the Institute from Mr. H. B. White VK3IR, who is a Telegraphist on one of His Majes ty's Ships. Here is the letter:-

"Frank O'Dwyer, 30F wrote to me and suggested that I should write a few lines to you about the doings of ex hams in the parts I visit. Well first, as co-operators here we have Ken Allen, 3UH, God Marloy 4CJ, Leo Myers 2KS, and myself 3IR. Whilst in Belfast, North Ireland, we were given a great reception by the North Ireland Amateur Radio Club, which is a part of the Radio Society of Great Britain. The Club is situated in the YMCA building in Belfast, and meetings are still held twice a week. These are always fully attended by locals as well as many Colonial and English hams on leave.. Two Americans, W1's presented themselves one night much to the surprise of everyone. I was invited to the BBC Annual Dinner for Belfast employees as representative more or less for Australia. I told the gathering of Engineers, Announcers, Radio Inspectors, etc., of the popularity of Amateur Radio in Australia, about the Institute and the magazine, about the close and happy co-operation between the Radio Inspectors Department and the Vigilance Committee. One of the Radio Inspectors afterwards asked me questions re the Vigilance system we have, and proposed forwarding same to the British G.P.O. when the time of re-opening wireloss stations comes into being. The manager of Honloys Teleg Works Co. in Belfast is a Ham and gave us much assistance both socially and technically.

One afternoon at the Radio Inspector's Office, we were given

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The Division meets on the Third Thursday of each month at Y.M.C.A. Buildings, Pitt Street, Sydney, and an invitation is accorded to all Amateurs to be present.

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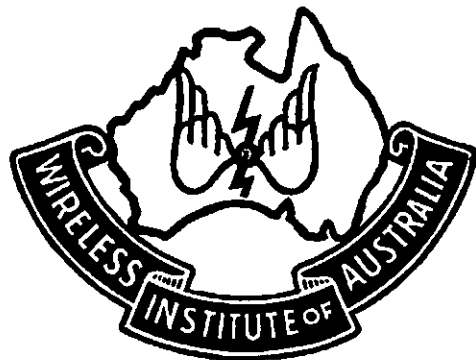
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SIXPENCE

JUNE 1941

AMATEUR RADIO

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BAIRD COLOUR TELEVISION.

(From "Wireless World")

At his laboratories in Sydenham, Mr. Baird has lately demonstrated his latest contribution to the television art. He used a large screen receiver of a type suitable for the home, capable of providing a super high-definition picture in full natural colours as well as reproducing the pre-war standard television transmission as radiated by the B.B.C.

Mr. Baird's first demonstration of television in colour was in 1928. This was followed, after ten years of successes and setbacks, by an 8 foot by 12 foot colour television picture being shown in a London theatre to an audience of 3,000 people. The transmission was by means of wireless over a distance of 8 miles. Both of the above mentioned results were achieved with the use of all - mechanical methods of scanning at both the transmitting and receiving ends of the links employed. In 1939 a demonstration was given of a 120 line colour picture using the same type of scanner at the transmitter as had previously been employed, but making use at the receiving end of a cathode ray tube in conjunction with a rotating colour filter disc. This was the fore-runner of the present receiver.

Before describing the transmitter and receiver, which were used in the demonstration, a short account will be given, for the benefit of readers not familiar with the three colour process, of the principle governing the reproduction of natural colour prints. All colours are produced by mixing the three primary colours red, green and blue in the correct proportions. Blue and red mixed, results in purple; red plus green gives us yellow, and so forth throughout the whole range of colours. In colour printing this principle is used in the following manner:- three pictures are made of the coloured subject, one showing the red component of the subject, one the green component, and the other the blue. Upon these three prints being superimposed a print is obtained which has in its composition the complete colour range of the subject, so providing a reproduction in natural colours.

Mr. Baird makes use of this principle by providing colour filters to his transmitter and receiver scanners, but uses only

two colours, red and blue-green, since he has discovered that this combination gives, with the type of photo-electric cell used, the same results as would be obtained with the three separate filters. This results in a considerable simplification of the scanning mechanism.

Mr. Baird's original system of flying-spot scanning is used. That is to say, the subject is scanned by a moving spot of light which, in the case of colour television, is projected through a disc fitted with the blue-green and red colour filters, so that the scene or person being televised is scanned by blue-green and red spots in rapid succession. The standard of scanning with this system is 600 lines per picture.

In the flying-spot system of scanning, the moving light spot is not obtained by mechanical means, but from the exceedingly bright spot that may be obtained in the screen of a projection cathode-ray tube. The tube used is of the "tea-pot" type, so named by reason of its shape, operating at a voltage in the region of thirty thousand. The spot is moved in the required scanning motion over the screen by magnetic deflector coils operated from circuits normally associated with such high voltage tubes. Mounted in front of the tube and driven by a motor is the disc on which are mounted the colour filters mentioned before. In front of the disc is a lens system which serves to transmit the scanning spot, after it has passed through the filter, to the subject or scene being televised, which is therefore scanned first by a blue-green and then by a red spot, the filter disc being run at the correct speed to allow full coverage for each filter colour. The light from the coloured spots covering the scene is reflected on to three large colour sensitive photo-electric cells, the current from these being amplified and passed to radio or line circuits for transmission to the receiver.

The method of reproducing the picture in colour follows the principles of colour printing already explained. The transmitted pictures corresponding to the colours described are superimposed to form the complete television picture in natural colours. The manner in which this is carried out is the converse of the scanning system at the transmitter, the picture being first produced in black and white on the screen of the cathode-ray tube, in front of which is rotated a filter disc identical with that at the transmitter. By means of impulses transmitted with the picture signal, the disc is kept absolutely in step with its counterpart at the transmitter.

The black and white pictures passing through the filters are coloured blue-green and red and then projected on the screen by means of an efficient optical system, at such speed that the eye sees them there together. The result of this is the same as that achieved in colour printing, namely, they blend to form a picture in natural colours. The projection cathode-ray tube in the receiver is situated at the bottom, throwing the picture

STABILISATION OF NEGATIVE FEEDBACK AMPLIFIERS.

(From "Wireless World")

The merits of amplifiers which make use of negative feedback are now widely known, and the improvement in the matter of harmonic distortion is probably the one that is first thought of by all those who are interested in the problems of amplification -- undoubtedly because negative feedback is now so much used in ordinary AF amplifiers, and the most immediate problem there is that of the curved valve characteristics. Negative feedback however, has other uses, and one is that of levelling-up the response of an amplifier over a considerable range of frequencies. In the absence of negative feedback stray capacities in the amplifier often make it difficult to realise the wide and level characteristics needed -- at least in any simple manner.

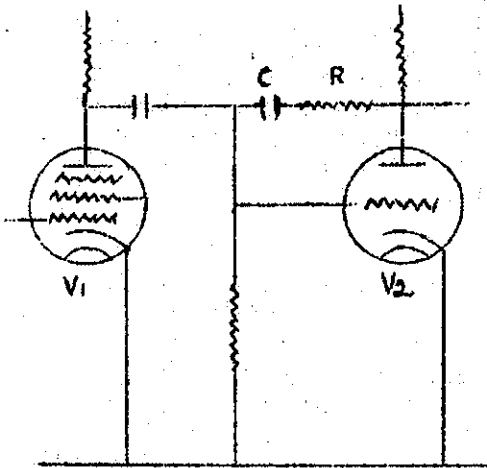
It must not be thought that feedback methods never give rise to problems of their own; they do, and especially in wide-band types of circuits. To achieve the greatest benefit from negative feedback it is necessary to use an amplifier of very large amplification. In this way the flattest characteristics and the least non-linear distortion are obtained. At the same time many amplifier stages are needed, and this is of significance when the presence of stray and coupling reactances is remembered.

CAUSES OF SELF OSCILLATION.

Suppose we consider a single amplifying stage in which the anode circuit contains simply a resistance. In calculating the gain of the stage quite generally we cannot think of the anode load impedance as just this resistance; we must think of it as this resistance shunted by whatever stray capacities there may exist. At sufficiently high frequencies the reactance of the shunt capacity will be of less magnitude than the resistance of the nominal load element. This, of course, means that the amplification of the stage will be less, but, more important, it means also that signals will be retarded in phase as compared with their transit through the amplifier at lower frequencies. The maximum retardation at the highest frequencies is 90 degrees. Thus, if three stages operate in cascade it is clear that at some sufficiently high frequency the effect of "negative" feedback will be the return to the input side of the amplifier of an in-phase signal of appreciable amplitude. If this signal is too large the amplifier will not, in fact, be an amplifier, but a self excited oscillator.

To prevent multi-stage negative feedback amplifiers from becoming unstable it is thus essential that the amplification

should have fallen sufficiently before the phase rotation in the amplifier has increased to 180 degrees. Methods to this end that have been used include the insertion of coupling networks in the amplifier or in the feedback path itself, and even an auxiliary path connected in shunt to the main feedback path which comes into operation at the higher frequencies to reduce the amplitude of signals fed back. Another method lies in the use of a special form of feedback applied to operate on one or more stages separately in the amplifier.



An example of the latter method is shown in the diagram. The stage V2 having the special feedback applied to it is driven from an earlier stage V1, which appears to the driven stage as a constant current source and may simply consist of a pentode type of amplifier. The feedback is of the current variety, and is brought about by the connection of an impedance R, complex or otherwise, between the output circuits of the two stages; it has the effect of reducing the gain of the driving stage V1 as currents are fed back in phase opposi-

tion into the output circuit of this stage, but the gain of the driven stage V2 remains almost unaltered. The feedback impedance in a simple case may be constituted by a fairly high resistance R, namely, one fairly large compared with an anode load resistance, and by a condenser C connected in series with it. The condenser C is of small value so as to prevent the feed-back functioning appreciably in the normal operating range of the amplifier, but at the higher frequencies its reactance becomes small and feed-back occurs through the feedback resistance. Thus although the phase rotation through the whole amplifier still occurs as before, yet the reduction of the gain by means of the auxiliary current feedback reduces the amplitude of the signal components which are subject to the rotation sufficiently to prevent any danger of self oscillation.

Advantage may be taken of the increased stability of the amplifier to obtain a higher amplification or with increased over-all feedback a more level characteristic. In order to increase the rapidity with which the auxiliary feedback is brought into action at the higher frequencies an inductance may be connected across the series resistance in the feedback impedance.

DIVISIONAL NOTES.

New South Wales Division

By VK2TI

.....

The May General Meeting was held at the Y.M.C.A. Buildings on Thursday 15th before a representative attendance. The increasing attendances each month are doubtless due to Councils efforts to provide a working demonstration each meeting.

Although the retiring Council was re-elected unopposed at the General meeting held in February of this year the election of office bearers was postponed due to the illness of Harold Peterson 2HP. Harold, members will regret to learn, suffered a nasty accident some months ago that compelled him to lay up for a considerable time. Councillors were pleased to welcome Harold back to the fold at the May Council Meeting. 2HP in reply, thanked Council for their action in deferring the election of Office Bearers until such time as he was able to be present, but intimated that he did not desire nomination as President of the Institute. Councillors expressed regret at this decision and many tributes were paid to Harold's work as President of the Division over a long period during which time it rose from a very lowly position to that which it holds today--the most active and strongest of all the states.

Office Bearers elected were as follows:-

President	...	F. Goyen	VK2UX
Vice Presidents	...	H. Peterson	VK2HP and
		C. Horne	VK2AIK
Secretary	...	W. G. Ryan	VK2TI
Treasurer	...	W. J. McElrea	VK2UV
Technical Officer	...	J. Howes	VK2ABS
Assist Secretary	...	D. Dunn	VK2EG
Magazine	...	A. Joscelyne	VK2AJO

In declaring the General Meeting open the Chairman extended a welcome to Bill Mather VK3WD, and congratulated Messrs. Arthur Walz 4AW and Launse Deane 5LD upon their promotion to Pilot Officer.

The lecture and demonstration was then given by Messrs. Johnson and McIntosh. These two hams had long been experimenting with home recording apparatus and had kindly consented to bring their gear along to the Institute. After describing the apparatus a record was made and members present were asked to volunteer to come forward and have their voices recorded. Much

surprise and amusement was caused when the record was played back and we were able to hear just how our voices sounded. Possibly the high light of this demonstration was the fact that after a lot of persuasion, Jim Corbin VK2YC eventually spoke into a microphone! What a great pity Ray Jones VK3RJ was not present at this meeting. What a scoop it would be to have 2 YC and 3RJ before the mike at the one and same time. Just think what posterity would have gained by having them on the same record!

Upon the conclusion of the demonstration the Chairman informed the meeting of the Election of Office Bearers, and it was decided that a recording be made of the various tributes paid to 2HP as Chairman, and this recording be presented to him. Messrs. Goyen, Tyan, Knock, and Lusby, as members longest associated with 2HP, spoke in glowing terms of Harold's work and interest in the Institute and Amateur Radio generally, and hoped it would not be long before he fully recovered.

The June General Meeting of the Division will be held at Y.M.C.A. Buildings on Thursday, 19th June, and the Lecturer will be Mr. W. J. McElroa.

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VICTORIAN DIVISION.

There was a large attendance at the monthly meeting of the Victorian Division held on Wednesday June 3rd. There were many visitors present, and we were pleased to welcome back our old friend Gil Miles, ex 3NQ last known as 7KQ. Another visitor was Mr. W. Holland, VK9WV from New Guinea.

The main subject of the evening was a working demonstration of audio equipment, with an output meter and standard frequency recordings. The amplifier was supplied by Mr. J. Kling, 3JB, who built it up specially for the occasion. This amplifier consisted of a 6N7G as input tube and phase inverter, and a pair of 6V6G's with inverse feedback over both stages. There had been no tests made with the amplifier prior to those made at the meeting. Mr. Ralph Clarkson supplied the crystal pick-up and gramophone.

Unfortunately it was not possible to completely match the output channel from the amplifier to the output meter, however the tests were very interesting, the result of which showed that the amplifier had a bass bump at the extreme low frequency end, and falling off very badly at 6000 cycles.

The highlight of the evening was the playing of some recordings made by Mr. Ivor Morgan VK3DH. These recordings were mainly of many of the gang made when we were "on the air." They are like the smell of rain to me who hasn't seen any for

D I V I S I O N A L N O T E S

- New South Wales Division -

By VK2AJ0

The June meeting of the N.S.W. Division was held on the 19th at the Y.M.C.A. Buildings, Pitt Street. Two vacancies on the Council were filled by the election of Messrs. Ray Priddle VK2RA and Russ Miller. Russ has been President of the Zero Beat Radio Club for many years. The President of the Division, Frank Goyen, was congratulated - by proxy - on having been granted a commission in the Air Force, but unfortunately this has necessitated him resigning from the Council. Ray Priddle was unanimously elected to the position and the Council is now constituted:-

President	.. R. Priddle	VK2RA
Vice-Presidents	.. H. Peterson	VK2HP
	.. C. Horne	VK2AIK
Secretary	.. W. Ryan	VK2TI
Treasurer	.. W. McIlrea	VK2UV
Technical Officer	.. J. Howes	VK2ABS
Magazine	.. A. Joselyne	VK2AJ0
Councillors	.. R. Miller	
	.. D. Dunn	VK2EG

The General Meeting was well attended, and had pleasure in making a further donation to the funds of "Air Force House." The lecture was delivered by Bill McIlrea, and was entitled "What happens when the shutter clicks," and judging by the range of questions fired at the lecturer ham radio contains many silent and not so silent supporters of the art of photography. 2 UV was ably assisted by our old friend Joe Reed 2JR. Incidentally the cameras exhibited by both these members showed the extremes in Camera design. 2UV's exhibit was a Graflex and 2JR's one of those minatures that do everything but develop and print the negative. At a later date it is anticipated that the Council will be able to prevail upon Joe to give a Lecture on the Calyptgian Venus...Ahem!

Congratulations to Bill Moore and Morry Meyers upon obtaining their Commissions in the R.A.A.F. After a long time the efforts of these chaps in organising the R.A.A.F.W.R. in New South Wales has been rewarded.

The Annual Election of the Institute Members of the New South Wales Section of the Vigilance Committee has now been completed and Messrs. Priddle, Peterson, and Ryan were chosen by the Senior Radio Inspector.

The July General Meeting of the Division will be held

at the Y.M.C.A. Buildings, Pitt Street, Sydney on Thursday 17th commencing at 8 p.m. and the subject set down for Lecture is entitled "LIGHT". A cordial invitation is extended to all Hams on service at present.

-- WAVERLEY RADIO CLUB --

Twenty-second Annual re-union

The twenty-second Annual Re-Union of the Waverley Amateur Radio Club was held in the Club Rooms, 13 MacPherson Street, Waverley on Tuesday 3rd of June. The manner in which this Club has carried on since its inception in 1919 was favourably commented upon by all present.

The Toast of the Club was proposed by Mr. John Moyle VK2JU Editor of Radio and Hobbies, who in his remarks traced the history of the Club and its achievements from the early days right up to the present.

The Institute was represented by Messrs. Peterson and Ryan who congratulated the Club on its fine record and also its unswerving loyalty to the Institute. Other Toasts honored were those of the "W.I.A" "Hams on Service," "Foundation Members". Upon conclusion of the speeches a moving picture show was put on by two of the members. During "Interval" ham spirit was much in evidence and many tales were told -- both probable and highly improbable.

Although the number present this year was naturally smaller than on previous occasions those present unanimously voted it a great night and are looking forward to the time - let us hope in the near future - when all Hams will be able to tell of the DX they worked "Last Night" ..

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VICTORIAN DIVISION

- Attention -

The Annual General Meeting of the Victorian Division will be held at the Institute Rooms, Queen Street, on Tuesday Night, August 5th, when it is hoped that there will be a very large attendance. Besides the ordinary business of the Annual Meeting, a lecture is scheduled to be delivered by Mr. W. Holland VK9VW, which should be very, very interesting indeed.

Those who did not come along to the last meeting missed a real treat. Listed for the evening was a lecture by our old friend Gil Miles 7KQ, ex 3KQ, fortunately or unfortunately for Gil (he didn't say very much) someone got in before him and provided an evening which us "HAMS" haven't had for many a long

day. Methinks that quite a few of the gang present went home and looked very longingly at their--or whats left--of their transmitters. Lieutenant Chippendale VK3VU, and some of his men--VK3VD, VK9MW, and Rimmer of the Army Headquarters Experimental Radio Laboratories brought along a display of Army Radio Equipment, which included some RF gear, pack sets, to wit, and a Kingsley receiver, modelled on well known American makes, the performance of which was excellent. Probably the exhibit which annoyed the gang more than anything else was a number of high power 'bottles' which were--believe me or believe me not, were handled with loving care. One could almost read the thoughts - "When I get back on the air:...."

During the month a letter was received from Tim Wells VK3TW of Hamilton--to quote from his letter ---

"Incidentally, hams are fairly well represented in this one horse town at the present time, there is Bill Hehir (can't think of his call) but he is pilot on Ansett Airways Airspeed Envoy, Hamilton to Melbourne. Martin Chaffer VK3XF, he is engineer on the staff of commercial 3HA, and bye the bye, Mart is to join the ranks of the benedicts on Saturday next 7th inst., the wedding is taking place in Melbourne. Stan Zeunart VK3SZ is still in charge of radio repairs at the Hamilton Branch of A. G. Healing. Mort Riley VK3TW is still doing a good job of work persuading prospects that the make of radio set that he sells is the best in the world. Jim Mitchell VK3JP is still Lands Officer for this truly rural area, and of course there is Tim VK3TW, the old man himself, so it seems that when we go back on the air again there will be a spot of QRM around this joint as all these fellows live within a radius of half a mile ... Brian Falkenburg VK3FA (aint it a shame) successfully passed the medical test for the RAAF last week. Brian is in the local Light Horse camp as a Universal Trainee and his statement that he never could get along with horses is born out by the fact that for the past week he has been enjoying his meals off the mantlepiece -- poor Brian.

You may be interested to know that I have submitted a plan to the local Federal Member whereby a chain of emergency Stations could be set up at the main towns, utilising the Hams gear and brains to keep them operating. The details are too many to quote here but the MHR in question was impressed and is placing them before the responsible authorities. (Here's hoping).

In conclusion allow me to add my humble congratulations to you fellows in the City for your magnificent efforts in keeping the good old Mag. going under such trying circumstances. Be sure to send my copy along, and if any of the foregoing is of interest for publication purposes, then go right ahead and print it.

My kind regards to all the boys,
Yours,

George L. D. Wells.

VK3TW (Tim)

There are quite a number of the boys at the Barracks mainly occupied as operators in Air Force capacity. Among them is VK3YF, VK3KY, VK3KR, VK3OR.

- 3WE .. surprised quite a number of the boys by appearing at the last meeting -- Sgnt. A. N. Williams -- to you -- at present at Broadmeadows.
- 3JO .. thinking of the old 5 mx field days was not content until he took a pack set up on to the roof, with 3 RN to t'other end made a few tests. Someone asked which way the aerial was pointing???????. CENSORED.
- 3RN .. there's a bit of blackmail attached to this---Ron---as far as I can gather spends a considerable amount of time walking the floor--knows all the lullabys around the place.
- 3XH .. now Captain Johnson is to be located at Army Headquarters Ringwood.
- 3XE .. is with the R.A.A.F. abroad.
- 3HG .. put in an appearance at the meeting.
- 3BQ .. had rather a bad time at the meeting .. Max turned up while the last magazine was being printed...somehow I've an idea Max has ideas for speeding up the printing.
- 3DG .. is reported to be a member of the R.A.A.F. and is at present at Laverton.
- 3HQ .. is, I believe nursing at the Alfred Hospital. How's about making one of the meetings Marg.. First Tuesday of any month.
- 3IK .. reports that he is indulging in Wine, Women and Song as a hobby. The neighbours don't complain about the amplifier any more, 'cause it aint no use, methinks he'll have the Malvern Council on his trail again when he starts foolin' with the Saxophone in front of the D104.
- 3HX .. usually forgets himself in these notes--yes in more ways than one--some people want to know why he is late on a Saturday when the Mag. is being printed--someone else wants to know how he writes these notes when his thoughts should be elsewhere--wonders too.????

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R. J. MARRIOTT, VK3SI; C. QUIN, VK3WQ.

Meeting Night—First Tuesday in each month.

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OF AUSTRALIA**

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SIXPENCE

JULY 1941

AMATEUR RADIO

THE
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WIRELESS INSTITUTE
OF
AUSTRALIA



Published by the Victorian Division

AMATEUR-RADIO

Vol. 9. No. 6

July, 1941

HOME RECORDING AS A HOBBY PROVIDES ENDLESS INTEREST

by

-- IVOR MORGAN - VK3DH --

These are the words of one of our faithful advertisers, who's product appears on the inside back cover page of "Amateur Radio" and I claim no originality for the statement but wish to vouch for the authenticity of same.

"Home Recording" is an expression which, when applied to the experiments and efforts of the average Ham, may be somewhat vague since the Ham, as I know him, usually wants to delve just a little more deeply into his pet branch of interest, than perhaps the ordinary person.

In comparatively recent years much progress has been made in the art of so-called direct or instantaneous recording of sounds on discs. Briefly this system differs from what is generally termed commercial recording, in that, the former is a finished record immediately after cutting and may be played there and then, but the latter starts with soft wax, which requires processing before it may be played back. The processing business is quite an industry in itself, consisting of several positive-negative reversals which are performed electro-chemically, and we will not concern ourselves with the subject in this discussion.

Instantaneous recording was almost exclusively done on aluminium discs a few years back, but later a series of coated discs were developed by various manufacturers, some on aluminium bases, others on glass and recently on steel bases.

About twelve years ago I conducted a number of experiments with the system of direct recording on aluminium with results which we, at the time, considered to be quite fair, but which suffered from several limitations, not the least of which was the difficulty of a reliable play back. Even if the main important requirements, such as a smooth running turntable and a good tracking pick-up together with a sharp and correctly shaped fibre or steel needle were provided, the reliability of play back was still poor.

To explain this difficulty as briefly as possible it must be considered that when recording on aluminium the track is "scribed" on the blank face of the disc and not "cut" as in the case of a wax or acetate coated disc. This sound track on the aluminium disc therefore consists of a correctly shaped groove with a "wall" on either side formed by the metal which is pushed up on either side of the recording needle. This wall is, from a cross-section point of view, higher than the original level of the blank surface. It will therefore be seen that when we play back our recording the needle of our pick-up has the choice of "tracking" in one of two tracks on the disc, the first being the correct one (that made by the recording needle) and the second being a track formed by adjacent walls of the correct sound track. If one is lucky the play back needle may start off correctly and run all the way in the right track, but it sometimes happens that when a loud passage occurs in the sound, the needle jumps to the wrong track resulting in a very distorted reproduction accompanied by an echo effect from the turn before or after that which the pick-up needle is "trying" (?) to follow.

Other difficulties associated with this method are the power required both in the driving motor for the recording turntable and the amplifier driving the cutting head. It is usually necessary to weight the cutting head to the order of about fourteen ounces to allow the recording needle to make a sufficiently deep track, resulting in a comparatively heavy load on the revolving turn-table and also a considerable damping effect on the armature of the recording head necessitating an increase in audio frequency watts to drive same.

These are some of the more serious difficulties which help to hold your efforts to make a respectable recording at a low standard.

The considerably more modern system of cutting a continuous thread from a sime-hard coating leaving a clean polished groove with a clear area of "land" between, completely eliminates the problem of play back needle running in the wrong track whilst the mechanical power required to rotate the turntable is much less and the cutting head armature is not "damped" as much when "cutting" a comparatively soft material with a sharp edge at a weight of only two to four ounces.

There are many forms and qualities of blank discs on the market at the present time, which make it an easy job to produce an entirely satisfactory recording which will compare more than favourably with the recognized commercial stock pressing, mainly in signal to noise ratio in the reproduced result. Since commercial interests have far more scope than the Ham to produce a better frequency characteristic we make no comment on that, but

as the stock from which commercial pressings are made contains an abrasive and the instantaneous type recording blank is of very fine granular structure, the familiar "scratch" level may be very much lower with the same "signal" level.

Opinions differ greatly as to which is the ideal make or type of blank, but suffice to say that the brand marketed by our aforementioned advertiser contains some fifty-two odd ingredients and is the result of years of research. In a few words the material is usually mainly composed of a cellulose mixture containing an oil soluble in amyl acetate and combined to form a coating on aluminium, glass, papiermache or steel which will not set hard when dry, as in the case of duco mixtures, but assume a semi-hard form which when cut by a polished steel, diamond or sapphire cutting point, leaves a polished groove.

With regard to mechanical means necessary to perform the all important spiral track on the blank disc, there are several excellent types now available for home use and I would not attempt to describe a method of construction without a number of complicated diagrams which are not altogether convenient for our Magazine in its present form.

However, the important points to consider, from some experience which I have gained, appear to be firstly, a smooth running turntable, which is true on its shaft and driven by a motor with ample power to overcome varying loads and thus ensure against any "wow" troubles. (Change of table speed during cutting.)

Reasonable quality cutting heads are available together with the tracking gear or the latter may be made or obtained separately and a magnetic pick-up adapted as a cutting head. Tracking gear and lead screw assembly which obtains its drive from the centre shaft of the turntable appears to be most suitable for home use and that illustrated on the inside back cover of "Amateur Radio" is ideal in every way. There are many other ways of achieving the object of feeding the cutting head across the disc either from the centre to the outside or vice versa, and some prefer a separate drive from the source of power to the lead screw which would be some distance from the turntable, and drive a carriage holding the cutter along a radius of the disc. This system has the advantage that the centre shaft is clear at all times and the cuttings may be swept to the centre and continuously cleared from the cutting head. The main difficulty with this construction is the absolute necessity of a very solid chassis construction between turntable shaft bearing and lead screw mounting and carrier, in order to prevent any small movement being mechanically magnified and resulting in "twinning" or uneven spacing of the grooves on the finished disc.

It is generally accepted that for best quality results the amplifier should be capable of producing about three times as much power as would be required to drive the cutter when fully

modulating the recorded track. The required power varies from about two to seven watts according to the cutting head, therefore the amplifier should be capable of approximately ten to twelve watts of undistorted output which would accommodate most types of cutting head.

For most types of disc and cutting needles either steel or sapphire the cutting angle should be between three and ten degrees from the vertical so as to present a slight trailing effect between the needle point and the disc surface.

It seems that the space available is somewhat out of proportion to the size of the subject when one sets out to write down what was calculated to be a short discussion on home recording. Therefore we may be able to select, at a later date, a "department", so to speak of the recording subject and make a more detailed and close examination of its features.

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-- A TRIBUTE --

The Editor,
Amateur Radio.

Dear Sir,

Under the heading of "Silent Key" in the May issue, the announcement was made of the passing of my old friend and co-member of the old Leichhardt Radio Club, Bill Manley VK2XH.

It was my honour and privilege to have been the founder and first secretary of the Leichhardt and District Radio Society, to give it its full title, and although over twenty years have passed since those flourishing days of Radio Club activity, I have very vivid memories of Bill's enthusiasm and good humour. He was a real "Ham" in every sense of the word, and I know that his loss will be mourned not only by members of the Gladesville Radio Club, of which body he was President, but by those fellow members of the Leichhardt Club with whom he was associated.

Yours faithfully,

William J. Zech.

VK2ACP -- ex VK2WZ

CONVERTER TUBES FOR SHORT WAVE OPERATION

OSCILLATOR FREQUENCY STABILITY -

On the broadcast band a good receiver may be tuned in as soon as the valves commence to operate, and the tuning need not be further adjusted so long as the set is operating. The position on the short wave bands is entirely different, and it is usually necessary to adjust the tuning several times during the first half hour, and occasionally thereafter. There may be causes of this frequency drift, all unfortunately additive. They may for convenience, be separated into:-

- (a) Internal valve changes
- (b) Changes in other components

In most cases the valve is only minor cause of the drift, which is largely the result of the use of bakelite and other unsuitable materials in the oscillator circuit. If all the unsatisfactory insulating materials were removed from the oscillator circuit and replaced with trolitul, steatite, isolantite, or other good ceramics, the frequency drift will be much reduced. Further improvement is possible by removing as far as possible, all sources of heat likely to raise the temperature of the oscillator coil, the condensers in the tuned circuit, the wave-change switch or the valve socket. Some elaborate receivers even go to the extent of removing the power supply completely from the receiver chassis so as to eliminate the major sources of heat. Even if this is not done, it is possible to make considerable improvements to the components and the chassis layout as indicated below:-

- (a) Increase the efficiency of the power transformer so as to decrease the losses which must be dissipated as heat.
- (b) Mount the power transformer on light legs so as to give the minimum metallic heat conduction and maximum air circulation.
- (c) Mount all heat dissipating components above the chassis, with allowance for air circulation.
- (d) Mount all valves at the rear of the chassis so as to have the best possible air circulation.
- (e) Mount the converter valve in a special can designed for maximum air circulation. In many cases it will be found possible to omit any top cover of this can and so improve the air circulation.
- (f) Mount the valve socket so as not to be in direct contact with the chassis e.g. on rubber grommets.
- (g) Avoid the use of bakelite and similar materials in the coils wave-change switch, and valve socket.
- (h) Avoid the use of insulated "hook-up" wire in the oscillator circuit. Bare wire is to be preferred.
- (i) Reduce to the minimum all heat dissipation in voltage dividers and dropping resistors.

- (j) Reduce the heat dissipation in the rectifier valve by using a low impedance type (e.g. 6X5GT for small receivers and 5V4G in large receivers).
- (k) Reduce the heat dissipation in the power valve by using a type having small heater dissipation (e.g. 6V6G) and reduce the plate dissipation as far as practicable.

It will be seen that some of these improvements are not practicable in a small table receiver, but all are worthy of consideration by a receiver designer.

When these matters have been dealt with, it will probably be found that the valve is then an important cause of frequency drift and the logical step is to make such improvements as are practicable. It seems that the whole of the frequency drift due to the converter valve is the result of heat (a) from the heater (b) from the electrodes (c) from the socket and (d) from surrounding components.

The choice of a converter valve should be influenced by items (a) and (b) while the heat from the socket and surrounding components should be reduced as much as possible. It may be noted that a considerable proportion of the total valve drift is due to the heating of the base, and any cooling of the valve pins through contact with cool socket contacts is very effective in reducing the drift.

The following table shows the heat dissipation of several popular converter types under typical conditions:-

Dissipation	Watts	6J8 G	6A8 G	6K8 G	6SA7
Plate		0.33	0.88	0.63	0.85
Screen		0.29	0.27	0.60	0.80
Oscillator		0.23	0.20	0.11	----
Heater		1.87	1.89	1.89	1.89
Total -		2.74	3.24	3.23	3.54

In the calculations of the oscillator dissipation it is assumed that 70% of the input is converted into oscillatory power, and 30% is dissipated as heat in the valve. Even if this assumption is not quite accurate it will not make much difference to the final result.

It will be seen that the heater dissipation is the controlling factor, and for this reason valves having a higher heater current than 0.3 ampere at 6.3 volts are undesirable for short wave operation. Although valves have been produced with a heater current less than 0.3 amp. these have not been found to be entirely satisfactory on the short wave band, on account of emission difficulties. Radiotron 6J8G has somewhat less total heat dissipation than the other types shown in the table, and this is to its advantage as regards frequency stability.

D I V I S I O N A L N O T E S

- New South Wales Division -

By VK2AJ0

The June meeting of the N.S.W. Division was held on the 19th at the Y.M.C.A. Buildings, Pitt Street. Two vacancies on the Council were filled by the election of Messrs. Ray Priddle VK2RA and Russ Miller. Russ has been President of the Zero Beat Radio Club for many years. The President of the Division, Frank Goyen, was congratulated - by proxy - on having been granted a commission in the Air Force, but unfortunately this has necessitated him resigning from the Council. Ray Priddle was unanimously elected to the position and the Council is now constituted:-

- President .. R. Priddle VK2RA
- Vice-Presidents .. H. Peterson VK2HP
- .. C. Horne VK2AIK
- Secretary .. W. Ryan VK2TI
- Treasurer .. W. McIlrea VK2UV
- Technical Officer .. J. Howes VK2ABS
- Magazine .. A. Joselyne VK2AJ0
- Councillors .. R. Miller
- .. D. Dunn VK2EG

The General Meeting was well attended, and had pleasure in making a further donation to the funds of "Air Force House." The lecture was delivered by Bill McIlrea, and was entitled "What happens when the shutter clicks," and judging by the range of questions fired at the lecturer ham radio contains many silent and not so silent supporters of the art of photography. 2UV was ably assisted by our old friend Joe Reed 2JR. Incidentally the cameras exhibited by both these members showed the extremes in Camera design. 2UV's exhibit was a Graflex and 2JR's one of those minatures that do everything but develop and print the negative. At a later date it is anticipated that the Council will be able to prevail upon Joe to give a Lecture on the Calyptgian Venus...Ahem!

Congratulations to Bill Moore and Morry Meyers upon obtaining their Commissions in the R.A.A.F. After a long time the efforts of these chaps in organising the R.A.A.F.W.R. in New South Wales has been rewarded.

The Annual Election of the Institute Members of the New South Wales Section of the Vigilance Committee has now been completed and Messrs. Priddle, Peterson, and Ryan were chosen by the Senior Radio Inspector.

The July General Meeting of the Division will be held

at the Y.M.C.A. Buildings, Pitt Street, Sydney on Thursday 17th commencing at 8 p.m. and the subject set down for Lecture is entitled "LIGHT". A cordial invitation is extended to all Hams on service at present.

-- WAVERLEY RADIO CLUB --

Twenty-second Annual re-union

The twenty-second Annual Re-Union of the Waverley Amateur Radio Club was held in the Club Rooms, 13 MacPherson Street, Waverley on Tuesday 3rd of June. The manner in which this Club has carried on since its inception in 1919 was favourably commented upon by all present.

The Toast of the Club was proposed by Mr. John Moyle VK2JU Editor of Radio and Hobbies, who in his remarks traced the history of the Club and its achievements from the early days right up to the present.

The Institute was represented by Messrs. Peterson and Ryan who congratulated the Club on its fine record and also its unswerving loyalty to the Institute. Other Toasts honored were those of the "W.I.A." "Hams on Service," "Foundation Members". Upon conclusion of the speeches a moving picture show was put on by two of the members. During "Interval" ham spirit was much in evidence and many tales were told -- both probable and highly improbable.

Although the number present this year was naturally smaller than on previous occasions those present unanimously voted it a great night and are looking forward to the time - let us hope in the near future - when all Hams will be able to tell of the DX they worked "Last Night" ..

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VICTORIAN DIVISION

- Attention -

The Annual General Meeting of the Victorian Division will be held at the Institute Rooms, Queen Street, on Tuesday Night, August 5th, when it is hoped that there will be a very large attendance. Besides the ordinary business of the Annual Meeting, a lecture is scheduled to be delivered by Mr. W. Holland VK9VW, which should be very, very interesting indeed.

Those who did not come along to the last meeting missed a real treat. Listed for the evening was a lecture by our old friend Gil Miles 7KQ, ex 3KQ, fortunately or unfortunately for Gil (he didn't say very much) someone got in before him and provided an evening which us "HAMS" haven't had for many a long

day. Methinks that quite a few of the gang present went home and looked very longingly at their--or whats left--of their transmitters. Lieutenant Chippendale VK3VU, and some of his men--VK3VD, VK9MW, and Rimmer of the Army Headquarters Experimental Radio Laboratories brought along a display of Army Radio Equipment, which included some RF gear, pack sets, to wit, and a Kingsley receiver, modelled on well known American makes, the performance of which was excellent. Probably the exhibit which annoyed the gang more than anything else was a number of high power 'bottles' which were--believe me or believe me not, were handled with loving care. One could almost read the thoughts - "When I get back on the air:...."

During the month a letter was received from Tim Wells VK3TW of Hamilton--to quote from his letter ---

"Incidentally, hams are fairly well represented in this one horse town at the present time, there is Bill Hehir (can't think of his call) but he is pilot on Ansett Airways Airspeed Envoy, Hamilton to Melbourne. Martin Chaffer VK3XF, he is engineer on the staff of commercial 3HA, and bye the bye, Mart is to join the ranks of the benedicts on Saturday next 7th inst., the wedding is taking place in Melbourne. Stan Zeunart VK3SZ is still in charge of radio repairs at the Hamilton Branch of A. G. Healing. Mort Riley VK3TW is still doing a good job of work persuading prospects that the make of radio set that he sells is the best in the world. Jim Michell VK3JP is still Lands Officer for this truly rural area, and of course there is Tim VK3TW, the old man himself, so it seems that when we go back on the air again there will be a spot of QRM around this joint as all these fellows live within a radius of half a mile ... Brian Falkenburg VK3FA (aint it a shame) successfully passed the medical test for the RAAF last week. Brian is in the local Light Horse camp as a Universal Trainee and his statement that he never could get along with horses is born out by the fact that for the past week he has been enjoying his meals off the mantelpiece -- poor Brian.

You may be interested to know that I have submitted a plan to the local Federal Member whereby a chain of emergency Stations could be set up at the main towns, utilising the Hams gear and brains to keep them operating. The details are too many to quote here but the MHR in question was impressed and is placing them before the responsible authorities. (Here's hoping).

In conclusion allow me to add my humble congratulations to you fellows in the City for your magnificent efforts in keeping the good old Mag. going under such trying circumstances. Be sure to send my copy along, and if any of the foregoing is of interest for publication purposes, then go right ahead and print it.

My kind regards to all the boys,

Yours,

George L. D. Wells.

VK3TW (Tim)

There are quite a number of the boys at the Barracks mainly occupied as operators in Air Force capacity. Among them is VK3YF, VK3KY, VK3KR, VK3OR.

3WE .. surprised quite a number of the boys by appearing at the last meeting -- Sgnt. A. N. Williams -- to you -- at present at Broadmeadows.

3JO .. thinking of the old 5 mx field days was not content until he took a pack set up on to the roof, with 3 RN to t'other end made a few tests. Someone asked which way the aerial was pointing???????. CENSORED.

3RN .. there's a bit of blackmail attached to this---Ron--as far as I can gather spends a considerable amount of time walking the floor--knows all the lullabys around the place.

3XH .. now Captain Johnson is to be located at Army Headquarters Ringwood.

3XE .. is with the R.A.A.F. abroad.

3HG .. put in an appearance at the meeting.

3BQ .. had rather a bad time at the meeting .. Max turned up while the last magazine was being printed...somehow I've an idea Max has ideas for speeding up the printing.

3DG .. is reported to be a member of the R.A.A.F. and is at present at Laverton.

3HQ .. is, I believe nursing at the Alfred Hospital. How's about making one of the meetings Marg.. First Tuesday of any month.

3IK .. reports that he is indulging in Wine, Women and Song as a hobby. The neighbours don't complain about the amplifier any more, 'cause it aint no use, methinks he'll have the Malvern Council on his trail again when he starts foolin' with the Saxophone in front of the D104.

3HX .. usually forgets himself in these notes--yes in more ways than one--some people want to know why he is late on a Saturday when the Mag. is being printed--someone else wants to know how he writes these notes when his thoughts should be elsewhere. Wonders too.????

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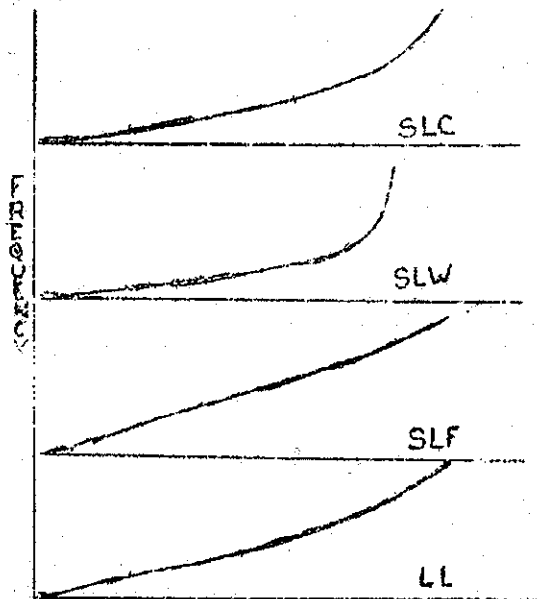
STRAIGHT LINE CALIBRATION

(From an article by W. A. Roberts.)

There always seems to be a certain excitement in calibrating a newly completed wave-meter or radio frequency oscillator. Provided that the instrument has been carefully and stably constructed, its whole value will depend upon the curve which results from those lists of frequencies and dial readings. If the curve is straight, open and of sufficient range, then the work of construction is adequately rewarded.

Very often though the curve is not quite all that may be desired. One of the most frequent troubles is that the plotted line bends seriously. As a result, the over all range of the instrument is less than it could have been with straight line calibration and the useful range is restricted.

The cause of this trouble lies in the tuning condenser and in the circuit capacities which are in shunt across the main tuning capacity. Fig 1 is a curve of dial readings plotted



Dial reading
Fig. 1.

against frequency for each of the four main types of tuning condensers which are available. In the order of the diagram the types are:- Straight line capacity; straight line wave length; straight line frequency, and log law or mid-line.

These curves show that the first two condensers are quite unsuitable for our purpose, the high frequencies are cramped in relation to the low frequencies.

These two types are in any case more or less obsolete, though there are still plenty to be found in junk boxes. The third type, straight line frequency is the best for our immediate purpose, while the fourth type--the log law--will also serve quite well.

Considering the straight line frequency design, it might appear that with one of these condensers connected across a coil straight line calibration is certain. In practice curve A of Fig. 2 will almost invariably result; it will tip up at the high frequencies and compression will result at the low capacity end of the scale.

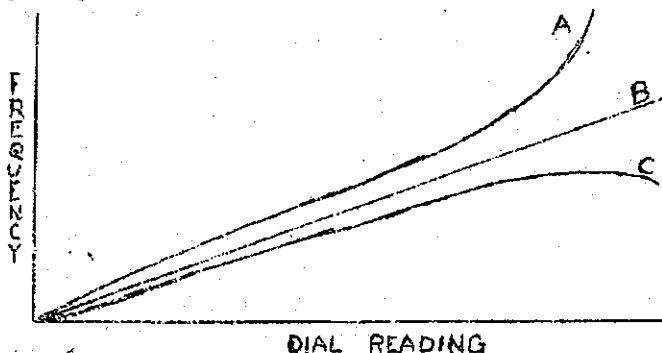


Fig. 2.

The design of any modern variable condenser takes into account the stray capacities which will be placed across it in practical use. Suppose a tuned circuit is to be arranged to give a 2 to 1 frequency variation from minimum to maximum of the condenser, with a straight line frequency law. Then the condenser design must be arranged so that the total maximum capacity is four times the total minimum capacity. Any trimmers which are in the circuit must be taken into consideration.

If that condenser is removed from the circuit for which it has been designed and put into another circuit without the same trimmer and incidental capacities, then the straight line effect will no longer be obtained. Suppose, as is most likely, that the new circuit has lower inherent shunt capacity than that with which the condenser is intended to work. With the plates near the full mesh position the capacity of the tuning condenser is large and the effect of any minor shunt capacity is small. When the condenser rotation has reached such a position that the plates are well out of mesh, the capacity is decreasing to a very low value and the effect produced by the absence of the fixed shunt capacity gets relatively greater and greater. The total capacity towards minimum is less than it should be, the frequency to which the circuit tunes is correspondingly higher, the curve bends upwards at an increasing angle and curve A is the result.

If for some reason too much shunt capacity is present, then the curve will bend downwards at the upper end, for the total capacity there will be higher by a considerable percentage than the capacity required for straight line results, and the highest frequency reached will be lowered accordingly (see curve C). This is the condition which obtains when a tuned circuit has been overloaded with fixed shunt capacity to obtain higher stability.

It is plain that somewhere there lies a happy medium for the value of shunt capacity, and, in fact a little trail and error with a variable trimmer or with different fixed condensers will produce the desired straight line for a curve of frequency against dial readings.

IMPROVING THE CURVE

Turning to the consideration of the low law or mid-line condenser, the same remarks regarding design apply. The theoretical curve will not necessarily be obtained by simply connecting the condenser across a coil and calibrating the circuit. However, using the circuit of Fig. 3, where C1 and C2 are trimmers, it is possible not only to obtain the theoretical curve but to go beyond this and obtain something very close to a straight line result. It will be noticed that this circuit is the same as that used in a superhet to track the oscillator portion of the ganged condenser.

Because the unknowns are so prominent it is not possible to give specific values for the parallel and series trimmers. One can, however, give an idea of the values which will be required, and after that trial and error is advised. First take the calibration curve without trimmers of any sort and see where correction is needed. Choose your correction circuit described previously. Now remember that with the parallel connection the larger correction required, the larger must be the capacity; with the series connection, the larger the correction required, the smaller must be the capacity. Then start connecting some trial values.

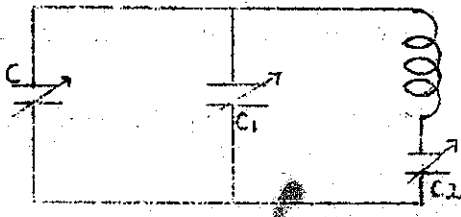


Fig. 3.

With a 0.0005 mfd main tuning condenser, used at wave lengths between 200 and 2 000 metres a parallel trimmer of 50 mmfds maximum will usually meet the case. With 0.00025 mfd as main tuning a condenser half that size will be better. Indeed a 25 mmfd trimmer will be suitable for use with most small tuning condensers.

THE SERIES PADDING CONDENSER

In the case of the series condenser we have said that the smaller the capacity, the larger the correction. At the same time there must be an early limit to the smallness of the capacity, or the resultant total capacity present may not be anything like the nominal value of the tuning condenser--with

NOISE IN CONVERTER VALVES

The following is taken from an article on converter valves published in "Radiotronics"

.....

THE CAUSES OF VALVE NOISE

Valve noise is present in all valves, but is only apparent when the signal input voltage is extremely small. It is thus noticed in the RF amplifier and converter stages of sensitive receivers. In all cases with normal converter types the converter valve noise is higher than that in the RF amplifier, for example a pentagrid converter valve has about four times the valve noise of a typical RF amplifier type. In the RF stage gain is high, the converter valve noise may be neglected in comparison with the RF amplifier noise, since the converter noise is divided by the RF stage gain in order to give the equivalent noise at the grid of the RF amplifier. The resultant noise voltage is obtained by taking the square root of the sum of the squares of the individual noise voltages.

It can be shown that if the RF stage gain is low, as is possible on the short wave band, the converter valve noise is important even when an RF stage is used. In an extreme case where the RF gain is very little above unity the addition of an RF stage may actually increase the total effective noise in the receiver.

In a triode valve, the valve noise is principally due to what is known as the "Shot Effect" and is a function of the plate current. This noise really occurs in the plate circuit, and is therefore divided by the valve gain when referred to the grid. The ideal valve thus has high gain and low plate current.

In a multi-grid valve there is an additional source of noise due to the fluctuating "sharing factor" of the additional electrodes. The ideal pentagrid converter thus has high gain and low plate, screen and oscillator (anode grid) currents. If the oscillator is completely independent of the mixer, as with triode-heptode, the oscillator plate current has no effect on the noise, and this is one reason why a triode-heptode may have a lower noise level than a pentagrid. Radiotron 6J8G is a triode-heptode having an extremely low noise level and for this reason is very popular for use in sensitive receivers. This low noise level is due primarily to the low plate and screen currents, the plate current being about half, or less than half, that of most other converter types, and the screen current being less than half that of comparative types, with the exception of the pentagrid types. The following table compares the electrode current of the best known standard converter types:—

	6J8G	6A8G	6K8G	6SA7	
Plate current	1.3	3.5	2.5	3.4	ma
Screen current	2.9	2.7	6.0	8.0	"
Oscillator					
Current	x	4.0	3.8	----	
Total Current	4.2	10.2	12.3	11.4	"

X Completely independent of mixer.

Since the valve noise occurs in the plate circuit the stage gain is extremely important. Type 6J8G has a fairly low conversion conductance but a very high plate resistance. In order to obtain high gain, and thus low noise level, it is therefore necessary to use an IF transformer having a very high dynamic resistance (i.e. high Q and high L/C ratio). With a suitable IF transformer a very high gain is obtainable in spite of the low conversion conductance. A high conversion conductance is usually accompanied by high electrode currents and a lower plate resistance and therefore higher noise.

OTHER CAUSES OF NOISE.

The valve is not by any means the only source of noise. A resistance or tuned circuit is also a source of noise which is known as "thermal agitation noise" producing a noise voltage proportional to the square root of the resistance (or dynamic resistance in the case of a tuned circuit at resonance). This noise is considerably greater on the broadcast band than on the short wave bands. On the broadcast band it is normally greater than the valve noise in a receiver having a high gain RF stage, and thus forms an ultimate limit to the practicable sensitivity of a receiver. The resultant noise voltage is equal to the square root of the sum of the squares of the equivalent noise voltage and the valve noise voltage.

=====

Continued from page 3.

adverse effect on the expected range. The series capacity must be large relative to the tuning capacity, and on the frequencies previously mentioned a suitable arrangement is an 0.002 mfd fixed condenser having a 300 or 500 mmfd trimmer in parallel with it. For the smaller tuning condensers the fixed capacity may be reduced to 1000 mmfd with the same trimmer for providing a range of adjustment.

Finally it is necessary to point out that if the same tuning condenser is used on several ranges, separately adjusted trimmers must be used with each coil. There is no particular difficulty in this. If the ranges are switched, then the trimmers can be switched with the coil; no extra switch contacts are necessary. If separate plug-in coils are used, separate trimmers can be incorporated in the construction of each coil.

DIVISIONAL NOTES

-- Victorian Division --

It is with deep regret that we announce the passing of Flying Officer Murray D. Orr VK3OR.

There was a fair attendance at the annual meeting, and in his Presidential address the President, Mr. H. N. Stevens, VK3JO outlined the Institute's activities for the past year, referring to those who had helped him during his term, and thanked Mr. Jack Kling VK3JB for his efforts in providing a very interesting series of lectures.

The election of Officers for the ensuing year resulted:-

President	. .	Mr. H. N. Stevens	VK3JO
Vice-Presidents	. .	Mr. T. L. Simpson	VK311
		Mr. C. Wadsley	VK3YI
		Mr. T. D. Hogan	VK3HX
Secretary	. .	Mr. R.A.C. Anderson	VK3WY
Treasurer	. .	Mr. J. G. Marsland	VK3NY
Council	. .	Messrs. I Morgan	VK3DH
		T.D. Hogan	VK3HX
		C. Wadsley	VK3YI
		F. Smith	VK3FR
		R. Higginbotham	VK3RN
		H. Burdekin.	

During the balloting for President rather an interesting situation occurred. On the count of votes, Mr. Stevens received 7 votes. Mr. Marsland the same - and there was one informal. On the re-ballot, Mr. Stevens was elected by one vote.

37Q .. turned up at the meeting -- Some wonder where he has been?

3FW .. now has no worries when the wind blows -- the mast has been taken down and is now safe.

3TE .. has been spending his time constructing an electric clock which is to run on batteries..that's if it goes???

3DH .. as usual has nothing to report except for playing around with the usual home recording.

3RJ .. is feeling miserable over the loss of a round dozen pebbles--all from the upper jaw. That's Ray's version but he doesn't look miserable. Note that he has a couple of stripes up now.

- 3QZ.. attended his first WIA meeting in spite of being a member for a number of years. At present Graham spends his time keeping the ground transmitters at Laverton on the air.
- 3DG.. was also present at the meeting. Note also that Dick sports a couple of stripes.
- 3QV.. says that he's still mucking about with the audio amplifier cum modulators, cum kitchen stove, and hoping...don't know what it's all about but I'm hoping.
- 3BM.. is from reports still on the farm. Let's hear from you sometime Bruce.
- 3RN.. is still very silent and refuses to talk. Maybe he finds that crime doesn't pay...or does it???
- Ralph Clarkson...is now an engineer at Radio Gippsland 3TR--to which address he has moved his super super receiver and of course himself.

From the RAAF Personnel "Somewhere in Cootamundra" - by 3WD

- 2AIS..uses a ,303 in spare time..maybe..anti as well as pro prachute.
- 2TQ.. something about "infinity" stop on a miniature camera--wish some of you guys could write properly.
- 3ZK.. is called the "Phanton" electrician, for reasons unknown??
- 3FH.. whose radius of action usually includes the local hostel??
- 4AW.. ex reservist finds himself a long way from VIB.
- 3WD.. with a debit leave card quoting figures akin to the national debt...Say Bill, why didn't you tell us you were engaged.
- The Ballarat Gang:-
- 3IE.. recently invalided home from the Sunderland Squadron in England after a bad run of luck. Len reckons the huns were out to get him. Tells a wonderful tale of bombs, submarines and all sorts of planes.
- 3IZ.. is still W/T up in the Sunderlands. Souvenered the safety device from the bomb they sank their first sub with.
- 3SP.. is serving in Palestine, and appears from letters to be having a good time.
- 3WD.. was home on leave and celebrated his engagement. What's this about tonsils Bill? and what happened to that 801.?
- 3BE.. has apparantly been in camp.
- 3SE.. hasn't had any luck in getting into one of the services.
- 3AL & 3WA .. are kee ping 3BA on the air.
- 3ZL.. is not to be found in Ballarat.
- 3GR.. sells and services radio..meets a few of the RAAF gang.
- 3DS.. After numerous attempts to get into the Air Force is getting fed up. Now due for military training. Doing a lot of photography.

NEW SOUTH WALES DIVISION

-- By 2TI --

The July General Meeting was held as usual at the Y.M.C.A. Buildings on Thursday 17th ult. The attendance was not as large as usual due to the recent call-up of new age groups.

The evening was devoted to a general discussion as to what direction those members of the Division who were over military age or in reserved occupations could assist the national effort, through the Institute, and several suggestions were made that will be taken up with the authorities.

Federal Headquarters will be located in New South Wales for the next two years--this Division having made an offer to VK3 to relieve them of some of the work that they are now carrying out. New South Wales was of the opinion that it was unreasonable to expect the Victorian Division to function as Federal Headquarters, publish the magazine and attend to their own Divisional matters.

Previously VK2 was of the opinion that no member should hold office in both State and Federal Executives at the same time. This matter was discussed and it was decided that this ruling would be waived for the period of the war.

Amateurs throughout Australia will regret to learn that our old friend Lieutenant D. B. Knock 2NO will be entering hospital to undergo an operation and all his friends will join with Council in wishing Don a speedy recovery.

Congratulations to Con Bischoff 2LZ on his promotion to Sergeant. It is safe to say that 2LZ was the most scientific DX hound in Australia. What Con couldn't make go, well no one could.

Mention has been made previously of hobbies taken up by Hams since the bann on transmissions but one of the most unusual is that of Dave Duff 2EO. You all remember Dave - I think he only worked 40 zones, 48 states and about 150 countries--well dear old "Piggy" is now keeping fowls! Wait till 2ALP and Sid Clarke read this. Dave by the way wishes to be remembered to all his old friends and hopes to be able to get up to VIS one day petrol coupons permitting.

You've of the chap that took delivery of one of those reliance? 22(?) tube Skyraiders the day before war broke out--Well listen to this " I have two Mims Signal Squiters--a two element and a De Luxe Dual Wave. The latter is a three element array for 10 & 20 metre operation. There are no less than six elements in the array...It arrived in Sydney on Sept 4th 1939" Anyone desirous of knowing how it feels to have this lying round the shack is advised to contact Rog Fagan 2RJ.

The next meeting of the Division will be held at Y.M.C.A. Buildings, Pitt St., on Thursday 21st August and the lecture postponed from July will be given by Mr. Frank Hole B.E.B. Sc. and his subject will be "Light".

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P. DICKSON, VK2AFB
Secretary: W. G. RYAN, VK2TI
Treasurer: W. McELREA, VK2UV
Councillors: V. BENNETT, VK2VA; N. GOUGH,
VK2NG; R. SMITH, VK2AIU; R. MILLER.

The Division meets on the Third Thursday of each month at Y.M.C.A. Buildings, Pitt Street, Sydney, and an invitation is accorded to all Amateurs to be present.

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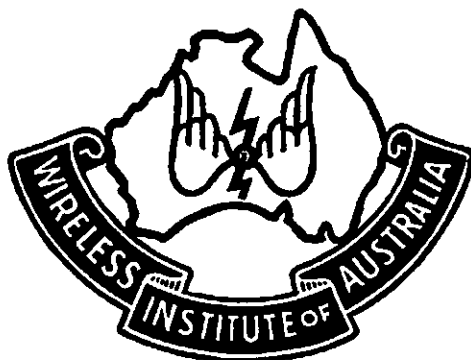
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SIXPENCE

SEPTEMBER 1941

AMATEUR RADIO

THE
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OF
AUSTRALIA



Published by the Victorian Division

AMATEUR - RADIO

Vol. 9 No. 8

September, 1941.

A LOW PASS FILTER

For Radio and Phono Use.

(Taken from an article by G.M. Kosolapoff published in "Radio")

With the advent of high fidelity equipment for radio reception and phonograph reproduction the constructor often finds himself facing the limitations imposed upon the sound reproduction. Few people wish to have separate tuners and amplifiers for high fidelity and normal broadcast uses but at the same time most of us would like to squeeze as much fidelity as possible out of a given signal. Phonograph reproduction is up against a similar problem. There are various types and kinds of discs in use which vary quite a bit in the noise level.

Simple RF tuners having wide enough band pass for high fidelity are not particularly pleasant to listen to on regular B.C. stations, due to interchannel whistle and a certain amount of chatter.

In regard to phonograph reproduction we now have high fidelity pick-ups which have good response beyond 10,000 cycles. They are excellent for low noise level discs, but frequently one wishes to run the regular shellac records; and then the trouble starts. There are some people who do not mind hearing a great deal of extraneous noise in order to pick out of it all a certain amount of higher harmonics. However, there are more people who do not feel that this extra "hash" adds to the fidelity of reproduction.

An ordinary tone control can be used to eliminate the difficulty in both of these cases. However, the ordinary tone control has a rather gradual frequency cut-off, so that in order to remove, say, the 10KC whistle, or some particularly objectionable record noise, the middle register response suffers quite a bit.

Now a low pass filter has a sharp frequency cut-off relatively speaking. Insertion of such a filter into the audio

system can cure most of the trouble mentioned above, provided the cut-off is made at the proper point for the desired application.

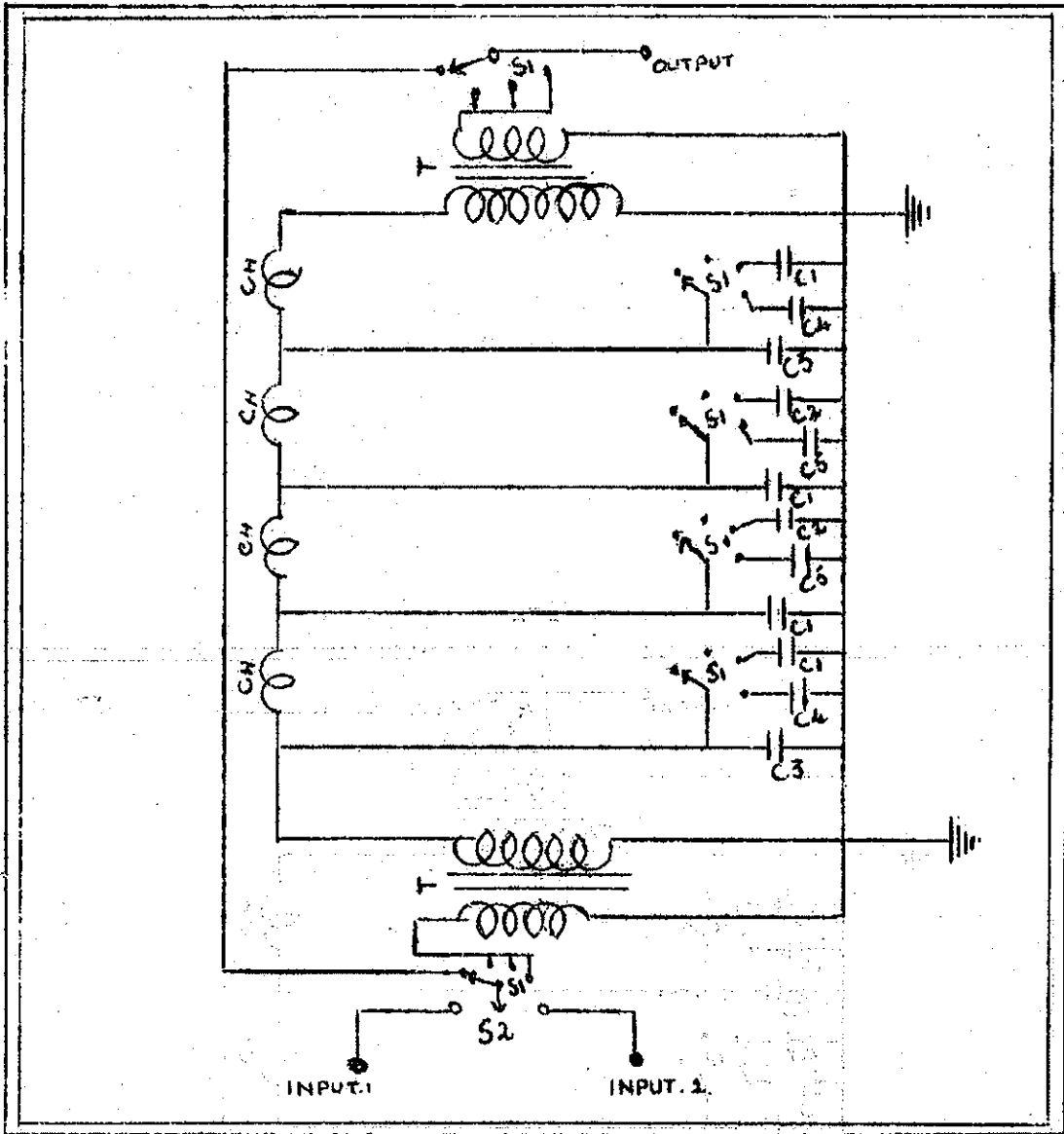
In order to have one unit which could be readily used for a number of applications the writer constructed an inexpensive and simple audio filter which has variable cut-off in three steps, so designed as to make the system usable for high fidelity application, as well as for bc listening and phone reproduction.

The filter is a three section job, which gives plenty of attenuation of the undesirable frequencies. The three cut-off frequencies are 8200, 6000 and 5000 cycles. The unit has an impedance in the neighbourhood of 500 ohms and must be coupled at both ends with matching transformers. However, since the transformers are in use only when the filter itself is operative there is no need to use expensive transformers of the extended frequency range type. A shorting lead cuts out the entire unit when high fidelity response is desired. The circuit as shown includes the entire unit including the phone-radio switch.

In its radio application the filter is usually set at 8200 which eliminates interchannel whistles as well as practically all of the audio "hash." When the interference is at high level lower settings are of great use. In its phono application the gadget is probably of most use on ordinary shellac discs, especially on the older ones.

It was quite amazing how well some really ancient discs sounded when they were used with the filter in operation. The filter unit itself provides a sharp and steep upper limit to the high frequency response, where practically all of the audible "hash" is located, so that by setting this threshold at the proper frequency the offending noises are reduced to inaudibility.

There is no obvious reason why more cut-off steps may not be used, but the three given here are found to be quite sufficient for the normal use.



C1.. 0.05 mfd
 C2.. 0.1 mfd
 C3.. 0.025mfd
 C4.. 0.02 mfd
 C5.. 0.04 mfd

CH.. 30 millihenry
 chokes
 T... 500 ohm line to
 grid transformers
 S1.. 6 gang, 6 position
 non-shorting switch
 S2.. rotary S. D. T. switch

-----XXXXXXXXXXXX

- SOME NOTES ON FIDELITY -

Simple design suggestions for A. F. Amplifiers from
an article by W9SDG published in QST

The designer of an audio frequency amplifier approaches his problem with three requisites in mind---sufficient gain, minimum wave distortion, and correct frequency response.

Getting sufficient gain is probably the least of his troubles, but minimizing wave distortion is not quite so simple. The usual procedure here is to follow the tube manufacturers recommendations as to electrode voltages, load resistances, and signal levels. Even harmonic distortion may be practically eliminated by using push-pull stages.

Push-pull circuits offer so many advantages that it often pays to use all push-pull stages in an amplifier. The use of push-pull allows savings in power supply filter and in decoupling circuits. Another advantage is that the output transformer of a push-pull stage does not suffer from D.C. saturation and consequently a smaller transformer with improved frequency response may be used.

In any resistance-capacity coupled amplifier there is a plate load resistance, a coupling condenser and a grid leak. The correct value of load resistance is taken from a tube data chart. In selecting values for the coupling condenser and grid leak it should be remembered that an increase in the value of either will extend the response range of the stage in the low frequency region.

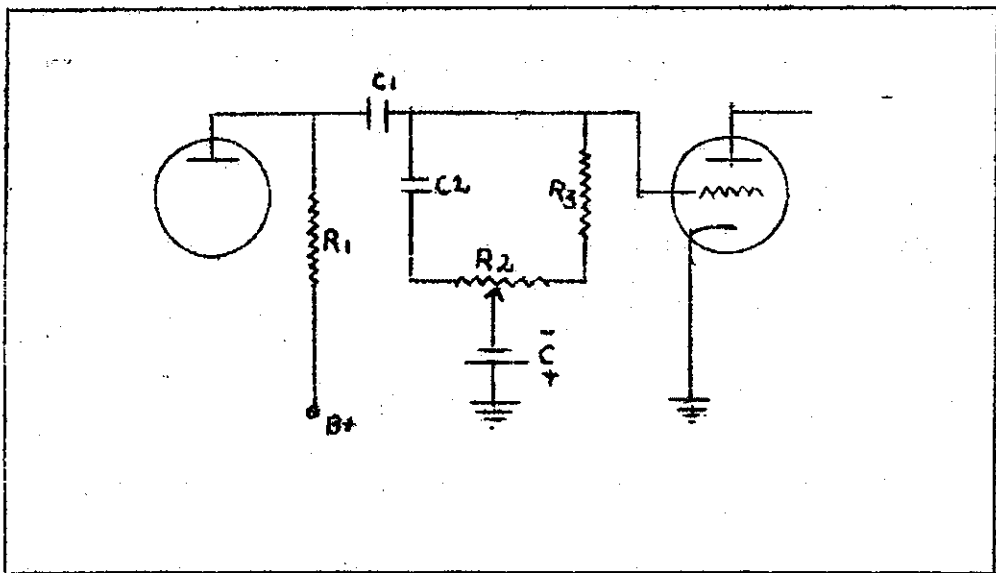
An RC product of 0.01, where R is in megohms and C in mfd, will give a substantially flat response curve down to 30 cycles. For example a 0.01 condenser and a 1 meg leak could be used or a 0.002 mfd condenser and a 5 megohm leak. The latter combination has the advantage that a relatively low cost mica condenser can be used and these are also less prone to leakage and break down than say a 0.01 mfd paper condenser. Another advantage of using the high value grid leak is that bass response may be attenuated simply by switching in a lower resistance, say 1 megohm.

Frequencies above 5000 cycles are not so easily controlled on paper. However, the input impedance of conventional tubes is in the megohms over the whole audio range. So it should be possible to build a satisfactory wide-band amplifier without inverse feedback or other compensation.

Uncontrolled feedback is our worst enemy but a logical lay-out of parts should minimize valleys and peaks in the response curve below 5000 cycles. Another thing to remember is that electrolytic condensers are not very efficient at 5KC and should be shunted by small paper condensers.

The zero-audio-potential elements of tubes used in single ended circuits must be by-passed to ground. Perhaps the most common destroyer of both low and high frequency response is the cathode bypass condenser. For good response down to 30 cycles this should be at least 5 mfd for by passing 2000 or 3000 ohms and at least 25 mfd for by-passing 400 ohms or so. A satisfactory screen by-pass capacity is 0.1 mfd.

A bass attenuator has already been mentioned and treble frequencies can be attenuated by a small condenser shunting the load resistance or the grid resistor. The circuit shown gives a form of tone control which can be used for full bass or treble attenuation using the one control.



C1....0.002 mfd

R1....0.25 meg

C2....250 mmfd

R2....5 meg potentiometer

R3.... 1 meg

D I V I S I O N A L N O T E S .

- V I C T O R I A N D I V I S I O N -

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No special qualifications required. If you can spare Monday or Thursday night and send at 15 - 20 W.P.M, please get in touch with the Class Manager, Mr. H. N. Stevens. V.K.3JO.

-
- 3YL... has recently accepted a position as instructress at the W.I.A. classes -- results so far most satisfactory to both 3YL and the students.
- 3RN... was heard at the last meeting discussing with Bert Burdekin the why's and wherefore's of constructing an electric clock of the grandfather type. We wonder just what the outcome will be.
- 3NY... recently returned from holidays to find himself on the relieving staff -- and what is worse the unhappy possessor of a crop of boils -- Why take holidays???
- 3JO.. reports that the morse class attendances are improving but more instructors are badly needed. All Herb has to do now is take his bed into the Institute -- Herb was elected Chairman of Council, at the last Council meeting.
- 3UM... had his picture adorning the centre page of one of Melbourne's dailys recently. Congratulations Bill on your marriage...all the best.
- 3WY... spent some time recently at the Law Courts as the result of being called to serve on the jury. We hope to hear more about it in the near future.
- 3YK... is from a recent letter from him, now in Singapore. Now has Commissioned rank..and reading between the lines has had some experiences. Let's hear from you again O.M.

Ralph Clarkson...has been trying out the HMV anti-static antenna and having excellent results, and definitely reduces noise. Short wave reception at Sale is far better than at Brunswick.

Mr. Ridgeway... a new member was present at the last meeting. He was one of the ones who got their AOCF too late.

3ZK... turned up in VIM a couple of weeks ago. We had first hand information of Jim's fighting capabilities. For further information apply to Fitz.????

3HX... seems to remember the fight of 3ZK being one of the interested spectators only a few feet away..Did I hear anyone say anything about picnics in the rain. They are not so bad when you've got a car.

-----oOOOo-----

-- N.S.W. DIVISION --

By VK2TI

The August General Meeting of the Division took place on the 21st ult., and the roll up was the best for some considerable time.

The Chairman, 2RA, in declaring the meeting open extended a welcome to Wilf Harris VK2ALF who recently returned from a "pleasure" cruise upon one of His Majesty's Australian Ships. This tour embraced such places as Cape Matapan, Greece, Suda Bay and Alexandria. Later on in the evening Wilf gave Members a summary of his experiences and the way in which his ship used to evade the dive bombers raised the query as to whether she was an outboard or a cruiser!

Lieutenant D. B. Knock is still an inmate of Prince of Wales' Hospital Randwick and expects to be confined therein for at least another couple of weeks. Don is anxious to see as many of his old friends as possible. Hut 19 is the QTH.

Mr. Keith Burbury of the Radio Inspector's Office Sydney was recently promoted to the post of Radio Inspector, Hobart. Keith, whilst in Sydney acted as Chairman of the Vigilance Committee of this State and his strict impartiality and attention to detail went a long way towards the efficient working of the Committee. Mr. Burbury was made a presentation of a desk calendar suitably inscribed, by the Institute as token of appreciation of the work performed by him.

The Election of the Federal Executive was held at the August Meeting and resulted as follows:-

Federal President	-- R. A. Priddle	VK2FA
Federal Vice President	-- A. Joscelyne	2AJ0
Federal Secretary	-- W. G. Ryan	VK2TI
Councillors	-- H. Peterson	VK2HP
	W. McElrea	VK2UV

With the exception of Federal President, Office Bearers were elected unopposed. Two nominations were received for Federal President Messrs. Corbin 2YC, and Priddle 2RA, 2RA winning the ballot.

Recently the Vigilance Committee discussed the operations of shortwave Broadcasting Stations operating in the 7 mc band, particularly between 7000 and 7200 kcs. In a number of cases these stations were operated by the B.B.C. and a communication received from the R.S.C.B. states that this body also took the matter up with the P.M.G. (England) and they have received an assurance that this is only a wartime measure and these frequencies will be immediately vacated once the necessity for their use is past.

The next meeting of the Division will be held at Y.M.C.A. Buildings, Pitt Street, Sydney on Thursday 18th September at 8 p.m., and a cordial invitation to be present is extended to all hams.

-----o00o-----

-- THE NEW FEDERAL EXECUTIVE --

For the next two years Federal Headquarters will be located in New South Wales and the Election of that Executive was completed at the August General Meeting, and herewith a short sketch of each Member.

The Federal President, Ray Priddle VK2RA. Ray, a comparatively young man in years is quite an old-timer as far as Amateur Radio is concerned, obtained his ticket in 1929, but had to wait several months until he "came of age" before he could go on the air. Started off with the usual Hartley and Dot and 1. Progressed through the various stages right up to an 808 crystal control and then e.c. Receiver these days is a McMurdo-Silver, a 10 tube affair. Ray's activities on the air have been many and varied. Always keen on a rag chew, Dx, and multi band operation 2RA has worked 85 Countries, 35 Zones in W.A.C. and W.A.S. and is one of the few VK holders of the British Empire Radio Transmission Award. Was a member of the Divisional Council several years ago, occupying the position of Magazine Manager and later Vice President. Resigned from the Divisional Council upon the receipt of a commission in the 18th Field Brigade. Was recently promoted to rank of Captain and Battery Commander, but as he is a Structural Engineer by profession, was recently placed on the Reserve of Officers and once more his services are available to the Institute.

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VK2NG; R. SMITH, VK2AIU; R. MILLER.

The Division meets on the Third Thursday of each month at Y.M.C.A. Buildings, Pitt Street, Sydney, and an invitation is accorded to all Amateurs to be present.

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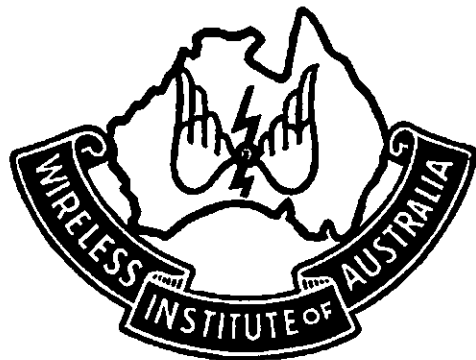
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SIXPENCE

OCTOBER 1941

AMATEUR RADIO

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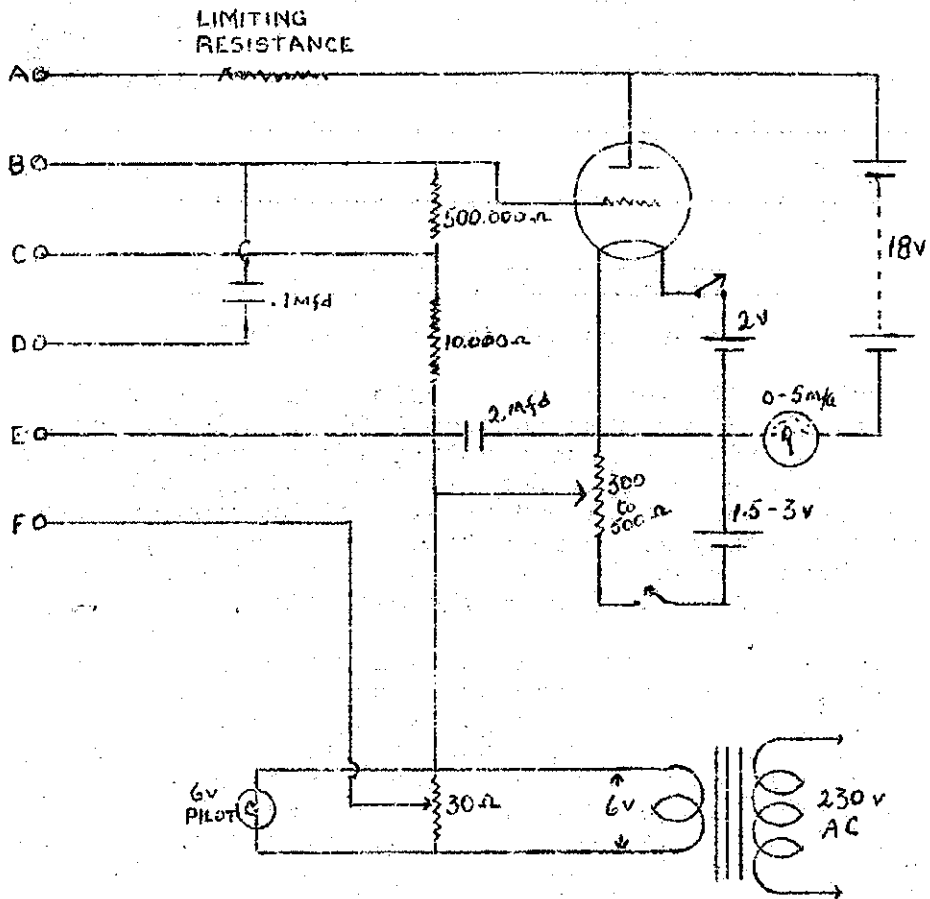
A SIMPLE VACUUM TUBE VOLTMETER

(From an article in Wireless World.)

The valve voltmeter to be described will measure (a) high resistances, (b) capacities between 0.001 and 1mfd, (c) AC voltage of the order of 1 to 5 volts, (d) inductances of the order of 1 to 10 henrys, if not with precision, at least with enough accuracy for normal purposes. Calibration must be carried out by using known inductances, capacities, resistances and AC voltages across the appropriate terminals of the instrument and noting the readings on the 5ma meter.

The inductance range will be calibrated by obtaining the loan of, say, half a dozen chokes whose inductances are known to be 1, 2, 4, 6, 8 and 10 henrys respectively. First with the mains plug of the instrument inserted into a power socket, terminals F and B are connected by a short length of wire and the slider on the resistance across the secondary of the Transformer moved until just 5 ma is registered on the meter. Next the 10 henry choke is connected between F and B in place of the shorting wire. The reading will be considerably less. Next the 8 henry choke is connected and the new reading noted, and so on with the other chokes. A graph is then constructed plotting henrys against ma. The capacity range is calibrated in exactly the same way. For the high resistance range, using terminals A and B it is sufficient to calibrate with ordinary commercial resistors of good make up to 5 megohms. The AC voltage range, using terminals D and E, is calibrated against an AC voltmeter.

Great accuracy is obviously not to be expected of this simple instrument, but as the tolerances are considerable in the usual commercial receiver components, it will provide a fairly reliable check. For example the leakage resistance of a condenser is tested by connecting the condenser across terminals A and B. Then its capacity can be roughly checked by plugging the instruments mains lead into the mains and connecting the condenser across B and F. Let us suppose for the sake of illustration, that the leakage resistance is found to be 100,000 ohms; this would not matter greatly if the condenser was used in parallel with a resistor of only a few hundred ohms, but, of course would be serious if the condenser was used across a high value resistor.



VALVE VOLTMETER FOR TESTING

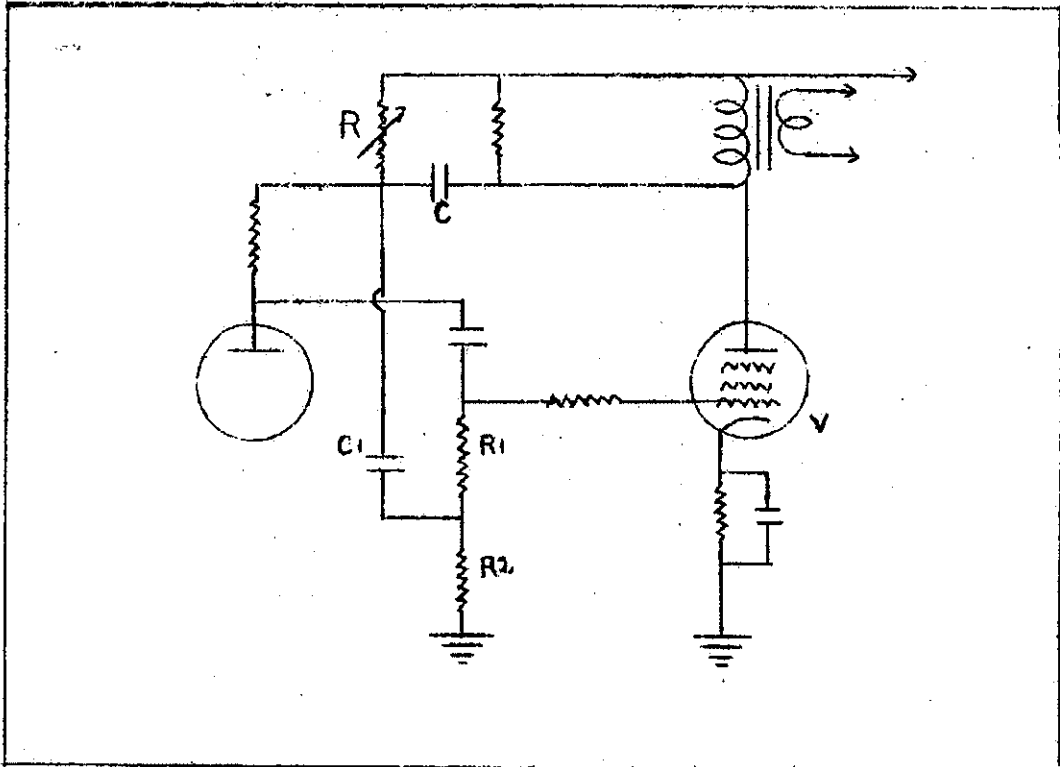
Especial care must be taken about insulation. The limiting resistance should be of such value that the 5 m/a meter reads just full scale when A is joined directly to B. The tests possible are A to B high resistance measurements; B to E, AC voltage without DC in circuit; D to E, AC voltage with DC in circuit; B to E, DC voltages in AVC circuits; E to C, higher DC voltages or higher AC voltages without DC in circuit; B to F inductive and capacity with 6v 50 c/s supply from transformer.

Many uses and variations of this simple instrument will suggest themselves to an experimenter of ingenious mind. Simply as a DC valve-voltmeter using the terminals E and B or C, it will for instance reveal the presence of AVC voltages; as an AC voltmeter across terminals E and D, it can be used as an output meter to measure the voltage developed across the speech coil of a loud speaker.

-----oOo-----

TONE CONTROL

In the type of tone control where a series resistance and capacity are shunted across the load circuit of the output valve and the upper cut off frequency is usually fixed, so that the attenuation can only be varied above this point. In such a circuit arrangement the resistance is always the variable element.



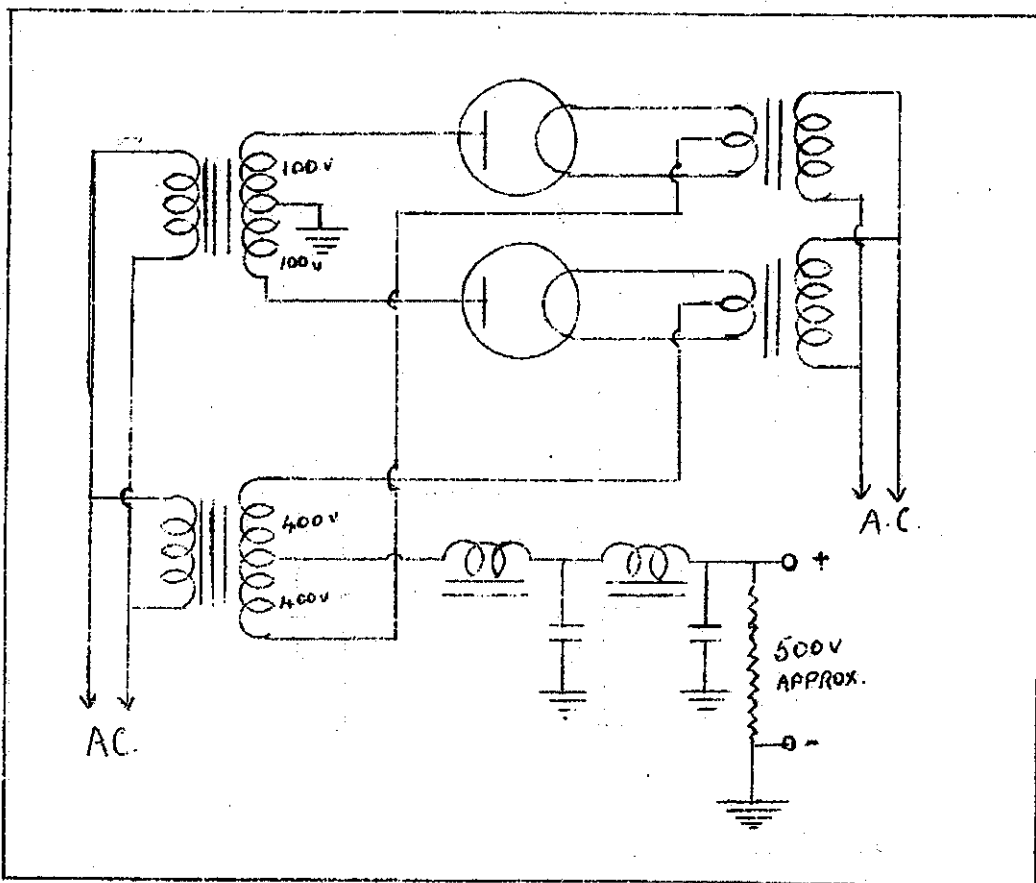
According to an invention patented by the Mullard Radio Valve Co., tone control is effected by using a negative feedback derived from a resistance-capacity circuit RC shunted across the output of a pentode V, the control grid of which includes a

(continued on page 5)

CONNECTING DISSIMILAR PLATE TRANSFORMERS IN SERIES

Ray Wheadon in QST suggests the use of the circuit shown to save the problem of connecting unlike transformers in series to obtain higher voltage. When identical transformers are connected in series, no problem is involved, since the centre-tap is easily obtained at the junction of the two identical secondaries. When dissimilar transformers are used, a centre-tap is impossible and the only means of using such a combination has been by the use of the bridge rectifier system which requires no centre-tap but does require four rectifier elements.

In the system suggested, only two rectifier elements are required but each filament must be insulated from the other.



Double rectifiers, like the type 83, may be used by connecting plates in parallel and using a separate tube for each element as shown in the circuit. Balanced output is obtained by connecting one of the transformer secondaries in the rectifier to turn leads and using both centre-taps. As with

any series arrangement, the transformer on the positive side must have sufficient insulation to take care of the extra voltage. Correct polarisation of the primary windings is required. This can be determined by trial. Incorrect polarisation will result in bucking voltages.

=====

(Tone Control - continued from page 3)

a potentiometer, R1, R2. The reverse feedback is applied from the variable control resistance R to the midpoint of R1, and R2 through a blocking condenser C1.

With increasing frequency, the reactance of the condenser C decreases, and a larger negative feedback is therefore applied to the amplifier. The amount of feedback will also depend on the setting of the resistance R, which thus governs and high frequency cut-off point. The attenuation above this point is, however, substantially constant.

-----oOo-----

FURTHER PERSONAL NOTES OF NEW FEDERAL EXECUTIVE

Federal Vice President, Alan Joscelyne, VK2AJQ. Alan is a comparative new-comer to Amateur Radio, having received his ticket a couple of years prior to the outbreak of war. Has been a Member of the Divisional Council for sometime now, occupying the position of Vice President and Magazine Manager. Prior to his election to the Divisional Council, had much experience on the executive side of Radio as a member of Zero Beat Radio Club.

Federal Secretary, Wal Ryan, VK2TI. Wal has been a Member of the State Council since 1936 and during that time has occupied the positions of Secretary, Vice President, Publicity Officer and President of the Division. Was Contest Manager for the 1938 VK-ZL Dx Contest. Obtained ticket in 1935 and started off with an 830 in the final and finished up with a pair of 808's. Receiver used was 10 tube super with xtal filter modelled on the Hammarlund Super Pro. 95 Countries have been worked and 89 verified has obtained W.A.S., W.B.E., W.A.C. both fone and cw and worked 37 Zones. Transmissions have been made on all bands and was the winner of the Australian Section of the 1938 A.R.R.L. Dx Contest.

-----o000o---

D I V I S I O N A L N O T E S

- New South Wales Division -

by VK2TI

The September General Meeting of the Division was held at the Y.M.C.A. Buildings before a much smaller attendance than usual.

Two interesting visitors were Messrs. Ray Carter 2HC and Clarrie Castle 5KL both of whom are now members of the R.A.A.F. 5KL handled bushfire traffic during the inferno that swept Victoria and South Australia a few years ago, and at that time his work was favourably commented upon. In private life he used to operate the radio at the base of a large carrying company operating through Central Australia and his anecdotes were much appreciated by members. I don't think it would be out of place to repeat two of them here:- As to be expected the company owned quite a few large trucks, and upon one occasion a thirty seven foot ten wheeler became stuck in the creek, and in their efforts to get it out the crew were unfortunate enough to break a tailshaft. A spare was fitted and met the same fate. Eventually it was decided to radio the base and an oxy-welder came out with his plant and as the tailshafts snapped he welded them. On another occasion a six tonner stripped its clutch and new clutch plates were made on the spot from an oil drum! -- "Where there's a ham there's a way."

Members will be pleased to learn that Lieutenant D.B.Knock 2NO has been discharged from hospital and is now enjoying a few weeks leave prior to rejoining his unit. Whilst in hospital Don considers he has designed the ultimate in 5 metre rigs both transmitter and receiver, but won't hazard a guess as to when he will be able to try it out. Don't worry Don you have quite a few mates!

The Institute has been a strong supported of Air Force House since its inauguration in VK2 and recently the Division was elected to Membership of Air Force House Association in appreciation of its work.

Another member of the Divisional Council to join the R.A.A.F. is Jack Howes VK2ABS. Jack was Technical Officer and the various Talks and Demonstrations arranged by him will be sorely missed by members.

Momentous changes are to take place in the Amateur Frequencies in the States. Commencing September 300 kcs of the 75 metre band will be taken over for the use of the Services. In order to compensate for this loss 7200-7300 kcs are to be thrown open to fone. Wondor how W6BKY will sound on forty.

We don't know whether there is any truth in this statement, but it has been rumoured that 3RJ and 2YC are to lead a deputation in protest to the F.C.C. !

FEDERAL EXECUTIVE

COUNCILLORS. Harold Peterson 2HP and Bill McElrea 2UV---2HP has been a member of the Divisional Council since 1936 occupying the position of President until this year when ill health has curtailed his activities quite a lot, necessitating his resignation from that office. Is quite well known throughout the DX world having obtained W.A.S. W.A.C. fone and CW and modestly refrains from telling us the number of Countries worked.

Will McElrea is at present the Divisional Treasurer and has had previous experience on the Council as Assistant Secretary. From the short sketches Members of the Institute throughout the Commonwealth will realise that as in the past Amateur Radio will have at its head for the ensuing period men well versed in all branches of the hobby.

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VICTORIAN DIVISION

Members are asked to note that on account of Tuesday, 4th November being Cup Night, the usual meeting will be held on Wednesday night, November 5th.

.....

An item of interest to amplifier enthusiasts is the competition being conducted by the Australian DX Radio Club in conjunction with the "Listener IN." This competition should be of much interest to many of our members, as now most of their radio activity is confined to audio work. A fee of 2/6 per entry is being charged, the proceeds of which are to go to swell the Lord Mayors Comfort Fund.

There are two sections which will interest our members -
Section 1. Public Address Amplifier, any wattage output.
Section 2: amateur Home Constructed, not exceeding 10 watts.
The closing date of the competition is the 15th of November, and the final judging will take place on the 29th of November. Anyone wishing to obtain further information on the subject can do so by getting in touch with Mr. N. H. Groves, 155 Burgundy Street, Heidelberg. N.22.

At the next meeting, which will be held on Wednesday 5th Novem. Mr. G. W. Manning 3XJ is to bring along an amplifier and a folded horn speaker which he has constructed. The improvement in tonal quality is outstanding George claims, and the demonstration should prove very interesting. If anyone cares to bring in his amplifier George will have very much pleasure in hooking it up to his speaker. The input tranny on the speaker, by the way is a single ended 5000 ohms as the output tube in the amplifier is a 6V6G.--So fellers roll along and pass your opinion both on the quality of reproduction and -- the quality of the home carpentry.

3QZ.. is now back at HQ Sigs Office and is sorting out the bits and pieces of an automatic transmitter.

3XJ.. is building an amplifier .. 6J7 and 6V6G, and has made a crystal pickup from a few bits and an Xtal cartridge. Seems to me as if George is rather a handy man 'bout the house. But George what's this about all the "LETTUCE GREEN" ?

3RN.. says that all his interests these days are confined to gardening and the building of an electric clock. (He also says something about the notes editor). I do believe that he is often woken up in the small hours of the morning.

3TE.. has for some time been constructing an electric clock (ye Gods .. another of 'em), which believe it or not, works perfectly, and will soon be placed in the hall.

3EX.. thinks he must have started something when he made the report that electric clocks were popular...he's now beginning to wonder what the outcome is going to be ???

3VM.. has produced issue, to wit..one female who it is alleged readily responds to CQ. Congrats OM.

3WQ.. also reports the arrival of a junior op..Congrats Chas.

3LQ.. has been transferred to S.A.

3RX.. had to resign from his job as instructor. Hence the frantic (?) appeal of last month.

From Laverton we learn that:- 3DG is a D/F operator.

3TD.. is on the Xmitters.....as well as 3QZ.

3XB.. is also a D/F op...bearings quaranteed or signal back.

3IN.. operates in aircraft...3 UC...D/F op bearings reported to be ALWAYS right...particularly in regard to Yank signals.

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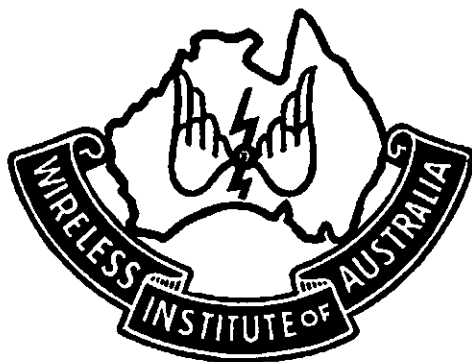
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SIXPENCE

NOVEMBER 1941

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-- A RECORDING AMPLIFIER --

by

IVOR MORGAN. VK3DH

The amplifier may be considered as the most important link in a set up of equipment for either commercial or home recording. The other two units generally speaking, being (a) the microphone or radio tuner or a pick-up, and (b) the cutting head. Either of these departments could fall below the ideal in some respects and with the aid of equalization and various means of compensation, we could still produce a respectable recording.

As the circuit illustrates, there is nothing outstanding or unusual in such an amplifier. There are however, a certain number of special features which go towards improving the convenience and efficiency with which we may produce recordings of many sounds.

Putting the cart before the horse, we might mention first of all, that the reason for using push-pull 2A3's to feed the cutter is the comparatively low impedance, namely 5000 ohms into which they can work. This is of considerable help since a highly inductive load such as the cutting head; presents a load to the output stage which varies considerably in impedance with different frequencies. At the same time the power output of about 10 watts is a convenient value to allow a fair margin of power for good quality of sound into the cutter.

This value seems somewhat ridiculous when it is considered that one of the latest model high quality cutting heads operates at a normal level of plus 20 DB which is about .6 watt of audio frequency power, to fully modulate the track on the disc when cutting 112 lines per inch.

However there are many types and makes of cutters which require much more power than .6 watt to efficiently drive them.

Now we might commence at the beginning and deal with microphones etc; as usual inputs to our amplifier. A jack to take

one of the higher quality crystal microphones is shown in the circuit, together with a switch and input transformer for some type of dynamic or velocity microphone with an output impedance of 200 ohms. For recording speech only, a crystal microphone is excellent since the natural tendency to increase in output towards the high frequencies constitutes a form of equalization necessary in recording. For the sake of simplicity in the discussion, no means of mixing a number of microphones is shown where two mixers are shown for mixing pickups etc., and a microphone. Any number of mixers could be inserted at this point in a suitable series parallel arrangement to maintain the correct impedance match and each microphone could have its own preamplifier, consisting of one or two stages depending on the relative output level of the microphone in use.

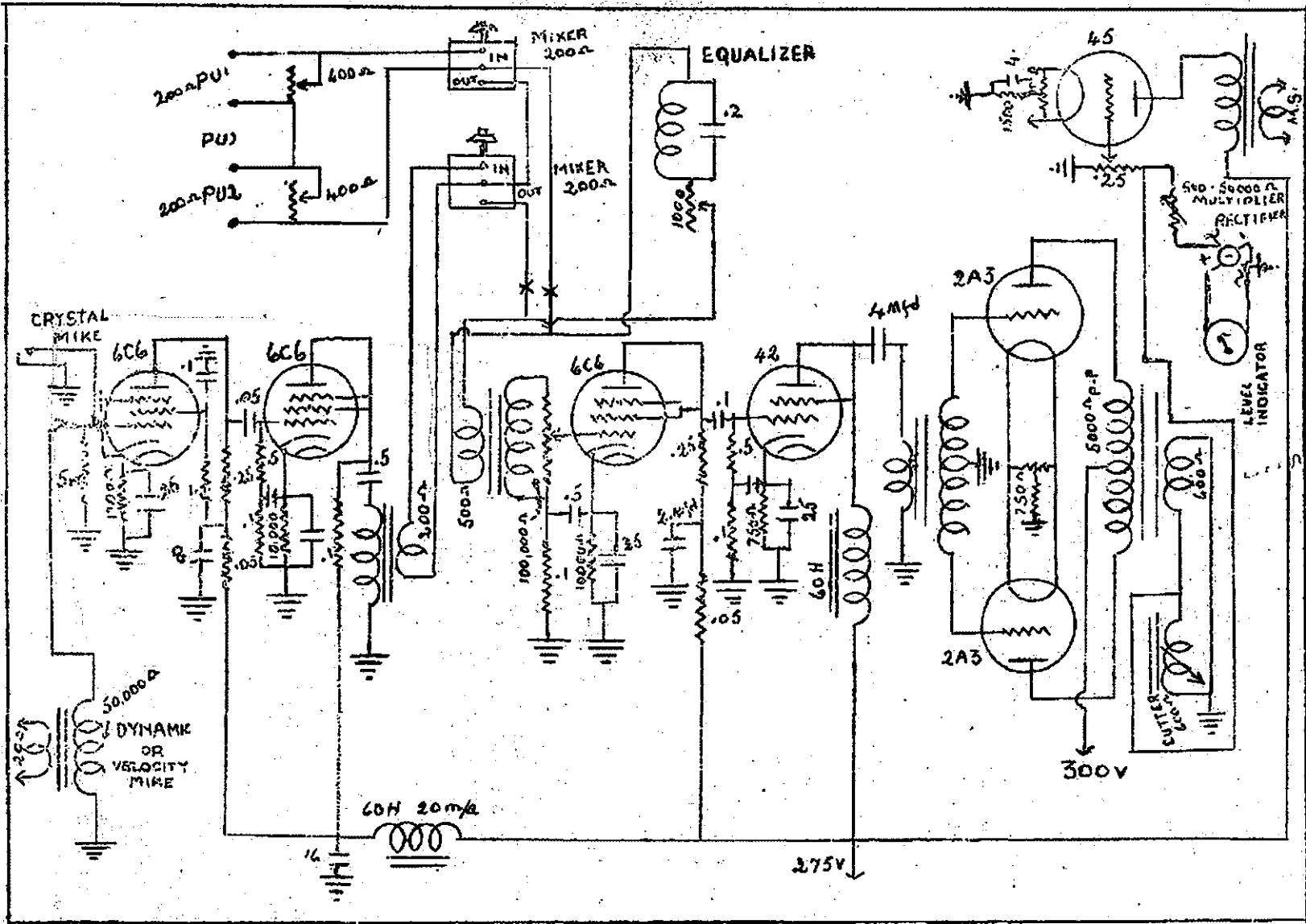
The example of one of these two stage pre-amplifiers is shown using a 6C6 connected as a pentode resistance coupled to another 6C6 triode connected, which in turn is coupled to a shunt fed output transformer which steps the output impedance down to 200 ohms, suitable for mixing.

Two 200 ohm mixers are shown series connected to a 500 ohm to grid input transformer. This is not a serious mismatch but a pair of 50 ohm fixed resistors inserted at points "x" would just prevent any arguments on the subject, and make no noticeable difference to the operation of the gear.

A cheap means of fading two 200 ohm pick-ups into our main P.U. mixer is by shunting an old 400 ohm variable resistor (which opens at the end) across the input to the mixer. Whilst this is a mis-match, it is only during changing from one pick-up to the other that any mis-match occurs and each pickup along "looks" into 200 ohms.

Across the primary of the input transformer is shunted the equalizer which is an important item when recordings at $33 \frac{1}{3}$ are being made, and also very useful at the speed of 78 RPM. With the values shown this form of equalizer resonates at 5000 cycles with a gradual falling off on either side of this frequency. The insertion loss is in the region of about 12 DB but this is easily made up with ample gain in the main amplifier. Even when the best type of cutting head is used there is always a falling off of level cut on the disc, towards the higher frequencies and when we attenuate the frequencies more and more from the 5000 cycle mark down to about 50 cycles, the resulting recording is of a fair average frequency range.

Of course the function of the equalizer is not merely to produce the correct result on the finished recording after taking into consideration the limitations of the cutting head, but also as the head travels towards the centre of the disc the equalizer must be brought more and more into effect by reducing the value of the variable 1000 ohm resistor in series with the resonant



circuit. This is necessary to compensate for the gradual reduction of the speed at which the material on the disc moves past the cutting needle. This subject is quite a long story in itself and should be dealt with separately; but briefly we might say that since the diameter of the circle being cut on the disc is smaller near the centre of the disc than at the outside and since the turntable revolves at a constant speed, it follows that the length in inches of the wave cut by the cutter at say 3000 cycles (sine wave) near the centre is much shorter than that near the outside. When the disc is played back, the reproducing needle fails to drive the pickup to the same level due to its inability to follow the very short wavelengths of the sound track and tends to take a short cut from peak to peak and also on an instantaneous type of recording irons out these short wave length cuts.

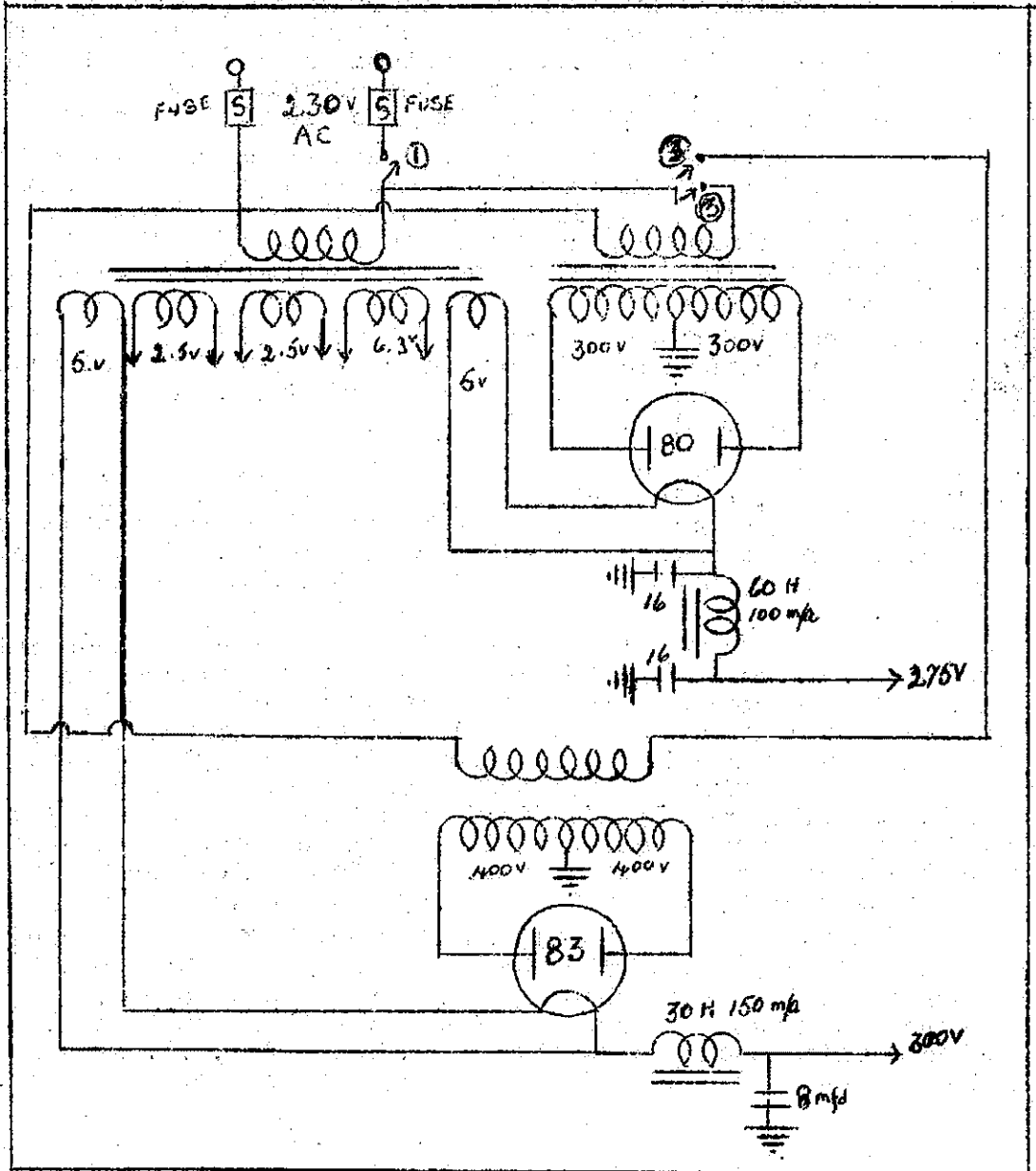
Turning now to the main amplifier the input transformer is loaded by the main gain control of a 100,000 ohm potentiometer which feeds another 6C6 triode connected. This stage is again resistance coupled to a 42 triode connected, which produces about .85 watt of power being ample to drive an output stage of push-pull 2A3's into class AB region if necessary, but this would only be the case if we were using the amplifier to feed a speaker for reproducing recordings. The input push-pull transformer is shunt fed to maintain as far as possible wide range frequency response in the system, by removing the 30 odd milliamperes from the primary which would only tend to saturate the transformer core or necessitate a bulky transformer to "stand the strain." Push-pull 2A3's feed the cutter via a 5000 ohm centre tapped, to 600 ohm transformer. One side of the 600 ohm line is earthed for convenience and would not cause any serious trouble. This allows us to shunt another 250,000 ohm gain control across the cutter and feed straight to a single 45 driving a monitor speaker. This monitor stage will have absolutely no effect on the operation of the amplifier or the cutter since no power is drawn from the 2A3's or the 600 ohm line and is excellent to listening to the actual sound as it goes into our cutting head.

Just as important as the equalizer or monitor amplifier and speaker is the level indicator. A 1. m/a type dry metal rectifier is shunted through a variable multiplier resistor across the 600 ohm output line and an 0-1 milliampere meter connected to the DC output posts of the rectifier. When the gear is first set up and tested, an experimental cut would be made, the track then inspected through a microscope and the multiplier set at a point where the meter reads about .6 m/a when the track on the disc shows maximum safe level of modulation.

The power supply is divided into two sections to provide ample filtering and stability. Switch No. 1 lights all filaments. No. 2 puts H.T. on the pre amplifier stages and first two main amplifier stages as well as the monitor amplifier. This supply has an extra stage of filter for the pre amplifiers

and other comparatively low level stages are decoupled by resistors and condensers, for stability and hum free output. Switch No. 3 puts H.T. on the 2A3's and perhaps speaker field is needed and requires much less filter and should have good regulation.

Although this is a very ordinary set up of amplifier, it constitutes a piece of gear which will supply everything the amateur recordist would require and should be capable of turning out a very fair example of a record.



MEMORIES OF THE PAST.

- The First Interstate Valve QSO -

It was not until well into 1919 that negotiations between the W.I.A. and P.M.G.'s Dept. resulted in permission being granted for Experimental transmission work. Several Spark Transmitters appeared, the most important being a small equipment used by Mr. Wangle, the late Government Astronomer for the Experimental transmission of Time Signals, and a somewhat larger affair installed by the W.I.A. Victn. Division at their Club Rooms at Prahran. This transmitter was complete with high-tension transformer, rotary spark gap and glass plate condenser which had the annoying habit of puncturing right in the middle of a transmission of W.I.A. Bulletin news. The Call Sign for the Transmitter was "V.240", it being the official fashion in those days to allot numerical Call Signs with the prefix letter of the State.

Spark transmission soon died as Broadcasting commenced and the first Experimental Valve Transmitters made their appearance. It must not be thought that these early transmitters were developed overnight. For Experimenters there were no valves better than small "R" and "V.24" types plus a few "Oscillaudions" so transmitting on anything on "flea power" was a practical impossibility.

Tests were carried out between 2JR and 2CM early in 1922 with 2JR operating quite unofficially of course - a 100 watt 2000 meter Service Transmitter from P.M.G. Radio Headquarters, Collins House, Melbourne under the call sign of "CH."

After it had been demonstrated that both Mr. McClurean, 2CM and Mr. Jack Pike, 2JP, could pick up these signals in Sydney, 2CM and 2JR co-operated in putting together a small valve transmitter at Strathfield, employing three parallel connected "V.24" receiving type Valves with an input power of NINE Watts, on a wave length of 1350 metres.

To make the best of this lower power and the truly microscopic amount that was radiated on the long wavelength employed, use was made of the tuned counterpoise system in addition to earth, and the remarkable aerial current of 500 milliamperes obtained. (2TI, 2RA, 2HP and 2HP kindly note!) This current with a calculated radiation resistance of approximately 0.1 ohms gave a radiated power of about 1/40 of a watt. During May 1922 the great test was made and 2CM contacted 2JR in Melbourne with signals capable of being copied on a Regenerative Detector and Two Audio. 3EF kept watch for 2CM's signals at Elwood and logged them during the Test.

It was not long before 2CM blossomed forth with a grid modulated carrier and all oldtimers will recall the Sunday night concerts from "Strathfield on the Strath" as Chas used to announce. While these were the first Amateur Radiophone signals in Australia, music had earlier been broadcast from A.W.A. and P.M.G. stations in Melbourne as many VK 3 Oldtimers know, but more of this anon.

T. High.

- 7 -
D I V I S I O N A L N O T E S .

Notes From Federal Headquarters

--- By 2UV. ---

The first meeting of the new Executive took place on Monday October 27th and it was decided to make an endeavor to ascertain the extent the Australian Experimenter is participating in the National effort. With this end in view each State will be asked to circularise all hams.

It was decided that the Khaki and Blue page in "Amateur Radio" be given every support and that the various Divisions be asked to appoint an officer to collaborate details.

On Tuesday November 11th a wreath will be placed on the Cenotaph in Martin Place, Sydney in Memory of all those "Hams" who have given their life for their life for their country.

.. NEW SOUTH WALES DIVISION ..

By VK2TI

The usual monthly meeting of the Division was held at Y.M.C.A. Buildings on Thursday 16th October.

The Chairman in declaring the meeting open extended a welcome to Sergeants Taylor G2 DL and "Taffy" Jones. Both these chaps are Members of the R.A.F. and are at present on loan to Australia in an endeavor to teach we "blanky Colonials" something about R.D.F. Whether they have succeeded or they themselves gained in knowledge we can't say. G2DL gave a very interesting talk on Ham Radio in England and his remarks concerning the ease with which American gear was obtained in England prior to the outbreak of war, were heard with envy particularly when reference was made to the cost thereof!

Another interesting visitor was 4CD who gave a short talk on Ham activities in Banana Land.

I suppose everyone has heard the story that most sailors after a number of years at sea look forward to the time when they will spend the last of their days on a farm. Listen to this! John Field, VK2AKF, of Warbreccan Station, Deniliquin, recently gained his First Class Ticket and is now leaving the "farm" to go to sea! Best of luck John. Its just too bad that you won't be able to do much transmitting isn't it.

Following on a recommendation from Council, the General Meeting decided that the Institute send a Christmas Parcel to all Members of the W.I.A. known to be Prisoners of War and whose whereabouts are known.

Clarry Castle 5KL was to have given a further talk on his experiences as Wireless Operator in Central Australia at this Meeting but unfortunately 5KL has been ill and was not able to be

in attendance. It is understood that Clarry experienced some form of gastric trouble after having been to dinner at a well known VK2's home. We don't know whether it was the "Lemonade" or the change from "Army surplus". Way Say Clarric?

Another member present at this Meeting was Lieutenant Don Knock 2N0. Don is looking in the pink and was seen in earnest confab with G2DL. Don had a "G" call many long years ago - its alright Don, I won't tell how long - and had quite an interesting time comparing "then and now."

The next Meeting of the Division will be held on Thursday 20th November and all hams on service are cordially invited to come along and swop lies.

-----oo00oo-----

SLOUCH HATS AND FORAGE CAPS.

.. By VK2YC ..

In these days of no Ham transmitters, but a general transmitting of the VK Hams themselves all over the globe, only a very few know where another very few are. In this column, with everybody's help we hope to let most of the VK Hams know where all those 2, 3, 4, 5, 6 & 7 Calls are these days, and what adventure befalls them. Each Division will have a Naval, Army and Air Force representative to send notes to, or a few lines direct to VK2YC will fill the bill. If you are in Sydney, 2YC's telephone number is MU 1092 and you can give him the latest by phone, or in person. 2YC being his own Boss (ahem! 'cept for Mrs. 2YC) visitors are welcome any time. We want news, chaps, we can't have too much of it.

Introducing some DX..G2DL was along at the last VK2 Div. meeting....about time the R.S.G.B. sent out a few Hams to Empire meetings to make up for all the VE's and ZL's etc. they get. Hi! G2DL is out with the R.A.A.F. "Hush hust" Department on the Ultra Highs. Queenslander 4CB, hobnobs with him at the 'Varsity, while P/O Goyen, VK2UX pays them when they ask nicely, on the right day. Frank also pays 2HC and 5 KL who are on the last (?) W.T.G. Course at Ultimo. To end R/L 2UR, and 2AH and some more Hams give us good representation at Richmond.

Distance being no hindrance to a Ham we go a bit afield to DX Hound 2PX. For a granddaddy Harold sets us all a pretty hot pace having had a look at "operating" conditions in Libya, Greece, Crete and Syria where all "crashes" do not denote QRN. SO, chaps, think what you have to do when you're a Grandad, Hi! Harold's son is over with him too, but the Grandchild thank goodness IS at home. Where one Ham is there are sure to be others so we find 2ZK, 2 AFT, 2AHB, 2ZZ featuring in 2PX's letters.

Bill of 2HZ, along with 3YK both nice P/Os fly around Malaya and meet all the DX about the place. What with VKs, ZLs, YI, VS6, VSI, G, ZS, ZJ all being in evidence, seems the place to hold a BERU Convention.

Farther up the Gulf, away from Singapore's gaiety, Corporal 2XQ perspires along with 2VI, 2ALW & a couple of VK3s.

Apart from 4CB, Arthur of 4AW is the only other VK4 that we have heard from recently. Arthur was made a P/O along with 5LD and was sent to Cootamundra to keep 2TQ and 2AIS company.

We even have some "returned men" here in VK2...2VG is back after getting safely through Libya...While 2 ALF, 2IT and 2ADI are pro tem back with the navy. After Crete, Greece and other parts of Musso's Sea they are quite "air minded," you may or may not know what I mean HI!

VK2RC is doing a P/O course in VIM, while 2ABS is another one to join the R.A.A.F. recently. He is at Richmond. 6YB, and 2ND, 2DN several other chaps keep our end up there.

Morrie 2VN was last heard of at Townsville after covering most of Oceania, and a bit of Canada. 2YA has been to VE twice but now, along with 2QL sees how well you can block at 25 per when you try to join the R.A.A.F. They should meet plenty of "it" these days of the W.A.A.Fs. I believe 2VGs sister is a W.T. Op.

Nothing has been heard of Super DXer 2ADE/4US. Charlie went over with the first squadron and has been flying around with our Sunderlands. It was heard he had collected a bit of schrapnel in the leg, been in Plymouth Blitz but nothing has come to light since.

Now chaps, plenty of us will be interested to know what the Hams you know are doing, so send in scraps of news by the of each month, or send it in, anyway, we will see it gets in. Don't forget send it to your State rep. or direct to 2YC..VK6s we hear nothing of you. How about some dope? Well, cheerio till next month, ending with the news that 3RJ has for the second time come over to VK2 to learn how to run a QSL Bureau...isn't it nice to have a column...2YC.

-----oOo-----

AMATEURS - RADIO WIREMEN - AND MECHANICS NOTE

.....

The Army Headquarters Signals are urgently in need of the above type of men and anyone wishing to enlist with them are advised to get in touch with:-

Captain Johnson,
A.H.Q. Signals,
Park Orchards,
Ringwood.....Telephone Ringwood 379.

VICTORIAN DIVISION

=====

The next meeting of the Division will be held at the Rooms on Tuesday December 2nd. On that date Lieutenant Chippendal 3VU and other members of the A.H.Q. Sigs. will present an illustrated lecture "THE HAM AT WAR." Those who were fortunate to be present at the previous visit of Lt. Chippendal will look forward to his second visit, and those who were not present are advised, that if they don't wish to miss something they haven't seen for a long time, to be sure to make an effort to get along. Several well known former Hams will be present including 9RW, 3SS, 3WE, 3GO.

At the last meeting George Manning 3XJ brought along (with the aid of 3JO's truck??) a folded horn speaker cabinet which he had constructed in his spare?? time, together with an amplifier the demonstration proved very interesting, particularly when compared with an amplifier supplied by 3JO. I understand that several of those present went home with the idea of constructing one for themselves.

3ML.. is somewhere in Queensland and has recently been promoted to the rank of Squadron Leader. Congrats Bob.

3WG.. was also on the recent list of promotions is now a Flight Lieutenant, Congrats Bill.

3WE.. has had a spell in the Heidelberg Military Hospital, but is now back again on the job.

3SS.. Sgt. Keith Scott is a member of the A.H.Q. Sigs at Ringwood.

3FW.. One of the old 200 metre gang is a member of the R.A.A.F. at present doing a course in Sydney.

3PE.. is a Pilot Officer serving with the R.A.A.F. overseas, understand that he is night flying a two seater fighter.

3XU.. is a sgt. in the 8th Div. Sigs. in Malaya.

3PR.. paid one of his occasional visits to the W.I.A. at the last meeting. Ron was supposed to be elsewhere..but radio won.

3FR.. Corporal please..seems to be having an easy time.. we've seen him twice lately.

3WY.. A very busy man keeping the wheels of industry running, wants someone to write a few technical articles for the magazine.

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The Division meets on the Third Thursday of each month at Y.M.C.A. Buildings, Pitt Street, Sydney, and an invitation is accorded to all Amateurs to be present.

H A M S !

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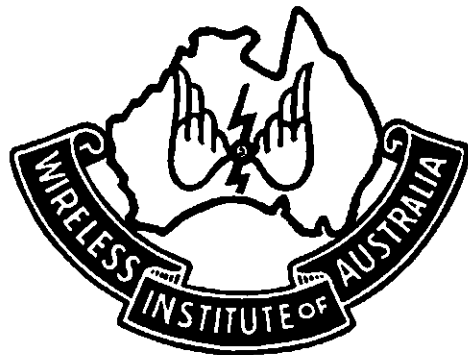
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SIXPENCE

DECEMBER, 1941

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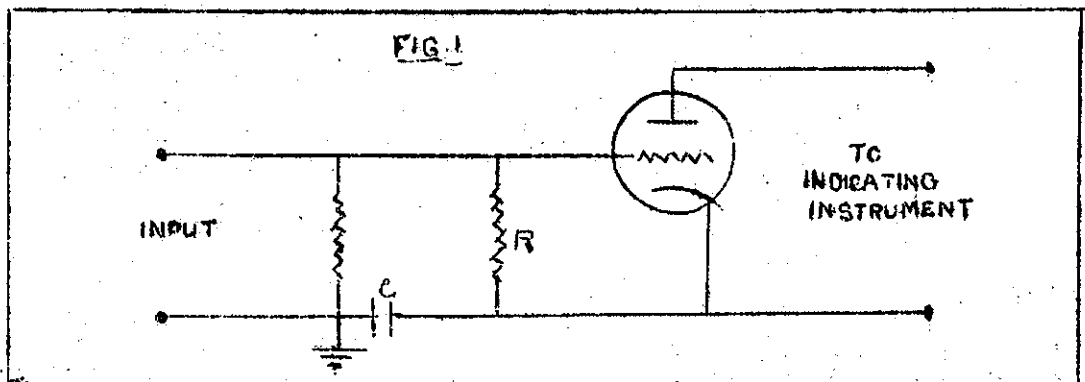
December, 1941.

A WIDE RANGE TUNING INDICATOR

(From an article in "Wireless World")

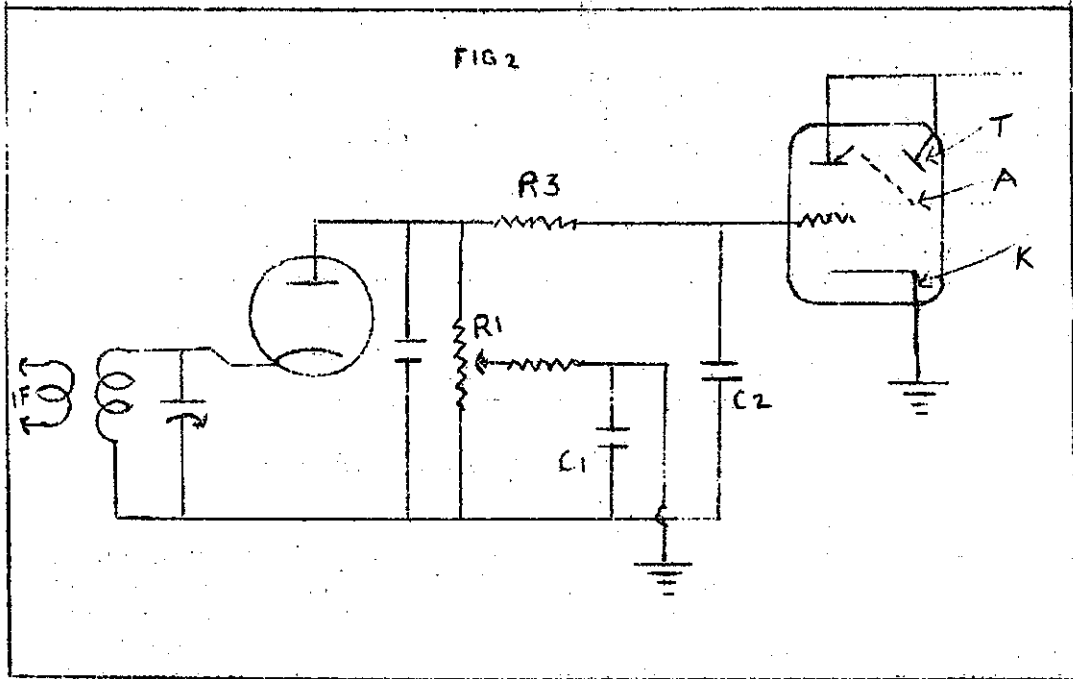
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Tuning indicators of the cathode-ray type are generally more sensitive to voltages well within the operating range than to extreme voltages. A circuit arrangement for an indicator free from this defect and possessing the same high sensitivity for both average and abnormal signals has recently been devised by the RCA laboratories and is shown in a very simple form in Fig. 1.



The voltage to be indicated is impressed upon the grid of the valve shown and also through a suitable time delay net-work upon its cathode. If the impressed voltage swings to an abnormal value, say highly negative, the grid potential may swing outside the straight portion of the characteristic and the valve may become effectively in-operative. However after a time interval determined by the values of resistor R and condenser C, this abnormal potential difference between the grid and the cathode disappears. Thus, the valve comes under effective control again.

Fig. 2 illustrates the application of the principle to a radio receiver.



The time constant of the resistance capacity circuit R2-C1 feeding the cathode is appreciably greater than that of the circuit R3-C2 feeding the grid, thus providing the necessary delay. The indicator valve may be a 6E5, which has a rod control electrode A between the cathode K and luminescent target T, this rod being supported by the anode and electrically connected to it, the tuning being indicated by contraction of the shadow thrown by the rod on the target.

When a signal of abnormal strength is received the target shadow closes up and becomes unresponsive to adjustment of the tuning condenser; however, after the delay interval, the valve returns to normal operating condition of the shadow. As usually connected the 6E5 is unresponsive to signals more negative than -8 volts on the grid; with the circuit of fig. 2 it can be arranged to respond to swings as great as -220 volts.

The application of the arrangement described is not confined to the tuning indicator of a radio receiver. The "magic eye" is coming into increasing use as an inexpensive and robust indicator for measuring devices of various kinds, and in many of these a widening of the useful range would be a distinct advantage.

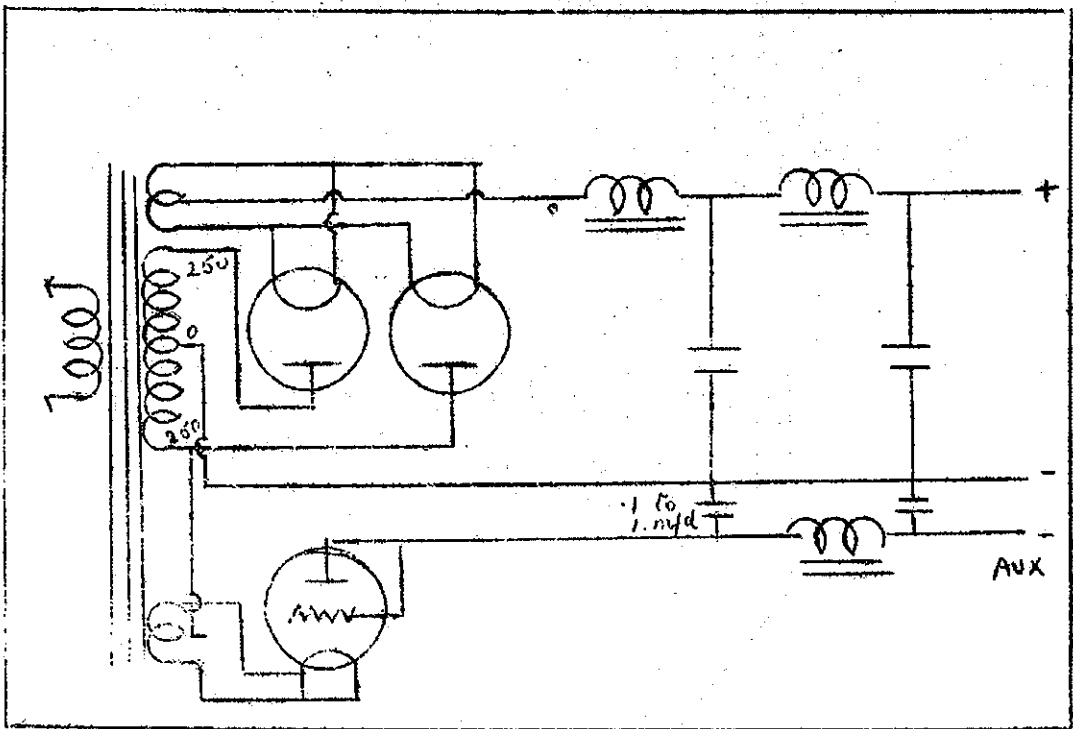
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AUXILIARY DC SOURCE

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The need for an auxiliary source of DC potential often arises in experiments with receivers, but the cost of a supply unit of conventional design is not always justified. This article describes how the necessary potential can be inexpensively obtained.

It will be assumed - as indeed should be fairly obvious that only a small current will be drawn from the auxiliary supply circuit to be described. The circuit shows how an ordinary rectifier unit conventional except that in this case choke input smoothing is employed, may be modified to provide an auxiliary supply, negative with respect to earth.



Any spare battery valve will suffice for the auxiliary rectifier. The output voltage can be adjusted from about 150 volts to 350 volts by selection of the capacity C; the higher the capacity the higher the resultant voltage. In the interests of valve life it is advisable to use the smallest capacity and hence lowest voltage sufficient for

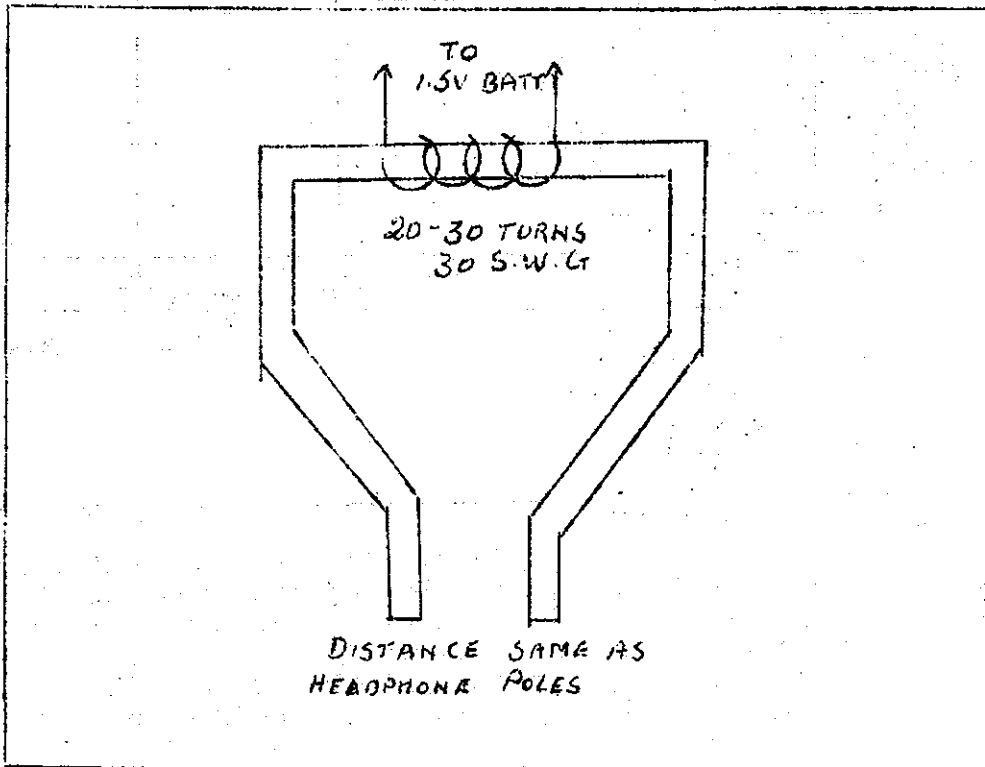
the designers needs. If no spare filament winding is available on the transformer, it is possible in some cases to wind a small secondary of thin wire on top of the existing windings without even dismantling the core.

If the current drain on the auxiliary supply is very small, the smoothing choke L may be replaced by a resistance.

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A SIMPLE WAY TO REMAGNETISE HEADPHONES

Construct a small electro-magnet as shown in the accompanying diagram, so that its poles are of the same size and are the same distance apart as the poles of the headphone magnets. Connect a 1.5 v battery and determine the polarity by means of a compass needle. Ascertain the polarity of the headphone magnets in the same way and then place the electro-magnet against the headphone magnets so that their opposite poles are adjacent. After a few minutes the phones should be as good as new.



MEMORIES OF THE PAST.

- LISTENING FOR THE FIRST AMERICAN SIGNALS -

"During the last few days some very fine work has been done by Sydney Wireless Amateurs in connection with long distance reception, signals transmitted from a station in California having been picked clearly.

Some little time ago Mr. F. Basil Cooke, F.R.A.S. of the Sydney Observatory, Mr. Charles Maclurcan of Strathfield, and Mr. J. Reed of Clyde, combined in an effort to organise a test with American Amateurs in an endeavor to span the Pacific. Major Lawrence Mott, of the United States Signals Corps, Avalon, Catalina Island, California, was written to and asked to co-operate. He expressed great pleasure, and offered to do all in his power to make the tests successful. Further negotiations followed and the times of transmission, wavelengths, and signals to be sent were arranged. Mr. Maclurcan's station at Strathfield was remodelled, and no efforts were spared to make his receiver capable of the long distance work.

It was arranged that Major Mott should send a special signal from 6 to 7 p.m. Sydney time commencing April 28th and from 7 to 7.30 p.m. Mr. Maclurcan was to regularly call M O T T using 100 watts power.

These plans were put into operation on the night of 29th April, and although Messrs. Maclurcan, Cooke and Reed listened very carefully, no signals were received. The second portion of the programme was, however, put into effect and for half an hour the letters M O T T were transmitted from Mr. Maclurcan's station. A similar state of affairs prevailed for several nights, and as nothing was heard, it was decided to slightly alter the circuit before attempting to receive on the night of May 4th.

However, on May 3rd, just as the tests had been completed, Mr. J. H. A. Pike of Epping, who has also done some excellent long distance reception, rang Mr. Maclurcan and reported having heard the word M O T T at about 7.10 p.m. Some doubt however existed as to whether the signal from America had been heard or whether Mr. Pike had heard a type of wave known to wireless operators as an harmonic, from Mr. Maclurcan's station.

Mr. Maclurcan's station, and as the reception was indefinite it was decided not to cable a receipt to America. On the other hand it was decided to extend the tests, and Major Mott was cabled and asked to transmit again. He continued his sending and on May 4th was clearly received by Messrs. Maclurcan, Mr. Pike and Mr. Gorman of Kogarah. On May 5th Messrs. Maclurcan and Pike again received the signals and May 6th Mr. Maclurcan's station only was successful. In all Strathfield definitely heard the signals three nights in succession, Mr. Pike two nights and Mr. Gorman once.

The amateurs concerned have thus achieved a notable feat. In the world of commercial wireless, traffic has been carried on uninterruptedly over distances almost twice as far but for purely amateur reception Messrs. Maclurcan, Cooke, Reid, Pike and Gorman have certainly established an Australian record. Further Trans-pacific tests are to take place this month and other amateurs are hoping to have the distinction of receiving from America."

The above is an extract from the "Sydney Morning Herald" of 10th May 1925 and I have been informed that the power used by Major Mott was 1 Kilowatt (even in those days!) and the wavelength 270 metres.

"T. High."

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SLOUCH HATS AND FORAGE CAPS

Well, this column is easy - so far. Here is VK2NO with enough to fill it all on his own. Now I want someone else to fill my next column - how about it VK3? (Just when I thought I had someone else to write 'em -- Notes Ed.)

And now, here are 2 NO's experiences just as he sent them in.

"Hams meet in war-time under unexpected conditions, but one place where personal contacts are sure to be made is a wireless school. Lieut. Don. B. Knock, (VK2 NO) Instructor at Army School of Signals, Liverpool, N.S.W., has had a goodly number of VK's among his students through 1941. His first surprise on taking over duties was that the senior Instructor, Major George Every, M.M., turned out to be VK7GE, a QSO of days long past. One day whilst out on exercise, VK2NO and a Corporal student were struggling to get a refractory petrol charger to tick over and the Cpl. turned out to be Bill

Burghard VK2ACL (who is now an A.I.F. Lieut. overseas). Sgt. Joe Ackerman VK2ALG was the next VK2 to show up for three months "penitentiary." Biggest surprise of all was when a young Sgt. turned out to be Geoff Partridge, VK2VU, of 56 mc fame. VK2NO and VK2VU burnt up a lot of watts trying to put 56 mc sigs between Sydney and Singleton before Hitler intervened! First thing Don asks of a class of students is "How many Hams are there in this course?" It is seldom that out of a course of 36 that there is not a single ham or at least a second op. from some station. As syndicate leaders are needed for certain wireless experiments during the course it is obvious that any hams gets this job! Bill Felton VK2RF, is now an A.I.C. W.O. recently went through the school other VK2's being Jacobs VK2SJ and Wells 2AME. But A.S.O.S. collects students from all parts of VK. VK3's who have been through the mill there are "Pat" VK3CP now a Sigs Instructor in tanks somewhere, Lieut. Chippindall VK3VU engaged on research work at A.H.Q. in VK3, Sgt. Kirby VK3KI, Lieut. Nye VK3WL and 3EV, old timer Reg. Anthony VK5CM turned up at the school as Sgt. 2NO and 5CM must have QSO'd many hundreds of times from as far back as 1928. From W.A. came Lieut. Elton Grey VK6ZX, now busy with a wireless section in the heart of VK on a special job. 6ZX had a narrow escape from disaster when riding an army mo-bike as Don R at A.S.O.S., riding slap into a wireless van just ahead of him, but obscured in dust. He was only R4 on parade for a week or so afterwards. From VK4 Sgt. Harley, VK4GH entered the school and Tasmania completes all states so far in the shape of Sgt. Morrisby, VK7LM. 2NO wont be seeing many more hams under army school conditions for he goes shortly to an active unit himself with the rank of Captain. "Its better being out in the blue on a real job, instead of the monotony of being a schoolmaster all the time."

Many of the ex-students are now sig. officers and N.C.O's overseas with the A.I.F. and 2 NO wishes them all a safe return to ham radio when the last ACK AR is sent."

Thanks Don, just filled the place nicely, and leaves me all of VK9XX/2XX's at Port Moresby to start next month's news. Merry Christmas to everybody, whether you read this before or after, and think of 2HC, ex W.I.A. Learners Code Tests back at the same old job...8 w.p.m. to trainees at Bradfield.

73 2YC

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D I V I S I O N A L N O T E S

- New South Wales Division -

By VK2TI

The usual Monthly Meeting of the New South Wales Division

was held at Y.M.C.A. Buildings on Thursday 20th November and quite a large number of Members were present.

The additional pages in "Amateur Radio" were the subject of favorable comment from all present and it was decided that every endeavor be made to include a further additional page. "Slouch Hats and Forage Caps" was particularly welcomed and the writer of that page received a considerably amount of advice regarding Service Headgear!

The vacancy on the Council caused by Jack Howes VK2ABS resignation upon being called up for the Air Force was filled by Mr. Neil Gough VK2NG. Neil is quite an oldtimer and has regaled members at times with anecdotes dealing with "Fone on 40". Incidentally 2NG has a record to be proud of having only missed two General Meetings since the outbreak of war. This is a fine example of Institute spirit.

Two more Members in "for the duration" are Geoff Pryor VK2AMP and Jim Haining 2AMQ. Geoff, by the way, joined the Institute at the first meeting held after the suspension of Licences and has been a stalwart ever since. Jim joined in October 1939 and until the call up was also in regular attendance. In addition to their calls being in sequence they are both going to that "Paradise of the North" Darwin, Geoff with Army Signals and Jim with the Engineers. Be careful of the "Dark Clouds" fellas and all the best.

An extract from November issue of Q.S.T. dealing with U.H.F. work in the U.S.A. was read to Members and proved of interest. Now that there is not much DX left for the "Kilowatt Kings" to work more and more attention is being directed to the Ultra-Highs and quite a fair amount of work has been done on 224mc and 112mc. W2MPY using 20 watts to a HY-75 has made contacts over 250,295,335 miles and has heard a station 400 miles away! Pretty good going for 2½.

The proposed Census of Commonwealth Hams recommended by F.H.Q. was approved and the Division is prepared to do its share as far as New South Wales Amateurs are concerned.

A letter from Basil Dale VK2XX and later 9XX was read to Members. Basil has been "touring" the Eastern States and is at present in the Mandated Territory. His remarks concerning the price of beer, cigarettos and tobacco was heard with envy. Basil's letter also contained much information dealing with the activities of hams he has met on Service and if other hams on Service do likewise 2YC should not lack material for "Slouch Hats and Forage Caps."

Another ham to make the grade is our old friend "Tiny" Carter 2HC. After completing his course at Ultimo, is now an instructor at Lindfield.

An interesting talk was given Members by Peter Adams ex VK2JX ex ZL2JX who recently returned from New Zealand. Pete's remarks concerning the ZL's reactions to his descriptive powers were quite humorous. His description of the workings of the N.Z.A.R.T. were particularly interesting also Pete, prior to going to New Zealand occupied the position of Federal Vice President for a time, and whilst in New Zealand became Editor of the Official Organ of the N.Z.A.R.T. "Break In".

The next Meeting of the Division will be held at Y.M.C.A Buildings on Thursday 13th December and the Lecturer will be W. J. McElrea VK 2UV and he has chosed for his subject "Technical Developments in Ham Radio during the Last Year."

VK2 Division wishes all hams a Merry Christmas.

QUEENSLAND DIVISION.

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4WT..Bill more or less runs the A.R.P. services up here, well more or less, anyway. Earns his honest crust fitting deaf aids to people with defective hearing. Have often wondered how Bill used to hear those teeny weeny signals. Hi.

4ES..Herb is the brains behind the new Police Radio station being established here. A regular attender at meetings.

4RY..Bill is also tied up with A.R.P. work. I think he is a divisional warden.

4RC.. Finished a decent super some little time ago. works fb.

4RT..Can generally be relied on for a good story can John.

4HU..Once more a resident of VIE after a sojourn in the country. Sells push bikes and wireless sets for a living.

4UU..Bill is in Camp at present - signals. Has put his car up on blocks. You should still have the motor-bike OM.

---XXX---

VICTORIAN DIVISION

At the monthly meeting of the Division the Army Headquarters Signals provided a very entertaining evening. Members of the A.H.Q. Sigs in charge of -- We're not exactly sure whether it was Sgnt. Will iams 3WE or Sgnt. Scott 3SS together with other Hams and potential Hams brought along sundry army gear--about a ton of it--or maybe it was two ton--'cause it took some time to transport it up to the Institute rooms; not only that the lift stopped half way up--and the Army is wondering why? If the Army really wants to know--methinks they had better ask the air force---of course they SHOULD know all about what goes up.

With all the gear distributed all around the Room Sgnts. Williams, and Scott and Corporal Ritter explained the gear and then left it in the hands of the gang--several were injured in the rush to handle it. The Institute extends its thanks to the A.H.Q. Sigs for providing such an interesting night.

The next meeting will be held as usual on the first Tuesday of the month--January 6th.

3DX..Les Kermond, one of the 200 metre gang is now a member of the technical staff of 3SH.

3XR..Jack Winton is with the Australian Field Regiment abroad.

3YO..Claude Woodward is believed to be a lieutenant with the 2nd Australian Heavy AA, sigs section.

3BH..another of the old 200 metre gang has been transferred to Euroa.

3YK..is still in Malaya. Thanks for the Xmas card Gavin.

3NY..complains that he isn't getting enough work these days.

3BQ..turned up at the meeting T'other night. After viewing one of Max's new Xtal units we're wondering what they're going to cost when we get back on the air.

3RN..had a day or two in bed recently, with sundry doctors calling on him. He hopes the trouble won't be repeated.

-----XXXXX-----

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