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FROM THE EDITOR'S PEN:-

As this present war drags on and on, it is remarkable to find that the value of the 'Amateur" is being more and more appreciated by Commercial interests.

Considering the pre-war attitude of these interests towards the Ham, the more or less complete change about by these interests augers well for the future of Ham Radio.

As Editor of this Magazine it is my duty to peruse all available local and overseas publications dealing with radio, and from time to time one reads in various commercial publications praise for the work the Ham is doing both in the Fighting Forces and in the Commercial sphere.

The most recent 'pat on the back' comes from the Editor of 'Electronics' in an Editorial in the August Issue of that Magazine. The Editorial is headed "AMATEURS" and to quote his remarks:-"

"In spite of the fact that everyone admits the value of the radio amateur in the time of peace or war, disquieting rumours get about that he is to be liquidated.

This seems highly undesirable from every standpoint. As he has demonstrated time and again, the Amateur is an essential element of the radio industry, an essential part of our national life. This is not true, alone, because he pounds brass and can help out in time of distress; nor is it true because he builds radio apparatus, and therefore is an engineer; nor is it true alone because he is a member of the amateur game where he has learned the value of a high spirit de corps. The Amateur is all these -- he knows his equipment, he can build it and maintain it in operation; he has enough theory, and lots of practical experience and knowledge.

Within the past few months, the Editor of Electronics has had his hands full of a high priority job for one of the armed services. Many men have been hired. It is only fair to state, right now, that the best men on his staff are those who have had Amateur experience. This testimony is available anytime, anywhere that it may be useful in keeping the amateur in radio after the war."

.....oOo.....

AMATEUR TEST EQUIPMENT REQUIREMENTS

Charles C. Quin...VK3WQ

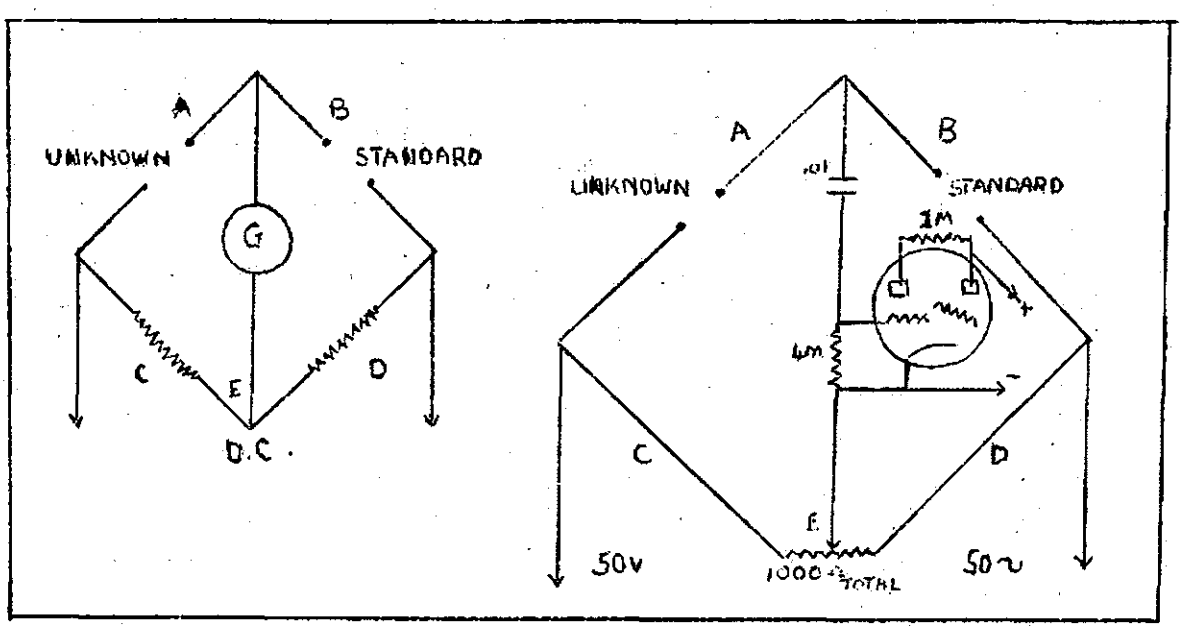
.....

THEORY...The mere mention of theory to a Ham is uaually met with a surprised look--the obvious thing then, is for him to say "What!! Do we have to try and swot up for our licences again??

Perhaps it would be a good thing if we did, because the advances that must have been made in the years we have been off the air, will surely astound us. Not everybody has had the time, nor the opportunity, to keep in touch with the few details which are published regarding some of the known apparatus in use.

However the saying 'An ounce of theory is worth a ton of practice' needs some reflection. We must know what we are doing, and what to expect from the apparatus being used, therefore our next point will be the explanation of the theory of operation of the various pieces of gear so far described.

A.C. Mains OPERATED BRIDGE...First of all it would be as well to consider the basic Wheatstone circuit, then compare it with the circuit we are using.



The basic circuit relies for its operation in that DC applied to junctions AC-BD will divide, and if any difference is resistance (total) appears in either arm a current will be read by the galvanomoter. If both arms are equal, current will equally divide and no potential will be registered by the galvanometer. The ratio arms C. D are normally fixed values and the standard is made variable.

It will then follow that if the standard is made a fixed value, and the ratio arms varied so that the TOTAL resistance AC, equals the total resistance BD, balance can still be obtained.

On referring to skeleton circuit of the AC mains bridge, and comparing it with original this will be followed. In both cases the formula for this can be given as:-

$$\frac{A}{B} = \frac{C}{D}$$

Or, to give an example, we wish to measure a resistance whose value is less than 10,000 ohms. Selecting the 100 ohm standard, E is varied until no AC is indicated by the eye, meaning that AC = BD. Reference to scale shows 10, and 10 multiplied by 100 equals 1000 ohms

Shown as formula above, this point on scale would represent 1/11 of the resistance of E in D arm and 10/11 in C arm. Then -

$$\frac{A}{B} = \frac{C}{D} \quad \text{or} \quad \frac{1000}{100} = \frac{910}{91} \text{ or } \frac{1000}{100} \times \frac{91}{100}$$

that is:- A = 1000 B = 100 = ten times

C = 910 D = 91 = ten times

As stated in the text originally extreme accuracy is not attainable with the AC mains bridge, but if care is taken in the original calibration, this 1000 ohm example should fall at 10 on the scale.

In AC bridges, both resistance and capacity may be measured, whilst comparison of the smaller inductances may be made, both iron and air core.

With a suitable attachment, accurate measurements of iron core inductances may also be made. This latter measurement will allow DC current to flow through the winding.

If the bridge is to be used for the latter applications, it would be as well to read up one of the available text books on this subject. The reason for this mention is that certain complications arise, namely, resistances should be pure resistance (non-reactive or non-inductive) also the frequency of the applied AC naturally affects results.

For the frequency employed in the bridge described namely 50 cycle, condensers and resistors measured can be assumed to be correct for DC considerations. An advantage is that there is no worry about frequency stability, and the influence of stray capacities is much less than at higher frequencies.

A point to watch, is to always carry out the measurements with the lowest range available, that is, greater accuracy will be obtained with C and D most nearly equal.

It is known that, for higher values of resistance and capacity a higher voltage applied, will give greater sensitivity. This is the purpose of the 1000 ohm resistor in series of the AC supply. When little or no current is taken, the voltage drop across this resistor is practically nil, but for higher currents, up to a dead short, it reduces the voltage (progressively) available at the instrument terminals. So that for higher values, the full 50 volts is available and the lower values, which would normally require heavy current, the voltage is reduced and little current taken.

Since provision is made in the measurements for taking into account the reading of POWER FACTOR the following short description is deemed necessary.

In AC engineering the equation $\text{Cos}\theta = \frac{R}{Z}$

Where Cos θ = power factor (current/voltage relationship in terms of lead or lag

R = Resistance

Z = Impedance (resistance) and Reactance (reactive ohms)

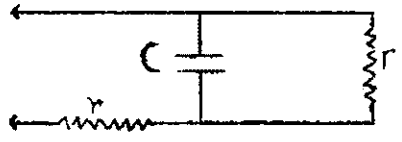
This is known as the power factor of a circuit, and is used to indicate the exact ratio, between any two sinusoidal waves of either current, voltage, or both, relative to each other.

In a pure condenser, that is, one which possesses capacity alone the current will lead the voltage by 90 degrees, therefore power factor is taken as zero. It is assumed that this condenser has no series or parallel resistance (actually no practical condenser has zero power factor.)

If on the other hand, inductive reactance alone is in the circuit the current will lag the voltage by 90 degrees, here again power factor is zero. As all inductances have resistance, again the power factor would be between zero and one, as in capacity.

Whilst with pure resistance in the circuit the current AND voltage are in phase, the ratio is one, and hence power factor is 100% (unity). A good condenser should have nearly zero power factor as should a good choke coil. Resistors for use in AC circuits, should on the other hand, have a power factor of 100%.

As we are considering condensers, we give the following example:-



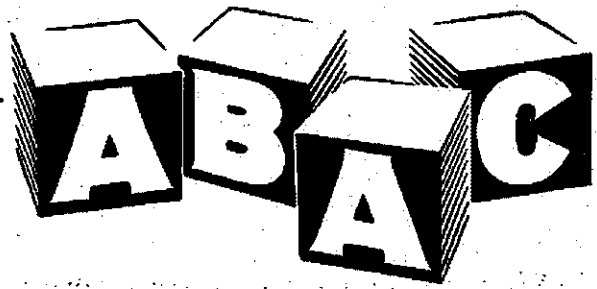
C = Actual capacity

r = Resistance (which can appear in series or parallel with the condenser.

r for instance, may be introduced by bad dielectric material, the condenser is then said to have a power factor between zero and 1 which can be determined from the formula above.

Transformer Problems

ARE AS SIMPLE AS...



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Another formula can be given for Power Factor.

$$\text{Power factor} = \frac{\text{Watts}}{\text{Volt amperes}} \quad \text{or} \quad \frac{\text{True power}}{\text{Apparent power}}$$

here the power factor is equal to the actual power in the circuit (watts) divided by the product of the current and voltage (volt amps)

In terms of a circuit property, it is equal to the resistance divided by the impedence in the circuit shown as:-

$$\text{Power Factor} = \frac{R}{Z}$$

For our considerations, it will be noted, from the circuit in the October Issue, that the simple expedient of introducing a variable resistor, in series with the 1 mfd standard, in order to balance out the resistive component of the poor condenser under test serves the purpose. Measured at 50 cycles, electrolytic condensers usually show a relatively large power factor, which if over 30% would mean their rejection.

Mica Condensers are usually good, but poor bakelite or 'moulded mud' cases will introduce some losses.

Concluding, a true explanation cannot be given of Power Factor without the use of vectors. An article has been promised on this subject and should appear shortly.

OSCILLATOR FREQUENCY STABILITY

The problem os oscillator frequency stability becomes more and more important as the radio spectrum becomes more crowded. Receivers must be capable of separating stations with a high degree of accuracy and must maintain the signal properly tuned for relatively long periods of time. This requires a high order of oscillator frequency stability. The principal factors contributing to oscillator frequency drift can be divided into four parts. These are:-

1. Temperature.
2. Humidity.
3. Operating parameters.
4. Shock and vibration.

Temperature.

The effects of temperature variations are probably of greatest importance since they are present under all operating conditions. those variations can be can be compensated over a small frequency range by the use of a negative temperature coefficient capacitor. This is not the correct approach however, as the drift would undoubtedly be due to several factors and the amount of compensation necessary to accomplish the desired effect would be excessive. Furthermore, compensation would only be correct over a narrow band of frequencies. For best results the drift due to each component should be studied separately.

The circuit layout should be studied first. All leads should be short and direct and proper ventilation should be provided to keep temperatures as uniform as possible.

The temperature of the tube usually stabilizes within the first 15 minutes of operation, while the other components may require an hour or more. It is thus fairly safe to assume that the relatively high drift encountered during the first few minutes of operation is due to the tube. The amount of this drift may be determined by substituting a cold tube for the warm tube when the initial drift has just stabilized and note the degree of frequency change. Once determined, a separate compensating capacitor can be employed which will offset this drift. With the tube drift accounted for and corrected, it is then possible to study the drift due to the other components.

Probably the component responsible for the largest amount of drift is the inductor. Variables to be considered are distributed capacity, expansion of coil form and wire and the Q of the coil. In general the coil form should be of low loss material; for instance, it can be shown that an inductor wound on a phenolic coil form will have more drift than one using a ceramic form.

A coil wound on a high loss factor material will obviously have a relatively high distributed capacitance. This will vary somewhat with temperature and in consequence will affect stability.

Effects due to the expansion of the coil form and also of the wire may be very complex. Theoretically it may be possible to design a coil wherein the expansions of wire and coil form balance to give a zero change of inductance with temperature. Practically, however, it is inadvisable, due to production variations in the materials.

The best approach when designing a coil is to keep dielectric losses to a minimum and to endeavour to reduce physical changes due to temperature effects. Variations due to expansion of the wire must be considered. By consulting a table showing the properties of metals we find that Invar or Nilvar have very low coefficients of expansion. The specific resistance of these metals, however, is quite high compared with silver and copper. Due to skin effects at radio frequencies the current travels only in a small portion of the outside of the wire. This phenomenon can be taken advantage of in the design of temperature - stabilized inductors by plating a metal such as copper or silver on wire which is thermally stable. An inductor wound with this composite wire on a ceramic form will show a change of less than one part per million per degree centigrade.

Oscillator circuits which require a tickler coil may be improved by spacing the tickler coil from the secondary by means of polystyrene tape, or better still, by designing the tickler so that it is located inside the secondary, with as little dielectric material between windings as possible.

Temperature effect on condensers must also be considered. Tuning condensers give negligible trouble, provided good electrical and mechanical design is followed. Negative compensating condensers are of two types; titanium oxide and bimetal - the first type being more popular on account of their compact construction. For variations of up to about 40 degrees centigrade these condensers have proved satisfactory.

Wiring panels, stand-off insulators and insulation on hookup wire have a very definite effect on the frequency stability of a tuned circuit. All high potential (RF) leads should be as short and direct as possible. Insulation should only be employed where it is impossible to support the wiring on ceramic stand-off insulators.

Phenolic insulation should be avoided, particularly in wave band switches, terminal panels and coil form since this

material "ages" over long periods when subjected to high temperatures.

HUMIDITY.

Humidity effects can be considered greater than those due to temperature if good insulation is not employed. Components should be non-porous and possess a surface which does not easily wet. Wax impregnation of component parts is not always the answer to the stability problem. It is necessary to apply a heavy coating without any pin-holes the heavy coating being necessary because most commonly used waxes absorb water to a certain extent under conditions of high humidity. Wax also adds additional dielectric losses to the circuit.

Good humidity protection with a minimum of temperature instability can be obtained by treating the part with a polystyrene base varnish. This adds little extra dielectric loss and allows practically no moisture absorption.

OPERATING PARAMETERS

The stability of an oscillator is largely dependent upon changes in the effective input and output impedances of the tube, the effective Q of the tank circuit, the harmonic content of the generated wave and the oscillator load. Variations in tube impedances are inversely proportional to the effective Q of the tank circuit; therefore a low L/C ratio is desirable.

Harmonics generated by the oscillator cross-modulate with each other and with the fundamentals to produce currents which are not in phase with the fundamental current due to normal operation. The resultant current affects the frequency of operation. Obviously, then, harmonics should be suppressed. Here again a high effective tank Q is desired since the impedance to harmonics will be at a minimum.

SHOCK AND VIBRATION

Shock and vibration can seriously affect frequency stability of an oscillator if the individual components and the complete unit are of poor mechanical design.

The effects of vibration can be minimised by the use of rubber cushionings in the form of shock mounts. For best results these should be placed in the plane of the centre of gravity.

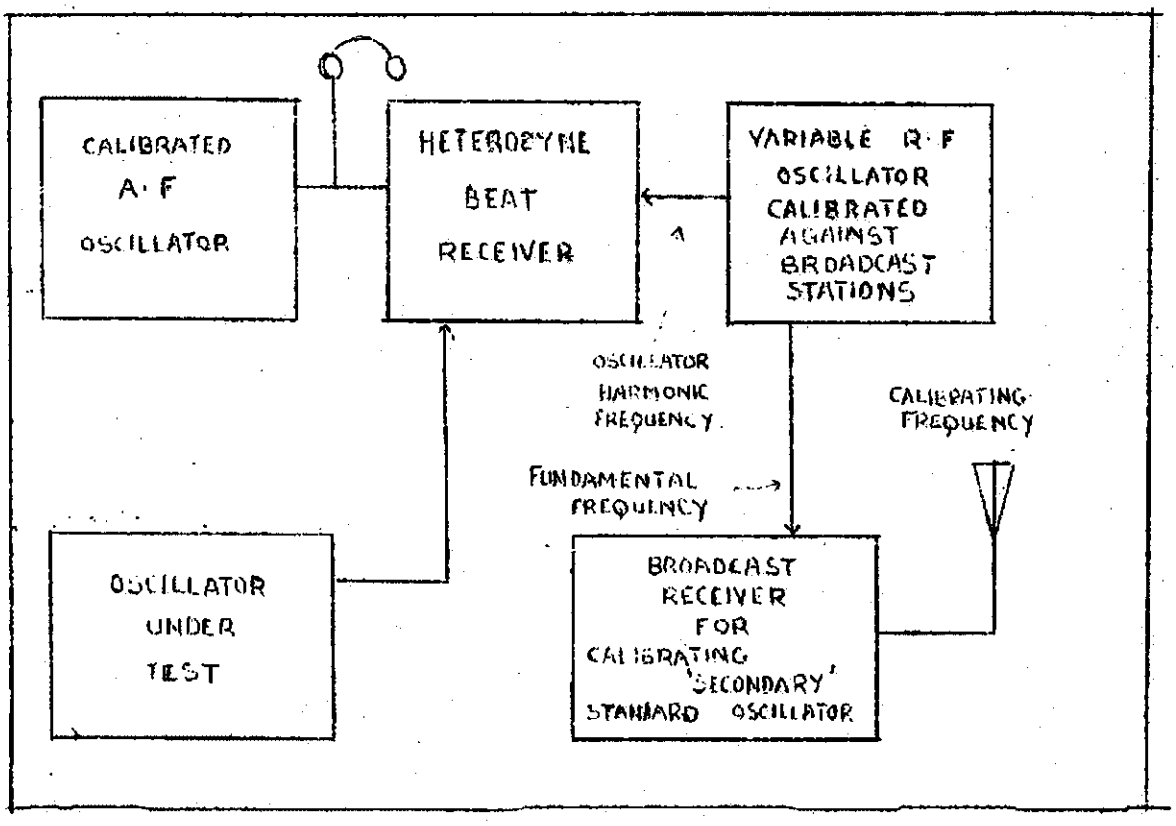
COMPENSATION

After all possible precautions have been taken to increase the frequency stability of an oscillator then, and only then, should the designer resort to methods of compensation. Fortunately, most component parts have a positive temperature coefficient so that a titanium dioxide condonser can be used to correct the variations.

MEASUREMENT OF STABILITY

A method which has proved satisfactory is shown schematically in Fig. 1. An auxiliary oscillator whose frequency has been determined by heterodyning against a broadcast station or other reliable source is coupled to a receiver so that a beat note is obtained between it and the oscillator under test. It is simply a matter of tuning the oscillator under test to zero beat with the secondary standard, and measuring the change in beat note against time by comparison with a calibrated audio oscillator. Checks should be made to ensure that the secondary standard is not drifting in frequency.

(Taken from article in "Radio.")



THE TECHNICAL LIBRARY

ULTRA HIGH FREQUENCY RADIO ENGINEERING...W.L. Emery (New York) 1944
295 pages ... 26/-

The matter of UHF engineering is certainly receiving some attention these days. We have previously reviewed two substantial volumes dealing with UHF very thoroughly and here is yet another; but this time in the lower price range and rather more elementary in scope. This is a book which can be recommended as an introduction to UHF.

Chapter headings, which are indicative of the range of subject matter are as follows:- Introduction, Voltage Regulated Power Supplies, Electronic Switching and Synchronisation, C.R. Tubes and Sweep Circuits, Amplifiers, Square Wave Testing and Transient Response, UHF Circuit Elements, Oscillators, Modulation and Detection, Radiation, and Wave Guides.

The Book is written as a text for use of Electrical Engineering graduates doing the first year of a conversion course in UHF engineering, but is equally useful for self-study purposes. Numerous experiments are described in conjunction with each chapter and the bibliography is extensive. The text is illustrated throughout with clear and informative diagrams.

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U.H.F. TECHNIQUE .. Reprinted from "Electronics" .. 61 pages .. 4/-

Quite a useful magazine size booklet has been compiled by the Editors of 'Electronics' from articles published in that journal during 1942, to provide a sort of general framework of basic knowledge of UHF around which a more complete understanding may be built up by reference to more advanced work.

There are eight articles altogether by various authors, the titles being; Electrical Concepts at Extremely High Frequencies, Radiating systems and Wave Propagation, Generators for UHF Waves, UHF Reception and Receivers; Wide Band Amplifiers; and Frequency Multiplication; Measurements in the UHF Spectrum; Applications of Cathode Ray Tubes; Wave Form Circuits for Cathode Ray Tubes.

Diagrams, which are numerous are in the well known "Electronics" white on black style and are particularly clear and easy to follow.

In commenting on this booklet I cannot do better than to quote from the final paragraphs of the foreword..."the editors of "Electronics" offer their readers this compilation of UHF technique with its three-fold presentation.

(1) In plain simple understandable text, the philosophy of UHF technique is given to outline the nature of the problems at frequencies for which line of sight transmission is of paramount importance.

(2) By means of graphs, tables and equations, the more important quantitative results are given to familiarize the technician with the general magnitude of the quantities involved.....

(3) Finally since UHF cannot be treated thoroughly in a 60 page booklet, a convenient bibliography is included at the end of each section."

All booksreviewed in this page are by courtesy of McGills, Melbourne.

SLOUCH HATS and FORAGE CAPS

Here is 1945 and at the moment the chances of QSO's this year do not look too bright...all the same, to all of you I wish the best of luck for the year and may you all be reading this column in one year's time. To those of you that have sent notes to column, many sincere thanks from all of us..and you can never know just how sincere those thanks have been at times...Hi! To those who haven't sent any notes yet...well, how about a New Year Good Resolution???

At Canberra F.C.T. things proceed along peacefully...those who are there cannot by any means escape to sea from "the ships that will never be sunk," and getting there is even more difficult. Incidentally, I hope you chaps are throwing off the "say Bud etc." and acquiring an Oxford Accent. Hi!

"2ACG ...Telegraphist A. Morris-Rees has nearly completed his fourth year in Canberra (poor.....) and having a spell at some technical work for a change, but expects to be blowing the dust out of the bug again shortly. Whilst on leave recently he contacted 2CX, Fl/Lt Jack Evans, just down after contacting the Japs up North..had an fb ragchew re old times and using captured Jap gear after the war from Ham Radio. In his home town of Cessnock 2ACG saw 2PZ, who, according to 2ACG is keeping the Ham Spirit alive on the coalfields.

Another Canberra habitue is VK4NO Norm Thuge who doesn't say much and is making the most of a monotonous job, whilst just waiting for the day to come when the RI lifts the QRT..and just aren't we all. Slight YL QRM is prevelant with Norm at the moment.

2ANP Ldg. Tel. J. Gore is an ex-Canberra ham now at Darwin and spending his exile studying for his First Class. But at least one knows more or less the time of ones stay in Darwin.

To conclude from 2RY..he wants it mentioned that there are some Hams up at Canberra and they can be contacted at Harman..visitors are more than welcome. (Thanks Ray, om it was good to hear from you..2YC)"

A letter from 30F bears the heading C.P.O. so it looks as if the Chief's Rating did come to the Reserve, after all. I gather that in the Silent Service...a Naval Reservist is of different catagories and the kind of "Amateurchappie" equivalent to the RAAFWR prewar, is thought in some quarters, to be quite hopeless. As Frank has been in the RANVR (hope that's the right initials) for enough years to acquire a long service reserve ribbon...it seems to my "amateur opinion" that his Chief is just about right. To my way of thinking Reservists were of untold help at the beginning of this Scrap, without them the start would have been much worse. Anyway, good on you Frankie...how's the new Miss O'Dwyer faring???

Received a letter from Sgt. W. R. Cross Group 67M RAAF Darwin... Bill was one of the ones the War just pipped for a callsign...but after the War...!! He sends a cutting from Guinea Gold about the first "transmitting Station" set up in New Guinea for the Troops by a Queenslander and a New South Welshman.

P/O Tel Syd Clark, naturally, caught the mail with some dope. I will let him tell it to you himself...

"On Friday a small "ad" appeared in Guinea Gold to the effect that Allied Servicemen interested in Amateur Radio would be welcome at a meeting on Sunday 2 p.m. Charing Cross. Came p p.m. and we had eight men present including R. H. Killy 7RK and Bob Stevens 30J...Pro tem Syd was elected Sec...(gee there will be plenty of letters written and how...2YC) and 30J President...the rest of the elections being held over till things got on the way a bit...The club has been named the N.G. Radio Club and we are seeking affiliation with both the W.I.A. and the IRE, because many members have commercial interests. We heard of some more Hams handy but not present including...5EC, 7HL, 7AL, and 3BC. The next meeting is scheduled for the following Sunday" and I'm sure Syd will have the dope down for the next issue .. 2YC.

And that is a good idea when one comes to think of it...it could be done in many areas...Townsville and Darwin come to mind at once...3RJ mentions 17 Hams in the lattor area and though scattered a central position may be able to be decided upon.

The Old Ray seems quite settled down in Darwin area these days and I suppose is now, following the prevailing idea...counting the time till the Southern leave eventuates. Hi! A nice inscribed wrist watch received from E/area Sigs was a bit of a shock, to 3RJ and so is all the more appreciated. Made all the work put in there the more worthwhile. Well now, how about that Radio Club, Ray, om????

This makes up the double spaced paras. Hi!

Had a note from Ray Carter 2RC who reports himself as still attached to Brisbane Area...no news from him though, alas...talk about the "silent Service"...they aren't in it Hi!

Things have been sort of happening round the Marsland household, both senior and junior. The junior to wit Jim, 3NY is not entitled to a para in these pages, but nevertheless I'd better tell you of the arrival of a Jnr. Op...Congrats Jim. The main news to come out of that home is that Jim's Pal, Cpl. Clem Day RAAF, VK3GY has been down on leave from Darwin where for the past 19 months he has had much time for reflection, the result of which is the announcement of his engagement to NY's sister...Congrats also Clem...All this happening at once is the Marsland family leaves them and also the Ham fraternity, wondering what's going to happen next. Clem 3GY was very well known in pre-war days from his activity on the 200 Mx band.

Another VK3 who has been recently on leave is L/Cpl Jim Watson VK3NQ. Jim is spending his time these days at Bonegilla. We hope to see him at VK3 meetings one of these days.

Looking forward to tons of notes in 1945 from "all those" Radio Clubs...hamfests etc...Happy New Year and Happy Landings....2YC.

35th ANNUAL REPORT - WIRELESS INSTITUTE OF AUSTRALIA

- New South Wales Division -

To be presented at Annual Meeting to be held at Y.M.C.A., Thursday, 18th January, 1945 -

Gentlemen,

It is my privilege to place before you the 35th Annual Report of the Wireless Institute of Australia, New South Wales Division. The year under review has been a most active and progressive one and nothing has occurred to mar our belief that this Division of the Institute is the most active organisation of its kind, in the world today.

Obviously the most important activity has been Civil Defence Radio and it is pleasing to note that despite various Departmental curtailments The Emergency Communication Network is still looked upon as a very important part of that organisation. Fortunately the Network was never called upon to function in an emergency, but it is quite safe to say that if it had been called upon it would have met every demand made upon it. This statement made by the Minister concerned is a striking tribute to the operators concerned, and it is to them alone that all credit is due. The efficient manner in which messages are handled is striking testimony to the enthusiasm displayed during the course of exercises. With the war moving further Northward the need for the E.C.N. is rapidly diminishing, and it is quite possible that the Department of National Emergency Services will be disbanded in the very near future. It is the duty of every operator to ensure that his station will be operating right up to the time that instruction is given. If such is not the case the charge that the Radio was not functioning and was a reason for winding up N.E.S. could be quite reasonably made. If this came about it would be a blot on Amateur Radio and would undo all the good work that has been done.

Two other avenues of Civil Defence were opened up to Amateurs during the year viz. Bushfires Emergency Radio and the Sydney Harbor Patrol.

At the request of the Bushfires Advisory Committee the Institute undertook tomake a Census of operating personnel and equipment that would be available to inaugurate a Bushfires Radio Network to work in conjunction with the Volunteer Bushfire Brigades. Unfortunately Amateurs and equipment did not always coincide with Fire Risk Areas. For instance the largest number of applications were received from the Newcastle and Coalfields district, but unfortunately for the amateurs concerned, this area came under a Fire Brigades District. Again quite a number of Country Amateurs were on Service or had left the country for the city. Despite these setbacks, it was eventually decided to commence operations at Young Dubbo and Wagga.

One of the greatest difficulties that had to be overcome was equipment, but despite this, Young under the capable leadership of J. Taylor VK2TC-ably assisted by A. Thackeray VK2TA and J. Dwyer VK2WA, and Dubbo guided by M. Moore VK2ll will be operating very soon. Unfortunately Wagga Shire Council failed to support the scheme.

The Sydney Harbor Patrol is a yachtsman's organisation, carrying out important Security Patrols on the Harbor and its various inlets, bays etc. It is allied with Maritime Services, Board, National Emergency Services and the Police Department. Recently a very important Patrol was carried out in conjunction with an Allied Nation. Radio played a very important part in this sweep and the Commanding Officer paid a great tribute to the manner in which communications were handled.

The Radio organisation of the two bodies mentioned in previous paragraphs was brought into being as result of the efficient manner in which the E.C.N. functioned and the prophecy is now being borne out that the Emergency Communication Network would be only the forerunner of other similar Nets.

The E.C.N. was the Amateur's wartime organisation whose operations were confined to Sydney and Suburbs. The Bushfires, Radio Scheme will give the Country Amateur his opportunity both now and in peacetime whilst the Sydney Harbor Patrol will continue long after hostilities cease and presents the city amateur with peacetime emergency work.

Federal Headquarters has now been located in New South Wales three years and has endeavored to keep the various States informed on Amateur matters generally. The location of Federal Headquarters has been discussed several times recently, and at the November Meeting the New South Wales Division were informed that the Executive were of the opinion that Experimental Radio in Australia could be best served by having Federal Headquarters located in the State where the office of the Chief Radio Inspector was situated - Victoria. This expression of opinion was prompted by the fact that the day is very rapidly approaching when the question of postwar amateur radio must be discussed with the authorities and there is no better means of doing this than by personal contact. This view was endorsed by this Division and VK3 were asked to act as Headquarters Division. To date no reply has been received. (I have ascertained that this letter arrived at the same time as this report, and will be considered at the next council meeting on the 8th of January...Ed.)

The Official Organ "Amateur Radio " has been well supported during the year although the number of articles submitted by VK2 Amateurs was not as great as in previous years. In recent months the Magazine Committee have been fortunate in securing sufficient advertisements to ensure that the paper can be published at a profit. It is confidently expected that in the very near future that it will be possible to publish "Amateur Radio" in a printed form.

In an endeavor to ascertain the views of Australian Experimenters on the post war era, this Division of the Institute suggested to Federal Headquarters that an essay competition be conducted with this object in view. This suggestion was agreed to, New South Wales providing the prizes in the shape of War Savings Certificates. Prizes were won by J. Ballinger VK3NK, E. Hodgkins VK2EH and P/O Tal. S.Clark. Not many divergent views were expressed. The question of power was expected to raise quite a deal of discussion but with one exception, all entrants agreed - again with one exception - that if the Institute was to progress, it would be necessary to have a permanent staff or at least a paid secretary.

During the year a slight re-shuffle in Office-Bearers took place due to the resignation of the Chairman Mr. R. A. Priddle. As a result Mr. W. G. Ryan VK2TI was elected Chairman and Mr. C. Higgins was appointed Secretary. Various councillors spoke of the work performed by Messrs. Priddle and Ryan whilst occupying the positions of Chairman and Secretary respectively, and a recommendation from Council that Mr. Priddle be elected to Life Membership was unanimously endorsed by the General Meeting.

Relations between the Wireless Branch and the Institute have been of cordial nature and quite a deal of assistance has been rendered by the Senior R.I. Mr. Crawford and his assistants particularly Messrs. Wetherill and Brislan in the preparation of applications for the various Networks. The Institute was also asked to co-operate with the Department by providing Observers for BBC and German Pacific Broadcasts.

In conjunction with the 1944 Annual Election of Officers a ballott was taken with reference to an increase in the annual subscription. During past years many calls had been made upon Institute Funds and although the position was always financial very little could be set aside as a Reserve Fund. The increased subscription now makes it possible to do this, and a small beginning has been made to build up the Divisional assets by the purchase of £20 worth of War Savings Certificates. Before leaving the financial affairs of the Division it would be unjust if I were not to pay a tribute to the excellent manner in which Divisional Funds are fostered by the Treasurer Mr. G. Cole VK2DI. Mr. Cole was a newcomer to the position this year, but he soon settled down and his keenness and enthusiasm augurs well for the future.

General Meetings have been well attended and quite a number of both International and interstate visitors have been entertained. The presence of these visitors has made Meetings most attractive and recently attendances have been such that it was decided to seek larger rooms.

Membership has been well maintained and in order to cope with the anticipated influx in the very near future, Mr. E. Treharne was appointed Membership Secretary.

1944 saw the passing of one of the oldest identities in Radio in New South Wales in the person of Reg Fagan, VK2RJ. 2RJ was always an Institute stalwart, and although due to location, he attended very few meetings in recent years, his interest never waned and no appeal went unanswered. It was decided to perpetuate his memory in the form of a Trophy when circumstances permit.

The Christmas Meeting of the Division took the form of a "Pound Night" supplemented by an exhibition of Moving Pictures organised by Mr. M. Lusby VK2WN, proceeds going to British Centre.

The foregoing, gentlemen, is a brief resume of VK2 activities for 1944. Let us hope that 1945 will see the day very, very close when "73's om" will once more circle the globe.

W. G. Ryan VK2TI
Chairman.

VICTORIAN DIVISION

Two meetings have passed since these notes appeared last and those attending the two meetings were:- 3WQ, 3KC, 3QS, sYQ, 3DH , 3EO 3IK, 3PJ, 3BQ, 3WY, 3XD, 3VX, 3SZ, 3CB, 3YL, 3WE, 3HX, 3JO, 3NY, Messrs. Ridgway, Hanson and Pottage.

A very welcome visitor was Lt. Norm Hannaford one of the foundation members of the Zero Beat Radio Club VK2ZB, Norm had been sendingspending some leave in Melbourne, and made a point of attending the December meeting.

Victorian Members are reminded that at the February Meeting to be held on Tuesday the 6th, Harry Kinnear 3KN will bring along a 16 mm movie outfit complete with sound and will put on a show comprising of many topical subjects and some educational subjects dealing with radio. Harry has offered to put on more of these shows later, and once again an appeal is made to those who may have access to films dealing with radio or associated subjects, to let us know if they could be made available for further shows.

The Laboratory Committee reports that a recent survey of the periodicals in the library has disclosed that many issues of "Amateur Radio;" "QST;" "Wireless World;" "Radio;" and "T & R Bulletin are missing. The Committee considers that the files of those magazines should be made complete, and is anxious to get the copies listed. An appeal is made to members who possess any of these copies and have no further use for them to make them available to the Laboratory Committee for this purpose. We offer 3d per copy for "Amateur Radio" and 1/- per copy for "QST." Copies required are Amateur Radio" May, July, August, September, 1934; April 1935; Two copies each of June and July 1938.

"QST"...1938, May, June, July, September, November, December. 1939...Complete set except April, 1940, 1941, 1942, 1943 and 1944 all copies. Next month we will list the copies wanted of "Wireless World" "Radio" and "T & R. Bulletin." Naturally if anyone has copies they do not require and are prepared to present them to the Institute they will be received with sincere thanks.

All Members of the Division will join in wishing congratulations to our Treasurer Jim Marsland 3NY and his good wife on the arrival of a Jnr. Op. On good authority Jim has already delved into the junk box and rescued his key which has been polished up and adjusted. Furthermore it is understood that he intends to borrow one of the morse oscillators from the Institute on his next visit.

.....

CORRECTION..In the formula on page 3 :- $\frac{91}{100}$ should read $\frac{91}{910}$

THE WIRELESS INSTITUTE OF AUSTRALIA

Divisions of the Wireless Institute of Australia exist in every State of the Commonwealth. The activities of these Divisions are co-ordinated by Federal Headquarters Division, the location of which is determined from time to time by ballot.

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Official Organ : "AMATEUR RADIO"—Published by the Victorian Division.

VICTORIAN DIVISION

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The N.S.W. Division meets on the third Thursday of each month at Y.M.C.A. Buildings, Pitt St., Sydney and an invitation is accorded to all Amateurs to attend. Overseas and Interstate Amateurs who are unable to attend are asked to phone the Secretary at FX3305.

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Published by the Victorian Division

AMATEUR-RADIO

INCORPORATING THE N.S.W. DIVISIONAL BULLETIN

Vol. 13 No. 2 February, 1945.

FROM THE EDITOR'S PEN

Many are the theories and suggestions put forward by Hams as to the possible post-war Amateur activities. Most particular attention has been paid to the question of frequencies.

In a current issue of QST is published a lengthy text of a testimony offered at formal hearings on allocation held by the FCC. Needless to say the testimony was made by officials of the ARRL in the interests of Amateur Radio.

It suggests that the Amateur Bands must be diversified as Amateurs are experimenters and investigators--of roving and divergent and changeing interests, and consequently necessitates the allocation of bands to cover all types of emission from telegraphy and telephony to facsimile, television and pulse transmission. Furthermore it is advisable for allocations to be in harmonic relationship so that Amateurs may have at their disposal frequencies suitable for the various types of emission over various distances, independent of diurnal or seasonal conditions.

Frequencies requested below 60 Megacycles are:-

1,750	to	2,050 Kc	21,000	to	22,000 Kc
3,500	to	4,000 Kc	28,000	"	30,000
7,000	to	7,300	56,000	"	60,000
14,000	to	14,400			

Above 60 Megacycles the ARRI have requested rather an extensive allocation which are:-

			Alternatively		
112	to	116 Mc	144	to	149 Mc
224	"	230	218	"	225
448	"	480	420	"	460
896	"	960	840	"	900
1,792	"	1,920	1,125	"	1,225
3,584	"	3,840	2,500	"	2,700
7,168	"	7,680	5,200	"	5,750
14,336	"	15,360	10,000	"	10,500
28,672	"	30,720	21,000	"	22,000

Rights shared above this figure.

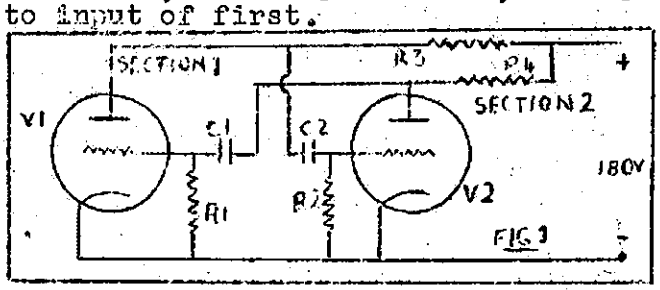
Rights shared above 30,000 Megacycles.

....oOo....

.. Charles C. Quin...VK3WQ ..

MULTIVIBRATOR.

Several ways of describing multivibrator action, have been given in various text books, and the following has been selected. "Consider two triode amplifier circuits - resistance, capacity coupled, - connected, the output of one, to input of the second, output of this to input of first.



In this circuit, only one tube is conducting at a time, the other being biassed beyond cut-off.

For example, if V1 is conducting, the coupling capacitor C2 has a charge such that the grid of V2 is highly negative. This charge leaks off through R2, until the grid voltage of V2 is high enough that V2 begins to draw plate current.

Now, during the time that C2 is discharging, C1 has been charging through R4, so that when V2 begins to conduct, the grid of V1 is driven highly negative, causing an abrupt transfer of plate current from V1 to V2. The coupling capacitor C1, now begins to discharge through R1, until such time that V1 begins to conduct, and the plate current is transferred from V2 back to V1 again.

Oscillations are then set up, the frequency of which depends principally on the values R1, R2, C1, and C2. If R1 and R2 are equal in value, the C1 and C2 are equal in value, each tube will conduct half the time, and a symmetrical square wave will result. The higher the values of R1, R2, C1 and C2, the lower will be the frequency of oscillation.

The sum of the non-conducting times of V1 and V2 is one period of the multivibrator frequency."

As with all theoretical explanations, errors are found in practical operation. For instance, it has been shown that, through slight differences in tube construction, and slightly incorrect values of circuit constants, the actual wave shape, and frequency of oscillation, will vary from that which is calculated. Of course this is only true when accuracy within a few cycles is required.

An instance given in another text book shows that for tests taken with nine different tubes of various manufacture, in an oscillator designed for these tubes to operate at 1,000 c.p.s., the frequency varied from 1041 to 1211 c.p.s. at a fixed plate voltage of 180 volts to a 6SN7 gt.

Also the actual plate resistance of the tubes used, somewhat lower than that obtained from static characteristics given in tube data books.

To design a multivibrator to operate at a natural frequency of 1000 c.p.s. the output of which must be symmetrical, then R1, R2, and C1, C2, must have equal values.

The tube to be used is a 6SN7 GT and plate supply voltage is 180 volts. (A 6SN7 is actually two type 6J5 in the one envelope.) Since it is symmetrical, Time constants of Section 1 and 2 are equal. This is shown as $= \frac{\text{TIME CONSTANT}}{2}$ that is, each triode contributes half the total period. Then choose R3 and R4 as 20,000 ohms.

To calculate the time during which V1 is non-conducting, and hence V2, we give the following for calculation of C1 and C2.

$$C2 = \frac{T_2}{5\left(R4 + \frac{R1 \times Rg1}{R1 + Rg1}\right)}$$

Where T_2 = Non-conducting time of V2
Rg1 = Grid cathode resistance of tube.
R1 = Grid resistor V1.
R4 = Plate resistor V2.

Then $\frac{1}{2 \times 10^3 \times 5\,(20 \times 10^3 + 1.5 \times 10^3)}$ this can be worked out to give 0.00465 ufd, and to take the nearest value in practice 0.0005 ufd.

A graph is now given for T, and T_2 - a point is chosen from here (x) since we are using 20,000 ohms for R3 and R4.

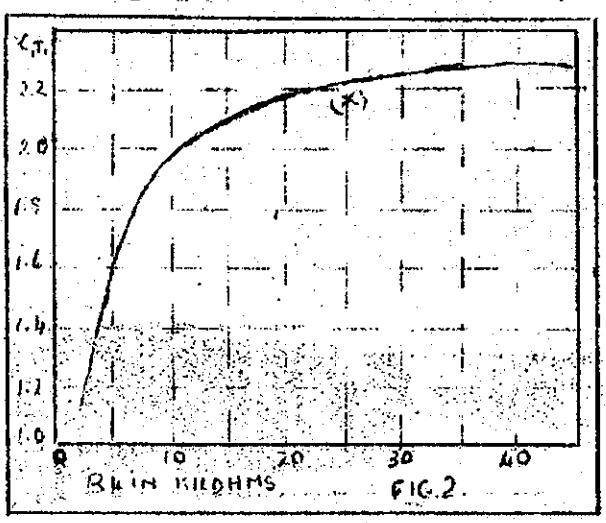


FIG. 2.

$$\text{Then } C1T_1 = C2\left(R1 + \frac{Rb2 \times R4}{Rb2 + R4}\right) \frac{T_1}{}$$

$$= 2.16$$

Where Rb2 = D.C. plate resistance of V2.

$$\text{Then } R1 + \frac{Rb2 \times R4}{Rb2 + R4} = \frac{T_1}{2.16 \times C2}$$

$$= \frac{1}{2 \times 10^3 \times 2.16 \times 5 \times 10^{-10}}$$

$$= 4.63 \times 10^5$$

The value of Rb2 for R4 = 20,000 ohms is read from the average D.C. plate resistance curve as 8.4×10^3 ohms, see Figure 3.

Therefore R1 = $463 \times 10^3 - 6 \times 10^3 = 457{,}000$ ohms.

If it is desired to adjust the frequency accurately to 1,000 cps a .25 resistor in series with a .5 potentiometer can be used at each R1 and R2. This will permit adjusting for symmetrical wave

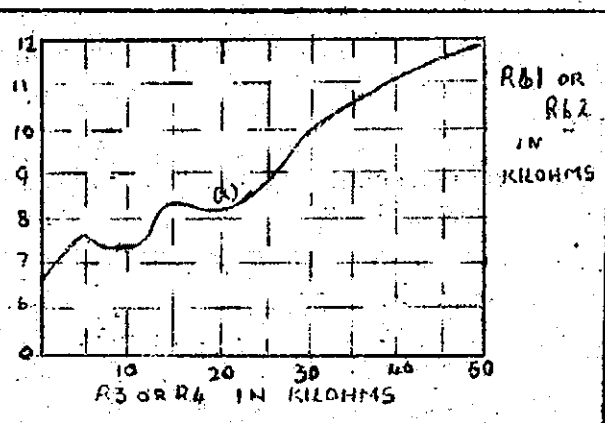


FIG 3

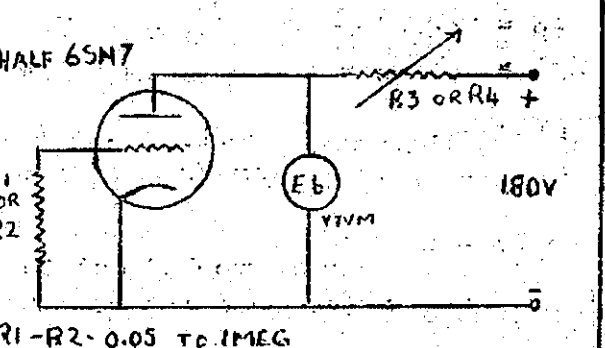


FIG 4

shape and correct frequency for different tubes.

Note that in this last example, Rb is practically independant of R1 for values of R1 in the range given,

$$Rb = \frac{Eb}{Ib}$$

where Eb = plate voltage.
Ib = plate current.

In all calculations, plate supply voltage must be assumed to be correctly held at 180 volts in practice, or the frequency will change.

For example, if the resultant frequency is 998 cps at 180 volts it could be 1022 cps for 150 volts, or on the other hand 985 cps at 210 volts, so naturally a stabilised supply is essential where maintenance of frequency is desired.

So far we have discussed only a symmetrical multivibrator which is not synchronised.

If a synchronised one is required, additional design formulae and many graphs covering phase difference etc., would be necessary, and, as seen from the foregoing, quite an amount of space would be taken up. We feel therefore that it is beyond the scope of this present series to embark on such an undertaking.

Suffice it to say then, that this synchronising voltage can be applied in the grid, plate, or cathode circuit of either, or both tubes, or in any combination of these places. It can also be any multiple of the natural frequency.

When considering this aspect, it should be kept in mind that the natural period of the multivibrator must be longer than its controlled period. If such is the case, then some variation of the circuit constants, and tube characteristics is allowable. A synchronising voltage of negative polarity is used which then prevents the tube from conducting at the time determined by the natural period of the circuit. The multivibrator is not permitted to trip until the end of the synchronising pulse.

It is possible to employ a natural period which is shorter than the desired controlled period. In this case a synchronising voltage

of suitable polarity (positive as referred to the grid of the tube to be synchronised) and of sufficient time duration, must be supplied to the circuit to prevent the multivibrator tripping at the time determined by its natural frequency, and the multivibrator trips on the front edge of the synchronising pulse.

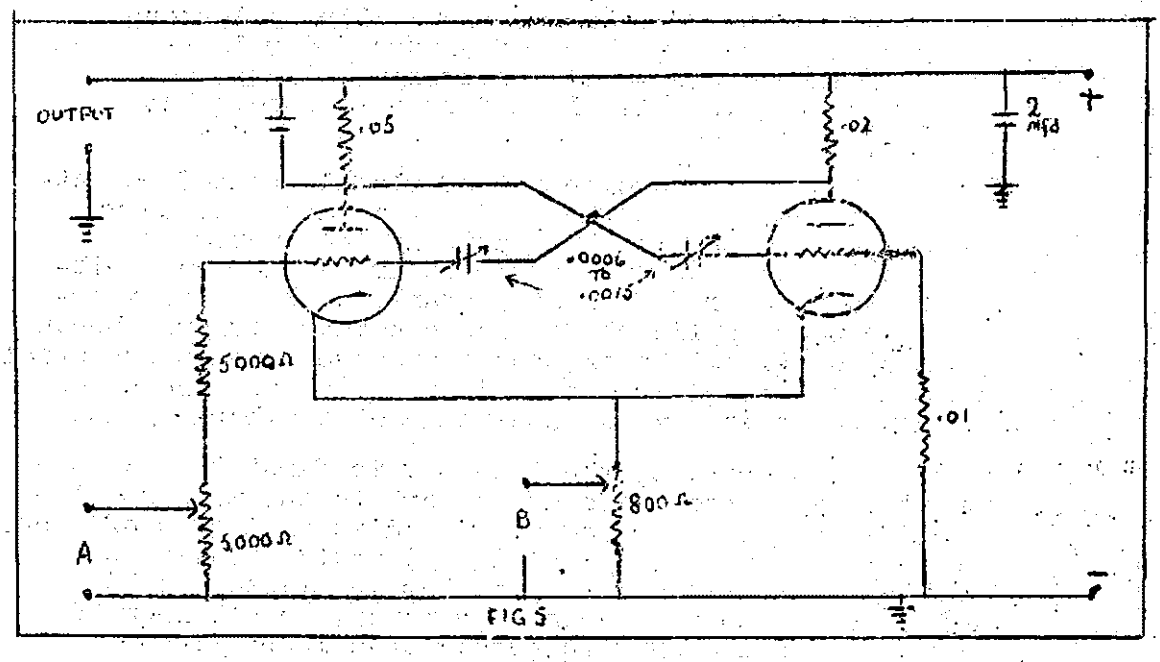


FIG 5

With synchronising applied at A, the vibrator will work equally well on odd or even harmonics.

If plate resistors are made to each be 30,000 ohms and synchronising voltage applied at B, preference will be shown by the vibrator to even harmonics.

Here the natural period of the multivibrator is 10 K/cs and assuming the applied synchronising frequency is 100 K/cs, the controlled period would represent 10 K/c intervals throughout the operating range, with a precision equal to that of the 100 k/c signal.

By varying A (5000 ohm potentiometer) a point will be found where an odd harmonic, that is, 8 or 10 beats, will be heard between two 100 K/c marker points on a receiver dial. This will indicate 11 and 9 K/c separation, whilst another point will be found where 9 beats occur, that is, 10 K/c separation.

If it is intended to design and operate a synchronised multivibrator you are referred to the bibliography at the end of this series before any ground work is done.

.....

AUTOMATIC RADIO RELAYING

The successful operation of a long-distance line telephone system depends upon the use of numbers of unattended relays (repeaters), yet the idea of automatic relaying stations in a radio communication system is still looked upon as a somewhat daring innovation.

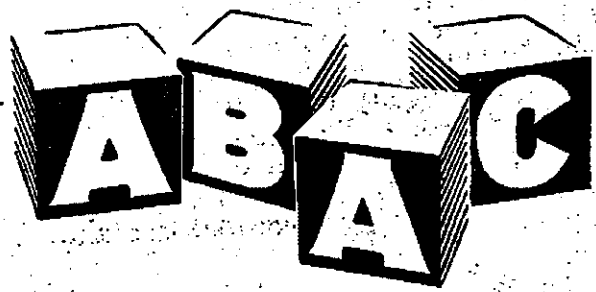
One reason for the early development of closely spaced repeaters on line telephone systems was the need for an approximately constant level of speech power at all points in the system, so that there was no need for adjustments in the individual subscriber's apparatus for calls over different distances. This consideration has not so far been applicable to radio communications, because the greater inherent difficulties of operation have made it essential to retain human supervision of the communication channel and have caused terminal equipment to have a wide range of available gain.

In radio working, therefore, the tendency is first to make the receiver as sensitive as possible so as to work to the maximum distance from a transmitter of given power. An additional gain of 6 db. in the receiver (2 : 1 in voltage sensitivity) would ideally be equivalent to doubling the field-strength, but the latter would involve a four-fold increase in transmitter power; e.g., from 25 kw to 100 kW, which would be far more costly than increasing receiver sensitivity.

But a limit to useful receiver sensitivity is reached when it can handle a signal which is right down to the noise level; this level is set by different factors at different radio frequencies. Atmospherics and interference from electrical machinery are dominant at the lower frequencies and the inherent noise level of the receiver at the high radio frequencies. Here we have a fundamental problem of communication systems, which in line working is solved by the use of repeaters but in radio working has usually been solved only by an increase of transmitter power and directivity. The difference in tactics arises from a fundamental difference between the two systems; in a loss-free telephone wire the signal strength would not decrease with distance, but a radio signal in loss-free space would still show a decrease of amplitude with distance due to the spreading of the energy over a greater volume as the radius from transmitter to wave-front increases. If one installed a relay station with non-directional aerial half-way between a transmitter and receiver, most of the energy from the relay station would not go in the direction of the receiver, but in all other directions, including back to the transmitter. Of course one would use "beam" aerials if the wavelength were short enough, but there would still be a considerable spread of energy. On world-wide short-wave systems, another problem is to know where to put

Transformer Problems

ARE AS SIMPLE AS ...



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the relay station, since the signal may go one way or the other round the world according to which side is in darkness.

Since it has become possible to build high-power transmitters which would normally send signals to the far side of the world, there has not been much encouragement to build a chain of several stations, each of fairly high power, to do the same job; the occasions when long-distance communication was prevented by specially unfavourable propagation conditions were regarded as unavoidable natural events. Continued study of the ionosphere has brought a much greater understanding of such phenomena, and a more hopeful attitude.

An entirely different set of conditions holds when we come to decimetre and centimetre wave-lengths. In the first place, their propagation is approximately optical, so that communication appreciably beyond the horizon (as seen from the top of the transmitting aerial) can only be secured by the use of relay systems; and the expense of increasing the range of a station on such wave-lengths is not that of increasing the power but of increasing the height of the aerial mast or tower. Secondly, the directivity of aerials is so much greater that the system can be made to behave as a series of well-defined channels between transmitters and receivers, almost like a wire communication system. Finally, the amount of fading experienced is small (provided there are no large objects moving in the vicinity), so that there is little need for variations in receiver gain; this also resembles land-line conditions.

One of the difficulties of all radio relaying systems is to prevent feed-back between transmitter and receiver at the relay station, since this would cause oscillation. On the longer wave-lengths the only solution is to use separate frequencies for transmission and reception, i.e., the signal changes its carrier frequency in passing through the relay station. For VHF working it has been suggested that the feed-back between transmitting and receiving aerials could be neutralised, but usually a change of frequency will be the safer plan.

There is therefore a good case for long-distance VHF communication systems based on highly directional aerials and automatic relaying stations at appropriate intervals. It is certainly a branch of radio which, in its various applications, should have an important future.

From an article in "Wireless World."

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CRYSTAL PICKUPS

The use of Rochelle salts as a piezo-electric unit is handicapped by the fact that the crystal tends to absorb or lose water under varying climatic conditions. At a temperature of 20 degrees Centigrade its water of crystallization is in equilibrium in air, having a relative humidity of 40 per cent. If the air is drier, the crystal tends to lose water and vice versa. In both cases its operation is adversely affected.

It is not easy to mount the crystal in an hermetically closed casing and at the same time, transmit the vibrations of the needle through the sealing. On the other hand, the use of a rigid damp-proof coating such as wax is found to cause excessive damping of the unit.

Such objections, do not however, apply to the use of certain semi-fluid mediums. Preferably the crystal is mounted in a casing filled with lanolin, which emulsifies any moisture that may percolate inside it, and by enclosing each globule in a coating of fat prevents the water from making intimate contact with the crystal.

.....

THE TECHNICAL LIBRARY

RADIO RECEIVERS AND TRANSMITTERS ... S. W. Amos & F. W. Kellaway.. (Lond. 1944) 281 pages .... 35/-.

The authors of this book point out in the introduction that they have endeavoured to produce a text book which will bridge the

gap between practical radio and the corresponding mathematical angle. They have therefore assumed that the reader has already acquired a good knowledge of radio practice (at about AOCP standard by the way) and a working knowledge of Algebra, Trigonometry and Calculus. This book shows how the two pic up.

The contents are set out under the following headings:- Introduction (a broad outline of the scope of the book) Inductance, Capacitance, Resonant Circuits, Propogation of Radio, Waves and Aerials for Transmition and Reception; Valves, AF Amplification and Detection. The Output Stage, The Loudspeaker, and Negative Feedback; RF Amplification, Straight Receivers and IF Amplification; Oscillators, Superhet. Receivers for AM,EM and Television; Transmitters for Telegraphy AM and FM Broadcasts and Television.

The following Appendices are also given to assist in understanding the Maths; Simple Harmonic Motion, Fourier Analysis, Work done during Hysteresis Cycle, Analysis of tone control circuits; Note on Dimensions, and solutions to three common differential equations. There are plenty of diagrams throughout the book, also eight photo plates.

This is a worthwhile addition to the library of the Ham who has a reasonable mathematical knowledge and would like to know how to apply it to radio.

....oOo....

THEORY AND DESIGN OF VALVE OSCILLATORS....H.A. Thomas..(Lond. 1944) 270 pages 35/-

For the oscillator specialist, this one, covering as it does the operation, characteristics and design of just about every known type of valve oscillator.

Contents are set out as follows:- Fundamental principles of Self Oscillation in valve maintained systems. Types of Oscillators and Conditions for maintaining oscillations, Amplitude and Wave Form of Oscillatory current and Efficiency of Oscillations, Frequency of Oscillation and its Dependence on the Maintaining System; Frequency Drift of Oscillators, Frequency Changes due to effects of Temperature on Inductance Coils, Ditto on Condensers, Frequency Stabilisation of Maintaining System, The Stabilisation of Inductance Ditto Capacitance, Frequency Stabilisation by Automatic Monitoring.

Despite Mr. Thomas' long windedness in the choice of Chapter headings he really does a fine job on the text. This a book which has been very thoroughly thought out and written, and if you are really interested in oscillators is well worth having.

All books reviewed in this page are by courtesy Mc.Gills, Melbourne.

SLOUCH HATS and FORAGE CAPS.

There is nothing like a bit of "fellow feeling"....I had an Air Letter from Jack Clarricoats G6CL and he says "Khaki & Blue" is "getting hard to fill"...so Our Column isn't the only one that has worries..."Wingeing, Jack, om, is the remedy they tell me, but, om, believe me...lay it on pretty thick." Hi!

The New Guinea Radio Club held its second Meeting just before Christmas, 3OJ, 4FW, 3WJ, 2ALD and sec Op of 2MZ, plus S/Sgt Barney Watson, Dick Bridgman, Sgt Allen Reid, Sign. Bob Sutherland, J.Donne, R. Callow, J. Rojers...and a bloke named Clark...Syd, or Petty Officer Telegraphist, or better still Hon. Sec. of above. 2ALD gave the lecture and all enjoyed themselves...as Syd put it..."the meeting closed at ten to seven...and the talk went on for hours!!!!" Syd is still trying to contact 7HL, 7AL, 5BC, 5YQ known to be in the area...but now they have free time on WVTH so the N.G.R.C. is there to stay. An offer of help and congratulation was received from the Vic. Division of the WIA. The next meeting of the Club was to be held on Xmas Eve...but perhaps they won't be able to even write the minutes on a date such as that. Hi!

I sometimes think our circulation is "whatever it is multiplied, but a number over three" as our Mag. and Your column gets around and is read by many others besides the chappie who receives it in his mail. This time the thought is prompted by a letter 3NY has received from Sgt. G. M. Hull, 3ZS Group 838 R.A.A.F. Pacific. It says... "You may wonder at my sudden awakening? Well, I have W/O Johnson (VK3YF) right in the same tent with me here and he received two issues of Amateur Radio two days ago which I read from back to front with very great interest indeed. He wishes to be remembered to any of the VK's down there who know him.

One morning recently we had quite a meeting of the boys for morning tea...er correction there, it was coffee. Gordon Williamson from Rainbow 3GW popped in unannounced and was right welcome. It goes without saying that the three of us took the conversation round to post-war "Hamdom." Len Johnson and I also ran into Dick Giddings 3DG back at Noemfoor Island a few months ago. As a matter of fact I have run into quite a number of the boys in my travels through the pacific War area, sometimes having gone into signal units in the hope of meeting some of the boys I knew back south.

During my first twelve months in the tropics I as op., on an RAAF motor auxiliary vessel which, as well as being highly interesting and exciting at times, served to keep the old fist in practice. I was originally an air operator, though saw no action in that category. Always on the lookout for American W's I once found W7FTF tucked away in his FB radio shack aboard a Liberty Ship. Boy, they sure have beautiful equipment...enough to make any ham's mouth water with envy." ...if I put all his interesting letter in the two pages would be full...thanks om (2YC).

Sgt. H.D. Ackling better known as Dx hound 2PX was in Sydney over Xmas and sends seasons greeting to all his old friends. His QRA is

Aust., Spec. Wireless Group...Australia (Hi)...Better contact some of those Hams in your area, om.

Sgt. Clarry Castles 5KL somewhere north of Capricorn is getting near the time where one counts the days to when ones leave South "should" be due...plans to spend a few days in Sydney this time. Hopes to meet all the gang again, and get some of the dust out of his throat...Have to water here, Clarrie...still you never know, Hi!

An air letter from W/O Manwaring A.L. once VK2AJK gives his service address S6D of Sigs AHQ Melbourne...and says he is on a "romantic coral island" though how rain and mud and war can be "romantic" is quite beyond 2AJK's comprehension...however, as he is always on the move he has hopes of a less primative QRA "next time." Hi! Sends his 73s to all the gang.

Did you know LTO Reg Morgan 2ABM has already ridden Hitler to Berlin...the former was a horse and the latter a town in S.W. Africa ...now don't blame ME...(2YC).

Major Don B. Knock 2NC sends quite a bit of dope..."Sqdn/Ldr. Arthur Walz is now at Townsville, in charge of quite a big area and a big job of work. Since he took over his new unit Arthur has run into the following Hams. At 4AW National Station 4RB and 4FE...our old friend 4RF in the Navy and in the RAAF where all the Hams seem to be...4KO, 2LZ, 9XX/2XX, 6FH, 3BV, 5UL, 5GS, 2LD, 2TQ, 2AFG, 6KN, 3UC, 3DP, 3YN/GYN, 4VT/2AIT, 3WM, 3VN, 5ZX, 30L, and C26A...whatever that last means...(2YC).

As Arthur says this is not a bad score...but as Don adds 4AW is a dyed in the wool Ham. It wouldn't matter if he were a Marshal of the Air Force, he would be quizzing round to see what Hams he could dig out...yes, Don, I too reckon this is the diff. between the real Brotherhood of the Ham ...and the "other thing"...2YC. Hope you enjoy your leave Don, om. and thanks for the notes.

The old 2LZeo dropped into 2YC's the other morning and for once I managed to get a bit of quiet to talk to him in...his last two visits were a fiasco. He looks pretty fit and seems to think what Don says of Arthur fits, fb. Con is thinking of trying to make an astronomical telescope to see how the stars look.

A note from our Canberra Correspondent says I'd better fag up FM...(he thinks I know everything else, apparently, Hi, 2YC) and says that 5GL Clem Tilbrook a Flight Loot in the R.A.A.F. has now set up shop at HQ in VIM, after spending some time in Townsville.

Many thanks om's for the Xmas Cards, etc., which were like 3RJ's watch - a bolt from the blue. I've answered the first one. (Hi!) and will catch up on the others. Besides we have made a good start for 1945 so I hope it will keep up, and all those "free readers" (hi!) of Amateur Radio will be able to find out just where their most frequently worked VK has wandered to. I'm sure you all know by now that the address is 78 Maloney St., Eastlakes and the 'phone number MU1092.

DIVISIONAL NOTES

.. Federal Headquarters ..

During the past years it is quite safe to say that the most discussed subject wherever Amateurs have met has been, "I wonder what the frequencies will be after the war?" Over the past months members of the A.R.R.L., together with other representatives of organisations dealing with all aspects of Radio have been discussing this all important question with the F.C.C. in Washington.

As a result of these deliberations the F.C.C. will recommend at the next International Communications Conference the allocation of the following frequencies for Amateur use:-

3500-3900	kcs.	218-225	mcs
7000-7400	"	420-460	"
14000-14400	"	1125-1225	"
21000-22000	"	2500-2700	"
28000-30000	"	5200-5750	"
144-149	mcs	10000-10500	"

From the above it will be seen that the 160 metre and 56 mc bands have disappeared whilst a new band 21-22 mc band has appeared. It is quite safe to say that there will be few regrets at the loss of 160. The only time it was ever used to the writers knowledge was during the All Band Contest and in later years, at the request of the VK4 Division, a 160 Metre Band Contest was staged in an endeavor to stimulate interest. Even this failed to attract very many entrants.

The loss of the 56 mc band will be deplored by quite a number of enthusiasts, but with Television and Frequency Modulation looming large on the commercial horizon, 5 metres seemed doomed almost prior to the outbreak of war.

The new band 21-22 mcs offers distinct possibilities and should compensate for the loss of the other bands. The suggested allocation of 7000-7400 kcs leads one to the belief that this band will be strongly sought after by commercial interests at the International Convention and in asking for a lot it is anticipated that at least something will be obtained.

At this stage it must not be taken for granted that the above recommendations will be granted as set out above. They have to go before the International Convention, but as this post war convention will be made up - more or less - of representatives of the United Nations and they will be sponsored by America - there is every reason to regard them in an optimistic light. One thing stands clear. There will be Amateur Radio after the war!

NEW SOUTH WALES DIVISION

The Christmas Meeting of the Division took the form of a Picture and Pound Night in aid of British Centre and was very well attended.

The Chairman in declaring the Meeting open extended a welcome to the large number of visitors present and welcomed home L.R.O. Reg Morgan VK2ABM who had just returned from three years service with the Navy. The movies were provided by Mr. M. Lusby VK2WN, B. Sc.B.E. who had just returned after several years abroad helping to destroy German Bombers before they knew it! Catering was in the hands of Mr. Russ Miller and to say that it was carried out in Russ' usual inimitable manner speaks volumes. Thanks a lot Russ. The success of the evening was due entirely to you and Morrie.

The sum of £3-3-0 was realised and this amount together with a subscription of £2/2/- from Institute making a total of £5/5/- was handed over to British Centre.

The 35th Annual General Meeting of the Division was held at Y.M.C.A. Buildings on Thursday 18th January. In moving the adoption of the Annual Report the Chairman said that he felt that any organisation affected by the war in the manner that the Institute was, could be more than proud of the splendid record of activity of the past year.

....oOo....

BUSHFIRES RADIO NETWORK

Call signs have now been allotted to the two towns at present participating and they are as follows:-

Dubbo	VL2EA, EB, EC and ED
Young	VL2EE, EF, EG and EH

It is unfortunate that the non-delivery of crystals is holding up the operation of these stations. Sets have been completed but cannot be air tested through the lack of frequency control.

Unfortunately Wagga will not be participating for some time. The local Council felt that due to the present state of the Country, Wagga and District was burnt out last year and with the drought there is now very little to burn, there is no need for Radio. How many times in the past has such short sighted policy brought disaster to a community. Bad luck chaps, but never say die! Your turn will come.

...

WIRELESS INSTITUTE OF AUSTRALIA

– New South Wales Division –

Statement of Income and Expenditure for the year ending 31st. December 1944.

INCOME				EXPENDITURE			
To Balance 31/12/43	£3	4	4	By Rent	£6	10	.
Subscriptions	105	13	.	Postage	7	15	.
Book Sales	3	3	.	Printing & Stationery	20	18	11
Exchange		2	.	"Amateur Radio"	40	8	6
Refund N.E.S. Expenses	9	12	6	Donations-British Centre	5	5	.
Advance Bushfires Scheme	10	.	.	A.C.F.	2	12	.
Donations A.C.F.	3	3	6	Prizes - Essay Competition	2	8	.
" British Centre	3	3	.	Box 1734	1	1	.
				War Savings Certificates	16	.	.
				Bank Fees	1	7	6
				Sundry Expenses	4	12	8
				Expenditure N.E.S.	9	12	6
				Q.S.T.	3	16	.
				Bank Balance 31/12/44	15	15	3
	£138	1	4		£138	1	4

BALANCE SHEET as at 31/12/44

LIABILITIES				ASSETS			
M. Moore (Bushfires Advance)	10	.	.	BANK OF NEW SOUTH WALES	£15	15	3
ACCUMULATION ACCOUNT	21	15	3	WAR SAVINGS CERTIFICATES	16	.	.
	£31	15	3		£31	15	3

Having audited the Books and Vouchers of the Wireless Institute of Australia (N.S.W Division), I hereby certify that the above Balance Sheet is in accordance therewith.

N. Brooks, F.C.A. (AUST).

EMERGENCY COMMUNICATION NETWORK

From the Press you will have doubtless noted that National Emergency Services have been under review by the Defence Committee. No little consideration has been given to the question of Civil Defence and in view of the improved war situation it was quite logical to expect that some curtailment would take place.

The main features of the decisions reached were:- "A post war Civil Defence organisation is to be maintained in Australia. The requirements in this direction are at present being examined.

While a reserve basis is now to be adopted, the arrangements made are to provide for remobilisation (with refresher training) within one month, and for the maintenance of volunteer training staffs for this purpose."

Upon receipt of this information the Department of National Emergency Services was contacted and a conference held to determine the position of the Emergency Communication Network. After hearing the views of the Department the following scheme was suggested and agreed to.

Network Stations would practice once a month only, and these exercises would take place on the first Friday in each month. District Ambulance Controls would not function, and it will be necessary for the operators to originate their own messages. Only 08 Messages would be transmitted. Exercises will commence at 8 p.m. and eight messages will be handled by each station, viz., four inwards and four outwards. Central will act as Controlling Station, that is to say, you will be asked if you have any traffic. Signal reports will be exchanged between 7.45 p.m. and 7.55 p.m. and you may use Radio to inform Control that your station is manned. It may be difficult to use a telephone due to the D.A.C. not being in operation.

It is anticipated that ships attached to the Sydney Harbor Patrol will be participating with Network Stations in these Exercises, and it is confidently expected that a high standard of operating will be the order of the day, hence every E.C.N. operator should be on his toes.

Remember it is essential that each Network Station be manned not later than 7.55 pm. You will realise that with the probability of nine stations being in operation, any delay at the start will cause complications.

.....

VICTORIAN DIVISION

Victorian Members and Hams throughout the Commonwealth will be pleased to hear that the Victorian Division has at last been successful, in conjunction with the Forests Commission, of establishing the start of what is hoped to be a really worth while Radio

Emergency Network. Although the news has not yet been conveyed in writing, it is known on good authority that the P.M.G. have issued licences for a base transmitter, and a mobile outfit to be located at Heywood. The call signs respectively are VL3DY and VL3DZ.

At present the Hams responsible for the gear are George Wells VK3GW and Mort Riley VK3TN, but it is hoped that their ranks will be augmented as time goes on. Unfortunately at the moment other districts have not yet been finalised and Hams concerned should not despair, as the information they supplied is being carefully considered. It is hoped that eventually a chain of stations operated by Hams will spring into being.

According to ye Editor's calculations, many city members will or should receive this magazine sometime on Tuesday next, and providing they read these notes on that day, they will discover that, if they are not already aware, there is a meeting tonight, February 6th. Harry Kinnear VK3KN has promised to bring along his sound projector and put on a show, this you should know from previous publicity, so come along and show your appreciation.

It is hoped that at this meeting a visitor in the person of VU2EB will be present. VU2EB is a member of the English Army who is at present stationed in Melbourne.

At the January Council meeting a letter was received from the New South Wales Division, which stated that as Federal Headquarters has been in that Division for some years, and as the time was rapidly approaching when it would be necessary for FHQ to be in the State in which the Central Administration of the PMG Department was situated and in consequence would the Victorian Division be prepared to assume office immediately.

In order that FHQ should continue to function without a break during the transfer Council appointed Federal Executive at that meeting. Federal President is Mr. R. Marriott VK3SI; Secretary Mr. A. H. Clyne VK3VX; Treasurer, Mr. T. D. Hogan VK3HX and Messrs. A.R. Williams VK3WE and C. C. Quin VK3WQ Councillors.

The Laboratory Committee are proving to be a very live body of this Division, and report that in response to the recent request for back issues of "QST and Amateur Radio" they wish to acknowledge with thanks an offer by VK3ON, perhaps better known to many Hams as 7CH, who has generously offered several copies of QST. A revised list of copies still wanted will be published at a later date, but in the meanwhile they would still appreciate any further offers. The promised list of "Radio" and "Wireless World" needed to complete the files is also held over as several copies have been returned necessitating a revisal of the list. (The remainder of their report will also have to be held over...Ed.)

In conclusion just a reminder of the March Meeting which will be held as usual at the Rooms on Tuesday March 6th at 8 p.m.

.....

THE WIRELESS INSTITUTE OF AUSTRALIA

Divisions of the Wireless Institute of Australia exist in every State of the Commonwealth. The activities of these Divisions are co-ordinated by Federal Headquarters Division, the location of which is determined from time to time by ballot.

Present location of F.H.Q. :— New South Wales

Federal President : F. P. DICKSON, VK2AFB.

Vice-President : H. F. PETERSON, VK2HP. **Federal Secretary :** W. G. RYAN, VK2TI.

Councillors : C. FRYAR, VK2NP ; W. J. McELREA, VK2UV

Official Organ : "AMATEUR RADIO"—Published by the Victorian Division.

VICTORIAN DIVISION

191 QUEEN ST., MELBOURNE

Postal Address : Box 2611W, G.P.O.

President : H. N. STEVENS, VK3JO
Secretary : R. A. C. ANDERSON, VK3WY
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First Tuesday in each month at W.I.A. Rooms, 191 Queen Street.

Visiting Overseas and Interstate Amateurs are welcome at meetings and they are invited to communicate with the Membership Secretaries :

T. D. HOGAN .. VK3HX - UM1732
J. G. MARSLAND VK3NY - WF3958

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Registered Office :

21 TUNSTALL AV., KINGSFORD

Telephone : FX3305
Postal Address : Box 1734JJ, G.P.O., Sydney

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Full Members	10/6 per annum
Service Members	7/6 per annum

The N.S.W. Division meets on the third Thursday of each month at Y.M.C.A. Buildings, Pitt St., Sydney and an invitation is accorded to all Amateurs to attend. Overseas and Interstate Amateurs who are unable to attend are asked to phone the Secretary at FX3305.

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C.M.L. Buildings,

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Secretary : C. QUIN, VK6CX.

QUEENSLAND DIVISION

Box 1524V, BRISBANE

SOUTH AUSTRALIAN DIVISION

Box 284D, ADELAIDE

TASMANIAN DIVISION

BOX 547E, HOBART

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SIXPENCE MARCH 1945

AMATEUR RADIO

THE
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OF
AUSTRALIA

Published by the Victorian Division

AMATEUR-RADIO

Vol. 1. INCORPORATING THE N.S.W. DIVISIONAL BULLETIN March, 1945.

A NEW TYPE OF AUDIO FREQUENCY GENERATOR

K. Ridgway (Laboratory Committee)

.....

For an audio frequency generator to be considered suitable for laboratory use it must measure up to certain requirements, namely:-

1. Ample Frequency Range (20-15,000 cycles)
2. Purity of waveform
3. Good frequency Stability
4. Constant amplitude.

Whilst for many years now the Beat Frequency Oscillator has held pride of place in the laboratory as an audio source, its disadvantages, particularly those associated with the simple and cheaper types, have been long recognised.

Recently a new type of oscillator has made its appearance, namely the Resistance Capacity Oscillator, sometimes known as the Phase Shift or Negative Feedback Oscillator.

Several variations of this type of oscillator have appeared in recent years and certain manufacturers in England and America have put them into production.

The oscillator is relatively simple in design and seems to meet all the basic requirements of an audio source without any of the disadvantages of the Beat Frequency Oscillator.

In practice the oscillator consists of a two stage resistance coupled amplifier, which is back coupled in such a manner that the positive feedback is applied to the grid of the first valve thus causing oscillation.

In the circuit to be described here (1) the two stages are back coupled through a Wien Bridge which supplies both positive and negative feedback. The Bridge is shown in Fig. 1.

Let us consider how this bridge operates. An audio frequency voltage is applied across points A and B. The conditions of balance of this bridge require that there be zero phase shift and zero voltage difference between points X and Y.

(1) Audio Frequency Generator, by S.K. Lewer B.Sc. Wireless World, January, 1944, page 2.

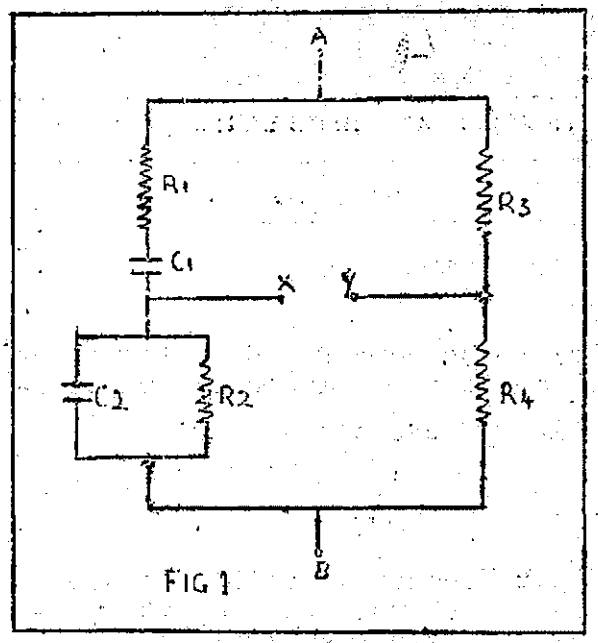


FIG 1

Obviously the phase at Y will be the same as that at A, whilst the voltage amplitude at Y depends on the ratio R3R4.

The conditions in the arms AX and XB are not so easily explained.

Firstly let us consider the series arm AX. Here at the applied frequency f the current in this arm will lead the voltage by an angle.

$$\tan \phi = \frac{1}{\omega R1\ C1}$$

Whilst in the parallel arm XB the current will lead the voltage by an angle

$$\tan \phi = \omega R2\ C2$$

where $\omega = 2 \pi f$

Consequently there will be zero phase shift when:-

$$\omega R1 \frac{1}{C1} = \omega R2\ C2$$

or when $$\omega^2 = \frac{1}{R1\ R2\ C1\ C2}$$

therefore the frequency at which there is zero phase shift is:-

$$f = \frac{1}{2\pi} \sqrt{R1\ R2\ C1\ C2}$$

If we make R1 = R2 and C1 = C2 this becomes $f = \frac{1}{2\pi} R1\ C1$ This being the balance frequency.

The conditions of balance of the bridge may be expressed as follows -

$$\frac{Z_{AX}}{Z_{BX}} = \frac{R3}{R4}$$

Substituting the Impedance of the series circuit for Z_{AX} we have

$$\sqrt{R1^2 + \left(\frac{1}{\omega\ C1}\right)^2}$$

Likewise substituting the impedance of the parallel circuit for Z_{BX} we have

$$\frac{1}{\sqrt{\frac{1}{R2^2} + (\omega\ C2)^2}}$$

Our equation then becomes

$$\frac{\sqrt{R1^2 + \frac{1}{(\omega C1)^2}}}{\sqrt{\frac{1}{R2^2} + (\omega C2)^2}} = \frac{R3}{R4}$$

Since we have decided to make R1 = R2 and C1 = C2-this becomes -

$$\sqrt{R1^2 + \frac{1}{(\omega C1)^2}} \times \sqrt{\frac{1}{R1^2} + (\omega C1)^2} = \frac{R3}{R4}$$

$$= \sqrt{\frac{1}{(\omega C1\, R1)^2} + (\omega R1\, C1)^2 + 2} = \frac{R3}{R4}$$

Since we have, already shown that at balance $f = \frac{1}{2\pi} R1\, C1$

or $\omega R1\, C1 = 1$

our equation becomes $\frac{Z_{AX}}{Z_{BX}} = \frac{2}{1}$

Therefore $\frac{2}{1} = \frac{R3}{R4}$ Therefore $R3 = 2R4$

Therefore with these conditions met our bridge is balanced at a frequency determined by the circuit constants R1 C1.

Let us now apply the bridge to a circuit of a two stage resistance coupled amplifier, Fig 2. Note that R1 C1 and R2 C2 form the tuning circuit, and that R4 is the cathode resistance of V1.

The feed back voltage is obtained from the plate of V2 and is applied across A and B through the feedback condenser Cf. Both positive and negative feedbacks are obtained by connecting X to the grid and to the cathode of V1 respectively.

When the bridge is balanced the phase and voltage amplitude at X and Y are equal, consequently oscillation cannot take place as the negative feedback equals the positive.

If, however, we make R3 variable, we are able to unbalance the bridge until there is a slight excess of positive feedback and the circuit will generate oscillations.

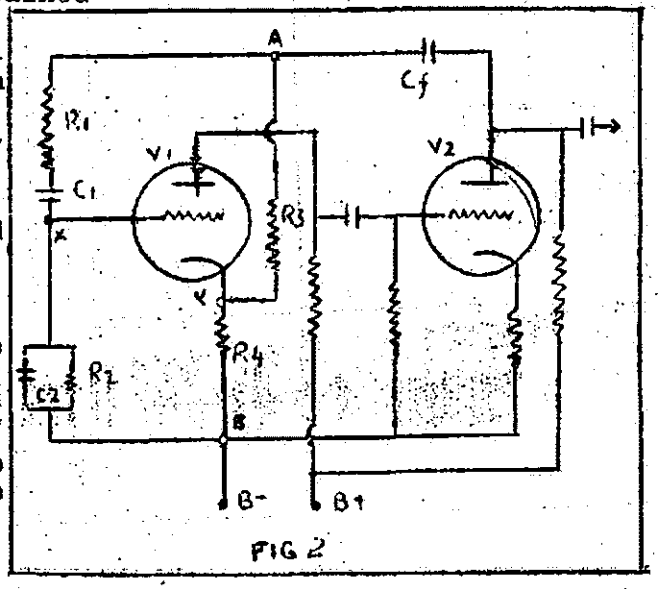


FIG 2

These oscillations can only occur at the balance frequency, for at all other frequencies there is an excess of negative feedback.

The frequency of oscillation in the R-C oscillator is inversely proportional to the tuning capacity, unlike the BF Oscillator, where the frequency determining circuit comprises inductance and capacity and the frequency is inversely proportional to the square root of the capacity.

This feature makes for convenience of tuning calibration, especially at the lower frequencies where the scale is very open -- So much for the theory, now for a practical case.

The Laboratory Committee of the Victorian Division has built up an experimental model R-C Oscillator to the circuit in Fig 3.

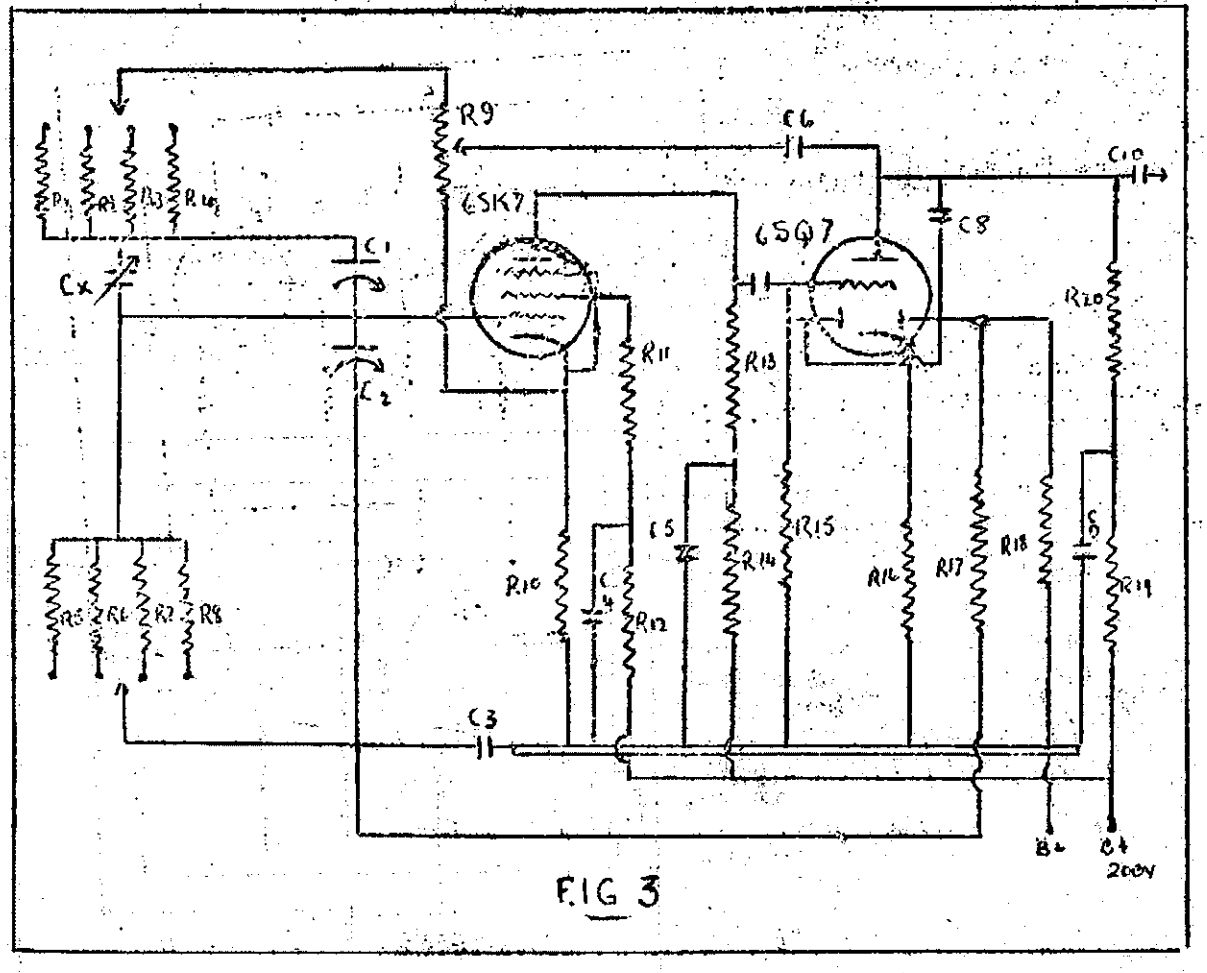
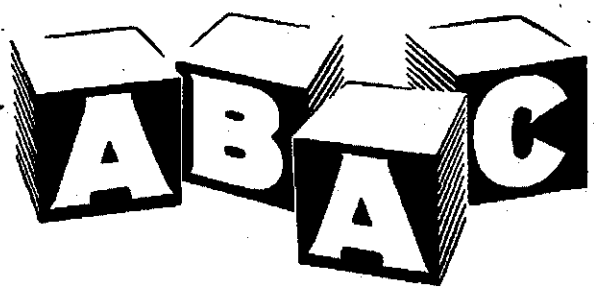


FIG 3

Transformer Problems

ARE AS SIMPLE AS ...



- Air cooled power transformers up to 2KVA.
- Small size current transformers for rectifier instruments.
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- 11, 16 and 31 point switches.
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ABAC TRANSFORMERS

—a product of TRIMAX TRANSFORMERS

DIVISION OF CLIFF & BUNTING PTY. LTD.
29-35 Flemington Road, North Melbourne

C1 - C2	.. 2 gang 0.00043 Mfd	R10	.. 2000 ohms
CX	.. 100 mmfd midget	R11	.. 30,000 "
C3,6	0.5 400 volt	R12	.. 50,000 "
C5,9	0.25 300 volt	R13	.. 50,000 "
C4,7,8,10	..0.1 400 volt	R14	.. 50,000 "
		R15	.. 0.5 meg
R1,5	...3.5 meg 1 watt (matched)	R16	.. 1000 "
R2,6	1 meg " "	R17	.. 1 meg
R3,7	375,000 ohms "	R18	.. 1 meg
R4,8	120,000 " "	R19	.. 50,000 "
R9	10,000 ohm Potentiometer	R20	.. 20,000 "

The results achieved were entirely satisfactory and served to prove that the basic design is entirely sound and eminently suitable for use as a laboratory instrument.

The circuit used is interesting. One important feature is the use of automatic amplitude control which is responsible for holding the output amplitude within very close limits.

The tuning is broken up into four ranges, and using a standard two gang BCL condenser in conjunction with the value of tuning resistance given in the text the range are approximately (a) 30-200 cycles/second. (b) 150-1000 c/s (c) 500-2500 c/s (d) 2000-15,000 c/s

Tests were carried out on a Cathode Ray Oscilloscope and the waveform was found to be perfectly sinusoidal over the entire

frequency range. The output amplitude was within ± 2db of flat over this range.

It was found to be desirable to provide shielding for the elements comprising the oscillatory circuit. This shielding should preferably take the form of a box which should enclose everything associated with V1 and V2.

As the frame of the variable condenser is at grid potential this shielding will cause a comparatively large capacity to appear between the grid of V1 and earth. To balance out this capacity the condenser Cx is connected across the upper section of the tuning condenser (c1).

The setting of the feedback potentiometer R9 is extremely critical, too much positive feedback will introduce appreciable distortion, while insufficient positive feedback will result in the cessation of oscillation.

Providing that the pairs of tuning resistances are accurately matched and Cx is adjusted to balance out stray capacities, the position of R9, once set, should not require further adjustment.

The automatic amplitude control functions in a similar manner to the AVC in a conventional broadcast receiver. A portion of the output of V2 is rectified by the diodes and used to control the conductance of V1, a variable mu pentode.

Stability is an important consideration in audio frequency oscillators.

The degree of stability of the R-C Oscillator is dependent upon the characteristics of the tuning resistances. Most carbon resistances exhibit varying characteristics due to ageing and loading, and it goes without saying that the best procurable should be used here.

If resistances possessing moisture and humidity resisting characteristics are used the stability will be excellent. Needless to say they should be non-inductive.

The stability appears to be substantially independant of voltage fluctuations.

Quoting Mr. S. K Lewer in Wireless World a line voltage variation of between 160 and 260 volts was found to produce less than 0.1 per cent variation in frequency. Stability of this order is reached within 30 seconds of switching on from a cold start.

The oscillator is quite critical as to the load applied to V2. The output is insufficient for laboratory purposes and an output amplifier is necessary. The output amplifier and the oscillator should be separated by a buffer stage, and any volumne control used in the circuit should be placed in such a position that its

setting, will not have any affect upon the oscillator proper.

The amplifier should be designed to have a flat frequency response over the frequency range of the oscillator, and particular attention should be paid to the values of the coupling condensers used.

The power supply to the oscillator should be decoupled to avoid any interaction between oscillator and amplifier.

The Laboratory Committee is convinced of the possibilities of the R-C Oscillator, and intends to design and build a complete unit shortly for use in the Laboratory. This model will probably use push-pull triodes in the output using the cathode follower method of output coupling.

CRYSTAL OSCILLATORS

Within limits, the frequency of a piezo-electric crystal can be varied by regulating the thickness of the air gap between the free face of the crystal and its adjacent electrode. A smooth and accurate adjustment is, however, essential to avoid sudden jumps in frequency, and to ensure stability of oscillation after each setting.

According to a recent patent, the crystal and its base electrode are mounted on the inclined surface of a stationary wedge-shaped holder, whilst the opposite electrode is set on the inclined surface of a second similarly shaped holder. Both holders are arranged in an outer casing so that the second holder can be moved transversely, in a straight line, relatively to the first, say by a screw under spring control. Both the inclined surfaces are thus kept parallel to each other in the course of their movement, whilst the distance between them is being altered by the control screw to regulate the air-gap. To avoid resonance due to the gap, the crystal should be Y-cut; or the unit may be mounted inside an evacuated bulb.

....o0000o....

SUPERSONICS USED IN TEST FOR RUBBER TYRES.

A new device which tests rubber tyres for flaws by means of supersonic waves has recently been demonstrated. The tyre is placed in a trough of water and slowly rolled. The supersonic waves are transmitted through the water to the tyre sides and a microphone picks up the waves passing through the rubber. As long as the rubber is solid the waves come through, but a flaw in the rubber will immediately break the continuity of the waves.

.....

THE TECHNICAL LIBRARY

ELECTRICAL ESSENTIALS OF RADIO...Morris Slurzberg and Wm. Osterheld New York 1944..529 pages...32/-

This book has the elements of a good manual of preliminary training of radio operators, but unfortunately is marred by a few errors which will no doubt be rectified in future editions.

The subject is covered under the following headings:- 1 Communication. 2. Basic theory of Electricity. 3. Batteries. 4. Electric circuits. 5. Magnetism. 6. Meters. 7. Electrical Power Apparatus. 8. Inductances. 9. Capacitance. 10. AC Circuits. 11. Resonance. 12. Basic Radio Circuits ... APPENDIX ... Drawing Symbols and Pictures of Electrical and Radio Parts...Symbols and Abbreviations... Formulas commonly used...Table of Spec Resistance and Temperature co-efficient of various metals at 20 degrees Centigrade...Bare Copper Wire Tables 25 degrees Centigrade and 77 degrees F. Fielectric Constant and Dielectric Strength of various materials. Standard Color Code of Resistors...Standard Color Code of Mica Condensers..Standard Color Code of Transformer Leads...Trigonometry...Sine and Cosine Tables.

Illustrations both line and half-tone are numerous and well done except perhaps the block on page 5 which depicts a Lucas Lamp and is captioned "Heliograph in use."

On page 434 the authors assert that the primary of an IFT is parallet tuned and the secondary is series tuned. I am afraid I cannot see it.

A rather interesting statement is made on page 471 to the affect that most BCL receivers reproduce only up to 5000 cycles and that the majority of stations cut off at about 6000 cycles because of this, although equipped to cover the entire audible range. It appears that the set manufacturers crack the whip and the stations humbly follow.

Fortunately the position is different in Australia, where although the set makers, for reasons known only to themselves, or perhaps no reason at all, produce receivers cutting off at 5000 cycles as an absolute maximum, the majority of stations go for wide frequency range for the benefit of those all too few BCL's who feel ill at the sound of a speaker booming its heart out in a box.

All this lends weight to Messrs. S. and O's assertion that the main advantage of F.M. is its noise reducing capability, in fact under Australian conditions the introduction of F.M. would result in no increase in transmitted quality (the receiver audio channels would be much better but what's to stop that now?), a fact which the manufacturers undoubtedly realise but which they seem reluctant to divulge to the public.

All books reviewed on this page are by courtesy of McGills Newsagency, Elizabeth Street, Melbourne.

SLOUCH HATS and FORAGE CAPS

With the Australians again permitted to be officially in action on the Philippine Islands the Hams are bound to "among those present and our Editor should once again get among the "fighting" news so to speak...so, you who read this, get out the pencils & paper.

Morrie Martin VK2VN once head of the prewar RAAFWR in N.S.W. in those now far-off days, and, at present a Wing Commander, seems to keep up pretty well with MacArthur and was last heard of in the Philippines. I'm not sure what Morrie does as regards RAAF Sigs, but he never seems to miss a jaunt out with the US PT Boats when they go on a patrol...he apparently just dotes on variety. Hi!

The Hon. Sec. of the New Guinea Radio Club arrived at 2YC's the other day, so I guess they are short of a Sec., at least pro-tem. But Wartime Radio Clubs are sure to suffer from this complaint so... you want to install several assistant Secs in the beginning. As Syd says...no sooner did they decide to make a start with the Club than a regular exodus started. In the usual Navy fashion Syd came home the easiest way...oh yes, plane from Lea to Madang, Madang to Brisbane... and poor chap had to come "all the rest of the way" by a train..shame! Next month I hope to be able to give you news of what happened at the Club in the absence of P/O Tel. Sydney Clarke.

Reading the news you will know that the H.M.A.S. Australia has returned after a rather exciting time around the Philippines. Both our Hams representatives CPO, 3OF, and Ldg/Tel 3IG came through OK. At the moment the latter is on leave in his home State while 3OF has to wait for the second batch of liberty. While Frank is at home will some VK3 show him how to anchor his hen house...short of taking home the Australia's anchor, complete with chain...there must be a simpler method I've been telling him. Hi! The news of the trip will have to await, along with all the other good news till the "lid is lifted," so I have nothing to add at the momont. Frank's one regret was that at that American Base where they went for repairs, there wasn't any ham gear available. Hi!

Major John Foldi VK4KT is on leave here at the moment. He expects to be returning to New Guinea very soon to take up work on a Government Station.

Another VK4 due down in VIS is P/O Les Page VK4LP. Les was a W/O when we last saw him here, and in the meantime like many of the RAAF he has been "getting round a bit." At the moment he is contemplating installing a UHF outfit on his jeep, but, as he puts it, while the installation is proceeding he has to think up a sufficient reason as to WHY it is there.

S/L Frank Goyen 2UX writes from up Darwin way...just down the road from 3RJ...wonder just how far down what road????(2YC)...Frank writes "from a dangerously exposed position (attacked by squadrons of March Flies under an umbrella of Wasps), in the front line .....

thirty miles behind the AWAS." ... so, you, who know him will see he is little changed. His main complaint, Ray, is about the "dryness." Hi!

Flt/Lt Frank Hine of 2AD has just had a few days at Home from over at Port Moresby where he has to do with the Sigs, side of the Lads who navigate (more or less) the Ansons one sees overhead in most areas. He says Gordon Kempton, a W/O these days has just turned up at that station. What's the news 2CI, ??? haven't heard of you for years, om. (2YC). Another lost Ham, so to speak, was whom he mentioned as having recently been at Mt. Gambier was MacNaughton of 2ZH...haven't heard of you either since the War, Mac (2YC). Frank mentions that S/L Jack Moyle is now in VIM.

Fl/Lt. Athol Wells 2FI is reported in Hospital again with a bout of Malaria...tough luck, Athol, hope when you read this you are AI again.

2FZ, Gordon Reid of Tomora is another Ham nothing has been heard of. Gordon, it appears joined the RAAF as an Electrical Mechanic, transferred to a "hush hush" dept....went to New Guinea...got a bad dose of Malaria, and at the moment is Fridg. Mechanic for Eastern Area. Just a few lines for five years' work. Hi! (Mascot) or

Major Don B. Knock 2NO, by the time you read this, will be back in "civvies." As Don says, this is his third war, so he is about up to retiring. Hi! Don got mixed up in the first World War just about as soon as he left school (1914-18) then put 1919 in over in Russia when the Revolution first started, and then he kicked off for his third in 1939, and after six years of it...has decided to take an interest in N.S.W. Div. affairs for a change. 5EG, Ivan Miller was Don's Service dentist...so you can bet the work was an fb job. Another Ham 2JC is a RAAF dentist around the place, but we have no news of where he is.

S/Sgt Alan Jocelyn is due up on leave from Bonegilla. Alan has discovered that 2AIZ Gordon Nolan is an engineer at 2AY, so he and Jim Todd who has passed his AOPC but has no allotted call, spend all their spare time with Gordon. Got everything tied down om, you know these Hams? Hi! (2YC).

It is with deep regret that I have to announce the death of Major J.D. Morris, VK3DQ. He was a Prisoner of War in Java for two years and four months and lost his life when a transport sunk near Sumatra on the 20th, 1944. He joined the A.I.F. in June 1940 and had previously served one year in the Permanent Forces and 8 years in the Militia. He also saw service in the Middle East for two years.

And so, till next Month, I'll be hearing from you, ... there is no let off ... YOUR COLUMN NEEDS NOTES...twelve times a year, so remember Jim Corbin, 73 Maloney Street, Eastlakes (Mascot) or 'Phone MU1092.

....oOo....

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

- Federal Headquarters -

At its 35th Annual General Meeting the New South Wales Division had the pleasure of entertaining quite a few visitors, among whom were several from VK5 including 3XZ who had some criticism to offer in an endeavor to ascertain the views of as many Australian Amateurs as possible, regarding Post War Amateur Radio.

3XZ was disappointed with the winning entries and felt that they followed the sub-headings that were given as suggestions when the contest was first written up in the magazine, too closely. He also stated that quite a number of VK3 members were very hazy as to what was required by F.H.Q. and that the matter had been discussed at a Divisional meeting and that was the general opinion of all present.

Like 3XZ, Federal Headquarters were also disappointed with the result of the Essay Competition! The members of the present Federal Executive have all been associated with the New South Wales Divisional Council for a number of years. During the past eight years it has been the policy of that Council to keep Institute members as fully informed as possible regarding all matters relating to Amateur Radio. In addition it has fostered the practice of members asking for information. When elected to the Federal Executive the same policy was put into practice and what subject has greater importance than the Post War era.

Federal Headquarters were disappointed from the point of view of the paucity of entries, despite the fact that the competition had been advertised for four months in the magazine. Entries were poor both in quantity and quality, all States being equally at fault. Frankly, it was hard to believe that so little interest was shown.

Federal Headquarters does not feel that is is above <u>constructive</u> criticism - welcomes it in fact, but does resent very strongly criticism undeserved.

If, as 3XZ states, the matter was discussed at Victorian Divisional meetings and members expressed themselves as being somewhat in the dark as to what was required by F.H.Q. it was the duty of the Divisional Secretary to take the matter up and obtain the necessary information - information that would be willingly given.

It is very difficult to follow 3XZ's statement that the winning entries ALL followed the SUGGESTED sub headings, but quite a few others did. Actually the only really new suggestion made worthy of consideration was that Licensee's should be graded into A, B and C, similar to the States.

It is extremely regretted that these paragraphs have had to be written, but as 3XZ has stated, quite a deal of criticism had been made at a General Meeting, there is no option but to reply. 3XZ is to be complimented even at this late stage upon doing a job that someone else in a more responsible position failed to do!

(I have referred these notes to the Victorian Division, who wish to state that the facts as stated above are not entirely correct. The subject of the Essay Competition had been given considerable publicity both in Divisional notes and at Divisional meetings, and at no time did any individual member request further information. In view of these facts no Officer of the Victorian Division failed in his duty.....THE EDITOR)

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NEW SOUTH WALES DIVISION

The February General Meeting of the Division could be quite easily described as Navy night due to the large number of members who are attached to the Silent Service who were present.

The Chairman, in declaring the Meeting open, extended a welcome to Chief Petty Officer Telegraphists Frank O'Dwyer VK3OQ and Gordon McLead VK2ADC P/O Tel. Sid Clark and L.T.O. Reg Morgan. The Army was represented by Captain Fred Carruthers looking very fit and well. An international visitor Frank Little second op (?) at W7GDE was also present.

With reference to the Annual Election of Council only nine nominations were received viz., Messrs. Dickson, Fryar, Cole, Higgins, Peterson, Priddle, Lusby, Ryan and Treharne. The nominations of Messrs. Cole and Higgins were subsequently withdrawn and thus it was not necessary to hold an election. Mr. Ern Hodgkins who had occupied the position of Vice-President in previous Councils, having been transferred to Kempsey, was not available for nomination. 2EH's transfer was a definite loss to the Institute as he was a very keen and enthusiastic member.

At its first meeting after the Annual General Meeting the following Office Bearers were elected:-

Chairman	..	W. G. Ryan VK2TI
Vice-Chairmen	..	H. F. Peterson VK2HP and
		E. Treharne VK2AFQ
Secretary	..	C. S. Higgins VK2LO
Treasurer	..	G. Cole VK2DI

All the above Officers were elected unopposed.

Several recommendations from Council were discussed, the first being that Lieutenant Jack Striker W6 MOV be elected to Honorary Membership in appreciation of the Keen and practical interest that he had taken in the Bushfires Radio Network. The second recommendation was that 5% per annum of total membership subscriptions be set aside each year and invested in Government Securities in an endeavor to create a Reserve Fund. B oth recommendations were unanimously endorsed.

Congratulations to our new "old" Councillor Morrie Lusby VK2WN upon joining the band of "Happy (?) Benedicts". Bring her up the right way old man. Its a great help when you have someone to write up the log and make out the Qsl's! Also in line for congratulations is Gordon Golle VK2DI who recently became a father again. Too bad it wasn't a daughter em, but as you say, there are advantages in having two sons. Speaking of sons, you and 2YC should get together sometime and have a long yarn.

At the conclusion of General Business each of the visitors gave a short talk on his wanderings during the past five years, particularly 30B and his description of the Philipines and surrounding waters. Boy, if we could only get that chap to REALLY talk. 2ADC took us for a Ferry trip from Alexandria to Tobruk. The boys were very interested in Salome and the "moral uplift" one meets in the Middle East!

Don't forget, March Meeting will be held Thursday 15th and all Amateurs are invited to be present.

...oOo...

NEW SOUTH WALES BUSHFIRES NETWORK

For the second occasion during the past four years Amateur Radio History has been made in New South Wales. Recently the Institute was successful in obtaining some crystal blanks and by the combined efforts of VK2RA and W6 Mov these were ground to the required frequency. These crystals were dead on frequency and the Amateurs concerned are to be congratulated.

On the night of Friday 9th February VL2EE, located at Young, was heard testing and calling one of his portables, thus obtaining the honor of being the first of the Network Stations to be heard in Sydney. It was right and fitting that this should be the case, as it was Jim Taylor, VK2TC, who first suggested the idea of making use of Experimenters and their Equipment as an aid to the Volunteer Fire Brigades, over twelve months ago.

In an endeavor to interest the right people the Institute had a particularly hard row to hoe and once interested the Department concerned did not feel inclined to spend any money on the scheme endeavoring to throw the onus on the Shire Councils and the Amateurs. The Institute felt that it would be failing in its duty if it were to allow the Experimenters to shoulder the whole of the cost and with the advent of the Bushfires in the Blue Mountains (!) it was found possible to have a much more lenient attitude adopted.

Associated with Jim Taylor at VL2EE are John Dwyer 2WA and Alan Thackeray VK2TA. These chaps are located well outside the town and have had to surmount quite a few difficulties before the installation was actually put on the air.

VL2EE was again heard on succeeding nights, but signal strength was not quite so strong, but nevertheless the frequency was checked ok by the R.I.

On Tuesday 13th February VL2EA was heard testing from Dubbo, The signal was an excellent one and despite a high noise level it was 100% readable right through the Test. Dubbo Section Leader is Max Moore VK2II and other Experimenters associated with him are 2ACT and 2AMR. Max at the present time is concentrating on aerials in an endeavor to obtain a good strong ground wave and hopes to obtain a meteorological balloon to raise the vertical area. Several photos are to hand showing Max and Bill operating the truck and pack sets respectively and its unfortunate that they can't be printed in the magazine. Watch the daily papers.

As previously mentioned the frequency in use is 3115 kcs and members are asked to tune round this frequency occasionally, and reports may be sent to H. J. Taylor "Bonnie Doone" Monteagle or M. Moore, McDonald Street, Dubbo.

It is hoped that three pack sets will be operating in each district very soon, but batteries are a big problem at the present time.

During the winter months it is proposed to push ahead with the organisation in other country towns in order that the summer of 1945 will see the Net operating on a more extensive basis.

Both 2TC and 2II have asked me to thank all those Amateurs who were good enough to make gear available so that they could get on the air quickly.

.....

EMERGENCY COMMUNICATION NETWORK

After a lapse of two months brought about by Departmental re-organisation, the first Network Exercise for 1945 took place on 2nd February. All stations checked in on time and transmissions were well up to standard. Traffic was handled very smoothly and cleanly and reflected the assiduous manner in which the operators concerned applied themselves to their task during 1944.

It had been anticipated that three ships of the Sydney Harbor Patrol would have also participated in this exercise but unfortunately one craft had to withdraw whilst another was twenty minutes late in starting. This marred the exercise somewhat and meant that there was a late finish.

With reference to Network Stations hearing transmissions from the boats, it is pointed out that these craft work on a very much higher frequency, and whilst in contact with them the carrier from Control is kept running.

Exercises will continue to be held on the first Friday of each month until further notice.

...o00o...

VICTORIAN DIVISION

February

The March Meeting saw rather a large muster of members and visitors. Those present were VK's 3VX; 3NY; 3EN; 3KN; 3QS; 3XC 3IK; 3SZ; 3XZ; 3BJ; 3SQ; 3IW; 3XJ; 3YL; 2QZ; 3UC; 9RM; 3JO; 3WY 3HX Messrs. Ridgway, Hibbet, Oakes and King.

Sgt. Peter Momfries VK9RM during the course of the evening gave a short talk on his Ham activities in New Guinea, mostly on his observations of tropic proofing, which proved of much interest to the gathering.

F/Lt Graham Colley VK3QZ who had recently returned from parts north where he on several occasions was one of the first wave of assult troops, also gave a short chat on some of his experiences and observations.

The highlight of the evening was a "free" movie show. This had been given considerable publicity in previous issues of the Magazine. Harry Kinnear 3KN brought along his 16 mm

projector complete with sound equipment, together with a collection of topical films. So great was the interest shown that after an hour's show (and the hour was growing late) those present were asked if they wished to see the remaining film which would run for half an hour.... there was an unanimous decision. Council wishes to express to Harry their thanks for the trouble he took to put on the show.

But that isn't all....There will be another show at the April 3rd. By courtesy of the R.A.A.F. Visual Training Centre, we have been able to obtain two Technical Films. The first, Cathode Ray Oscilloscope, which will run for twenty-five minutes, and the second, Thermionic Valves, which will run for forty minutes. Those attending that meeting will be assured of a number of technical films, together with a few topical features. So do not forget the April Meeting.

As mentioned last month, the Laboratory Committee have been and are proving to be a very live body. This month they report that although many copies of periodicals have been returned since the original check of magazines in the library, the files are still far from complete, and no further offers have been received in response to the appeal in the January issue.

Copies of Magazines still required are:-

"Wireless World,"	1938	- all copies.
	1939	- all except June.
	1940	- February, March, April, May.
	1941	- August.
	1942	- March, November.
	1943	- July, August, December.
	1944	- May, June, October
"R A D I O "	1938	- All copies.
	1939	- All except October, December.
	1940	- All copies.
	1941	- All copies.
	1942	- January; Feb; March, Apl, Spt. Dec.
	1943	- January;
	1944	- All except January, February, March.

Anyone having any of the copies listed above and willing to dispose of them is requested to write advising us of what copies he has available without delay. Whilst we are prepared to pay a reasonable amount, our sincere thanks will go to you if you desire to make a present of them.

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The N.S.W. Division meets on the third Thursday of each month at Y.M.C.A. Buildings, Pitt St., Sydney and an invitation is accorded to all Amateurs to attend. Overseas and Interstate Amateurs who are unable to attend are asked to phone the Secretary at FX3305.

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- TROPICALIZATION -

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The preparation of radio and electronic equipment for tropical service is of fundamental importance today. Tropicalization, which is a specialised problem, may be defined as the design and protection of equipment for use in tropical areas. This equipment must frequently be operated intermittently in low, wet, damp lands where there is little direct sunshine and no cover, and where repair facilities or maintenance parts are not available. During the periods when the equipment is not operated there is considerable absorption of moisture and condensation takes place on non-absorbent surfaces.

High humidity causes three destructive forces to go to work on electronic equipment; rot and swelling, corrosion and fungus. The problem of combating these resolves itself into several associated problems.

1. Selection of components which do not readily absorb water.
2. Components which give minimum corrosion trouble.
3. Components not readily attacked by fungus.
4. Protective coatings of those parts subject to damage by moisture, corrosion or fungus.
5. Proper design which takes cognizance of the above problems.

In connection with the selection of components which do not readily absorb moisture, the following conclusions have been reached. Phenolic insulation should be molded wherever possible. If this is not practical, a non-organic base laminate is preferred to cotton or linen. Water absorption can be reduced by thorough varnish impregnation before or after terminals are placed in a terminal board. Special care should be taken to see that fibre ends are sealed against moisture penetration. This helps to eliminate swelling, lowering resistance and growth of fungus.

Fibre, cotton, linen and wood have proved troublesome and in order to protect them against moisture, each strand must be saturated with a moisture-resisting fungus inhibiting impregnate after the material has been thoroughly dried. Ceramics are porous in an unglazed state, best treatment is to use a glazed finish.

SELECTING COMPONENTS... The selection of components to resist the inclusion of moisture is a more difficult

matter, but in general, it is concluded that all components should be insulated and coated with a mineral wax, preferably bearing a fungus-inhibiting material. Resistors of the power wire-would type should be selected to be of maximum resistance to high humidity and salt water immersion consistant with the space allowed; the use of small diameter wires and exposed windings should be avoided.

CAPACITORS...Capacitors of the fixed mica type, molded in phenolic should be coated with a fungicide and high melting point mineral wax. Oil filled capacitors should be hermetically sealed; paper wrappers are virtually useless under high humidity conditions.

Transformers and chokes should be hermetically sealed. RF coils should be thoroughly impregnated and wound on forms which are suitably moisture resistant, such as molded phenolic or glazed ceramic.

Wire should be selected to have a high initial insulation resistance, so that under prolonged humidity exposure the insulation resistance will still exceed ten megohms.

It is difficult to form and conclusions as a result of the above discussions. Water absorption of materials and components can be stopped if care in selection is applied. The best rule would be, when in doubt, eliminate the material or component, if an acceptable alternate is available.

MINIMIZING CORROSION...The rules for minimizing corrosion are better established than any of the other rules in this discussion. Corrosion has been defined as an electrochemical destructive reaction between two dissimilar materials. Since two unlike surfaces and a conducting medium are necessary for most corrosion, perhaps the simplest method of preventing corrosion is the coating of each surface. Some surfaces may be protected with what is known as a layer of protective salts which may sometimes be obtained in the manufacturing operation. In practice it is common to treat aluminium with anodic processes to give a protective salt on the surface. This means the formation of a chromate, sulphate or like salt on the surface.

An effective treatment of unlike surfaces would be as follows:- proper cleaning of the surface, priming and then painting, elimination of metallic inserts in an unlike metal. Study of types of atmospheres to be encountered and expected corrosion products.

The selection of materials and components, not readily attacked by fungus, is a little more difficult to define than any other problems already presented. Certain things we know, and these are few:- fungus grows in a moist atmosphere, fungus attacks certain metals to form organic salts; fungus grows in confined atmospheres; fungus will attack rough surfaces.

FUNGUS GROWTH...Elimination of components which tend to absorb water can now be seen to be important as a means of preventing fungus. Bare metal surfaces are not only subject to corrosion

but also attack by fungus.

Confined atmospheres are the most difficult problems to solve. Compact light-weight equipment makes necessary the very thing which contributes to the equipments failure: confined atmosphere which are good clinging places for fungus. Points of concentration of fungus are lacing of wire, switch contacts, motors etc.

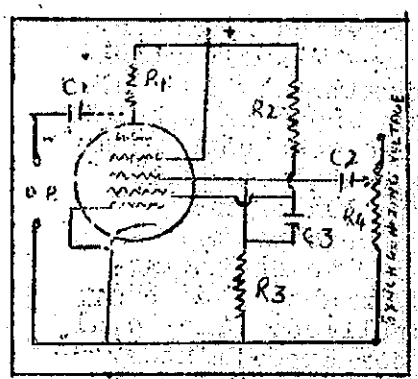
These points of growth can be best eliminated by proper design. Selection of material and components and the proper protective coatings can also help. These coatings, basically, involve use of fungus inhibitors such as phenyl mercurial or chorinated phenol in carriers such as phenolic varnish vinyl varnish or the like. The actual coating may either be sprayed or brushed onto the component. If sprayed, masking of certain components which must have a bright surface will of course be necessary during the spraying operation.

CIRCUIT DESIGN. Critical, high-gain circuits perform well in a laboratory setup but do not perform satisfactorily in the field. The use of high resistance grid leaks in high gain amplifiers is one of the best examples of this. For instance under high humidity conditions a five megohm resistor will behave more like a three megohm resistor. Again, high Q coils in RF circuits will have a high Q only as long as no conducting film shunts the coil. Then the Q will drop considerably.

This type of reasoning would outlaw some of our highly developed circuits of today, if it were carried to its utmost. But the less critical the circuit, the fewer the parts, the more careful choice in the selection of parts and material---the longer the equipment will last.

...oOo...

ONE TUBE FREQUENCY DIVIDER



In most multivibrator circuits used for frequency division, at least two tubes are employed in the multivibrator and an additional tube is required to isolate the multivibrator from the output circuit load. In an article in a recent issue of "Wireless World" a circuit to do the above job and using only one tube is described.

As shown in the accompanying circuit a hexodo oscillator circuit is used with the sychronizing voltage fed to the No. 4 grid. The degree of this voltage is regulated by the potentiometer R4 while the coupling condenser is so chosen that its capacity is approximately one tenth that of C3. The oscillation frequency of the uncontrolled multivibrator is determined by the time constant of the resistance and capacity in the oscillating circuit. By using a hexode, it is possible to utilize the electron-coupled plate circuit for external coupling purposes. Thus R1 serves as the plate load and C1 as the output coupling capacity.

F E D E R A L H E A D Q U A R T E R S

-- A Review of Activities in N.S.W. 1941-1944 --

Early in 1941 the question of the location of Federal Headquarters was discussed at length at New South Wales Divisional Council Meetings. At this particular time Victoria was acting as Headquarters Division in addition to publishing the Magazine. It was felt that the Institute as a whole was asking a great deal of the Victorian Division to act as Federal Headquarters and to publish the magazine as well. It is to be stressed at this juncture that no request for relief had been received from VK3.

It was decided to approach Victoria and offer to relieve their burden by taking over Federal Headquarters. VK3 gratefully accepted this offer and the first meeting of the new Executive which consisted of Messrs. Joscelyne, McElrea, Peterson, Priddle and Ryan, with R. Priddle as Chairman, W. Ryan as Secretary, was held on 27th October'41.

One of the first decisions made was to make a survey of the workings of the various Divisions. This was found to be very disappointing. N.S.W. and Victoria were found to be the only really active Divisions. Western Australia maintained an active organisation which met occasionally whilst in the other States, the Institute was non-existent. As far as Queensland was concerned it had elected a comparatively new executive just prior to the war - the new Secretary just having received his licence, so very little blame could be laid at anyone's feet. It is fully realised that this state of affairs arose mainly due to Service inroads on personnel, but nevertheless there must have been some members available who could have maintained some form of skeleton organisation.

The next step taken was the compilation of a Service Register. Every ham listed in the P.M.G's List of Experimenters was circularised. In all 2018 circulars were sent out and approximately 50% were returned. This Census gave a wealth of information and upon tabulation, was published in the magazine. Quite a deal of good came from it in other ways. Amateurs realised that the Institute was still functioning and active Divisions benefited by an influx of new members. In addition, P. Allen VK7PA offered to represent the Institute in Tasmania and likewise E. A. Barbier 5MD in South Australia. 7PA has continued to act in that capacity right up to the present, but unfortunately 5MD's interest was shortlived. The total cost of the Census amounted to £15/11/9 or 1.85d per Experimentor.

The Executive was concerned with the position of those Amateurs in States where the Institute was inactive and various proposals were made and discussed as to the manner in which these Experimenters could be catered for. Several times the possibility of an all Australian organisation was discussed.

In other words, instead seven Divisions - only one. The main inducement at that stage to be a really worthwhile "Amateur Radio" to be the means of holding the Members interest.

Eventually the suggestion of one body was pigeonholed due to the lack of time necessary to organise, but it was decided that steps be taken to have the magazine made worthy of the oldest Experimental organisation in the world.

At this time New South Wales was publishing "The Monthly Bulletin," circulating among its own members. Both Victoria and New South Wales were approached with a view to an amalgamation. Eventually a satisfactory basis was reached and a worthwhile magazine - although not in printed form appeared.

Before leaving the Magazine, the retiring Federal Executive would like to congratulate the Magazine Committee, particularly Messrs. Hogan, Marsland and Anderson upon the splendid job that they have done often under difficulties - perhaps more often than not. It is particularly gratifying that sufficient advertising is now forthcoming to make certain that no loss is being incurred. In addition, the magazine goes to all Members of the Division, which as far as VK2 was concerned, meant quite a boost in circulation. New South Wales must not be forgotten for their part by making a monetary contribution to help offset the increased cost of the enlarged magazine as well as supplying notes and technical matter. A word of warning, "Amateur Radio" is the "Official Organ of the Wireless Institute of Australia," not of any one State. Recently some members of the Federal Executive had the pleasure of meeting Mr. "Bob" Anderson, Secretary of the VK3 Division and a Member of the Magazine Committee. Naturally the magazine was discussed and 3WY advanced the view that "the people who did the work on the magazine should decide what should be published." This is wrong. As the magazine represents the Australian Amateur, deep consideration should be given to the matter published. In the post war years the magazine will play a very important part and it must not be permitted to develop any outlook other than an AUSTRALIAN one.

J. Corbin 2YC also is to be congratulated for his efforts in making the "Khaki and Blue" subsequently changed to "Slouch Hats and Forage Caps," pages, the most popular and eagerly read section of the magazine. Strange to relate, the compilation of these pages has not always been easy. For some strange reason quite a number of Service Amateurs adopted a form of reticence quite foreign to the ilk. If some of the tributes paid to these pages by various visitors to VK2 Meetings and more than likely VK3 as well, quite a lot more chaps would have dropped a line to 78 Maloney Street, Eastlakes. There is still time yet!

A Prisoners of War Fund was organised by the Executive and no less than £42/19/- was collected. Unfortunately the majority of Australian P.O.W's are in Japanese hands, and it has been impossible to forward comforts to them. Several donations were made to A.R.C. Prisoners of War Fund whilst parcels and books have been despatched to Messrs. Campbell and Edwards. The balance of the account amounting £27/18/- is still on hand, and it is to be hoped that arrangements can be made in the very near future for its distribution.

During the latter part of 1942 a direction was issued by Security Service per medium of the Wireless Branch, stating that Sealed Containers in the possession of Experimenters were to be handed over to local authorities for safe keeping. This order created a furore in the Amateur ranks as very few containers had been packed sufficiently well for their removal. Application was made to the Chief Radio Inspector for an extension of time for lodgment and this was granted.

The China Amateur Radio League asked the co-operation of Federal Headquarters in obtaining a collection of Australian Qsl's for their Convention, to be held in Chumgking. A collection of cards representative of all Australia States including New Guinea and Papua was made and safely reached its destination. The fact that Chinese Amateurs could hold a Convention in that war torn land speaks highly of their courage and tenacity of purpose. Congratulations XU.

During October 1943 New South Wales had acted as Headquarters Division for the statutory period of two years. Upon referring the question of location to the States or their representatives, all were unanimous that New South Wales continue to act. Following upon this advice, it was decided that an election of Officers be held. Messrs. Priddle and Gough both intimated that they were unavailable. Mr. Gough VK2NG had been elected to fill a vacancy caused by Mr. Joscelyne's resignation upon joining the Army. It was decided to place on record the retiring Executive's appreciation of the work performed by Messrs. Gough and Priddle. The new Executive consisted of Mr. F. P. Dickson VK2AFB Chairman, H.F. Peterson, VK2HP Vice President, W. G. Ryan VK2Ti secretary, and Messrs. Fryar VK2NP and McElroa VK2UV Councillors.

In an endeavor to ascertain the views of Experimenters regarding the Post War era and Essay Competition sponsored by the New South Wales Division was held by Federal Headquarters. The results were disappointing both from the point of view of the number of entries received, the quality and the very few original ideas expressed. In publicising the competition, quite a number of sub-headings were suggested. Most competitors wrote around these. Whilst this was flattering to the Executive, it was disappointing that very little originality was expressed! One.

important point where quite a deal of controversy could be expected, was the question of power. Every entrant agreed that 100 watts would be sufficient.

Perhaps the most important advance made by Experimental Radio in Australia took place in 1942 when official approval was granted for the use of Amateurs and their equipment as an arm of Civil Defence. Networks came into operation in New South Wales, Western Australia, South Australia and Tasmania. Of these Nets the largest and most important was in New South Wales and was the only one called into action during an Emergency. Unfortunately VK 5, 6 and 7 Nets have now closed down whilst New South Wales is functioning on a reduced scale. However, out of these war time Nets have sprung organisations that will expand largely in the post war years, viz. the Bushfires Radio Networks in Victoria and New South Wales.

Unfortunately Victoria was unable to obtain permission to inaugurate a Net for A.R.P. purposes, but in recent months some headway has been made with the Forestry Commission and it is understood that stations will be in operation very soon. Victoria are to be congratulated upon efforts and their refusal to acknowledge defeat.

In New South Wales, Bushfires Emergency Radio is in operation and during the winter months the organisation will be expanded to meet demands of the forthcoming summer. A great difficulty to be overcome is lack of personnel in areas where they are needed.

During pre-war years many pleas were made for the use of the Amateur and his equipment during Flood and Bushfire Emergencies. Out of the A.R.P. Nets during the war this opportunity arose. Let us make certain that it is not permitted to slip away during the post war years.

The foregoing pages deal briefly with the activities of the Federal Executive during the past three years - years which have been the darkest in the history of civilisation. Despite this fact, every Member of the Institute will agree that the Executive has not been inactive and has kept the flag flying in an endeavor to make certain that a live organisation will be ready when the day comes for the lifting of the ban on Experimental transmissions in Australia. That day is very, very, rapidly approaching. The location of Federal Headquarters has been the subject of discussion at several recent Executive meetings. It was finally decided that the interests of Experimental Radio could best be served by having Federal Headquarters located in that State wherein the Director of Posts and Telegraphs had his office. The New South Wales Division endorsed these views and Victoria was asked to act as Headquarters

Division, VK3 have agreed and their term of office commenced on the first of March 1945.

What of the future? It is the perogative of a retiring body to make recommendations to the newcomers. During the past year the possibilities of a Federal organisation with a paid staff or at least a paid Secretary have been discussed and the outgoing Executive are unanimous that if the Institute is to progress and take care of the influx of new Amateurs once the war is over, the present practice of a Division in each State will have to be departed from. It will be too much to expect any person acting in an Honorary capacity to devote the time necessary to do the work efficiently. It is not beyond the bounds of possibility, One thousand members at one guinea per annum would be a startling point, and if the post war Institute Membership does not exceed this figure it will be very surprising.

Again, with a permanent secretary or staff, the work of compiling and publishing the magazine would not be as difficult as it is to-day. The majority of the entrants in the Essay Competition were of the opinion that at least a permanent Secretary was an essential for the post war Institute. The A.R.R.L. and R.S.G.B. have a permanent staff. The N.Z.A.R.T. had decided on this step just prior to the outbreak of war. Must Australia lag behind?

Another wartime innovation of the retiring Executive was the publication of Notes in the magazine and prior to that, each Division received a copy of Executive Council Meeting Minutes. This practice should be continued. Do not let Federal Headquarters become a closed book to the majority of Institute Members. Tactics of that nature brought about the unfortunate happenings when Federal Headquarters was last located in New South Wales in 1937-38.

In conclusion the Federal Executive would like to thank all Divisions or representatives, particularly VK6 - who, nearly two thousand miles away set a splendid example-as 7 PA Peter Allan, for their splendid co-operation during the difficult years. To the incoming Executive, hearty congratulations and the hope that they will see Experimental Radio again active very soon in Australia.

On behalf of the Retiring Federal Executive,

W. G. RYAN, VK2TI, Retiring Secretary.

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THE TECHNICAL LIBRARY

MATHEMATICS ESSENTIAL TO ELECTRICITY AND RADIO....Lt. Nelson M. Cooke and Dr. Joseph B. Orleans (New York) 1943...418 pages ... 24/-

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The radio training programmes of the armed forces in the United States since Pearl Harbour have apparently necessitated the production of books concerning the technical and mathematical basis of radio communication, if one is to judge by the number of such books which have appeared during the past three years.

The book under review this month is representative of the better class works dealing with the mathematical angle and is intended for the student who has only a rudimentary knowledge of mathematics. The entire field is covered with reasonable adequacy from addition to quadratic equations. The former, one hopes, is included mainly for the sake of completeness!

Chapter headings are as follows:- Introduction, Literal Numbers, Addition and Subtraction, Multiplication, Division, Equations, Powers of Ten, Significant Figures, Units, Ohms Law, Series Circuits, Resistance, Wire Series, Special Products and Factoring, Fractions Equations containing Fractions, Ohms Law--Parrallel Circuits; Graphs, Sets of Linear Equations, Generator, Motor and Battery Circuits, Exponents and Radicals, Quadratic Equations, Kirchoff's Laws, Logarithms, Applications of Logs, to Decibels and Transmission Lines, Angles, Trig. Functions, Tables of Functions, Solution of Right Triangles, Periodic Functions, Elementary Plane Vectors, Alternating Currents, Fundamental Ideas, AC Series Circuits, AC Parallel Circuits.

An Appendix rounds off the subject matter with tables of Mathematical Symbols, Greek Alphabet, Copper Wire Tables and Trig and Log Tables.

It is really surprising that so much has been fitted into just over 400 pages, yet there appears to be no evidence of skimping at any stage, and everything is well set out, with clear and adequate diagrams where necessary.

I would like to say that Lt. Cooke and Dr. Orleans have, between them, done a good job.

This book and all books reviewed in this page are supplied by courtesy of McGills Newsagency, Elizabeth Street, Melbourne.

Alec. H. Clyne - Review Editor.

SLOUCH HATS & FORAGE CAPS

In wartime you will often see that the news of today is out of date, and often reversed tomorrow. Our column is no exception. Last month, for instance, I mention that Frank Hine 2QL is over at Port Pirie, but yesterday he rings me up and I find that in the meantime he goes from F/Lt to Sq/Ldr, attends a school in the North, holds an appointment in VK4, and is on the way to a new job in the Northern Area somewhere. And he adds, I haven't discovered where McNaughton, 2AH, is...as he is already posted from Mt. Gambier...Hi! 2QL reckons I'm getting old and can't keep up with modern speed, and from the above it looks as if he may be right.

The CO of the School Frank attended was Bob Chilton 2RC, while the class had its usual ham quota...Sq/Ldr 3GU, F/Lt 4RM & P/O 4EA Another Ham, Roy Stacey, 2HY, now a F/Lt., was attending another school in the same area. Roy has been in the R.A.A.F. since the beginning, but news of him has been very scarce.

Fred Lubach 4RF is still around Townsville, and apart from a little work for the Navy, he is designing an II tube super, and wondering how 813s go on 50 Watts. Apart from that he keeps an eye out for news for Amateur Radio. Bill Asplett visited him recently in between shifts at Townsville G.P.O.

Chief Telegraphist Kerkin VK2CT is now holding a very responsible position on H.M.A.S. Hobart.

Leo Myers 2KS who seems to have been just about everywhere since the War began, is now in a Naval Beach Unit and expects to meet a few of the "Honourable" Js in person soon...they tell me, Leo, the Yanks just about blast everything off the face of the earth near the landing...so here's hoping...2YC.

Sgt. Ackling...Australian Special Wireless Group...Australia.. wouldn't it!!!, far better known as VK2PX has at last met some "Foreign" DX...in the shape of two VEs...4UY and 4KO. These two, say there are more hams with them, and that one of them has often worked 2RA. In true missionary spirit 2PX gave them his Amateur Radio, so they could get in touch with the Division in any Capital city they might happen to be in...what a man...a WIA man...a WIA man, I mean...if only all VK Hams in such circumstances would do likewise.

Some of you know Walter Haynes...IF the war had waited two more months he would have a call but, alas, he only holds AOCP no. 2404, Hi! He is P/O Radio Mechanic H.M.A. Radio School at Watson's Bay. As usual he has a Ham to keep him company...VK2NQ. Wal has been in the Navy for sixteen years now. He was on the Canberra from the time War was declared till she was sunk in the Solomons. During the three years he was on the "Canberra" they acted as escort to the AIF going to the Middle East, served in the South Atlantic, Indian Ocean, Bay of Bengal, Red Sea and Arabian Sea. She was in

Transformer Problems

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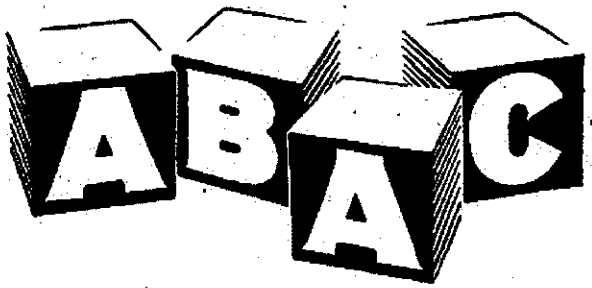

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Singapore and the Dutch East Indies when things were pretty desperate ...so no wonder Wal has now gone more or less into retirement. But I believe he wants to go to sea again. Hi.

Con Bischoff 2LZ has returned to Townsville, and the study of telescopes. He tells me that Sq/Ldr Reid 6BE/3BE is yet another Ham to join the outfit, replacing Allan Heath, who has returned to VIM. Sgt. Kahn 4QA has also returned to their unit, while Norm Hart 4KO has been posted to Brisbane. What they want mostly up there is a VK7 to give them all States, Hi!

Lt. Norm Hannaford is now with 1st Aust. Beach W/Shops A.E.M.E. A.I.F. and in Feb was feeling pretty sorry to find himself still in VK. He was in the middle of leave in Melbourne when he was urgently recalled. As he says...he shot through VIS & VIB, they were to go at once...and here they are still...and all that leave lost. But he says that when we hear that the 7th Div., has been in action he will be in it too, as they go in with the first lot...but as he puts it.. "somebody has to go in first"....best of luck, Norm, om, in any case...2YC.

Another Ham who made my news feel a bit out of date was 2VN. He popped in the other day on his way out to Mascot aerodrome to arrange a plane back. Morrie's Dad is unfortunately very ill and he had just made a rush trip down from the Philippines....I think

he said it was under three days trip down here...two days leave at home and then straight back again. He looks very well and is the same old Morrie you all knew in prewar days in spite of the fact he has now reached the giddy heights of a Wing Commander.

The latest authentic information about Sgt M.R. (Snow) Campbell, VK3MR, comes from Bruce Mann VK3BM, in a letter card received by him. It is dated 1/10/44 and reads "This is my third letter to you since being on my confined tour! I very often think of Quambatook and the interesting time I spent with you, and I can't help but wish to hear how you all are keeping and what you are doing etc. (Bruce says apparently Snow hasn't received letters from him.) I have met quite a lot of chaps from the Swan Hill area and they know a lot of folks that we know. I am keeping very well and passing the time now practising our pet hobby! Cheers, good health to all."

Sgt. Keith Scott VK3SS now finds himself well up in the islands and sends us news of himself. He contacted a Lt. E.D. Worsham ex W8KXX of Detroit Michigan who welcomed Keith as a Ham and took him out to their base G receiver site; which gave him an insight into their communications long range system. They are working teleprinter links only over their main links; WT even high speed they consider obsolete by many years. The receivers are double diversity in racks and cabinets, there being two or three pairs in each rack. They work on fixed frequencies, HF Osc and BFO are Xtal controlled. Tuning is possible over a limited range only by adjusting iron dust slugs in coils and IF's. When they move to another frequency they simply switch to another receiver. The teleprinter operates on a two tone system using FM sort of modified. Most elaborate and separate AVC channels maintain a constant signal strength of minus 6db. Filter circuits reject any frequencies other than the two selected tones, one used for mark and the other for space. They use lots of single wire rhombics on portable light steel lattice masts. Voltage regulator tubes are used extensively and they claim the receivers will maintain on correct pre-set frequencies for up to six months. That's the bare facts, says Keith "and she's a good show."

Expecting a perfect deluge of mail and telephone calls...yes the number is in the book...MU1092...and the QRA Jim Corbin, 78 MaloneySt. Eastlakes...Mascot...I thank you all....Hi!

.....

FEDERAL HEADQUARTERS

Most readers will be aware by this time that Federal Headquarters has at the request of the New South Wales Division, been taken over by the Victorian Division. Officers elected by the Victorian Divisional Council being:- President Mr. R. Marriott VK3SI, Treasurer Mr. T. D. Hogan VK3HX; Secretary Mr. A. H. Clyne VK3VX, Councillors Messrs. A. R. Williams VK3WE and C. C. Quin VK3WQ.

At their first meeting much time was spent in becoming familiar with their duties of office and studying the records forwarded by the outgoing Executive. A full report has been promised for next issue.

NEW SOUTH WALES DIVISION

At the March General Meeting of the Division, Members were informed that Council were at present discussing plans for a Post War Institute. Among many matters discussed was the question of Permanent rooms and the advisability of changing the Meeting night from the third Thursday. At the present time the W.I.A. Meeting clashes with that of the I.R.E. and as many Amateurs belong to both organisations, it is felt that different nights may mean larger attendances. It is realised, of course that the Institute has been meeting on the third Thursday for a decade or more, and Members will be asked to express an opinion before any change is made.

Members were informed that Major Don Knock was "again" a civilian and that Council had immediately availed itself of his Services by electing him to the position of Assistant Secretary. Don, who in pre-war days was Chairman of the U.H.F. Section is just as keen an amateur as ever, and he should be a tower of strength to the Institute in the days to come.

Federal Headquarters has now been transferred to Victoria after a periof of three years in New South Wales. Every good wish is extended to Victoria and every offer of co-operation made.

Members will regret to learn that Ivon Baalue VK2TN underwent a serious operation recently and is at present an inmate of War Memorial Hospital, Waverley. Bob Fussell VK2SS is also having a bad spin. Members everywhere will join in wishing these old "Zero-Beaters" a speedy recovery.

BUSHFIRES NETWORK

Dubbo and Young are still carrying out Tests with their portables and a definite Practice Night has now been fixed. The Stations may be on any night in the week, but in order that other City and Country Amateurs may tune in to the transmissions, Friday night has been laid down as a definite Practice. Practices will commence at 8 p.m. and the frequency is 3115 kcs.

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EMERGENCY COMMUNICATION NETWORK.

It has been decided that N.E.S. will continue after the war and be known as the A.R.D.A. Air Raid Defence Arm. Radio is to play a much more important part. It is hoped that further details will be available next month.

In the meantime Network Stations will continue to practice on the first Friday of each month.

VICTORIAN DIVISION

Two meetings have passed since the last issue of the Magazine, and it is our usual custom to publish the calls of those attending the meetings, here we go:- VK3's JC, WY, JR, VZ, YC, XE, SG, NY, KN, UR, WQ, SC, KJ, XC, IK, QS, SQ, ND, YK, HX, BQ, WE, XZ, MQ, VK2AIH, VU2EB, Messrs. Hibbert, Craig, Ridgway and Rimmer. April Meeting, VK4RM, VK3's VX, PJ, XE, XZ, EC, MK, AC, JE, GW, SZ, QS, SQ, EC, XD, JC, WY, WQ, UR, AP, WC, KJ. Messrs Hibbert, Brooks, Rowse and Ridgway.

It will be noticed that DX put in an appearance at the March meeting in the person of Captain Cadell VU2EB, who during the course of the evening gave a humorous talk on Ham Radio as used in pre-war days in India.

A suggestion put forward at that meeting by one of the members interested in a gliding club was that it was intended by the Club to install ground to flight transmissions and they would welcome members of the Institute forming a roster to operate the gear. Those interested should contact the Institute Secretary who will pass on their names.

Unfortunately the movie show skeduled for the April meeting did not eventuate. Harry Kinnear 3KN apologises sincerely for this unfortunate happening, but through circumstances entirely outside his control his equipment became tied up and he was unable to make other arrangements. However, as soon as he regains control of his equipment he will put on the show. It is doubtful just when this will take place. It maybe at the May Meeting and again it may not be until the June Meeting.

As a result of the show being off, the meeting tuned itself into a discussion of Frequency Modulation, and what is more important a free discussion of post war aims, and quite a few very good ideas were put forward.

Once again the Laboratory Committee have passed a report to the Editor which reads - "These notes are claiming the attention of more and more readers...we have definite proof that three members now take the trouble to read beyond the heading. A few months ago our request for back issues of QST was noticed by 3CN, and now 3KN and 3BM have responded to the appeal for back issues of magazines published last month.

The preparation of plans for the re-habilitation of the library has been occupying our attention for some time, and these will be put into effect just as soon as the necessary finance can be secured by the sale of the motor generator set.

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HAMAD...Bruce Mann VK3BM. "Morningquest" Quambatook, Victoria will pay any reasonable price for:- Radio May '40; All issues 1942. Radiotronics No. 97;107; 109; 115 and all later issues. Philips TC No. 64,73,88 and all later issues.

xxxxxxx

THE WIRELESS INSTITUTE OF AUSTRALIA

Divisions of the Wireless Institute of Australia exist in every State of the Commonwealth. The activities of these Divisions are co-ordinated by Federal Headquarters Division, the location of which is determined from time to time by ballot.

Present location of F.H.Q. :— New South Wales

Federal President : F. P. DICKSON, VK2AFB.

Vice-President : H. F. PETERSON, VK2HP. **Federal Secretary :** W. G. RYAN, VK2TI.

Councillors : C. FRYAR, VK2NP; W. J. McELREA, VK2UV

Official Organ : "AMATEUR RADIO"—Published by the Victorian Division.

VICTORIAN DIVISION

191 QUEEN ST., MELBOURNE

Postal Address : Box 2611W, G.P.O.

President : H. N. STEVENS, VK3JO
Secretary : R. A. C. ANDERSON, VK3WY
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Subscription Rates

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First Tuesday in each month at W.I.A. Rooms, 191 Queen Street.

Visiting Overseas and Interstate Amateurs are welcome at meetings and they are invited to communicate with the Membership Secretaries :

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J. G. MARSLAND VK3NY - WF3958

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Registered Office :

21 TUNSTALL AV., KINGSFORD

Telephone : FX3305
Postal Address : Box 1734JJ, G.P.O., Sydney

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Subscription Rates

Full Members	10/6 per annum
Service Members	7/6 per annum

The N.S.W. Division meets on the third Thursday of each month at Y.M.C.A. Buildings, Pitt St., Sydney and an invitation is accorded to all Amateurs to attend. Overseas and Interstate Amateurs who are unable to attend are asked to phone the Secretary at FX3305.

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MAGNETIC PHONOGRAPH PICKUPS.

The magnetic pickup made possible the change from acoustic phonographs to the electrically amplified type, bringing with it improvements that had always been the dream of every phonograph engineer. Accurately controlled volume level, power output limited only by the amplifier used, greatly increased frequency range and controlled tonal effects were only a few of the advantages gained.

Early types of magnetic pickups were all very similar in design, operating at vertical pressures averaging about 6 oz. They were usually large and unwieldy, with great masses of weight attached for counterbalancing, in general, a far cry from present-day designs operating at less than 1 oz. pressure. However, they paved the way for the modern phonograph, and still have advantages for specific applications where other types of pickups have proved inadequate.

Pickup Design, Fig. 1. illustrates the most conventional type of design. Both pole pieces and armature were machined or formed from soft iron or high permeability alloys. The armature, in an approximate shape of a cross, had section "A" machined or swaged to a cylindrical shape, about which were fitted rubber sleeves, to act as bearings, the pole pieces were so shaped as to retain and compress the rubber bearings when assembled to a back plate (not shown), which permitted the armature to reciprocate in an approximate lateral plane only, indicated by the double arrow.

The magnet was a permanent horse-shoe type, tungston in early designs, and cobalt alloys in later models.

A coil of wire surrounded the armature, being spaced to permit the armature to move, and held rigidly in the pole piece assembly. The impedance of the device was determined by the number of turns of wire used, high impedance pickups having as much as

10,000 turns of No. 44 EN wire, with a resulting impedance of 1,000 cycles of about 50,000 ohms.

Air gaps existed on each side of the armature and the upper pole piece tips, which varied with different designs from .008" to .018" each. However, when once determined for a particular design, these were held very closely by means of assembly gages.

Since a decided magnetic attraction existed between the armature and the pole piece tips, some means was necessary to center the armature in the air gap by overcoming the attraction, but which would permit the armature to reciprocate between the tips when driven by the record groove. The material most commonly used for such a centering block was gum rubber and, later, a loaded rubber stock. The centering block was slotted to receive the free end of the armature, and was in turn clamped to the pole piece assembly in such a manner that it could be moved laterally, thus centering the armature in the air gap.

An equivalent fixed air gap existed between the lower part of the armature and the lower pole piece tips, through the rubber bearings. There was no metal-to-metal contact between the armature and the pole pieces.

In operation, the armature reciprocated between pole piece faces 1 and 2, varying alternately first one and then the other air gap. Thus, when the armature was nearer to 1, a greater number of lines of force appeared through the armature between 1 and 4, since the reluctance between the north and south poles of the magnet was smallest for that magnetic path. When the armature approached face 2, conditions were reversed, the lines of force through the armature were also reversed, being predominant between 2 and 3, and current was generated in the turns of wire due to the reversal of flux through the armature.

Now that we have a general picture of a simple magnetic pickup, let us consider certain design considerations necessary for desirable characteristics.

Design Considerations. Voltage output is dependent on flux density, saturation, the number of turns of wire in the coil, and velocity. By velocity is meant the speed at which the armature travels as it reciprocates in the air gap. Flux density is dependent on the magnet used and the reluctance of the air-metal circuit between the magnet poles. Only one precaution need be observed with respect to flux density, namely, that the armature must not be saturated at any time. Saturation would result in distortion, and would particularly affect the

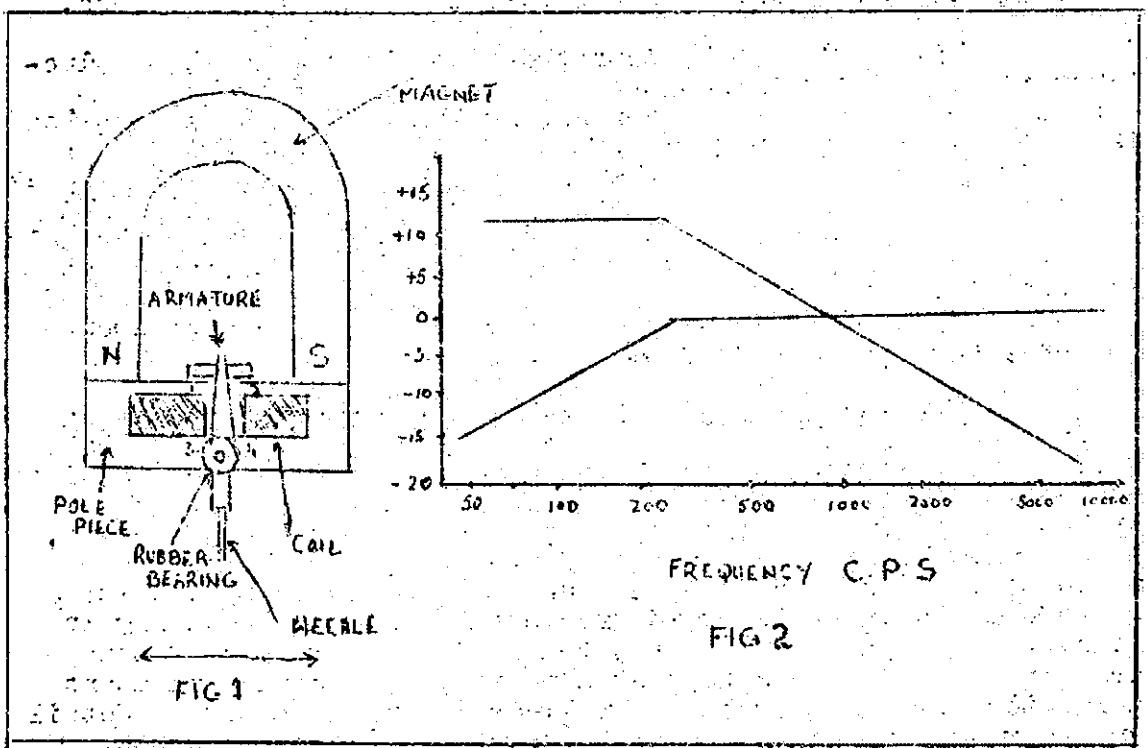


FIG 1

FIG 2

dynamic range and response of the pickup. Fortunately, this condition is rarely encountered, since the air gaps are usually sufficient to prevent it, but in attempting unusual designs, it is well to keep saturation in mind.

Increasing the number of turns of wire does not result in a proportionate increase in voltage, since the resistance of each turn increases as the turns become larger, but in any practical design, a worth while gain may be had.

Velocity, when considered from a pickup standpoint is not a variable to be tampered with indiscriminately. It may be changed in any one design by increasing the ratio of the distances between the bearing and needle point, and the bearing and upper air gap, so that for a given distance of travel of the needle point, the armature between the upper pole piece faces will travel a greater distance, but such practice invariably results in greater difficulties with armature resonance, to be discussed later. Good design practice calls for a ratio of about 1 to 1.

Voltage output is the simplest of the design problems to deal with, since adequate gain is available in any good amplifier, at little or no cost. Very worth while savings may be effected by using low cost materials in the pickup design,

resulting in low flux density and less output, and letting the amplifier carry on from there.

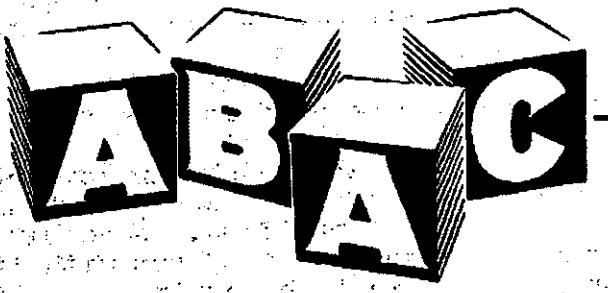
Resonance. As is usual with all electro-mechanical devices covering a wide frequency range, we come to the important problem of mechanical resonance. This has been discussed at some length in previous articles, 1. and 2. in connection with tone arms and crystal cartridges. The resonance conditions encountered in a magnetic pickup, however, are much more severe than in a crystal cartridge, because of the fact that the armature must have low magnetic reluctance and for a given mass, such metals and alloys exceed by far the weight of aluminium and magnesium used in making chucks for cartridges. In order to obtain a frequency range beyond 5000 cycles without resonance peaks or cutoffs, a great deal of thought must be given the armature, striving for the lowest possible mass and greatest stiffness.

With a few exceptions there has been a notable reluctance to break away from the conventional design as shown in Fig. 1, and this design is definitely limited mechanically when one begins to think in terms of response to 10,000 cycles, and tracking pressures of less than 1 oz. The prime reason for lack of improved design may be traced directly to the insistence of magnetic pickup users that the voltage output be kept relatively high. 2.5 to 3.0 volts RMS at 1000 cycles was not unusual at tracking pressures of 6 oz. Gradual refinements over a period of years resulted in tracking pressure being reduced to about 2.5 oz., and approximately .5 volts output.

Vertical Inertia. In considering further reduction of pressure, the problem of vertical inertia, discussed in the article on tone arm design, becomes of prime importance. While it is simple enough to reduce the effective vertical pressure of the system by counterbalancing, either by spring or weight, such counterbalancing in no way decreases vertical inertia, quite to the contrary, weight counterbalancing increases it. Therefore, in order to avoid groove skipping, particularly in coin-operated phonographs, the total mass and weight of tone arm and pickup must be kept at a minimum. This in turn means a lighter, smaller magnet, as well as attention to every detail in order to save weight, and the inevitable result must be decreased voltage output. In addition, a pickup mechanism cannot be made to track at low pressures unless it has a suitably high compliance, which can be obtained only by small light moving parts, a minimum of damping and centering resistance, and a good frequency range, and quality must be made at the expense of voltage output. If users of magnetic pickups would be content with approximately 0.1 volt output, very definite improvements could be made in magnetic pickup design.

Transformer Problems

ARE AS SIMPLE AS ...



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A two-fold problem exists in centering and damping a magnetic pickup. Maintaining the armature in the magnetic center of the air gap, and yet permitting it to move freely when driven by the groove, is a condition requiring a tough, resilient system, unaffected by humidity and temperature changes, and showing little change of characteristics over long periods of time. In addition, the armature must be adequately damped to overcome resonant peaks and transient response. Unfortunately the requirements of a good centering material and an efficient damping material are very much in opposition with each other. The very nature of damping material requires that it be soft and with a minimum of resilience. Obviously, such could not be used for centering.

Centering. Probably the simplest, most efficient, and least expensive means of centering is pure gum rubber. It may be applied mechanically in a number of ways, the only precaution being that it be used generously, and not in small blocks, which tend to age much more rapidly. But such centering is useless, from a damping standpoint, since rubber so used lacks that ability to a marked degree. Damping must then be applied separately, using a material having the desired qualities. Both centering and damping may be applied in compression or shear, however, compression is preferable, since in shear, a portion of

the material is necessarily carried with the armature, and thus adds to the mass and weight of the moving system. This in spite of the fact that damping in shear is more effective.

Much research has been done in attempting to obtain better damping materials. Many compositions have been tried, some borrowed from other industries, and a few satisfactory compromises have been found. It is possible to both center and damp with one material, but such material never has both properties to a satisfactory degree, and failure can result if precautions are not taken from a mechanical standpoint. In addition, materials having good damping qualities are invariably subject to severe changes in characteristics with changes of temperature. Increased temperature results in decreased damping efficiency, and resonant peaks appear in the pickup response.

It is to be hoped that among the many new materials being produced today, a more suitable damping medium will be found, particularly with respect to temperature effects.

Bearings. There is little to be said about bearing systems. Rubber has been used in the majority of designs, being simple, effective, and inexpensive. Knife-edge bearings have been used successfully, and result in long operating life, but have the disadvantages of added cost, mechanical noise, and aggravation of resonance problems. A combination of rubber and knife edge has also been used but with little success. If a rubber bearing system is to be utilized, precautions should be taken to see that pure gum stock or its equivalent is used, and that the walls of the tubing or sheet be as thin as practical. Excessive wall thickness will result in loose play of the armature at the bearings, becoming more pronounced in effect as the frequency increases, low efficiency and distortion can only result.

The magnetic pickup differs from a crystal device in that the voltage output is proportional to velocity. Reference to Fig. 2 illustrates the comparison between theoretically perfect crystal and magnetic pickups. A perfect magnetic pickup would reproduce the magnetic recording head characteristic, since both are proportional to velocity. The loss of bass response below 250 cycles is due to the constant amplitude recording characteristic of commercial home type records, made necessary to avoid break through between adjacent groove walls.

Unfortunately, the magnetic pickup cannot be compensated so readily as the crystal, as illustrated in the article 2 on crystal pickups. Similar adequate networks would require the use of large iron-cored inductances and large capacitors, whose cost and space requirements would be prohibitive.

It is much simpler to make the necessary compensations in the amplifier circuits, wherein suitable bass compensation may be had with little cost.

Moving Coil Types. Moving coil, or dynamic types of pickups have been designed, with varying success. They differ essentially from the armature type in that a coil of wire is movably suspended in an air gap and, when driven by the record groove, cuts lines of force existing through it, with a resultant generation of current proportional to velocity. The inherent drawback is reduction of weight in the moving system, which compels the use of very few turns of wire, as few as one turn being used. Since such a device would have very low impedance, it must be coupled through a suitable transformer for maximum efficiency. The transformer, in turn, is expensive and tends to aggravate hum pickup problems since it must be located closely to the pickup, to avoid excessive losses.

A distinct advantage, however, is that there is no centering problem because, by use of proper materials, there exists no magnetic attraction between the moving system and the pole piece assembly.

Successful moving coil systems have been expensive, delicately made, and suitable for use under exacting conditions, where they give a splendid account of themselves. It is not at all impossible, however, that the design may be applied to routine phonograph requirements with success.

The magnetic pickup has been neglected to a large degree since the general acceptance of the crystal types. However, it has demonstrated its dependability under adverse operating conditions where crystals are inadequate, and is by no means obsolete. General acceptance of low voltage outputs could result in some startling improvements that might well place it at the head of desired pickup types.

From an article in "Radio"

.....oOOo.....

1. Tone Arm Design - DALLY, RADIO, JULY 1944.

2. Crystal Phonograph Pickups - DALLY, RAIO, SEPTEMBER, 1944.

XXXXXXXXX

ARE YOU A MEMBER? IF NOT; WHY NOT ?

CONTACT YOUR DIVISIONAL SECRETARY IMMEDIATELY .

NEW TUBES

It is a far cry from today's complexity of tube types to the early days of radio when one or two types only were available.

Since the advent of the metal tube in 1935 there has been a never ending stream of new tubes pouring from the developmental laboratories.

Needless to say the war has been responsible for tremendous advances in the science of electronic tubes.

Most of these wartime developments have naturally been shrouded in secrecy; but ever so often the veil is lifted just sufficiently to allow a glimpse of what has been done.

Much of the developmental work has been done on tubes for the Ultra and Hyper High Frequencies, and owing to the tremendous field for portable, mobile, walkie talkie etc. many of the new tubes are minature types.

The RCA list of minatures which was introduced in 1940 with four 1.4 volt type tubes, now numbers eighteen. Included in this list are the 9001, 9002 and 9003 which are similar in characteristics to the 954, 955 and 956 acorn types, but use a standard minature envelope with a 7 pin glass seal base.

Recently in this series is the 6J4 which is a high mu triode especially designed for use at UHF. According to published data the 6J4 has a transconductance of 12,000 micromhos and a mu of 55, and can be used as a grounded grid amplifier at frequencies up to 500 Mc.

Also just released in the minature series is the 2D21 Thyratron intended for use as a control tube. The 2D21 is capable of handling peack currents of 500 milliamperes. Incidentally the sizes of these minatures are - height $1\frac{7}{8}$ inches seated; diameter $\frac{3}{4}$ inch and average weight $\frac{1}{2}$ ounce.

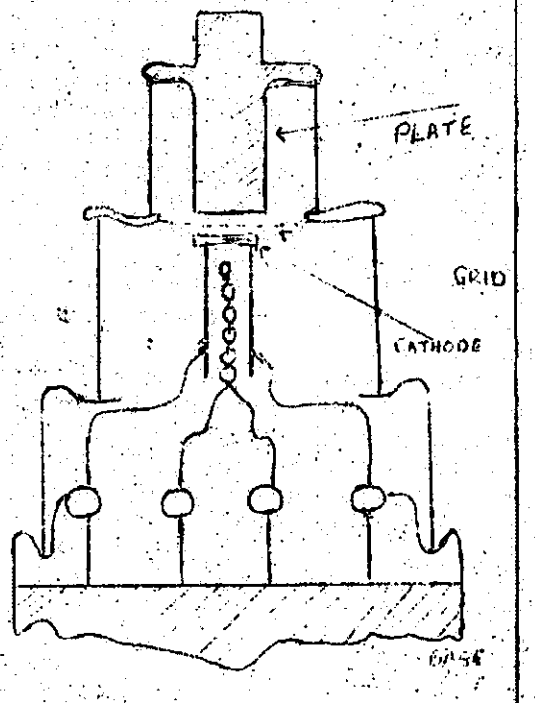
Possibly the most interesting developments in the tube world are the G. E. Megatrons popularly known as "Lighthouse" tubes.

Developed by General Electric for military use, the Lighthouse tubes have now been removed from the secret list. These tubes feature an entirely new type of construction as shown in Fig. 1.

Instead of the plate, grid and cathode being arranged around one another in cylindrical fashion as in conventional design, these tubes are constructed with the electrodes in parallel planes. The grass envelopes and metal electrodes are fused together by a special process, ensuring an extremely rigid construction.

The design allows a very low plate-cathode capacitance and reduction of electron transit time to a minimum. As a result the tubes are capable of extremely efficient operation at very high frequencies. They have been manufactured in a large range of both receiving and transmitting types.

Not only in the receiving type tubes has progress been made. Eimac have developed a series of transmitting tubes primarily for use as pulse generators. Their interest to us as Hams, especially in view of the proposed extension of Ham frequencies into the Hyper highs, lies in the fact that they are designed for operation in the 200-400 Mc range. Although no data is at present available on the operation of these tubes as amplifiers it appears that they will be capable of delivering real power as oscillators in the HHF range. They are charactorised by extremely low interelectrode capacities dual leads to electrodes to facilitate neutralizing and special bulb design to allow voltages as high as 15,000 to be used. They are made in sizes from 15 watts to 300 watts plate disapation.



ELECTRODE CONSTRUCTION OF G.E MEGATRON

The increasing applications of electronic heating in industrial uses has been responsible for the development of small but high powered oscillator and amplifier tubes. RCA features two such tubes the 9C21 and 9C22 which are capable of an output of 50KW at 25 Mc. The 9C21 is a water cooled triode and the 9C22 is fitted with radiating fins making it look surprisingly like an aircraft cylinder.

Westinghouse also have just released the W1475 a Pilotron no larger than a mans hand yet capable of delivering 2½ KW at UHF.

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Friends of Sgnt. M. R. (Snow) Campbell, VK3MR will be delighted to learn that his people have received a cable stating that he is safe in London. We hope to see him home in the very near future.

...

SLOUCH HATS and FORAGE CAPS

You will pardon me I hope if I more or less fill this month's page up with a letter from a new source...so, introducing a Ham, one VK3VG ..SJT.H.A.Vinning I33 Wing No 2 Coy. IASTB Bonegilla. He says, "I am on the staff at the school the Army is running here and occasionally we are lucky enough to have the pleasure of teaching a ham. About five months ago I noticed that one of the students was more interested in how the rig perked instead of the often met aptitude of "punch the key and hope for the best." Suddenly this particular student grabbed the key and rattled out a snappy little CQ DX. I pricked up my ears and he signed VK2ACX...and that is how it started, and from then on we swapped lies and bashed ears to no small order. Next course a new officer took over command of the school, to wit, Lieut. Arthur Stowar (nee VK2ACX).

Since then ACX and myself have held, almost daily, a two-ham ham-fest. We were constantly on the lookout for other hams, as this place, being a signal depot, is the place to find hams. One by one we managed to QSO them and 2ACX is pleased to relate they nearly all QSL, and he is gradually filling up the wall with QSL cards of those who have been contacted. Finally 2ACX suggested that seeing we had quite a few hams in the area, it was time we held a Ham-fest where we could all get together for some unrestricted ragchewing. The arrangements were completed and our dinner was held at the Albury Hotel at 1800 hours on April 19th. Those present were:-

VK2BN	Reg Flood	(Sigmn)
VK2ACX	Arthur Stowar	(Lieut)
VK2CJ	Noel Arnold	(Albury Businessman)
VK2AJM	Fred Bull	(SJT)
VK2AJO	Alan Jocelyne	(S/SJT)
VK3FR	Fred Smith	(SJT)
VK3NQ	Jim Watson	(L/CPL)
VK3VG	Howard Vinning	(SJT)
VK3ZD	Ron Williams	(Lieut)
VK5LO	H. Loiser	(SJT)
VK5RT	Bob Manuel	(Capt)
	Jim Todd	(No call allotted)

Because duty called, those in the area but couldn't make it...

VK2AO	John Proust	(Engineer at 2AY)
VK2QI	Lloyd Davies	(Capt.)
VK2AIZ	Gordon Nolan	(Engineer at 2AY)
VK3VR	Sid Rogers	(CPL)
	Mark Doolan	(Lieut)

Naturally the only topic of conversation was Ham Radio and we concluded the ragchew at about 2200. 2CJ said it was the most hams he had seen altogether for many years and I suppose it was one of the biggest gatherings of the clan since that rateful day of the rod telegram. A good time was most certainly had by all, and everyone agreed that there should be more of the, conducted at regular intervals.

2ACX and myself are, unfortunately, more or less permanent fixtures here, but the majority of the others make up the floating

population that must exist at a signal depot, such as this. So by the time we hold our next Hamfest it is hoped that there are a few n new faces and 2ACX has some more QSL's on his wall. Could you mention in our column that THE SECOND JOB OF ANY HAM UNFORTUNATE ENOUGH PASS THROUGH THIS PLACE? IS TO QSO EITHER PERSONALLY OR THROUGH HONE 2ACX or MYSELF. THE QRA IS BLOCK 7 THE PHONE NR EXTENSION 46 ON THE CAMP SWITCH.

Many a Ham has passed another without knowing it. It certainly pays to advertise, but I don't suggest going to the lengths one Ham did, when in Jerusalem, and his cups, too, he had his call tattoed on his arm. However, he tells me it is as good as a CQ DX, it certainly brings 'em in. Hi! Another I met had his equipment marked with his call and that also brought results, besides that of the SJT-MAJ's wrath."

Thanks Howard, om. To my (2YC's) way of thinking its the same old story of what could have been done and still can be done by Hams where that thing Hams have always talked and writted about, lives on...the good old Ham Spirit. Wars do not last forever, we seem to see the beginning of the end of this, but our Hobby goes on, so far and only so vitally alive as this Ham Spirit keeps it.

Well, it looks to me from what I can hear that if you want to find out where all the RAAFWR are those days you had better take a trip up around the equator...who wouldn't in Winter...and you will find most of them up there. Its a funny thing though...not one of them seems too enamoured of these lovely tropic isles...its just another case of you can't tell everything from a picture, and tropic beauty isn't e ven skin deep.

Our ex State Divisional President 2UX has, after much trying, managed to get out of VK...he is just about in front of those AWAS now. When I think of some "decent" answers I may write to him.

VK3RY has had a trip down to VI3...spending his time hobnobbing with the Dons at the Radio Physics Lab at Sydney University. He tells me a couple of the WRANS at Harman have Ham brothers, one a VK7 and another a VK2. Wonder who will use the old rig in those places after the War??

VK6CY P/O T ol Crawford Young is now on a newly commissioned Frigate. Its good to hear of those VK6's...news of whom is very hard to obtain, though I hear most of them are in the Services.

Somebody m entioned meeting Bill Nash 2WW/4WN on his way up North to join Alec Slight 2ZA. Bill has just about been every where and seen everything so I was told...why keep it so dark Bill, om...(2YC)

Well, oms very sorry to use up so much on the one subject, but my excuse is that it is those Wartime meetings, that will stick to VK Ham Radio after the war...and remove those remarks we sometimes hear, darkly expressed..."he seems to think this.....War is going to last forever"...Hamfest and Service Radio Clubs seem to be the answer...so lets have more of them...and of course, send the reports to YOUR COLUMN...via VK2YC.

- DIVISIONAL NOTES -

Federal Headquarters

By medium of this, the first installment of FHQ notes since the change of location of FHQ from Sydney to Melbourne, the new Federal Executive makes the acquaintance of the members of the WIA and other readers of Amateur Radio wherever they may be.

The new Federal Executive has now had two meetings and apart from routing matters the most important item so far was a decision to contact the Chief Radio Inspector and secure an interview. This was duly arranged and the Members of Federal Executive spent a most interesting hour with Mr. Martin on Thursday, 26th April.

The main point arising from our informal chat with the Chief Inspector is that we at FHQ must begin immediately to draw up a comprehensive plan for the conditions under which Amateur Experimenters in Australia will operate when the current international difference of opinion has been settled.

Now we could take this entirely upon ourselves and go right ahead with our own planning, based upon the ideas of the five members of Federal Executive, but we prefer, and we know you would insist, that the job be tackled in a more democratic way. We had therefore, prior to seeing Mr. Martin, asked each Division to appoint a small Committee to collect ideas on the matter of Post-War amateur radio and to forward their results to FHQ. As stated elsewhere in this issue such a committee has been formed in N.S.W. and we hope that something similar can be arranged in other States.

Such a set-up unfortunately makes no provision for members in the services who are located at points remote from Divisional Headquarters, however there is nothing to prevent such members, and in fact non-members, from writing direct to the Federal Secretary who will welcome any ideas you may care to send, individually or collectively.

Just before going to press we have received via the Victorian Division a most interesting letter from VK3VG who, with a dozen or so other Hams has conducted a Ham-Fest at Albury recently and proposes to make it a regular affair. Apart from having a good old-fashioned ragchew these boys have submitted a foolscap page full of ideas on almost every aspect of post war activities. (A copy of this will be published next month...ED)

Such information is of the utmost value to us as we simply must find out what the rank and file members are thinking, therefore we earnestly recommend to you that this example be followed wherever possible and that study groups, discussion circles or just plain ear-bashers clubs be started (call them what you like so long as they serve the desired purpose.) wherever and whenever Hams in the services may meet.

(Continued on Page 16)

NEW SOUTH WALES DIVISION

The April General Meeting of the New South Wales Division insofar as it marked the beginning of the Division's post war plans for the Institute. After a period of five years the services of an outside Lecturer were availed of and the wonderful support accorded this move spoke well for the future.

In addition the April Meeting was the last to be held at the Y.M.C.A. as arrangements have been made to hold future Meetings of the Division at Science House, Gloucester Street, Sydney. Council were fortunate in obtaining space at Science House - a meeting place much more in keeping with the Institutes standing - but what is more important, Meetings will still be held on the third Thursday with the exception of the November Meeting which will be held on the 22nd of that month. Science House is situated on the corner of Gloucester and Essex Streets and those Members who come by train should break their journey at Wynyard, proceed north along York Street, turn into Grosvenor Street and Gloucester Street runs off Grosvenor Street. Members coming by tram via George Street should get off at Essex street, one stop past Bridge Street and walk up the steps. Members coming from the Eastern Suburbs should get off at Bridge Street, walk down to George St., then either up to Gloucester Street or down George Street to Essex Street.

Before declaring the meeting open for General Business one minutes silence was observed in memory of President Roosevelt and Anzac Day.

In all there were 42 persons present including a representative of the daily press and the Amateurs included W6MOV, VK3OB , VK2 AFB, NQ, DI, WD, NP, LO, JR, ZI, TI, AKR, NO, JU, RA, WN, AGA, JN, OM, ABM, HP, TF, JF, AMT, YC, Messrs. Blackett, Brucll, Glasscock Jnr, P/O Tol. S. Clark and many others.

Members were informed that pursuing its course of building up Assets, the Division had made an investment of £20 in the third Victory Loan Total investments during the past six months have amounted to £36 and it is hoped to reach the £50 mark before the end of the year.

The question of Post war Equipment for Experimenters has been engaging the attention of Council at various times during the past few months and members were asked their opinion regarding a suggestion that a debate be held on this subject and following on this, manufacturers be asked to address the meeting and state their plans and if possible display their product. The amount of discussion that arose from this announcement augurs well for the debate. As a matter of fact it could have quite easily taken place there and then!

Two letters from Federal Headquarters were read to the Meeting the first congratulating the retiring Federal Secretary VK2TI and the other members of the Executive on the splendid work carried out whilst New South Wales was Headquarters Division during the darkest days of the war. The second gave details of Office-Bearers of the New Executive and suggesting the formation of a post-war Planning Committee to formulate ideas for the post war era. It was pointed out that F.H.Q. already should have a wealth of information on this matter from the recent essay competition. Nevertheless it was decided to give the matter consideration.

Don Knock VK2NO informed the meeting that tests carried out by the Ski Club of Victoria Radio Rescue Network had been heard at excellent strength in Sydney during the Easter week-end.

The main item of business for the evening was a Lecture given by Mr. J. Reed on Radio Frequency Heating. The lecture proved of great interest and was delivered in 2JR's inimitable style. A vote of thanks upon conclusion was carried in a very hearty manner.

Don't forget the next meeting of the Division will be held at Science House, Gloucester and Essex Streets Sydney. It will take place on Thursday 17th May at 8 p.m. and it is anticipated that the Lecturer will be Mr. W.W. Honner of A.W.A. Ltd who will deal with the "Aircraft Radio Problems". All Experimentors are invited to be present.

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SYDNEY HARBOR PATROL

By the time these notes are read it is anticipated that the Armistice will have been signed in Europe. With the signing of the Armistice it is anticipated that the populace will give vent to pent up feelings of nearly six years of war, despite the efforts emanating from certain quarters to restrain any demonstrations of relief. It is fully realised that the signing of the Armistice will not mean the end of the war of the Pacific, but the writer is optimistic to feel that once boomerangs and assegais are replaced by Bulldozers and Flamethrowers etc., it won't be very long.

During the Armistice Celebrations the Sydney Harbor Patrol will be on the job covering Sydney's waterfront and of course communications will play a vital part. It is anticipated that eight boats will be on duty, four of which will be equipped with two way Radio. The other boats will have Receivers and will be in sight of craft equipped with two way radio and will communicate by means of flags or morse lamp. In addition a station will be located at the Patrol's Headquarters at "Sea Horse".

The Control Station will be located at N.E.S. Headquarters and the whole of the operations will be under the control of the Police Departments. It is anticipated that the operators at Control will have a pretty busy time. Let's hope that its a week-end!

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EMERGENCY COMMUNICATION NETWORK

The Network still continues to hold monthly Exercises and occasionally a rag chew has been held at the conclusion of exercises. One notable one was between 2TI and 2NO and brought back memories of the good old days.

Network facilities have been placed at the disposal of the Police Department during the Armistice Celebrations and at the time of writing this matter is under consideration by the Department. It is confidently expected that these stations will be made use of but in what direction it is not possible to say at this juncture. In the meantime each Section Leader should check over the installation under his care and make certain that there will be no breakdowns. It is suggested that each station instal a new mike battery!

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BUSHFIRES RADIO NETWORK

The Network continues to expand at both Dubbo and Young and in each of these centres a Truck Set and two portables are in operation.

VL2EA-Dubbo Truck Set - continues to be heard in Sydney at good strength varying from R7 to R8 whilst the portable 2EB is also heard varying from Q5 R7 to Q3 R4. 2EC has not yet been heard although known to be in operation. Up to the present experiments at Dubbo have been carried out from fixed locations and on Sunday 29th April a Filed test will be held, and on the following Sunday 7th May it is proposed to stage a demonstration for the benefit of the Shire Councillors. Max Moore VK2 11, Bill Brook VK2ACT and Tom Stroud VK2AMR have put a great deal of work into this Network and Dubbo should be well prepared by the time next summer comes round.

VL2EE-Young Truck Set is also heard in Sydney not quite as strongly as VL2EA and also has a tendency towards frequency drift. 2EF and 2EG are the portables attached to 2EA and it is understood that they are both working although not heard in Sydney as yet.

As previously mentioned these stations may be on the air practicing any night in the week and definitely Friday nights using a frequency of 3115 kcs at a bout 8 p.m. and reports would be appreciated. They should be sent to H. J. Taylor "Bonnie Doono" Monteagle via Young or M. Moore, McDonald Street, Dubbo.

- VICTORIAN DIVISION -

The May Meeting of the Division has come and gone, and an interested gathering were entertained by a short lecture and demonstration, with the aid of an Oscilloscope, of the Resistance Capacity Oscillator described in a recent issue of Amateur Radio by Mr. J. K. Ridgway.

To follow our usual custom those present were:- VK3's VX;PJ; MW;IK;RZ:EC:JT:XD:YL:CNox7CH:BQ:PU:KK:UQ:HX:JO:WY:WQ:K.Ridgway and VU2EB.

Ern Cook VK3EC late of the RAAF and now once again in civies spoke of some of his experiences while travelling round, and hoped that as he was now located in VIM would be regular visitor at meetings. VK3JT also a member of the RAAF also spoke of some of his experiences.

Probably the item which caused much speculation was the small portable broadcast receiver brought along by VU2EB. A moulded case some eight inches by four inches by two inches contained a complete four tube super together with speaker and batteries. Naturally the gathering was not satisfied until they had examined the works.

Well now for the GOOD news. The movie show which Harry Kinnear VK3KN, intended to put on at the April meeting, but was postponed by circumstances outside his control, will definately be screened at the JUNE MEETING which will be on Tuesday 5th June. Circumstances permitting it is intended to screen the same show which was previously advertised. That is, The Cathode Ray Oascilloscope, and Thermionic Tubes. One or two short subjects will complete the show. So don't forget it chaps, it will be worth waiting for.

The Laboratory Committee have handed me another report, and I've got to publish it otherwise I'm in dutch with them. They state that "Ken Ridgway has made some progress with his task of indexing technical articles in some of the periodicals in the Library. This will be a lengthy job, but once back issues have been indexed, keeping the index up to date will be a comparatively simple matter. When completed, ready reference to all technical articles pertaining to any specific subject will be available and the time likely to be saved by its use will more than compensate for the time spent in the actual work of indexing. We are indebted to Jim Marsland for the idea."

.....oOo.....

FEDERAL HEADQUARTERS:

The previous Federal Executive made a good start with their Essay Competition. Let's keep the ball rolling, we want every opinion of every Ham, we don't care if there are a million of them, keep them coming. Post-War Amateur Radio will be largely what YOU make it, but we must start NOW.

xxxxxXXXxxxxx

THE WIRELESS INSTITUTE OF AUSTRALIA

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The N.S.W. Division meets on the third Thursday of each month at Y.M.C.A. Buildings, Pitt St., Sydney and an invitation is accorded to all Amateurs to attend. Overseas and Interstate Amateurs who are unable to attend are asked to phone the Secretary at FX3305.

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TRANSITRON OSCILLATORS

By Charles C. Quin, VK3WQ (Laboratory Committee.)

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Some of the following has been extracted from an article in MARCH 1944 ELECTRONICS, to which you are referred for further information.

Since Negative Resistance is mentioned, an explanation of its theory and practical operation is deemed necessary.

Normally, when coils and condensers are put together to form a tuned circuit, they are equivalent to a very high positive resistance at the frequency to which they are tuned. The lower the resistance due to losses in components, the higher is the so-called "Dynamic Resistance." Using efficient components it is possible to make it several hundred thousand ohms, whilst using poor components, that is poor power factor, it may be only tens of thousand ohms.

If there were no losses at all, the dynamic resistance would be infinity, but this can be achieved only by neutralising them by means of negative resistance, of which valve-action is the most familiar example.

If this resonant circuit was completely free from losses, a current, once started, would continue indefinitely, that is, sustained oscillations would occur. Naturally this is impracticable, so this condition can be simulated in practice, by cancelling the actual resistance in the circuit by inserting an equal, or greater amount of negative resistance.

Negative resistance is exhibited by any device showing an increase of current when the applied voltage is decreased or vice versa.

The vacuum tube can be made to show negative resistance by a number of arrangements of electrode potentials.

For example, in a normal regenerative detector circuit, the

feedback energy from the plate to the grid circuit acts to neutralise the effect of the positive resistance, and negative resistance results.

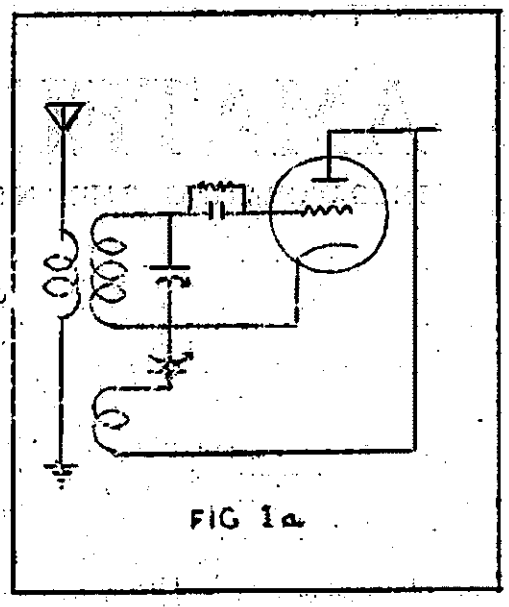


FIG 1a

In a normal tube, in a receiver, the speed of the electrons, from cathode to plate is such, that on striking the plate, some of them 'bounce' back and would return towards the cathode, if it were not for the slightly lower positive voltage applied to the screen, and in earlier type tubes such as the 24, where there was no suppressor, this increased the screen current. In later tubes such as the 57, right up to the 'modern' 6SK7 and others, where a suppressor grid is used, these electrons that 'bounce,' are repelled towards the plate again by virtue of the fact that a negative voltage is applied to this suppressor.

This 'bounce back' is known as SECONDARY EMISSION.

In the Dynatron Oscillator, this fact is made use of in that the screen is operated at a potential higher than that of the plate, and most of the electrons that pass through towards the plate and 'bounce back,' are then attracted by the screen.

The net result is that nearly all the electrons emitted by the cathode are attracted and retained by the screen. Now, if the plate voltage is gradually increased, a still smaller current is taken by the plate, owing to the neutralising effect at some critical point between the normal electron emission from the cathode, and the secondary emission from the plate. When this particular point is reached, the plate cathode circuit resistance would indicate a negative resistance characteristic, if an alternating current potential were applied to the circuit. It is this peculiarity which is the basis of the action of the dynatron oscillator.

In the dynatron, the amount of negative resistance depends on the valve itself, and not on external couplings or adjustments, as also in the transitron, where, by virtue of the fact that as the suppressor grid of a pentode is given more negative bias, electrons normally passing through to the plate, are turned back to the screen, thus increasing the screen current and reversing normal tube action.

The negative resistance so produced, is sufficiently low, that ordinary tuned circuits will oscillate readily at frequencies up to 15 Mc or so.

If you were asked whether - 10,000 ohms or - 100,000 ohms would be most effective for neutralising losses, the obvious answer would be - 100,000 ohms. But wait. 10,000 ohms represents much heavier losses than 100,000, therefore - 10,000 ohms must be a correspondingly more effective negative resistance to neutralise it. When calculating, one must use the rule for adding the resistances in parallel $\frac{R1 \times R2}{R1 + R2}$ by which a combination of + 10,000 and - 100,000 gives + 11,111 ohms which is only a slight improvement on the original 10,000.

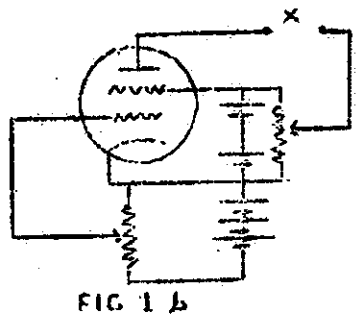


FIG 1 b

BASIC TEST DYNATRON CIRCUIT

The negative resistance of a dynatron, when it is given such a large negative bias as nearly to cut off its current, is nearly infinity, so only circuits already extremely low loss should be attempted. As the bias is reduced, the negative resistance falls, giving correspondingly greater neutralising ability, but one has to be careful not to allow the screen current to rise excessively or the valve will be damaged.

It is important then, to work with the grid bias just on the right side of the oscillation point. Any increases in the losses of the circuit necessitates reduced negative grid bias to bring the valve to oscillation point.

The bias voltage (taking care to keep all other working voltages constant), is therefore a measure of the circuit losses or resistance. Secondly, the frequency at which the circuit oscillates depends of course on the capacitance and inductance. Any change due to added connection necessitates retuning to restore the original frequency.

These two facts form the basis of substitution tests with the dynatron.

The transitron oscillator works on the principle of producing negative resistance between two grid circuits containing the frequency determining constants. As stated previously, negative resistance is produced between the plate and screen grid of a tetrode by dynatron action when secondary emission takes place.

Since dynatron secondary emission is not always reliable, due to variable factors in tube manufacture, that is, slight mechanical

differences effect electrical characteristics, and the oscillator resulting cannot always be relied upon for consistant results.

The transitron obtains its negative resistance characteristics in a different manner and so has the advantages of the dynatron without the attendant disadvantages. Stability of the circuit is excellent because only the RC values determine frequency, (at audio frequencies), the electrode voltages consequently having practically no effect whatever. Such a circuit is comparable to the crystal oscillator in stability since power supply variations of 25%, only change the frequency a few parts in a million.

The oscillator can be used throughout the audio range, and considerably above, using RC circuits alone. The upper practical limit with RC constants is approximately 0.5 Mc. Transitron circuits employing Inductance, can be operated with reliability to 20 Mc, and even to 60 Mc if careful design is observed. Operation above 20 Mc is somewhat difficult as regards efficiency and reliability.

The transitron can be made to oscillate at three distinct frequencies at the same time, by having LC circuits of different constants in its grid and cathode circuits. Thus the tube can operate at radio frequencies and be its own AF modulator.

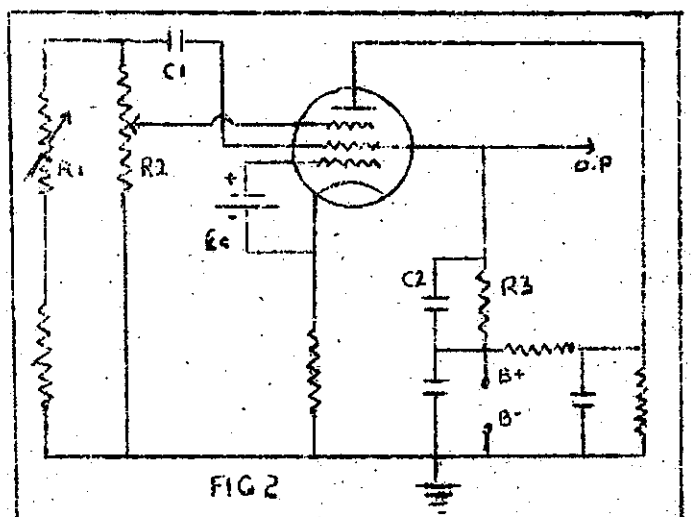


FIG 2

R1. Frequency Adjustment
R2. Feedback Adjustment
R3. Screen resonant circuit component
C1. Feedback Capacitor
C2. Screen resonant circuit component
Ec. Grid bias used to produce sine waves

This circuit therefore presents great potentialities for use with battery equipment in which constancy of calibration as the battery ages is important.

In this basic transitron circuit, the suppressor grid goes negative with respect to the cathode due to applied voltages. Electrons are attracted by the positive screen and repelled by the negative suppressor. A negative voltage change on the screen grid is transmitted from this grid to the suppressor through C1, causing the suppressor to repel more electrons, and resulting in a net increase in screen current. Such an increase with a negative increment in voltage, is effectively negative resistance between the screen and suppressor grids.

A typical negative resistance curve is given herewith - an AC fluctuation in screen voltage operates above and below point X. By this method an alternating current is produced which is 180 degrees out of phase with its initiating voltage.

Rn is the negative resistance portion of the screen characteristic, where an increase in screen voltage gives a decrease in screen current.

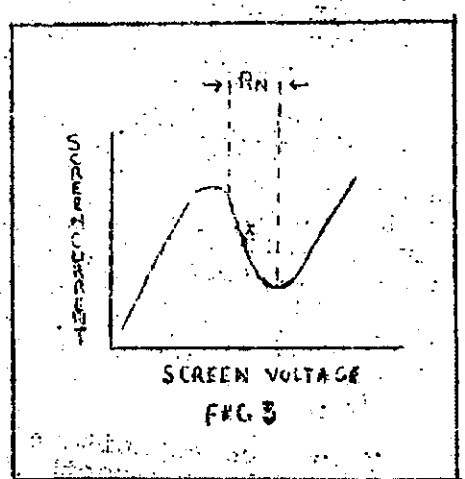


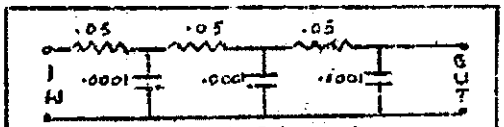
FIG. 3

Any circuit whose output can supply all input losses by the creation of negative resistance can sustain continuous oscillations. By applying bias to the control grid, the total space current of the tube and the slope of the negative resistance curve can be controlled.

In this interval an increase in screen voltage will give a decrease, in screen current, and conversely. Sine-wave output of the oscillator is obtainable when the operation is confined to the linear portions of the Rn curve, that is, by supplying fixed bias to the suppressor and control grids, while properly adjusting the feedback. An alternative method consists of making the screen resistor a voltage divider, the centre arm of which is connected through a capacitor to the control grid. This system is useful in

direct sine-wave production when using proper bias on control and suppressor grids. Consequently, grid bias is used to produce sine waves and omitted to produce highly distorted waves.

SINE WAVES may be produced by operating the transitron to give an isosceles shape wave in the plate circuit and then to pass such a wave through a low-pass RC filter as shown in Figure 4. Such a combination may then be synchronised by the impression of a synchronised signal in the control grid circuit of the transitron. This produces synchronism not only in frequency but in phase as well, when periodically occurring pulses are used as a synchronising voltage.



Low pass filter for converting isosceles waves of 10 to 20 Kc to sine waves

SQUARE WAVES may be produced by proper feedback adjustment of the suppressor grid potentiometer as shown in Figure 2. The square wave output is taken from the screen circuit. Feedback adjustment controls the waveform together with the spacing between adjacent crests of the wave.

The transitron may be used as a source of PULSES by adjusting R2 so that a square wave derivitave is formed which produces a sharp peak over a small portion of the electrical cycle. When such a pulse is derived from a balanced square wave, negative pulses may be eliminated by rectification, while the pulses may be sharpened by passing them through voltage delay circuits. Both operations can be accomplished by using one biassed diode, see figure 5.

A SAW TOOTH WAVE may also be generated (See page 8 November 1944, AMATEUR RADIO). This wave form may be kept isosceles in shape over the range by making the cathode resistor variable. The wave form in the screen circuit is square wave or its derivitave type. The wave form in the plate circuit is saw tooth due to the large capacitance. To produce an isosceles shaped saw tooth wave, the capacitance must be large enough to employ only the linear portion of its charge characteristic. Varying the cathode (Inverse Feedback) resistor will vary the shape of the Sawtooth from Isosceles to other shapes.

Values of capacitance above those needed to correct the non-linear slope of the saw-tooth waveshape merely reduce the voltage output of the oscillator. Naturally such a capacitive filter has a frequency characteristic; when designing an oscillator for a wide frequency range, attenuation of the output voltage must be suffered at the high end to preserve the linearity at the low end. The linearity of the saw-tooth wave should be established at the low end of the desired range by inserting the minimum amount of capacitance necessary to produce linearity at that point, and unless this value is

gradually decreased with the frequency increase, attenuation in oscillation output voltage must be suffered. Also the type of saw-tooth waveform changes with the frequency and must be compensated over a frequency range by a feedback adjustment.

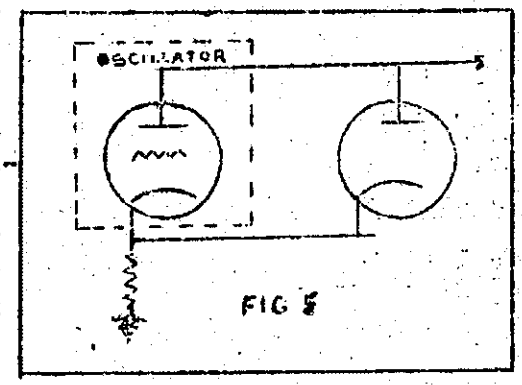


FIG 5

To obtain constancy of waveform and voltage output over a wide frequency range, a complex circuit control is necessary. When operating the oscillator over a limited frequency range, waveform and attenuation do not vary appreciably, and thus do not require compensation. Falling off in output voltage can be compensated by the use of an automatic amplitude control as shown in Figure 5. Best results are obtained by using voltage delay in the diode circuit so that oscillations must reach a certain level before amplitude control takes place. This may be accomplished by inserting a bias cell in series with the rectifier tube or by tapping the cathode return above ground on the power supply bleeder.

The transitron can be used as a SELECTIVE AUDIO AMPLIFIER by varying the negative feedback through zero and to a slightly positive value, producing neutralization. Such action is accomplished by adjusting the feedback control to the point just below that for oscillation, and then using the control grid as a signal input, while taking the output from the screen grid. The only trouble with such a circuit is that the change in mutual conductance causes a change in selectivity, and the circuit hence does not possess equal qualities of inverse feedback circuits used for the same purpose. The effect is not too great at most audio frequencies, but increases as the upper part of the range is approached, and is of considerable magnitude at frequencies above the audio range.

Properly adjusted, PHASE SHIFT OSCILLATORS generate high-precision sine waves accurate to 0.1 per cent. The phase shifting network usually introduces so much attenuation that considerable amplification in the tube must exist to sustain oscillation. Proper filter design together with the use of high-u tubes will, however, produce favourable results from this type of oscillator. The use of fixed bias will facilitate the production of oscillation in some difficult cases. It may also be found necessary to include small bypass capacitors to prevent high frequency parasitics.

The variation of frequency in this oscillator does not make for easy construction since at least one constant in each section of the filter must be varied. An attempt to control the frequency over any appreciable frequency range, by variation of only one component in the circuit, would cause such attenuation in the filter circuit as to stop oscillations.

(continued on page 9)

POST-WAR RECONSTRUCTION

Last month we mentioned in FHQ report that a number of Service and civilian Hams held a Ham Fest at Albury, and had forwarded many ideas which had been discussed on that occasion. Here are their ideas.

STAFF OF WIA. Federal HQ to have at least President and Secretary on permanent staff. President to edit Magazine. Federal HQ to be located permanently in Melbourne, or where ever Chief RI's Office is located.

VIGILANCE COMMITTEE. - A Provost Committee to keep watch on all bands for Bum signals. If any one is caught using bum 'phone or T6 CW have him rubbed out for a month or so, depending on seriousness of offence. Similarly with unstable signals or any action unbecoming to a Ham and a gentleman...such committee to be responsible to Federal HQ and taken from the ranks of Hams who have proved themselves to be ideal Hams...Committee to work on a roster system.

VK2WI: VK3WI: ETC...To have a 500 watt permit and operate on edge of both domestic Bands (3, 5 and 7 Mc). The idea being to provide accurate frequency checks, and also to broadcast latest news from FHQ.

Each station to have accurate frequency meters, CRO's etc. and to provide Hams desiring modulation and frequency checks with such information when QSO-ing.

Assuming the B/C band is made available, WI stations to operate on this band, program being to provide the public with WIA activities as well as normal recorded items. Buckshee advertising for approved dealers in Ham gear.

EMERGENCY NETS...To be permanent, with WI Station acting as control regular practise of working such nets to be carried out.

WIA COMMITTEE DIVISIONAL ...Duration of office to be limited to 12 months. The idea being to do away with any cliques that may creep in. President and Secretary of FHQ to be from 5 to 8 years.

AFFILIATED CLUBS ...To work with, not against WIA. No limit to membership.

ZONE CONVENTIONS..To be held annually in a different town each year. WIA to pay expenses of at least one member from Divisional Committee.

MUSIC ... Banned on all bands below 112 Megacycles.

FREQUENCIES .. Same as submitted by ARRL to FCC. NO band to be divided into separate 'phone and CW channels..Phone and CW on all bands.

Appropriate frequencies to be allotted to FM, Pulse and similar transmissions.

EXAMINATIONS...CW speed to be 15 WPM. General standard of examinations to be stiffened. Those passing this exam to operate on CW only...Phone men to pass CW ticket first and then pass special phone exam. Holders of such tickets to operate any type of licenced transmission.

PROBATIONARY PERIOD...New comers to have to complete such period duration of which to be six months on reduced power (25 watts). At the end of the period log book to be submitted to HQ for perusal and if satisfied that certain progress has been made, Log Book to be submitted with recommendation for full rights to be granted. New comers to operate either CW or 'phone (depending on ticket held) on passing Exam.

POWER INPUT...100 watts to final. The reason for request is that much equipment at present being used by armed forces is around 100 watts rating and would probably be available to Hams.

HAM GEAR ...Some attempt be made to have exise duty reduced. Duty and prices to be at least pre-war ZL level.

AGE LIMIT...To be raised to 18 years. Reason--to prevent over-enthusiastic youths neglecting their school studies.

POST WAR EXAMS ...Everyone to start from scratch and sit for tickets before licence is re-issued.

AIM OF W.I.A. - To have 100% Membership.

...oOo...

TRANSITRON OSCILLATORS.

The phase shift oscillator is frequently sluggish in starting, and should always be allowed to stabilize after being set into operation. Since many tubes will not operate in this circuit, the 6SL7 is to be recommended. In addition to the excellence of wave-form produced by this oscillator, inherent difficulties, which arise in the conventional heterodyne audio type, such as poor beat-frequency stability due to high frequency drift, poor frequency synchronism and poor constancy of the calibration are overcome. The phase shift oscillator will operate from a fraction of a cycle per second throughout the audio range.

Best sine wave production is obtained where oscillations are barely sustained. Automatic amplitude control can be used.

In conclusion it should be noted that any feedback adjustment or other wave form control will cause a frequency shift, and the frequency control will, through its range, cause a wave form change. Thus a reference to wave form or frequency control refers only to the major effect of the control upon the circuit. Thus in Figure 2, R1 is mainly a frequency control whereas R2 is mainly a feedback control.

SLOUCH HATS and FORAGE CAPS

Have you sent in your ideas for Post-war Australian Ham Radio yet? Federal Headquarters asked for them last month and I'll bet every one of you has discoursed long and loud on this subject many times since we were put off the air. Of course, no two of you agreed entirely, and just that fact makes it essential that you post your own ideas into FHQ. IF they get all our ideas they have a chance of getting what the majority want...but how they can do it, if you all leave it to mental telepathy, is quite beyond me...so get the old pen out and, "go to it."

And so, "Snow" 3MR is once more "seeing his DX," which this time involved taking part in that great march you all read about in the papers across what used to be the Third Reich. When one thinks of from North Africa, to Italy, to Poland, across Europe, to England... well, he should be now content to contact all his DX once more from that tall stick he had down in VK3. Air letters from both G6CL, and G2MI say he was "full of beans" as soon as he arrived in England... full enough anyway to contact RSGB HQ at once, and out seeing the sights of London a week later. So you had all better start looking for him on 14 mc. Hi! Good on you, Snow, om...don't forget an exclusive article for "A.R."

Incidentall Clarry 6CL mentions G6SN as arriving back after five years P.O.W., and in 6SN's camp there was a VK2...wonder who it was ...anybody have any ideas on the matter?

That lad VK2QL seems as though he will never get to where-over it is he is going as he rang me up, yet again the other night from Sydney to know how a Proselector of two 1852's would go. And me a poor stay at civvie, who never saw an 1852 outside of the ARRL Handbook. Hi! Hope they send him out to 5KL's location. Hi!

I have reason to believe that VI3OF, CPO Tel Frank O'Dwyer has headed out to meet some DX, too. I wonder who is going to rebuild the Hen house after the next VK3 storm. VK6IG has left the ship and I believe is headed back to home territory, but a couple of the Sigs staff have brothers, Hams, so it apparently, is, "in the blood" so to speak.

Dave Hogan, VK2??? is a bit unique in that he passed his AOPC while on Active Service...wonder how many others have done this (2XC?)...He is just gone on a spot of leave after 18 months in New Guinea...mostly around Madang. Whilst up there he met quite a few VKs including 9MT and 4HU, plus VK5's and VK6's. Asked regarding the other VK9's he said that he and 9MT were too busy "looking over some gear," but he didn't say whether in a service OR a Ham capacity... ..which makes all the difference, in the end, if you get what I mean.. Hi! MOST IMPORTANT, he says the Japs make an 807, so all yo Hams up North, look carefully, and hope strenuously they are not too typical of the HON quality (prewar) the Hon. country.

Fred Lubach 4RF still serves the Navy up at Townsville. He has now just about had twelve months there. As usual, so it seems, he is due for another trip to VIB to see the daughters. Hi! He also talks of starting on an II tube super....well, Fred, if you were here in Sydney you would stop right at the beginning...trying to get a chassis. He often sees Arthur 4AW, and Jim Rafter 4PR, while Arthur Burton 4FE and Bill Aspiett 2ALT drop in for a ragchew.

On a trip to Magnetic Island, about 8 miles from Townsville, there is, inscribed on a seat, the following calls....VK5CV, VK2AJR, VK2GT, VK4PR, VK3BK...(and now I suppose VK4RF, Hi!) These Hams do leave impressions, don't them????

W/O Norm Foxcroft RAAF, VK3UQ tells us that they have a good mustering of Hams among the personnel at the Sigs School down Point Cook way. VK3BZ and VK3AB spend their time training telegraphists VK3AF Alan Foxcroft now a Flight Lieut is in charge of Cathode Ray DF training; while VK3TY Bill Burden, a Squadron Leader no less is OC of Signal Officers School. On the staff of this Sig. Officers School is VK2WC F/Lt Cavanagh, VK5JT F/Lt Jas. Golley and myself VK3UQ W/O Foxcroft. Norm's comment about the gear is "It certainly makes your mouth water to see the half kw transmitter in the Laboratory and with a tang of remorse we think of the "lil ole" 10 watter in wadding for the duration.

Cfn M. D. Sidebottom, a member of the Victorian Division has been moved a bit closer home and may now be located with Vic L of C Workshops at Broadmeadows, from where he has hopes of being able to get along to the Divisional meetings.

In a letter to VK3NY, Sgt. Charlie Garver W8WFF who was a visitor to the last Annual General Meeting of the Victorian Division writes, "I have been getting your WIA Magazine promptly each month and enjoyed it thoroughly. But now I've left my ship and am living ashore here in New Guinea, but my stay is only temporary. I'm on my way home for a nice long leave. When my leave expires, I expect to go to a replacement center for re-assignment. Of course I'll still be in radio but my sea-going days may be over."

Amongst a batch of new members recently admitted to the Vic Division were:- VK3EV S/Sgt Frank Walker of Camberwell who is now with 20 Aust Tech Maint. Sec. AIF somewhere in Australia; VK3MQ Sgt. J.A. Cusick of South Melbourne is with a Heavy Wireless Group AIF not far from Melbourne; VK3BJ S/Sgt. Frank Hanham of Essendon is with an AIF Radar Detachment; VK3GX Cpl. P. R. Gibson of Camberwell with 4 Aust. Div. Sigs AIF; VK3FH F/O H.F. Huon with the RAAF somewhere in the Darwin area; VK3IO Lieut. A. L. Maguire of Stratford is with a Heavy A.A. Battery also somewhere in Australia; VK3FX Cpl. Gordon Daniel of Warracknabeal may be located at Group 417 RAAF Tocumwal and VK3KD Sgt. A.K. Carlyle of East Preston is with the RAAF somewhere in the Pacific area.

F/Lt George Glover VK3AG was on leave in Melbourne recently after having had quite a spell in the Darwin Area and other parts reported that before going north he had contacted F/O Paul Watson VK3PY. George may now be located at No. 1 OTU East Sale.

(Continued on Page 16).

DIVISIONAL NOTES

- Federal Headquarters -

This month we are pleased to announce that FHQ has made some progress in the direction of post-war planning. At the May council meeting of Federal Executive it was decided to proceed without delay with a draft plan for post war Amateur Radio. This plan was duly drawn up at a special meeting of FHQ held on May 2and, and represents only the ideas of the Federal Executive within the framework of the knowledge gained from our interview with the Chief Inspector. The draft plan should by now be in the hands of the Divisional Secretary's who are active. Where the Division has closed down a copy will be forwarded to the known contact in that state.

Suggestions for alteration will be welcome, in fact this is why the draft plan has been drawn up. These further suggestions will then be incorporated in a revised edition of the "PW Plan." This will then be re-circulated and the same procedure gone through again until the whole thing is built into a substantial design, complete in every detail.

This project does not, however, take the place of the scheme referred to in last months notes, namely the desire on our part for ideas from all members, rather the two are complementary. We still want to know what every Ham thinks so go to it.

Federal Executive would like to point out that in post-war planning there are two distinct plans. The first is that on which we are now working, and that is the approach to the PMG Department on conditions of licencing and regulations thereto. The Second is the actual workings within the W.I.A. framework, by that is meant the necessity of permanent officials etc., etc.

It seems your most humble commentator made a faux pas last month in those notes, mentioning the fact that N.S.W. had formed a Post-War Planning Committee and quite forgetting to point out that Victoria has had such a committee functioning for some time. Let the error be hereby corrected immediately lest the writer by chance encounter the VK3 Council some dark night.

Federal Executive decided at its May meeting to pay over the balance remaining in the Trust Account of Prisoner of War Fund, to the Australian Red Cross. This action was taken as the European Theatre of war had ended, and as far as it could be ascertained prisoners held there had been released. A cheque for £28 was therefore forwarded to the Red Cross. In reply the Australian Red Cross desire Federal Executive to convey to those members who contributed to the fund their sincerest thanks, as the amount collected would help considerably in carrying out their work of mercy.

...oOo...

NEW SOUTH WALES DIVISION

The May General Meeting of the Division was the first to be held at the new Headquarters Science House and despite the fact that the elements were very, very unkind, only one or two vacant seats could be observed. This augurs well for the future and if attendances continue to increase, consideration will have to be given to the taking over of the Main Hall.

The Chairman, in declaring the Meeting open, stated that he felt that he could not let the occasion pass without touching upon the significance of the May 1945 General Meeting. Firstly it was the first Meeting after V-E Day and that he would have a little to say later on in the evening regarding the effect of that great event on Experimental Radio. Secondly, this month marked the 35th Anniversary of the foundation of the Wireless Institute of Australia, another milestone in the history of the Institute and the fact that this meeting was taking place on Science House - the headquarters of all scientific bodies in New South Wales, was a noteworthy event.

Numbered amongst those present were VK2ABM, 2AJW, 2AGO, 2ADQ, 2DR, 2WN, 2JN, 2HZ, 2FN, 2NI, 2IE, 2MP, 2NG, 2LO, 2RA, 2TI, W6DJP, ex-VK2LK, CCY, 2AHJ. Messrs. Crozier, Chenhall, Davidson, Bordan, Mendel P/O Tel, Clark. IT IS HOPED THAT THE THREE MEMBERS OF THE COUNCIL WHO WERE NOT PRESENT, WILL BE IN A POSITION TO BE PRESENT AT THE JUNE MEETING!

A very interesting lecture was delivered by Mr. W. W. Honner B.Sc., B.E., A.M.I.E. who chose for his subject "The Effect of Atmospheric Conditions on Aircraft Radio Equipment." The subject matter was quite a departure from the usual trend of talks these days which deal mainly with the effects of heat and humidity. W.W.H. dealt mainly with temperature variations between ground level and 50,000 feet and the various astounding happenings that occur, particularly to Radio Equipment - to say nothing of human beings. The Lecturer was accorded a very hearty vote of thanks upon the conclusion of his talk.

Members were informed that Federal Headquarters were losing no time in making preparations for Post War Experimental Radio and had already had an interview with the Chief Radio Inspector. The Meeting was given brief details of certain proposals that the Divisional Council was submitting to F.H.Q. and after some discussion, the proposals were endorsed.

During the past two months, Members have had the opportunity of hearing lectures by outstanding speakers in their particular spheres. It must not be imagined that Experimental Radio and its present day problems have been overlooked. At the June General Meeting Mr. M. Lusby B.E., B.Sc. will give an outline of some types of equipment that should be available to Licensed Experimenters after the war, together with details of some operating techniques. 2WN is well qualified to speak on this subject and from his talk and the discussion that will most certainly ensue it is hoped to place some tangible programme before the manufacturers. This lecture will be of importance to every holder, and prospective holder of an AOCP, and it will be in your own interest to be present.

Don't forget, the June General Meeting will be held on Thursday 21st June at Science House, commencing at 8 pm, and it will be advisable to come early if you are to obtain a seat.

.....

SYDNEY HARBOR PATROL

Details were given in the May issue of the magazine regarding the part to be played by this organisation during V-E Day Celebrations. As prophet predicted the Day has come and gone and we are now waiting for V. P Day.

Unfortunately (?) VE Day and the night preceding same passed off very quietly. It can be said with certainty that on the day we see the 8th Division swinging down Martin Place, Sydney will show the rest of the world how to <u>really</u> celebrate. That is by the by, of course.

Here are details of VE day as the Experimenters saw it. Sharp at 7 p.m, Central was manned and at 7.05 p.m "Pert" was the first boat to check in. The Radio set up at the Control station was as follows:- Four Receivers and one transmitter were in use. The Receivers were tuned as follows - No. 1 National Station. No. 2 Police Transmitter. No. 3 Harbor Patrol (E.C.N. Wavelength). No. 4 Harbor Patrol, Shore Patrol and Police Cars. The Transmitter operating on the E.C.N. Wavelength.

At 8 p.m. launch "Pert" intimated that she was now leaving "Sea Horse" for her allotted Patrol area, and during the evening until 1 a.m. reports continued to be exchanged. We are very sorry that "secrecy of Correspondence" debars us from telling a few stories regarding the night's happening as heard per medium of the various Receivers!

At 1.10 a.m. Central closed down and a few weary hams wended their way home (I hope) regretting that Sydney must be getting a very quiet place like Melbourne, but happy in the knowledge that if they had been called upon they would not have been found wanting.

...oOOo...

- E.C.N. DOINGS -

Exercises are still carried out on the first Friday in the month and May practice saw all stations manned. Those E.C.N. Operators who are not rostered for duty on any Practice night should make a point of listening to the messages passed from Control to the outlying stations as these days, they are usually made of interesting items concerning the Institute.

After an absence of many moons 2NP graced Control with his presence recently. It was too much for the transmitter. The relays just wouldn't work. It was a sight for sore eyes to see a wellknown Radar operator sitting on the floor holding the contacts down, Tom's version of it was "Well, I feel more at home, anyway," spoken like a real ham!

BUSHFIRES NETWORK

On Sunday May 13th Dubbo Network had a Field Day, and they report Tests quite satisfactory, in fact they were able to contact VL2EE-ta Young - on the Truck Set in broad daylight. Signals at both ends were R7 to R8.

Quite a lot was learnt from the field day, quite a number of faults showing up, particularly with reference to the portables, insofar as they were not "sufficiently portable," the battery supply being the main problem.

At the present time the portable sets are forced to use Superdynes as a source of power and it can be quite easily understood that carrying this type of battery around the country is no easy job. It is hoped that in the very near future when Service demands slacken, it will be possible to have made available a lighter type of "B" battery.

In the meantime Section Leader Max Moore intends equipping the portables with a small vibrator and a very small 6 volt motor cycle battery. He feels that the saving in cost would be tremendous and the saving in space quite worth while. Of course hash at the receiving end may be difficult, and then again vibrators are not readily available.

T here is no news from Young this month, but this is understandable as the operators down there are busy moving stock northwards to more favorable areas.

...oOo...

VICTORIAN DIVISION

Members are reminded that on Tuesday June 5th, that's the day you should receive this magazine, is Meeting night. Publicity in last month's magazine tells that Harry Kinnear VK3KN will be putting on a movie show, and as far as known, the features published still hold good. They are "The Cathode Ray Oscilloscope" and "Thermionic Tubes", both of which should prove of very much value to every Ham. The show will be completed with one or two topical shorts. Everyone is welcome to attend, so roll up and make a good mustering.

Membership of the Victorian Division still shows a remarkable increase, due mainly to the work of the Membership Secretaries At the present moment the total is very close on 250, a figure which is as high if not higher than it ever has been. Members can help swell the number by introducing non-members, and others interested in Radio. Drop a line to your Divisional Secretary.

....XXXX....

It seems that your Notes Correspondent only has to say one word out of place to be taken to task. The Laboratory Committee have passed in another report so to save any further recriminations here it is as written. "Lack of space precludes comment on the Editor's preface to last month's report (I'm looking for copy to fill up this month...Ed.) He'd probably censor it, anyway and we have more worthwhile news to impart.

At last we can report some concrete progress in the rehabilitation of the library. Six modern technical radio books, to wit... Meter at Work..Rider; Basic Radio...Hoag; Radio Receiver Design.. Sturley; Hyper and Ultra High Frequency Engineering...Sarbacher and Edson; Time Bases...Puckle; Radiotron Designers Handbook...AWA: have been purchased and will be available for loan to members shortly. In addition subscriptions have been made to "Wireless Engineer" and Communications." This very modest beginning has been made possible by the use of funds secured by the sale of some Admiralty Handbooks, 1936 Edition. In order to secure more funds so that we may enlarge the library, ten copies only of the Admiralty Handbook 1931 edition are offered for sale at five shillings each.

And now to end up, the next meeting of the Division will be held on Tuesday 5th June at the Rooms, 6th floor, 191 Queen Street, and the evening will be taken up with a Technical movie show put on by Harry Kinnear....everyone is welcome.

....oOOo....

SLOUCH HATS AND FORAGE CAPS.

Constant readers of this page will recall that early this year we announced the double event in 3NY's family. A prediction was made in respect to the announcement of the engagement of Clem Day VK3GY, RAAF to NY's sister..well. it didn't take very long because about a month ago Clem did a knee tremble waiting at the end of the "issel." After spending a honeymoon at Lakes Entrance, Clem is back at work...he must know someone, because he managed to get posted back to Essendon.

Heard of a very sad case the other day. A couple of very active pre-war Hams have since married, and their wives do not take very kindly to the idea that "a Home is a place where Ham Radio is carried on, with spells in between contests when Pop can mind the baby etc." These poor ladies think Ham Radio is the subsidiary affair. As they have said so quite loud and often, these rightly alarmed Hams request support and an organisation where all Wartime Wives be taught to "see the light," Hi....YYL, please note....

Now, look here, would some of you "seeing Dx" Hams remember you all have to knock off looking in their eyes to send in your notes to YOUR column...you all get lazier and lazier...or is it only the old cry "vy yl QRM" Hi! In any case send your notes at once to the divisional Secretary or to VK2XC...78 Maloney Street, Eastlakes (Mascot), Phone MU1092.

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Official Organ : "AMATEUR RADIO"—Published by the Victorian Division.

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The N.S.W. Division meets on the third Thursday of each month at Y.M.C.A. Buildings, Pitt St., Sydney and an invitation is accorded to all Amateurs to attend. Overseas and Interstate Amateurs who are unable to attend are asked to phone the Secretary at FX3305.

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AMATEUR-RADIO

INCORPORATING THE N.S.W. DIVISIONAL BULLETIN

Vol. 13. JULY, 1945. No. 7

- UNIVERSAL MEASURING INSTRUMENT -

This instrument is designed around a 'magic eye' tube arranged as a DC null indicator, to which can be connected by switching various filters, standard resistances, a diode rectifier etc.

The output from the power supply portion of the unit is applied to a voltage divider which splits the voltage into two parts, 200 volts for operation of the "Magic eye" and 120 volts for the potentiometer giving the comparison voltages. The latter is developed across a neon stabiliser which ensures a constant reference voltage. In addition there is a semi-variable tapping to give 100 volts positive to 'earth' for operation of the megohm meter.

The EM1 is connected between earth and 200 volts positive with an adjustable cathode resistor, 2000 ohms fixed in series with a 5000 ohms variable. This gives variable sensitivity which is useful when rough measurements are to be made. The cathode return is made to a 400 ohm potentiometer in the main potential divider which acts as a zero adjustor. This zero setting is constant for all DC and resistance measurements, and also constant at a different setting for all AC ranges. Maximum sensitivity is obtained with the shadow angle at about 45 degrees but in practice it is found quite satisfactory to adjust the shadow to zero angle.

A Cossor S130 neon stabiliser is used to give an output of about 115 volts at a tube current of 15 M/a. This is used as the comparison voltage, the 5000 ohm voltage adjustment dropping it to 100 volts across the potentiometer network which consumes 5M/a. The potentiometer track R5 consists of a 20 watt type which is fitted with a six inch diameter rotating scale; for the 100 volt range this is connected across the whole supply, in switch position 3. In the other two switch positions resistance networks are brought into circuit which reduce the voltage across R5 to 1 volt and 10 volts respectively.

The calculation of resistance values is straightforward, but tedious, and only the results are given here; they are expressed as functions of R5. R6 = 0.9 of R5; R7 = 0.09 of R5

R8 = $\frac{10R5}{99}$ and R9 = $\frac{R5}{99}$

It is suggested that these resistors should be wire wound and adjusted by comparison with R5 as standard in a conventional bridge circuit.

If it is desired to measure a voltage greater than 100--either AC or DC---an external source of voltage can be connected to the terminals marked, which are normally short-circuited by a link.

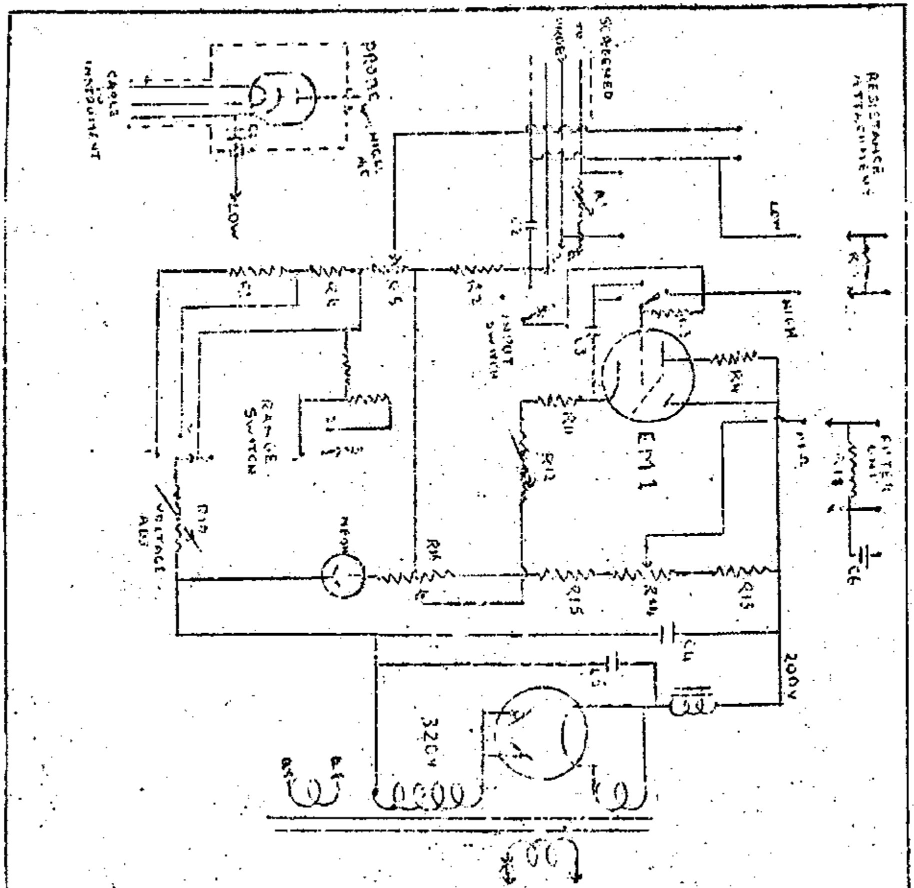
The switching arrangements in the grid circuit of the EMI are necessary to connect the various filter circuits to the grid. In Switch position 1 the instrument is set for use as a bridge indicator. The input is connected across terminals "HIGH" and "LOW" and the slide-back control set at zero. This use of the meter is effective throughout the audio range. If the alternating voltage under investigation is superimposed on a DC component, the latter can either be balanced out by the slide-back voltage, or removed by a condenser-resistance filter. If the bridge does not present a complete path to DC looking from the detector terminals, a resistance must be connected across these.

In switch position 3, DC voltages can be measured, again using terminals "HIGH" and "LOW", the former being positive. AC components are removed by an internal filter consisting of a 5 megohm resistance and an 0.01 mfd condenser. A DC path across the input is again necessary. Readings are taken on the main scale which is graduated from 1-100. Resistance and insulation are also measured in this position, and this is done by connecting an external 1 megohm standard to the appropiate terminals. For resistances below 1 megohm; the standard which is fitted with rigid spade connectors, is placed between terminals "MEGOHMS" and "HIGH", the unknown between "HIGH" and "LOW" and scale A used with a multiplying factor of 10,000. The range switch then acts in the same way as for DC voltage.

The megohm adjuster is best set as follows:- Having set the EML zero and the voltage adjustor to give correct DC voltage readings, the standard megohm is connected across "HIGH" and "LOW", the scale set to 1 megohm and another external standard megohm connected across "MEGOHM" and "HIGH." The megohm adjustor is then set until the EM1 zero is again reached.

In switch position 2, the diode rectifier is connected for AC voltage measurements. In all cases peak voltage is indicated. The diode is made in the form of a probe and in the original instrument a Mullard EA50 was used--the heater being run at 5 volts instead of 6.3 volts to reduce heater cathode leakage.

Essential points to watch in construction of the probe are:-. (1) a short path from the diode anode to its terminal and from the cathode through the condenser to the earthy terminal. (2) screening as complete as possible. (3) good insulation and screening of cable. (4) ceramic insulation wherever possible in RF circuits. The theoretical value for the input resistance of the meter is of the order of 5 megohms.



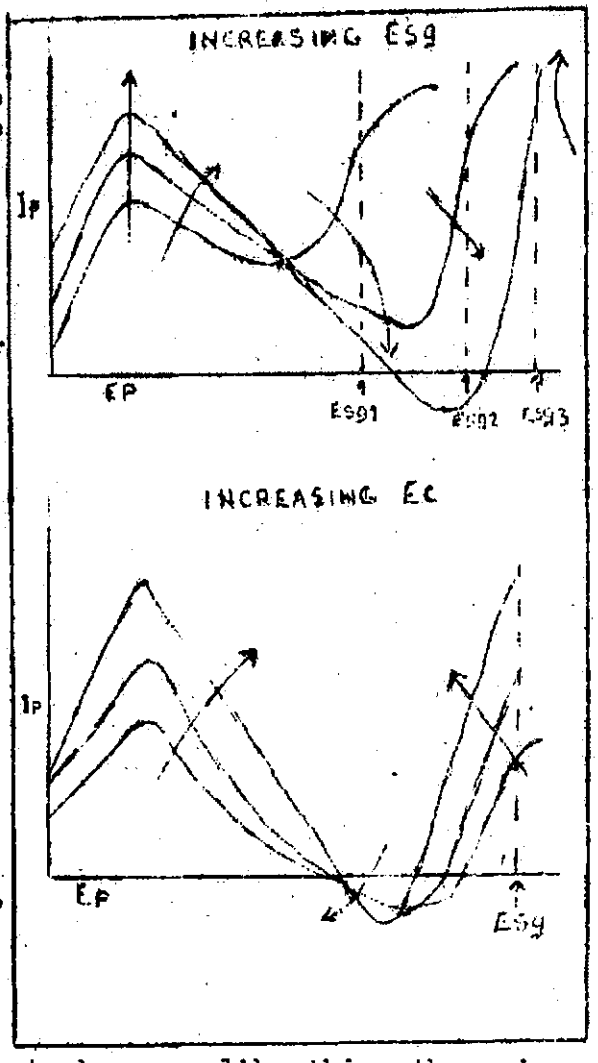
R1..10 ohm	R10..5000 Ohm	R17..1 megohm Std
R2..10 megohm	R11..5000 Ohm	R18..1 Megohm
R3..5 " "	R12..5000 Ohm	C1..100mmfd
R4..1 " "	R13..4000 Ohm	C2..0.01
R5..20,000 ohm	R14..2000 Ohm	C3..0.01
R6..See Text	R15..5750 Ohm	C4..4 mfd
R7.. " "	R16..400 Ohm tapped at 150 ohms	C5..4 mfd
R8.. " "		C6..0.01
R9... " "		

A DYNATRON TEST OSCILLATOR

Charles C. Quin VK3WQ. (Laboratory Committee)

*****

Almost any screen grid tetrode with the plate fed at a substantially lower voltage than the screen grid will work as a Dynatron. Typical curves show that when the plate voltage Ep is between the limits of about 10 to 90 per cent of the screen grid voltage Esg, the plate current (Ip) curve slopes the opposite way from the usual, which means that the plate AC resistance is negative and that any oscillatory circuit connected in series, will oscillate if its dynamic resistance is numerically greater.



As the curves show, the negative resistance can be varied, either by Esg or by the grid voltage Ec. (Screen voltage is worked along the plate voltage scale).

Generally it is convenient to fix Esg at the lowest that will give the required negative resistance and sufficient amplitude of oscillation, and to use Ec for increasing the resistance until oscillation is only just maintained.

Under these conditions it sweeps over the practically straight downward slope and the purity of the waveform is exceedingly good.

Convenient voltages are, Esg 100, Ep about 20 for small amplitudes and 50 for maximum amplitude, variable to about negative 8. With zero bias the plate resistance of some tubes will go down to about negative 6000 ohms, which is capable of setting even heavily damped circuits into oscillation, but when run like this, there is a risk of the dynatron properties deteriorating quickly. The dynatron is therefore not recommended for URP work in which the impedance of the oscillatory circuit is inevitably low.

An important practical point is to make any potential divider used to tap off the plate voltage, considerably lower in resistance

than the negative resistance of the dynatron. The advantages of the dynatron are its ability to set up oscillations in a simple two terminal circuit which may even be screened and inaccessible. The ease and precision of control, the straightness of its working characteristic and the frequency stability of its oscillations, PROVIDED THAT THEY DO NOT SWEEP BEYOND THIS WORKING SLOPE.

It lends itself (as also the transitron) to automatic amplitude control, because the control element, (the grid), forms no part of the oscillating circuit and a very large control is exercised by a small grid voltage.

Examples of practical use are:- Matching coils and condensers to high accuracy for ganged circuits. Measuring or comparing the dynamic resistance of tuned circuits, testing RF chokes for mistuning or absorption over the band of working frequencies. Testing samples of insulating materials for RF losses, measuring the characteristics of aerials.

To understand how the dynatron can be used for the various purposes suggested, it is necessary to visualise it in the circuit as a negative resistance, the amount of which can be conveniently controlled by varying the grid bias. The control grid is NOT subjected to any oscillatory voltage, but is kept at a steady bias voltage that acts as a throttle.

When the positive resistance of a tuned circuit is fully neutralised, oscillations set up in it continue indefinitely. If the grid bias of the dynatron is further reduced, so that the resistance is more than neutralised, the amplitude of the oscillations increases until it sweeps around the bends of the tube characteristic curves so bringing the negative resistance to a balance once more.

This has at least three bad results. It causes the tube to take unnecessarily high current. It produces strong harmonics in the oscillation. It causes the frequency of the oscillation to depart from that which is determined by the capacitance and inductance of the components. It is important then to work with the grid bias on the right side of the oscillation point.

The method in all cases is to compare one circuit or component with others. If actual values of some are known, they can be used as standards to measure the unknown (as already shown in our bridge). Both are connected in turn at X in Figure 1A. (See Article in June Amateur Radio and Figure 3 this issue.)

Smooth control of the grid voltage is essential, as also accurate indication of small changes in voltage.

Although negative resistance does not depend very much on the plate volts, it is convenient to be able to adjust it so as to avoid any part of the curve that looks like (a) Fig 2, (greatly

exaggerated) and to select a point that is more like (b). The difference is that with (a), the negative resistance falls as the amplitude increases and so oscillation, once started, jumps to a large amplitude and there is electrical backlash in adjusting the threshold of oscillation.

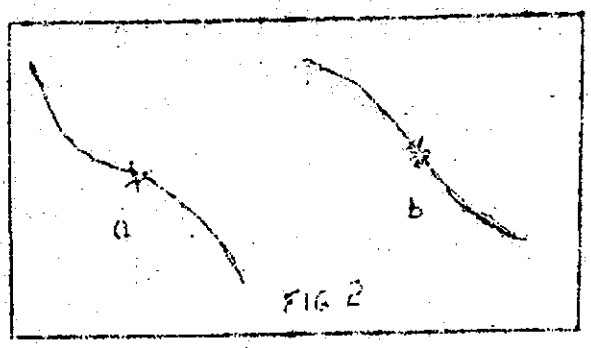


FIG 2

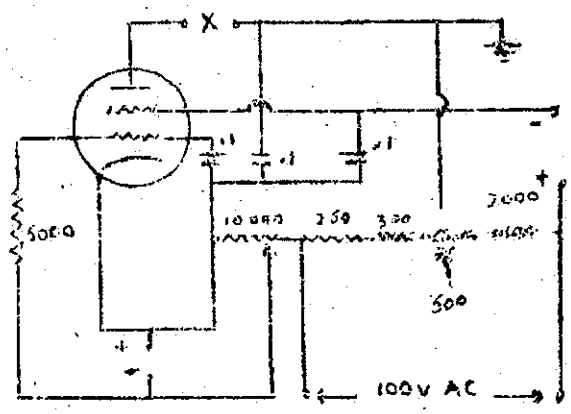
Raw AC can be used to power the dynatron, and this enables lower negative resistance to be obtained without risk to the valve, and the resulting oscillation can be heard in a superhet receiver. A practical circuit is given as follows.

R1 is to prevent excessive grid current on the positive swings when the unit is to be used on RAC - it can be left in when running on DC.

Connection to the plate should be as short as possible as also the connections of the various bypass condensers which should be non-inductive.

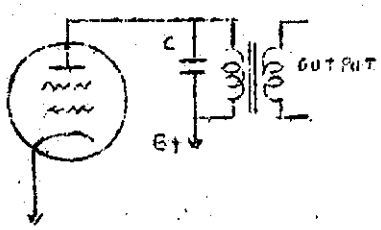
To check whether the dynatron signal in the receiver is a fundamental or harmonic, move the grid control some distance around, and note whether the strength alters greatly - if it does not, but jumps very close to the oscillation point, it is the fundamental.

As in the transitron the dynatron can be used to produce Audio frequency as well as Radio Frequency, or both simultaneously. (See Figs. 4 and 5.)



NOTE:- Unit is earthed at ONE point as shown

FIG 3

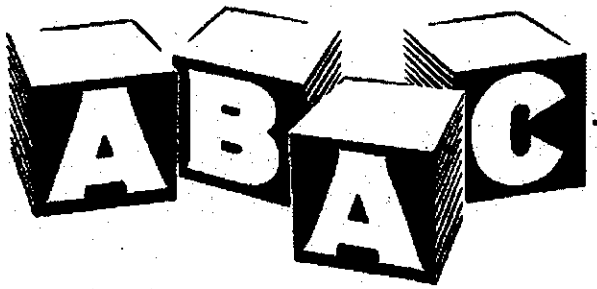


For higher audible frequencies it is necessary to connect an air core choke of suitable inductance in parallel to the primary

FIG 4

Transformer Problems

ARE AS SIMPLE AS...



- Air cooled power transformers up to 2KVA.
- Small size current transformers for rectifier instruments.
- Audio and carrier frequency transformers on silicon steel or nickel alloy cores.
- 11, 16 and 31 point switches.
- Custom built sheet metal.

ABAC TRANSFORMERS

—a product of TRIMAX TRANSFORMERS

DIVISION OF CLIFF & BUNTING PTY. LTD.
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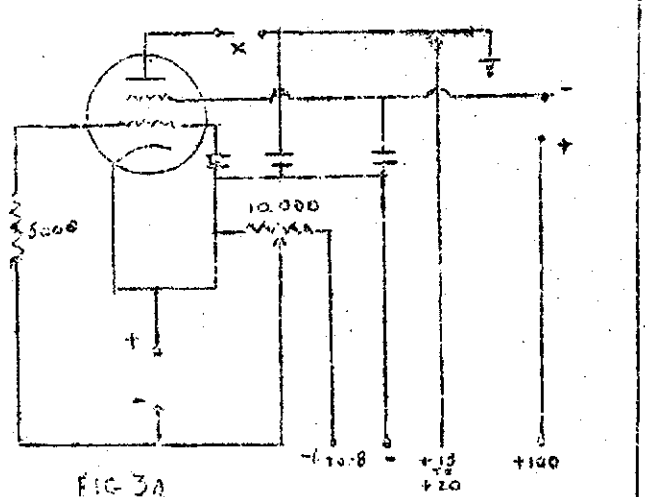
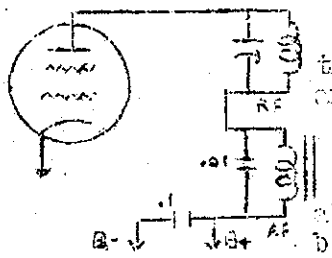


FIG 3A



Here the coil and tuning condenser must always be connected as shown, the 3 hy audio source being on the supply side. Audio is approximately modulating at 1000 cps in this case.

FIG 5

R5 can be a semi-fixed resistor, as, once set, it will be left. When used on AC, provision must be made for the grid voltmeter to read AC volts--a DC meter would be damaged, so must not be left in the circuit.

Readings on AC are not so accurate or convenient.

R3 should be definitely wire-wound and, if a good resistance element, and viper arm contact is good, actual scale markings can be used as reference points

POST WAR PLANNING.

Federal Executive wish to point out that all matter published on this subject is not the FINAL PLAN, but is published for the benefit of Members who may wish to make some comment which will help considerably in drafting a plan acceptable to all.

The following are the draft proposals forwarded to FHQ by the New South Wales Division.

1. Immediate lifting of the suspension of licences and the ban on experimental transmissions upon the signing of the Armistice with Japan. As it is reasonable to assume that this act would see the cessation of hostilities all over the world, there is no apparent reason why the delay that ensued after the last war--four years--should again be permitted to operate.

   Even now the question of the immediate release of the experimenters' sealed containers from custody should be discussed with the Department and the possibility of building transmitting apparatus and testing with a dummy aerial should also be explored.

2. All pre-war frequencies, consistent with service demands, should be made available. AS Service requirements become smaller, those frequencies to revert back to the experimenter. If it is not possible to hand back all pre-war frequencies, allocations to be made in other parts of the spectrum - preferably harmonically related - to compensate for any losses.

   Ultra-high frequencies and the various bands to coincide with U.S.A. allocations.

3. There should be three types of licences - A, B and C - and qualifications for the various grades to be as follows:-

   'C' The pre-war A.O.C.P. - power limit 50 watts - to be issued to successful examinees, 16 years of age and over. All new experimental licensees to serve a probationary period of twelve months, six of which to be confined to the use of c.w. In view of the increased probationary period, it was felt advisable to leave the minimum age at 16 years for this type of licence. In addition, it is proposed that the A.T.C. be continued after the war and as the age of enlistment in that organisation is 16 years it is felt that an A.O.C.P. would be an advantage. Again, educational standards are so high these days that the average youth or young woman of 16 years is in his or her final year at High School.

   'B' To be issued to any licensed experimenter, who has attained the age of 18 years or over and who has served the probationary

period of twelve months as the holder of a 'C' class licence, and provided always that the probationary period has been satisfactory. The holder of a class 'B' licence to be permitted to use 100 watts C.W. or telephony.

'A' To be issued to any licensed experimenter of 18 years or over provided that he has operated an Experimental Station under a class 'B' licence for a period of six months or more. He must pass an examination in Higher Radio Technology and Electrical Theory, also a Morse Code Test of 16 w.p.m. Power to be 250 watts phone or cw. If the applicant already possesses the necessary qualifications or part thereof by reason of other P.M.G. Commercial Examinations he will be exempted from all or part of this examination BUT HE MUST HAVE OPERATED UNDER A 'B' CLASS LICENCE FOR SIX MONTHS.

4. All pre-war experimentors to be issued with a 'B' class licence without being called upon to sit for re-examination. If, in the opinion of the Vigilance Committee, the operation of any Experimental Station-pre-war be such to warrant the opinion that the holder of the licence is lacking in the necessary qualifications, he will then be called upon to undergo an examination.

5. The Vigilance Committee should be re-established under the name of "Experimenters' Advisory Committee" and all its members, with the exception of the Chairman, should be members of the W.I.A.

....xxXXxx....

POLICE NOTICE.

1000 microfarads reward is offered for the capture of Hop Along Capacity who escaped from Pushpull Primary Cells yesterday armed with a carbon rod. He is wanted for the inductance of an 18 year old coil. Pushpull E.M.F. have been searching the magnetic field for ampere hours. It must be noted that when cornered he will offer great resistance which must be neutralized. Ohm town dialectric agents please pick-up and relay.

.....

THE WIRELESS INSTITUTE OF AUSTRALIA HAS FOR THE PAST FIVE YEARS KEPT A CLOSE WATCH ON YOUR INTERESTS: AND IS NOW MORE THAN EVER WATCHING AND PLANNING TO GET YOU BACK ON THE AIR. THE WIRELESS INSTITUTE OF AUSTRALIA IS YOUR OFFICIAL ORGANISATION, SO BACK IT UP BY BECOMING A MEMBER OR ENCOURAGING OTHER HAMS TO JOIN.

REMEMBER ... UNITY IS STRENGTH.

THE TECHNICAL LIBRARY

FUNDAMENTAL RADIO EXPERIMENTS...Robert C. Higgy...(New York 1945)
95 pages - 13/6.

This is a book of the familiar type designed for the use of college and university students, which sets out a variety of laboratory experiments, with their aims and methods. It is rather different from the usual run of laboratory handbooks, however, inasmuch as it contains a considerable amount of information which can be readily applied beyond the field of the actual experiments described.

The contents are divided into the following chapters: Introduction--use of Measuring Instruments; Fundamental Relations of Direct Current; Wheatstone Bridge; Reactance of Inductances and Condensers; Series and Parallel AC circuits; Study of AC waves; with Cathode Ray Oscilloscope; Series and Parallel Resonance at Low Frequencies; Resonance at High Frequencies; Thermionic Emission and the Diode; Tuned Air Core Transformers at Radio Frequencies; Characteristics of the Triode; Amplification Factor; Plate Resistance and Mutual Conductance of the Triode; Characteristics of the Pentode Vacuum tube; Power supply Operation; Gain and Frequency Response of Audio Amplifier; RF Oscillators; Resistance Capacity Coupled Audio Amplifier; Operation of Sweep Circuits; Telephone Circuits and Wire telephone transmission; P.A. Systems--the Decibel; Class A Vacuum Tube Amplifiers; Class C Amplifier Characteristics; Modulation; Detectors; RF Transmission Lines; Analysis and Adjustment of Radio Receivers; H.F. Resistance Measurements; UHF Transmission Lines; Selectivity and AVC; Characteristics of Receivers; The Communication Type Receiver; Frequency Measurement; Measurement of Inductance and Capacity; The VT Voltmeter.

An Appendix contains brief constructional information on an RF Oscillator, an AF Oscillator, a VT Voltmeter and a 100kc oscillator with 10kc Multivibrator.

This book is a worthy companion on the bookshelf to Scroggies Radio Laboratory Manual, previously reviewed on this page. Although it contains very little information on the construction of Laboratory instruments, the methods of use and the applications of such equipment is clearly and fully covered.

Our copy by courtesy of McGills Newsagency, Melbourne.

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I desire to acknowledge many letters from readers expressing their appreciation of these reviews.

Alec H. Clyne -- Review Editor

SLOUCH HATS AND FORAGE CAPS

"G Hams are back on the air"....that was the best and most believed "buzz" I've heard since the War began...but, alas, it was not so, yet. But it caused a bit of a sensation and meant a couple of cablegrams between VK and G. Hi! It does appear that some G7's came on the Ham bands for a short time at one stage of the concluding days of the European War, but they were not operated by Hams... and so we still have to wait a bit.

Service Hams...have you sent in your postwar Ham ideas to FHQ yet? From what I can gather, the most debated points are whether there should be various grades of licences...from probationary (after AOPC, of course), B Class and a class A grade..."Super Ham".. Hi! and whether old licencees should sit for their tickets again after the war. What do you think of these ideas...give the matter your best consideration and your ideas to FHQ.

Wing Commander Morrie Meyers VK2VN has been mentioned in despatches...and I am sure we all offer him the heartiest of congratulations. Morrie was the head of the Reserve in VK2 before the War and started at the beginning. He has had a most active career from the beginning and seems to have been right in the thick of everything for the last 18 months or more, so the "mention" has been richly deserved as many of you know better than I. Group 495 is his last QRA. in his last letter he mentions being "befronted by a bearded body in naval uniform...was impossible to recognise him "by face," but it turned out to be Leo Meyers 2KS. Being then on a shore job...after a beach-landing party...he was feeling a bit insulted, but quite happy. Also saw a Lt. Colonel wearing wings of an English type...turned out to be Jim London 20P...used to be at Manly, as most of the city VK2s will recall."

Telegraphist Jack Coulter VK3MV HMAS Mildura, although he hasn't managed to catch up with "A.R." for a few months reckons I will be crying for notes...if you only knew how I do, om...sends in a few. He spent the Summer down South but is wintering on a "sunshine cruise"...with tons of swimming and sunbaking. He and George Benwell 3KQ had a Hamfest of two when they met after two years...and Cpt. Bligh 3UH reaches the station it will be a case of "sink me Jack" Hi! He spent some time in both Darwin and Madang areas but not getting "A.R." regularly missed the Hams that were stationed there (then..2YC)

Ray Jones 3RJ is now out of the RAAF and after using up all the acquired leave from both the RAAF and the PMG is thinking about getting back to work...but managed to catch a few complaints such as lumbago, rheumatism, sciatica...well, well...didn't I say stick to "sunny" NSW...VK3OF please note...2YC. No doubt Ray often thought of the warmth of Darwin during this time and wished the PMG hadn't needed supervisors so badly down in VIM. Hi! After it is all over VK3 Hams can look forward to some good tales told with all the 3RJ art, but they will have to wait till "after."

I hope this doesn't become a "lost and Strayed" column, but anybody knowing the whereabout of W/O J. Perooz 2PE, F/o J.T. Evans 2CX, and P/O Grantham a VK4 please inform the Hon. Sec. VK2 Div. as all their mail is being returned. On the same line...VK6BW would like to hear from VK6 MY,GS, AP, MW and MF...C/o Box M1002 GPO Perth.

The VK2 in the POW Camp could have been ACI J.T. Edwards 2AKE who was a POW in Italy in '41/42 or Don Knock 2NO suggests it could have been Dick Ross. Dick operated VK2RE way back in '27 and pre-war was on the trawler "Trianna." He joined the Merchant Navy and was taken prisoner when his ship was sunk in the Indian Ocean. 2NO by the way is now working for Phillips and I believe we can look forward to the Ham being well catered for by that firm after war... good work don, om.

VK3EV Frank Walker...3/Sgt to you is another one up in the area where 3HJ used to me...more or less...He hasn't contacted any of the Hams in the area yet...but will any Ham around there ask for him at main exchange at VID...and he will only be too pleased to show them how to operate the whole of the post war rig my mouns of relays...may even take the tube out and put it back by this method. So those of you that are still there call him up by line or by person. Hi!

VK3AH now a Fl/lt is mentioned by 3EV as being in the Solomons these days, where there is only one Nurse to 300 or 400 men...boy, oh boy, how that girl's spare time must be booked up. Hi! Haven't had a note from you since you were a P/O Adrian, so how about a little inocuous news????

Bruce Mann VK3B M forwards extracts from a recent letter from Snow Campbell 3HR. Snow says that he has been travelling round England and Scotland, and expects to be travelling home in the very near future. The latter was dated June 6th, so it is quite likely that VK3 will see him at the Annual General Meeting on August 7th.

Ivor Stafford VK3XB is back again in VIM after spending a considerable period "up north." The furtherest north he got was to Thursday Island.

VK3 report that at their last meeting a large number of Hams and future hams were present. They are stationed at Balcombo. We would like to hear more of your doings...OM's...Ed....Drop a line to 2YC...He'll sure to be pleased to hear from you.

And now the Editor cannot resist saying that in view of the new arrival in the 2YC household reported elsewhere, he was very doubtful that any notes would arrive from 2YC this month. Was he relieved when they did.

Notes are still pretty slow at arriving and there is still so many of you that others are looking for...so don't forget the QRA, 78 Maloney Street, Eastlakes Mascot....Phone, MU1092.

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

- Federal Headquarters -

June has been an eventful month for Federal Headquarters. Early in the month suggestions in connection with the alteration of the regulations governing the issue of licences were sent to each Division, or where the Division was inactive the proposals were sent to known interested Hams in those States.

The immediate result was a sudden revival of interest in Queensland, Western Australia, South Australia and Tasmania. Meetings have been held in each of these States to consider the proposals, and much constructive criticism has been forthcoming. The future of the W.I.A. in these states now seems assured.

New South Wales and Victoria have also considered the suggestions and their comments have been received by FHQ, so we now have a complete picture on a Divisional basis of what the WIA member thinks about post-war licencing. However, our task has just begun, as now we have a wealth of data to co-ordinate as part of a process of carrying the proposals a step further towards the drafting of a final plan.

During the month some members of FHQ and councillors of the Victorian Division had the pleasure of meeting Mr. Mick Wale VK6BW, Treasurer of the VK6 Division. A considerable time was spent in discussing with him the VK6 view of the draft proposals, and FHQ were able to get a very good idea of their views. It is a pity that more of these meetings could not be arranged, as it is possible at such a meeting, to accomplish more in a couple of hours than weeks writing letters.

They are moving overseas too...from the RSGB comes word that Hams have been advised by that body to apply now for a renewal of licence in preparation for the great day. This move has been made to relieve the rush on the GPO which would occur if all the applications were made at the one time. This does not mean that British Hams will soon be allowed to resume activity, it may be some considerable time before they are allowed to go on the air.

In U.S.A. also the ARRL are on the move, busy gathering data to submit to the US Government in support of the Amateur's case at the next International Telecommunications Convention.

Your Federal Executive is keeping close watch on all overseas moves, and is co-ordinating its own activities with what is being done elsewhere.

NEW SOUTH WALES DIVISION

"House Full. Standing Room Only!" These were signs that could easily have been placed outside the Meeting Room on the occasion of the June General Meeting of the New South Wales Division held at Science House on Thursday 21st June. The attendance was as great if not greater than those of pre-war days and if numbers continue to increase, serious consideration will have to be given to hiring the Main Hall.

Among those present were:- 2TF, 2AGO, 2AGA, 2IE, 2WD, 2DI, 2HP, 2NO, 2HP, 2JT, 2UG, 2PF, 2IW, 2AFQ, 2LO, 2AFB, 2JN, 2DR, 2AJW, 2AHR, 2AX, 2GG, 2WN, 2VA, 2TI, 2AIW, 2AKI, 2AFY, 2ALQ, 6MY, 7CM. Messrs. Clark, Gand, Borlan, Crocker and seven others whose names were unobtainable. Time marches on. During the evening several references were made to the "oldtimers" and the fact that 2AKW brought his son along to this meeting and Bert Glasscock his to the April Meeting, makes us realise that quite few of us are rapidly qualifying for inclusion in the ranks of the "Oldtimers". Think I'll have to bring VL2JY along to a meeting sometime - better not let his mother know!

Members will regret to learn that the Institute has been unfortunate in losing the services of Mr. Perce Dickson VK2AFB. 2AFB was Federal President during the last twelve months of its location in New South Wales, and in addition served on the State Council for quite a number of years. Whilst a State Councillor he acted as Technical Officer to the Division and was responsible for the design of the Receiver for the E.C.M. and the equipment used in the Bushfires Network. Pressure of business has compelled his resignation and he leaves a vacancy difficult to adequately fill.

The Meeting was informed that Wing Commander "Morry" Meyers VK2VM had been recently Mentioned in Despatches. The Chairman in briefly outlining 2VM's career stated that he had been in charge of the R.A.A.F.W.R. in N.S.W. prior to the outbreak of war. When the Reserve was called up he started off as an A.C.2. He had risen to his present rank by hard work in operational areas having been at some time or other in practically every area in the Pacific Zone where the R.A.A.F. has operated. It was decided to forward a letter congratulating 2VM on the Mention.

Members will be pleased to learn that Jim Edwards VK2AKE is now safe in London. Jim was taken P.O.W. early in the Libyan campaign and spent quite a few years in Italian prison camps and was later moved on to Germany. We don't know how long he'll be in London, but if anyone cares to write to him, here's the QTH.
6650 AC1. J. T. Edwards, ex-Australian P.O.W. RAAF, Auspo, London.

Recently quite a stir was created in the dovecotes by the news from a very authentic source that the "G" hams were on the air.

Some people being naturally of a suspicious nature, just couldn't believe this and a cable was despatched to R.S.G.B. Alas a reply was received in the negative, but in a covering letter some very interesting news was received and has been forwarded on to F.H.Q. We'd like to tell you, but that's F.H.Q.'s prerogative.

A very interesting talk was given by Mr. Lusby VK2WN B.Sc. B.E. on Postwar Techniques and Equipment. 2WN dealt at length on Techniques, and held the audience breathless when he described what could be done with a valve or two (more or less of course). Unfortunately very little could be said regarding equipment in view of an unexpected ban placed on discussion at a recent Trade Conference.

In reply to a question the Chairman informed the Meeting that it was expected that "Amateur Radio" would appear in printed form with the October issue. Members expressed satisfaction with this announcement, as it was felt that the present roneoed form had outlived its usefulness.

In view of the great amount of work thrust upon Council with the plans for Post War Amateur Radio, it has been decided that the pre-war practice of two Council Meetings each month will be reverted to. Council Meetings are now held on the first and third Thursday of each month. With reference to F.H.Q's plea that anyone having ideas regarding Post War Amateur Radio, should get in touch with F.H.Q. or the Divisional Secretary, N.S.W. would like to add its voice to that plea also. All Australian Amateurs are given the opportunity of expressing an opinion as to the conditions under which they are to operate after the war. F.H.Q. are doing a great job and if you don't take advantage of this offer now, it is no use complaining afterwards.

During the month the N.S.W. Divisional Council had an opportunity of meeting "Mick" Wyle VK6BW, Treasurer of the VK6 Division of the Institute. Quite an interesting discussion took place and many views were exchanged, and it is quite safe to say that East and West now appreciate each other's position better than before. Later on we had a ring from "Bob" Anderson VK3WY Secretary of the VK3 Division, and although we would have liked to have seen him personally the telephone call cleared up quite a few matters. Which brings me to this point - a certain well-known VK3 who at one time was federal President and State Chairman was present in Sydney during May--may be still here, but didn't bother to look us up.

It would not be right for me to conclude these notes without mentioning the world shaking event that took place in Eastlakes on Wednesday 6th June in the year of our Lord one thousand nine hundred and forty five. Believe it or not 2XC's wife presented him with a baby girl at last. Now he'll be able to devote some time to getting the Q.S.L. bureau ready. Or will he!

The next General Meeting of the Division will be held at Science House, Gloucester and Essex Streets Sydney on Thursday 17th July at 8 pm, and a Lecture will be delivered by Mr.E.Treharne VK2AFQ,BE.B.sc on "Industrial Electronics" and if you want a seat, come early.

VICTORIAN DIVISION

Members of the Victorian Division are reminded that the ANNUAL GENERAL MEETING of the Division will be held at the Rooms, 191 Queen Street on Tuesday, August 7th 1945 at 8 p.m. Nominations for Council must be in the hands of the Secretary not later than Friday 20th July. It is hoped that members who have not previously nominated for Council will do so, as present members of Council have held that position for some time, they are of the opinion that other members of the Division should help carry the burden.

Since the last issue of the Magazine we have two meetings to report on. At the June Meeting almost a record attendance packed out the rooms. Among those present were:- VU2EB; VK's 6MN; 5ZX;5KL;4NY; 2XX;-ozOXX; 2DH;3AP;3U;BQ;DH;GD;GW;HQ;HX;IK;IV;IX;JO;KJ;KN;LA;ML;MX;MY;PJ: PU:PW:QS:7RC:3RJ:RN:RT:SC:SZ:TF:UC:UG:UR:VD:VX:WQ:WT:XC:XD:XE:XJ:XZ: YK:YL:ZS: Messrs. Burdekin; Belcher, Cunningham; Bail; Barnett; Bennett Hibbert; Kerley; Searle; Vinner; Ridgway.

The main feature of the evening was the movie show put on by Harry Kinnear 3KN the subject being the Cathode Ray Oscilliograph. At the conclusion a hearty vote of thanks was moved for the trouble Harry went to to put the show on.

Mr. Don Bennett of the Victorian Ski Club was present at the June Meeting, and explained the object of their emergency Communications net was to provide a means of contact between various huts in the Alps country so that aid could be readily summoned to assist an injured person or for any other eventuality as may arise. Already some call signs have been allotted and some equipment obtained on loan from the Forests Commission. Tests have been conducted, the most recent on June 16th and 17th, and were heard in Melbourne by a few Hams, though reception was marred by QRM from the third harmonic of 5DB on 3090 KC.

Mr. Bennett advises that there are many difficulties, and the assistance of Hams in overcoming them is sought. The Laboratory Committee has not yet secured full information on all problems, but an outstanding one is that of a suitable aerial, which must withstand not only winds of 70 to 80 mph; but also accumulations of snow and ice, which would cause horizontal antennas to break under the strain. What are your ideas? The Laboratory Committee will be pleased to hear from you. The next tests will be held on Tuesday 17th; Wednesday 18th and Friday 20th July, on 3090 KC. Stations will be VL3LC Mt.Hotham; VL3LD Cole Hut being on the air at 9 am; 1.30mm. 5pm or 5.30p.m. 8pm and possibly at 10 pm. VL3AE Mansfield will be on at odd times mainly at 9am. 1pm. and 5pm. Reports will be appreciated.

July meeting also saw a very large attendance. Present were:- VK's 3BQ: AS: ZS: UR: GW: PX: WE: XZ:QS:LL:ML:MX:JO:WX:UC:PU:SI:2FN 3MX:WQ:PJ:MW:XD:IK:QZ:XF:4AN:5KL:3DH:VK;NY: Messrs. Rimmer, Wilson; Shoppard; House; Ridgway; Belcher; Long; Hubbard; Kerley; Roberts; Bail; Gibson; Haines; Berber; McDuff; Harlowe; Riley; Connell; Couch; Jones; Peters; Hanson; Smart. Apologies from VU2ED. VK3YK; VK3JT and VK3RJ.

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Vice-President : H. F. PETERSON, VK2HP. **Federal Secretary :** W. G. RYAN, VK2TI.

Councillors : C. FRYAR, VK2NP; W. J. McELREA, VK2UV

Official Organ : "AMATEUR RADIO"—Published by the Victorian Division.

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Full Members	10/6 per annum
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The N.S.W. Division meets on the third Thursday of each month at Y.M.C.A. Buildings, Pitt St., Sydney and an invitation is accorded to all Amateurs to attend. Overseas and Interstate Amateurs who are unable to attend are asked to phone the Secretary at FX3305.

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SIXPENCE AUGUST 1945

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Published by the Victorian Division

AMATEUR-RADIO

INCORPORATING THE N.S.W. DIVISIONAL BULLETIN

Vol. 13. AUGUST, 1943. No. 8

- RADIOLOCATION -

For security reasons it has hitherto been impossible to publish any details regarding radiolocation. Some details of the basic principles have now been made public and the following information has been taken from an article appearing in "Wireless World."

When England entered the war she was already partially equipped with a new technical weapon in the form of a novel application of radio waves to the detection of objects such as aircraft or ships. This technique first known as RDF; later as radio-location and has finally become largely known as Radar.

Radiolocation may be described as the art of using radio waves for the detection and location of an object, fixed or moving, by the aid of the difference of its electrical properties from those of the medium adjacent to or surrounding it. No co-operation is required from the object being detected; this being the big difference from radio direction finding. All that is required of the object under examination is that it should reflect or scatter some of the radiation which reaches it from a transmitter forming part of the whole Radar installation. The detected object is thus merely a source of secondary radiation which results from its being illuminated, as it were, by the incident radiation from the primary sending station.

With this definition of the subject, we may now proceed to an explanation of the fundamental principles forming the basis of this new application of radio waves.

REFLECTION AND REFRACTION OF ELECTRIC WAVES... At the end of last century, Hertz demonstrated the salient properties of the newly produced electromagnetic waves and showed that these were similar to those of light-waves when allowance is made for the difference in wave-length. He showed that the long electric waves could be reflected from metallic sheets concentrated into beams by suitably shaped reflectors, and refracted by passage through prisms of insulating material. These phenomena are due to the fact that when electric waves, of whatever length, impinge on the boundary separating two media of different electrical properties, the path of transmission of the waves is altered; some

of the wave energy passes across the boundary, but in doing so its path is bent or refracted; another portion of the wave energy is turned back from the boundary and forms the reflected portion of the waves on the same side as the incident waves (see Fig. 1). The relative magnitudes of the reflected and refracted waves depend upon the electrical properties of the media on the two sides of the boundary, the angle of incidence (o in Fig 1) and the frequency or wavelength of the waves. If these quantities are known the reflecting power of the surface of separation of the two media can be calculated, and in many cases this calculation is made easier as the first medium is air which has low electrical conductivity and a dielectric constant of approximately unity.

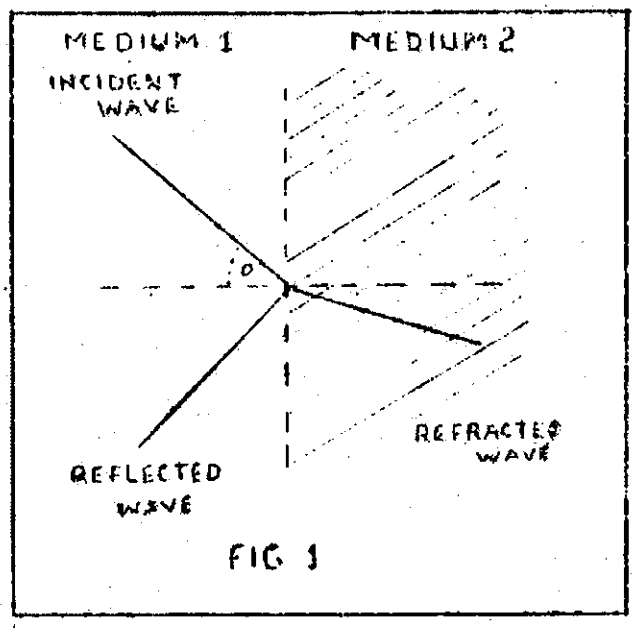


FIG 1

If the second medium is a sheet of copper with high conductivity, nearly all the incident energy in the arriving waves will be reflected as the result of re-radiation. The same result will be obtained if the second medium consists of fresh water; for, although in this case the conductivity is low, its permittivity is high and thus strong dielectric currents will be set up, particularly at high radio frequencies. In the case of soil or earth, which has both a moderate conductivity and an intermediate value of permittivity, a portion only of the incident wave energy will be reflected, the remaining energy passing into the medium to form the refracted waves.

It may thus be seen that reflection of radio waves is caused at a boundary between two media, and when waves in air strike a surface, which may be either a metallic conductor or an insulating medium, the waves are reflected in some degree by the surface. If the surface is relatively smooth, the reflection is of the same type as met with in light waves; and in such cases if the waves impinge normally on the surface, they will be reflected back along the original direction towards the source of the incident waves. A rougher surface causes "scattering" and in consequence only a portion of the reflected energy is returned along the path of the incident waves.

MEASUREMENTS WITH LIGHT WAVES...Fig. 2 illustrates the manner in which a searchlight enables a target--aircraft or cloud--to be seen by an observer situated

at R, who can then determine its bearing and angle of elevation; This is a well known art but the observer cannot determine the distance of the target by this means. In order to do this, it is necessary to interrupt or modulate the beam of light in such a way that the time of transit of the waves between the source and the target and then back to the receiver may be determined.

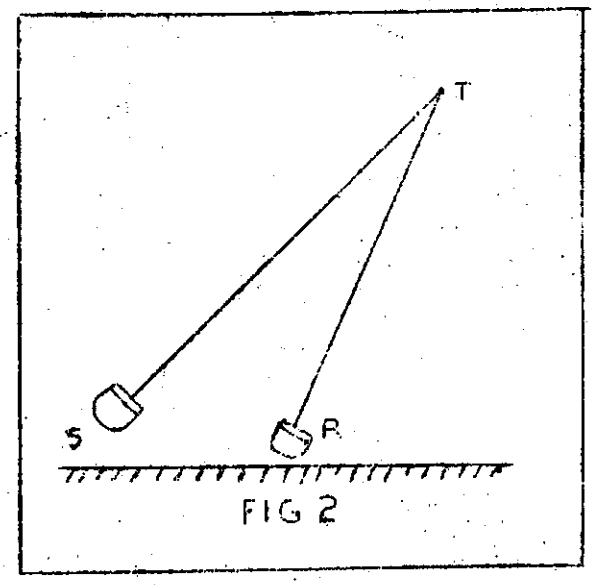


FIG 2

This was done as far back as 1849 in experiments carried out to determine the speed at which light waves travel. A mechanical method was used for measuring the time of transit of an interrupted beam of light over a return path about 3 or 4 miles long. At that time the distance was accurately measured and so the velocity of the waves determined. Nowadays, as the velocity is known, then the length of an unknown path with a reflector at the end of it can be calculated.

A possible arrangement of this method of determining the distance by the aid of light waves is illustrated in principle in Fig. 3. As before, light from a source S is transmitted to a target at T whence some of it is reflected back to a receiver at R. In front of both S and R rotates a disc W, with an even number of radial apertures in it, so that the beam of light is alternately interrupted and allowed to pass. With the disc stationary the outgoing and incoming beams pass through the corresponding slots at the end of a diameter. As the disc is rotated and its speed gradually increased, some of the light which has passed through a slot A1 in front of S will be cut off, because by the time it has traversed A1 T A2 the corresponding slot A2 will have moved round through a small angle. As the rate of rotation of the disc is increased, a speed will be reached at which the returning light will be cut off by the portion of the disc between the slots. As the speed of the disc is further raised the

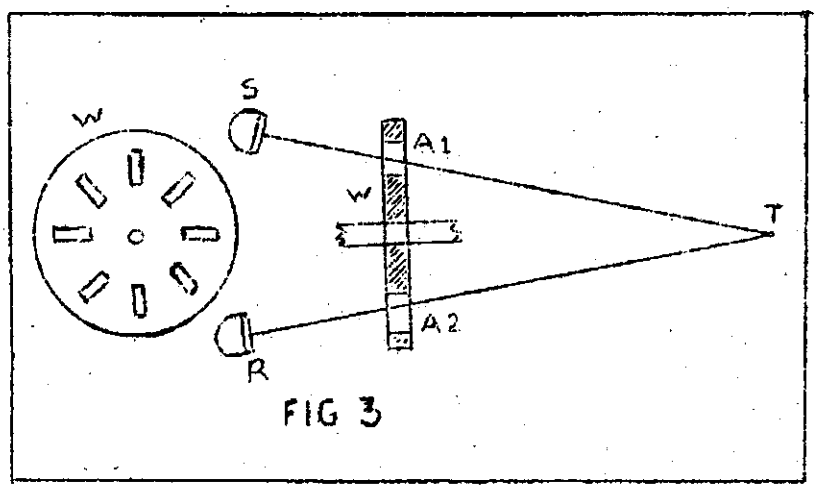


FIG 3

light will again be perceived at R, since while the light is traversing the path A1 T A2, the disc will have rotated through an angle equal to that separating adjacent slots. Hence from an observation of the speed of the disc under these conditions, and assuming the velocity of the waves, the distance A1 T can be determined. From this type of measurement and the associated observations of the angular directions of the reflector T in both the horizontal and vertical planes, the position of T in three-dimensional space becomes known. This is, in essence, the fundamental principle of radiolocation as it is practised today.

THE PRINCIPLES OF MODERN RADAR...The reader is now in a position to understand the elementary principles of radiolocation, in so far as these are analogous to the experiments with light waves described above, but making use of the longer electric waves in the radio-frequency portion of the spectrum. The transmitting section of a station emits radiation over a broad arc in the desired direction. When this radiation strikes an object having appreciable conductivity or dielectric constant, some of the energy is reflected or scattered back. If the radio waves are transmitted in short pulses, the time of transmit to the reflecting target and back can be measured by displaying the received signals on the screen of a cathode ray tube. The arrangement is shown in Fig 4, where successive pluses P1, P2, P3 and P4 have been emitted from the antenna A1, the first two pulses having already reached the target and been reflected back towards the receiving antanna A2. The pulses received at A2 are suitably amplified and rectified and then applied to the vertical deflecting plates of a cathode ray tube. If the horizontal deflecting plates are connected to a suitable time base circuit operating in synchronism with the pulse generating circuit, then for a fixed distance A1 T A2, the received pulses will appear superimposed on one another as vertical deflections from the horizontal time base. If the time base is made to start its deflection from the left hand side of the screen at the same instant as the pulse of radiation leaves the transmitting aerial, then the distance along the time base from its origin to the position of the pulse displayed on it is a measure of the

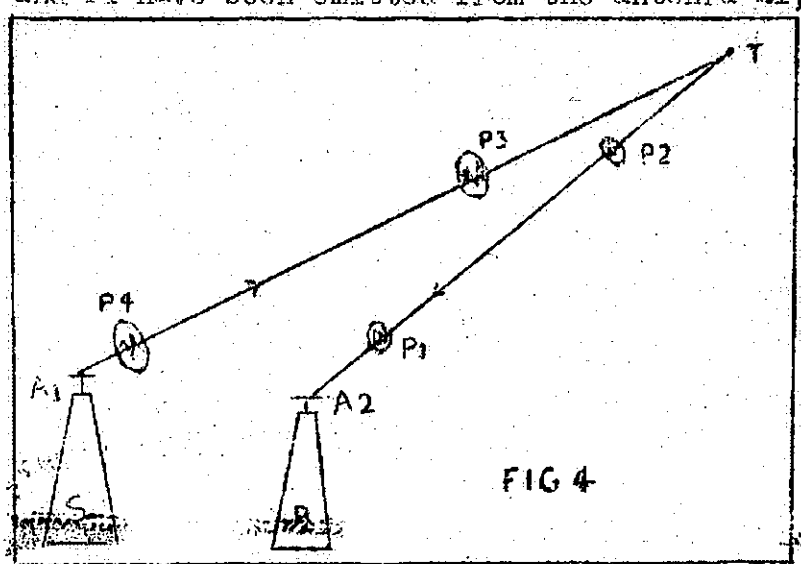
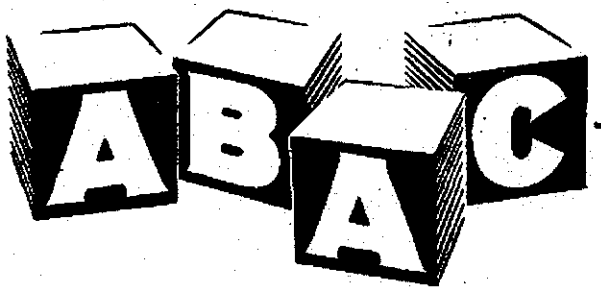


FIG 4

Transformer Problems

ARE AS SIMPLE AS...



- Air cooled power transformers up to 2KVA.
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length of the path A1T A2. As we know that the velocity of radio-waves is substantially 186,000 miles per second, the scale of the time base can be graduated in miles (see fig. 5).

The amplitude of the pulse on the tube is proportional to the strength of the received signal and so increases the nearer the target is to the receiver. When other conditions remain the same, the amplitude of the echo is also a measure to some extent of the reflecting properties of the target, for example, its size, and an experienced observer may be able to guess the nature of the target from the echo pulse seen on the tube screen.

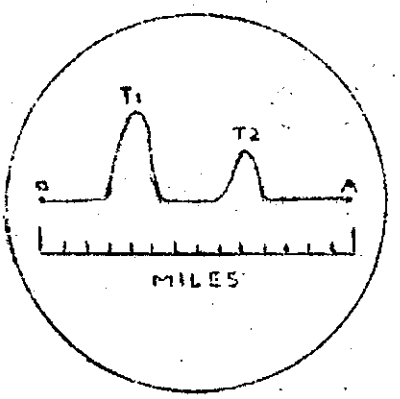

FIG 5

It is also necessary to determine the direction of arrival of the waves in both the horizontal and vertical planes. These measurements can be made by well established methods for observing the

bearing and the angle of elevation (see fig 6). The first may be determined by standard DF methods while the angle of elevation can be measured by comparing the amplitudes of the voltages induced in two similar aerials mounted one above the other at a known distance apart; the distance depending on the wavelength used and the range of angles of elevation it is desired to cover. If the target is an aircraft, then the knowledge of the range and angle of elevation enables its altitude to be calculated.

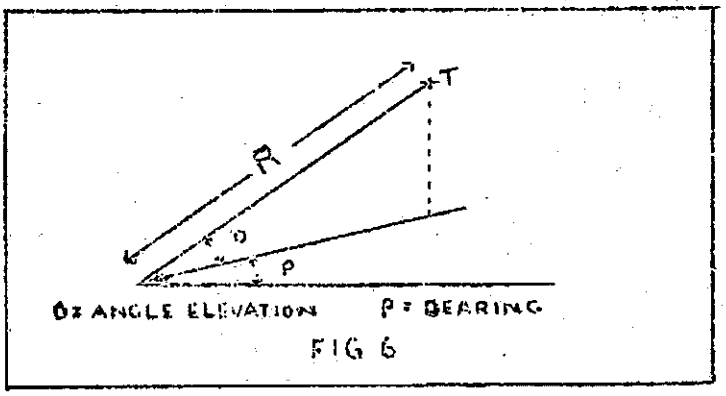

FIG 6

The above considerations all apply to the use of wavelengths of about 5 to 50 metres. If much shorter wavelengths are used it becomes possible to arrange what is, in effect, a radio searchlight, but with the addition of the facility for determining distance. When this type of radiolocation set is trained on the target to give the maximum deflection of the received pulse the bearing and elevation can be read off the horizontal and vertical planes respectively, while the range is determined as before.

....oOo....

ODE TO A RADIO TUBE

When I was young and full of hope,
The diode tube was all the dope,
Then, came the triode and high-mu,
The latest thing, I'm telling you.

Next came the tetrode with its screen,
And then the pentode hit the scene.
We thought they surely were the last,
But from then on things happened fast.

Duo-diode, Pentode-triode,
Pentagrid converter;
Duplex-diode, detector triode,
Pentagrid inverter;
Now tubes arrived by every train,
'Twas at this point I showed the strain.

Now I am old, beyond my years
I've got gray hair above my ears,
And to the world Itellmywrongs,
Why do tubes have so many prongs?

....

AMATEUR TEST EQUIPMENT

- Charles C. Quin VK3WQ -

PRACTICAL WORK WITH INSTRUMENTS

As pointed out at different times throughout the series, it is essential that good quality components be used in building up the various pieces of equipment if results are to be relied upon.

Assuming that a receiver is the apparatus under construction, all components are first checked with the aid of the BRIDGE. You then proceed with construction. Some people simply must check operation before the job is completed. Here is where the MULTI-VIBRATOR is a great help. With speaker or 'phones connected to the output of the receiver, the signal of the MV is applied at each successive point, back from the output plate, until the faulty stage is located. Care must be exercised that a 'stopping' condenser be placed in series with the MV output when placing it on points where DC voltage appears, which of course can be checked with your UNIVERSAL METER. The obvious reason is that the output of the MV is fairly low impedance, and would 'short' the supply voltage at that particular point. As each point is reached further from the output, increased signal from the MV should be noticed, thus showing whether that particular stage is working or not.

Coils can be checked up with the DYNATRON or TRANSITRON in conjunction with the SIGNAL TRACER. Losses are checked with the Dynatron, then coil (and condenser to be used with it) are connected to the Transitron and oscillation set up. Output of Transitron is fed into RF section of the SIGNAL TRACER. In this way the coils can be easily checked for actual frequency coverage and 'pruned' before wiring into the receiver. Any stray capacitances which may be present in the receiver can be checked with the bridge, by assembling all components and then measuring at the appropriate points, (in the receiver).

It will now be assumed that the receiver is completed and ready to undergo an actual test 'on the air'.

The first requirement is to see that the IF stage or stages are correctly aligned. Transitron is now used with its coil and condenser tuned to the IF frequency. Signal tracer is tuned to this frequency, and output of Transitron applied to the last stage, with the signal tracer probe plugged into the R. F. section of the tracer. Point of this probe is applied to the detector section of the receiver, and with the transitron output fairly high, the IFT is tuned, gradually reducing this output as resonance is reached. AVC if used on the receiver, should be shorted out or rendered inoperative, during these operations. The next stage is now aligned in the same manner. If necessary the signal tracer can be applied to the audio section of the receiver. In this case of course, the

probe is plugged into the audio section of the tracer, and point is placed preferably on the grid of the audio tube. IF stages now being aligned, the RF section presents no greater difficulties.

Signal tracer can now be tuned to the IF frequency and applied to the grid or plate of the first IF tube and this should provide a useful level to work with. It is a good plan to line up the lower frequencies first. Tuning to the high frequency end of the coil to be checked, that is, with the tuning condenser of the receiver about 3/4 out of mesh, trimmer of oscillator is set to the desired frequency, with the aid of a signal from the Transitron, and Trimmer condensers of other stages are now adjusted until maximum output is obtained through the signal tracer. Now tune to the low frequency end of the band, and, with the aid of a signal from the MV, adjust the oscillator padder. Due to the multiplicity of signals, the tuning condensor of the receiver need not be 'rocked', as the MV signal will appear to be one continuous signal and a 'peak' will easily be found. Now return to the high frequency setting and, with the Transitron signal, recheck the alignment. This should complete the alignment procedure for this particular coil, but as a final check, output of MV is fed into receiver and tuning condenser rotated throughout its range, any dead spots will now be shown up, and series or parallel trimmers added accordingly. This of course will mean that the whole procedure will have to be gone through again, for aligning the oscillator and RF section of the receiver. The higher frequency coils are now aligned in the same manner. Your receiver should now operate equal, if not better than a factory aligned job, because it is to your own individual requirements.

If you have gone to the trouble of calibrating the output of the transitron etc., you should be able to carry out measurements of stage gain, and sensitivity. But that is another story.

The foregoing is only one of the uses of the individual apparatus which obviously has uses other than that shown.

A short bibliography is given from which the foregoing articles since last September, have been compiled. This is of necessity, by no means complete, as everyone has his own particular choice of text books and other publications. Therefore it will serve as a guide only. Victorian Division members at least may be more fortunate in the respect that Ken Ridgway has been hard at work compiling an Index from the various publications in this Divisions Library, and this should be very helpful, not only for the apparatus mentioned in AMATEUR RADIO from time to time, but for anything connected with the art generally.

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THE TECHNICAL LIBRARY

FUNDAMENTALS OF RADIO...Jordan, Nelson, Osterbrock, Pumphrey and Smoby...Edited by W. L. Everitt (New York 1942), 400 pages.....37/6.

Another of the very long list of books which the war has apparently caused to be compiled on this subject, but rather more expensive than most.

Contents are:- Mathematics of Radio, DC Circuits, AC Circuits; Electronic Principles; Rectified Power Supplies; Sound and its Electrical Transmission; Audio Amplifiers; Vacuum Tube Instruments; Electromagnetic Waves; Transmission of Signals by Radio; RF Amplifiers and Detection; AM Transmitters; AM Receivers; Frequency Modulation; Radio Wave Propagation; Radio Antennas.

The book is thorough, due probably to the editing of the capable Wm. Everitt, but considering its scope in relation to its price it would not seem to represent the same value as some of the other books on fundamentals which have been reviewed here.

The copy reviewed here was supplied by courtesy of McGills Newsagency, Elizabeth Street, Melbourne.

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POST WAR AMATEUR RADIO IN AUSTRALIA.

- By R. H. Cunningham, VK3ML -

INTRODUCTION:

It must be anticipated that there will be a boom in Amateur radio in Australia after the war.

2. For the purpose of estimating various requirements to meet an expanded organisation the tentative figure of 5,000 licencees has been taken.

3. It is incumbent upon the W.I.A. being the oldest and best established radio society in Australia, to plan for such an expansion - if it has the aim of truly representing the Australian Amateur. Such consideration should be given now and not when the war is over; if chaotic conditions are to be avoided.

4. The object of this paper is therefore, to review the possibilities of the future and to give thoughts to the requirements of an organisation that will meet the needs of the future.

5. It is assumed that the P.M.G. Department will undoubtedly maintain its present cordial relationship with the W.I.A. It is further assumed that this Department will look to the W.I.A. for greater assistance than ever in the administration of the Amateurs. Therefore, the problem of efficient administration will fall heavily upon the shoulders of the W.I.A. and a considerable effort will have to be made by the W.I.A. on the part of the Amateur to formulate a plan and policies for the Government of its members.

6. There lacks, at the moment, a Federal Constitution that represents the agreements or voices of all Divisions of the W.I.A. Such a constitution should represent the guiding principle of the W.I.A. as a whole and without one we cannot possibly hope to achieve sound government and organisation. This is the document that should be presented to the P.M.G. Department as the policy of all Divisions and upon which the fundamentals of the W.I.A. are based. It is therefore strongly urged that a federal constitution be drawn up now and presented to the P.M.G. Department. It is realised that there are difficulties in drawing up such a constitution at the present time in the absence of many of our members, but as the matter is so vital there should be no reason why a tentative constitution should not be formulated with effective powers for say 18 months to 2 years after the regranting of our licences. After this period this constitution may be amended as directed by Divisions.

7. As such close liaison with the P.M.G. Department will be necessary in the re-establishment of Amateur radio period, it is urged that, at least for the duration of the tentative federal constitution, the location of the Headquarters of the Federal Executive should be with the Department in Melbourne.

8. The administration of 5,000 licencees on a federal basis will call for perhaps a permanent and paid secretary acting under the direction of the Federal Executive Council.

9. One of the major tasks to be decided upon lies in the W.I.A's and P.M.G. Department's interpretation of the meaning of "Amateur Operators Proficiency Certificate." It is known that the "Amateur" has always been divided into two classes -

(i) The experimenter.
(ii) The Amateur or traffic handler.

As this is a contentious point it is not proposed to deal further with the matter, but it is suggested that paragraph (ii) may be given consideration from the Defence Services point of view.

MAGAZINE:

10. It is also suggested that consideration be given to the future role of the W.I.A. Magazine "Amateur Radio." Magazines may perhaps be considered in the following classes -

(i) Technical magazine - on which an organisation's livelihood depends - T & R Bulletin Amateur Radio.

(ii) Non-technical - such as a trade journal with "personality" articles with contributed technical articles which may or may not be run with a view to financial gain - R.A.C.V. "Radiator," Australian Radio Trade Journal.

(iii) Technical magazine in competition with others - Q.S.T. - Electronics - Wireless World etc.

Other factors to be considered suggest themselves, such as -

(i) W.I.A. policy towards affiliated clubs.
(ii) Relation to services.
(iii) Training and courses for students.
(iv) Relation to A.R.R.L. and B.E.R.U. etc.

But the object of this paper is W.I.A. Federal policy on the highest plane and details are left to sub-committee planning.

COURSES OF ACTION:

11. It is suggested that the following course of action should meet our immediate needs of post war planning -

(i) Appoint a federal executive council (war-time) from W.I.A. members in Melbourne who will be responsible for drawing up a federal constitution.

(ii) Appoint a main committee for post hostility planning.

(iii) This main committee to appoint suitable sub-committees to investigate individual problems.

SLOUCH HATS AND FORAGE CAPS

It is not very often that the Editor has anything to say in these pages, but as always the time must come when he must have something to say.

At more or less the last moment before going to press he receives a telegram from 2YC which reads - "Can you manage a page. Nothing here at all this month...Jim." In the following mail he does manage to forward a page or so of notes....where he dug them up from I don't know.

Now chaps this is a very sad state of affairs. These pages have run continuously for some four years, sole for your benefit, and I believe Slouch Hats and Forage Caps, is the most widely read feature in the magazine. I say most definitely that it is not 2YC's place to have to chase sufficient notes each month to fill his allotted quota. It's up to you to see that he has the notes sent to him.

...xxxxxx..,

Well, what about that "A" Class licence...you don't like it? well, did you write in and say so???..,its the best idea you have heard of????? well, if the others write in and you don't your "best idea" will be lost forever. Boiled down, its like this...every Ham you meet will have fierce ideas on this Post War Ham Radio but there are still the majority of you that have to write in to FHQ on the matter. So, after you send me the notes for YOUR COLUMN get on with that letter to FHQ.

VK2NO Don B. Knock once more back in civvies and working hard on new ideas for post war Ham Radio, reports a ring from Duds Heuree, whom most of you know as VK2DQ. Duds was just on his way south after just returning from overseas. Now a Fl/lt 2DQ was last heard of in this column as in an RAF Hospital recovering from a "sprang" in the leg. He visited Clarry G6CL while over the other side, but apart from a rumour he saw service in Italy we know nothing else of his doings....how about a bit of news, Duds, om....2YC.

Going overseas for a paragraph...Don.reports a letter from G8LP Jeff Handley of 28mc fame and one of Don's oldest associates in Ham Radio. Jeff reports Cyril Price G6PC whom many of you remember from pre-war WIA divisional meetings. Cyril came through OK, and ended up as inspector in an aircraft factory. The G's are very interested now that the war is over to hear news of LA6N who was dropped over Norway with a Radio Xmitter, one foggy day, and they are also very keen to hear what happens to LA1G who was among the most well-known of the Norweigan Quislings.

Lieut Norm Hannaford landed with the assault troops in N.W. Borneo. He mentions the capture of a IKW Jap Station and says that the idea of Jap equipment being of poor workmanship and design

is all out of date. Anyway, I guess Norm very ruefully thought of the jobs still ahead, the distance between Borneo and Sydney, and his post war Ham Stn. before pushing past that collection of gear. Never mind, Norm, the new power limit is 50 watts, not 5KW. Hi!

W/O Ratcliff VK3RA of the RAAF reports his return to Brisbane after service in the Philippines. He has nothing to say of his service duties. He says that the yls and the Wx were very fb and if there had been no war things would have been lovely...but there was a war.

VK2AMQ Sig Haining writes from "somewhere in the Pacific on a place not very big and rather warm" that he is playing housemaid to a couple of rigs which thank heavens do not give too much trouble as many of them do in this part of the world. He mentions that he had several rag chows with Lieut. Geo. Lance VK3DS who wishes to be remembered to all the gang down South. About twelve months ago 2AMQ had a visit to 1650 jolts when he overbalanced and put his hand on the tank coil of one of the rigs...only another op. saw the accident and switched off the power...well, these notes would have been written on another type of paper altogether, Hi!

We hear that VK2AGJ is now in England waiting to be returned to Australia after his enforced sojurn in Stalag III. Does anyone know if Snow Campbell has returned yet.

Hams seem to be always amongst the list of decorations. The latest brought to your notice is F/Lt. J. B. Bell VK3SN, who has been Mentioned in Despatches. The citation reads "For marked devotion to duty. He served in New Guinea from 11-6-43 to 25-4-44 and was responsible for signals installations in forward areas in which enemy patrols were still operating." Before enlisting VK3SN resided in Shepparton.

Jim Marsland 3NY forwards a letter from Capt. J. H. Winton, VK3XR, which reads "As you can see by the address I'm languishing in hospital--the Nip eventually caught up with me and plugged me in the leg shattering the thigh bone. This means a 'Homer' for me so you can expect to see me in a few months time hobbling into a meeting or two. Hope you are doing well these days. I was very wound up about one of the articles on Post War Radio I read in AR just before I was wounded, and was just about to take up pen and launch a fearsome attack---but now I've lost the article. It concerned proposals for policing amateur transmissions and other such ideas which smacked too much to me of Gestapo methods. Give my kind regards to all--should be at Heidelberg in a couple of months.

And now it only remains to tell you that the address to which to send your notes is...J. B. Corbin, VK2YC, 78 Maloney Street, Eastlakes, or better still if you happen to be in Sydney the 'phone number is MU1092.

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NEW SOUTH WALES DIVISION

The Monthly general meeting of the Division was held at Science House on Thursday 19th July at 8 p.m. and the usual large representative number of Members were in attendance.

Members were informed that Mr. Bill Dukes VK2WD had been elected to the vacancy on Council caused by Mr. F. P. Dickson's resignation. 2WD has been appointed Membership Secretary and all queries regarding Membership should be addressed to him either at Box 1734 G.P.O. or Francis Street, Strathfield. From his call you will see that Mr. Dukes is no newcomer to Experimental Radio and he brings to the Council a wealth of experience in all branches of the art and will be a decided asset in Divisional affairs.

Another election to Council was that of Mr. Ray Patterson VK2AJW. Under the Articles, Council has the right to fill certain ex-officio positions and as one of these positions still remained vacant it was decided to fill it at the same time as 2WD was elected. 2AJW has been Section Leader at VL2JE for some considerable time and will be in an excellent position to express the views of Members living on the Upper North Shore Line.

Here is a list of those Members present:- 2WD, 2DI, 2NO, 2RA, 2AFQ, 2AGA, 2NP, 2EE, 2JN, 2AKR, 2TF, 2NG, 2DR, 2AGO, 2AKW, 2AJW, 2AFB, 2ABN, 2YC, 2TI, 2LO, 2ADQ, 2JF Messrs. Borlan, O'Neill, Hawkins and Murphy.

Whilst on subject of "among those present," here is a suggestion. In pre-war days, most chaps had their call engraved on a small badge that could be worn in the lapel of the coat. You must still have them at home somewhere. Why not dig them out and wear them to meetings and let the other fellow see who he's sitting next to.

Members were informed that Mr. Maurice Lusby had been in Melbourne recently and had conferred with F.H.Q. on post war matters. We would like to thank the members of F.H.Q. for the manner 2WN "was looked after." These exchange of visits do a wonderful amount of good, and it is hoped that more will take place in future.

Quite a considerable amount of discussion centred around a recent sale of Radio Equipment held by the Disposals Committee. It would appear that a great quantity of equipment that could be used for transmitting purposes is being sold to all and sundry without the necessity of obtaining a permit. Members were of the opinion that such being the case the P.M.G. should return the sealed containers belonging to Experimenters.

A very interesting visitor at the July Meeting was Petty Officer Ed Bush of the Fleet Air Arm. Ed is not a ham, or perhaps it would be correct to say "not yet." He is typical of many thousands of keen &

enthusiastic young men throughout the Empire who have gained their first insight to radio through the Services. Our only regret is that Ed couldn't talk. What he did tell us only whetted our appetites for more!

Mr. Elgar Toharno VK2AFQ was the Lecturer at this Meeting and he chose for his subject "Vacuum Tubes in Industry." This subject proved a very interesting and entertaining one and at its conclusion he was accorded a very hearty vote of thanks.

The August General Meeting of the Division will be held at Science House Gloucester Street Sydney on Thursday, 16th August, and Mr. Foster-Stubbs will speak on "Home Made Talkies", and this talk will be accompanied by a screening of home made films. So, come early.

EMERGENCY COMMUNICATION NETWORK

Monthly exercises are still being held, but now take place on the second Friday of the month instead of the first. This change was brought about by the decision to hold two Council Meetings monthly.

Operators will regret to learn that State Operational Controller Colonel F. Lorenzo D.S.O. is confined to hospital suffering from thrombosis. Everyone will join in wishing "Lorry" a speedy recovery.

BUSHFIRES RADIO NETWORK

Following on a recent re-organisation of Council, Mr. Elgar Treharne VK2AFQ has been appointed Director of Country Radio Schemes (Emergency). This has been a decided gain to the Network as 2AFQ has been interested in all types of portable and mobile equipment for many years.

Bushfires Stations can still be heard practising during any night of the week particularly Friday night.

.....

ARE YOU INTERESTED - Allen Fairhall, VK2KB passes on this information. In the course of his work he has been associated with the Netherlands East Indies Signals people, and has been requested by them to supply a possible source of personnel to instal and operate small broadcast transmitters in the N.E.I. as the Government of that country will shortly be faced with the necessity of rehabilitating communications in their restored possessions.

He is advised that the PMG Broadcast Operators Certificate will not be necessary. Ham qualifications and experience should be

(Continued on page 16)

VICTORIAN DIVISION

Members of the Victorian Division are reminded that on Tuesday night, August 7th is the night of the Annual General Meeting of the Division. At this meeting the annual election of Officers takes place, and it is to your own interest that you attend and in doing so you will be taking an active interest in Divisional affairs. DON'T FORGET TUESDAY? AUGUST 7th AT 8 P.M.

The Laboratory Committee have been busy in co-operation with the Victorian Ski Club, and report that Mr. Don Bennett of that club has been away at Mt. Hotham and Mt. Bogong for the past few weeks carrying out further tests with their emergency sets, so that we have been unable to confer further about their problems. It would appear however, that the aerial system is the most difficult problem to overcome. Reports on reception of their recent tests have come from Balcombe and other parts where 3DB's harmonic does not interfere with reception. Even so, conditions are not entirely satisfactory, but they have been able to identify various stations and hear most of what has been said.

Another problem is that of a suitable power supply. A pedal generator has been considered and would be very suitable were it not probable that the set may have to be worked by someone in an exhausted condition or with a broken limb, and so quite unable to generate enough power to operate the set. Another possible solution is an accumulator kept fully charged by means of a wind driven generator. Objections to this scheme are:- the low temperature at which the battery would normally operate reduces its efficiency considerably, the charger would become useless due to icing for periods of about a week and may also be stopped for various periods due to lack of wind. Another consideration is that the absence of a high charging rate may be detrimental to the battery unless it were designed for these particular conditions. Dry batteries are the only other suitable source of supply available, but because of their limited capacity severely restrict the power of the transmitter. Thus it is that an effective radiating system is needed to ensure that the low power signals reach the farthest point at which reception is desired---a distance of 80 miles.

The Victorian Ski Club desire to express their gratitude to those who were able to listen to the tests and forward reports on the reception of the various stations.

.....

(ARE YOU INTERESTED)

sufficient. Selected operators would be signed on for at least a year at a salary 30% higher than Australian pay for comparable work plus travelling expenses.

Those interested should contact:- Major Jannson; N.E.I. Signals Section; 21 Macquarie Place: Sydney...Phone BW3064.

THE WIRELESS INSTITUTE OF AUSTRALIA

Divisions of the Wireless Institute of Australia exist in every State of the Commonwealth. The activities of these Divisions are co-ordinated by Federal Headquarters Division, the location of which is determined from time to time by ballot.

Present location of F.H.Q. :— New South Wales

Federal President : F. P. DICKSON, VK2AFB.

Vice-President : H. F. PETERSON, VK2HP. **Federal Secretary :** W. G. RYAN, VK2TI.

Councillors : C. FRYAR, VK2NP ; W. J. McELREA, VK2UV

Official Organ : "AMATEUR RADIO"—Published by the Victorian Division.

VICTORIAN DIVISION

191 QUEEN ST., MELBOURNE

Postal Address : Box 2611W, G.P.O.

President : H. N. STEVENS, VK3JO
Secretary : R. A. C. ANDERSON, VK3WY
Treasurer : J. G. MARSLAND, VK3NY
Councillors : I. MORGAN, VK3DH; T. D. HOGAN, VK3HX; R. J. MARRIOTT, VK3SI; C. QUIN, VK3WQ; A. H. CLYNE, VK3VX; H. BURDEKIN; K. RIDGWAY.

Subscription Rates

Metropolitan	£1 per annum
Country	14/6 per annum
Defence Forces	7/6 per annum

Subscription includes "AMATEUR RADIO"

Meeting Night

First Tuesday in each month at W.I.A. Rooms, 191 Queen Street.

Visiting Overseas and Interstate Amateurs are welcome at meetings and they are invited to communicate with the Membership Secretaries :

T. D. HOGAN .. VK3HX - UM1732
J. G. MARSLAND VK3NY - WF3958

NEW SOUTH WALES DIVISION

Registered Office :

21 TUNSTALL AV., KINGSFORD

Telephone : FX3305
Postal Address : Box 1734JJ, G.P.O., Sydney

Meeting Place

Y.M.C.A. BUILDINGS, PITT ST., SYDNEY

President : R. A. PRIDDLE, VK2RA
Vice-Presidents : H. F. PETERSON, VK2HP ; E. HODGKINS, VK2EH.
Secretary : W. G. RYAN, VK2TI
Treasurer : W. J. McELREA, VK2UV.
Councillors : N. GOUGH, VK2NG; E. TREHARNE, VK2AFQ; P. DICKSON, VK2AFB; C. FRYAR, VK2NP; R. MILLER

Subscription Rates

Full Members	10/6 per annum
Service Members	7/6 per annum

The N.S.W. Division meets on the third Thursday of each month at Y.M.C.A. Buildings, Pitt St., Sydney and an invitation is accorded to all Amateurs to attend. Overseas and Interstate Amateurs who are unable to attend are asked to phone the Secretary at FX3305.

WESTERN AUST. DIVISION

C.M.L. Buildings,

ST. GEORGE'S TERRACE, PERTH

Postal Address : BOX N1002, G.P.O. PERTH.

Secretary : C. QUIN, VK6CX.

QUEENSLAND DIVISION

Box 1524V, BRISBANE

SOUTH AUSTRALIAN DIVISION

Box 284D, ADELAIDE

TASMANIAN DIVISION

BOX 547E, HOBART

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SIXPENCE

SEPTEMBER 1945

AMATEUR RADIO

THE
OFFICIAL ORGAN
OF THE
WIRELESS INSTITUTE
OF
AUSTRALIA

Published by the Victorian Division

AMATEUR-RADIO

INCORPORATING THE N.S.W. DIVISIONAL BULLETIN

Vol. 13 SEPTEMBER, 1945. No. 9.

A MOST USEFUL PIECE OF APPARATUS

By

- Percy G. Feeny, VK2AKX -

One of the most useful articles around the Ham Shack is a set of absorption wavemeters. With this meter one can:-

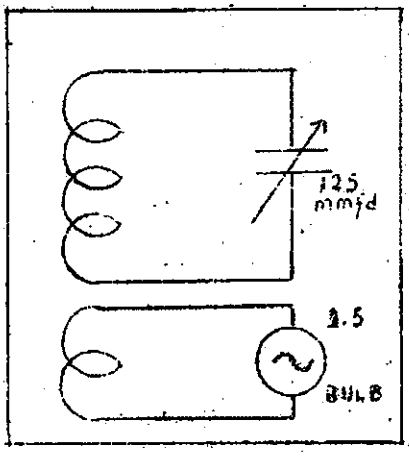
1. Check the frequency of an oscillating circuit with an accuracy of one percent.
2. The presence of harmonics.
3. The frequency of parasitic oscillations.
4. The neutralisation of an RF Amplifier.
5. The presence of RF in unwanted places...such as power wiring.

When co-operating with VK2HP in the building of the ECN network transmitter for Randwick, the writer had the idea to build a set of wavemeters. This article describes the job which eventuated from that idea and which is offered as a suggestion to fellow Hams to build for themselves.

CONSTRUCTION. The case is made from 3/16" masonite or wood, and measures $5\frac{1}{4}$" x $5\frac{1}{4}$" x 4" deep. If masonite is used three-cornered strips of wood are glued inside the case to hold the sides together as nails cannot be used. A brass strip handle is bolted to the left hand side, so that the meter may be held in position and the dial twiddled with the right hand.

A 500 mmfd AWA condenser was taken apart and half the plates removed. This doubles the spacing and makes the total capacity 125 mmfd. Do not forget to measure the length of the condenser with the plates open and then make the INSIDE measurements of the case to suit. A rectangular brass block was shaped on one side to a 2 inch radius to suit the periphery of the 4 inch dial. The block was drilled and tapped from the back, not breaking through, and after filing a slot for reading the dial, was bolted to the front panel.

The condenser and dial on the front and an Amphenol four pin socket, deprived of its mounting plate and glued in a hole drilled in the top of the case next to a flashlight bulb holder are all the parts required.



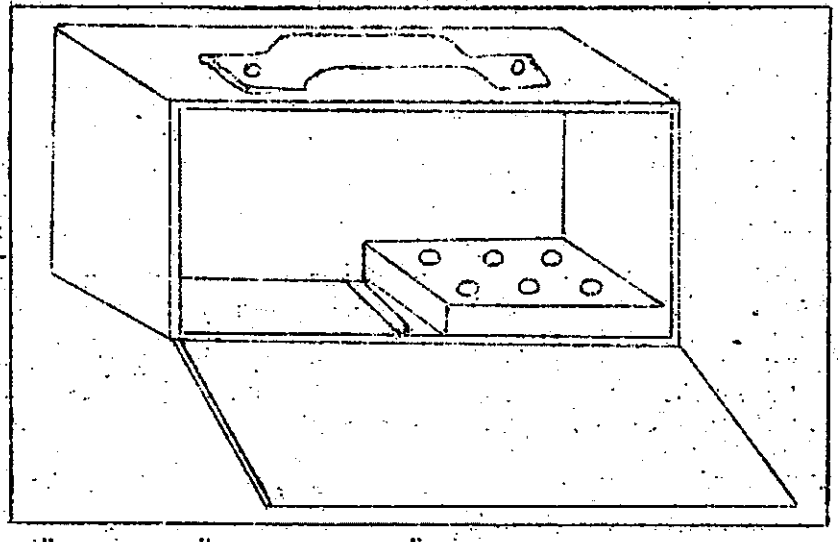
The coils are wound on 4 pin valve bases which have been fitted with a cover and finger grip.

It was thought that the presence of a closed loop, as the brass ring really is, in the field of the coil would be detrimental to its operation, but that has been found to be not the case.

The meter "grid" coil is wired to the filament pins and the flashlight coil to the G and P pins, this making the winding much less troublesome.

Coils were wound for six bands which may seem optimistic but at least I hope that they will all be used. The flashlight was wired in a separate circuit as by doing this the resonance point is more sharply defined. The coils tune the Ham bands at about half scale but the turns may have to be varied slightly to suit different condensors.

The meter may be calibrated by using the "click" method with a regenerative receiver or the user may do so by checking against a multistage transmitter in which case the number of calibration points are only limited by the number of crystals the owner (or his friends) possess.

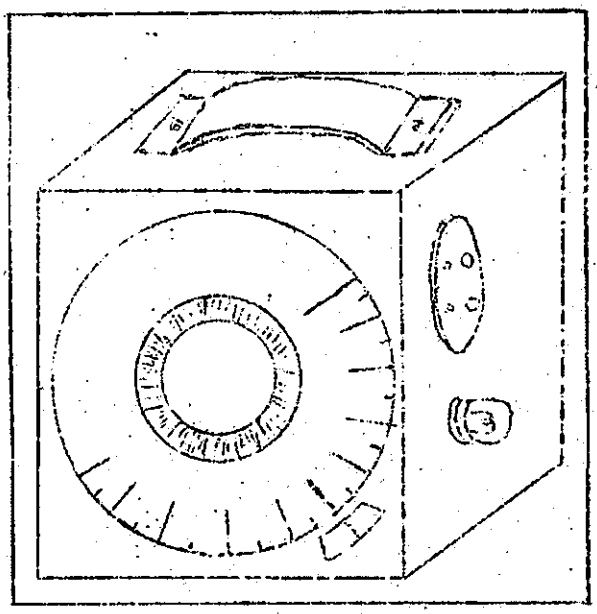


A masonite case 12" long; 6" high and 6" deep was made with a hinged front panel and a carrying handle on the top. A small subpanel 5½" x 4½" was drilled with six holes 13/16" diameter spaced so that the six coils could be dropped into them. This shelf was mounted one inch above the floor of the case at one end and holds the coils in a tidy manner and where they can always be found at the required time.

The meter case is slipped into the case between two strips of wood which hold it firmly when it is carried bodily, as it surely will be when your friends want to borrow it...I've loaned mine to 2ZC already!

This may seem to be a lot of trouble to go to for a lowly absorption wavemeter, but any Ham who builds one will get a lot of

satisfaction from this set, which is complete, does a good job and costs practically nothing to construct, altogether a Most Useful Piece of Apparatus.



COIL DATA

Freq range.	Wire size.	Turns.	Link
1.1-3.5 Mc	28	82	17
2.5-8 Mc	24	35	11
4.5-14 Mc	20	16	6
7.5-25 Mc	16	8	4
15-33 Mc	16	4	2

.....oo00oo.....

The powdered iron cores used for RF inductances are so brittle that they are liable to crack or break, either when being wound or during the final heat treatment, when replacement is costly.

According to the invention, the cores are strengthened by including reinforcing strips of non-magnetic material in the course of manufacture. For instance, the core for a toroidal winding is moulded in two "split" halves, each circular in plan and semicircular in cross section. A ring shaped strip of whalebone fibre, 20 to 40 mils thick, is cemented to the flat face of each half, and the two halves are then cemented together, strip to strip to form the complete reinforced core. This is baked hard to dry out the cement, before being taped and varnished.

From "Wireless World."

.....

Unlacquered brass can be given a beautiful grey finish in the following manner. Mix 1 oz. of tartar-emetic with just enough muriatic acid to dissolve it; add water equal to one third of the mixture. Now apply the solution to the brass and the colour will soon change to a pleasing grey.

"Break-In."

WIRELESS INSTITUTE OF AUSTRALIA

- Victorian Division -

PRESIDENT's report for the year ended 30th June, 1945, presented at the 35th Annual General Meeting of the Victorian Division.

....

For the fifth successive year it is my pleasant duty to review at this, the 35th Annual General Meeting, the activities of this Division of the Wireless Institute of Australia during the past twelve months.

Finance heads the list of matters for review and as full details are shown in the Balance Sheet, and Income and Expenditure Accounts, a copy of which will be posted to every member, I will deal briefly with only the most outstanding items. The years operations resulted in another loss, which, after providing £27.3.0 for depreciation, amounted to £59.18.1; About £44.0.0 less than the loss incurred last year and somewhat less than the losses of other war years. As I have stated in previous Annual Reports Losses must be expected while the war continues and your Council is of the opinion that it is better to suffer such loss and retain these rooms than to economise by giving them up.

Two items of Laboratory Equipment, namely:- Tinsley's Portable Wheatstone Bridge and GR 1000 cycle Tuning Fork Oscillator were sold during the year for a total of £70.0.0, so the capital value of apparatus is reduced by that amount, and because of support received from three advertisers, operations by the Magazine committee on the publication of "Amateur Radio" resulted in a small profit of £3.9.2d. I regard with satisfaction the fact that we have carried out the year's operations without having to sell any of our holdings of Commonwealth Government Inscribed Stock which remains at £550.0.0.

MEMBERSHIP...Once again figures show an increase, largely due to the efforts of the Membership Secretaries, Messrs. J. C. Marsland VK3FY and T. D. Hogan VK3HX who have continued the drive for new members throughout the year. At the beginning of the year members numbered 208; 70 either joined or rejoined, but 14 failed to renew their subscriptions so the total is now 264, a nett increase of 56. Service members total 135; 7 being either reported as "Missing", or "Prisoners of War." P/O J. E. Snadden VK3VE was one of these, reported in a list issued last year. The only one of whom we have information is "Snow" Campbell VK3MR who was reported repatriated, though it is not known whether or not he has left England...(Snow was present at the meeting at which this report was presented....Ed.

In extending to all new members a hearty welcome and an invitation to participate in all activities of the Institute, I would like to express the gratification felt by those of us who have for so long carried on with the support of a comparative few who saw the wisdom of keeping the Institute alive in this Division, so that when the

time for restoration of licences arrived the organisation necessary to accomplish this and to organise other post war activities would be already in existance. When we compare the present increasing membership with the bare 100 members of a few years ago, we feel that our policy of keeping things going in spite of the discouraging position has been vindicated.

A suggestion by VK3ML that members be issued with a membership card has been adopted by Council at its last meeting and these will be distributed as soon as they come to hand from the printer. Members should make it a habit to carry this card with them wherever they may go, as it will identify them as members when purchasing equipment or borrowing books or instruments from the library, and may also lead to bringing new members in when displayed in front of friends.

MAGAZINE...We are now printing 575 copies each month, some of which are used by the Membership Secretaries to assist the membership drive, and the circulation apart from this is about 500. To print all these copies it is necessary for members of the Magazine Committee to devote two Saturday afternoons each month to this task, which is done at the home of Mr. J. G. Marsland VK3NY. The Institute is indebted to the Magazine Committee for their continued attention to their task, and to Mrs. Marsland for permitting this invasion of her home.

We had hoped before this that the change over to the printed Magazine would have been made, but various difficulties and delays occurred to prevent it. Not the least of these is that of securing enough advertising to enable the printed magazine to be produced without incurring a loss. We are endeavouring to secure the services of an advertising agent, and expect to have this difficulty overcome in time for the October issue. Needless to say, we of the Magazine Committee will have no pangs of regret about being deprived of our task of feeding the duplicator. The new magazine will require much matter for publication than is possible with the duplicated magazine, and it is here that members can render valuable assistance. Interstate Hams are please asked to note this:---the magazine is the Official Organ of the Wireless Institute of AUSTRALIA, not Victoria or New South Wales or any other Division, and in order that it live up to this statement, it should include articles and other contributions from all States.

POST WAR AMATEUR RADIO...This subject has been claiming more and more of our attention, and in order to fully explore all its aspects, a Committee consisting of Messrs. Marriott, Clyne and Ridgway was appointed early this year. Before they really had time to get under way, Messrs. Marriott and Clyne were appointed to Federal Executive, and the Committee as a purely Victorian body ceased to exist. Doubtless this Committee will be reformed with new members by the incoming Council.

Post War reconstruction may be divided into two classes:- (1) purely Institute matters and (2) Regulations by which Amateur Radio is controlled by the Radio Inspector. It is this latter aspect which has first received our attention, and was the subject of much discussion at the July General Meeting as a result of suggestions from FHQ. Generally, the opinion of this largely attended meeting was that with a few modifications the regulations as they existed before the war would be satisfactory. Both classes however, are matters upon which we are anxious to have the opinions of as many Hams as possible, particularly country Hams, and those in the services who are unable to attend meetings to express their opinions.

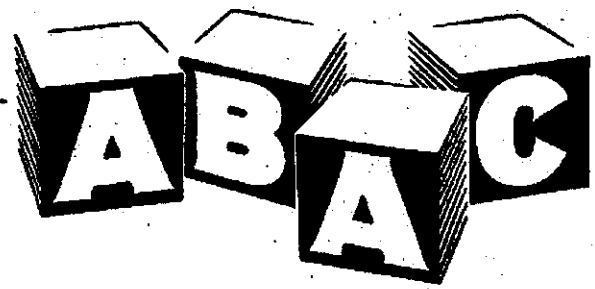
FEDERAL HEADQUARTERS...In accordance with the decision of the last Federal Convention, which was held in Melbourne at Easter 1939, Federal Headquarters was located in this Division until in August 1941, the offer of the New South Wales Division to relieve us of this responsibility was accepted and the affairs of Federal Headquarters passed into their capable hands. The determination of the location of FHQ is normally one of the duties of a Federal Convention, but as New South Wales and Victoria were the only Divisions where Institute activities were sustained at this lean period in our history, it was thus impossible to arrange a convention and the location of FHQ was decided by mutual consent between those two Divisions. The chief benefit to us of the transfer of FHQ to New South Wales was that we were able to concentrate upon producing the magazine...a job which alone, severely taxed our resources at that time.

However, with the change of the world situation and the approach of peace, it was deemed advisable that FHQ be located where close contact with the Chief Radio Inspectors Office could be maintained, so once again this Division is bearing the responsibilities of Federal Headquarters. The various offices were filled by nominations of the following Councillors:- Federal President...Mr. R. J. Marriott VK3SI, Secretary Mr. A. H. Clyne VK3VX, Treasurer Mr. T. D. Hogan VK3HX; Councillors Messrs. C. C. Quin VK3WQ and A. R. Williams VK3WE. In order to devote their energies to their tasks all have refrained from nominating for re-election to the Victorian Council.

LABORATORY AND LIBRARY... Following its recommendations that the obsolete laboratory equipment (i.e. GR Capacity Bridge, GR Precision Condensor, GR 1000 cycle Tuning Fork Oscillator, Tinsley Portable Wheatstone Bridge) be sold and the proceeds used for the purchase of modern laboratory equipment when it became available, the Laboratory Committee set about disposing of this apparatus, and the motor generator set. Firstly a circular was sent to The University, The Melbourne Technical College, The PMG Laboratory and the CSIR and this eventually resulted in the sale of the Tuning Fork Oscillator to the University.

Transformer Problems

ARE AS SIMPLE AS...



- Air cooled power transformers up to 2KVA.
- Small size current transformers for rectifier instruments.
- Audio and carrier frequency transformers on silicon steel or nickel alloy cores.
- 11, 16 and 31 point switches.
- Custom built sheet metal.

ABAC TRANSFORMERS

—a product of TRIMAX TRANSFORMERS

DIVISION OF CLIFF & BUNTING PTY. LTD.
29-35 Flemington Road, North Melbourne

Chas Quin 3WQ was then largely responsible for publicising our intention to sell this equipment amongst various commercial organisations who may have been interested, and eventually the Wheatstone Bridge was sold to Messrs. Hodson & Gault of Springvale.

The complete diary of Mr. Quin's efforts to dispose of the equipment would make interesting reading, and would be too lengthy to include in this report, but some idea of the amount of work he has put into this task is shown by the fact that he has contacted some 30 firms and has spent much time during his lunch hour (and after too) showing it to prospective buyers. In short his efforts have been worthy of a greater measure of success than has been achieved. At present an answer is awaited from the Rola Co. concerning purchase of the Capacity Bridge and Precision Condenser.

The library has also received attention from the Laboratory Committee who have submitted to Council two reports concerning it and its re-habilitation. Practically all books in the Library were obsolete having been published about 1928; the last two books added not long before the fateful red telegram day were nowhere to be found and no clue could be found to indicate their present whereabouts. In its report to Council, the Committee recommended that, in order to modernise the library, new text books should be

purchased, subscriptions made to several overseas periodicals, and that it should be kept up to date by the regular addition of new books as they became available. It suggested that by the sale of Admiralty Handbooks and the Motor Generator Set suffi[illegible] could be made available to initiate such a plan. Council has ted those recommendations and with the £10 realised by the sale of these handbooks, six modern text-books have been purchased and subscriptions made to "The Wireless Engineer" and "Communications."

These books will be available for loan to members when all arrangements for their safety are completed. Within the last few weeks a further success in our efforts to sell unwanted equipment has been achieved by the sale of the Motor Generator Set to D. F. Skelley for £35. This will ensure finance for the completion of the initial stages of the re-habilitation of the library.

Another task undertaken by the Laboratory Committee is that of indexing technical articles in periodicals in the library, by means of an index system. This is being done by Mr. J. K. Ridgway and when completed, ready reference to all articles on a given subject will be available, and this should prove of immense value in many directions. Our efforts to secure copies of periodicals found to be missing from the library have been partially successful... VK3KN: VK3CN and VK3BM generously gave many copies, but more are required to complete the files in accordance with the Committee's recommendations that, if possible, all copies of the following periodicals from 1938 should be kept in the library for future reference..."QST: Radio: Wireless World and RSGB Bulletin."

The Laboratory Committee has many important tasks ahead of it...the supply of technical articles for the magazine, the arrangement of a series of discussions on modern technical developments for general meetings; the planning and building of the post war laboratory are but a few. An enlarged committee is essential if these plans are to be realised and any members willing and able to assist will be welcomed by the present committee.

EMERGENCY COMMUNICATIONS...At this time last year we were awaiting replies from officials of the Bush Fire Brigades Association to our letters regarding the establishment of an emergency network. We are still awaiting them, but without any cares as to whether or not we receive them. In the meanwhile the Forrests Commission sought our assistance to enlarge their communications networks in several country districts. Unfortunately there are no hams in some districts where communications are desired, so that we are unable to assist to the extent we could have wished. However, a start was made early this year when VL3DY and VL3DZ, base transmitter and mobile station respectively, were licenced for operation in the Heywood district. Hams participating are VK's 3 TN and 3TW of Hamilton. We are hopeful that stations in at least one other district will be licenced shortly. Nothing further has been heard from either the State Electricity Commission or VK3HD

about his suggestion that an emergency network of Hams could assist in reducing the time when power was cut off from country towns due to lines being broken by bush fires or other causes.

The Ski Club of Victoria is establishing an emergency communication network in the Mt. Hotham and Mt. Bogang areas, the chief value of which is to obtain assistance or medical advice when a skier may be injured and to check up on the safety of parties venturing out or being caught out in doubtful weather. The Club intends to secure equipment of its own--at present they are using sets obtained on loan from the Forrests Commission---and is seeking our assistance in overcoming some of the difficulties encountered in their setup; particularly in the design of an effective aerial system. Members of the Laboratory Committee have conferred with the Secretary of the Ski Club, Mr. Bennett, but so far discussions have been of a preliminary nature and will be resumed when he returns from his present sojurn in the Alps.

...00...

THE TECHNICAL LIBRARY

The RADIO AMATEURS HANDBOOK...22nd Edn., 1945 (ARRL)...512 Pages, plus index and 200 p. catalogue section, ...11/6.

The new 1945 Handbook is a comprehensive digest of the older, familiar phases of radio theory and practice with which has been combined material covering the more advanced techniques of the future. While the basic treatment of the theory section has not been materially changed, many of the latest phases of radio such as pulse technique, panoramic reception velocity modulation etc. have been covered in completely new additions to the text, thus paving the way for the post war amateur development with its new techniques as well as those which have become orthodox practices of amateur radio operation.

Treatises on amateur radio and radio operating are included in the general information section which also contains an enlarged collection of formulas, miscellaneous data tables and the classified vacuum tube tables which have been revised to include data on all the released new types. This compilation is most comprehensive, including as it does magnetrons, klystrons and other special tubes in addition to all the better known American types, A cross index is provided to further assist in the use of the tube data. Some idea of the completeness of the tube data may be gained from the fact that it occupies 45 pages!

By no means the least interesting section of the Handbook is the usual catalog section at the back. As in previous years no doubt this section will cause much tearing of hair by VK Hams. There is so much new material included in the 1945 edition of the Handbook that I can recommend it even to those who have the previous edition.

We are indebted to the publishers the American Radio Relay League for the copy reviewed above. .. Alec H. Glynn - Review Editor.

CORRESPONDENCE.

The Editor - Dear Om,

I read with much interest 3ML's article on Post War Amateur Radio appearing in the August issue of "Amateur Radio" and I agree with quite a deal of what he has to say, but I am afraid that he is laboring under a misapprehension regarding the Federal Constitution.

At the Fifteen Annual Federal Convention held in Melbourne during Easter of 1939 the Constitution was re-drafted and in its new and modified form, unanimously agreed to by the delegates present. This Constitution lays down the organisation of the Institute stating that it shall consist of Divisions, a Federal Executive - and a Federal Council and certain very definite powers are given the Executive including a mandate from all Divisions to execute or handle all matters of a Federal nature. The Federal Council to consist of one member from each Division together with the Federal President, Federal Vice President and Federal Secretary. The Council would be the governing body and as the name implies, the Executive would carry out its decisions.

A Convention was held once a year and Councillors met and laid down the policy of the Institute for the ensuing year. This did not mean, of course, that if any matter cropped up during the year that it would be impossible or perhaps difficult for any action to be taken. That is of course ridiculous, and as the various Divisions are aware, they have been consulted by letter from time to time.

It is fully realised that at the present time the only really active Divisions are those in N.S.W. and Victoria, whilst a skeleton organisation has been maintained in VK6. In VK4, 5 & 7 the Institute is dormant. This state of affairs has been brought about by the demands of Mars, but it is quite safe to say that if encouragement had been received from the right quarter these latter three Divisions would, like VK6, maintain some form of organisation. Nevertheless there are still stalwarts like Arthur Walz VK4AW, Joe Kilgariff VK6JT and Peter Allan 7PA interested in the affairs of their States, and will be well to the fore in any re-organisation schemes.

3ML suggests that in order to impress upon the Chief Radio Inspector that the Institute is representative of the Australian Amateur, that the old organisation be done away with. Does the C.R.I. doubt the Institute as being representative? That is the only interpretation that can be placed on paragraph 6 of his article? Does he seriously suggest that in the light of section (1) Courses of Action that the valued advice of the active Divisions or representatives - already mentioned - of others not so active should be lightly dispensed with? This particularly refers to New South Wales, a Division of which I am proud to be Chairman. A Division which has been responsible for keeping Amateur Radio alive in Australia during the war years by reason of the fact that it was able to obtain permission for a wartime Emergency Communication Network. Although unfortunately confined to VK2, this Network provided a stimulus to Experimental Radio throughout the Commonwealth.

If it is thought necessary to again re-draft the Federal Constitution, why not wait until such time as a representative number

of Australian Amateurs on Service have returned to civilian life and give them an opportunity of forming the Constitution instead of presenting them with a fait accompli. Of course 3ML suggests that a tentative Constitution be drawn up to operate for two years. The writer can see no reason for this.

It is realised that with the cessation of hostilities, Federal Headquarters will have to consult with the Department on many occasions and possibly would like to say yes or no without consulting any Division or representative thereof. This policy on the face, has many advantages, but by the same token is dangerous and has its limits.

Recently, Federal Headquarters circulated a number of proposals to the various Divisions or representatives thereof. Numbered among these proposals was a suggestion that there be three types of Licences, namely C.B.A. The suggestion for qualifications and privileges of the Class "C" were as follows - Age 18 years - an increase of three years over pre-war standards. Code speed 14 w.p.m. (Increase of two words p.m.) 12 months operation on c.w. with a power input of the whole of 15 watts! If this proposal had been submitted to the Department as part of the Post War plan, it is quite safe to say that the Institute would have had to close down. When one considers the hard fight that was necessary to have the limit raised from 25 watts to 50 watts in pre-war days, it is hard to follow F.H.Q.'s reasoning. It is almost impossible to believe that the Institute was making it harder to obtain the A.O.C.P.

As a result of circularising the Divisions and representatives, I have been informed by a member of the N.S.W. Council who recently visited Melbourne, that the view expressed by N.S.W. - that the Class "C" Licence should be similar to the pre-war A.O.C.P. - has been endorsed by the other States. This demonstrates in no uncertain manner the value of obtaining the advice of the people concerned, namely, the Australian Amateur represented by his Division of the Institute or some responsible pre-war official, and definitely proves that it would be dangerous to delegate to a small body - however good their intentions may be - the sole right to plan Post War Amateur in Australia.

I agreed with 3ML that if the Institute is to progress, it must have a permanent staff with at least a full time secretary, who would be governed by the Federal Council consisting of a representative from each Division.

As far as the magazine is concerned, it must become definitely Australian in character, and here again, if it is to become a source of revenue and not a burden, as it has been on the Victorian Division, it must cease to be a voluntary effort on the part of a small band of willing helpers as the magazine Committee have proved themselves to be over the past years.

Mr. Editor, I trust that I have not taken up too much of your valuable space in my endeavors to show that the Federal Constitution is workable and the value of obtaining advice on Post War plans, and, in conclusion, would like to state that if F.H.Q. consults a State, it is up to that body to forward a prompt reply.

Yours faithfully,

WAL RYAN - VK2TI.

DIVISIONAL NOTES

Federal Headquarters

In the past few weeks Federal Executive have received numerous inquiries as to when the ban on Amateur Transmissions will be lifted, a thought which must exercise every Ham's mind.

Unfortunately it will not be next week or indeed next month or the month after. We, Federal Executive can say with considerable authority that it will be some time before Australian Amateurs will be allowed back on the air. Although the war is finished, service communications will have to be continued for some time.

Many countries now in the possession of Japan will have to be re-occupied, with the result of a further strain on the already crowded frequency allotments, which means that the Amateur bands will have to remain in use by the various services.

However we are assured that as soon as there is a possible change for the return of Amateur Frequencies, machinery will be set in motion which will restore Amateur Licences, so until that time, we Federal Executive, ask all Hams to wait patiently.

Federal Executive have spent much time in recent weeks in the collation of the replies from Divisions, on the Draft Proposals in regard to Post War Licencing. The task has not been exactly an easy one, for on some points there was widely diversified opinion. However on the major points almost unanimous assent was received.

In the course of the next few weeks, the revised Draft will be forwarded to all Divisions for further discussion and if necessary amendment. Federal Executive wish to point out that the revised Draft consists of a majority vote by Divisions on the various points. If any one Division does not agree with any particular point, that Division must remember that a majority of other Divisions desire that particular point included. However the Draft is not final yet, and further suggestions or amendments are in order.

Federal Executive are delighted to report that South Australia, Queensland and Tasmania are once again active Divisions and we recommend that Hams in the services join or re-join their Divisions. By doing this they will help their Division get under weigh again, as well as strengthening the hand of Federal Executive, who may then say that they represent an Australian wide organisation. In next months Amateur Radio we will list the addresses of the Secretary of these Divisions.

...oOOo...

SLOUCH HATS AND FORAGE CAPS

1st Peace Edition Hi!

...

And so it looks as if very soon your column can, like the War, cease to be, for soon you will all be free of wearing the above-mentioned caps, stripes, gold braid and what-have-you, and be once more merely VK0ZZ calling CQ DX...did I hear an echo "20 metre phone". Hi! However, till its all over, over there, and you all get home YOUR column has to function, and with plenty of time on your hands and no more censorship, I expect to expand to four pages till we go out of production.

At the moment, Chief Petty Officer O'Dwyer seems to be the farthest away. This 5OF seems to be able to judge things in an uncanny way...just manages to arrive in England to join in the VJ Peace Celebrations...not to mention the elections. AND, like a lot more of you, writes me two whole pages with nary a morsel of news for our column in either of them. He is yet another VK to be met and given a very friendly welcome by Clarry G6CL of the RSGB. Like all VK Divisions, Clarry has one "moan" throughout this War, and it was and is..."Why don't more visiting Hams get in touch with the Ham Society of the country they are visiting." The answer is a Great BIG Question Mark.

Les Coupland 2BQC Sgt. in the RAF (stationed at Camden) was a bit of an exception as he got in touch with 2TI and was at our WIA Divisional meeting. Les was one of the "Early Birds" who went to France in '39. As he sports a Pacific Star he must have been out here for longer than represented by his arrival in VK2. He was in Belgium before the Germans turned it in and the ON's held a Ham fest in Ghent on 7/10/44. He remembers the following as being present:- ON4KB, 4KX, 4HK, 4FEM, 4CK, 4PA. During the occupation these Hams had built a Xmitter for underground use. EVERYTHING but the tubes themselves had been "Hammade." As soon as the Allies came in this Xmitter has presented to the Allied Government.

Had a "Post War" letter from Wing Commander Meyers VK2VN. Morrie saw the war out from the front line so to speak, quite by accident, as he should have been down here on leave, but his relief took sick and stayed in VIB...and now it "kind of doesn't matter". When he wrote 2VN was in Labuan after five weeks at Balikpapan. "As usual" Morrie said, "arrived there the day the landing was made and went through the usual hardships of installation etc." On his staff are Sgt Wootton, Roger Choate 6RK, and John Allan 5OL, so, as he says, all spare time goes into discussions of "I think I'll build," etc. etc. Morrie himself has gone into serious study of all QST's he can get hold of since the War ended...and I guess he looked around and about. Hi! Recent arrivals up there are MacNaughton 2ZH, very proud of some very new and very late equipment, the first of its kind, while on Peace Day along pops Johnny Traill, 2XQ, and so they had a celebration, as Morrie says "of a kind." And if he remains there any further time, Morrie is going to have Hamfest...and

quite right too. Hi! Thanks Morrie, would they all wrote as often as you). Clarry Castles 5KL, Sargeant to you, and now QRA RDIAU, 87 Exhibition St., Melbourne, writes to be remembered to all the VK2 Gang. Clarry is another who always supported the column from way out in the Never Never, and its good to know he is back in "civilisation" Hi! He says the VK5's had a meeting of over 40 Hams recently, and with VK3 with over 60 and VK2 over 50...,it looks as though the boys are just becoming a bit Ham Band Conscious. Hi!

From Ex Fl/Lt Evans one 3VQ come a long letter of some of his travels, which are better told in his own way. "Came out of the RAAF last February, after 5¼ years service. Whilst in New Guinea I saw most of the spots up there starting with Kiriwina, Goodenough, Milne Bay, Moresby, Nadzab and Biak. Saw a lot of Gavin Douglas 3YK in '43 and early '44 while at Goodenough and Moresby, and lastly about a month ago had lunch with him before his departure for Morotai. (Incidentally I noticed in the paper where a G.C. Douglas welcomed the Cook while he was touring up North...was it 3YK??? 2YC) Mel McCartney 3KV is in England with RAAF Photography Section and does not anticipate being home before Xmas. He has been all over England and Scotland on visits to RAAF units there during his stay, but reckons the climate is too cold for him.

Saw Oscar Blythe 3XW quite a few times at Moresby and Finschaffen late in '44, Morrie Meyers at Nadzab and Noemfoor, and Arthur Walz (4AW)Jack Bell, and Jack Evans (2CX) when they were doing installation work from Milne Bay and Nadzab."

Apart from his own travels 3VQ has this other news, "I believe news has been coming fairly regularly from Arthur Tinkler 3ZV and Roy Prowse 3XS POW's at Singapore. The last message was from the Singapore Radio early this year, so we can hope to see them both very soon now. 3VQ's younger brother is now second Radio Officer on M/V Troja the first officer of which is LA7H." Thanks 3VQ...and once again it shows what news there is waiting for this column.

Sgt VK2AGA just arrived down South from New Guinea and Nth Q. has promised me his story and travels for our next issue as has also Jeff Prior 2 AMP just back from Boganville. While over there he worked with a sigs group comprising ZLs Ws and VK's. So I am at least assured of a few notes, thank goodness.

F/O Cec Light is now back in Sydney after his trip over to Europe. Cec seems to have been round quite a bit. He flew several types of bombers including Stirlings, Halifaxes, and Lancasters. On D Day he dropped Paratroops over Caen and generally helped things by towing gliders and dropping bombs where needed. Anyway, that's how he dismissed a couple of years excitement, so I guess I will have to invite him out to tea. Hi!

And that concludes "Peace Edition No. 1"...no 2 follows next month provided letters arrive at 78 Maloney Street, Eastlakes, NSW and the 'phones at MU1092 and MU1879 keep ringing.

P.S. I have a packet for Jim Stevens when I get his QRA...2YC.

- NEW SOUTH WALES DIVISION -

The Victory General Meeting of the New South Wales Division of the Institute was held at Science House on Thursday 23rd August, and as could be expected, the Meeting was the largest since pre-war days.

The Chairman in declaring the Meeting open, stated that this meeting was unique insofar as it was being held on a night other than the "Third Thursday," but he felt that Members would forgive Council for this lapse as the reasons were quite good! It was fitting that at this meeting we should have a representative of the "Few that we owe so much to" namely Sergeant Les Couplant AA-2BQC of the RAF, Flying Officer "Lanc" Light VK2QM was also welcomed back home after three years service with the R.A.A.F.

Among the large gathering was noticed VK2ADV, 2AMP, 2IE, 2WD, 2DI, 2ADK, 2WN, 2NO, 2AHU, 2AGO, 2AJW, 2HP, 2QM, 2RA, 2NP, 2JW, 2TE, 2AKR, 2AGA, 2AFQ, 2LO, 2TI, 2AZ, 2OM, 2.DC, Messrs. Eyres Borlan, Hopkins, Murphy, Gard, Knock Jnr. and Ryan Jnr.

Members generally expressed keen disappointment that the draft proposals had not been received from Federal Headquarters, but it was pointed out that several telegrams had been forwarded to F.H.Q. on this matter, but unfortunately the Federal Secretary was absent in the country. A brief note from a member of the Executive stated that the Chief Radio Inspector, in reply to a request for a statement as to the position of the Experimentor had stated that there were no immediate prospects of getting back on the air, as due to the large number of Islands that had to be garrisoned, frequencies would be at a premium. The news that F.H.Q. intended seeking the release of sealed containers was received with delight.

In view of the cessation of hositilities and the increasing attendances at General Meetings it is proposed to make efforts to obtain the Main Hall at Science House for 1946. This may prove difficult as this Hall is much sought after, but no effort will be spared, and at this juncture it can be stated that if this Hall is available, meetings will NOT be held on the third Thursday. Members will be kept informed regarding negotiations, but please keep this in mind. You will receive ample notice of any change in Meeting night.

At the conclusion of General Business a very interesting talk and demonstration was given by Mr. Foster Stubbs of the Australian Amateur Cine Society. Mr. Stubbs briefly outlined the progress made with technicolor amateur cinematography. Members were astounded with the films shown - all of which had won prizes, and it was hard to believe that they were the work of amateurs and the enthusiastic manner in which each film was received would leave no doubts in the minds of the lecturer of the popularity of his demonstration. We would like to have you again sometime, Foster. Many thanks.

The next Meeting of the Division will be held at Science House on Thursday 20th September, and it is hoped that by then Draft Proposals will be on hand from F.H.Q.

VICTORIAN DIVISION

The Annual General Meeting of the Division was held on Tuesday August 7th, and, once again, the accommodation of the rooms was severely taxed, some 65 members and visitors being present. Interstate visitors were 4LD, 5FL, 6AF and 7LM, and we were especially pleased to welcome back to our ranks "Snow" Campbell 3MR, recently repatriated from P.O.W. camps in Europe. Others present were 3XC, IK, QS, NW, MZ, PJ, HK, YQ, LI, LX, UM, IG, OC, EC, UR, KN, BQ, ML, XD, VG, FR, DS, JA, XB, UC, QZ, JE, SZ, PW, PG, RJ, LF, YL, XJ, NY, HX, WY, LN, WQ, NK, XZ, JX, Messrs. Viney, Ridgway, Couch, Roberts, Belcher, Lonsdale, Manseagh, Rouse, Nielsen, Ferrier, Kerley, Burdekin.

First item of business was the President's report on the year's activities, and in the unavoidable absence of the retiring President, Mr. H. Stevens 3JO, the report was read by Vice President Mr. T. D. Hogan 3HX. The report is printed in full elsewhere in the magazine. The Balance sheet was then presented by the Treasurer, Mr. J.G. Marsland 3NY, after which the meeting proceeded to the election of officers for the present year. Messrs. Kinnear 3KN and Cunningham 3ML were nominated for President, and in the ensuing ballot, Mr. Kinnear was elected. The following Vice-Presidents were then appointed - Messrs. R. H. Cunningham 3ML, R. Dowling 3XD, M. Howden 3BQ and T. D. Hogan 3HX. Messrs. Gandy, Cohen and Hiscock were re-appointed Auditors.

Only eight nominations were received for Council, those nominated being automatically elected, the new Council being Messrs. R.E.Jones 3RJ, R. Dowling 3XD, I. Morgan 3DH, H. N. Stevens 3JO, R. McGregor 3XZ, K. Ridgway, H. Burdekin and K.D. Hanson.

Some members questioned the value of technical equipment as shown by the Balance Sheet, and a motion was passed that a re-valuation of technical equipment be carried out by the Laboratory Committee. The possibility of holding a Federal Convention in Melbourne at an early date was discussed, some members being of the opinion that it would be possible to obtain a delegate for each Division from Service personnel and civilians at present located in this State, and a motion was passed that F.H.Q. be requested to communicate with the other Divisions with a view to arranging such a Convention. Another motion embodied a request to F.H.Q. to approach the PMG's Department with a view to re-opening the 5 metre band. A lengthy discussion took place on a letter from F.H.Q. regarding the transfer of certain powers to the Federal Executive, and whilst many were of the opinion that the Executive already possessed sufficient powers under the 1939 Constitution, a motion was passed to the effect that F.H.Q. be given power to carry out any negotiations with the P.M.G's Department.

At the first meeting of the new Council on Aug. 14th, Mr. H.Kinnear 3KN was elected Chairman of Council & Messrs R.Anderson 3WY & J.G. Marsland 3NY were re-appointed Sec. & Treas. respectively. Messrs. Stevens 3JO & K.Ridgway were appointed to the Labor. Committee with power to co-opt. Considerable discussion took place on the subject of Fed. Executive's powers & the Sec. was instructed to pass on the recommendation from the General Meeting. A motion was also passed that FHQ approach the P.M.G's Dept., with a view to obtaining the release of gear in the custody of the Department.

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The N.S.W. Division meets on the third Thursday of each month at Y.M.C.A. Buildings, Pitt St., Sydney and an invitation is accorded to all Amateurs to attend. Overseas and Interstate Amateurs who are unable to attend are asked to phone the Secretary at FX3305.

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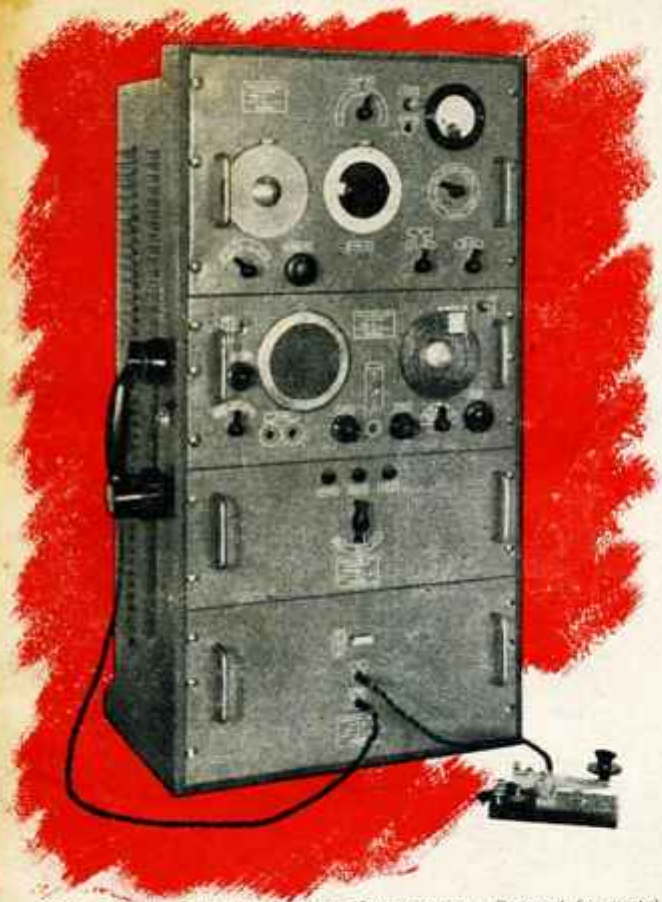

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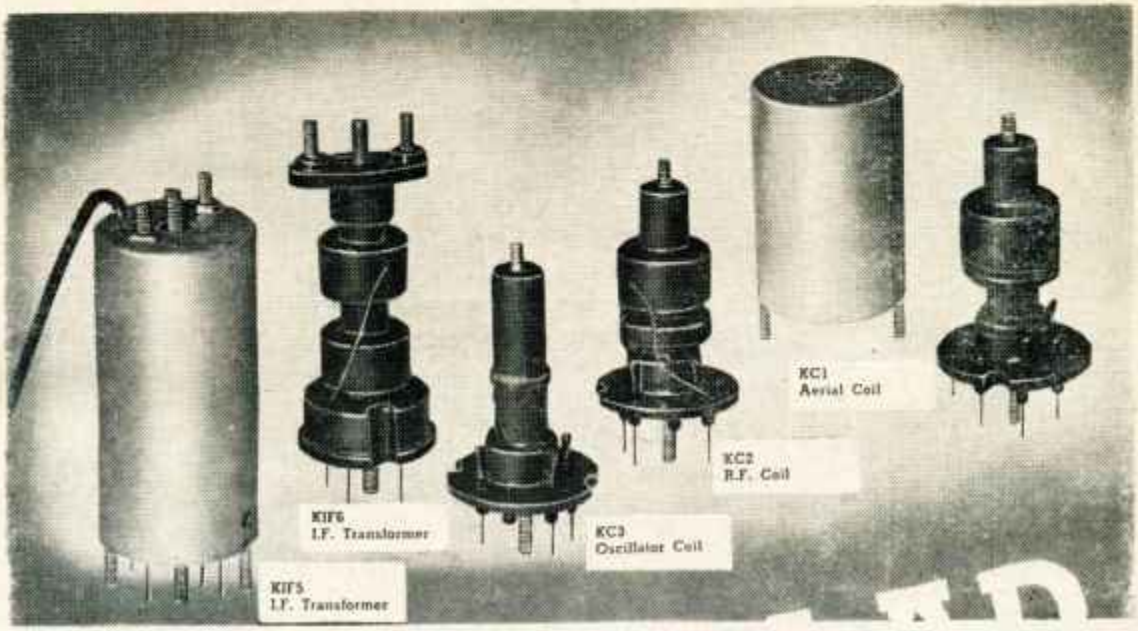

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EDITORIAL

Proudly do we, the Magazine Committee, present the first printed issue of "Amateur Radio" since January, 1941.

We trust that the new "A.R." meets with your full approval, for we have spent many months planning to return to print, but due to delays outside our control, it has not been possible to do so until now.

The duplicated magazine, we are sure, served a purpose—It was either a duplicated magazine or none at all, and the members of the Magazine Committee over the past four and a half years have felt that the time they put into preparing and printing the Magazine, did much to keep alive Ham Radio and the Wireless Institute of Australia during the darkest hour of its history.

It is fitting that this, the first issue to be printed in post war years should fall on the anniversary of the first issue of "Amateur Radio," for it was in October, 1933, that the Magazine made its appearance.

We feel that we should not let this opportunity pass without publicly expressing our appreciation of the high degree of co-operation we have received from our printers, Messrs. H. Hearne & Co. Pty. Ltd., and from our Advertising Representative, W. J. Lewis Advertising Service. Their advice and enthusiastic help has considerably lightened our burden.

To our advertisers also may we express our appreciation of their willingness to take space. We trust that our readers will take note of their advertisements and remember them when the time comes to build that new rig, receiver or other gear.

In conclusion, may we state that contributions from readers, both in the shape of notes, technical articles, or anything of interest to the Ham in general will be appreciated.

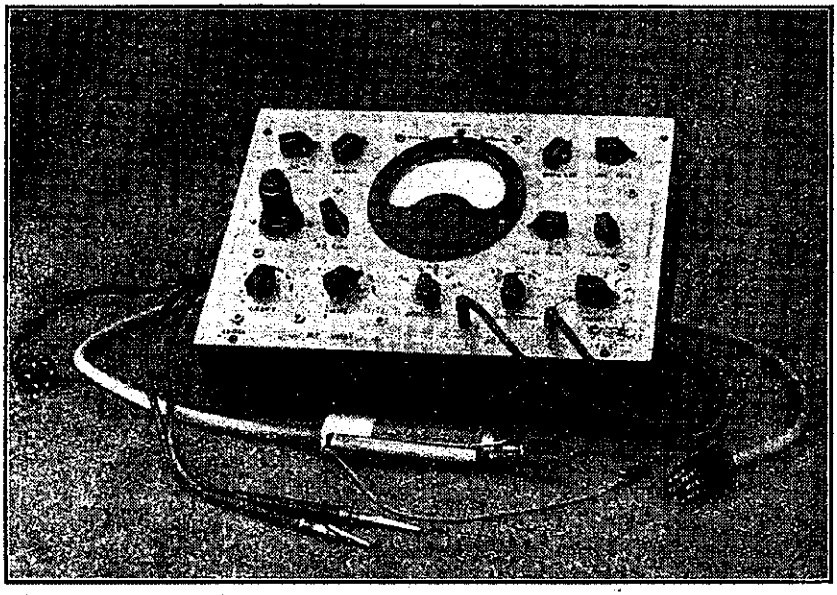
IN THIS ISSUE

A COMBINATION INSTRUMENT.

VACUUM TUBE VOLTMETER, OHMMETER, MEGGER, CAPACITY TESTER

By B. R. MANN, VK3BM*

Most Hams and Experimenters are at some time or other faced with the necessity of measuring voltages under conditions that will not tolerate the slightest loading. Mr. Bruce Mann has gone to considerable lengths to design, build and describe a Vacuum Tube Voltmeter that is well-nigh the ultimate for DC, AC and RF measurements. Add to this facilities for measuring accurately capacitors and resistors as well as an insulation tester and you have a gadget that should be in every Ham's shack.



A view of the complete instrument.

From time to time I have built up various VTVM's for special tests, but not one has been of general enough usefulness to escape being wrecked for its parts.

However, recent articles in "Amateur Radio," reawakened my interest, so I obtained a copy of "Rider—Vacuum Tube Voltmeters," and turned up everything on the subject in my library, McMurdo Silvers article in February, 1944, Radio, and C. B. De Soto's article in "Q.S.T." for December, 1941, were also very helpful.

Having thoroughly perused all the above information, I soon decided that the best type to build would be a balanced Push-Pull D.C. VTVM with a diode or triode probe for R.F. measurements.

An 0—1 ma meter with a 5 inch multiscale being on hand, I was determined that I would make a multirange VTVM that would accurately read to the D.C. meter scales, or else ——

Firstly I tried out McMurdo Silver's circuit. Not having a 6SN7GT as specified, I used a pair of 6J5GT's which have identical characteristics. However, the results were not too good. The grid current was so great that the pointer was a half inch up the scale, so that linearity was impossible unless the input resistance were drastically reduced or the lowest full scale voltage range was increased to 10 volts.

I then tried the "Q.S.T." circuit with only slightly better results.

Now, to reduce grid current trouble we are faced with the following alternatives:—

(1) Use lower voltages on tube elements.

(2) Use higher values of cathode resistances.

(3) Use tubes less prone to grid emission.

(4) Omit lower voltage ranges so that grid emission is not so noticeable in its effect on linearity.

(5) Use lower input resistance.

To cut a long story short, I experimented along all these lines and found that:—

(a) Of all tubes available, 41's used as triodes had the least grid emission:

(b) that 75,000 ohm cathode resistors would iron out any tube mismatches, and give perfectly linear scale;

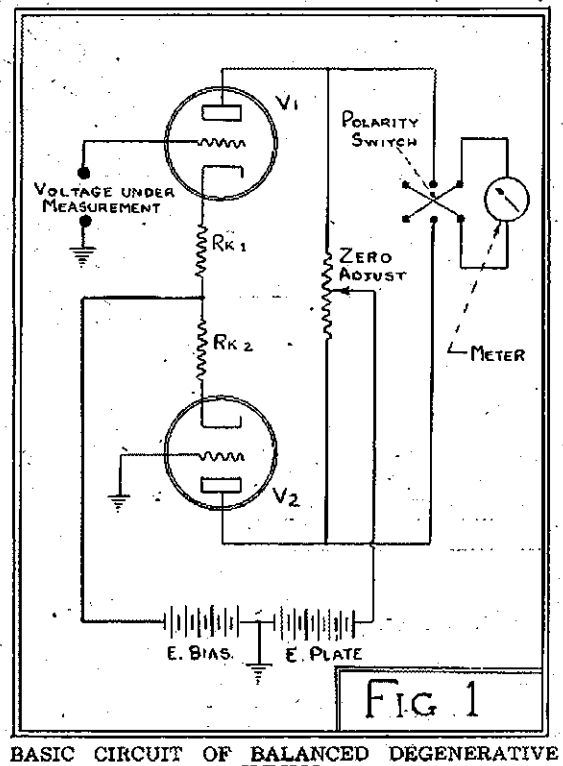
(c) that reducing the heater voltage lowered the grid current, but it was not safe to go too low

*"Morningquest," Quambatook, Victoria.

or line voltage changes would affect stability, 5.25—5.5 volts seemed to be O.K.

(d) that cathode resistors in excess of 50,000 ohms would either require 300 volts of B supply, or a micro ammeter;

(e) That the circuit in Fig. 1 was about the simplest and most effective basic circuit.



BASIC CIRCUIT OF BALANCED DEGENERATIVE V.T.V.M.

To qualify some of my statements above with my determination to use an 0—1 ma meter with a maximum of 300 volts B supply, and linearity at 4½ volts full scale (for ohm meter battery) I found that if I selected matched 41 tubes everything was O.K., and that grid current was negligible with 15 megohm input resistor. So the circuit was tried out with an input voltage divider and sundry other refinements. The 5 volt range is set with a 500 ohm resistance in series with the meter and all higher ranges are determined by the input voltage divider. An A.C. filter, comprising a 1 megohm resistor and an 0.002 mfd condenser is in the voltmeter triode grid to filter out any induced A.C. components. I haven't bothered to experiment with the tap on the voltage divider, except to find that it has some effect on linearity and seems to go best somewhat below the halfway mark. The cathode resistors should be matched.

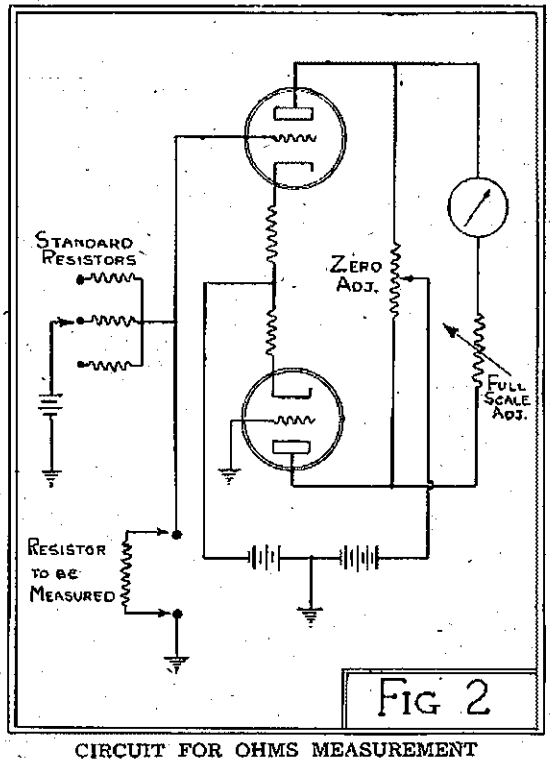
For measuring AC, AF and RF up to a few hundred KC, I have used a diode rectifier. A 6C5 plugs into the panel and its rectified output is filtered and applied across the input voltage divider of the DC VTVM. A separate calibration resistor is used so that the meter will read RMS, although the DC output is peak volts. (Please note here the calibration should be carried out with a sinusoidal AC voltage under which condition the RMS reading will be 0.707 of the peak voltage. If, however, a non-sinusoidal voltage is to be measured, the calibration cannot be taken as accurate, and will vary according to the complexity of the waveform. The calibration, if carried out at 50 cycles will hold good within a few per cent. up to several megacycles).

For the higher frequencies, a diode on a probe is used. See Fig. 5. I used a CB1, as it has the plate connection on the top, and is a convenient size and shape. The heater voltage was drastically reduced to reduce contact potential trouble. The probe cable is terminated in an octal plug which fits into the panel socket from which the 6C5 low frequency rectifier is removed. The connections are so arranged, so that whichever is plugged in has the correct heater voltage and other connections There are many substitutes for the 6C5 and CB1 which are used here.

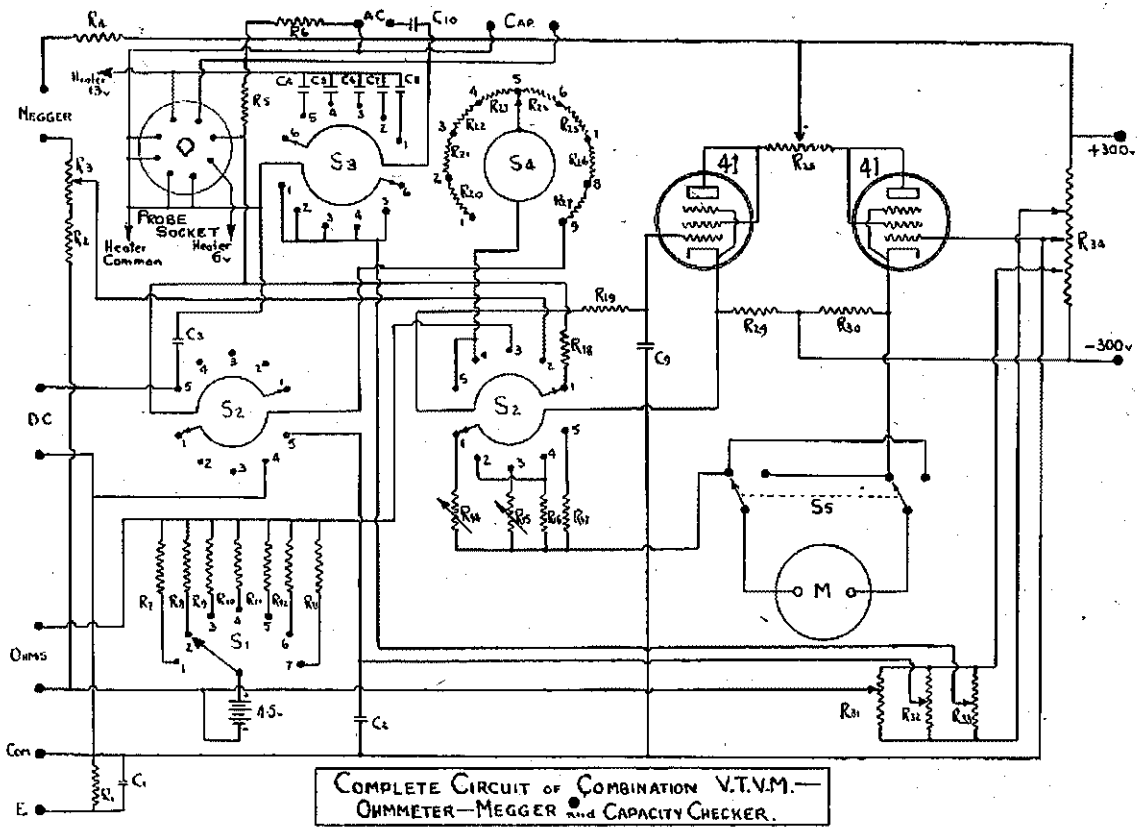
OHMMETER

A 4½ volt "C" battery is used and a 5000 ohm variable resistor in series with the meter to adjust to zero ohms with the prods shorted. A potentiometer is used across the appropriate portion of the voltage divider so that an initial bias is placed on the grid. As the ohms scale starts at the right of the meter, so we just reverse the meter, apply the bias and balance it against the battery, thus getting ohms readings on the printed ohms scale of the meter. The standard resistors must be properly related to the scale graduations. On my meter, the central figure of the ohms scale is 15, so I use standard resistors of 15, 150, 1500, 15,000, 150,000 and 15,000,000 ohms. The maximum reading on the scale is 1,000 ohms, so that the corresponding full scale readings of the various ranges are 1,000, 10,000, 100,000, 1,000,000, 10,000,000 100,000,000 ohms.
ohms.

A great advantage of this type of ohmmeter is that it is not necessary to re-adjust for zero when you switch from range to range.



CIRCUIT FOR OHMS MEASUREMENT



COMPLETE CIRCUIT OF COMBINATION V.T.V.M.—OHMMETER—MEGGER and CAPACITY CHECKER.

R1—10 megohm ½ watt.
R2—0.5 megohm ½ watt.
R3—0.5 megohm (megger zero).
R4—14 megohm ½ watt.
R5—1.5 megohm ½ watt.
R6—20 megohm ½ watt.
R7—15 megohm ½ watt 1%.
R8—1.5 megohm ½ watt 1%.
R9—150,000 ohms ½ watt 1%.
R10—15,000 ohms ½ watt 1%.
R11—1,500 ohms 1 watt 1%.
R12—150 ohms 2 watt 1%.
R13—15 ohms 2 watt 1%.
R14—25,000 ohms (Capacity zero).
R15—5,000 ohms (Ohms zero).
R16—See text.
R17—See text.
R18—10 megohm ½ watt.
R19—1 megohm ½ watt.
R20—0.1 megohm ½ watt.
R21—0.1 megohm ½ watt.
R22—0.2 megohm ½ watt.
R23—0.6 megohm ½ watt.
R24—1 megohm ½ watt.
R25—2 megohm ½ watt.
R26—6 megohm ½ watt.
R27—10 megohm ½ watt.
R28—5,000 ohms (meter zero).
R29—50,000 ohms 2 watt.
R30—50,000 ohm 2 watt.
R31—5,000 ohms (Megohms and Ohms infinity).
R32—5,000 ohms (AC zero).
R33—5,000 ohms (Capacity Maximum).
R34—25,000 ohms 25 watt.
C1—0.05 mfd 600 volts.
C2—0.05 mfd 600 volts.
C3—0.01 mfd 600 volts.
C4—1.5 mfd 600 volt 1%.
C5—0.15 mfd 600 volt 1%.
C6—0.015 mfd mica 1%.
C7—0.0015 mfd mica 1%.
C8—0.00015 mfd mica 1%.
C9—0.002 mfd mica.
C10—0.02 mfd mica.
M—0—1 DC M/a 5 inch scale.

Switching.
S1—Ohms Switch.
S2—Range Switch.
S3—Capacity Switch.
S4—Volts A.C. and D.C.
S5—Meter Polarity.

500 VOLT MEGGER.

Having found how easily megohms could be measured, I set out to devise a means of measuring megohms with a steady voltage applied, for use in testing condensers. I made up a 500 volt power supply for experimental purposes. The total series resistance was 15 megohms, and a portion (about 5 volts) of the voltage drop across it was taken off, via., a half megohm potentiometer and used to set the meter pointer to zero with the prods shorted. The same potentiometer that supplied the

(Continued on Page 19)

WIRELESS INSTITUTE OF AUSTRALIA

FEDERAL EXECUTIVE

FINAL POST-WAR PLANS FOR REGULATIONS

This plan consists of suggestions to be placed before the Chief Inspector (Wireless) of variations in the pre-war licencing conditions. F.H.Q. proposes to recommend that all pre-war conditions be retained except where they are inconsistent with the proposals set out herein, which have been derived from the original plan in accordance with comments made on the latter by the Divisions. The points in the final plan represent the majority opinion of the Divisions.

It will be noted that three classes of licence are proposed. The Class C licence will take the place of the pre-war probationary period, the Class B will be equivalent to the prewar licence, while the Class A will replace the prewar "High Power Permit." The introduction of the Class A licence should result in a general improvement of operating ability and technical knowledge among amateurs. The Class A licence would carry certain automatically granted privileges in addition to a higher maximum permissible power and these advantages should make it sufficiently attractive to achieve the above

PART 1. REQUIREMENTS FOR HOLDING A.O.C.P. AND STATION LICENCE.

(a) NATIONALITY.
Applicants shall be of British Nationality, but consideration should be given to applicants of United Nations Nationality subject to residential or naturalisation qualifications.

(b) MINIMUM AGE.
16 years.

(c) ABILITY.
Code test at 14 W.P.M. in addition to written examinations.

PART 2. CLASSES OF STATION LICENCE.

(a) Licenses shall be allotted in three classes as follows:
Class C. This class shall be comprised of all new licences allotted after 1/3/39. The licences shall have a normal tenure of 12 months only, but this shall be extendable at the discretion of the Department if circumstances warrant.
Class B. To be applied for on or before expiry of the Class C licence. Applicants must submit evidence of activity as Class C licencee, i.e., log and notes of experiments conducted. Class B licence shall be renewable every 12 months.
CLASS A. Applicants must have held a Class B licence for at least 12 months, must be 21 years of age or over, and must pass a technical A.O.C.P. examination and a code test of 16 W.P.M. Applicant must also submit evidence of Class B activity. The possession of a 1st or 2nd Class Commercial operator's certificate or a Broadcast operator's certificate shall not constitute reason for exemption from these requirements.

PART 3. OPERATIONAL RIGHTS OF LICENCES.

(a) FREQUENCY BANDS.
Shall be the pre-war frequency bands at 1.7, 3, 5, 7, 14, 28, and 56 Mc/s, in addition to the proposed new band at 21 Mc/s and UHF bands as proposed by the A.R.R.L.

(b) TYPES OF EMMISSION.
The following types of emission shall be permitted.
CLASS C. CW Telegraphy only for the first 6 months, after which application may be made for permission to use AM phone for ensuing 6 months.

CLASS B.	CW telegraphy.	
	AM phone.	
	FM phone	x
CLASS A.	CW telegraphy.	
	AM phone.	
	FM phone.	x
	Television	x
	Facsimilie	x
	Pulse transmission.	x

x When available to amateurs.

All the amateur bands shall be available to all classes of licencee.

(c) POWER LIMITS.
As measured by the DC input to the plate or plates of the tubes feeding the aerial;
CLASS C. 50 Watts.
CLASS B. 100 Watts.
CLASS A. 250 Watts.
A Class A licence may apply for permission to use higher power for special experiments, the nature of which in the opinion of the Department warrants the use of higher power. Such permits shall be for a limited period only, and extensions may be granted only on the same conditions as the original permit.

(d) PRE-WAR LICENCEES.
Pre-war licencees, who have served their probationary period (i.e., those holding station licences on or before 1/3/39) shall be allotted Class B licences on the resumption of activities.

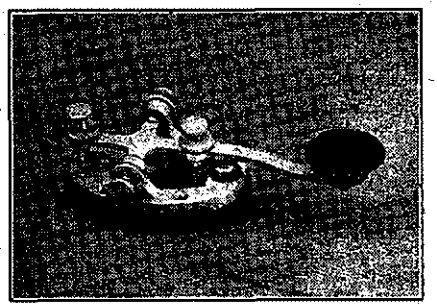
(e) PORTABLE AND/OR MOBILE OPERATION.
These privileges shall be automatically granted to Class A licencees. Class B licencees shall be required to apply for permits for portable and/or mobile operation.

(f) DISTRESS TRAFFIC.
Communication with other types of stations to be automatically authorised for amateur stations in cases of Distress, Urgency and/or safety, if after a reasonable time has elapsed since first hearing the call, it becomes apparent that no other station is answering.
A suggestion is made here that all services using the HF region (1.5—30 Mc-s) be advised that failing an answer to a Distress, Urgency or Safety call on the calling station's normal channels it is highly probable that contact could be made with amateur stations.

(g) MUSIC.
Prohibited. This prohibition shall not preclude the use of standard frequency records, test tones, or playback of a recording made of another amateur station's transmission to that station.

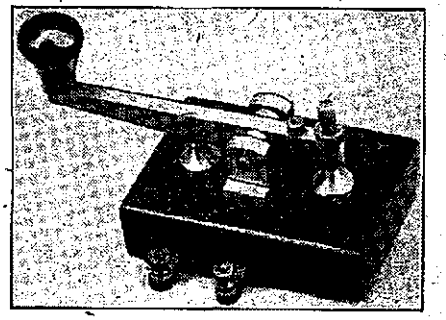
PART 4. CONTROL OF OPERATION.
A "Monitoring" or "Experimenters' Advisory" Committee, consisting of a number of members of the W.I.A. and a representative of the Department shall be formed in each call area. The duties of each committee shall not be restricted to the monitoring of signals from its own area, but shall embrace all areas under the jurisdiction of the Commonwealth of Australia.

PART 5. EMERGENCY AND RESERVE NETWORKS.
The Department should encourage the formation of Emergency and Service Reserve Networks by allotting spot frequencies, preferably outside the regular amateur bands, and by any other means found possible.



Morse Keys

By Percy G. Feeny
VK2AKX*

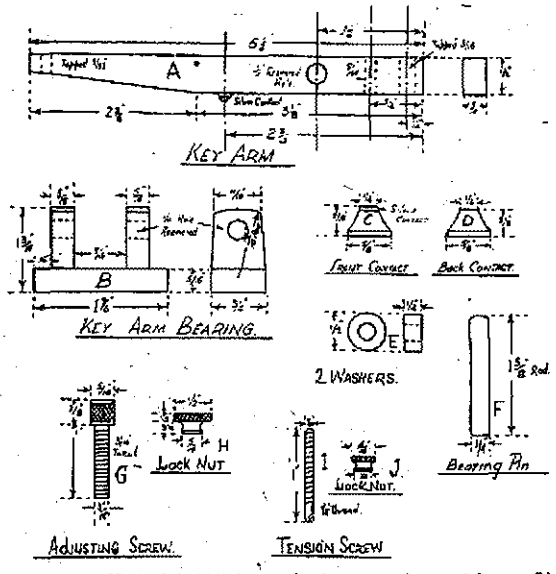


For those Hams who take pride in constructing their own gear from key to aerial, this article should prove of interest. Not everyone, of course, has the machine shop facilities available, but possibly a search through the junk box will provide most of the hardware necessary, whilst a little elbow grease and a couple of files should take care of most of the constructional work.

Although many hams are owners of morse keys, I am sure there will be many of the boys who could make good use of a new Key for the shack to replace the old trusty "pump handle," whose contacts they pounded flat in the search for DX in the good old days.

In this article the writer wishes to describe two different keys he constructed since that fatal Saturday when we received that "urgent" telegram.

THE P.M.G. TYPE.



THE KEY ARM "A" is made from a piece of brass 5½ inches long by ¼ inch by 5/16 inch in section. A taper is filed on one end for a length of 2⅜ inches. This is only to improve the appearance, but prevents the clumsy look if the arm is left thick.

Marking the centres, drill and reamer the ¼ inch hole, a 9/64 inch hole for the spring tension screw, a 3/16 inch tapped hole and a 5/32 inch hole for the knob screw.

Emery the arm to a smooth finish and round off the corners at each end on the ½ inch sides.

Cut a 7/16 inch thick blank from a piece of ¼ inch brass rod and solder it under the arm, 2⅜ inches from the rear end. A ⅛ inch or 3/16 inch disc of silver is cut from a silver coin and soldered to the ¼ inch block.

THE KEY ARM BEARING "B" is made from a brass casting. Make up a wooden pattern which you can have made up at any brass foundry for a couple of shillings. File to shape on all sides keeping it as square as possible, and file the top to a 15/16 inch radius. Drill and reamer a ¼ inch hole 9/32 inch from the top, and two ⅛ inch holes in the base for the mounting screws.

THE FRONT CONTACT "C" is turned from a piece of ⅜ inch diameter brass. Drill and tap a ⅛ inch hole through the base and solder a disc of coin silver to the top.

THE BACK CONTACT "D". This is similar to "C" with the exception of the silver contact which is absent here.

WASHERS "E". Two washers ½ inch diameter and 7/32 inch wide are needed. They are drilled with ¼ inch drill and it is advisable to leave one washer slightly thicker, so that it can be carefully fitted to eliminate side play.

THE BEARING PIN "F". This is a piece of brass rod ¼ inch in diameter rounded on the ends, and which must be a good fit in the ¼ inch reamered holes.

THE BACK ADJUSTING SCREW "G" can be an ordinary round head 3/16 inch bolt. However, a nicer screw can be made by soldering a knurled bush to form a head.

THE LOCK NUT "H" and "J". The former has to fit a 3/16 inch screw and may be found on old type electrical gear as binding posts. The smaller nut comes from an audio transformer and has a ⅛ inch thread.

TENSION SCREW "I". This screw may be a 1 inch brass bolt with the head removed. One end is flattened for 3/16 inch and a slot is filed to hold the top of the spring.

ASSEMBLY. A maple or hardwood base about 4½ inches by 3 inches by 1 inch was cut and the various parts of the key mounted thereon. Two terminal bars ⅜ inch by ⅛ inch brass are used for terminals. These were fitted in slots chiselled underneath the base and connected to the front contact and bearing respectively.

An alternate method of making the base is to use two ½ inch pieces of masonite, mounting the parts on the top piece and grooving the lower one for the terminal strips.

This key is well balanced and heavy enough for serious work, and it will repay any Ham the short time necessary to make a good job of it.

*23 Rolfe Street, Mascot, N.S.W.

(Continued on Page 15)

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SUNSPOT MINIMUM

HAS IT ALREADY PASSED?

In "Wireless World" for February, 1944, was an article entitled 1944; sunspot minimum year, in which were discussed some of the solar phenomena which occur at the end of one solar cycle and the beginning of the next. It was pointed out that, though it was impossible to say with any certainty when the minimum of the current solar cycle would be reached, there were definite indications that it was fast approaching, and that it might occur during 1944. In the July issue was a report of the indication put forward by Dr. A. H. Shapley, who, using formulae derived by Brunner, found that the minimum of the cycle might occur in 1944.9 (using the decimal date system). He was careful to add that this date should be regarded rather as an indication than as a definite prediction.

As 1944 is now well past it may be interesting to see what variation in solar activity did take place during that year, but it should first of all be stated that, because the solar activity fluctuated widely from day to day, it is impossible to know that the minimum has actually been reached until sometime after that event. The solar activity—as evidenced by the size and frequency of appearance of the sunspots, and in other ways—may temporarily increase only to decrease again to a new low level. Nevertheless the solar happenings of recent months do indicate that the minimum is possibly already passed, and that the sun's activities has begun its rise towards the next solar maximum, which may occur in four or five years' time.

EFFECTS ON RADIO. Before going into any details about the solar activity, it may—at the risk of being repetitive—be as well to reconsider the connection between it and the science of radio communication. Why should the radio man be at all interested in these solar phenomena? Well, it is because of the fact that the short radio waves are dependent for their propagation over long distances upon the state of the ionosphere, and that the ionosphere is produced—at least largely, if not entirely—by the ultra violet light radiated by the sun. The degree of ionisation of the gases in the ionosphere therefore changes with the variation in solar activity; reaching high levels at the maximum of the solar cycle, and low values at the minimum. When the ionisation is high then higher frequencies (shorter waves) must be used for a given distance for good propagation by the ionosphere, and when low ionisation prevails the lower frequencies longer waves must be used. Consequently, as the solar activity increases again we may expect to have to make more use of higher short wave frequencies than for the past few years, perhaps to bring into use high frequencies not hitherto used, and to discard some of the lower ones.

To return to the recent variations in solar activity, The sunspot activity is measured and recorded by means of a system of "relative sunspot numbers," which takes into account the number of sunspot groups and also the number of individual spots observed at different observatories, this "relative number" may thus be regarded as a measure of solar activity as evidenced by the sunspots. The table gives the yearly means of this number for each year since 1937, the year of the last solar maximum.

YEARLY MEANS OF RELATIVE SUNSPOT NUMBERS.

Year	Sunspot Number
1937	114.4
1938	109.6
1939	88.8
1940	67.8
1941	47.5
1942	30.6
1943	16.3

It is seen that the activity has decreased year by year from then, so that the mean for 1943 was at the low value of 16.3. Although the yearly mean for 1944 is not yet available, it was probably about 10.0. The yearly mean for 1933—when the previous minimum occurred—was 5.7.

LOWEST LEVEL.

During the first few months of 1944—judging from the monthly mean of the sunspot numbers so far available—the solar activity dropped to even lower levels than had occurred towards the end of 1943; indeed, during February and April there were practically no sunspots observable. But in August there was a considerable increase, and up to the end of December this increase had been fairly consistently maintained. So that as far as the period 1943-1944 is concerned, there was a minimum in the activity at about 1944.5. Was this the actual minimum of the sunspot cycle, or may the activity fall to a now low level? That is a question which only time can answer, but it may at least be said that there is a distinct probability that the minimum is indeed already past, and we are definitely on the way towards a new maximum.

During December there appeared a major group of sunspots—the first large group to be observed for many months—and this crossed the sun's central meridian on December 14.3. It was in solar latitude 22 deg. South, and this fact indicates that it might properly be considered as belonging to the new cycle. For towards the end of a cycle, the spots belonging to the old cycle appear in low latitudes—around 8 degrees—but there also begin to appear sunspots in high latitudes (20 deg.-40 deg.), and these are considered to belong to the new cycle. These high latitude spots have been appearing for the past eighteen months, and with increasing frequency during that period.

As was explained in the "Wireless World" article first a reversal of polarity at the end of the cycle, the Mount referred to, the magnetic field of the sunspots undergoes Wilson Observatory has observed this reversal of polarity to be occurring in the case of the high latitude spots for some time past. There are thus the three facts (a) the reversal in magnetic polarity of certain sunspots which has been observed for some time; (b) the observation with increasing frequency of the past eighteen of high latitude sunspots; (c) the increase in sunspot activity which commenced in August, 1944, which would seem to indicate that the solar activity has now started a general increase towards the maximum.

IONOSPHERE DISTURBANCES.

Incidentally, readers will no doubt remember that the sunspots besides producing a rise in the ionisation of the upper atmosphere, such as gives rise to good propagation of short waves, sometimes also appear to be responsible for temporary ionosphere disturbances, radio fade-outs and magnetic storms. They will therefore be interested to know that, following the passage across the sun's central meridian of the large sunspot group on December 14.3, there was a considerable disturbance in the earth's magnetic field on December 16th-17th. A number of sudden radio fade-outs also occurred, and then ionosphere conditions were very "stormy" from December 16th-20th.

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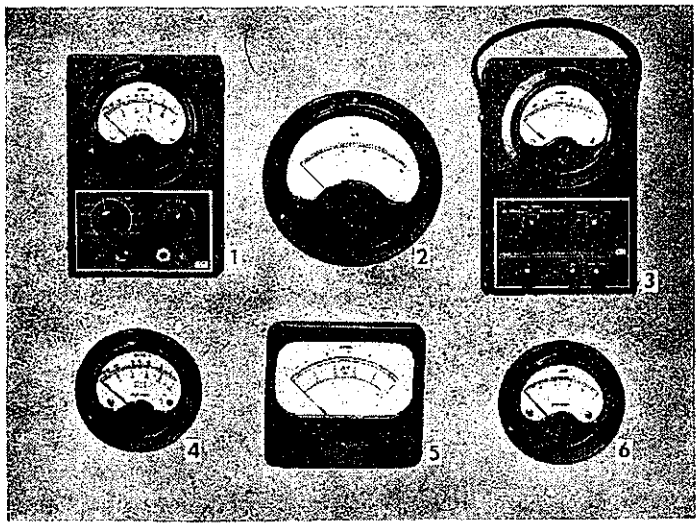

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IN REVIEW

TECHNICAL BOOKS —— RECORDINGS —— PRODUCTS

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MAJOR WORKS.

Ein Heldenlieben. (Hero's Life) Rich. Strauss. Philadelphia Orch. Cond. by Eugene Ormandy. H.M.V. ED 334/8.

This work was dedicated to William Mengelberg whose imported recording is said to be incomparable. However, Ormandy's high fidelity recording is super, and Richard Strauss lovers will be well pleased.

Concerto for Oboe and Strings. (Cimorosa arr. Arthur Britten). Leon Goosens (Oboe) and Liverpool Philharmonic Orchestra, cond. by Malcolm Sargent. Col. D.O.X. 742/3.

Leon, brother of Eugene Goosens, famous conductor and composer, gives a masterly performance of an instrument rearely heard in concerto form.

ORCHESTRAL.

Pelleas and Mellisande. Incidental Music—Faure. Cond. by Serge Koussevitzky. Boston Symphony Orch. H.M.V. E.D. 340/1.

Faure's suite is in three movements. Prelude, called "The Spinner," and a Molto adagio, associated with the death of Melisande. The music is intensely moving throughout. Koussevitzky and his great orchestra are at their flawless best and are superbly recorded.

Dubinushka. ("Little Cudgel"). Rimsky-Korsakov.

A Russian folk song that always signified revolt to the Russian workers of the Czarist days. When the abortive 1905 uprising took place, Rimsky-Korsakov, then a professor at the St. Petersburg Conservatorium made this orchestral setting of Dubinushkaa as an expression of his sympathy with the Revolutionary cause.

The above is the fourth side of the Faure discs also played by the Boston Symphony Orchestra, cond. by Koussevitzky.

INSTRUMENTAL.

Sonata in F Major K. 376. Mozart. H.M.V. Ed. 342/3. Hepzibah and Yehudi Menuhin, Piano and Violin.

This Mozart sonata is a "first recording" now issued, and is one of a group published in 1791 under the title, "Six Sonatas for the Clavier with violin accompaniment." The title throws an interesting sidelight on the status attained by the violin since those days. The work is delightful.

Sonata in G Major. (Scarlatti). "Jesu Joy of Man's Desiring." (Bach-Hess). Myra Hess (Piano). H.M.V. EA 3248.

Dame Myra Hess was born in 1890. In 1902 she won her scholarship, in 1907 made her debut. She is noted especially for her playing of Bach and Scarlatti, two famous examples of which are presented on this record.

VOCAL.

Sea Shanties—Medley. The Georgian Singers, cond. by Leslie Woodgate. Col. D.O.X. 745.

When tasks of a rythmic nature were performed on sailing ships, a special shanty man sang the verses while the rest of the gang joined in the chorus, thus achieving a unanimous pulling of rope or pushing of capstan.

La Traviata (Verdi) "Now Command Me." "Ah, Say to thy Daughter." H.M.V. E.B. 244. Joan Hammond, soprano, and Denis Noble, baritone.

Australian born Joan Hammond's lovely lyric soprano voice is heard in duet with one of England's most popular baritones. Born in Bristol in 1898, Noble entered his profession by chance. On leaving school he joined the Army, only to be wounded, and while convalescing, appeared in Leslie Hensen's concert party. Later he was specially trained by Dinh Gilly for operatic singing and made his debut in 1925. He has since won fame both in England and New York.

"Love Walked In," (Gershwin). Minuet in G (Paderewski). Andre Kostelanetz and Orchestra. Col. D.O.X. 744.

Russian born Andre, besides being a brilliant musician, speaks seven different languages, dabbles in chemistry and photography. His treatment of a tune, however hackneyed, is bold, incorporating complete woodwind sections (including three oboes, massed strings and strong brass sections), the combination consisting of 45 men—16 violins, 3 violas, 3 'cellos, 3 flutes, 3 oboes, 3 trumpets, 3 trombones, 2 string basses, 2 pianos, 4 saxes, guitar, drums and harp. The varied effects come from the strings and basses, while the rhythm invariably in dance time, remains unbroken and provides foundation for the rest of the orchestra. The result is harmonious, rythmical and exciting.

SWING STYLE.

Victor Silvester's Swing Style. "How Come You Do Me Like You Do." Boston Bounce. Col. D.O. 2770.

Vic. Silvester's Jive Band has won the praise of many swing lovers. George Chisholm, England's greatest Jazz soloist, is given many opportunities to go to town with sometimes whole improvised choruses, to say everything for the other notable swing musicians who constitute this purely recording combination.

Vic Lewis and Jack Parnell's Jazz Men. "Johnny's Idea." "Mean Old Bed Bug Blues."

Personnel. Lewis (G), Parnell (D.S.). Derek Hawkins (Alto CL.), Ronnie Chamberlain (Sop. Sax.), Billy Riddik (T.P.T.), Dick Katz (Piano), Charlie Short (B). February 12, 1944.

This enterprising little group, recruited by Vic Lewis and Jack Parnell (of Buddy Featherstonhaugh's Radio Rhythm Sextet) exclusively for these Parlorphone recordings in one of the few, if not the only one, in England, that attempts to play real Jazz.

This being the first release here in Australia of at least half a dozen recordings made and issued in England by them, should prove of interest to Jazz lovers.

MAGNETIC WIRE RECORDER.

Members and visitors attending the general meeting of the Victorian Division in September were privileged to witness a demonstration of a magnetic wire recorder, kindly turned on by Captain T. Cadell, VU2EB.

Of American manufacture, the recorder is contained in a case about the size of a portable typewriter. The front panel, which is inclined at an angle of about 20 degrees from the vertical, carries two pins upon which are mounted two spools of about four inches diameter by two inches deep. One spool carries the wire which is fed over a guide roller, through the recording head and over a second guide roller, and is finally wound onto the second spool. Two arms, which project from the panel, traverse back and forth across the spools ensuring that the wire is wound on in even layers. The wire used is of high tensile steel of about 40 gauge. The principle upon which the magnetic wire recorder operates is, of course, fairly well known to most Hams.

The recorder consists of a high grain amplifier, the output of which is fed to the recording head, which is essentially an electro-magnet, between whose poles the field is varied in accordance with the speech currents fed to the head. Therefore, any wire of sufficiently high permeability which is fed between the poles will have its molecular structure re-arranged to conform with the magnetic field to which it is subjected. Consequently, reproduction simply necessitates the changing over of the head from the output to the input of the amplifier and the addition of a speaker to the output. If the wire be passed through the head once more, the varying flux densities, caused by the speech currents will set up corresponding voltages in the head which are amplified in conventional manner.

Although expressly designed for the recording and reproduction of speech, the recorder gave a surprisingly good account of itself on music, as was evidenced by the few recordings made the previous night by Capt. Cadell from a session on one of the local broadcasting stations, (whose Chief Engineer happened to be present).

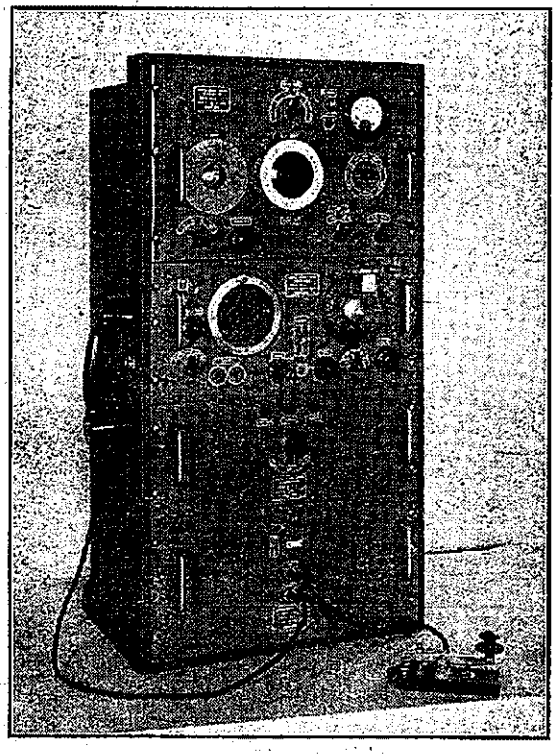
Those present were given the opportunity of recording their voices, and sixty pairs of Ham hands lovingly caressed the sleek outlines of the "Turner" Dynamic mike as it was passed around, and many envious comments could be heard.

One feature of the recorder is the fact that the wire can be used over and over again, the mere action of imposing a new recording on the wire automatically erases the previous one.

Sixty-five minutes of playing time can be obtained from one spool of wire which contains approximately 10,000 feet of wire.

Whether or not the magnetic wire recorder is applicable to really high fidelity recording, remains to be seen; the fact that it is possible to record a complete symphony, or concerto in one shot instead of in 10 or 12 bits as in the disc system, appeals to your scribe, apparently much more than it does to the manufacturers of these latter commodities, who appear to have spent a considerable amount of money lately in telling the public that these new fangled contraptions will never supplant the disc.

PHILIPS' TYPE D.R. 101 TRANSMITTER-RECEIVER R/T or C.W.



Our photograph on this page shows a rack and panel assembly of gear that any meticulous "ham" would be proud to see gracing his shack. It is not a "ham job" in the sense that it was designed from a commercial angle during the war, and for use by Allied Fighting Services. Nevertheless, we can't help feeling that considerable "ham" influence among the engineers responsible for it, had something to do with its evolution. Produced recently in the factories of the Philips Australian organisation, it is a credit to the name of the famous parent concern. It is known as D.R. 101. The rack carries four sections, attractively finished in grey lacquer, the panels from top to bottom housing respectively R.F. and modulatro section, receiver, generator unit for emergency battery operation, and A.C. Rectifier supply unit.

The transmitter covers 1.8 to 3.1 mc/s (97 to 167 m) and the receiver 550 Kc/s to 22 mc/s (545 to 13.6 m), with operation from 115-230 volts A.C. or a 24 volt accumulator. Flexibility of transmitter control is provided by calibrated V.F.O. supplemented by switching for 3 crystal frequencies. Valves in the R.F. line-up are 6L6G OSC, 6L6G buffer, and parallel 807's for P.A. The modulator uses two 6L6G's and two 807's in class AB1.

With A.C. supply R.F. output averages 40 watts (unmodulated) and 12 watts from generators. The receiver is a neat and very effective communications job with no unnecessary "bits and pieces." Switched in 3 bands over the range stated, it has the essentials such, as A.V.C. B.F.O. speaker muting for headphones, but no costly "extras." The third tray carries the generator units. An interesting point about the latter is that one generator is a 50 cycle 115 volt alternator—and is used to power the receiver alone, thus permitting application of standardised A.C. equipment from a 24 volt D.C. source. The bottom assembly is the usual A.C. rectifier and filter unit for normal operation. The whole transmitter-receiver is provided with a dust-proof cover totally enclosing the units, but with adequate provision for ventilation.

Equipment has to be more than good to bear the name Philips ,and this DR 101 is certainly a job to be proud of.

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Further particulars are available from the Secretary, Box 2611 W G.P.O., Melbourne, or phone (evenings only) WM 1579.

HAMS ON SERVICE

Good news this month—in the lists of liberated Prisoners of War in our daily papers he Hams are represented—there is no doubt about it, you find these Hams in everything. To most VK2's it is a great pleasure to see the name of F/O W. M. Moore, VK2HZ, appear safe in Batavia, also Tom Slawson, VK2AFN. Chas. Roberts, VK2JV, who was a very great help to the VK2 Division as a kind of unofficial, and always, willing adviser, is as yet unfortunately not listed.

In VK3, however, Hams in that State will be pleased to know that of the six Victorian Hams who had been reported "Missing, believed Prisoner of War," five have already been recovered. Flight Lieutenant Arthur Tinkler, VK3ZV, has arrived back in Australia. Warrant Officer Roy Prowse, VK3XS, is believed to be on his way home, and Major Lyle Andrews, VK3HY; Lieutenant Gordon Weynton, VK3XU, and Sergeant K. W. Oliver, VK3GZ, have been reported recovered. Sergeant Jack McCandlish, VK3HN, has not yet been accounted for.

Jack Mackel, VK2HG, who started off in tanks, is at present attached to a workshops unit (radio, of course), in New Britain, and by now possibly at Rabaul. Jack, like most of us, has very high priority for his post-war rigs.

The cessation of hostilities has skyrocketed the attendance at the VK2 Division, in fact, all other Divisional meetings as well. Lionel Swain, VK2CS, a Ham who claims that his ticket was issued as far back as 1919, was at the last VK2 meeting. 2CS was leading a nice quiet life in the Water Board at Newcastle when "things began." The Navy had his services for three years—and the Navy gets around, and so did Lionel. Leaving that service, he finally appears as in charge of Radar for the Department of Munitions. Strangely enough, his opposite number in VK3, another old VK2 Ham, Dave Gray, 2IJ, was also at the VK2 Divisional meeting. Ray Conrad, VK2TR, who also is in the Navy as pertains to Radar, renewed acquaintance with Ham radio in September.

It seems that the R.A.A.F. are being left out up to date, but a note from Jim Stevens, VK3ZK, informs us that he is now back at Rathmines, and is now a Sergeant, having acquired his third stripe recently. All Hams who know Jim will realise just how well he is living up to his old call "Zebra King." However, the jobs that Jim falls for are just nobody's business—he is now a projectionist at the unit movies, and puts on six shows a week, and they are better than some city shows, even if I say so myself, he says. The outfit, R.C.A. Photofone projectors and 2A3's in the audio output.

The war now being over, C.P.O. Frank O'Dwyer, VK3OF, reckons that the quicker the "Australia" leaves for VK the better. He says that alas when they were in New York, Ham gear was pretty well unobtainable, that is gear a VK Ham would want to buy there, and the priority system was in operation too, making things even more difficult. He hopes that New York is on the track homeward.

VK2ADE paid a visit to 2YC—he said a farewell visit in R.A.A.F. togs as he had received his discharge that day. It's back to the radio business and Miss and Master Miller from now on. Oh, well, Chas. you saw a good bit in the first few years.

Up in Canberra after the war worries are the dilemma of VK2EO and VK3RY. Ray Smith says don't tell the war is over. For six years he says all the ships preserved Radio Silence, and the Operators only "looked at" the Transmitters—but now they can send messages on them, and, adds 3RY—"and how." Ray has an all Ham staff at the moment—2ACG, 3RY, and 4NO. Another Ham, L/Tel Alan Rogers, VK3UI, of Mildura, has recently joined the gang at Harman.

While talking about Mildura, Telegraphist J. M. Coulter, VK3MV, writes: "We arrived off Hong Kong on the 30th of August and commenced sweeping operations. The following day we swept right to the boom. Having cleared a passage of all mines, the lead was taken by a couple of destroyers and a cruiser—just in case heavy guns were needed as we entered the harbour. The State of Victoria and the City of Mildura in particular will be pleased to know that H.M.A.S. "Mildura" was the first Australian ship to enter Hong Kong for over three years. As we entered the harbour, Marines were put ashore, and after a few skirmishes, the dockyard was taken possession of. On board the only Jap ship afloat, a couple of Japs attempted to use their main armament, but a Marine planted a heavy boot just where it does the most good, and the other Jap threw his hand in, as did the rest of the crew. It was strange to pass within a few feet of Japs and carefully ignore 'em. They were not there, and neither were we. There's good material for a yarn to the boys when I'm next in Melbourne, so I'll keep the rest, hoping to hear you all on the air soon."

Cec. Light, VK2QM, and Sgt. Mills, VK2AJN, are now back in civies. Well I call that pretty quick work, Cec. Better send me that "Story" before you forget what happened—and how about yours to AJN?

Reg. Morgan, VK2ABM, whose rank is covered by LS/LTO, after a very nice and nobly deserved spell on shore writes from Australia's newest and most modern destroyer, "Bataan." From press despatches when you read this, Reg. should be having, or had, a look over Tokyo. When he wrote he thought the war would "end soon"—he was three days too soon. On board the "Bataan" there are, of course, Hams. This time VK2FF and VK2YA (Bob Cairns, of Kurri), help to make up the three way talks that begin, "I'm going to . . . . "

Frank Goyen, VK2UX, has been paying the R.A.A.F. in various spots in Borneo, and from his letter expects to keep doing so for years. He has just received a W.I.A. letter that has been chasing him for 14 months.

VK2XC, Ian Cuffe, now Lt. Commander R.N.V.R., recently fleet Radar Officer, R.N. Pacific Fleet, was in Sydney for a short time lately, but has now returned via Hong Kong to the United Kingdom for discharge.

Amongst those Mentioned in Dispatches has been Vince Egan, VK2AJI, F/Sgt. in the R.A.A.F., who was a member of a patrol which went up through Dutch New Guinea, all through unexplored territory, and maintained communications throughout the journey. So says the citation, and, as you know these citations are pretty bald kind of things. Vince is somewhere up around the Philippines.

Harry Hutton, VK2HV,—well Harry has just spent a spot of leave at his home town, Inverell—that leave was helped by VK2AGA and VK2ZP, and the latter tells the story the best if you ever want to hear about it. Oh, you can find 2AGA at Somers, just look at all the Sergeants passing and ask all the ones with a Ham-like look. Getting back to 2HV—Harry has been "all over the place" but mostly around Hollandia. He has, I believe a notebook full of notes about the Hams he has met, so I hope in the near future to lend him these pages till he exhausts the note-book—How about it Harry?

Sgt. Bill Williams, VK3WE, is no longer a member of H.M. Australian forces. He heard at the beginning of one week that he was to get his discharge. Someone, wishing to contact him near the end of the week, rang his unit, to be told that Sgt. Williams was no longer a member of the Defence Forces. Bill is now to be located back in Omeo at his old job of distributing the local news, and where no doubt he will resume his old signature, "The Old Man of the Mountains."

VK4CJ, Cedric Marley, of the Navy P.O./Tel., he was—has been round the world a couple of times and passed through Sydney last month. While in England, he married an English girl, and is said to be going to be a VK2 for the future.

VK2LZ, W/O Con Bischoff, was down in Sydney on leave and left a book on astronomical telescopes as a temptation to me. He reports that at R.A.A.F. Townsville they still claim "All States" and have everything worked out for the new rigs and receivers.

Since the cessation of hostilities, one hears of many Hams being discharged from the various services. The latest to be known are Wing Comander Bill Gronow, VK3WG, and Wing Commander Bob Cunningham, VK3ML. It is reported that Bill has gone to work with a radio firm, while Bob has returned to his old peacetime occupation of Industrial Chemist. It is also reported on good authority that Group Captain Vaughan Marshall, VK3UK, will shortly join the ranks of discharged servicemen.

Sgt. Allan Joscelyne, VK2AJO, after spending quite a long time at Bonegilla, has lately reported to Albert Park, Melbourne, where he, together with Sgt. Fred Smith, VK3FR, were to do a crystal grinding course, much to their glee, as they anticipated being able to grind their own rocks when they wanted them. We hope the powers that be allow them to complete their course.

As the war is over, and all Divisions are getting more active, would the various Divisions appoint somebody to keep me informed of Hams in the Services, and also those being discharged in their States. This is going to be very necessary in the future, as with the Magazine being printed there will be more space to fill up.

For those who do not know the address, and for those who do not use it, please contact J. B. Corbin, VK2YC, 78 Maloney Street, Eastlakes (Mascot), N.S.W. The telephones are MU 1092 and MU 1879.

We regret to report that Pilot Officer J. E. Snaddon, VK3VE, who was reported missing in "air operation" in the European theatre during May, 1944, has now been presumed killed.

It is with regret also that we learn of the death of Corporal W. M. Gaze, who lost his life as a result of an air crash in Queensland recently.

To Mr. and Mrs. J. H. Snaddon and their family, and to Mrs. Gaze, we offer our sincere sympathy in their loss.

ANY IDEAS?

Now that hostilities have ceased and the time when the Ham will be back on the air is rapidly approaching, the Ham, no doubt, is busily planning his new outfit.

There is perhaps, no other group of enthusiasts whose opinions differ so widely in respect to the particular type of gear, and more particularly to the layout of that gear.

The idea has occurred to us that, in view of the fact that there are so many individual ideas of the best type of gear mounting, and the operating position, that those ideas could be "aired" through the medium of this magazine.

Some Hams prefer rack and panel, others mount their gear direct on the operating table. One Ham in pre-war days went so far as to mount all the gear underneath a table with the controls coming out on top of the table—all these ideas would undoubtedly help someone.

If you can furnish a sketch plan, or better still a photo either of pre or post-war vintage, it would be most helpful in illustrating the idea behind the layout.

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FEDERAL HEADQUARTERS

"When do we get back on the air?" Members of the Federal Executive have heard that question so many times in the last few weeks that they can now tell by the gleam in a fellow-Hams eye whether it is going to be asked, even when said Ham is ten yards off. In fact, this question has been so popular lately that Federal Executive officers may be seen almost any day walking about with that glassy look, muttering, "When, oh, when?"

Naturally, we, too, have been anxious to find the answer, so we approached the P.M.G.'s Department with a request for information. We were advised that the matter of frequency allocations, which is the key to the whole situation, is in the hands of the Navy, and that as our frequencies were required for use during occupation of enemy held territories it may be some months before we could expect to get them back.

In response to many requests, we then asked whether we might be permitted immediate operation on some of the VHF bands. We also took up the questions of release of equipment, exemptions from parts of the A.O.C.P. examination for servicemen suitably qualified, and immediate application by amateurs for renewal of licences. This latter, we thought, might be the means of avoiding a rush of clerical work in the Department later.

In a letter dated 10th September, the Chief Inspector has given us the following rulings.

"1. Because of National Security Regulations still in force it is impracticable at present to accede to your request for the release of amateur transmitting equipment held by the Department, or to permit operation of Experimental stations.

"2. It is not the practice to grant exemptions in any portion of the examination for the Amateur Operators' Certificate of Proficiency, unless the applicant had previously qualified at an examination held by this Department. It is regretted, therefore, that the privilege cannot be conceded to servicemen.

"3. As no advantage is likely to accrue at this stage, either to experimenters or the Department, from the lodgment of applications for renewal of licences, it is not proposed to take such action until the situation becomes clearer. The matter of licencing experimental stations is at present receiving consideration in collaboration with the Department of the Navy, and you will be advised as soon as a decision is reached in regard thereto."

That is the position as it stands at the time of writing these notes, but F.H.Q. is continually on the move, and members may rest assured that they will be advised promptly as developments occur.

Having for the time disposed of your favourite question, we would like to put one to you in return—"What is going to happen when we do resume?" There seems to be a burning ambition prevalent among Hams to whom we have spoken recently, to be first on the air, or to be on within a few hours of the great moment.

This is something which may cause a great deal of trouble, unless each and every Ham uses his head. The fellows who have 1939 rigs in going order, requiring only the insertion of tubes, coils, etc., may be for the most part O.K.; but imagine what is going to happen if a thousand or so hurriedly built haywire transmitters are suddenly to open up? Remember, too, that such rigs would likely be feeding even worse contraptions in the way of skywires.

Just consider for a moment the chirpy signals, over modulated phone, off frequency operation, harmonics and BCL QRM likely to result. Whether you are a new Ham or old timer, if you have to build a new rig to get on the air, for the love of Amateur Radio be sure of what you are doing. We will be starting off with a glorious war record, let us preserve its memory in good operating and gentlemanly conduct.

In recent months there has been much talk of post-war licencing conditions, and FHQ has been active in setting out a number of proposed amendments to the pre-war regulations. Some time ago we submitted these to the Divisions, and following receipt of their comments, a second edition has been drawn up. Due to the sudden end of the war, this edition must necessarily be the final one, and by the time you read these notes, FHQ will be negotiating with the Chief Inspector along the lines of this plan, which is published elsewhere in this issue of "Amateur Radio."

Speaking of "Amateur Radio," we take this opportunity of extending to the Editor, the Manager and the Committee of "Amateur Radio" the congratulations of FHQ on the occasion of the first printed issue of the Magazine since 1941.

The duplicated magazine was good, but the limitations imposed by the duplicating process constituted a severe handicap to the effective production of a technical journal. However, the magazine has now moved out of the shadow of that cantankerous machine, and we feel sure that from now on "Amateur Radio" will rapidly progress to the stage where it can take its place with the best in radio periodicals catering for the Amateur. We wish the management and staff of "Amateur Radio" every success in their efforts to provide a better, bigger and brighter magazine.

THE WIRELESS INSTITUTE OF AUSTRALIA

Divisions of the Wireless Institute of Australia exist in every State of the Commonwealth. The activities of these Divisions are co-ordinated by Federal Headquarters Division, the location of which is determined from time to time by ballot.

Present Location of F.H.Q.: Victoria.

Federal President: R. MARRIOTT, VK3SI

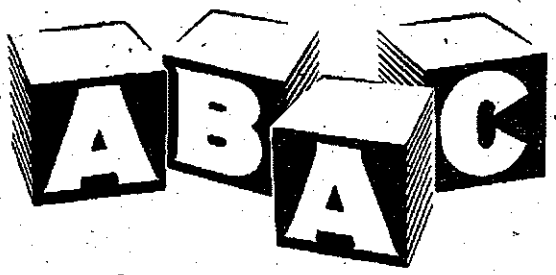
Treasurer: T. D. HOGAN, VK3HX **Federal Secretary:** A. H. CLYNE, VK3VX

Councillors: A. R. WILLIAMS, VK3WE; C. C. QUIN, VK3WQ

Official Organ: "AMATEUR RADIO"—Published by the Victorian Division.

Transformer Problems

ARE AS SIMPLE AS . . .



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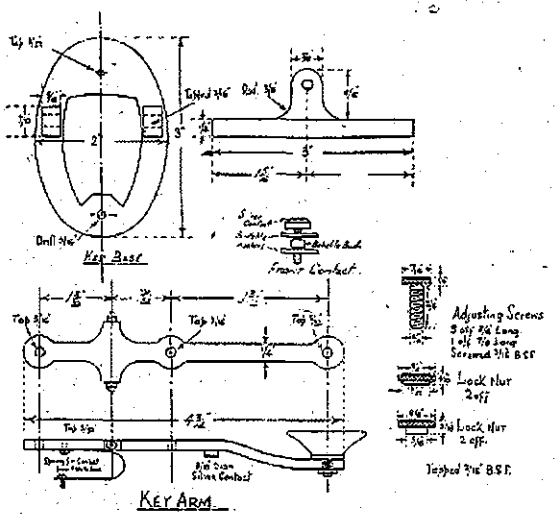
MORSE KEYS

(Continued from Page 6)

THE NAVY KEY.



This key will be familiar to most Hams, and is a Chinese copy of a key made by Messrs. Bunnell and Co., of New York. The original was kindly loaned to me by Wal Ryan, VK2TI, to whom I wish to tender my thanks for his indispensable services.

THE KEY ARM. The key arm is cut and filed from a piece of ¼ inch steel. Mark out the outlines and keep to a nice curve in the centre of the cross arm. Care must be taken in filing the cones for the bearings. Two 3/16 inch tapped holes and a 3/32 inch tapped hole for the contact spring are needed. Bend the front leg of the arm to drop the knob about ⅜ inch lower than the rest of the key. The silver front contact is soldered under the arm 1⅛ inch to the front of centre.

THE KEY BASE. The base is made from a brass casting, and is filed smooth all over. Two 3/16 inch tapped holes are drilled i nthe uprights, care being taken to keep them both in line. A ¼ inch hole is drilled in the front to take the ebonite or fibre bush for the front contact. A bakelite washer is placed under the contact and also under the nut underneath.

THE BEARING SCREWS. These screws are 3/16 inch on the thread and are ¾ inch long, with a 1/32 inch hole 1/16 inch deep drilled in the end of the shank to take the cones of the key arm. The large lock nuts are used on each of these screws.

The screw which is used for varying the tension of the spring is also ¾ inch long, and has a similar hole in the shank to take the tip of the spring which in this case is of the compression type.

THE ADJUSTING SCREW is another 3/16 inch screw, but it is ⅝ inch long to allow it to reach the base. One of the smaller lock nuts is used on this screw and the other on the spring screw.

THE CONTACT SPRING. A piece of thin shim brass or copper is cut to 2 inches long and ½" wide with 3/16 inch diameter circles on each end. A 3/32 inch clearance hole is drilled in each end. This spring is bolted to the underneath of the key arm and then after bending gently to the shape of a "U" is bolted to the rear of the base. It

(Continued on Page 20)

DIVISIONAL NOTES

NEW SOUTH WALES DIVISION

The September General Meeting of the Division was held at Science House, Gloucester Street, Sydney, on 20th September. The usual large number of members and visitors were in attendance and included many faces that we had not seen for years.

Among those in atendance were: 2DR, 2AJW, 2AKU, 2LO, 2TI, 2RA, 2AFQ, 2NO, 2NP, 2NQ, 2DT, 2YC, 2AKR, 2EE, 2IE, 2DI, 2WD, 2WN, 2ALD, 2KB, 2HP, 2ADQ, 2NG. Numbered among the visitors were G2DU, VK3-WY, 2TR, 2ZW, 2CS, 2DA, and 2JX.

The chairman in declaring the meeting open, welcomed visitors, particularly G2DU and VK3WY, secretary of the VK3 Division.

Members were informed of efforts to get back on the air, and it was stated that American Amateurs were operating on a band between 112-115 mcs., and that additional privileges were expected after 15th November. A press cutting with a London address stated that English Amateurs would be permitted to operate at the end of September. Swiss Amateurs were active in the 7 mc. band, with transmissions confined to that country's borders. In Brazil, "Radio News" reports that the PY's were authorised to operate on 56, 112 on an experimental basis and that transmissions of one hour's duration confined within the country were permitted three times weekly on 1800-3500 kcs. Getting nearer home, ZL amateurs have had their equipment returned to them, and are permitted to build it up and test with an artificial aerial.

The Final Draft Plan for Federal Headquarters was discussed, and despite the fact that these proposals or the draft leading up to these proposals had been circulated to members since June in various degrees towards finality, members took exception to them, and after quite a deal of discussion it was decided that F.H.Q. be requested not to put them before the C.R.I. until such time as a general meeting of all N.S.W. Amateurs had been held on the second Thursday in October. Whether this is a wise move at this late stage in the proceedings, time alone will tell.

Members were pleased to learn that the Magazine Committee had decided to again publish the Magazine in printed form. Over the war years, the Magazine Committee have had a particularly difficult task, and they are to be congratulated upon the fact that they kept the magazine going during those years. Members would do well to remember when they feel like criticising any shortcomings that publishing the magazine is a voluntary job carried out by fellows just like yourselves, whose only reward is the knowledge that they are serving Amateur Radio.

Padre Dransfield give a brief resume of his activities, and it is unfortunate that the Institute has not a couple of hundred members of the same calibre.

In reply to questions, members were informed that VK2HZ, 2AFN, and 2JC had been reported safe as P.O.W.'s, and expected to be repatriated very soon. As yet, there is no news of Charlie Roberts, VK2JV, last reported in a Singapore Hospital, some years ago. Should any member have news of 2JV, kindly communicate with FX3305. It is the intention of the Institute to hold a Complimentary Dinner in honor of these repatriates in the early future, and members will be advised of particulars as soon as possible.

Some questions were asked regarding the Institute's domestic Post-War Plans. The first of these calls for permanent Rooms, including Class Room for A.O.C.P., Workshop, Library and Transmitting Room. Unfortunately floor space is at a premium these days, and up to the present, it has been impossible to obtain accommodation.

The October General Meeting of the Institute will be held at Science House, on Thursday, 18th October, and you are reminded that the NOVEMBER General Meeting will be held on the FOUTH Thursday and NOT the third.

TASMANIAN DIVISION

At a summoned meeting of city and suburban hams on Friday night, 31/8/1945, the Tasmanian Division of W.I.A. was reactivated, 12 members forming a neucleus upon which to rebuild, this after several years respite is most encouraging.

A Council, consisting of President, Lon Jensen, 7LJ; vice-president, A. E. Allen, 7PA; secretary, Joe Brown, 7BJ; treasurer, Alan Finch, 7CJ; K. Melville Kelly, 3LL; Max Loveless, 7ML; C. Walch, 7CW; was elected; others present were M. Glover, 7MG; E. Nicholls, 7RY; R. Forsyth, 7BC; O. S. Dahl, 4KA; N. Hopwood, 7GJ; Alan Burke and ex-secretary, Chummie Moorhouse.

Our honorary life member, "Pop" Medhurst, 7AH, was elected Patron.

Several apologies were received from those unable to attend, and letters from country members stated their desire to participate in the revival, and prospects generally seem bright for VK7.

Letters from Federal Headquarters were dealt with and other matters put in hand, a meeting room being amongst these.

As will be seen by the meeting list, several northern hams have drifted south, and we welcome their presence, also other States are noted and welcome in 3LL and 4KA, also 6AR, who was unable to get along, but we hope to see him next meeting. Bert is a very busy man.

A minute of appreciation was made to 7PA for the work he had done during the years of inactivity, by keeping VK7 in touch with F.H.Q. throughout.

General meetings are set down for the first Wednesday in each month for the present ,and it has been arranged to procure the Photographic Society's room in Liverpool Street for this purpose, until some permanent quarters can be acquired.

JOTTINGS.—Chummie Moorhouse is not re-joining. He had become a bird fancier during the years of recess. Best of luck, Om.

7AH was not "on deck" for the meeting. Had a batch of 'flu, which kept him indoors. Must have been a bad attack, Pop, but you can't keep a good man down.

The re-appearance of 7CW is very pleasing, and we trust that he can find sufficient time to continue the good work.

Our new Secretary is very promising, but also very modest. You'll come good, Joe.

Association with 3LL proves him to be full of beans, and he should be a valuable asset to VK7—we may need some diagnosis, Doc.

4KA still yearns for "Sunny" VK4 and our present weather has not helped matters. He says the life of a Civil Engineer on Survey is N.B.G. in VK7. Afraid he'll sight the South Pole someday.

7LJ is one of the many over-busy ones, but hopes to have more leisure time a little later on. It shouldn't trouble you too much, Lon. Joe is a good horse.

(Continued on Page 20)

VICTORIAN DIVISION

The usual monthly General Meeting of the Victorian Division was held on Tuesday, September 4 and, notwithstanding the wet, cold night, a very good attendance was experienced, some 62 members and visitors being present. An innovation at the meeting was the Attendance Book, which was passed round for all present to sign—those present also identified themselves by calling out their call-signs or names.

Interstate visitors were Alan Joscelyne, VK2AJO, and Dave Laing, a member of the R.A.A.F., from Brisbane. Captain T. O. Cadell, VU2EB, was also present, but more of him later.

Others present were Max Howden, 3BQ, (who occupied the chair in the absence of the President, Harry Kinnear, 3KN); George Manning, 3XJ; Vic Smith, 3UR; John Symons, 3JT; A. H. Bowley, 3AP; L. Harding, 3LX; Ivor Morgan, 3DH; Ed. Marks, 3VM; G. Bollas, 3LA; G. Dennis, 3TF; R. C. Smith, 3YQ; A. C. Zander, 3PG; D. G. Britt, 3HT; Keith Heitsch, 3HK; G. W. Ireland, 3IG; T. Manks. 3TZ; R. McGregor, 3XZ; F. McTaggart, 3NW; F. Rowley, 3QF; M. K. Bunn, 3LF; Herb. Stevens, 3JO; Norm. Foxcroft, 3UQ; I. Sewell, 3IK; C. Holland, 3XC; J. Wall, 3QS; C. S. Harvey, 3UO; A. Matthews, 3ZT; C. M. Barnett, 3VD; J. Wilkinson, 3PQ; Jim Marsland, 3NY; I. Stafford, 3XB; Dick Giddings, 3DG; D. Stalker, 3KJ; S. Zeunert, 3SZ; Fred Smith, 3FR; J. A. Cusick, 3QM; R. Jackson, 3PU; F. W. Bond, 3SQ; Bob Anderson, 3WY; Bert Burdekin, John Scott, D. Couch, G. Jones, L. Sykes, P. Orchard, John Belcher, Jim Kerley, A. Simmons, C. Fraser, M. Hibbert, R. Hunt, J. Mansergh, J. O. Bail, L. Cusick, Ken Ridgway.

The secretary read a letter from the Federal Secretary containing the final plan to be submitted to the P.M.G.'s Department concerning Post War Regulations. It was pointed out that this plan had been arrived at after reference to all the Divisions, and represented the majority decision of the Divisions. Some points were not approved of by everybody, but it was felt that F.H.Q. had done a good job, and it was agreed that F.H.Q. be advised that the Victorian Division approved of the plan as submitted.

Captain Cadell, VU2EB, then produced a Wire Tape Recorder, and gave a demonstration of its capabilities. He had already prepared several recordings, and after these had been played ,a mike was passed around and quite a few of the boys were recorded on the tape. VU2EB is to be congratulated on the show that he was able to put on. A technical description of the recorder apepars elsewhere in this issue.

Arrangements have been made for an interesting lecture at the October meeting. Mr. Howard Love, and engineers from Kingsley Radio, have offreed to give a lecture and demonstration on "Developments in Permatune Tuning."

At Council meeting on September 11, the main item of business was the magazine. At the previous meeting, a new magazine committee was formed, and it had been decided to proceed with the printing of the mag. as soon as practicable. The Committee reported on the position and recommended the printing of the October issue.

Further to the recent arrangement concerning the closing of the main door to the building, it was agreed that the owners of the building be asked for permission to instal an extension to the present door-bell, such bell to be switched over to our rooms on nights when meetings are being held.

The letter from F.H.Q. re Post War Regulations was referred to, and the Secretary was instructed to pass along the motion from the General Meeting approving of the plan.

The possibility of resuming A.O.C.P. Classes was brought up, and it was decided that applications be called for the positions of a Class Manager and Instructors for Morse and Theory. The Manager would be responsible for all publicity in connection with the classes, and would be required to be in attendance two nights each week. Instructors would be required to be in attendance one night each week. Scale of remuneration has not yet been fixed, but anyone interested in any of the positions is asked to communicate with the Secretary.

The Laboratory Committee reported on their activities, and it was decided that a comprehensive report be prepared for publication in the magazine.

Applications for membership continue to pour in and seven new applicants for membership were signed up at the September meeting. Since July 1, the following new members have been admitted: Messrs. J. L. Mansergh, J. L. G. Symons VK3JT, T. V. Sawers VK3OG, L. McIntyre VK3XF, H. M. Finnigan VK3PX, M. A. Rodgers VK3UI, J. Wilkinson VK3PQ, J. O. Bail, P. A. Orchard, A. G. Smith, C. M. Fraser, A. Simmons, L. D. Sykes, R. M. Davis, G. Bollas VK3LA. Membership is now higher than at any time since 1934, prior to which no records are available. Members are asked to bring non-member friends along to a meeting and let them see for themselves the advantages of membership of the W.I.A.

The November meeting has been altered from the Tuesday to the Wednesday night on account of Cup Day holiday. The meeting will therefore be held on WEDNESDAY, NOVEMBER 7th. Don't forget the alteration in the night.

THE LABORATORY COMMITTEE. IT'S AIMS AND OBJECTS.

The Victorian Division of the W.I.A. has always been proud of its claim to be the possessor of first class laboratory equipment. The fact that it was seldom used, and no determined effort made to set it up in a laboratory, kept up to date by the addition of new equipment as it became available, is a reflection on either the financial policy of the past or lack of interest in such a project, or both.

Amateur Radio has progressed through the years, and the more or less haphazard, cut and try methods of the past have now given way to practices involving the use of accurate measuring equipment of all kinds, much of which is too costly for the average ham to purchase.

One of the first objects of the Laboratory Committee, therefore, is to plan, design, construct and equip with modern and accurate apparatus, a laboratory which can be of assistance to members in their efforts to secure maximum efficiency from their gear, and to test the accuracy of the calibration of their own test equipment. The Committee, in its report to Council in July, 1944, recommended that the apparatus necessary to establish such a laboratory should include the following:—

1. Beat Frequency Oscillator, or other of suitable type, having a range of from 20 to 15000 cycles per second and capable of developing at least two volts across a suitable range of output impedances.
2. Precision Signal Generator, suitable for making accurate tests on communications and ham band receivers.
3. Inductance, Capacity and Resistance Bridge.
4. Vacuum Tube Voltmeters.
5. Cathode Ray Oscilloscope.
6. Heterodyne Frequency Meter.
7. Transmitting and Receiving Tube Testers (Mutual Conductance).

Such measuring or other equipment as may be deemed necessary for future developments.

With a laboratory so equipped, the Committee would be in a position not only to apply many tests to members' own equipment, but also to carry out experiments and tests to determine the behaviour of new circuits, components and practices, and to write up their observations, and the results of such experiments and tests in the form of technical articles for the magazine.

The provision of technical articles for "Amateur Radio" is another important task for the Laboratory Committee, and one which will require continuous attention. The position where the Technical Editor had to set to at the last minute and write a technical article because none had come to hand, should never occur again. By careful planning and selection of subjects and co-ordinating the efforts of contributors, it should be possible to build up a reserve of articles of a standard that reflects the undoubted genius and ability of the Australian Radio Amateur. With the advent of the printed magazine, this task has increased. Although the number of pages devoted to technical articles remains about the same as for the duplicated magazine, about three times as much matter is required to fill them. If it can be arranged, we plan to include as regular features, in addition to the main technical article, a Digest Section, a Beginners' Section, etc., as the space permits.

The success of such a plan depends to a large extent upon the co-operative efforts of many members and volunteers are urgently needed for this work, which must be started immediately if succeeding issues of the magazine are to attain the desired standard. It is suggested that a Sub-Technical Editor be appointed for each section, with as many assistants as practicable, to share the task of supplying technical articles. Volunteers should contact the Technical Editor, Mr. K. Ridgway or Mr. H. N. Stevens. It is also hoped that other Divisions may form similar groups for the express purpose of supplying technical articles.

Both the Book and Instrument Libraries come under the control of the Commitee. New books are to be added to the library at frequent intervals and these, and also meters in the library are available on loan to members. Future requirements of Ham radio may require the extension of the facilities already provided by the Instrument Library. Such equipment as Field Strength Meters, Modulation Depth Indicators, etc., could well be included among the instruments available on loan to members, and the construction and maintenance of these would come within the scope of the Committee.

VK3WI will go on the air again ,and will have to keep pace with modern developments. Construction, operation, alteration and additions to transmitting and receiving equipment will also form a large part of the work of the Committee. Other undertakings include the following:—Assisting to solve problems encountered by members, assistance to non-radio bodies such as, for example, the Ski Club of Victoria, who may require the use of radio for emergency communications, provision of lectures at General Meetings, assistance to and co-operation with, where possible, other research laboratories and the exchange of information and observations on any tests that may be being made.

The first requirement for the achievement of the foregoing is the enlargement of the Committee, the present complement, Messrs. Ridgway, Quin and Stevens, being quite inadequate for the task. Members who are technically inclined will be most welcome to the ranks, but there is also room for the man who is prepared to help the committee in any way and thus, not only being in a position to learn more about experimental radio, but also of being of assistance to your fellow hams.

QUEENSLAND DIVISION

The main obstacle to the full-scale resumption of activity in this Division is the lack of a suitable room for meetings, etc. However, we are making the best use of the only room obtainable, and the present programme consists of a General Meeting once a month, plus a Student's Class once a month. This will, however, be expanded as soon as conditions permit, and should result in a definite increase in hams in this city.

General Meetings are held on the last Friday of each month at the Diggers' Association Rooms, Adelaide Street, Brisbane. Any visiting hams can contact the Secretary by ringing M 2144.

Eighteen hams rolled up at the last General Meeting held on Friday, 31st August, and although the number may not seem large, it was a decent showing, because Brisbane at the time was in the throes of a tram strike. Some half dozen student members were also present.

Office-bearers at present are:—
Chairman: K. Schleicher, 4KS.
Dep. Chairman: F. Nolan, 4JU.
Secretary: H. MacGregor, 4ZU.
Treasurer: R. Campbell, 4RC.
Tech. Adviser: V. Jeffs, 4VJ.
Publicity: N. Roberts.

This committee was elected by a recent meeting and will function until the return of our absent President, VK4AW ,and Treasurer, 4UU. Now for some Personal Notes.

4EN. Got quite a write up in the April QST, so we'd better not forget him in the local magazine. Eric is one of our four members who are conducting the Students' Code Class.

4KS. Keith is reputed to be suffering from itchy trigger—I mean switch finger. Also just finished an fb dual waver for the car.

4FB. Fred still presents himself at meetings complete with the 4FB pipe. Rumour hath it that he is dabbling with acorn tubes in his receiver.

4RF. House hunting is the fascinating pastime that Fred is indulging in at the moment. Actually, we believe that its not the house so much as its land for a beam that he is after.

4JF. Well, Jack, apart from seeing you at meetings, I can't really think of anything to write about. Glad to see your still keen on Ham Radio.

4RC. Bob is interested in an acorn converter and also, of course, he is our all important treasurer.

4JU. Morse tuition should yield good results in our Student's Class, if Frank's efforts yield the results they deserve.

4ES. Herb. is a busy man these days with his duties at the Police Radio. Has a very nice receiver at home, I believe.

4HM. Now a resident of Brisbane, late of Pomona. Another Morse instructor.

4HU. Still wearing khaki. Future interests include high power high fidelity phone.

4FL, 4FY and 4DM. A trio at the last meeting who defied the tram strike.

4IR. A keen member, who has unbounded enthusiasm and plenty of ideas for the future of Ham Radio.

4VJ. Professional Radio is Vince's livelihood. Will be asking you for a lecture or two soon, Vince.

4ZU. In Norm. Robert's temporary absence, I've compiled this list of dope, so I guess that lets me out.. Don't forget, contact me at M 2144 if you're in town and want to meet some of the gang.

QUEENSLAND DIVISION

Chairman : K. SCHLEISCHER, VK4KS.
Deputy Chairman : F. NOLAN, VK4JU.
Secretary : H. MacGREGOR, VK4ZU.
Treasurer : R. CAMPBELL, VK4RC.
Technical Advisor : V. JEFFS, VK4VJ.
Publicity : N. ROBERTS.
Meeting Place—Diggers' Association Rooms, Adelaide Street, Brisbane.
Meeting Night—Last Friday of each month.
Secretary's Address—"Mouquet," Eildon Road, Windsor, N.3. Phone: M 2144.

SOUTH AUSTRALIAN DIVISION

Since the reforming of the Institute in this State, we have to report that results have been very encouraging, both in the number of old and new hams who have joined, and those who have signified their intention of becoming members, and with this in view, it should be no time before the Institute is on a firm footing.

The incoming council elected at the first general meeting held at 17 Waymouth Street on August 14, are Ivor Thomas, President, Joe Kilgariff, Vice-President, Doc. Barbier, Hon. Secretary, Cec. Baseby, Treasurer, George Luxon, Programme Organiser, Joe McAllister, Membership Organiser, Pete Bowman, Publicity.

All are very enthusiastic in their various jobs and looking forward to seeing the Institute back bigger and better than it was pre-war, and are sparing no effort to that end.

The second General Meeting took the form of an inspection of the R.A.A.F. training school, and was well attended. Some splendid equipment was on display, and plenty of good ideas were obtained for post-war rigs.

At the conclusion of the meeting, Mr. McGrath thanked Mr. Gill who was responsible for the arrangements which led up to the inspection. Council meetings are being held bi-weekly until such time as we are re-established on the air, and the preliminary work can be considered done.

A room has been booked at 17 Waymouth Street for the second Tuesday in each month, and meetings have been arranged for these nights when an attractive lecture will be delivered on a topical suciect.

The first of these lectures was given by Mr. Decure at our first general meeting, the subject being picturegram transmissions and their relations to present day radio practices.

For the October meeting to be held on Tuesday the 9th, Mr. Cox, of the School of Mines, will talk on push-pull amplification, which will be illustrated with various apparatus, and as Mr. Cox is an acknowledged authority on this subject, he should have some enlightening information for us.

A.O.P.C. classes are to be formed, and following announcements to this effect in the local papers and air time kindly donated by station 5KA, a large number of students signified their eagerness to take advantage of this service.

Mr. Roy Buckorfield, who has had a great deal of experience in tuition of this type, has agreed to conduct the classes ,and we are indeed fortunate to have been able to engage him for these duties.

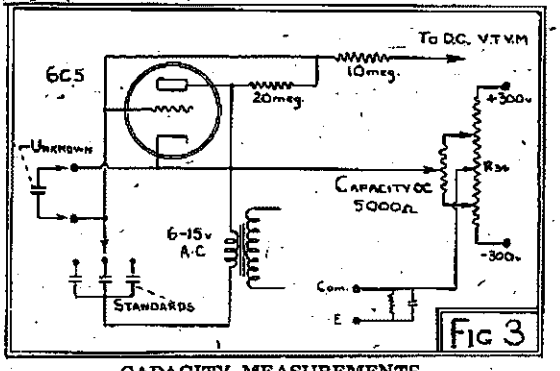
On resumption of active life, an effort was made to obtain our old Post Office box number, but we were unable to do this, but we obtained another, which, if nothing else, is easier to remember, 1234K, and all information concerning Institute activities can be supplied at this address.

A COMBINATION INSTRUMENT

(Continued from Page 4)

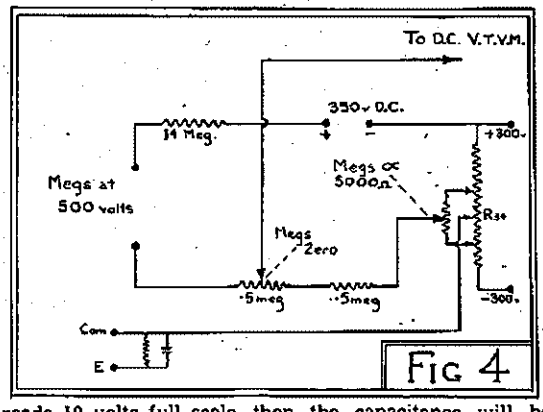
counter bias for the ohmmeter circuit was used to set the hand to infinity with the hands apart. You can't get a shock through 15 megohms. I found that in measuring large capacities it took a long while for the condenser to charge through the 15 megohms, so I added a terminal so that condensers could be quickly charged directly, and then tested. This test is so good for condensers that I don't know where to draw the line between good and bad, as even the best do not test perfect. Naturally the reading would depend on the size of the condenser; a large value would show higher leakage than a small one of the same quality.

I test a batch all the same capacity, throw out the duds, put the better leaky ones aside for bypassing low values of resistance, etc., and keep the high testing ones for coupling condensers, etc.



CAPACITY MEASUREMENTS.

Finally, I decided to make the gadget read microfarads, micro-microfarads, etc., direct on the ohms scale of the meter. The principle under which I finally got the thing to work was this:—If, say, 10 volts AC is applied across two condensers in series, the voltage across the unknown is measured ,the value of the known bears a decimal relationship to the centre of the scale, and the meter



reads 10 volts full scale, then, the capacitance will be read direct off the scale. If the unknown equals the known, then the meter will read half scale. If the unknown is infinitely greater than the known, then there will be practically no voltage developed across it, therefore the meter will read infinity ohms. If the unknown is extremely small as compared with the known, practically all the voltage will be developed across it and the hand will point to zero resistance.

With the prods shorted, the voltage divider potentiometer is adjusted for infinity capacity, and with the prods open, the resistor in series with the meter is adjusted for zero capacity. The ranges I used had a centre scale value of 0.00015, 0.0015, 0.015, 0.05 and 1.5 microfarads.

The two lower ranges are inaccurate for two reasons, one being due to stray capacities of leads, test prods, etc., and the other due to the impedence of the 10 megohm resistor (due to the AC measuring voltage), which causes appreciable error on low ranges. However, they are useful for comparisons. I should point out here that this error could be eliminated where the mains are frequency controlled ,the unknown capacities could be balanced against non-inductive resistances which equalled the values of the impedances of the required standard con-

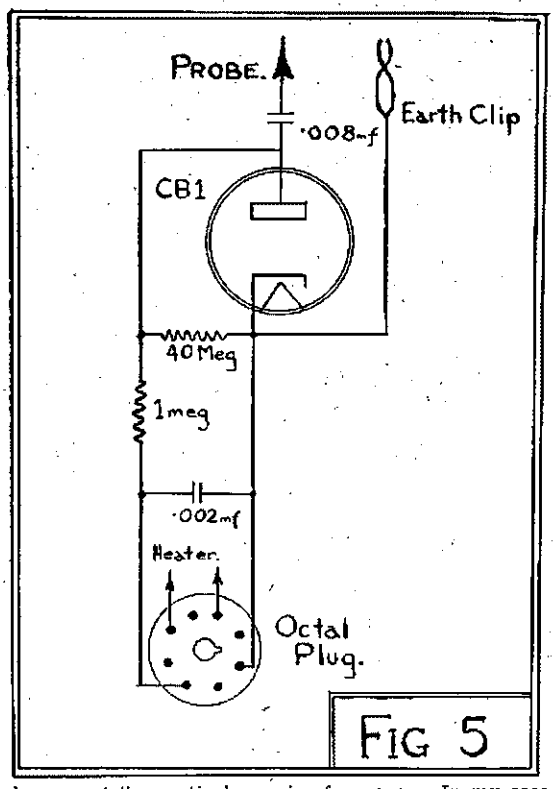


FIG 5

densers, at the particular mains frequency. In my case, the AC comes from a rotary converter, driven from a 32 volt farm lighting plant, so the frequency is an ever variable quantity.

In conclusion, I might pass on a few constructive points. In my own case I used elaborate switching and a number of potentiometers so that each section is normally in adjustment for rapid measurements. However, considerable cost and space can be effected by using one potentiometer on the voltage divider to adjust Capacity Maximum, Megger and Ohms Infinity and AC Zero. Also one resistor could be used for ohms and capacity zero. I found that HT ignition cable was necessary for prod leads on the megohm ranges. The Instrument takes about five minutes to settle down, but is quite stable after this period.

MORSE KEYS.

(Continued from Page 15)

is advisable to lightly lubricate the cones with a little vaseline.

A Masonite or wooden base may be fitted to this key, but it does not need to be over half an inch thick. Thanks to the fact that this key was copied from a manufactured article there should be no complaints from the brethren about bad design or anything in that line.

WESTERN AUST. DIVISION

Postal Address : BOX N1002, G.P.O. PERTH.

Secretary : C. QUIN, VK6CX.

TASMANIAN DIVISION

(Continued from Page 16)

7ML after his hectic experiences on active service is a much improved man these days, and he should be 100% by the time CQ is again heard.

7PA was very pleased with the first postwar meeting, and welcomes the respite he has been given after seeing the war years through for this Division. He trusts his successor won't find it quite so arduous from now on. Good luck, Lon.

Not much is known of the Northern Gang as yet, and like the rest, many of them are still in the services somewhere or other, and time only can rectify this situation. Maybe we will eventually procure a record of each one of them as they return.

Any news is welcome for this column, and many "whispers" will be gratefully received. What have you?

TASMANIAN DIVISION

President : L. R. JENSEN, VK7LJ
Secretary : J. BROWN, VK7BJ.
Treasurer : A. E. FINCH, VK7CJ

Councillors : K. M. KELLY, ex-VK3LL; A. E. ALLEN, VK7PA; M. L. LOVELESS, VK7ML; C. A. WALCH, VK7CW.

Meeting Night—First Wednesday of each month.
Secretary's Address—12 Thirza Street, Newtown.

STH. AUSTRALIAN DIVISION

Box 1234 K, G.P.O., Adelaide.

President : I. THOMAS, VK5IT.
Vice-President : J. KILGARIFF.
Secretary : E. A. BARBIER, VK5MD.
Treasurer : C. BASEBY.
Programme Organiser : G. LUXTON.
Membership Organiser : J. McALLISTER.
Publicity : P. BOWMAN.

Meeting Place—17 Waymouth Street, Adelaide.
Meeting Night—Second Tuesday of each month.

VICTORIAN DIVISION

191 QUEEN STREET, MELBOURNE

Postal Address : Box 2611W, G.P.O.

President : H. KINNEAR, VK3KN.
Secretary : R. A. C. ANDERSON, VK3WY.
Treasurer : J. G. MARSLAND, VK3NY.

Councillors : I. MORGAN, VK3DH; R. DOWLING, VK3XD; R. JONES, VK3RJ; H. N. STEVENS, VK3JO, R. R. McGREGOR, VK3XZ; H. HANSON, H. BURDEKIN, J. K. RIDGWAY.

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AMATEUR RADIO

NOVEMBER 1945

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

What are YOUR plans?

For that post-war VK Station, experimental, D.X., or V-H-F minded—what are YOUR plans?
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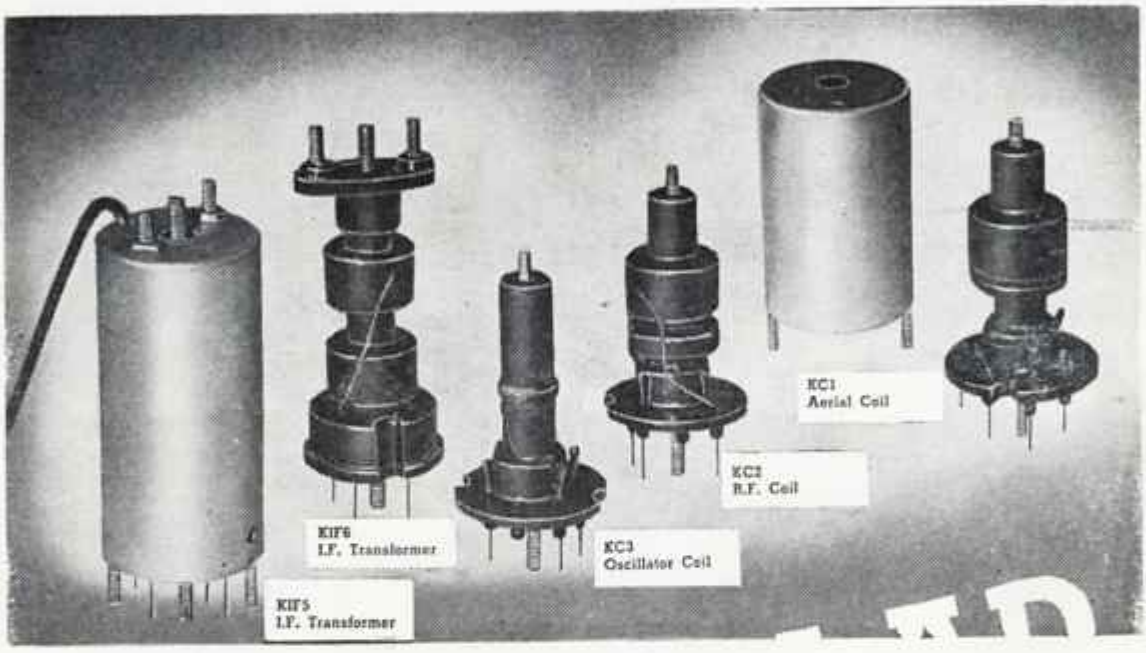

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Editorial

The official notification of the release of gear, held by the P.M.G. in custody since 1942, has been welcomed by Hams throughout Australia. Even more welcome, accompanying the official notification of the release of gear, was the application form for the re-issue of Experimental Licences; a fact which brings the day when we may resume experimental transmissions nearer.

By the time that this magazine reaches you the regulations governing Amateurs will be, in all probability, gazetted.

This does not authorise any Ham to immediately commence transmissions, or does it authorise him to start building his much thought about Ham station.

Amateurs must wait until their Experimental Licence is issued to them before commencing transmissions... It is confidently hoped that these licences will be issued shortly after the gazettal of the regulations.

No doubt many who have been listening on the Ham bands are wondering why some VK signals have been heard. These transmissions are entirely unauthorised, and are causing considerable embarrassment to Federal Headquarters and to Executive Officers of the Divisions.

Your old call sign is safe, so be patient and wait until your new Licence is issued—it won't be long.

IN THIS ISSUE

The Design of Compressed High Frequency Beams

By H. K. LOVE, VK3KU*

IN pre-war days the rotary beam was proving a very effective means of getting places. Hams living in built-up areas were unfortunately precluded from erecting a really efficient beam. This article by VK3KU goes to considerable length to describe methods whereby the effective length of the elements can be considerably reduced without loss of efficiency. The information herein should prove of much value to 14MC DX men.

During the immediate pre-war years 1938-39, the writer commenced some work on a rotable beam for 14 Mc. which would have less overall dimensions than the 33 ft. structure we had become accustomed to.

Any type of multi element radiator reaching dimensions in excess of 30 ft. becomes a rather expensive arrangement if it is to be safe, and completely free from liability from the neighbour when situated in congested suburban areas.

My original work centred round the idea of folding down the ends and while some very successful results may be expected from this arrangement, it is still a cumberson and heavy assembly.

In the latter part of 1939, experiments were begun with elements comprising tubes 9 ft. in length, to which were added at each end, coils calculated to make up the full electrical length.

Some success atended this attempt, but the work did not proceed long enough to bring the matter to any satisfactory conclusion. The elements were very critical to tune and indicated that capacity in some form would be necessary to construct a stable and satisfactory radiator.

The partial results of this experiment suggested that an easier way to compress a beam, might be to use inductance at the centre of the elements.

At this point my work was interrupted by the more pressing need for equipment designed required for our Armed Forces.

It was, however, of major interest to me to receive a copy of Wireless World of November, 1940, in which I read of some very excellent work carried out by Mr. E. L. Gardiner, B.S.C., under the heading of "Compressed Dipoles."

To some of our readers, 1940 seems a long time ago after what has happened in the meantime, and I am sure the Editor of Wireless World and Mr. Gardiner will forgive me if I extract from this article for the information of readers of the W.I.A. Magazine. I should like it to be understood that the very able exposition of the work on "Compressed Dipoles" is entirely credited to Mr. Gardiner and W.W.

I believe the work described by Mr. Gardiner can form a basis for early post-war investigation by the Australian Amateur of the possibilities of the reduction of the physical dimensions of Short Wave Aerials.

Mr. Gardiner writes: "For shorter wave lengths in the neighbourhood of five to seven metres, it fortunately becomes practicable to construct the dipole and reflector of metal tubing, which can be strong enough to support its own weight in a high wind. Even at these short wave lengths, however, there will be occasions when a reduction in bulk would be very acceptable. Experiments in direction finding may be quoted as an example. Just before the war the writer constructed a dipole and reflector supported by a light wooden framework which could easily be transported by car. This was employed in the field to locate a hidden five-metre transmitter. The latter radiated vertically polarised waves, and the procedure was to rotate the receiving aerial system until signals were at minimum, when the reflector will be in the direction of the incoming waves.

In this way it was found possible to determine direction with an accuracy of about five degrees, provided, of course, that the direction of arrival of the waves had not been modified by intervening objects.

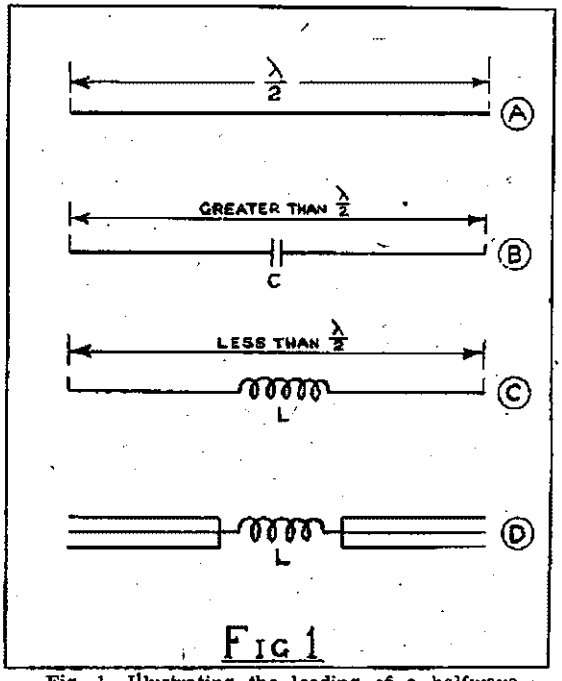


Fig. 1—Illustrating the loading of a halfwave dipole (diagram (a) by capacity and inductance.

The aerial structure was 8 feet high and 4 feet wide, and could be fairly easily handled when mounted upon a stout camera tripod fitted with a rotating head. It could hardly be termed convenient, however, and too much time was needed in setting it up, so that the need for a more compact arrangement giving, if possible, more pronounced directional effects was very evident.

Consideration of the possibilities of such an improvement naturally directed attention to the compressed dipole. This form of aerial has been known for many years, and is used by certain commercial organisations as a television receiving aerial in locations where space is very limited. It is barely mentioned, however, in most handbooks, and very little information seems to be available concerning its general use in short-wave reception. Thus there seemed good reason for carrying out

*Managing Director, Kingsley Radio.

practical tests on similar lines to those described in the previous article already mentioned, and in which the field strength measuring equipment could be pressed into service.

HALF-WAVE AERIAL CHARACTERISTICS.

The ordinary dipole, or more correctly the Hertzian half-wave aerial, resonates to a certain wave length by virtue of the distributed inductance and capacity of the conductor. In open space the resonant wave length is slightly more than twice the length of the dipole, which is therefore slightly less than a half-wave length long. The proximity of buildings or of other conductors increases the electrical capacity of the wire, and thus reduces the length necessary to resonate at any particular wave-length.

An interesting example of the effect was noticed by the writer when adjusting the length of a 20 metre aerial, one end of which was only a few feet above roof level, whilst the other was 20 feet higher. It was found that the lower end could be reduced in length by some two feet to restore resonance, thus making the two halves of the aerial unequal by that amount with respect to its electrical centre. Similarly, the resonant length of a dipole can be increased if the distributed capacity of the wire is reduced. This can be done in practice by the introduction of a condenser into the centre of the aerial, and shown at C in Fig. 1 (b). Since the capacity of two condnesers in series is always less than that of either alone, and the added condenser acts in series with the distributed capacity of the aerial wire, the effective value of tuning capacity is reduced. The aerial thus resonates to a shorter wave length, or must be increased in overall length to resonate at the wave length to which is responded before the condenser was inserted. It is possible to tune the aerial over a limited range by varying the capacity of the added condenser.

REDUCING AERIAL LENGTH.

As a rule, however, there is no advantage in increasing the length of a dipole, and it will be more useful to decrease it. By analogy with a tuned circuit employing a coil and condenser, the wave length will be increased, or the aerial shortened for a fixed wave length, if either its distributed capacity or inductance be increased. It is inconvenient to increase the capacity to any material extent. To do this by adding a condenser would imply connecting this between the two free ends of the dipole, and would only be possible by the addition of long leads which would modify the action of the whole system profoundly, or by bending the aerial round until the free ends are in close proximity. In either case the aerial becomes a closed loop, and whilst it will in fact resonate to a considerably longer wave length than before, it is no longer a dipole, and is not within the scope of this discussion.

It is, however, quite convenient to increase the inductance of a dipole by the addition of a coil, which can be inserted at the electrical centre as shown at L in Fig. 1 (c). This coil acts in series with the inductance of the wire, increasing the effective value, and thus increasing the resonant wave length. The distributed capacity is little changed, and the overall length of the dipole must be reduced to bring back into resonance with the original wave length. Being shorted, the aerial is termed a compresed or loaded dipole.

As the value of added inductance is increased the overall length must be reduced to maintain resonance at a particular wave length, and this shortening process can be continued until finally the dipole itself vanishes, leaving only the loaded coil which now resonates by virtue of its own self-capacity. In such an extreme case there would clearly be little radiation from or reception by the "aerial," which has become a closed circuit consisting of a small coil of wire. Some intermediate case must be investigated, and for the purpose of these tests it was decided to choose a value of loading coil which would reduce the overall length to one half of its original value, or to about a quarter wave length. The accompanying table gives an idea of the lengths and sizes of loading coil found suitable for wave lengths of from 5 to 20 m. No. 16 SWG enamelled copper wire was used throughout in constructing the aerials, and the loading coils were wound on a Trolitul former 1¾ inches in diameter, the turns being spaced by approximately the diameter of the wire. It must be appreciated, however, that whilst the figures given will form a satisfactory starting point from which to work when trying out compressed dipoles, they cannot be regarded as exact. The resonance of these aerials is noticeably sharper than that of a half-wave aerial, and for best results the length should be trimmed experimentally, since it be determined to some extent by the exact materials used, and particularly by wire diameter and turn spacing.

Approximate design data for compressed dipoles having a length of one-quarter wave length.

Wave length metres.	Approx. length of comp. dipole ft.	in.	Turns in loading coil.	80 ohm feeder turns. tapped across
5	4	0	12	2
7.0	5	6	16	3
10	8	0	22	4
20	16	0	40	6

In order to keep the conditions as simple as possible, the remainder of the dipoles were composed of straight single wires. It is possible to employ as the portions m and n of Fig. 1 (c) either conductors of larger diameter, such as copper tubes, or several spaced parallel wires joined together at the terminals of the loading coil, as sketched in Fig. 1 (d). By so doing the distributed capacity of these portions is further increased, and either the overall length or the inductance of the loading coil can be decreased somewhat. Clearly the possibilities are extensive, and for the present no attempt has been made to examine the properties of aerials which are compresed to less than a quarter wave length, or in which multiple wires are used. Probably the chief advantage of increasing the diameter of the arms m and n lies in the established fact that by so doing the "Q" of the aerial is reduced, and it resonates more broadly over a wider band of wavelengths. This may be important in the particular case of television reception, where some slight loss in image detail may result from the excessive selectivity of a compressed dipole in which a single wire composes the arms, and for which three wires in parallel spaced by about 2 inches can be recommended. A second case which might justify this procedure would be where a fairly uniform preformance over the whole of a waveband was desired, rather than the best possible performance at any one frequency.

FEEDER CONNECTIONS.

Before experimental tests can be made with a compressed dipole, it must be connected by a non-radiating feeder to the transmitter or receiver. Whilst any of the recognised types of feeder could be used, the aerial is symmetrical about its electrical centre, and therefore lends itself to a balanced twin-wire transmission line, rather than to the concentric type. Since it is particularly necesary that only the aerial shall radiate, a low-impedance line was preferred to one of a higher impedance, in which the two conductors would be spaced by several inches, because the latter is more likely to become unbalanced during the course of adjustments. A proprietary cable of 80 ohms nominal impedance was selected, having the useful property that the radiation from it was too slight to be measured by the equipment

used, even when the cable was not exactly matched to the aerial impedance.

The simplest and most widely used method of coupling is to break the dipole at its electrical centre, and, on the assumption that its impedance at this point has the theoretical value of 72 ohms, to insert a cable of about that impedance directly. This system works well in practice, but suffers from the disadvantage that if any steps are taken which change the impedance at the centre of the dipole, a mismatch to the feeder must occur. The presence of a reflector near the dipole will have the effect of lowering this impedance, and thus tends to destroy the desired correct matching between feeder and aerial.

MATCHING IMPEDANCES.

In the case of loaded dipoles a better method of coupling is fortunately available, since it would not be advisable to break the continuity of the loading coil. The feeder may be tapped across a few turns equally placed on each side of the centre of the coil, as shown in Fig 2 (a). Whatever the exact impedance of the feeder or of the aerial, it is now possible to get an exact match, for the imepdance across a portion of the loading coil will vary from zero when the two feeder wires are attached at a common central point, up to a comparatively high value when they are separated by the whole coil. At an intermediate point, therefore, an impedance equal to that of the feeder will always exist, and can be found by trial.

An alternative method exists in the form of inductive coupling between the loading coil and a coil of a few turns connected across the ends of the feeder cable, as shown in Fig. 2 (b). For the sake of completeness a method of coupling to the extended dipole of Fig. 1 (b) may be mentioned. Here the feeder is joined directly across the series condenser, as shown in Fig. 2 (c), and the capacity of the latter is selected so that its resistance matches the imepdance of the feeder. In this way an exact match to cable of any impedance is possible at one particular wave length only, but unlike most other arrangements the system will not operate satisfactorily at harmonics of this, since the reactance of the condenser will then be different.

It will be remembered that the performance of various arrangements was measured in the present case by connecting the aerial under test to a transmitter adjusted to deliver as far as possible constant power and observing the readings of a field strength meter placed at two wave lengths from the aerial. It can be safely assumed that the behaviour of the aerial under receiving conditions will be complementary to that when tested as a radiator, since the same physical factors are involved in the two cases, and provided of course that the incoming waves can be assumed to arrive from the direction in which measurements are made.

It was decided first to determine how the radiated field from a compressed dipole of the dimensions given in the table compared with that from a plain dipole. The latter was first set up, under the conditions of the preceding article, and the field strength at a point broadside to the aerial was noted. In this case the feeder was tapped directly into the centre of the dipole. A compressed dipole was then erected in the same position, and the same feeder connected across a few turns of the loading coil, as in Fig. 2 (a). This tapping was varied until the radiation from the aerial was at maximum, no change being made to the coupling of the other end of the feeder to the transmitter, or to the adjustaments of the latter, which was, of course, crystal controlled. It was noted with great surprise that the field strength from the two aerials was almost identical, whilst in the second case the feeder current and estimated current in the aerial had increased. The experiment was repeated several times, and on a number of wave lengths, with similar results. It was found that the reduction in overall length of the compresesd dipole to one half of the original was not accompanied, as had been anticipated, by a reduction in the radiated field to 50 per cent. or less of its

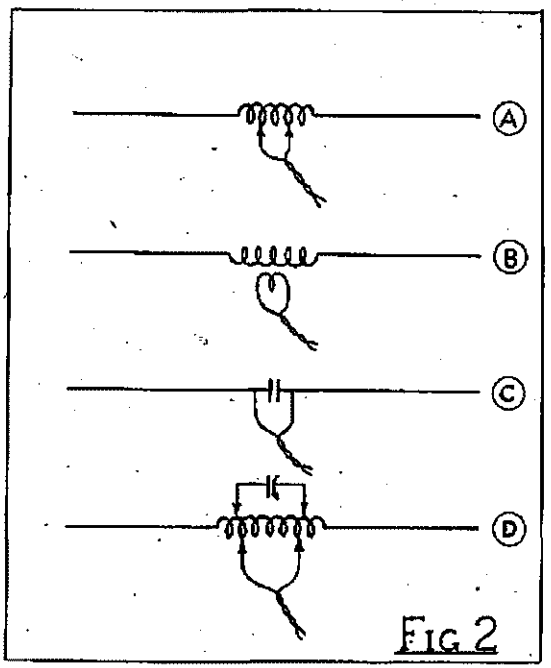


Fig 2. Methods of connecting the feeder to a loaded dipole.

former value, but that if the feeder current was maintained the same in the two cases, the field strength was reduced to between 70 per cent. and 80 per cent. only, whilst if the feeder tapping point on the loading coil was adjusted to optumum performance as first described, there was practically no reduction observed. Secondly, it was noticed that, whilst no accurate method for measuring the oscillatory current within the dipoles was available, it was clear, from the usual tests of coupling a neon tube or small lamp to the aerial wire, that both the current near the centre of the compressed dipole and the voltage of its free ends was greater.

UNEXPECTEDLY GOOD RESULTS.

It is generally asumed that the most effective portion of a dipole in radiation or reception is that near the centre, in which maximum current flows. It would therefore be expected that, if this portion be coiled up and rendered ineffective as a radiator, the radiation from the whole aerial would suffer considerably. From the evidence it seemed that this was not altogether true.

Whilst calculation of the current distribution within a loaded dipole would not be simple, it seemed likely that the following two effects were mainly responsible for the relatively good performance. First, the "Q" of the compresed dipole had been increased, as was evident from its sharper tuning ,and a given amount of power induced in it would thus be expected to set up a larger oscillatory current. The radiation resistance of the aerial was almost certainly lower than that of a plain dipole, and so there would be less damping through radiation. Secondly, it was possible to reach a very effective impedance match into the feeder by the tapping adjustment, and this would still be possible when the aerial formed part of an array, and its impedance was upset by the presence of other elements. The transfer of energy into the aerial was therefore somewhat better, and in con-

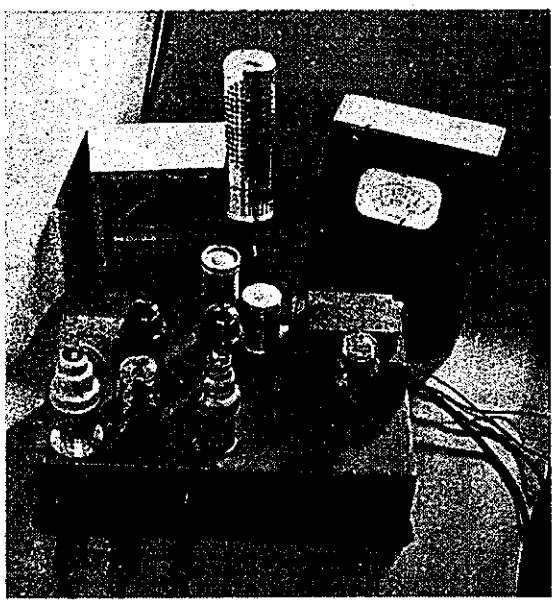
(Continued on page 20)

A RIBBON MICROPHONE

By THOMAS D. HOGAN, VK 3HX*

RECORDING enthusiasts and others interested in public address work, who are constructionally minded will no doubt be interested in the details of this Ribbon Microphone. Although the original model described here requires the use of a lathe, and other processes outside the capabilities of the home workshop, we are sure that, knowing the ingenuity of the Ham, alternative methods of construction could be employed.

As everyone knows the ideal microphone for all-round frequency characteristics, the Ribbon stands alone, and for that reason the construction of this microphone described here was undertaken. The main use to which it was to be put was in conjunction with a recording outfit owned by Mr. D. Threnoworth.



The Microphone in a typical set-up.

In search of information on the subject, an article in QST for March, 1938, described a home constructed Ribbon Microphone which used magnets which were taken from a discarded magneto. This microphone used the magnets as they were, which means that the completed article together with its associated ribbon to line transformer was some twelve inches high.

This appeared to be somewhat bulky compared with some commercially manufactured microphones. To obtain smaller magnets two methods could be used:—(1) to anneal and cut down the magneto magnets, and (2) to construct entirely new magnets.

After considering the matter at some length it was finally decided that the easiest method would be to construct entirely new magnets. I might mention here that all the constructional work was carried out by Mr. Threnoworth, ye scribe acting as technical adviser and doing the final assembling of the microphone.

*Editor "Amateur Radio."

To arrive at the length of the ribbon, which, of course, governs the lengths of the magnets, considerable research was resorted to, and several standard text books were consulted, from which one gained the information that the length of the ribbon needed to be at least 2½ inches long by ¾ inch wide. Of course, a longer ribbon would probably be more sensitive, but in this case it is offset by the desire to construct a small compact unit. In fact the completed job, together with its associated matching transformer, measures six and a half inches long.

THE MAGNETS.

The first problem in the construction of the magnets was the choice of matrial. Inquiries from one electrical firm, who do considerable constructional work, disclosed that high speed tool steel was used for the construction of permanent magnets. I've no doubt that other types of steel would be far better than "High speed."

However, as stated, high speed tool steel was used. A piece of ¾ of an inch wide by ¼ inch thick and 11 inches long was obtained. Of course, before being worked it was annealed. This was done by taking it along to a blacksmith and heating it in the forge and allowing it to cool slowly. At the same time he cut the bar into two pieces, and bent each piece to form a U with a spacing of one inch between the prongs, taking care that each U-shaped piece was a replica of each other.

The ends of the prongs are now filed, or better still ground on an emery wheel, until they are nice and square. The inside of the prongs are also filed parallel, as on this will depend the pole pieces being parallel to the edge of the ribbon.

On each prong two 3/16 inch holes are drilled. These holes are for the mounting of the pole pieces, and also serve to hold the "legs" by which the whole assembly is mounted on the base plate.

In the U portion of each piece a ¼ inch hole is drilled through. This hole is to bolt the bracket which holds the bakelite bridge to which the ribbon is clamped at each end.

This completes the mechanical work on the magnets, it only remains now to have the two U-shaped pieces treated for hardening, after which they may be magnetised. No suggestions are offered for either the hardening process or the magnetising, as the original were done commercially.

THE POLE PIECES.

The pole pieces were cut from ¾ inch square mild steel. Each pole piece was 2¼ inches long. Along one face 1/16 inch holes were drilled through. These holes although not entirely necessary are advisable as they allow free passage of air through the microphone and so relieve pressure on the ribbon.

On one face at right angles to the face on which the 1/16 inch holes are drilled, it will be necesary to drill and tap four ¼ inch holes. These holes must correspond to the 3/16 inch holes already drilled in the prongs of the magnets. It can now be readily seen why oversize holes were drilled in the magnet prongs, as the oversize holes allow some latitude of adjustment so that the faces of the pole pieces may be adjusted until they are absolutely parallel. The ¼ inch holes in the pole pieces by the way

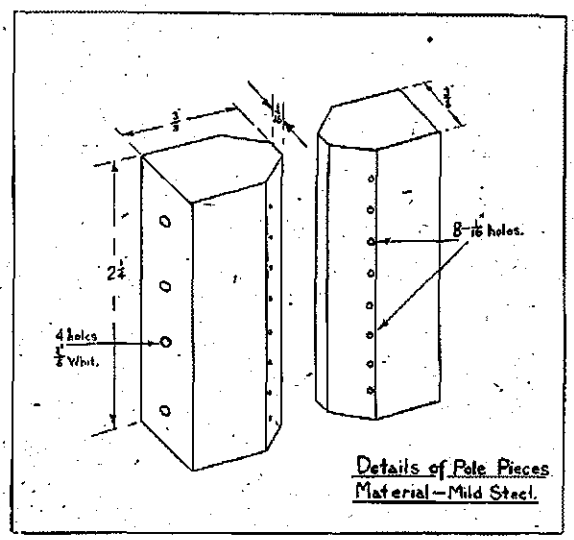


Fig. 1.

are not drilled right through, about 3/16 of an inch should be sufficient.

The front face of the pole pieces, that is, the face opposite the one in which the ¼ inch tapped holes are, is ground so that only a narrow surface is presented to the edge of the ribbon. (See fig 1). This face should be between ¼ inch to 1/16 inch along the whole length of the ribbon.

THE BRIDGES.

The bridges, as the name indicates, are the strips to which the ribbon is clamped at each end of the microphone. They are composed of ¼ inch bakelite cut in the shape of a semi-circle and are fitted in the bend of the magnet and on top of the pole pieces.

On each piece of bakelite three holes are necessary. One at top centre, which takes the machine screw holding the bracket by which the bridge is mounted. Two other holes are needed towards the wide section. These holes were tapped to take a ¼ inch bolt, and are for the brass strip by which means the end of the ribbon is clamped.

Undoubtedly other methods of mounting the bridges could be devised. However, in this case the method used appeared to be the easiest. Not only did it appear the easiest, but it provided a very simple method of adjusting the ribbon for centre of the pole pieces. It was only necessary to bend the bracket in the desired direction.

THE RIBBON.

The article in QST mentioned earlier, used for a ribbon good quality tinfoil and may be identified by the tinkling noise when a strip is waved in the hand. Quoting QST "The noise is distinctly metallic and usually a foil giving this noise will have good tensile strength. A lead foil will not have the proper springiness, but may stretch if put under slight strain. A good foil, if slightly wrinkled, can be stretched in the same manner as a coil spring, provided the stretching is not too violent."

The writer in pre-war days having visions of constructing such a microphone had stored up such a piece of tinfoil. In the good old days, chocolate came wrapped in good foil, and this is where the foil used camed from. This foil was half of one thousandths of an inch thick and proved ideal for the purpose.

Firstly the sheet of foil was cleaned to remove any trace of grease that may have remained on the surface—bright, clean surfaces are necessary for good contact to the clamping strips. A strip ¾ inch wide was cut from the piece of foil. This may be done by laying the sheet on a piece of cardboard and carefully drawing a razor blade along the edge of a rule. The strip of foil was then laid on a pad of felt and a small gear wheel run along it to form the "crinkles."

If care has been used in doing this the ribbon should be quite straight along the edges. Holding both ends of it the ribbon may be gently stretched, and when one end is let go it should spring back.

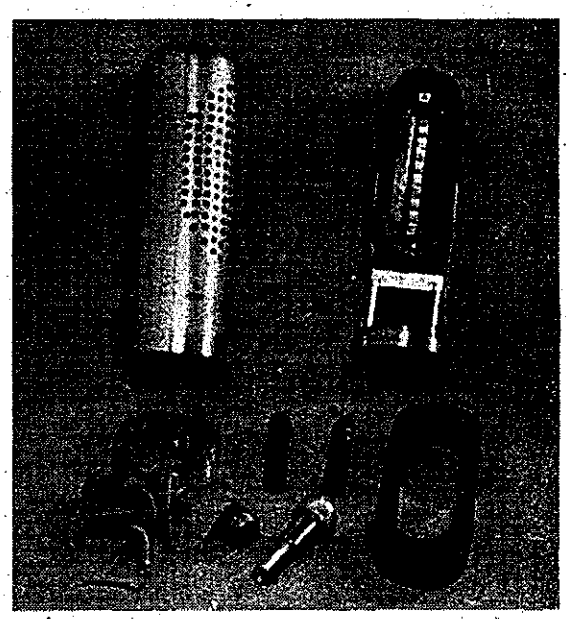
THE CASE.

Individual constructors will have their own ideas of the type of case which would suit their construction methods best.

In this instance there was on hand some 2 inch diameter Dural tubing. This fact was taken into account before the magnets were constructed, so that the magnets were made so that they would fit inside the tubing. This Dural tubing when properly buffed up results in a very high polish, and looks a really professional job.

The front and back of this tubing was drilled out with ¼ inch holes to form a pattern. This can be seen in the photographs. The work of drilling all these holes, one will realise is no small task, but the result is well worth while.

The cap on the top consists of portion of an old aluminium piston, one from a Baby Austin is almost the right fit, and also polishes up beautifully. The top was turned up in a lathe to form a dome, after which the piece of tube was heated up and the top cap forced in. This, of course, makes it a very tight fit. The other end of the tube was screw cut on the inside. This was to allow



The pieces used in construction.

the base plate to be screwed in.

This base plate or plug was turned up from a piece of ½ inch thick aluminium, and on this plug the entire microphone is mounted. This can also be seen in the photographs. In this plug two ¼ inch holes were drilled to allow machine screws by which the "works" are bolted down.

To allow mounting on a stand, a ⅝ inch tapped 27 threads per inch (standard microphone thread) was drilled. Opposite this hole a ¼ inch hole was drilled. This was to take an "Amphenol" PC1M chassis mounting type microphone connector. The other connector, MC1F, of course, fits onto the end of the microphone cable.

(Continued on page 15)

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NEW TUBES

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Developments by Vacuum-Tube laboratories these days appear to be concentrated in the U.H.F. and V.H.F. fields. In view of the likelihood of increased Amateur activity in these regions, the following new releases should be of interest to Hams.

Raytheon 6N4.

The 6N4 is typical of the type of tube with which the Ham will be working in the near future. It is a triode capable of working as an oscillator, amplifier, or a doubler up to frequencies as high as 500 megacycles. By reducing inter-electrode capacitances, shortening lead lengths, and producing high transconductance in this tube, efficient operation at these frequencies is made possible. It looks as though this tube will be widely used in M.O.P.A. rigs, walkie-talkies, and portable-mobile units.

Characteristics—6N4.

Heater voltage	6.3 volts
Heater current	0.2 amperes
Plate voltage	180 volts
Plate current 12 milliamperes (Class A amplifier)	
Grid voltage	3.5 volts
Amplification factor	32
Transconductance	6000 ohms

General Electric 2C40

Designed for Amateur use in the proposed V.H.F. bands up to and including 2500-2700 megacycles, is this G.E. triode "lighthouse" type tube, the 2C4O. As a local oscillator it is capable of giving a power output on 3370 megacycles of 750 milliwatts with a plate voltage of only 250 volts. As a class A-R.F. amplifier in receivers it is good up to 1200 megacycles. It has a six pin octal base and may be mounted in any position.

Electrical Characteristics—2C4O.

Heater voltage	6.3 volts
Heater current	0.75 amperes

Direct Intereleetrodc Capacitances.

Grid Plate	1.3 uufd
Grid-Cathode	2.0 uufd
Plate-Cathode	0.05 uufd
Cathode R.F. connection-cathode	4.5 uufd

Average Characteristics.

Grid voltage	1.7 volts
Amplification factor	36
Grid transconductance, Ib equals 17 milliamperes	4850 umhos
Frequencies for max. ratings	3370 megacycles

TYPICAL OPERATING CONDITIOSS—2C4O.
Grid separation circuit.

Class A R.F. Amplifier	Typical Operation	Maximum Rating
D.C. Plate voltage	250	500 volts
D.C. Grid voltage	—3	25 volts
D.C. Plate current	15	25 milliamps
Plate input	3.75	watts
Plate dissipation		6.5 watts
Noise figure (small signals)	8.5	decibles
Power gain (small signals)	15	decibles
Frequency	700	1200 megacycles

C.W. Oscillator. Intended primarily as a local oscillator in the frequency range 100-3370 m/cycles.

Frequency	3370	3370 megacycles
D.C. Plate voltage	250	500 volts
D.C. Grid voltage (Rg—10,000 ohms)	—5	volts
D.C. Plate current	25	25 milliamps
Plate input	5	watts
Plate dissipation		6.5 watts
D.C. current (approx.)	0.3	milliamps
Plate power output	0.075	watts

G.L. 3C22.

Another tube likely to be of interest to the Ham will be the G.L. 3C22. If you want to push out 50 watts at 600 megaclcles, this is your tube; it will do that with 1000 volts on the plate. However, forced air cooling at the rate of 30 cubic feet per minute is required for cooling. Above 750 megacycles the heater voltage should be reduced 0.5 volt below normal.

A stack of external circular fins is an integral part of the plate connection to this tube which permits the maximum plate dissipation to be so high. It has a six pin octal base and may be mounted in any position.

Electrical Characteristics—G.L.3C22.

Heater voltage	6.3 volts
Heater current	2.0 amperes
Heating time	1.5 minutes

Direct Intereleetrode Capacitances.

Grid-Plate, shield on radiator	2.4 uufd
Grid-Cathode	4.9 uufd
Plate-Cathode, shield on grid and radiator	0.05 uufd

Average Characteristics.

Amplification factor	40
Grid-plate transconductance, 1b equals 50 mA	5000 micromhos
Frequency for maximum ratings	1000 megacycles

Maximum Ratings.

Class C R.F. power amplifier and oscillator. Key down conditions per tube	
D.C. Plate voltage	1000 volts
Peak plate voltage (under modulation conditions)	2100 volts
D.C. Grid voltage	2000 volts
D.C. Plate current	150 milliamperes
D.C. Grid current	70 milliamperes
Plate input	150 watts
Plate dissipation	125 watts

6AJ5

Tung-Sol has added to the list of V.H.F. and U.H.F. miniature glass-button based tubes the 6AJ5, a pentode intended for operation at plate voltages in the order of 28 volts in low power applications at these frequencies. In most applications where higher voltages are available, the 6AK5 should be used.

In the case of a push-pull Class AB1 amplifier, however, 6AJ6s are the tubes to use. They will deliver an output of one watt with 180 volts on the plates, 75 volts on the screen, and —7.5 volts grid bias. Under these conditions the plate to plate impedance is 28,000 ohms, second harmonic distortioc is two per cent., and third harmonic distortion is five per cent.

Electrical Characteristics—6AJ5.

Heater voltage	6.3 volts
Heater current	0.175 amperes

Intereleetrode Capacitances.

Plate to control grid (with shield)	0.01 uufd
Input	4.1 uufd
Output	2.0 uufd

Mavimum Ratings.

Plate voltage	180 volts
Screen voltage	140 volts
Plate dissipation	1.4 watts
Screen dissipation	0.5 watts
Cathode current	18 milliamperes

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Typical Operating Conditions.

Plate voltage	28 volts
Screen voltage	28 volts
Cathode bias resistor	200 ohms
Plate current	3 milliamperes
Screen current	1.2 milliamperes
Amplification factor	250
Plate resistance	90,000 ohms
Transconductance	2,750 micromhos

R.C.A. OA2.

This tube is a miniature type of cold cathode, glow discharge regulator type designed for regulation of "B" and "C" voltages in compact equipment where space precludes the use of the larger standard regulator tubes. The D.C. operating current range for this tube is 5 to 30 milliamperes and its output voltage 150. Its characteristics are substantially the same as the OD3/VR150.

Eimac 4-250A.

The big brother to Eimac 4-125A is the 4-250A, a kilowatt tetrode capable of giving 75 per cent efficiency at 100 megacycles. The filament takes 5 volts at 10.5 amperes. Maximum ratings are as follows:—

D.C. voltage	4000 volts
D.C. Plate current	350 milliamperes
D.C. Screen voltage	600 volts
Plate dissipation	250 watts

Taylor 822-S.

The Taylor 822-S is an all-round general-purpose high-power triode limited in R.F. applications to the vicinity of 30 megacycles. It's appearance is very similar to the 810 with the plate cap on top and the grid cap on the side. It's carbon plate has a dissipation rating of 200 watts. A pair of 822-S in a Class B modulator will give a kilowatt of audio with 3000 volts on the plates (500 mA. max. average plate current). At 1500 volts and 390 mA. the output is reduced to 400 watts. In Class C Telegraphy service a single tube is capable of 600 watts output at 2500 volts and 300 mA. plate current. Required driving power for this type of service is 17 watts. In plate modulated Class C amplifiers maximum plate voltage is 2500 and plate current is 250 mA. Driving power required is 13.7 watts.

Electrical Characteristics.

Filament voltage	10 volts
Filament current	4 amperes

Interelectrode Capacitances.

Grid to Plate	13.5 uufd
Input	8.5 uufd
Output	2.1 uufd

Typical Operating Conditions.

Plate voltage	2000	2500	volts
Plate current	300	300	mA.
D.C. Grid current	51	51	mA.
D.C. Grid voltage	—130	—190	volts
Plate dissipation	140	150	watts
Power output	460	600	watts

It is with regret that we learn of the death from illness of Flying Officer Gordon Lander Templeton, VK3OW. Gordon obtained his ticket in 1930 and was a member of the R.A.A.F. Wireless Reserve before the war. As such he was called up for service immediately war was declared and was still in the Service at the time of his death on October 8, 1945. To his widow and two small children we extend our deepest sympathy.

IN REVIEW

TECHNICAL BOOKS — RECORDINGS — PRODUCTS

RECORDINGS.

ORCHESTRAL.

Spitfire and Prelude, EB242, played by Halle Orchestra conducted by William Walton.

Written specially for the film "First of the Few," the contemporary English composer, William Walton, in conducting this incidental music gives us a thrilling authentic version and a brilliant performance.

Adagio Strings, ED230, played by N.B.C. Symphony Orchestra, conducted by Toscanini.

A particularly fine recording of the work of the contemporary American composer, Samuel Barber. This work has acheived great popularity in concert performances. The playing is superb and the recording fine.

VOCAL.

Lily Pons sings with the Metropolitan Opera Orchestra two excerpts, "He Must Depart," and "Every One Knows" from Donezzetti's "The Daughter of the Regiment." LOX 574.

This coloratura soprano made her debut with the Met. Opera Co. in 1931 with sensational success and immediately became leading member of that company. She has sung in opera and concert in Paris, Rome, and London, and also has a wide following in Radio programmes and films. She gives a very fine performance of these two arias.

Webster Booth with Halle Orchestra. Take a Pair of Sparkling Eyes and A Wandering Minstrel. EB243.

Both these excerpts from the Gondoliers and the Mikado respectively are well known to lovers of Gilbert and Sullivan. The popular English tenor, Webster Booth joined the D'Oyley Carte Opera Co. in 1923. This disc is one of the most amazing vocal recordings ever issued. The reproduction gives one the impression of it having been recorded in a cathedral.

POPULAR VOCAL.

"Don't fence me in," and "The Three Caballeros." Y5909.

Bing Crosby enlists the aid of the Andrew Sisters for his version of these two numbers and he and the girls reach a very high standard in both. Recomended as being the best record from this team.

"Riding Down the Canyon" and "You're the Moment in a Lifetime." Y5911.

Bing Crosby turns cowboy to sing the "Canyon side." His famous whistle is absent and somehow one expects to hear it in this sort of song, nevertheless the disc and recording are excellent. The reverse is a Spanish song in which we hear Bing sing in Spanish and English.

DANCE.

Victor Silvester and His Ballroom Orchestra. "My Heart and I" (foxtrot) and "There are Angels Outside Heaven." (waltz). DO 2737.

Two perfect examples of Vic Silvester's strict dance tempo.

"Dance and be happy," says Vic Silvester. "Dancing is enjoyed by every nation in the world and ballroom dancing is one of the greatest social amenities of life."

Joe Loss and His Orchestra. "Come with me my honey" and "Rosanna." EA3263 "My Beautiful Sarie Maria," and "Together." EA3258.

No small part of Joe Loss's success comes from his irresistible tempos in dance music. His arrangements are excellent—his musicians first class and his own early studies in both serious and gay music have given all his numbers that polish and musicianship that can only come from a dance orchestra of the higest quality. His new titles are a good illustration of this.

JAZZ.

Duke Ellington and His Orchestra. "All Too Soon," H.M.V. EA 3254 "I never felt that way before."

In these days of commercial swing this Ellington double is a perfect example of real jazz. Performance and recording of this disc is excellent.

BOOKS

INTRODUCTION TO MICROWAVES

By Simon Ramo, Ph.D.

This little book is unique in that it is written for the benefit of engineers who are familiar with alternating current phenomena at very low frequencies, that is to say at frequencies in the power supply range, not at the very most the lower radio frequencies. Thus an attempt is made to introduce the reader to the elementary concepts or circuit behaviour at ultra-high frequencies without first covering the ground of "Concentional", or medium and high frequency circuits.

This may seem rather ambitious until one realises that the behaviour of familiar circuit elements at ultra-high frequencies is as unlike their behaviour at high frequencies as the latter is to that at power frequencies. Thus to give the semi-technical reader a basic understanding of the ultra-high frequency phenomena it is not necessary, and indeed not even desirable, to first teach him something about the radio frequencies which lie between the two extremes.

Commencing by setting out the ways in which electricity is common over the entire frequency range, Dr. Ramo then proceeds in the second chapter to show in what way Microwaves differ from low frequency electricity. Having thus laid the foundation he discusses in more detail the points of difference—how Microwave currents travel not in conductors but at the boundaries of their surface with surrounding media; how electrons travel with a finite velocity, enormous in relation to low frequency effects, no so great when we view it in relation to Microwaves. Thus is introduced the familiar concept of transit time, which we have found to be important even at frequencies lower than the ultra-highs.

In the next chapter we are told (or reminded, as the case may be) how a flow of electrons through space can induce a current in a circuit system, an effect common to all frequencies. Following on from this the author tells us about retardation, the electromagnetic equivalent of transit time; the effects of retardation and radiation on circuits; displacement current; resonant cavities; guiding Microwaves; transmission line concepts; hollow pipe wave guides; Microwave phenomena as a series of waves; voltage current and impedance concepts; and finally how a Microwave antenna combines concepts all the way from DC to light-wave frequencies.

The book serves its purpose excellently, it gives in clear and simple terms, without any mathematics whatever, the basic ideas upon which Microwave theory is built. The Appendix includes the titles of eleven books dealing in greater detail with electrical theory from DC to ultra-high frequencies.

(Introduction to Microwaves. Simon Ramo, Ph.D. (McGraw-Hill, New York, 1945-. 133 pages, 5" x 8", plus Appendix and Index, 120 diagrams, cloth bound, 12/3. Copy by courtesy Technical Book Shop.

THE ELECTROLYTIC CAPACITOR

Alexander M. Georgiev, M.Am.I.E.E.

The object of this book it is pointed out by the author, is to describe the construction, manufacture, function and testing of dry and wet electrolytic condensers. to ex-

plain the operating characteristics of the various types and to indicate both their useful application and their limitations.

The book should be primarily of value to people concerned mainly with the design and manufacture of electrolytic capacitors, and also to those concerned with design, production and maintenance of equipment in which electrolytic capacitors are used—radio receivers and transmitters, sound systems, electronic devices generally, telephone circuits, electric welding equipment, and single phase induction motors of the "capacitor" variety, such as are finding constantly increasing application to refrigerators, washing machines, oil burners and the like.

The subject matter covers comparisons between electrolytic and other capacitors, between wet and dry electrolytics, the electrodes, theoretical and practical considerations of the dielectric film and methods of producing it, etching of aluminium electrodes, spacers, electrolytes, cans, winding of capacitor sections, impregnation of dry types, measurements and tests, faults and emergency repairs, general design, trends in development, and applications of electrolytic capacitors.

Appended to the text are a glossary of terms, a bibliography and a comprehensive list of U.S. and other patents directly or indirectly related to electrolytic capacitors.

The book is profusely illustrated with line diagrams and exceptionally clear photographs.

THE ELECTROLYTIC CAPACITOR—Alexander M. Georgiev, M.Am.I.E.E.—(Murray Hill, New York, 1945-, 159 pages, 6" x 9" ,plus appendix and index(86 diagrams and illustrations, cloth bound, 24/-. Copy courtesy Technical Book Shop.

—ELECTRONIC EQUIPMENT AND ACCESSORIES.—

R. C. Walker, B.Sc., A.M.I.E.E., A.M.I.Mech.E,

During recent years a new branch of electrical engineering has appeared, or to be more correct, has been given a name "ELECTRONICS." Like all things new it is just being publicised to the limit; many things are claimed for it, which are economically unsound, being accomplished with equal efficiency and at less cost by simple mechanical means, other assorted wonders and marvels are being loudly acclaimed which have been in actual fact common knowledge for years.

Mr. Walker sounds a note of caution against over-enthusiasm for electronic devices when he says "While it is true that the simple electronic devices have found their way into all industries, economic considerations invariably decide whether their use is justified. When a simple mechanical device will meet the requirements, the novelty of an electronic device will be no recommendation for its adoption." In other words it is of little use to contrive a Health-Robinsonian conglomeration of power supplies, vacuum tubes, gas tubes and relays to ring a bell, or to put the cat out, when a mechanical arrangement in the case of the gong, or a simple manual for pedal action in the case of the feline will achieve the same object with equal, or perhaps greater efficiency.

In the early chapters, the fundamental characteristics of the electron tube are dealt with, also its various applications. Separate chapters are devoted to gas-filled tubes, light sensitive devices, and the applications of light cells, while the principles of the Cathode Ray Tube and the methods of using it are described.

The "Accessories" mentioned in the title include miscellaneous electronic devices such as neon tubes, magic eye indicators, etc., small switch gear, time delay devices, recorders and counters, and miscellaneous circuit accessories (small motors, metal rectifiers, selsyns, remote indicators). These are all fully described, together with their applications in relation to electronic devices.

ELECTRONIC EQUIPMENT AND ACCESSORIES C. Walker, B.Sc., A.M.I.E.E., A.M.I.Mech.E,—(Newnes, London, 1945)—369 pages, 6" x 9" plus appendix and index, 343 illustrations, cloth bound, 40/-. Copy by courtesy Technical Book Shop.

OUR FRONT COVER

V.H.F. TRANSMITTER-RECEIVER COMBINATION

The amateur with a leaning toward V-H-F QSO's will have more than a passing interest in equipment of the type pictured here, for the reason that it is a commercial product embodying principles well familiar to earlier day "five metre" men.

It is the Philips DR106, made in quantity during the war for the Allied Services, and used particularly for short-range inter-vessel Naval R/T Communication.

As with most types of radio equipment for the fighting services, the design is one of special robustness, whereas the Ham would achieve the same effectiveness of QSO with a much lighter affair, probably of "breadboard" construction, service demands are that gear must withstand possible rough usage. Those in the factories know that one military specification requirement is the drop test, where gear is dropped about 50 times from a height of 2 feet or 80 feet in to solid concrete. Solidity with unbreakability are the virtues required—and attained by our wartime radio manufacturers.

DR106 is built complete into a steel case with watertight lid, and comprises a MOPA TX using 6V6G, M.O., with P-P 807's as P.A., modulated by P-P 5V6G's and 6V6G phase-splitting sub-modulator. Frequency range is from 60-80 Mc/s. The receiver is a super-regenerative type with tuned R.F. stage, essential for "anti-squeal" and uses 954 R.F., 955 self-quenching detector, 6J7G first audio, with 6V6G output to the panel speaker or headphones.

Power ratings for the transmitter are: R.F. output of 13 watts at 60 Mc/s, and 8 watts at 80 Mc/s. Versatility must be the keynote of service power requirements, so provision is made for power supply alternatively from 115 volts A.C., 12 volts and 24 volts D.C.

Power consumption under these conditions varies from 230 to 185 watts.

The equipment is designed for use with either a vertical end—fed antenna or the usual centre—fed dipole with coaxial line.

Finished in grey matt lacquer with white outlined engraving of indicated controls this DR106 by Philips is an attractive proposition for many post-war commercial utility applications.

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CLASS MANAGER, MORSE INSTRUCTOR AND THEORY INSTRUCTOR.

Instructors rate of remuneration not yet fixed.

Further particulars are available from the Secretary, Box 2611 W G.P.O., Melbourne, or phone (evenings only) WM 1579.

CORRESPONDENCE

Editor "A.R."

During the month we received at Federal Headquarters a circular from an Amateur Radio Society in West Australia under the name of "Transix." No doubt many have received a copy.

It seems that these people have an axe to grind, but they do not make it clear what their grievance is. However, their circular, vague though it is, merits a reply, and we give it herewith, addressed as is customary, to their Secretary.

Dear Mr. X,

Your circular was unsigned, so we have to call you Mr. X or Mr. Smith or something like that. There are a lot of Mr. Smiths who read "A.R." and we wouldn't like to offend them, so Mr. X it must be. You won't mind, will you?

There are two reasons why a circular is sometimes unsigned, one being that it costs less to post, unless you sign with a rubber stamp and rubber stamps are hard to come by these days— or are they? The other reason we can neglect—no responsible Ham would make use of it.

You mention that Hams will be thinking about the speedy return of gear to "rightful ownership." Since each Ham's gear, although temporarily removed from his possession, has never changed owners, it almost looks as though you mean it should be returned to someone else, that it really doesn't belong to the chap who passed it in, but to somebody else.

You talk, dear Mr. X, of new regulations, too. Of course by the time you read this, if you ever read it, (it's obvious you don't usually bother to read "Amateur Radio"), the gear will have been returned, and the new regulations probably will have been gazetted. Isn't it amazing what your organisation can do—with a little incidental help from the W.I.A.

You say that you don't want to see amateur radio cramped within those "experimental" limits of pre-war days, the cause, you assert, of the "mass of meaningless jargon" on the bands heretofore. Really! dear Mr. X, what an astounding piece of self-contradiction. Sometimes, you know, you must even amaze yourself!

Don't you realise that the "meaningless jargon" was so prevalent simply because a lot of Hams in pre-war days were not sufficiently experiment conscious?

Don't you know that some of the greatest ideas in the science of radio communication came about because of the Ham urge to experiment. Yours is indeed a strange attitude for "An Organisation of Licenced Radio Experimenters."

So there is no co-operative effort among Hams in some States. If this is so, and if you mean VK6 in particular, THEN THE FAULT IS YOUR OWN!

Why talk of a "new National Amateur Organisation" when such a thing is already in existence? You say, dear Mr. X, that you want an organisation with a democratic vote—if you will take the trouble to find out something about the W.I.A. you will see that the whole show is truly democratic through and through. You believe that an organisation along the lines of the A.R.R.L. with a democratic vote, could function successfully in Australia. **IT HAS DONE SO FOR SOME 33 YEARS.** As a matter of fact is is older than the A.R.R.L.

And you wanted a printed "National Amateur Magazine," Mr. X, you have that, too!

Apparently you think the W.I.A. is not all it should be. Very well then, it is in your power to improve it.

WHY DON'T YOU GET INTO THE W.I.A., MAKE YOUR PRESENCE FELT AND TAKE STEPS TO CHANGE WHAT YOU DON'T LIKE?

Remember this, the man who offers good, sound constructive criticism engenders respect, but the chap who, because he can't always get his own way with his fellows, sets up on a soap box all his very own causes nothing but mild amusement. The choice is yours.

ALEC H. CLYNE, VK3VX,
Federal Secretary, W.I.A.
24 Charles Street, Adeliade.

Editor "A.R."

Hearty congratulations on the October Number of "A.R.", which has just come to hand. If you can maintain and advance from this standard you will be doing a great service to the W.I.A. and Ham Radio generally.

The general set up appeals to me strongly, making the reading and location of the features quite easy. The way you have balanced the subject matter is also considered excellent. Please let us know what you want in the way of co-operation from us over here and we shall be pleased to comply. Again, congratulations on this effort, and best wishes for a bigger and better "Amateur Radio."

IVOR THOMAS, VK5IT
President, S.A. Division.

Editor "A.R."

I would like to convey my appreciation to the Magazine committee for the FB effort with this month's "A.R."

It is well arranged and nicely produced and I think the cover alone should increase greatly the sales.

I have always admired each month, the work that it takes to produce "A.R." in the duplicated form. I was similarly conected with the production of a magazine for the Zero Beat Radio Club about 1936, and I know how much time must be spent when there are stencils to be cut and duplicated.

Well, boys, my thanks for your fine effort to amateur radio in general to keep the Magazine on the go during the past years, and I sincerely trust it will be possible to obtain sufficient advertising to maintain the paper in its new form.

ROGER TORRINGTON, ex-VK2TJ

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TUBES WHILE YOU WAIT.

During the push across Europe which preceded the German collapse in May. the United States Forces came across a telephone system from which the retreating enemy had removed the tubes and left the rest of the equipment intact. Being of German design, no substitute tubes were available, so a sample was rushed by air to the Bell Telephone Laboratories with instructions to duplicate the tube and to deliver 1000 immediately. Within three days experimental models were on the plane to Europe, and within three weeks the 1000 tubes had been delivered and the telephone system was back into operation.

The Late Sir Ambrose Fleming

It is with regret that we hear of the death of Sir Ambrose Fleming, D.Sc., F.R.S., in his 96th year, on April 18, 1945.

John Ambrose Fleming was educated at University College, Gower Street, and at the Royal College of Chemistry. He graduated B.Sc., and worked at South Kensington under Professor F. Guthrie and presented his first scientific paper on "The Theory of the Galvanic Cell" at the inaugural meeting of the Physical Society in 1874.

He relinquished in 1877 a teaching post at Cheltenham College, to go to Cambridge chiefly with the object of working under Clerk Maxwell in the then recently erected Cavendish Laboratory. There for two years, he says, "I enjoyed Maxwells' stimulating teaching and intercourse." In the year that Maxwell died, 1879, Fleming was appointed scientific adviser to the Edison Telephone Company, and three years later to a similar position with the Edison Electric Light Company, formed to introduce incandescent electric lighting into England.

In 1885, he was appointed Professor of Electrical Engineering at London University; a post he held until 1926.

It was in October, 1904, that Fleming, then scientific adviser to the Marconi Company, whilst studying phenomena in incandescent lamps, which had already been observed by Edison, discovered that a perfect device for rectifying the current induced in a receiving aerial existed in a high-vacuum tube containing two electrodes.

In the following month, Fleming took out the fundamental patent No. 24850, covering the thermionic valve. The title of the patent was "Improvements in Instruments for Detecting and Measuring Alternating Electric Currents." This valve, which was soon used in practical wireless reception by the Marconi Company, was the first technical application of the emission of electrons from an incandescent conductor in vacuo.

The early Fleming valves had carbon filaments surrounded by a metal cylinder, but in 1908, Fleming found that tungsten wire possessed advantages in that it could be heated to a higher temperature.

Writing in Wireless World, in 1925, Fleming states: "I was was well aware that the anode current could be reduced by holding near the valve a permanent magnet, but unfortunately it did not occur to me in sufficient time that this could be controlled by inserting a spiral wire or metal mesh cylinder between the filament and the anode, and giving to this grid small positive or negative potentials."

Fleming was the author of many scientific papers and standard text books, amongst them "Fifty Years of Electricity" (1921); and "The Thermionic Valve" (1919); published from the offices of Wireless World.

Sir Ambrose received many awards and honours for his work in electrical physics. In 1892 he was elected a Fellow of the Royal Society, and in 1910, he received the Societies' Hughes medal. In 1921 he received the Albert medal (R.S.A.), in 1928 the Faraday Medal (I.E.E.), in 1931 the Dudell Medal (Physical Society), and in 1935 the Kelvin and Franklin Medals. He was knighted in 1929.

We are now able to speed arrangements for meeting civilian requirements, but naturally reconversion and retooling mean that, temporarily, there may be delay in supplying your full needs.

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★ Line interstage and output transformers of all types.
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HAMS ON SERVICE

If anybody reads this this month it will be on account of the forbearance of "ye Hon. Editor." What with Blackouts and shut warehouses life has been a trifle mixed at your correspondent's QRA and, alas, following the bad example set by all you chaps who forgot to send in any notes, I also forgot, till a "gently worded," but nevertheless blunt telegram arrived, signed "Hogan" . . . so as I said at the start you may never read this collection at all. So I am as popular with the Hon. Editor as most of my usual correspondents are with me. Hi!

Since I last wrote I had the pleasure of meeting Bill Moore on his arrival in Sydney after a quick trip from Batavia. Apart from being about two stone underweight, he was the same old Bill Moore. As is the case usually it was impossible to get anything from him, except that he had constructed the Camp's Radio, which comprised various tubes, and those included Acorns, and that it ranged from battery plate supplies through vibrator units up to using the camps AC supply, which was OK till the Japs instituted a blackout. Hi! Bill brought home the single headphone he used for listening . . . reckons he has over 8000 hours to his credit—ABC and BBC.

Bill Lewis, 6YB/2YB, gave me the first news of Bill in a short note to say that "2HZ had apparently got hold of some xmitting gear as he had contacted one of our aircraft flying in the vicinity and subsequently, after a message had been dropped to him, contacted our local "Airadio." A few days later I received another note to say that Bill had arrived unexpectedly at 6YBs QRA and they had spent the whole afternoon discussing Ham radio with the help of the latest ARRL Handbook—and two copies of "A.R." Fl/Sgt. Doug. Watson, 7DW, added another VK State to the occasion. So it didn't take 2HZ long to get back to ham radio, and from then on, he was greeted by Hams at every stop, even having the company of two of them on the trip over from Melbourne to Sydney. Bill Moore, 2HZ, has always been a keen Ham and not even three years of the Nips made any difference.

On his own account, Fl/Lt. Bill Lewis hasn't much to say. Now that everything is over life is very pleasant as they are camped just at the beach and Sports Meetings and Troop Welfare has taken priority over the Nips.

It appears that I took Cec. Light out of the R.A.A.F. a bit in advance—so he informed me while adjusting the fifty foot stick at Wal Ryan's, 2TI, over at Kingsford. Cec. says he is still in it and looks as though it suits him. He didn't seem too safe to Wally and I perched up on top of the stick, but he assured us it wasn't near as bad as one night he took a Lancaster up, forgot to fasten his safety belt and then started to take evasive tactics to avoid a nightfighter. Hi!

S/Sgt. Alan Jocelyne, 2AJO, writes from Digger's Rest —and one conjures up pictures of Alan at the Veteran's Home, but, its all false as he informs that the name comes from the gold diggings, and has nothing whatever to do with tired troops such as himself. His Mess has six in it and five are Hams—George Downing, 3GD, "Mac" Macgregor, 3XZ, Bert Cusick, 3MQ, Bill Shakespeare, a VK2 without a call, and 2AJO. Alan says we can imagine what the conversation is about every meal, but what I would like to know is what the sixth chap talks about. Hi!

Sgt. Jim Stevens, 3ZK, duly rang up MU 1092, and has now been rewarded with his packet. I hope you DID get it Jim, om. Reckons he wants more respect from VK2 chemists—but I couldn't see any reason for it!!!

Had a note from Jack Mackel, 2HG, since our last issue —he just happened to find a copy of August "Amateur Radio," and thought he had better report himself. How August "A.R." got to Jacquinot Bay he did not say, but, as I've told you before OUR MAG. just does get around, and each copy does "umpteen" Hams. For over two years he has been with 1st Aust. Inf. Troops W/shops, Wireless Section, and knows far more about servicing receivers than he used to. He sends 73 to all the gang and wants to know "what bands we will get back on?"—and THAT is what everybody wants to know, Jack, om.

Jack Coulter, 3MV, complains that he always gets "Amateur Radio" just after the ship has left a port wherein were several Hams that he reads about too late —He wants more co-operation between the Hon. Ed. and the Navy. Hi! OK, Jack, I'll get Tommy to see "'em" for you. 2YC. He sends a cheerio to Clarry Castles, 5KL, and hopes to QSO him again soon, reckons it all of ten years since their last QSO. Hi!

That Red Headed Sailor, Syd Clark, has arrived safely in Nippon land — or is it their land, anymore? — and doesn't seem to like it as good as VK2. Syd missed all the VJ Day celebrations—nearest was when he arrived at Townsville a day after the celebrations ended, and as Syd says "things were really quiet." He reports good gear being scrapped by the U.S. and regrets he was going the "wrong way." — 832's, lighthouse tubes, sockets, modulating equipment — as Syd says, what a pity he didn't have a spare ship. Hi!

On the trip up Madang, Hollandia, Biak, Morotai, Subic Bay, Hong Kong and thence to Japan, he was unlucky to miss several Hams although he says all Radio Service men reckon they will be Hams as soon as tickets are issued again. At Manilla he met S/Sgt. Dan Scott, W6CBZ, who worked many VKs, being on for ten years before the war. At Morotai he just missed Fl/Lt. Radclyffe, a friend of Perc Dicksons, but he did strike Jim Dickie, a VK2, whose call Syd couldn't remember, but that was all the Ham Radio he struck between here and Japan. Hi!

To revert back to Jim Stevens, VK3ZK, who while on a visit to Melbourne recently (some people are wondering just why Jim is so eager to get to VIM these days), tells a story about an electrolytic condenser. Readers may remember that some time ago we published several ideas of rejuvinating defunct electrolytic condensers. Well on one of the R.A.A.F. stations some of the boys decided that they would try out the cure. As a result, this gang had visions of getting a fortune from the patent they intended to take out. After carrying out the directions, they discovered that the re-juvinated electrolytic condenser was giving a voltage?

From Bill Williams, VK3WE, we learn that his eldest son has arrived back after being a POW since the fall of Java. Bill writes, "He finally turned up working in a Jap coal mine in Japan, and after the surrender was promptly brought out by the Yanks, flown to Manila and then to Morotai, Darwin, and Melbourne. He was only a little over 6 stone and just about 'out' when they got him, but he has put on weight rapidly in the last six weeks, and although very nervy and old about the eyes, he is picking up rapidly."

Corporal Bob Stevens, VK3OJ, at Wewak reports having to service a set used by ANGAU recently, and sends the following particulars. Made by AWA the 3BZ is also known as a Teleradio and comprises three units of similar size—receiver, transmitter and speaker with a compartment for spare tubes. It is battery operated. Line up of transmitter is CO or MO 6V6 and 807 final either CW or fone, plate modulated by parallel 6V6's driven by a 6V6 mike amplifier. The carbon mike is excited by voltage developed across a resistor in the cathode of the 807PA and is resistance coupled to its amplifier. Plate supply is derived from a 12 volt battery by means of a vibrator, and the power output is rated at 15 watts. The receiver, superhet, has a RF stage and is operated from a 6 volt tapping on the battery with its own vibrator for plate supply. A five band wave change switch enables coverage of the broadcast band and the high frequency spectrum up to 20 metres. Bob says he located the trouble in this set, in the plate load resistor of the 6V6 mike amplifier, and the set goes, he says, "like a house on fire" and that the receiver "performs very nicely."

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From Townsville comes a note from F/Lt. Len Burston VK3BV, who says the Yanks are going to town on the 20 metre band. He has heard quite a number coming through—some using X4 and J calls.

Well, this again seems to be the issue for this month. It seems as though the more time you boys have to spare the less you feel inclined to send me some notes. You should have some very good stories to tell, so why not drop me a line—J. B. Corbin, VK2YC, 78 Maloney St., Eastlakes.—MU 1092.

A RIBBON MICROPHONE.

(Continued from page 6)

THE TRANSFORMER.

This is one item which caused some concern, as it was desired that it be of such a size that it would fit inside 2 inch diameter tubing.

At the time of construction transformers for particular applications were very hard, if not impossible, to come by. It was, of course, necessary to feed the microphone into a low impedence line.

The original intention was to employ the good old Ham method and use a speaker input transformer—one of the small 5 inch type. A rough calculation of impedence ratio showed that, assuming the impedence of the ribbon to be ½ an ohm—a value which was probably high—the reflected impedence on the secondary of the lowest standard winding available, which was 2500 ohms, would be far too high for a 200 ohm line. 200 ohms for the line was chosen for the reason that 200 ohm to grid transformers were already available. The choice of line impedence is of course entirely a matter for the individual constructor.

The only alternative to the problem was to get to work and wind a suitable transformer.

Some readers will, no doubt, recall HX's exhaustive inquiries on the subject of transformer design—in fact, he still has vivid recollections of delving into design in various handbooks.

The Radiotron Set Designers' Handbook, and the RSGB Handbook proved to be most helpful, and in the RSGB Handbook a formula is given for certain types of lamination steel and their shape, as well as the type of winding. E type of laminations being the easiest type to manufacture these were used.

The writer, believing in short cuts, decided that he might well use this formula—the only drawback was that he had to assume that the laminations steel on hand was of a certain kind. If the steel was not of the type assumed considerable error would be the result. However, it was decided to take the risk.

The formula is:—

$$N = 1000 \sqrt{\frac{R}{K}}$$

where N = Number of turns
R = Resistance of circuit
K = Constant

The constant K, for square section core of "Stalloy" lamination steel is 575, the secondary winding being wound on top of the primary.

After considerable calculation and resort to the slide rule, the figures arrived at were:—Primary 30 turns; Secondary 600 turns. The guage of wire for the primary was 28, and for the secondary about 40.

In view of the number of turns it was decided that a very small transformer could be constructed, so sundry junk box audio transformers were wrecked in search of

(Continued on page 20)

FEDERAL HEADQUARTERS

CONTAINERS—Recently came the long-awaited news of impending release of sealed containers. Post-Officewards went the headlong rush of eager Hams, great was the joy amongst the multitude throughout the land.

Many the tales of what went into those containers—and what didn't! One RI told us that quite a few containers were packed by Parents or other relatives, of Hams absent in other parts. In went everything in the shack, transmitter, receivers, QSL's, log books, even items of clothing!

LICENCES — Most Hams will by now have filled in and returned the application forms for renewal of licences. If you have not already done so you should request on the form the return of your old call sign. The official policy is to return pre-war call signs, and this will be facilitated by writing your old call on the application. Money should not be sent with the application, it will only have to be returned, as until the new regulations have been gazetted the Department cannot issue any licences, and consequently cannot accept any fees.

We find that where particulars of technical qualifications are requested on the form, we are supposed to state how long we held our station licences before the war. We must say that this is far from apparent in the phrasing of the question, and it is little wonder that the majority of the forms so far received do not contain that information.

A little more co-operation on the part of the Wireless Branch with the W.I.A. would have saved a good deal of trouble.

REGULATIONS—The new Ham regulations are almost completed and will be gazetted early in November.

We have gained quite a few of the points set out in our post-war set out last month, we have had to concede some points. We think, more—we are sure—the new regulations will be an adavance on those in force in 1939, criticism will no doubt be forthcoming, but we believe the majority will approve.

HANDBOOK — Remember the "Little Grey Book"? The 1939 edition is now withdrawn, and Radio Inspector Peter Dunne has been hard at work writing a new one which will be on sale soon, probably shortly after gazettal of the new regulations. We liked the idea of the original "Handbook for the Guidance of Operators of Experimental Wireless Stations," even if we did not agree with all it contained, and we earnestly recommend that every Ham should buy a copy of the new edition when available. The price will probably be 1/6.

EXAMINATIONS — The Department advises that the next examination for the A.O.C.P. will be held on the first Tuesday in February next, after which the pre-war programme of examinations will be resumed—second Tuesday in April, July, October and January. Full particulars from the Superintendent (Wireless) in your own State.

FREQUENCIES—It seems now that return of our frequencies from the services (and others) will delay our return to full activity. Now don't panic, we think the delay will be only short, but it seems likely that the new regulations will be in force before we get the frequencies.

We want to state quite plainly that we desire the return of all our pre-war bands as soon as reasonably possible, we see no reason why 28, 56 and 112 megacycles should not be returned at once. There seems to be some sort of feeling in the Services that some of our bands should be kept permanently for Service use. This we will not tolerate. The Service "Big Noises" responsible for frequency allocations must realise that the war is over, and that Service use of frequencies on the scale practised over the past six years must be drastically reduced, in fact there seems no justification whatever for allocations in the region of 3-30 megacycles greater than those of 1939. In the VHF, UHF, etc., region, it is, we admit, a different story, but on the other hand there should be ample room there for everybody. We hear that the P.M.G. proposes to replace the present carrier phone lines between Capital Cities with chains of UHF relay stations using Multi-Channel Pulse transmission. We hope the band width requirements are not too great!

And another thing, there are at least 25 broadcast transmitters operating between 7 and 7.3 megacycles. The majority are American and British, two are Australian. These services are now no longer necessary, we look forward to the speedy removal of these stations from our 40 metre band.

FREQUENCY MODULATION—Did you know that the use of FM, Television and Facimile are under the jurisdiction of the Parliamentary Standing Committee of Broadcasting, and that the P.M.G. cannot issue licences for these types of emission without the consent of the Committee?

It is absolutely unthinkable that FM, Television and Facsimile should be barred from Hams in Australia, so we are looking into this matter.

CORRECTION—We regret that the phrasing of the section of our Post-War Plan dealing with qualifications of Class A Licencees made it appear that holders of Commercial Certificates would have to sit for another examination. We hasten to assure you that this is not so. This error showed us two things:—

(a) There are a lot of Hams holding C.O.C.P.'s
(b) They are quite capable of sticking up for their rights.

The Federal Secertary may now come out of hiding.

TWINS.—To Chas. Quin, VK3WQ, Federal Councillor, and Mrs. Quin, twins, one of each. Heartiest of congratulations from FHQ. All doing well, we hear. Call signs have not yet been allotted at the time we go to press.

DIVISIONAL NOTES

NEW SOUTH WALES

Well, the great news arrived that the gear was available for collection. This meant that it would not be very long now before frequencies were allotted and call-signs re-issued. In Sydney, Experimenters were given the opportunity of either collecting their equipment or having it delivered to the Post Office closest to their home. It was felt that more Amateurs would have availed themselves of the opportunity of collecting their gear rather than having to wait to have it delivered as the Institute circular pointed out that transport was at a premium.

There were about 450 containers stored at Asbestos House and only about 130 of that number were collected. The highlight of Friday's performance was the ham who brought along a multimeter to test his 809!

Application forms for Licence are now available and if you haven't yet received one drop a line to the Divisional Secretary. These came to hand much sooner than expected and it is hoped that this also will be a happy omen for the early resumption of transmissions.

The October General Meeting of the Division had to be postponed on account of the Power strike—no auxiliary power supplies being available at Science House. It is hoped to hold this meeting on the first Thursday in November, but this, of course, will depend upon accommodation being obtained.

You are reminded that the November General Meeting of the New South Wales Division will be held on the Fourth Thursday of the month, viz., 22nd, and not the Third Thursday.

——BUSHFIRES EMERGENCY RADIO NETWORK.

This network continues to function at both Young and Dubbo and very good news came to hand during the week that there is an awakening of interest at Wagga. With a change in Shire Clerks it is confidently expected that 2YW and his gang of fellow workers will receive some encouragement.

Young Network have been carying out some extensive tests and a full scale exercise was held on Sunday, October 1. Despite rainy conditions the test was 100 per cent. successful. Two transmitters were out in the field and communication was established with the local broadcasting station, 2LF. In addition, mobile contacts were also made between two cars.

These lads under the guidance of Jim Taylor, VK2TC, have been carrying out extensive tests with various types of aerials in different parts of the shire and results were very interesting.

Now that releases are being made from the Services it is anticipated that it will be possible to rapidly expand this scheme to include Wagga and Coff's Harbor. Before a net can be established, however, it is necessary that there be at least three Amateurs available to form a technical nucleus. It is no use one man trying to form a net, as the initial organisation, building-up equipment, etc., is no mean task.

Another bright aspect of the matter is the comparative ease with which equipment can be obtained these days. The heartaches and broken promises of early days are still remembered.

All enquiries regarding the Bushfires Network should be addressed to Mr. E. Treharne, 65 Lucas Road, Burwood.

——THE EMERGENCY COMMUNICATION NETWORK

On the 1st October, 1945, the Institute was informed that it had been decided to wind up the Department of National Emergency Services. This meant that the Emergency Communication Network would be no longer required.

Thus ended one of the greatest achievements of Experimental Radio in Australia. From the time war broke out, the New South Wales Division of the Institute was untiring in its efforts to have the Australian Experimenter recognised by giving him a part in the defence of the homeland. Many times success was close, but always at the last moment a hitch occurred, until July, 1942, the news was received that, under the auspices of the State War Effort Co-ordination Committee, a net was to be established.

In the next issue of the magazine, the full story will be told, and as censorship has been lifted, this will be the first time that it has appeared in detail.

As Deputy Controller Wireless, I would like to take this opportunity of expresing my gratitude to all those Operators, both Amateur and non-amateur, who gave so much of their time to make the Network the outstanding success that it was. Their unswerving loyalty — and there must have been times when some decisions could have been considered harsh and difficult—was an inspiration to me and made an onerous task comparatively easy.

It is extremely difficult to pick out any individual as teamwork was the underlying factor, but I must thank Mr. Ray Priddle, VK2RA, particularly for his valued help and assistance.

—WAL RYAN, VK2TI.

VICTORIA

The monthly meeting of the Victorian Division was held at the Division's Rooms on Tuesday, October 2nd, some 60 members and visitors being present. Amongst the visitors were Messrs. C. Tilbrook, VK5GL, Alan Joscelyne, VK2AJO, and Eric Machen from VK6.

Discussion at first centered around the questions of "when are we likely to get back our gear?" and more important, "when are we likely to get back on the air?" The Federal Secretary, who was present at the meeting, gave the most up-to-date information available, and, whilst nothing definite could be said, it was apparent to all that the period of waiting would probably be much less than the many months most of us had expected.

Mr. H. Love, one of our oldest members (I mean length of membership—not age) who has been very busy during the last few years making receivers and other equipment for the services had agreed to give us a talk on developments in "Permatune Tuning" and also a demonstration of the equipment he and his staff had evolved at Kingsley Radio. Mr. Love first spoke on the general aspects of the subject and was followed by Mr. Bremner, who discussed the technical aspects of the matter. Mr. Bennett then followed with a brief outline of the chemical problems associated with the production of the fine iron particles used in the cores, etc., and finally Mr. Ray Cranch gave some details of the problems involved in the actual production of the coils and other components. A receiver using permeability tuning was demonstrated and, apart from the ease of tuning, the fine tone obtained was very noticeable. Mr. Love and his colleagues were enthusiastically thanked for a particularly enjoyable "show." The subject matter of their talks was so interesting that it is to be hoped they can be persuaded to write it up for "Amateur Radio" for the benefit of those members unable to attend the meeting.

Following the above talk and demonstration, the Chairman, Mr. Kinnear, informed the meeting of a fine gesture by Mr. Love. He stated that Mr. Love had offered, "just for old time sake," to present to the Victorian Division of the W.I.A. one of the AR7 receivers which his company had developed and produced for the services. This offer was naturally greeted with much enthusiasm, and this Division very sincerely thanks Mr. Love for his generous gesture.

At the Council meeting held on October 9th, considerable consideration was given to the technical services which could be provided by the Institute in the best interests of members. It was suggested that standard, or near standard, frequency transmissions would be of great value and the Laboratory Committee was requested to submit a report on the possibility of providing such service for all amateur bands when these bands are again open for our use.

George (Tim) Wells, VK3TW, has informed us that the Western Zone intends to hold a convention at Hamilton, on Saturday, November 17. The intention is to reform the Zone and endeavour to have a working organisation in the zone. There are many things to discuss, and suggestions are invited for the agenda. It is hoped there will be a good roll up of Hams in that district, and any from other zones who may be able to get along. If any one intends to attend the convention, would they contact George Wells, VK3TW, Hamilton.

It is pleasing to note the large number of applications for membership, these have come in at a great rate during the past month. Interest is also being shown in the probable re-starting of the A.O.C.P. Classes, although it may be several months before these can be properly organised.

Once again we extend an invitation to members to bring along non-member friends to meetings; we feel that once having come along they will wish to become part of the organisation. Finally, don't forget the next meeting is the night AFTER Cup night, that is, Wednesday, November 7th.

——THE LABORATORY COMMITTEE

As a result of appeals for more members to join the Laboratory Committee, Ron Higginbotham, VK3RN, and Harold Webber, VK3PW, intimated their willingness to assist to their fullest extent. This is encouraging, but the Committee is still in need of more members if the objects as set out in last month's "A.R." are to be realised. Readers comments and criticisms on these would be welcome, by the way. After all, it is for the advantage of all members that we are making these efforts and concerted action by many members can produce results that would be unattainable if left to only a few.

At the Committee meeting on October 16, special consideartion was given to the direction of Council that a report on the suggestion to operate frequency "Marker" stations on all Ham Bands be prepared. Several suggestions by various members were discussed and it is expected that the report will be available for consideration at the next Council Meeting. Doubtless, many readers will have their own ideas on this subject and their comments and suggestions are invited.

After trying for almost twelve months ,our efforts to dispose of the remaining laboratory equipment has been successful. The G.R. Capacity Bridge, Precision Condenser and Beat Frequency Oscillator have been sold to the Rola Co. for a total of £100. The age of the B.F.O. can be gauged from the fact it uses four 201A's, and the offer of £10 is regarded as highly satisfactory. The GR Capacity Bridge used in conjunction with the Precision Condenser provides a highly accurate means of measuring capacities from a few micro-microfarads to 0.0015 microfarad, the maximum capacity of the condenser (high capacities may be measured, but the process is lengthy an dsomewhat involved calculations required) so that its unsuitability for our purpose is quite apparent. This £100 brings the total of the funds set aside for the rehabilitation of the Laboratory to £205. Probably the first of the proposed equipment for the new Laboratory to be purchased will be a Cathode Ray Oscilloscope.

QUEENSLAND

At the last General Meeting a goodly crowd rolled up, a welcome visitord being Arthur Walz, VK4AW, down on a spot of leave. We will be honoured at the next meeting by a visit from representatives of the Radio Inspectors ,and of course everyone is hoping that we may obtain some definite information as to the date of "CQ Day."

The Queensland Division of the Institute has now firmly found its feet, and we are looking forward to a good deal of activity in the way of Field Days, etc., when conditions permit. At the moment of writing I am advised that Amateur Gear has been released from the P.M.G.'s custody, so that will be a happy event for most VK4's.

We would like to extend our congratulations to the Magazine Committee for their fine job in producing the new "Amateur Radio."

4KS.—Had a few of the local gang out on a recent Sunday helping him to erect a new antenna. I believe its to be a 3 element beam.

4JU—Looking around for a heavy truck to collect his gear fro mthe P.M.G. Will be using a beam erected just before the war and which, as yet, has not justified its existence.

4HB—Pleased to see you along at the meeting, Harry.

4VJ—Busy with PA work at the moment ,but will be finding time to lecture on receivers at the October meeting.

4IR—Has been stocking up on test equipment to iron out those post-war bugs.

4RY—Bill is holidaying in the south at present, but expected back soon. Is trying to decide where to erect his shack.

4RF—Fred is cont emplating some work on the ultra highs judging by a couple of bottles he has obtained.

4EN—Eric has been shifting his shack around to accommodate new equipment—also busy winding transformers.

4JP—George will be remembered for high quality phone in pre-war days. Four Juicy Peaches was the call.

4FB—Fred earns a crust repairing watches. While in his shop the other day I had a rag-chew with 4SA.

4HU—Busy on a very compact rig designed to work from an arm chair. This is but the forerunner of bigger and better things later.

4EY—Hoping to see you along one of these times, Eric, OM.

4ES—Is another one on holidays in the south.

4RC—Has been compiling lists of the DX to be heard on 20 mx these nights.

4RT—Just a chance that you might rea dthese notes, John. Hope the health has improved ,and 73's OM.

4ZU is complete with new shack and receiver, but is bothered with mains QRM.

SOUTH AUSTRALIA

Since the last appearance of news from this division in the new "Amateur Radio" events have moved very rapidly in this State as in others.

All hams have been given back their impressed boxes, or rather ben given the opportunity to collect them if they can provide the necessary transport, this position has arisen owing to the amount of work the department has for the next few weeks.

However, we were assured that if we were not in a hurry the gear would be delivered as soon as possible.

Another encouraging sign for the future of our art is the growing attendances at the W.I.A. meetings, also the boundles enthusiasm which is plainly evident.

At the last of these meetings we were given a very fine lecture by Mr. Cox of the school of mines staff, on push pull amplification. Mr. Cox dealt very ably and thoroughly with his subject and answered some very searching questions at the conclusion of the lecture.

Good response has been received to the offer of A.O.P.C. clases, and it is hoped to start on this project before the end of October providing all subscriptions are in hand by that date.

Big business is reported from the printing trade as all hams in this State seem eager to outdo each other in the design of novel QSL cards, which should be quite an array if all the ideas go into practice, and should make VK5 even more attractive to the elusive dx than ever.

The first full size "Amateur Radio" caused quite a stir here, both in the style and setting up, and hearty congratulations are in order for all those who have been responsible for its publication, needless to say we are looking forward eagerly to future editions especially as the membership all over the Commonwealth growing as it is will soon be reflected in an even better publication.

It is very pleasing to see our service personnel returning to the ranks of civilians again, and amongst the many who are back are F/Lt. Alan Heath, VK5ZX, S/Ldr. L. A. Deane, VK5LD, Sgt. H. Roberts, VK5MY, W/O J. Bergin, VK5JB, who has recently returned from a prisoner of war camp, F/Sgt. J. T. Kilgariff, VK5JT, and F/Lt. R. Turner, VK5RT.

To be discharged shortly are Sgt. D. Whitburn, VK5BY, S/Ldr. H. M. Brown, VK5MB, F/Lt. Dud Nourse, VK2DQ, was through Adelaide recently and it was a pleasure to renew his acquaintance again. "Dud" has seen many countries since he left Australia, and has acquired a perfect English accent.

Letters have been received from W/O Ray Deane, VK5RK, and Sgt. Howard Stacey, VK5XA, both of whom are on Labuan Island, to those of you who may have returned and been missed in these notes, please let us hear from you at So. Aust Headquarters soon.

At the time of writing these notes the Institute has received its 100th application for membership. Considering that this Division has only been reformed since July of this year, the Council feel that their efforts have been highly successful.

The greater the membership the more weight we can wield in your favour. We are pleased to receive applications for membership from anybody who is interested in Radio, so write in to the Secretary, who will be only too pleased to forward an application form for membership. The next meeting of the Institute is to be held on November 13, at 17 Waymouth Street, when a lecture will be given by Mr. Al. Smythe on "The Construction of a Ham Transmitter."

This lecture will be of immense interest to those hams who gained their tickets just prior to the war and to all those contemplating acquiring an amateur ticket in the near future.

TASMANIA

The monthly meeting of this Division was held on Wednesday, October 3rd, at the Photographic Society's Rooms, over Coleman's Chemists (free advt.—Ed.), Liverpool Street, Hobart. This meeting was preceeded by a brief Council Meeting.

The muster was fair but it is hoped that as we settle down to business in earnest there will be a still better response.

The important business of the evening was matters from FHQ relating to proposed regulations and classification recommendations for the P.M.G.'s Department. These came in for quite a gruelling, and generalising it seems that the main beliefs are that the Department will give us plenty of control without us making too exacting restrictions for ourselves. The classification of licences is too odious of class distinction and that the vigilance committee should be in a position to hold the qualified amateur in proper control.

It was also decided to ask that the amateur licence cover any number of receivers and transmitters as it did previously.

Some alterations were made to our "Articles of Association" to make them more straight forward, and fees were reviewed and set back to their old scale of £1/1/- Full City Member, with 10/6 Associate and 5/- Student. Country Members to be 10/6; 7/6 and 5/- respectively. A permanent quarters is still hoped for and some suggestions are to be looked into on the matter.

Other suggestions for arousing interest in the meetings were put forward by the President, VK7LJ, and some discussions were had on post-war prospects, etc. Of course, the old Ham spirit predominated the latter part of the meeting.

Nominations are still coming in and there are hopes of a greater increase now that the preliminaries are over and we are open to general membership.

It was pleasing to see VK7AH present, although he was not fully recovered from his bout of 'flu, he hopes to become active again once things are clear. Being 78 he will possibly need a little helping hand to put some gear into working order, but he is assured of this.

Regret was expresed at the accident in which Chas. Oldham, VK7XA, was involved. He had an altercation with a lorry, his steed being an Austin, results, a couple of broken ribs, and a few days in hospital. History doesn't relate what happened to the "Baby" apart from it being bowled about a bit. We wish you a quick recovery, Chas.

The notification from the P.M.G.'s Department re the return of gear will be welcomed by all concerned, and a general rush has been made to recover and inspect same. It certainly looks good to run through the old familiar parts, and we hope it will not be long before we can energise some of it.

The when and where, are we going to start ,and what class of gear we desire first are now the uppermost thoughts of most of us.

Next meeting is set down as a Special General Meeting for the 7th November, at the address previously stated and all interested are invited to attend.

WESTERN AUST. DIVISION

Postal Address : BOX N1002, G.P.O. PERTH.

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THE DESIGN OF COMPRESSED HIGH FREQUENCY BEAMS

(Continued from page 4).

junction with the former point, these two factors seemed approximately to compensate for the reduced size of the aerial.

As a receiver the compressed diople may not show up quite so well, since the improved impedance matching will not hold over any wide band of wave lengths. Attempts to confirm this by reception tests over a period indicated that in general signals were noticeably but not seriously weaker than from a full length dipole, but that when it was possible to tune the aerial exactly to the wanted signals, the difference largely disappeared. A simple and apparently effective method for tuning the aerial was evolved, and is of particular assistance in tuning loaded reflectors, as will be mentioned later. It consisted in joining a small variable condenser across a few turns near the centre of the loading inductance. In the case of the five-metre band, the feeder cable was tapped across two turns of the coil, and a 15 m-mfd. condenser across four turns, as sketched in Fig 2 (d). This enabled the aerial to be tuned over some two megacycles, and was a decided assistance in reception.

From the foregoing information a number of suggestions should present themselves, for the continuation of this work.

Small air condensers shunted across a few turns in all elements should permit resonance at the required frequencies to obtain satisfactory front to back ratios—a very positive means of adjustment.

I am sure the Magazine Editor would be glad to publish reports of work done on this type of radiator when hams are again in a position to exchange ideas and results.

A RIBBON MICROPHONE.

(Continued from page 15).

suitable laminations. The final transformer measured 1 inch x 1¼ inches allowing ½ inch winding space. This proved ample.

The core was ¼ inch square section. Naturally considerable filing was necessary to acquire an even lamination. The easiest way was to clamp the required number of laminations together in the vyce and work on them all at once.

The bobbin on which the windings were wound was made by wrapping brown paper around a ¼ inch square piece of wood using an adhesive to fix the paper together. End pieces were cut from thin card and glued on the ends of the required length of former. After winding on the required number of turns the whole winding was dipped in hot wax allowing time for the wax to soak well into the windings.

The transformer was finished off by bending some strip aluminium to form a channel, and this was clamped all around the laminations. This makes a very neat finish.

ASSEMBLY.

Reference has been made earlier to the "legs." These are two strips of aluminium ⅝ inch wide and 3¼ inches long, serving to mount the transformer as well as the whole microphone assembly on to the base plug. There are two holes drilled in them to correspond to the 3/16 inch hoses on the side of prongs of the magnets.

The two U-shaped magnets are placed together, being careful to place like poles together. ¼ inch machine screws are used to clamp the pole pieces in place. When doing this be careful to see that the narrow faces of the pole pieces are parallel.

The bridges are now attached to their brackets and fitted into place, a ¼ inch machine screw through the bend of the magnets holds the brackets in place. The bridges may now be bent so that the face to which the small brass strip is attached is centred on the narrow pole piece-face.

The transformer is mounted at one end of the magnet assembly, the end which carries the legs. The transformer will fit here neatly. The ends of the legs can now be bent up so that it can be bolted to the base plug.

One side of the secondary winding is soldered to the centre contact of the microphone connector, the other side of the winding is of course soldered to the frame of the connector.

Now we come to the fitting of the ribbon. After having got the ribbon ready, one end is slipped under the brass strip at one end of the microphone, the clamping screws can be tightened so that the clamp holds the ribbon firmly. The other end of the ribbon is slipped under the brass strip at the other end of the microphone and is pulled up until the ribbon starts to stretch. The ribbon can now be centred and the screws tightened. Returning to the other end, the clamping screws are loosened off and the ribbon centred, keeping the ribbon stretched. When centred these screws are tightened, and the job of fitting the ribbon is finished. The two ends of the primary winding are soldered direct to the brass clamping strips. These strips by the way, are well polished to ensure good contact to the ribbon.

The asesmbly is finished off by covering the whole unit with a bag made from fine silk. This will prevent the moisture from the breath attaching itself to the ribbon. This silk could ,of course, be fixed inside the case, as is done with speakers.

PERFORMANCE.

In the initial testing stages some hum was experienced, due to the transformers; however, the usual methods of turning the transformer round and shifting it to another spot on the chassis soon cleared up the trouble.

To date no frequency curves have been run on the microphone, but to the ear its response appears to be excellent. The pick-up also is good, having the usual figure eight patern of this type of microphone.

The output is low, lower than the commercially manufactured article of the same type, however two stages of high gain pre-amplification were all that was necessary to obtain full output.

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DECEMBER 1945

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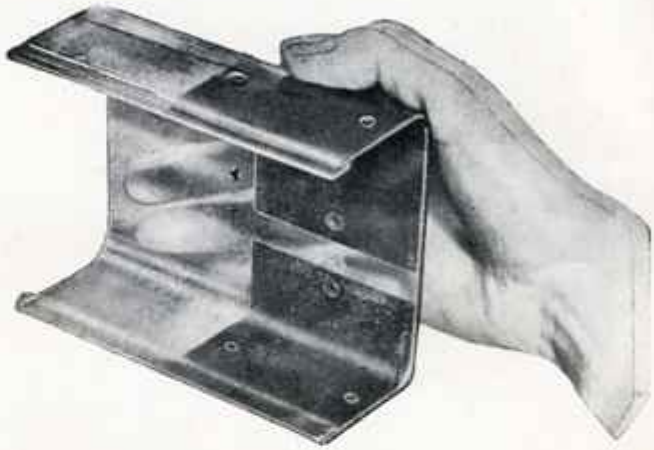

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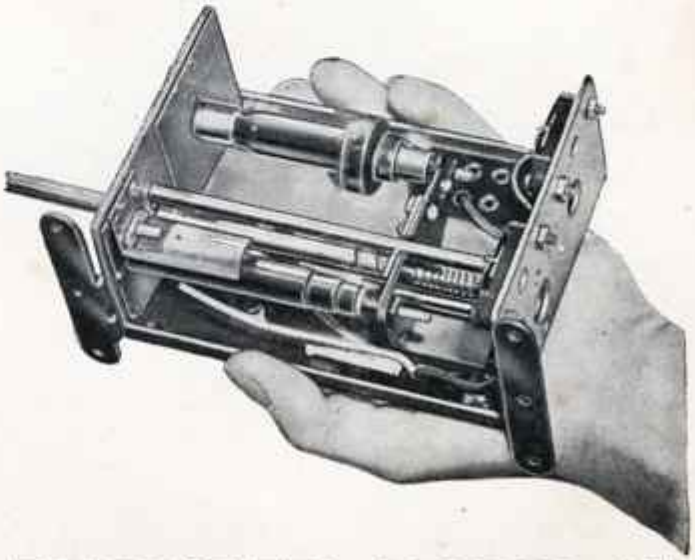

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Editorial

Experimental Radio—What does it mean to you?. Does it mean chasing DX, or simply ragchewing? Does it mean extensive experimentation and research in the field of radio transmission and receiving? Perhaps, in your case it means a combination of all—if it does you are truly an "Amateur"—for the definition of Amateur reads: "One who cultivates a particular study or art for the love of it."

The love of radio goes further—it induces a feeling of friendship with fellow amateurs and consequently a desire to co-operate—a factor which has done much to advance the science of radio and which would be a dominating factor in the propagation of International Peace.

It is the Hams proud boast that he co-operates with his fellows—yet—looking through the file marked "Amateur Radio Technical Copy" reveals a lamentable position. There is no dodging the fact that repeated appeals for contributions from readers have met with disappointingly poor response.

Just why this is so is hard to understand. Surely the work put into the production of "Amateur Radio" by the Magazine Committee, and the confidence shown in the magazine by our advertisers is worthy of better support.

THE MAGAZINE COMMITTEE DESIRES TO EXTEND TO READERS AND ADVERTISERS GREETINGS IN KEEPING WITH THE FESTIVE SEASON.

IN THIS ISSUE

The Amateur's Workshop

By J. K. RIDGWAY*

WITH the resumption of Amateur activities after six years of inactivity, most Hams will be busily engaged in their rebuilding programme.

Although much of the pleasure of Ham radio is to be derived from Operating, Rag-chewing, DX chasing, etc., there is also a certain pleasure and satisfaction to be derived from the construction of equipment of high quality, both from an electrical and mechanical standpoint. This article is designed to assist the Ham to obtain the best results from his tools. So lets take a little time off from operating and spend a little more time on constructional work. Later, if the demand is sufficient, we may give an article on the care and operation of a lathe, so if you are interested, please let us know.

The most common operation that is performed by the amateur is that of drilling. If the financial position will allow, a drill press is probably the most useful piece of machinery for inclusion in the workshop. During the war many scores of thousands of these machines were made in Australia, and now that the essential works programme is completed it should not be difficult to obtain one for a reasonable figure. Most of these machines have speed ranges of from about 300 R/P/M to 3000 R/P/M/. A ½ horsepower motor is usually fitted. By far the most satisfactory type of drill chuck is the "Jacobs" which is supplied with a key for tightening purposes. Although the initial outlay upon a drill press may be rather high it will be amply repaid over a period if the Ham does any large amount of constructional work.

Some hints on the care and operation of drill presses might prove of value at this juncture. A drill press should be regarded as a precision machine tool, and should be treated as such. A little care spent in regular cleaning and lubricating will be amply repaid in efficient working.

Most machines come equipped with ½ inch capacity drill chucks, but no attempt should ever be made to use drills of this size without first drilling a pilot hole of at least ¼ inch diam. If any degree of accuracy is required in the positioning of a hole a centre drill should be used for starting. This little gadget is more correctly known as a combined drill and countersink. The countersink is at 60 degrees and is usually used for preparing work for lathe centres. It is the point however that is of interest in starting holes. The lip angle is the same as an ordinary drill, but the flutes are more like a router bit and allow the drill to be pushed sideways in the work. Anyone who has vainly tried to persuade an ordinary drill to edge over a little will appreciate what this means. It is always advisable to clamp work down onto the drill table, especially where large holes have to be drilled. "G" clamps are very useful for this but other clamping arrangements can be worked out to suit the particular job being drilled. Remember, it is easier to spend a few seconds in clamping a job correctly than to run the risk of having it pulled out of your hand by the drill, which usually results in the operator losing the bark off his knuckles, as well has having a broken drill left on his hands into the bargain. Special care is needed when drilling brass, especially if the brass is of the extruded variety. Brass has a nasty habit of seizing on the drill when on the point of breaking through. Usually straight fluted drills are used on this work, but an ordinary twist drill can be made quite safe by simply grinding a slightly negative rake on the cutting edge as shown in fig. 1c. Drilling speeds are important and should be watched carefully if good results are to be had and long life to be obtained from the drills. Steel panels can be drilled with holes of up to 3/16 inch diam. at speeds of about 1500 R/P/M. Above this size it is advisable to drop down one step on the cone pulley drive, whilst holes of the order of ½ inch should be drilled with the slowest speed available.

Aluminium can be worked at higher speeds than can steel, provided that the drill is sharp, whilst brass can be drilled at still higher speeds **PROVIDED THAT THE PRECAUTIONS PREVIOUSLY MENTIONED ARE OBSERVED.** Polystyrene, Lucite, Perspex and similar insulating materials drill easily except for their notorious susceptibility to heat. The speed for these materials can be as high as possible up to the point where heating results. When drilling a transparent piece of this type of material you can see the side wall of the hole turn white if the point heats up. This is the danger point. Incidently, don't be two heavy with the centre punch on these materials or they are liable to develop cracks.

Lubrication of the drill point is desirable for all drilling work if good results are desired. For steel, commercial cutting compounds, usually vegetable oils, soluble in water are ideal, but are not readily available to the Ham. However, a light machine oil will do very nicely. Aluminium benefits from the application of kerosene during drilling, whilst the plastic materials should be lubricated with a strong solution of soap and water.

SELECTION OF DRILLS.

It is advisable to carry a selection of fractional size drills ranging from 1/16 inch to ½ inch in steps of at least 1/32 inch. As well as these it is frequently desirable to have a range of number and letter size drills. These drills come in sizes in between the fractional sizes, and are useful for drilling tapping and clearance holes. A table of drill sizes is given at the end of the article. High speed steel drills are a good investment and will outlast the cheaper carbon steel drills many times, especially when used in a high speed drill press. Always see that drills are held tightly in the drill chuck. Nothing contributes more to the inaccuracy of a drill chuck than drills which slip around under load, thus tearing both the chuck jaws and the shank of the drill. Sharpening of drills is important and will be dealt with at large later on.

Next in usefulness to the drill press is probably the bench grinder. Anyone who has ever tried to sharpen drills and chisels on a hand operated machine will realise the truth of this statement. A satisfactory type suitable for the amateur's workshop would be a double ended machine using 6 or 7 by ½ inch wheels. One-third horsepower is ample for a machine of this size. In order to maintain a satisfactory surface speed for the wheels 3000 R/P/M/ is desirable.

Grinding wheels for these machines come in a wide variety of grits and grades. The type of wheel is designated by the code lettering on the label. The grit, which of course refers to the coarseness of grain is indicated by the numerals; whilst the following letter or letters refer to the grade or hardness of the wheel. For instance, a 46 wheel would indicate that the particles of abrasive had passed through a screen of 46 mesh. The most satisfactory wheel for general use is one of average hardness, i.e., one which carries one of the following code letters: J, K, L, or M. Paradoxical as it may sound, a hard grade of wheel is used for grinding soft material, whilst a soft wheel is desirable for the grinding of hard

* Technical Editor "Amateur Radio."

materials. The most satisfactory wheel for general purpose use is a 46K. If two wheels are used a 30K and a 60K are recommended. Before mounting a grinding wheel, always test it for cracks. Do this by holding the wheel loosely on a screwdriver or any convenient object that will pass through the mounting hole and giving the wheel a light tap with a small metal object. A good wheel should ring in the same manner as a china cup; a cracked wheel will have a dead sound and should not under any circumstances be used. Always see that the blotters provided on either side of the wheel are used between the wheel and the mounting flanges on the spindle. These are provided for the express purpose of preventing too much pressure being exerted by the flanges of the wheel, which might cause a fracture of the wheel structure. Remember, a wheel rotating at 3000 R/P/M., if it breaks, is quite capable of causing serious, if not fatal injuries.

Grinding wheels should be kept in free cutting condition by frequent dressing. Small industrial diamonds are ideal for this purpose, and one of fractional carat size may be purchased quite cheaply.

Drill	Diameter	Drill	Diameter	Drill	Diameter
1	.2280	18	.1695	7/64	.1092
2	.2210	19	.1660	36	.1065
7/32	.2187	20	.1610	37	.1040
3	.2130	21	.1590	38	.1015
4	.2090	22	.1570	39	.0995
5	.2055	5/32	.1562	40	.0980
6	.2040	23	.1540	41	.0960
13/64	.2027	24	.1520	42	.0935
7	.2010	25	.1495	3/32	.0937
8	.1990	26	.1470	43	.0890
9	.1960	27	.1440	44	.0860
10	.1935	9/64	.1406	45	.0820
11	.1910	28	.1405	46	.0810
12	.1890	29	.1360	47	.0785
3/16	.1875	30	.1285	5/64	.0786
13	.1850	1/8	.1250	48	.0760
14	.1820	31	.1200	49	.0730
15	.1800	32	.1160	50	.0700
16	.1770	33	.1130	51	.0670
17	.1730	34	.1110	52	.0635
11/64	.1716	35	.1100	1/16	.0625

FILES.

A file is one of the most useful tools around a Ham workshop, and without doubt one of the most difficult to use correctly. Good files are cheap, so there is no necessity to buy inferior ones. Files are sold in various lengths from 4 inches to 14 inches and in various shapes. The cut of a file denotes the coarseness of the teeth. These cuts are defined, starting with the coarse end as: Rough; Bastard; Second cut; Smooth; Dead smooth; and Dead dead smooth. The most useful flies for Ham use would be a selection of shapes, sizes and cuts as follows: 8 or 10 inch Flat, Half round, Round, Square and Three cornered in the following cuts: Bastard, Second cut and Smooth. New files should be reserved for use on brass and copper, then when they are too dull to cut these materials they should be transferred to steel and aluminium. A file that has been used on steel will be next to useless on brass. Aluminium has a nasty habit of clogging the file teeth, and files used on this material will benefit from being rubbed over with chalk. This will slow down the cutting action somewhat but will prevent the clogging. Always clean a file after use with a stiff wire file brush to remove any particles that may be lodged in the teeth. Filings which are firmly lodged can be removed with a piece of tin or brass. A file is probably the most widely used and the most consistently abused tool in the workshop, and a little care with it will work wonders.

SCREWDRIVERS.

Screwdrivers as purchased from the dealer are capable of doing more harm than enough to the head of a screw. It will be noticed that a new screwdriver has the point ground at an angle. This usually results in the blade slipping out of the screw slot if any great pressure is exerted, and nothing looks worse than a panel covered with screw heads with torn slots. It is the writer's practice, upon the aquisition of a new screwdriver to grind the end of the blade parallel for a distance of ¼ inch. A screwdriver treated in this fashion will never be guilty of damaging a screw slot, provided, of course, that it is a reasonably good fit in the slot. Screwdrivers are made from tough material, usually a nickel, chromium or vanadium steel, tempered to a high degree of hardness, and should never be allowed to show colour when being ground on a wheel.

TAPS.

Taps are extremely useful things to have around a Ham's workshop. The most likely sizes to have are 1/8, 5/32, and 3/13 Whitworth. In addition, B.A. (British Association) threads are often encountered in radio and electrical work. The most common B.A. threads in use are 2B.A., 4B.A., and 6B.A. Tables of drilling and tapping sizes are given at the end of the article. A small "T" type tap wrench is very useful and should always hold the tap firmly; a tap with a rounded end due to badly fitting wrenches is worse than useless. Taps come in three varieties, taper, intermediate and plug, although for amateur work, which rarely consists if tapping anything heavier than 14 gauge sheet metal, the intermediate type would be satisfactory, with possibly a plug thrown in for those deep blind holes which require a thread right down to the bottom. Never force a tap; if the tap is not cutting freely something is wrong, either the tapping hole is too small or else the tap is blunt. A tap should be withdrawn slightly every half turn or so to allow the chips to clear the flutes. Lubricants for tapping are the same as given under drilling. Sharpening a blunt tap is a job best left to an expert, and is usually done on a special attachment. A fair job can be done by hand however if certain precautions are taken. The main precaution is to see that sufficient clearance is allowed between the cutting edge and the back edge of the tooth. In other words, the cutting or front edge should be slightly higher than the back edge. A similar amount should be ground off each edge if the tap is to cut evenly.

Screw size	Tapping Drill	Clearance drill
1/8 Whit.	No. 41	No. 30
5/32 Whit.	No. 30	No. 22
3/16 Whit.	9/64	No. 12
2 B.A.	No. 25-26	No. 10-11
4 B.A.	No. 33-34	No. 26-27
6 B.A.	No. 44	No. 32-33

SHARPENING DRILLS.

A drill is a difficult tool to sharpen without the attachments, but a fairly satisfactory job can be done by hand provided that a little care is taken. Referring to the sketches in Fig 1 a and b, there are three angles to be taken care of in sharpening a drill, one the cutting angle or the angle of the point which is 59 degrees, two, the clearance angle or rake which is about 4 or 5 degrees, and the third which is the angle "X" shown in Fig. 1A, and is obtained automatically by the correct grinding of the other two angles. Hold the drill against the side of the wheel as shown in Fig 1b with the left hand near the point and holding the shank of the drill between the thumb and forefinger of the right hand. Bring the cutting edge of the drill into contact with the wheel and rotate the drill for about a quarter of a turn, taking

care that the other cutting edge does not come in contact with the wheel, at the same time dropping the right hand slightly to give the clearance angle of 4 or 5 degrees. Then having done this repeat the operation on the other cutting edge of the drill. A little practice along these lines will soon enable the correct action to be achieved. Looking at the point of the drill, the centre of the line "X" must coincide with the centre of the drill. Care should be taken to see that the amount is taken off each side of the drill and that both cutting edges are of equal length. Unless this is so, the drill will cut oversize and will be very hard to centre. Never allow the point of a drill to become overheated and discoloured whilst grinding as this will draw the temper and soften the point.

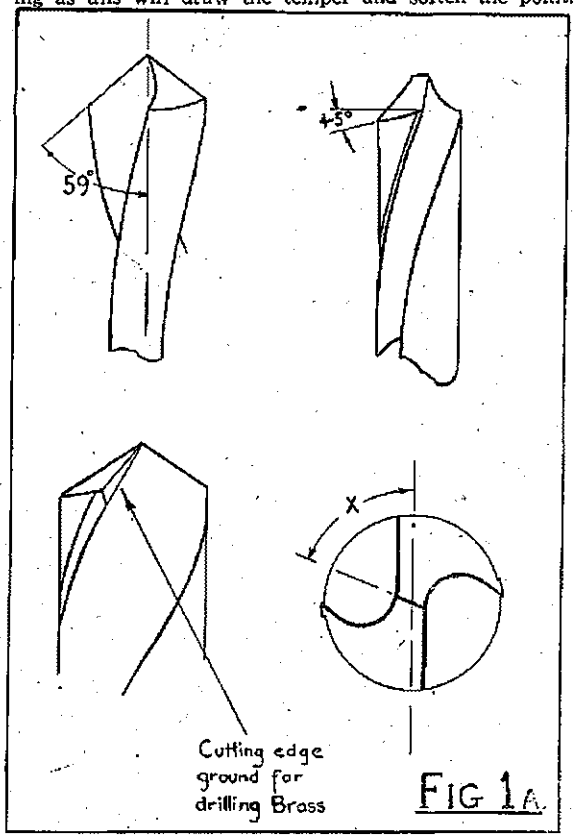


FIG 1A.

HOME MADE TOOLS.

It is sometimes necessary to make special purpose tools for specific purposes. The most useful material for such use is "Silver Steel." Silver steel is a high grade carbon steel which does not as the name implies contain silver, that title having been bestowed upon it because of the high polish imparted to the finished bar which is ground to an accuracy of within .0005 inch. Silver steel is supplied in all standard sizes from less than 1/16 inch diam. to 1 inch diameter, and can be obtained quite cheaply from any merchant dealing in high quality steels. As supplied, silver steel is quite soft and is able to be sawn, filed and turned readily without trouble. The hardening process for silver steel is very simple. Simply heat the tool to a bright cherry red and plunge it in clear, cold water. This treatment, known as the preliminary hardening, leaves the steel in its hardest possible condition, far too brittle to be of any use at all. To make it useable it is necessary to "draw the temper." Now to what extent the temper is to be drawn will depend upon to what use the tool is to be put. A table showing the relationship between hardness and colour is given. To temper a tool that has first been preliminary hardened, clean off the scale from around the hardened portion with a piece of fine emery cloth, bringing the steel up to a polish. Then hold the tool in the flame (preferably from a gas torch or bunsen burner) with the flame a short distance away from the part that it is desired to temper. Allow the tool to remain in the flame until it becomes blue. At this stage the hardened portion should not be affected.

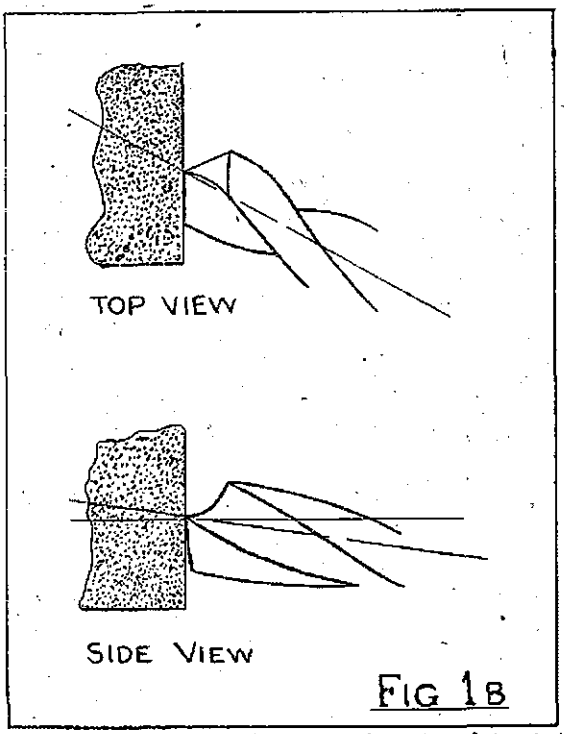


FIG 1B

Hardness	Colour	Application
Very hard	Cherry red	Preliminary hardening
Hard	Pale straw	Hammer faces
	Light straw Medium straw	Machine tools
	Dark straw	Taps and Dies
Elastic	Brown-yellow	Reamers and Punches
	Yellow-Purple	Plane Irons—Metal Drills
	Light purple	Wood drills
	Dark purple	Cold chisels
	Dark blue	Springs—Screwdrivers Wood chisels
Soft	Pale Blue	Too soft for any practical purposes.

(Continued on page 9)

Theory and Practice

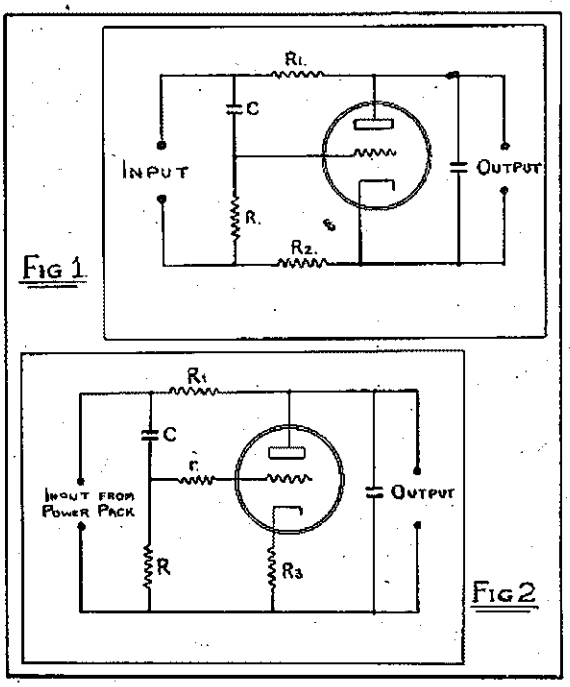
VOLTAGE REGULATION AND RIPPLE SUPPRESSION.

The voltage of A.C. mains is constantly varying by small amounts, and with considerable rapidity, due to the varying load conditions. These changes find their way to the output side of a power pack. It is interesting to connect a power pack through a blocking condenser and amplifier to a cathode ray tube; if the amplifier has a reasonable performance down to 10 c/s or less, the output voltage will be seen to be subject to violent and random variations. It would be a bad case where the variations exceeded a fraction of a volt, but they can be a greater nuisance than slow variations of a larger amount.

There are several well-known stabilising circuits, all of which are characterised by features which have disadvantages from the point of view of expense. The output current has in many cases to be passed by a large valve, or by a battery of valves in parallel; or gas discharge stabilising tubes are needed; or the load is paralleled by a large valve so that the total current always equals the full-load rating.

The circuits to be described removes almost the last trace of ripple from the output of a power pack. At the same time it removes all but the slowest of those variations due to mains voltage fluctuation.

The components required are standard type, easily procurable. In essence the arrangement consists of a normal power-pack, with ordinary smoothing designed to reduce the ripple to a valve well within the capacity of an ordinary triode. This triode has a low anode circuit resistance, and acts as an amplifier, giving phase reversal but neither loss nor gain. By this means the normal ripple is neutralised. Simultaneously, if the time constant of the grid circuit of the triode is large, relatively slow variations superimposed on the ripple are also neutralised.



Analysis shows that, in fig. 1 R1 equals I/gm where gm is the mutual conductance of the valve. R2 must have a value designed to give a suitable grid bias, and this value clearly depends on the fixed load current. C should have very low leakage ,and should be as large os possible, say up to 2 microfarads; R should be 1 megohm. A large condenser or a further decoupling circuit is essential across the output terminals, to lower the impedance presented to voltages arising in the load. For an MH4 type valve which is a medium Mu general purpose triode, R1 should be about 300 ohms, and for the best results the final adjustment of value should be made with the aid of a cathode ray oscilloscope. Due to the presence of R1 the voltage regulation is made worse by about 1 volt for every 3 mA in the load.

Fig. 2 shows a modification suitable for, say a laboratory power-pack which may be used on various fixed loads without further adjustment. The performance is independent of the load, but this is at the expense of voltage regulation. R1 should now have a value of 1/gm plus 83 (1 plus 1/u). Using an MH4, R3 can be 750 ohms, and R1 will have to be 1,070 ohms. But again, for best results, adjustment should be made by the use of a cathode ray oscilloscope. The resistance (R) is included to limit grid current when the load is suddenly increased; it can be 50,000 ohms. The voltage regulation is made worse by about 1 volt for every mA in the load.

In both these circuits there is little objection in using output voltages up to 350. The MH4 is not likely to be damaged so long as the anode dissipation is kept below 2.5 watts, because the anode voltage variation is small.

Examples built to these circuits have shown a residual ripple or not more than millivolt in 300 volts. Moreover the random instability of output voltage has completely disappeared.

The chief application has been the supply of oscillators. In this case the oscillator portion of the instrument is connected to the semi-stabilised output, whilst the anode circuit, grid circuit, and cathode circuit of the power stage are connected to the unstabilised power-pack direct; the chassis and case are also, for safety, connected to the negative end of the power supply, and to one output terminal.

MODULATION RELATIONSHIPS.

By R. B. DRANSFIELD, VK2ALD

With the close return of Amateur radio to the air, there is bound to be a large number of VK's who are nutting out the new rig. This may present some snags with the shortage of various valve types, so here are some easy methods of calculating modulation relationships.

In the first place there seems to be a lot of misunderstanding about the various values given, and formulae which include the calculation of a dropping resistor with "Heising" modulation. With the shortage of valves at the present time there seems likely to be a swing in favour of Class A modulation for low power transmitters. So here are some of the answers:—

Everyone knows that for 100% modulation the modulator must have an undistorted output of one half the D.C. power input to the final R.F. Amplifier. So this will be our starting point. A popular valve will be the 6L6G of the 807 which will give 6.5 watts output (audio)

(Continued on page 9)

IN REVIEW

TECHNICAL BOOKS - - - - - - - RECORDINGS - - - - - - - - - - - - - PRODUCTS

RECORDINGS—NOVEMBER—DECEMBER RELEASES.

The November-December release has brought us an up-to-date recording of ELGAR'S SYMPHONY No. 2 IN E FLAT OP. 63, played by the B.B.C. Symphony Orchestra conducted by Sir Adrian Boult. H.M.V. ED. 344/9.

This recording will be warmly welcomed by many Elgar devotees, who earlier in the year had the opportunity of hearing the work performed here in Melbourne by the A.B.C. Symphony Orchestra conducted by Dr. Malcolm Sargent.

Another new recording is that of the late George Gershwin's most ambitious and successful CONCERTO IN F FOR PIANO AND ORCHESTRA, played by Oscar Levant with the New York Philharmonic Symphony Orchestra, conducted by Andre Kostelanetz. Col. LOX 575/8. These artists are to feature this work in a forthcoming Gershwin Film Biography.

Mantovani and Orchestra contribution this month is "THE LULLABY OF THE BELLS" PIANO CONCERTO from "The Phantom of the Opera" with Guy Fletcher solo pianist, whose playing is outstanding.

Among the popular songsters is Vera Lynn's recording of "White Christmas" (in time for this coming one), and "I'll be with you in apple blossom time." Also in time for Christmas, Bing Crosby sings two numbers "God Rest Ye Merry Gentlemen" and "Faith of Our Fathers," and is very ably assisted by mixed chorus and orchestra.

Some brilliant trombone playing by Tommy Dorsey with orchestra accompaniment is featured in the ever popular "Sleepy Lagoon" (Coates) with "Melody" (Dawes) on the reverse.

A first release in Australia has now arrived in the popular overseas hit, "ACCENT-TCHU-ATE THE POSITIVE," played by Jack Payne and his orchestra, and well sung by the Crackerjacks. The reverse side is the ever-popular "I Promise You," played in Beguine tempo.

Eric Winstone and his band feature a new popular hit, "I'm Gonna Build a Fence Around Texas," with Joe Loss and his Orchestra, on the reverse side playing "More and More," with Alan Kane doing the vocal.

Felix Mendelssohn's Hawaiian Serenaders introduce "BLUE BAHAMAS," another first recording in Australia. The arrangement here is very good and shows up well on the instruments available to this combination, particular emphasis being given to the electric guitar of Harr Brooker. Backing this up is an old favourite "LA ROSITA."

The Catford Salvation Army Choristers, with Band, sing "THE COVENTRY CAROL" and "THE HOLY GUEST." Christmas Carol.

Isbel Baillie, soprano, with the Liverpool Philharmonic Orchestra, conducted by Dr. Malcolm Sargent, sings an aria from Handel's "Messiah," "REJOICE GREATLY, O DAUGHTER OF ZION," and "IF GOD BE FOR US, WHO CAN BE AGAINST US."

The Blue Hungarian Band, a very good combination, are represented with a Schubert Medley, introducing "MOMENT MUSICAL," "SERENADE," "MARCHE MILITAIRE." On With the Medley introducing "GIPSY MOON," "MOONLIGHT MADONNA," "KISS ME." (Bitter Sweet).

There are records for the children by Anne Stephens, child star of "Alice in Wonderland," who sings "The Night Nursery," "The Sick Teddy Bear," and "Mummie's Song."

Uncle Mac (Derek McCulloch) tells the Grimm story of "Rumpelstiltskin. Charles Laughton, famous English stage actor, presents readings with musical background, appropriate to Christmas: MR. PICKWICK'S CHRISTMAS, THE OLDEST CHRISTMAS STORY and THE STORY OF THREE WISE MEN.

OUR FRONT COVER

AUSTRALIAN DESIGN OF COMMUNICATION RECEIVER.

In these days of widespread interest in general communications on the M.F. and H.F. ranges, the keen amateur may not be content with ownership only of a receiver confined to the amateur band-edge limits. Things are liable to happen in other portions of the spectrum, things which may be of particular interest to the amateur in indirect or even direct manner.

Before the late war, there were instances of expeditions—American in general, which relied upon amateur channels for certain classes of communication. QSO's were effected "cross-band", with the expeditions on "commercial" frequencies. A "communications" receiver is an asset for such occasions, and indeed, it is a handy thing to have around the shack. The pre-war overseas product of this type was such a pricy article that the average VK could only study ads. in U.S. magazines with envy. Few VK's got around to ownership.

An attractive answer for the man with a shallow pocket is now provided by the advent of the Philips R163 Communication Receiver pictured. This, a 7-valve superhet. for R/T, C.W. and M.C.W. has coverage from 550 kc/s to 22 Mc/s with direct reading of calibration and twin-speed tuning. Panel loudspeaker or headphone operation is provided, with speaker muting switch. Power supply can be from 110 to 220, 240 and 260 volts A.C. with alteration to any of these voltages by plug connector. Wave-change is switched in three overlapping ranges and other essential panel controls include combined tone and ON-OFF switch, twin headphone jack, A.V.C ON and OFF with standby position for transmitting use, B.F.O. ON-OFF switch, and B.F.O. note control. Valve line-up is conventional, an important point for future replacements, and the types used are RF—6U7G, FC—6J8G, I.F.—6U7G, Det.—6B6G, AF—6V6G, BFO—6U7G. Rect.—5Y3G.

Structural design is robust, and the entire chassis is readily removable from the outer cover by releasing the spring loaded panel clips. In appearance, the job is unpretentious but very neat and clean, being finished in matt black with white outlined engraving. The accurately calibrated dial has a non-reflecting matt surface which permits quick reading at a glance. The full worth of this R163 shows up in the handling, which is of a delightfully simple nature. Sensitivity is high enough for any amateur need, being better than 1 microvolt over most of the tuning range and 5 microvolts at the 22 Mc/s end. Examination of the chassis shows a strong resemblance in design to the "Reception Set No. 4", as designed by Philips Engineers during the war for Australian Army Signals.

BOOKS

AN EXPERIMENTAL COURSE IN THE FUNDAMENTAL PRINCIPLES OF RADIO—R. H. Humphry

This is a book of the Physics Class Lab Manual type comprising a laboratory course designed for those who have little or no knowledge of electricity and magnetism. The fundamental principles of the subject are dealt with, and a statement of the theory underlying each experiment or group of experiments, is given in a concise form. Many of the experiments are of an elementary nature.

An interesting note from the preface: ". . . the difficulty of choosing valves from the very large number which appear in makers' catalogues has been resolved . . .

(Continued on page 9)

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CORRESPONDENCE

Correspondents are requested to keep their letters short and to the point. The Editor reserves the right to delete anything he may think fit. The views expressed by correspondents are not necessarily those of the proprietors.

135 Parkway Avenue, Hamilton, N.S.W.

The Editor, "A.R."

Dear Sir,—In the N.S.W. Division notes appearing in the October issue of "A.R.," reference is made to the move at the September meeting to delay presentation of the Institute's plans for post-war regulations to the P.M.G.'s Department.

As the spokesman for that particular move, I think it necessary to make a few comments for the record and would be glad if you could do the honours in the November issue of "A.R."

Firstly, the Council's criticism of such a last minute move after ample invitation to co-operate, is completely justified. I can only offer the well-known failings of human nature by way of excuse. Nevertheless, whilst last minute criticism is distasteful, it must not preclude consideration of a constructive redraft. The majority of N.S.W. members present who voted for the stay of proceedings is evidence of the deep concern felt over some of the proposals.

There is nothing personal in my criticism. I have only respect and appreciation for the stalwarts who have kept the Institute functioning during the period of Amateur inactivity. I believe the draft would be very different had there been a more general appreciation of the evident need to change our point of view of Amateur Radio. The time has come, without doubt, to forsake the pleasant fiction that worthwhile experimental work is possible within the scope of facilities available in the ham shack. Recognition of the obvious would open the way to the acceptance of Amateur Radio as a scientific hobby offering peculiar and extremely valuable benefits to national security and international understanding by its existence. If that view is acceptable, then surely the liberalisation of the conditions under which we operate might well be the guiding influence in our approach to the problems of post-war licencing.

Nor will there ever be a time when Amateur Radio will be able to advance a better case for liberal treatment or be sure of a more sympathetic hearing than now, when the not inconsiderable contribution of the amateurs to Australia's defence in all branches of the services and throughout the radio and signals industries is fresh in mind. It is in the light of these facts that I considered the draft to be unrealistic and pessimistically narrow in its conception.

To deal briefly with the more obvious faults in the draft. Clause (a) of Part 1 is a matter for Government policy and for the W.I.A. to offer comment is presumption. There seems little reason for increasing the speed of the code test of Clause (c).

Part 2 is definitely dangerous and it is the considered opinion of many members of N.S.W. Division that the proposed three classes of licence is explosive and must ultimately split the W.I.A. The draft provisions are unduly restrictive, particularly in view of the age qualifications. In the case of a man taking out a "C" licence at age 16, it is ridiculous to suggest that he wait five years before being eligible for a class "A" licence regardless of his ability.

The reference to commercial certificates means by inference that a man may be fully qualified to earn his living in commercial radio, perhaps carrying the responsibility for lives and property at sea, yet be not considered competent to operate amateur radio. Such a provision is fantastic. The suggested rule that twelve months operation must be put in on each grade of licence may well mean that a laboratory worker or commercial design engineer thinking to enter amateur radio may be so frustrated by these years of unnecessary probation as to give the idea away and amateur radio will lose the interest and support of individuals we need to strenthen our ranks technically.

The power limits of Clause 3 (c) are too stringent when one considers the range of low cost, low voltage, high power tubes readily available and the increasing ease with which one may purchase high voltage power supply, etc. Any fear that a power race would set in from which some amateurs would be barred on economic grounds does not arise, and 250 watt is the logical step above 50.

The higher technical qualifications suggested offer little worthwhile safeguard for as much BCL QRM can be caused by 50 watts badly handled as by 250, and there must be other and better ways of dealing with the irresponsibles than by penalising all concerned.

Part 3 (e) represents a harmless piece of self-deception entirely in keeping with the thoughts behind Part 2. The inference, however, will do little to create good public relations for Amateur Radio amongst commercial men.

Parts 4 and 5 are illogical instrusions into proposals dealing with licencing conditions, Part 4 being more suitable for negotiations between the Institute and the P.M.G.'s Dept., after licencing conditions have been settled whilst Part 5 seeks to impose on the Department a duty for which no responsibility could be accepted and which, indeed, falls within the province of the Institute itself.

In conclusion, Mr. Editor, in offering these comments, I am concerned only in promoting a more realistic appreciation of Amateur Radio and a more liberal and constructive approach to our post-war state. Nevertheless, I am prepared to be misunderstood and criticised for the benefit of the grand old game.

But let us remember that no matter how sympathetic may be the Department towards amateur radio, and I believe we have good friends there, no department administering regulations will give us more than we ask for. Why must we always pessimistically feel that in placing a reasonable assessment on our own value to the community our representations will not be given the liberal treatment they deserve?

If this country's future is to be secured it will only be as each one of us will visualise broader horizons be it in industry, politics, amateur radio or any other sphere of interest in which Australia meets the rest of the world. —Yours, etc., ALLEN FAIRHALL, VK2KB.

P.S.—Divisional circular is now to hand advising that Part 2 should read that holders of commercial tickets "may be exempted from further examination." We might, with grace and profit, have deleted the entire reference. The error has thus been corrected at this late stage by Divisional consultation after the virtual rejection of the N.S.W. Division's instruction to its Council at the September meeting and after the date upon which we were led to believe the submission had already been made to the Department.

This is the best possible justification for the contention that the draft plan should have received further detailed consideration before presentation.—A.F.

H.M.A.S. Mildura, c/o G.P.O.

Editor "A.R."

To-day I received October isue of "A.R." and I think it FB, excellent, and any other adjective you care to add. The people responsible are to be congratulated on their effort, and I hope that all Divisions and individual Hams give their support—in a big way.

The editor and his minions could point out to all members that one way to support the Mag. is to write most anything and let the Editor be the judge of its value.

There's just one suggestion I'd like to make in regard to the Mag. Let's have an "Open Forum" "Rag Chew" column. Call it what you like, but let's have space in the Mag where anyone can put his views on the air. . . " —Yours, etc., JACK COULTER, VK3MV.

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THE AMATEUR'S WORKSHOP.
(Continued from page 4).

Then remove the tool and allow the heat to creep along to the hardened portion. When this reaches the desired colour (as shown in the table) plunge the tool once more into the water. The tool is now ready for use. Small flat tools can easily he forged from silver steel, but the forging temperature should be kept below the hardening temperature (preferably a dull cherry red) or the steel is likely to be harmed. Silver steel, being of high carbon content burns readily if heated above a medium yellow, so take care that this temperature is never exceeded.

MODULATION RELATIONSHIPS.
(Continued from page 5).

with 300 volts on the plate. This will modulate a final amplifier of 13 watts.

Now for 100% modulation the PEAK AUDIO voltage must be equal to the D.C. VOLTAGE of the final. How can we get at this? The load for a 6L6 or 807 at 300 volts is 4500 ohms. So—

$$\sqrt{6.5 \text{ watts} \times 4500 \text{ ohms}} = 171 \text{ R.M.S. volts.}$$

But we said that for 100% modulation we must have a PEAK voltage equal to the D.C. VOLTAGE of the final. So to find what this is we must multiply the R.M.S. value by 1.414—like this:—

$$171 \times 1.414 = 242 \text{ volts (peak).}$$

However this is still 58 volts below the 300, so we can either drop the voltage to the final (which seems a waste) or step up the peak voltage with a transformer.

The turns radio of the transformer is $\frac{300}{242}$

which is approximately 1.244 to 1.

Now if you want to check this just multiply 242 by 1.244 and the answer is 301 volts: Easy isn't it?

If you want to know what to load the final to, to arrive at the right load restistance, just divide your final wattage (13) by the voltage (300) which will equal 43 mills.

If you want to check again by the old method, divide the final plate voltage 300 by 43 (mills) and the answer will be 6976 ohms.

The turns radio will be the square root of this figure divided by the proper load value for the modulator:—like this:—

$$\sqrt{\frac{6976}{4500}} = \sqrt{1.55} = 1.244.$$

BOOKS.—(Continued from page 8).

fundamental principles can be illustrated without resorting to a large and confusing variety of valves." (Loud applause!).

The range of subjects covered is from simple DC circuits to elementary transmitter circuits.

A book of more interest to the Technical College Student or Radio beginner than to the mature Amateur.

AN EXPERIMENTAL COURSE IN THE FUNDAMENTAL PRINCIPLES OF RADIO.—R. H. Humphry. (Sir Isaac Pitman & Sons Ltd., London, 1945) 194 pages, 5 x 7 and index, 122 diagrams, cloth bound—18/9. Copy by courtesy Technical Book and Magazine Co., Melbourne.

HAMS ON SERVICE

Well, December—just think of next December, 1946—DX galore, QRM aplenty, phone versus CW arguments, little dull Hams with "B" (below normal) licences and Dons with "A" Class licences—all "hamming", and, we hope, all thoughts of these years of inactivity forgotten. Anyway that's the outlook—next December will provide the answer—"yeah" sez a Ham in the Islands, we'll be right here, Buddy, at the rate of present progress. hi!"

One reads of these chaps who dodge all kinds of service dangers and then meet with disaster as soon as they come home—well, our ex-Fed. President, Fl/Lt. Bill Moore, 2HZ, is among those kind of chappies. He comes home safely after years of POW in Batavia, and is now in hospital at Jervis Bay, with a factured ankle. It was suggested to me that the poor old ankle wasn't used to carrying the two and a half extra stone Bill suddenly put on as soon as he arrived home, Hi! Anyway it's Bill for hospital for six weeks, and he doesn't seem to like it much. With luck, he will just be out to go on the air—with the "BN's", Bill?

It is with regret we learn that Charlie Roberts, VK2 JV, died in Malaya, while POW. 2JV was attached to the same unit as Tom Slawson, 2AFN, and also a cousin of 2YC's. Chas. was a true Ham in spirit, always ready to rally to the Ham game and we found his legal aid very valuable and always freely offered, during the formation of the A.R.A. in VK2, and later on when taking over the "lost" W.I.A. (N.S.W. Div.). To his people, all his Ham pals offer their sincere sympathy in the loss of their son.

Some of you read the R.S.G.B. Bulletin, but many of you who do not do so heard and worked G2ZQ in most Contests, particularly the RSGB Test. Wing-Commander Johnny Hunter, 2ZQ, died in Ceylon last December from an attack of pneumonia, and with his passing England loses a very fine officer, and the RSGB one of their leading Hams. As the "Bull" says, "he possessed an uncanny sixth sense for extracting practically inaudible signals from the QRM on our bands and for making them into intelligie contacts." VK2NR (now 2AJX) vouches for this. Jack was pretty "hot" himself, but he says he sat with phones attached to the same rx while G2ZQ conducted a QSA5 QSO, that Jack couldn't hear a sound of, Hi! Many Hams all over the world add their condolences to his wife and two little children.

Fl/Lt. Ray Carter, 2HC, rang up after his (he hoped) pre-discharge leave. Ray was on the way back to Brisbane where he expected to sever connections with the R.A.A.F.. When things ended up, Ray was on a trip to Moratai. He says that the clearing depot at Madang is just one big collection of Hams. What Ray did I don't know. I really think he was afraid my journalistic instincts for Slouch Hats and Forage Caps would have overcome my discretion. Well, well! What a pity if our column missed a scoop. Didn't you know Freddy always censored my column and had me scared to death—till peace was declared. Hi.

Fl/Sgt. Jim Edwards, VK2AKE, is another POW reported in Australia. Jim was in Italy first and then in Germany and ended up as he put it "a bit weak on it," and so is having three weeks rest at Jervis Bay. While in England he was guest of Clarry 6CL and the RSGB, and with luck, Jim you might strike Bill Moore where you are now, Hi! I think Jim's arrival makes all the European Ham POW's safely home. How about some notes about what happened after you left Italy, Jim. 2YC.

Lt. Joe Ackerman writes from Sch of Sigs, New Guinea and has so far given up all hope of reaching VK2 again, that he wants the dope on how to get a New Guinea call. Just before hostilities ended, Joe was mixed up in a mass of appointments and recalls that kept him dashing up the VK coast from VK2 to VK4, then to VK6, then VK9, with a trip to the Solomons in the air, and then once more back to New Guinea—and peace, or did you say stagnation, Joe, Hi! Well, in passing, om, I may add for everybody's benefit that it was whispered to me that if we did get any bands it would be for Commonwealth use only—should this be the case, I hope you "holidaying" hams will use your VK "portable" calls, Hi! Gee, I hope, Freddie has let his sub to "A.R." run out!

Who said all we prewar Hams aren't getting into the "old chap's" class. The other week I received a letter from Sgt. Jim Todd, who is yet another one of those who passed the AOCP but were not allotted calls. Jim is the son of one of VK2's very active old-timers, VK2CR, of Tamworth, now using the call 2LS, as an ABC station Just happened to take a fancy to his first call. 2LS works with the RI's office in VK2, so I guess Jim's P. A. Tranny will have to be according to Regulations. Sgt. Todd was one of the Bonegilla group of Hams for the past few years, but they all seem to be split up now and Jim is enjoying the hospitality of VK6. With a bit of luck he hopes to start off his Ham activities with a VK6 call.

Ldg. Tel. George Benwell, otherwise VK3KQ, is on the H.M.A.S. Bowen, one of the flotilla stationed at Moratai. With George on the ship is Bob Heath, of Albury, who is just waiting to get his call and add to the QRM of 2OJ and Co. They are keen collectors of Jap gear (for the ship!!!) and have had so much experience that they have even learnt to read the Japanese on the knobs. H!

With the flotilla is Keith Hatch, a second op. from Malvern way, and Keith provides the Amateur Radio—sells 'em one each, om (2YC)—for the crowd. Jack Gore VK4HC (?) is on H.M.A.S. Platypus with Keith, while another VK4, L. Griffiths, 4LZ, of Toowoomba, is on the Junee, so it looks as if the Hams are well into the Navy too. Everyone of them say that any group of two discuss only two matters—when do we go south—and WHAT frequencies are we going to get?

A ham who shall be nameless (hi) wants to know have we gone any farther with the organisation "to make XYLs and YLs see the light." In case you do not remember, the "light" consists in the utter desirability of the om, having a Ham Station—in the dining room or some such spot—and never going out or having visitors (other than hams) except at odd times when DX is non est and conditions generally punk. Now, who and where is the lad brave enough to be the Secretary?

Jack Coulter, 3MV, whom we just in the last issue landed safely in Hong Kong, drops me a note to say he hopes to attend the November or December W.I.A. meeting in either VK3 or 2. Jack wants an open forum column in Amateur Radio.

To conclude, as I said last month, you have now more time than you all know what to do with, for years you have read YOUR column full of notes provided by "the other chap"—your movements are of more interest now than ever to the hams who hopes to QSO you again soon. So send your notes via your Divisional Sec. or direct to 2YC, 78 Maloney Street, Eastlakes (Mascot), or if passing through Sydney, phone MU 1092.

SHIFTING THE FREQUENCY OF A CRYSTAL.

A coating of finger nail polish thinned down with cuticle remover will lower the frequency of a crystal considerably. Very little if no effect on the strength of oscillation will be noticed.

To shift the frequency higher give one side a few light rubs with a little Bon Ami.

TAP ON TANK COILS.

Taps on tank coils can conveniently be made by using a piece of sheet brass ¼ inch wide, looping it round the required turned of wire in the desired position and soldering.

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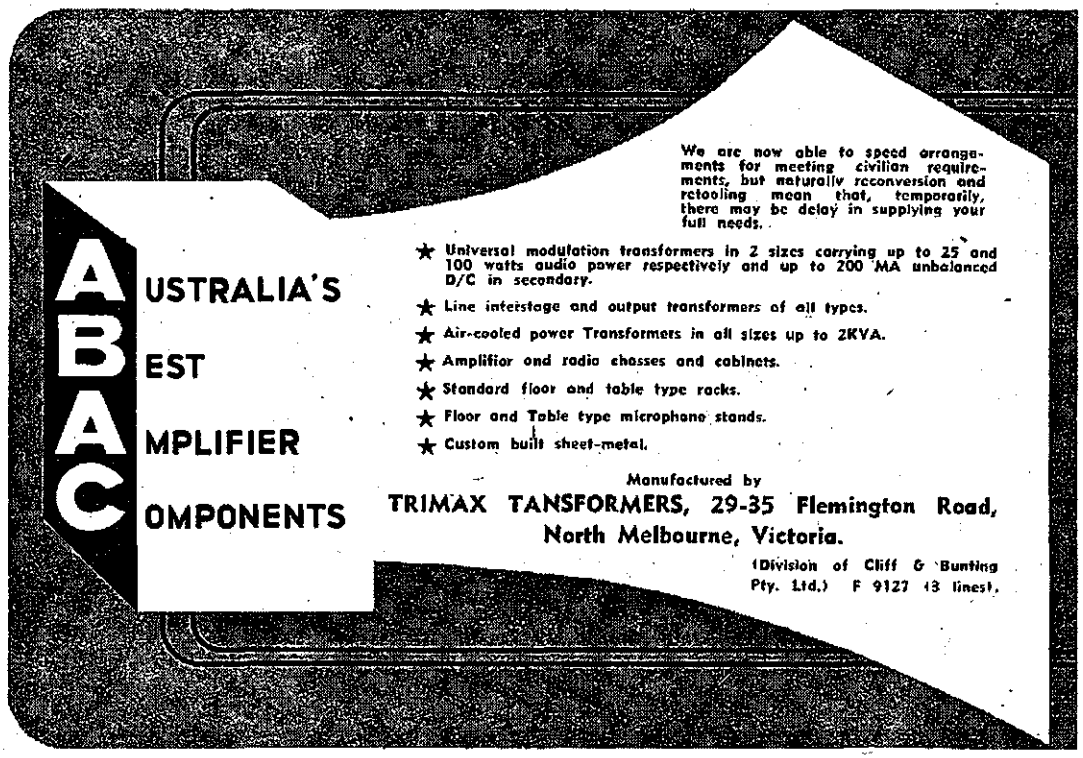
FEDERAL HEADQUARTERS

RESUMPTION. The long awaited day is, we hope, now not so far off. The new regulations are now awaiting signature by the Federal Executice Council in Canberra or wherever they happen to be at the moment. After that it is up to the Government printer to do his bit and break the necessary news in that well-known manual of short-stories, the Government Gazette. When all this has transpired, the P.M.G.'s Department will be all set to collect the smackers from the fraternity. For once we will all be pleased to pay a bill! In the meantime, if anybody has any influence with the Federal Executive Council.

FREQUENCIES. We hear that the people who have the unenviable task of allotting the post-war frequencies have already cleared three of our old bands—2½, 5, and 10 metres. There is some doubt as to whether all of the 10 metre band has been cleared, some say only the portion from 28 to 29 Mc/s, others tell us that all of it is no longer required by the Services. All our information on this subject at the time of going to press is unofficial however. A little blue bird told us that of the seven members of one of the committees, five are Hams, which sounds very promising, except that the fellows concerned refuse to do any promising!

SERVICE HAMS. Since at least one has asked a thousand will want to know the position with regard to licences for those fellows still stationed in ex-battle areas, and likely to be there for some time. One member in New Guinea applied for a licence and was knocked back, as he thought, by the Dept. FHQ was asked to look into the position. We found that the reason behind the refusal was not lack of interest or anything of that nature, but simply that the Dept. has no jurisdiction in territories which are still under military control. A licence therefore cannot be issued by the P.M.G. Any Ham so situated should apply to his CO for permission to operate, and there seems to be no valid reason why in most cases this should not be granted. The next question is one of frequencies, but this will, of course, be automatically solved at the time when we are permitted to resume. There remains only the matter of call signs. Naturally any Ham operating in these areas will want to use his own call, and this is where the Dept: does come into the picture. Assuming that permission to operate has been granted, it is then necessary for the Service authorities to apply to the Dept. for the issue of the call sign to the Ham concerned. After that it would seem that all is plain sailing. Don't get the idea that the Dept. has no say from that point onwards; any breaches of operating regulations coming to the notice of the Dept. would be immediately referred to the Service authorities for action against the offender. This has already been done in the case of one or two fellows who have been heard pirating recently in Northern areas. We know that the Yanks have been having the time of their lives in the past few weeks and no doubt many of you in those parts are itching to get going too, but it must be borne in mind that our bands are not yet officially released, and the probability of interference with vital services is very considerable, so the sensible thing to do is to be patient, and do nothing likely to endanger our reputation. In the meantime, see what you can do in the direction of getting the permission referred to above.



HANDBOOK. We are now able to confirm that the price of the new edition of the "Handbook for the Guidance of Operators of Experimental Wireless Stations" will be 1/6. We understand that printing has been held up due to the fact that the Government Printer has an abundance of important work to handle first—as if anything could be more important! When the Handbook does eventually make its apearance we suggest that every licencee and every candidate for the AOCP should regard it as most essential that he have a copy. We will make a further announcement when the Handbook is published, and if any reader is then unable to obtain a copy the Federal Secretary will be pleased to get one for him. Terms—strictly cash with order.

CONVENTION. It is proposed to hold a Federal Convention as soon as possible in the New Year, and the Secretaries of all Divisions have been notified of this intention. The last Federal Convention was held in 1939, which is six years ago, believe it or not,, so we feel that another should be arranged as soon as possible. Among the items which will be listed for consideration is the matter of writing a really up-to-date and comprehensive Federal Constitution to replace the existing one approved by the 1939 Convention.

OVERSEAS. We have, since the writing of last month's notes received comunications from the ARRL and the RSGB. In England things are very much as they at the writing of last notes, while news from the States confirms that they have there been permitted operation on 112 to 115 Mc/s and expected that as from November 15th they would be moved to the new band at 149 Mc/s. No mention was made of other frequencies.

The International Amateur Radio Union will shortly come into operation again and the first post-war edition of the IARU Calendar is expected to be sent out next month. We do not envy the IARU officers their colossal task of reorganising the world wide system of co-operation which existed between Amateur Radio organisations in pre-war days but we do wish them every success in their efforts.

RETIRED. Two prominent people in W.I.A. circles, who have decided that the time has come for them to take a well-earned rest and let others take a share of the hard work for a while, are Chas. Quin, VK6CX and A. E. (Peter) Allen, VK7PA. Chas. Quinn was Secretary of the West Australian Division throughout the war and was responsible for keeping the Divisional structure intact there despite the absence of nearly all the members, while Peter Allen as President of the Tasmanian Division did the same job very capably in the Apple Isle. Federal Executive wishes to place on record its appreciation of the good work done by these two in the difficult times through which we have just passed and for their sterling efforts in getting things going again since the conclusion of hostilities.

EXCUSE. If these notes are a little haywire it is most probably due to the arrival of a Junior Op. in the Federal Secretary's menage, not to mention the subsequent celebrations.

RE-SECURING A VALVE ENVELOPE TO ITS BASE.

A loose glass valve envelope can be tightly secured to its base by the following procedure:—

Use a mixture of 1 tube of secotine to 2 oz. of plaster of Paris. Remove the base of the valve by unsoldering the pin connections, taking care not to lose the code of connections. It may be advisable here to label each wire immediately the base is removed.

Re-solder 6 inch leads of bare 24 guage wire to each wire. Clean off all old paste from valve base. Apply the mixture of secotine and plaster, thread wires through pins, pull gently on wires, squeeze base against glass, re-solder connections, then allow the valve to stand on its pins for 24 hours to dry.

DIVISIONAL NOTES

NEW SOUTH WALES

The October General Meeting of the New South Wales Division, postponed owing to elcetricity rationing, was held at Science House on Thursday, 8th November, and it is quite safe to say that that never before have so many Amateurs been present at Institute Meeting.

The Chairman, in declaring the meeting open, apologised for "the lack of standing room," but trusted that all present would gain some pleasure in the knowledge that commencing with January, 1946, General Meeting gatherings would be held in the main hall of Science House, thus ensuring ample seating accommodation for even greater atendances that are expected in the near future. Negotiations had been in progress during the past three months and whilst the Institute had every reason to believe that accommodation would be made available, final confirmation was welcomed.

The fact that, commencing January, 1946, General Meetings are to be held in the Main Hall, will mean a change in the Meeting Night. You are particularly requested to note, particularly older members, that GENERAL MEETINGS WILL BE HELD ON THE FOURTH FRIDAY OF EACH MONTH.

Before we leave the subject of meetings, you are reminded that the December General Meeting will NOT be held. The Annual Dinner has been set down for December 20th. Naturally members will be kept informed by Bulletin of any happenings of importance regarding the lifting of the ban on transmissions, etc.

Getting back to October General Meeting, over 70 members were present, and here are the majority of calls and names:—VR4BA, VK2ZW, 2FX, 2AOH, 2PX, 2VA, 2KS, 2LW, 2JX, 2DA, 2TF, AA-2BQC. 2QM, 2TR, 2NG, 2ACJ, 2AX, 2AKR, 2AHB, 2NO, 2NP, 2HP, 2JN, 2RQ, 2AIK, 2WN, 2AFB, 2NQ, 2DI, 2ADK, 2AJW, 2ADQ, 2WD, 2AHQ, 2TI, 2LO, 2ADV, 2AHU, 2XD, 7RZ, 2ABU, 2AKW, 2ADZ, Messrs. R. & H. Mondel, Blackett, Burton, McIntyre, Borlan, Eyre, Haines, Tracey, Wirsu, Keast, Thane, Wade, Pettrich, Solomon.

Members were given details of the events leading up to the release of sealed containers and the calling for applications for Licences. The chairman, in prasing the work performed by Mr. H. Cox, VK2GU, stated that he regretted very much that he could not give other than brief details of the work done by 2GU, and Amateurs owed it to Mr. Cox and Cox alone, the early release of equipment and the distinct possibility of being on the air much sooner than was expected. Federal Headquarters, dealing in these matters have left much to be desired, and it is suggested that if they are to retain the confidence of the various Divisions, a much more straightforward manner of doing things should be adopted. This refers particularly to the Final Draft Plan and the coverng letter which was ambiguously worded. It is difficult to imagine a majority of sane people voting against exempting the holders of first and second class certificates from Class "A". Examination! A demand that the names of the States that allegedly voted that way brought the reply, "Wording of plan gives wrong impression. stop. Exemption from Class A examination may be granted."

In recognition of 2GU's work it was unanimously decided that he be elected to Life Membership of the New South Wales Division of the Institute. Others who did good work included Messrs. F. P. Dickson, VK2AFB, Padre Dransfield, VK2ALD, R. Tracey, and W. Chapman.

Members are reminded that Mr. Bob Fussell, VK2SS, is still an inmate of Parramatta District Hospital, and would very much appreciate a visit or a few lines from any of his many friends. 2SS has been bed-ridden for nearly a year and would enjoy talking "shop" with any ham, even if for only a few minutes. So what say you fellows?

A very hearty welcome home was accorded to Gordon Brigden, VK2ACJ, who had spent sometime as a P.O.W. after being shot down in Burma. Gordon looked very fit and is anxiously awaiting the opportunity to "pound brass" again. By the way, maybe you've heard of Bill Moore, VK2HZ. Well, he was a "guest" of the Nips for quite a while, but recently got fed up and decided to come home—by courtesy of the Atomic Bomb—and was picking up quite nicely at Springwood, and then had to report to R.A.A.F. Medical Rehabilitation Unit, Jervis Bay. Playing tennis, he unfortunately fractured an ankle! What a man! He'd be delighted to hear from any of his many friends and letters should be addressed to Ft. Lt. W. M. Moore, M.R.U., R.A.AF., Jervis Bay, N.S.W.

A very interesting lecture was delivered by Mr. G. Parker, B.E., B.Sc., VK2AHO, who took for his subject "Panoramic Reception." This proved one of the most interesting talks delivered for some time, and the speaker held the interest of his audience for over an hour, and upon conclusion a very hearty vote of thanks was accaccorded this brilliant young scientist.

Upon conclusion of General Business, various members gave very interesting talks on their experiences overseas, particularly Engineer Sub-Lieutenant Len Burton, who was wandering round Japan just after the occupation. His "trophy" aroused considerable interest, and many were the questions as to what use he intended to make of it. "R.A.C." Pearce, 2AHB, shed considerable light on what happened to a R.A.A.F. installation at Aleppo, whilst "Grandfather" Ackling was sorry the holiday was over. Ken Williams, 2XD, gave a brief resume of his experiences in the Middle East, stressing the universality of the Ham spirit. We were very sorry to leave Leo Meyers, 2KS, out of the story-telling, and realised later why he made himself so inconspicuous.

Remember the ANNUAL DINNER will be held at NEW DUNGOWAN, MARTIN PLACE, SYDNEY, on THURSDAY, 20th DECEMBER, and will be a welcome home to P.O.W.'s and Servicemen generally. Further particulars may be obtained by ringing FF 1705.

The Chairman and Council of the Wireless Institute of Australia, New South Wales Division, take this opportunity of wishing all Members and Amateurs a Merry Christmas and a Bright and Prosperous New Year, and it is sincerely hoped that by the time you read this message you will also be able to exchange these self-same Greetings per medium of Experimental Radio, and if such be the case, remember a toast to VK2GU would be in order.

A FINAL REMINDER.—THE ANNUAL DINNER WILL BE HELD AT THE NEW DUNGOWAN, MARTIN PLACE, SYDNEY, ON THURSDAY, 20th DECEMBER. THE JANUARY GENERAL MEETING WILL BE HELD IN THE MAIN HALL, SCIENCE HOUSE, FRIDAY, 25th JANUARY, 1946.

VICTORIA

The November General Meeting was held on Wednesday, 7th November, and over 100 members and visitors were present—a record atendance. Overseas and interstate visitors were Captain T. O. Cadell, VU2EB, ZL4FW, VK2TJ, 2AHE, 4WT, /FL, 5GL, 9RW. Others who signed the attendance book were 3WQ, 3HX, 3KN, 3NY, 3KK, 3JO, 3VX, 3BD, 3SI, 3GO, 3GV, 3VY, 3DG, 3EA, 3GD, 3UJ, 3DA, 3FR, 3QU, 3BJ, 3MX, 3MR, 3DM, 3JT, 3XD, 3UQ, 3NW, 3XS, 3PQ, 3ED, 3LA, 3DL, 3ZO, 3IF, 3RN, 3XJ, 3ML, 3SZ, 3DS, 3LF, 3UC, 3XB, 3SS, 3OC, 3IK, 3QS, 3SQ, 3AP, 3TF, 3TZ, 3ZD, 3VQ, 3XN, 3YL, 3CB, 3WF, 3CF, 3KB, 3IG, 3HK, 3PG, 3LN, 3DH, 3VM, Messrs.

Simmons, Fraser, Belcher, Orchard Smith, McDonald, Arnold, Camp, Lamb, Matthews, Oakes, Herald, Roberts, Greenham, Manscrgh, Meallin, Couch, Scott, Chesterfield, Curnow, Hanson, Ridgway.

The President, 3KN, occupied the chair and extended a welcome to all new members, intending members and visitors present. We were also pleased to see Roy Prouse 3XS once again. Roy has recently returned from Malaya where he had been a POW since the fall of Singapore.

The Federal Secretary spoke on the prospects of an early re-issue of licences, and we were advised that the matter of frequencies was still under discussion. The acting Secretary read a letter from VS5JH asking for reports on 14 m.c. transmissions. Address is 2599340, Cpl. Hunt, J. A., c/o BBCAU W/T Station, Labuan Island, Borneo. Frequencies being used are 14240, 14270 and 14280 KC.

Considerable discussion took place on the possibilities of obtaining equipment through the Disposals Commission. A number of those present signified their desire to obtain some Service equipment. 3KN is to report on the position at the next meeting. "Snow" Campbell, 3MR, was then prevailed upon to recount some of his experiences as a POW in Germany ,and told of some of the ways in which the boys amused themselves and also of some of the ways in which receivers were hidden from the guards.

Captain Cadell, VU2EB, again came to our assistance with a demonstration of some portable equipment as used by the British Army. The gear was passed around for inspection and, somewhat surprisingly, returned safely as one of the receivers, complete with batteries, was no larger than an ordinary novel. After a vote of thanks to VU2EB had been carried with acclamation the meeting formally closed at 10 p.m. and the Membership Secretaries were kept busy for some time afterwards, no fewer than 12 new members being enrolled.

At the meeting of Council on November 12th, the Magazine Committee reported on the new magazine and were congratulated upon the standard maintained in the November issue.

On the motion of 3NY, seconded by 3XZ, it was decided that all returned POW hams be made honorary members of the Division for the remainder of the financial year.

For some time we have been endeavouring to obtain a supply of badges, and it was decided that further efforts be made, as numerous enquiries are being received, particularly from new members.

VK3WI gear, which had been lodged with the P.M.G.'s Department, has now been returned, and the Laboratory Committee reported on the condition of the gear. It was agreed that the Division should have a transmitter capable of getting on the air as soon as licences were reissued and the Lab. Committee were instructed to make the necessary arrangements to make the transmitter serviceable.

Applications for membership are still being received in increasing numbers. New members admitted include the following:—Messrs. E. B. Ferguson VK3BD, A. F. Taylor VK3AT, E. K. Williamson VK3IF, S. R. Coleston VK3XK, J. A. Hunt VS5JH, R. B. Jones VK3BG, E. Anderson VK3EA, R. Williams XK3ZD, D. C. McDonald, VK3DM, A. R. Whote VK9RW, P. Evans VK3OZ, C. I. Falconer VK3CF, A. R. Hearald, D. A. Greenham, W. Russell, C. J. Arnold, R. Curnow, R. R. McDonald, R. F. Lloyd, K. Hunt and A. Camp.

Members are reminded that the December meeting will be held on Tuesday, December 4th, and to also note that the January meeting will be held on the SECOND Tuesday in January, that is January 8th, 1946.

QUEENSLAND

The attendance at the last general meeting, held on Friday, 6th October, was the largest I have ever seen at a general meeting. The total well exceeded the half centurymark, and taxed the seating accommodation to the limit. The high-spot of the evening was, of course, the address delivered to members by the Chief Radio Inspector, Mr. Conry, in which he gave a general outline of what he believed would constitute our Post-War Amateur Radio. Most of those present were a little disappointed that the promise of an immediate resumption of activity was not forthcoming, but on the whole, members were well pleased with the views expressed by Mr. Conry. Mr. Graham of the R.I.'s Dept. also attended the meeting.

The forms for the application for licence were distributed, and the large gathering then adjourned to listen to a lecture by Mr. Vince Jeffs, 4VJ, the subject being "Receivers." The lecturer dealt most comprehensively with the matter, and it is doubtful if more aspects of receiver design have ever been covered in one lecture.

Several of the "Ipswich Gang" were welcome visitors, and it was unfortunate that the departure of trains, etc., ruled out more chin-wagging. The P.M.G.'s Dept. has, of course, been relieved of most of the gear which it so kindly looked after for us during the war, and no doubt some formidable rigs are taking shape, if only on paper.

It was noted that the views of VK7 towards the F.H.Q. post-war plan were more or less identical to our own.

4FE—All set for a push-button tuning rig, which seems to be an A1 affair from the description of it.

4KS—Keith at present in Sydney, and naturally he will be contacting some of the VK2 hams during his stay.

4EL—Eric has an excellent receiver going, but line noise is R9 most of the time, from line transformers and pole switches. Anyone got a cross-cut saw to lend Eric?

4JU—Believe Frank is chasing the "sprags" off his beam antenna and now has a receiver going on the ham bands.

4AP—Came along to the last meeting. Is no doubt dreaming up a new rig for the big day.

4KO—Norm was down on leave from R.A.A.F. Came to meeting with home-town mates, 4AB and 4WS, so the Ipswich Gang will be active again.

4UW—Bernie was in town at the end of last month, but couldn't get along to the meeting.

4PX—Arthur is still in the Army, but the old discharge deosn't seem to be too far distant. Will be "among those present" when the Big Switch is turned on.

4RC—Got the "sealed container" home and found everything in good shape. Like a lot of others, is looking for some good filter condensers.

4ZU—Is at present enjoying a spot of holidays at one of our beach resorts. I bet those new-fangled bathing suits are R9 on the eyes, Howard!

SOUTH AUSTRALIA

The past month has been one of continued expansion of this Division and Council members have had a busy time keeping abreast of developments. At the last Council meeting, 27 full members, 10 Associates and 13 Student members were elected. The total membership to date, after a start from scratch in July is 121.

It has been decided to incorporate the Institute and a sub-committee is hard at work on the drafting of the Constitution.

Owing to pressure of work, our Publicity Officer, Mr. H. N. Bowman, has asked for, and been granted, three months' leave of absence. To act in his place, Mr. A. F. Wreford (VK5DW) has been co-opted to Council.

The Institute wishes to compile a complete record of the War Service of Amateurs who enlisted in the Forces and also of those who have been engaged in any special war work. A number have already been written to, but the addresses of many are not known. Council, therefore, asks all these Amateurs to write to the Secretary, giving a resume of their activities, together with Unit, Rank, length of service, etc.

Student Classes commenced on 29th October with 18 members. Mr. S. R. Buckerfield (VK5DA) is the Lecturer in Theory, whilst Mr. H. M. Roberts (VK5MY) teaches the code. The students are reported to be a very keen lot, and two trophies have been provided, one for the most improved student in Theory at the end of the course and the other for the most improved in code.

The monthly General Meeting was held on Tuesday, 13th November, when, despite the local transport stoppage, more than 70 attended.

The first was a lecture by Mr. A. C. Smythe, VK5MF, on "Suggestions for the Design, Layout and Construction of an Amateur Station." This is quite a wide subject, and Mr. Smythe covered an amazing amount of ground in the comparatively short time at his disposal, our President remarking at the conclusion that he had never before heard a lecture with so much "meat" in it. The lecture should do much to crystalize the ideas of those engaged or about to engage in the building or rebuilding of a rig—and aren't we all!? The Lecturer advocated relay rack construction with the standard 19 inch panel, a "basic" tapped power transformer with separate rectifiers but common filter, for 300 and 600 volt output, and an 807 band switching exciter with crystal and e.c. oscillator incorporated, which would be capable of driving any type of P.A. tube likely to be used. A triode was suggested for the final stage and a good case made out for cathode modulation which, in effect, is partly grid and partly plate modulation. The beauty of this arrangement seems to be that a moderate sized modulator can be built up of, say, P.P. 6L6's or even 6V6's and the fixed output of this made to modulate any final power input by suitable adjustment of the radio grid modulation to plate modulation. One thus has an exciter and modulator adaptable to any final stage.

After the lecture the old 5WI gear was auctioned and a total clearance effected, the bidding being keen and spirited.

General business was then attended to and various suggestions discussed and adopted, including a Suggestion Box and the providing of plaques or badges as a means of identification for members to wear at meetings. A Technical Committee to deal with members' problems is to be formed, also a Roll and Attendance Book is to be kept at meetings.

It was announced that Mr. R. A. Bruce, VK5BJ, had offered a trophy, leaving the Institute to decide its application.

Among those present at the meeting and recently discharged from the Forces were Lionel Badenoch, VK5LB, Merv. Brown VK5MB, Clarrie Castle VK5KL, Reg Galle VK5QR, M. Richards, VK5WR, "Ossie" Richardson, VK5YK, T. Welling, VK5TW, and Doug. Whitburn, VK5BY.

The Christmas Meeting is to take the form of a Social, and will be held at the Bohemia Cafe on Tuesday, 11th December.

TASMANIA

The monthly gathering ran to schedule on the evening of November 7, at the rooms over 92 Liverpool Street. (No free advt.).

The attendance was very pleasing, many new faces being evident.

As has been the policy to date, a brief Council meeting preceeded the general meeting, and those present were 7AH, 7AR, 7BJ, 7CJ, 7CL, 7CT, 7CW, 7GJ, 7HM, 7LJ in chair, 7MK, 7ML, 7PJ, 7RY, 6AR, A. Morrisby and F. Gee, 3LL council only. Apologies, 3LL, who left after council meeting, 7AM, 7BC, and 7PA.

This meeting was summoned as a special general meeting, the business being: (1) To verify the action of the Institute, and the mode of election of officers which, under the extraordinary circumstances involved in getting started again, were not in strict accordance with the normal routine of the Articles.

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(VK3OI)

These actions were unanimously confirmed.

(2) To elect two country members to the Council; 7CK was elected for N.W. coast and 7AM for Launceston.

It is hoped that the Launceston gang will stage a get-together at their earliest and endeavour to swing into stride as before the war, and further, that a branch might be possible at Burnie also.

The general business of the meeting being disposed of the meeting closed, and then the true ham spirit predominated, a general discussion on xtal oscillators and xmitters was indulged in and all went their way at the conclusion feeling pleased in the knowledge that they belong to a fraternity such as we have in the Ham organisation of W.I.A.

Little is known of the individual at present, but some have commenced their preliminaries, I believe, and application forms have been completed and returned to the Dept. in many cases in anticipation of an early start.

The final regulations and restrictions are awaited with interest.

Meeting night for December will be Wednesday, 4th at 7.30 p.m. Council, 8 p.m. General, with an open invitation to all interested to attend.

TASMANIAN DIVISION

President : L. R. JENSEN, VK7LJ
Secretary : J. BROWN, VK7BJ.
Treasurer : A. E. FINCH, VK7CJ
Councillors : K. M. KELLY, ex-VK3LL; A. E. ALLEN, VK7PA; M. L. LOVELESS, VK7ML; C. A. WALCH, VK7CW.
Meeting Place—PHOTOGRAPHIC SOCIETY'S ROOMS, LIVERPOOL STREET, HOBART
Meeting Night—First Wednesday of each month.
Subscription Rates:
City, Full Member: £1/1/-; Associate, 10/6; Student, 5/-.
Country, Full Member, 10/6; Associate, 7/6; Student, 5/-.
Secretary's Address: 12 Thirza Street, Newtown.

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PARALLEL "R" AND SERIES "C" ON THE SLIDE RULE

Users of the ordinary 4 scale type of slide rule (i.e., without the reciprocal scale) will no doubt be interested in the following facts which are not generally known—to find the reciprocal of any number all that is necessary is to reverse the slider and close up rule fully. Reciprocals of numbers appearing on scale "A" may now be read direct on scale "B" (now upside down). By leaving slider in this position it is now possible to calculate any combination of resistors in parallel—or condensers in series without further movement of slider; the cursor only is required. For, say, three resistors in parallel, proceed as follows: set cursor to value of R1 on scale "A" and note corresponding number on scale "B"; repeat for R2 and R3 and add total of numbers on scale "B". Reset cursor to this total on scale "B" and the absolute resistan ecvalue appears opposite in scale "A."

After a little practice this will be found to be a much quicker method of calculation than the old formula, and it reduces the operation to one of simple addition. This system may, of course, be used with equal ease for calculating the total capacity of any number of condensers in series, and the procedure is the same.

QUEENSLAND DIVISION

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Secretary : H. MacGREGOR, VK4ZU.
Treasurer : R. CAMPBELL, VK4RC.
Technical Advisor : V. JEFFS, VK4VJ.
Publicity : N. ROBERTS.
Meeting Place—Diggers' Association Rooms, Adelaide Street, Brisbane.
Meeting Night—Last Friday of each month.
Secretary's Address—"Mouquet," Eildon Road, Windsor, N.3. Phone: M 2144.

STH. AUSTRALIAN DIVISION

Box 1234 K, G.P.O., Adelaide.
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Vice-President : J. KILGARIFF.
Secretary : E. A. BARBIER, VK5MD.
Treasurer : C. BASEBY.
Programme Organiser : G. LUXTON.
Membership Organiser : J. McALLISTER.
Publicity : P. BOWMAN.
Meeting Place—17 Waymouth Street, Adelaide.
Meeting Night—Second Tuesday of each month.

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