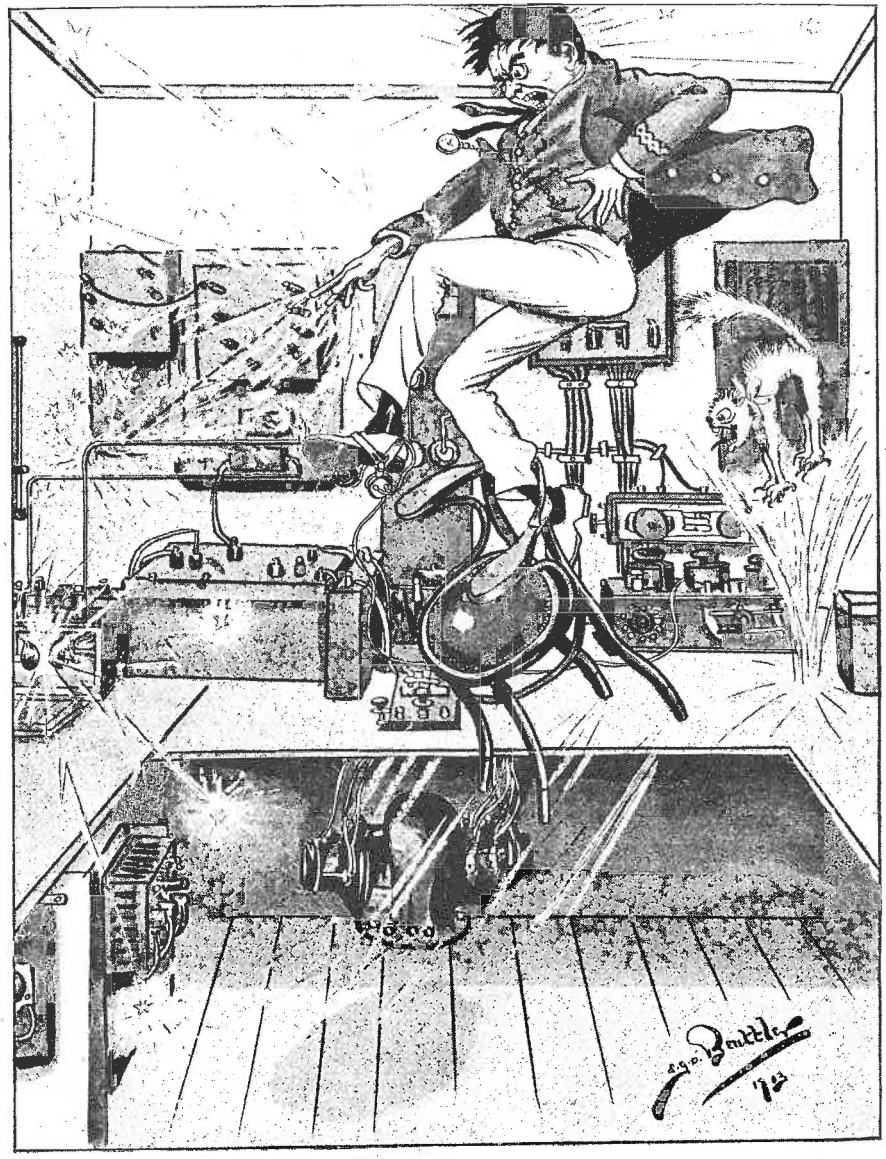

WIRELESS TERMS ILLUSTRATED - *THE BOOSTER*

With acknowledgement to The Wireless World of the 1920s

NZVRS BULLETIN

Vol 26 No. 4 **November 2005**

MAKARA RADIO STATION BUILDING IN 1944

A. F. (ANDY) SMITH
OFFICE-IN-CHARGE
AT MAKARA RADIO
IN 1944

NEW ZEALAND VINTAGE RADIO SOCIETY INC.

A non-profit organisation devoted to the preservation of early radio equipment and associated historical information.

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Contributions should be sent to the
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AUCKLAND MEETINGS will be held at the Horticultural Society Hall, 990 Great North Rd. (opposite Motion's Rd.).
Mon. Nov. 21 at 7.30pm. Valved Oscillators
Mon. Dec. 19 at 7.30pm. Auction Night
Mon. Jan. 16 at 7.30pm. Talk about Henderson Radio Hall

BAY OF PLENTY AREA MEETING
None scheduled at present..

TARANAKI AREA MEETING
Our meetings are held on the second Sunday of the months of February, April, June, August, October and December. Visitors are most welcome; contact either Bill Campbell, 06/7532475 or Graeme Lea, 06/7585344
The next weekend meeting will be held on the 3rd weekend in February 2006. Future weekend meetings will be held every two years.

WELLINGTON MEETINGS
are held typically from 1pm on the second Sunday of every month at Tireti Hall, Te Pene Ave, Titahi Bay. For details contact Bob Hatton, 40 Rose St, Wadestown. 04/472 8788.

CHRISTCHURCH MEETINGS.
For details of meetings contact Jim Lovell, 41 Yardley St, Avonhead, Christchurch 8004.Ph 03/342 7760

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FROM THE EDITOR

One of the most compelling reasons for collecting radios is undoubtedly the design of the radio cabinets and dials. An immense amount of thought has been put into increasing the aesthetic appeal of these items, primarily for a commercial reason - sales.

A great deal of thought has also been put into the design of the radio itself but for lack of knowledge on the part of the buyer this part of the production is seldom appreciated by the purchaser as long as the set produces what he or she wants.

Admittedly it requires some theoretical radio knowledge to appreciate the technical designers qualities but many radio collector have, or can acquire this knowledge and have the means at hand in their collections to study these aspects. I certainly know that some collectors do so and occasionally they burst into print about them. In this issue Jack Whittaker makes a case for more concentration on this angle of collecting which I heartily endorse. Be assured articles on the merits of radio designs will be welcomed for publication

Which brings me to a plea that I have frequently made in the past. I have pretty well depleted my store of original articles. Give some serious thought to putting pen to paper about those triumphs (and failures) which you have made in pursuit of your hobby and let me have the result. Don't worry about grammar, spelling or presentation, it will be my pleasure to look after those points.

We apologise for any delays you may have in acquiring the capacitors or any other items which you have ordered from our advertised stock. To keep prices at rock bottom we often have to change our vendor (with a little difficulty!) and this produces these delays.

NEW MEMBERS

Baird C	**Timaru**
Duncan K G	**Auckland**
Le Quesne P	**Napier**
Bardenheier R D	**Auckland**

CONTENTS

RCA Did Make an Octal 2.5 volt Tube.

Peter Lankshear.

Like most other valve historians, I "knew" that 2.5 volt filament tube development had ceased about 1934, before the introduction by RCA of the revolutionary all metal octal based series the following year. (Seventy years ago!)

Recently I was given some tubes to test and amongst them was a box of the original pattern 6L6 tubes, with very large steel envelopes and a distinctive flange at the junction with the base. Well, they were not all labelled 6L6, there were two type 1622, selected for industrial service, but electrically 6L6's for all that.

The industrial 1600 series included some familiar standard types, with individual specimens selected for close tolerances. Thus a 1620 was the old favourite 6J7, the 1621 was a 6F6, and the 1614 a 6L6 especially intended for R.F. work. Others of the 1600 series had no direct equivalents in the standard range.

Also there was a pair of tubes labelled 1619 which at first glance appeared to be yet another form of the 6L6. Although they were physically the same, before testing them as such, I was a bit cautious and checked in the AVO Valve Checker manual. I was surprised to find that the settings were for a 2.5 volt filament. Here was an octal valve, and a metal one at that, with a 2.5 volt filament. Unbelievable! The AVO manual does have the occasional error so I checked with the 1971 RCA RC-28 tube manual which lists industrial types briefly. Sure enough the beam tetrode 1619 does have a 2.5 volt filament and furthermore is directly heated. Its other characteristics are roughly intermediate between a 6V6 and a 6L6.

Unfortunately, I have no other references to the 1619 so I don't know what its intended purpose was. The directly heated filament would mean quick heating so maybe it was intended for mobile transmission, but why 2.5volts? Could it have been intended for industrial processing? Does anyone know?

No, this was not written on April 1st and until now I was sure that RCA never produced 2.5 volt valves with octal bases, least of all with metal envelopes.

Editor's note. Type 1619 is listed in the RCA Transmitting Manual TT-4 as a beam power tube with the following preamble to its technical parameters.

> *Coated filament type having metal shell used as power amplifier and modulator and as RF power amplifier and oscillator. May be used with full input up to 45 Mc. For operation at 60 Mc plate voltage and plate input should be reduced to 90% of maximum ratings; at 90 Mc, to 77%. Requires Octal socket and may be mounted in vertical position only, base up or down. The 1619 is used principally for renewal purposes.*

The last sentence is possibly a clue to it's use. Presumably it was convenient to produce it as a replacement for an older 2.5 V filament valve then out of production but still in wide use in transmitters - possibly the pentode type 1610 or the type 247- the metal shell providing a useful addition to the RF shielding. (Further or alternative information is welcomed).

MAKARA RADIO RECEIVJNG STATION - Part 1

By George King (ex Makara Radio)

INTRODUCTION

For some years after 1935 it was apparent to the New Zealand Post Office that a new radio receiving station would be required to provide for the ever increasing demands of the Departmental radio services terminating in Wellington. Since it was opened in 1930 to cater for the new Sydney-Wellington radio telephone link, the small NZPO Receiving Station in the prison grounds at Mt. Crawford in Wellington had become overtaken by service demands.

Furthermore the increasing traffic demands being made on the NZPO station on Wellington's Tinakori hill (Mt. Etako) meant that Wellington Radio was approaching overload conditions. The escalating level of electrical interference originating from Wellington City and from station transmitters, together with the lack of terrain for any additional aerial systems at either Mt. Crawford or Wellington Radio meant that a more suitable receiving site would have to be found. Consequent site testing work carried out in the Makara region had provided very favourable results.

A CRITICAL DECISION

The possibility of setting up a new receiving station at Makara was given further impetus in 1943 by a critical Public Works decision. The then P.W.D. had decided to install a high voltage power line from Khandallah to Wellington Central Park thereby creating a further serious source of electrical interference to the Wellington Radio telegraph and telephone services being operated at the time. With this in mind establishing a new Post Office Receiving Station at Makara became a Departmental priority. Because of the war-time situation, consideration was given to providing a bomb-proof receiving station building but this was eventually discarded in favour of a more standard type of construction.

SITE ADVANTAGES

In addition to being free of all types of electrical interference, a further advantage of the Makara decision lay in the purchase by the Department of 1448 acres of private land on which to establish the entire station. In comparison to the limitations of the existing receiving sites in Wellington it would now be possible to establish a far more comprehensive layout of aerial systems. It was decided to provide a total of 15 new aerials comprising 2 rhombics .3 long wire V's, 6 double doublets, 1 Marconi T aerial, I 16kHz loop antenna and 2 arrays. In addition there was ample room to establish an entire housing settlement comprising houses for the married staff, a single men's hostel and all ancillary facilities.

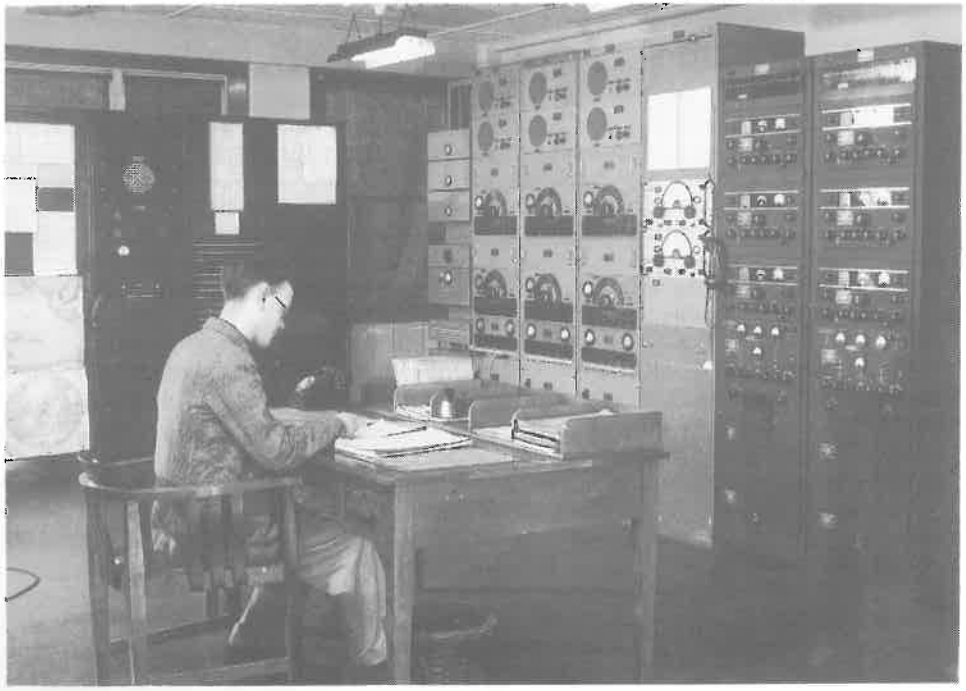
THE NEW ZEALAND BROADCASTING SERVICE

When the New Zealand Broadcasting Service became aware that the Post Office was building a new receiving station at Makara, it requested permission to include a separate small receiving station at Quartz Hill on the Makara site. It was agreed that the Broadcasting Service would rent the Quartz Hill station and associated aerials along with the residences for their staff. This would enable them to independently receive overseas broadcast transmissions (including London in particular) for relaying on their N.Z. network. The aerials erected by the Post Office for the Quartz Hill Station comprised - 2 rhombics, 3 long wire Vs, 3 double doublets and 1 Marconi T.

A NEW STATION

The new Post Office Receiving Station at Makara became operational In 1944 whereupon an immediate improvement was noticeable in the quality of the radio-telegraph and telephone signals being relayed on by cable to the relative Wellington Traffic Terminals at that time.

Makara Radio - Rugged Terrain and Magnificent Views



Early Equipment Provision at Makara Radio -

With the approval of the Australian Authorities, very sensitive noise measuring equipment was transferred from the Rum Jungle site near Darwin to Makara Radio to confirm the advantages of the Makara site. After an extended period of noise testing it was found that the indicator meter on the equipment had failed to register any perceptible noise - Makara was indeed an ideal site. The noise measuring equipment was duly returned to Australia.

SERVICES PROVIDED

The new Makara Radio Station was now able to provide enhanced reception facilities for a range of International and Domestic radio transmissions inward to New Zealand and to Wellington in particular:- These included;

The overseas radio-telephone service from Sydney,

The overseas high speed telegraph transmissions from San Francisco,

The overseas hand speed (morse) circuits from the Pacific Islands,

Inward traffic from ship to shore stations around the North Island. coast (including Marine Department lighthouses),

Inward fire hazard reports from the State Forest Department stations at Kaiangaroa and at Riverhead in the Auckland District. These were relayed on to the Forestry H.Q. in Wellington.

The services to shipping later included an inward radio-telephone service from the inter-island ferry steamer Hinemoa and the trans-Tasman vessel Monowai.

RECEIVER ALLOCATION

The adjacent photo shows the original layout of receiving equipment in the main operating room at Makara.

To the right are two cabinets of R.C.A. type AR88 receivers (in triple diversity) to provide a relatively stable reception of the high speed telegraph servide from San Francisco. These receivers later proved effective on the radio-telephone service from the inter-island ferry Hinemoa and the Trans Tasman vessel Monowai.

Further to the left are three cabinets of A.W.A. Ltd. Receivers (in dual diversity) for the reception of radio-telephone or radio-telegraph services according to circuit demands. Constant volume amplifiers in the adjacent rack ensured that the receiver output level to line (and the Wellington traffic terminals) did not exceed one milliwatt in 600 ohms.

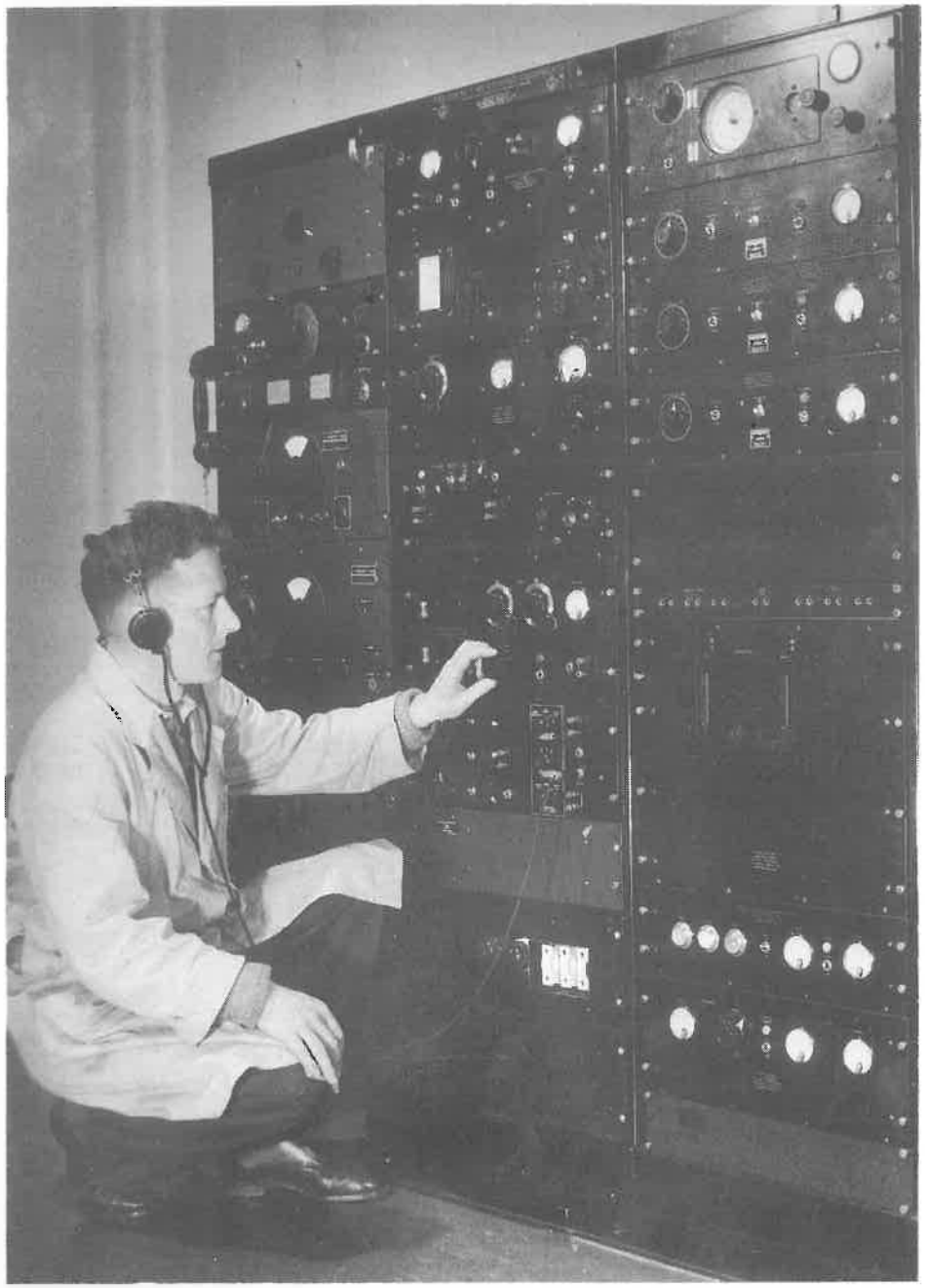
Between these two sets of receivers is a rack with two Canadian Marconi CSR5 receivers which were used on the Pacific Island services and as general purpose search receivers when required.

Located behind the operating technician (not shown in this picture) were a further four Marconi type CSRS receivers - three on the small ships frequencies of 1182, 2162 and 2045 kHz and one on the New Zealand Forest Service fire hazard transmissions.

RECEIVER SUMMARY

The RCA Type AR88 receivers were popular units with the operating staff due to their mechanical and electrical reliability and the ease with which their overall sensitivity figure could be regularly maintained. On the communication bands an RF input level of 1 microvolt produced a signal to receiver noise ratio of 10db and the reliability of the RCA type metal valves with which these receivers were fitted ensured trouble-free service with a minimum of maintenance over a lengthy period.

The Canadian Marconi Type CSRS receivers became effective units on the Pacific Islands telegraph service at Makara due to their mechanical and electrical reliability, ease of operation, robust dial



The Early Frequency Measuring Equipment at Makara

mechanism and clarity of dial readings. Although displaying a slightly reduced sensitivity on the top frequency band, the average input for a signal to noise ratio of 10db was 1.5 microvolts. A desirable feature of the CSRS was that the oscillator could readily be crystal locked for fixed frequency reception such as on the Coastal Shipping Service at Makara.
The CSRS became the "work horse" receiver within the Post Office and was widely used throughout the various radio branches.

FREQUENCY MEASURING

Another service allocated to the new Makara Station was the responsibility for conducting a Dominion wide frequency measuring facility. This had originally been carried out at Wellington Radio on Tinakori Hill since 1938 and at the Post Office Radio Section in Wellington since 1941. Both of these sites eventually proved unsatisfactory due to the increasing levels of interference from Wellington City. The radio search receivers and associated measuring equipment were therefore transferred to Makara in 1945.

Under the requirements of the International Telecommunications Union, Geneva, it is the responsibility of each Government to ensure that all radio transmissions registered within their territories operate on their specified frequencies. To this end an order had been placed prior to 1938 on the General Radio Corporation of America for the supply of the two racks of their frequency measuring equipment; depicted in the adjacent photo (centre and right.)

FREQUENCY STANDARD

The right hand bay contained the equipment for creating the standard of frequency with an attainable accuracy of 1 part in 10.000.000. This comprised a temperature controlled standard oscillator at a frequency of 50 kHz followed by a 3-unit divider chain supplying a 10 kHz output (with detectable harmonics) and a final output of 1000 Hz to a synchronous clock at the top of the rack. The specific design of this clock enabled checks to be carried out against the WWV transmissions to determine any time error of the standard oscillator and hence the equivalent frequency error.

The centre bay contained the heterodyne and interpolation oscillator equipment for determining the final frequency of the observed signal. Mixing the output frequency of the heterodyne oscillator (derived from the receiver bay) with the appropriate harmonic (derived from the standard bay) produced a beat frequency of 0 - 5 kHz against which a final zero beat and frequency indication could be obtained with the interpolation oscillator.

SEARCH RECEIVERS

The left hand bay was a New Zealand Post Office addition to accommodate the three search receivers covering a total frequency range of 14 kHz to 32 MHz. These receivers comprised a National HRO covering the HF bands and two Collier & Beale Ltd units. The latter allowing for signal searching over the Broadcast and lower frequency bands (Aeronautical navigational beacons and Marine Dept. lighthouse beacons in the main).
Dominion wide radio transmissions falling within the range of this equipment were checked for their accuracy on a monthly basis.
In 1955 this frequency measuring equipment was replaced with a new installation employing digital techniques.

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NZVRS Journal May 1990 . Overseas Radio Telephone reception in 1930
NZVRS Journal August 1997. NZ's First Primary Standard of Frequency

Random Thoughts on Servicing a Valve Chassis.

George Newlands

The content of this article has been put together over a considerable time and comes from personal experience rather than any published course or formal training. The ability and inclination to give a radio a technical overhaul or fault-find a sick one is not essential for someone who has an interest in vintage radio but it is always good to have something in working order if at all possible. Given the diminishing number of professional servicemen who will now take on valve equipment and given the high cost of such time and effort, it is some advantage to the average enthusiast to be able to attempt repairs, however basic. This article is not intended to make a serviceman out of someone who isn't but, hopefully, the ideas herewith will be of help to some.

From September 1968 until some time in 1976 this writer was employed in the Development Laboratory of the New Zealand Post Office Transmission Section. Apart from development work the place undertook instrument repairs and, because of the expertise and facilities it could provide, we did all manner of work for other Government Departments. The staff was only five and we had a high profile in the New Zealand electronics industry. Too high for our own good as it turned out but that is another story. The pointers and advice given here are the result of experience gained over that period and what I always tried to impart to my staff when I came back in charge of the place between 1983 and 1986.

The following notes are intended to apply to a mains operated valve chassis. When servicing something unfamiliar a set series of checks should be made first. It goes with out saying that a good clean is in order, even if it is only dust removal with a suitable brush and a vacuum cleaner. This in itself may improve performance, particularly the cleaning of a tuning capacitor, and will make the whole thing more pleasant to handle. As regards electrical function the procedure should be as follows. This applies to a set you have no reason to trust.

Firstly, check that the item is complete. Have you got all of it or is there something you haven't been told? A careful visual inspection will give clues here and generally show up missing or broken components and obvious faults. Secondly, fix the obvious faults first. Replace anything that is missing. There is little point in setting out to test suspect capacitors if the power transformer is a charred mess or the valves are missing. It is entirely possible that, where several faults are apparent, fixing a major one will clear others.

I recall an incident where one of my staff brought a radio in as a lunch-hour repair job and wouldn't let anyone help him. The set was smitten with a loud hum behind which could be heard a distinct whistle. He acknowledged that the hum was a dud filter capacitor but was determined to find the cause of the whistle before changing it. Nothing would shift him from this course of action so he was left to it. While he was away at lunch I tacked a new capacitor across the dud and promptly cured both the hum and the whistle. It was a while before he heard the last of that one.

Coming back to power transformers, it goes without saying, or at least it should go without saying, that power safety checks should be made on any chassis as a matter of course and high priority. Power cord earth lead continuity and leakage from the power transformer primary to the chassis should be checked.

When confronting an old or inoperative chassis for the first time, and being satisfied that it is all there, first remove all the valves and dial lights before applying power. This should mean that the power transformer will have no load on it and should remain cool during a 20 minute power-on test.

Check the secondary voltages at this stage. Any fluctuations in the H.T. volts or any marked difference in the voltage on either side of the H.T. centre tap and you are looking for a new transformer. If all is well plug in the dial lights and the valves except the rectifier. Check that the heater voltage is what it should be and watch the dial lights. Any flickering indicates a problem.

Next, with the power off, check the H.T. rail (rectifier cathode or filament) to ground with an ohm meter. What is measured here will depend on the circuit configuration and the state of the filter capacitors. With the filter capacitors disconnected the resistance measured should not be less than 50k. What you will be measuring will be the I.F. valve screen voltage divider, always provided the set uses such a system. If all seems well, plug in the rectifier valve and apply power. Keep a wary eye on the rectifier valve for flashes, blue glows or visible heating of the plates. Anything untoward indicates a problem somewhere in the set.

Any electrolytic capacitor, if it has been unused for a considerable length of time, is distinctly suspect. This is particularly true of the old upright "wets" which it is really a good idea to avoid as a matter of course. They can be left in situ (disconnected!) for cosmetic appearance and pigtail types wired in their places without spoiling chassis appearance. The leakage current, with consequent heating and burst risk, can be quite high in these. That is if they haven't leaked and dried out completely. In the days when they were new and common a maximum acceptable leakage was 1 mA per microfarad at working voltage. (Say 10 mA for 8 mfd.) Note that this figure applies to the wet type, those that slosh when you shake them, only. Aluminium foil types should have much lower leakage than this.

An old electrolytic should be "formed" before having working voltage applied. This is done quite simply by applying a small d.c. voltage, of correct polarity, to the capacitor for a short while. 6 or 12 volts is enough. What this does is to start the electrolytic action so that the electrolyte doesn't get too big a shock when the working voltage comes on. Applying full voltage to a capacitor which has been allowed to age to an unformed state may puncture the insulating barrier before the electrolytic action can take place.

Having got the H.T. on the chassis without fireworks of any kind, check the voltages which appear through the various parts of the set. If they're all there, and something like what they should be, your old set should work. If it doesn't you're on your own.

I shall now relate a couple of incidents from my own career, just to give an idea of the sort of odd-ball things one can come across. The first concerns a five valve mantle set which came to me with audio distortion. I cannot now recall the make but it had a metal cabinet so it was probably a Rolls RB. A look in the back showed a straightforward superhet, a 6K8G with its characteristic offset heater, IF and audio valves in screening shields, output and 6X5 rectifier. Nothing to it I thought- leaky audio coupling capacitor, which it proved to be. Having replaced the capacitor and checked a few others the set went back in its cabinet for the customary half hour "soak" test. Everything worked but something unexplainable just didn't seem to be right. This feeling is something that comes only from experience. It is the ability to know that something is not quite right without knowing why: a or sixth sense that cannot be taught or adequately explained. There is a certain degree of experience beyond which if you think something is not right the chances are it isn't.

Such it was in this case. Although the set did all that it was supposed to do there was something unexplainable wrong and it wasn't obvious. A considerable time was spent breathing heavily and with a furrowed brow measuring voltages that all seemed to be within what they out to be. (This is the sort of situation where a hobbyist can persevere. A professional serviceman would go broke.) Everything was where it should have been but it still wasn't right. Finally I decided to check the

valves. removed the screening can from the IF valve and there it was. A 6J7G! At some stage in this set's career some clown had replaced the 6K7G with its sharp cut-off cousin. Insertion of the correct valve made everything as good as new.

My second incident concerns a Majestic "Herald", a small plastic cabineted mantle set made by Dominion Radio Corp. Ltd. This basic superhet, using the unhappy marriage of valves and a printed circuit board, came to me as a non-working gift: with the comment "there might be something in it you can use". Never being one to turn such things away, and always working with the attitude that if something worked once it can always be made to work again, I accepted graciously. The first thing I noticed was the cardboard back cover of the cabinet. Written on this, very neatly with a ball-point pen, was "Power transformer primary open circuit 14/1/88." I wondered if it might be a faulty on/off switch, having been caught with that one before, but it actually was the winding. Good start! A careful check of the terminations showed the break to be somewhere deep in the winding.

Dud power transformer primaries are not a common fault and I always consider a transformer to be a write-off under these conditions. The H.T. secondary was a single winding (half wave solid state rectifier system) so by attaching a Variac to this and adjusting the voltage until the heater winding showed 6.3 volts I determined that the H.T. requirement was 185 volts a.c. A hunt through a large number of recovered power transformers (I think the damned things must breed in dark corners) I turned up a 150-0-150 one with, believe it or not, the correct mountings. Installation of a full wave rectifier system brought the H.T. back to normal and the set, dismantled on the bench, burst into life. Once back in the cabinet, switch-on brought complete silence. Cursing quietly I considered that some stress of mounting must have opened a crack in the p.c. board and removed everything only to find the set still dead. Flexing the p.c. board proved nothing at all and checks of voltages nothing conclusive so a full servicing job seemed in order. A complete lack of I.F. amplification gave the clue and replacement of the I..F. valve (EBF80) cured the problem. A check of this valve showed the screen to be open circuit, a complete coincidence that it should have failed between the dismantled test and the reinstalled one.

In closing and in general, I can give three more bits of advice on servicing. Firstly, go as far as you can see: then you will see further. This applies to all things and particularly to something new and unfamiliar. Secondly, you don't know what you can do until you try and thirdly watch out - when the power is on a chassis keep your fingers and other body parts clear of it - when measuring voltages use a well insulated meter probe in one hand and keep the other hand in your pocket.

HAMMARLUND VERNIER CONDENSERS.

MODEL B.

This is the finest condenser yet seen in New Zealand. The old model Hammerlund was a marvel, but the NEW MODEL B IS PERFECTION.

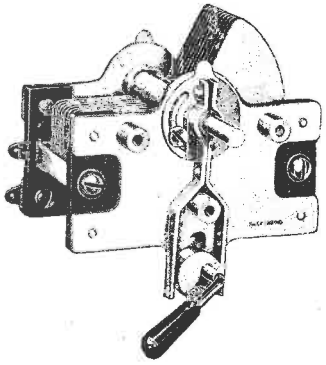
Plates fit into milled slots; accurately spaced. Vernier moves main shaft, so DIAL SETTINGS CAN BE EXACTLY REPEATED. No BACKLASH WHATSOEVER.

ROTOR PLATES are connected to end plates, all being of BRASS. ELIMINATES BODY CAPACITY.

PLATES are all soldered in position. Resistance losses too small to be measured.

MINIMUM DIELECTRIC LOSSES because practically no insulating material is used.

SPECIAL CONTACT ARRANGEMENT, better and more permanent than pigtails.



An example of good design from the past (John's catalogue 1924).

Design Appreciation in Hobby Activity

By Jack Whittaker

Hobbies as a Learning Experience.
Amateur pursuits at hobby level can indeed be a useful and enjoyable way to expand appreciation of good design.

Appreciating a Design Classic
To revere good design and appreciate real classics of design and creation, may be as real an experience as appreciating a classic wine, a top of the range single malt, or admiring a Bugatti type 35B motor car.
Milestones in design can range through numerous examples such as the original Volkswagen car, the Mini, the Aga Cooker, the Gugenheim Museum, and to Classic Radio productions.

Design as a Compromise of numerous factors.
A boat can be designed for beauty, for speed, for fuel efficiency, for stability etc etc., but a design can never achieve the absolute ultimate in any one aspect without sacrifice or compromise in some other aspect. This applies to almost all technical and constructional design. The cost and effort of design is often immense – I believe the Lexus LS400 car needed the development of over 90 prototypes to become a masterpiece of engineering design and function, but perhaps still did not quite achieve the ultimate peak in artistic design.

To understand what efforts went into sound design development and the achievements of designers and manufacturers, I believe that an effort to try to create and design a pleasing article has its own rewards and is at the same time, an enjoyable and gratifying learning curve.

The Challenge
To start with a clean sheet of paper is indeed a challenge. I have recently been trying to get ever improved design into building a good stereo valve amplifier. Each one I build seems to lead to yet new or revised/ improved design as may be seen on my web site http://users.qldnet.com.au/~jcwhitt/ There seems absolutely no end to a quest for a "better" design. It does indeed keep the brain active and needs a lot of lateral thinking at times too. It is also great fun at hobby level.

There (of course) needs to be a basic foundation of experience, a rather wide experience base in fact, combined with knowledge of what one is doing. This can and does require study and research, so it is not entirely a suitable pursuit for the faint hearted.

Appearance and Image
To combine functionality, neat wiring layout, good engineering and aesthetic beauty is a real challenge, and to build a valve amplifier these days, one really needs to be able to show it off in a reasonable manner. This necessitates considered proportions, colour and image, plus of course showing off the glowing tubes to best advantage. It needs to perform properly and adequately too. It is all too easy to throw up a design quickly and build up an amplifier on some old chassis with a few hastily wired in components, but the result will look much like just that – a quickie job (a 'dog'). A good result takes a **lot** of planning, time, consideration, and great care. Simplicity and elegance are not always easy to achieve in design. It is not done easily or with little effort.

Classics for Inspiration

A Masterpiece of Design – A design for practicality and use.
For many years, I have admired the design of the "Command " receivers (also known as ARC5 receivers) which were widely used in WW2 in military aircraft and in various communications applications. These receivers had all octal based metal tubes, and must be a design masterpiece of that era. The receivers were made by several manufacturers, undoubtedly for the war effort. The design appears to be totally consistent through the range, and is designed for a special use, for practical and reliable service use, and not to create an impression of an artistic masterpiece.

All six valves / tubes plus IF transformers are fitted neatly within a 108mm x 108mm square (4 ¼ x 4 ¼ inches). The tube line-up being - RF stage 12SK7, mixer 12K8, **two** IF stages 12SK7s, BFO and detector 12SR7, with a 12A6 as the output tube to headphones. All this in such a small space is quite amazing, and it is just so neat. The designers seem to have achieved the impossible.

There are 6 metal encased capacitors, four of which are triple 0.05uF capacitors and two singles, one being 5uF and one of 15uF. One larger multi capacitor contains triple 0.22uf capacitors. The BFO coil and output transformer are also lined up with the capacitors under the chassis.

The wiring is simply exquisite on many of these receivers, almost reminding me of a similarity to precision jewellery. I can only think that small and nimble women's fingers must have done this assembly and work. My fingers are simply too big for such tasks!

The receiver design depended upon many specially made parts. These components were manufactured for this special purpose, and made to the very highest quality standards This was of course a very necessary ingredient of the **design** process for these receivers. The variable tuning capacitor is an exquisite 3 gang piece of craftsmanship with glass ball bearing, geared tuning drive and calibrated dial. The IF transformers are also a work of art, with air trimmer capacitors and also incorporate variable coupling adjustment.

To make a receiver which can cover several different *frequency* models on an assembly line must predate the multi-model car production assembly lines of modern day. The receiver could simply be made into any one of the several frequency ranges by;

1. Fitting the appropriate dial (I believe the same capacitor would have been used on several if not on all models),
2. Plugging in the correct coil box,
3. Plugging in the correct range of IF Transformers and BFO coil.

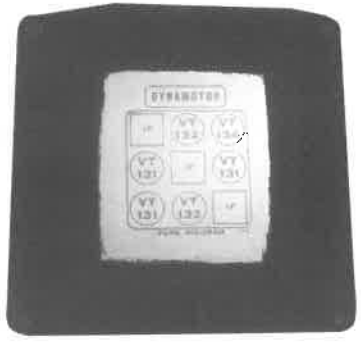
Basic servicing was obviously a routine to test the tubes and replace the capacitors, which must have been the ultimate for simplicity and speed of operation.

This must be an ultimate peak of design effort in those times and surely a real classic. I would take my hat off (if I had one on) to those designers. Sadly, many of these receivers and their companion transmitters were cannibalized by amateur radio operators for their valued components, in the days when 'hams' built more of their own equipment. I confess to being guilty there too.

Today, of course, these receivers are of no practical use, but simply appeal to collectors as a remarkable piece of design and manufacturing from the world war two era - and an inspiring design indeed they are.

Left is an unmodified 180 to 550 kc (khz) receiver which was serviced in 1956. The official service plate says "reconditioned" The only visible change has been the fitting of a complete replacement set of fixed capacitors. Original appearance is otherwise retained.
The receiver on the right is of better appearance but has been modified for 'ham' purposes and was originally 1.5 to 3.0 mc. I plead not guilty to the modification.

Top view of the 1.5 to 3.0mc receiver.



Underside of the cover lid with the original label and felt lining.

Underside of the 'ham' modified receiver.

Under-chassis view of the 180 to 550 kc receiver which seems all totally original, apart from the replaced capacitors.

Share the design experience --DESIGN AND MAKE SOMETHING.
It is a great learning/appreciation curve and it can be fun too.

Christchurch's Radio Preservation Society.

Pete Ingram

During 1984, a group of Christchurch radio enthusiasts formed a vintage radio restoration society at Ferrymead's Historic Park in the suburb of Heath cote. This came about on the invitation from the Park's director, to place on display a number of sets that had been in long term storage. Two rooms within one of the several staffing houses were utilised for the project and initial work commenced with about a dozen members.

Four years later, a large building in the far northeast of the Park, known as the Cranmer Hall, became available to the society. Although a kilometre ftom the village center, it was at least adjacent to the original entrance and administration area and visitors could then take either a tram or train 'journey' to the village from this point.

This building was developed into three different sections. The main hall already contained the remarkable Dini phonograph collection of late 19th and early 20th century instruments which now came under the custodianship of the new arrivals. A room at the end of this hall was then set up as a vintage radio museum with a good range of 1925 to 1955.sets. The opposite end of the building was turned into a general storage area.

During 1990, the radio amateur station ZL3RPS was set up within this building, to be followed by the creation of the society's broadcasting station, 3XP, as donations of records and equipment had been rather generous from a city that was close at hand. The latter transmitter came via a loan from a local company, TV Repair Services and a 90 foot pipe aerial was soon emitting a 100 watt signal on 1413 kHz every Sunday.

A replacement NZBS 100 watt transmitter, complete with mast, that was now surplus to the hydroelectric camp at Twizel, was transferred to Ferrymead by the NZRPS members in 1994 and put into operation. Then a further unit, obtained from Makara four years later, was modified and went on air utilising 300 watts of a possible one kilowatt output. Signal coverage was now favourable over most of Canterbury, with reports of reception occasionally coming in from Blenheim, the West Coast and Dunedin. Broadcasting was then extended to cover the whole weekend. Currently, the 3XP library contains 60,000 records from which 367,000 titles are catalogued on computer index.

In 2002, the City Council which now had control of the Park, requested the removal of the 3XP aerial to a new site west of the village. A tidal wetlands park was to be created over the paddocked area that the aerial was located on. The new 110 foot lattice mast was installed by BCL and a transmitter hut placed close to hand with a UHF link back to the broadcasting station. A new solid state transmitter from Blyth Radio was now installed with its output also governed to 300 watts. Replacement turntables and CD players have been installed in the studio as well.

The Society's museum is open from 1300 to 1600 hours each weekend and on public holidays, or on request for interested groups. Space has now become critical and it is hoped that during 2006, an adjacent room can be cleared for a specialised technical and military equipment display. A workshop has been recently set up with the normal range of test equipment and the serviceability of the museum's radios, now at 10 percent, is planned to be raised to a much higher level over the next few years. A very full technical and magazine library is also available to members. A new spare parts and a valve division are now being created.

Assistant, Pete Ingram sits alongside the ex-4YA record lathe.
The large framed poster contains a centennial celebration of Henreich Hertz

Assistant, Hadler,
checking an ancient copy of Lamphouse catalogue for original prices of components he has stored in his parts department.

Recently arrived Californian, Mark Atherton, currently in charge of the valve department checks out an emission with his Avo Valve Tester.

A successful social division of the RPS has been the creation of a Listeners' Club with a current membership of 330. A vigorous committee sees to bus outings, sing-alongs, barbeques and picnic events. Full members of RPS number around 40. Technical staffing has also been given a recent boost by the arrival of three qualified technicians, so the radio restoration programme should once more become a proper activity of the Society.

Display Manager,Miles Bank,and some of the radio display

A return of the RPS to the Ferrymead Historic Village site is expected in about three years' time. A new center to be known as the ICIS (Information on Communications, Image and Sound) Building will take in the Society as one of four divisions. Display space will be much the same with a new storage area created in a nearby building. 3XP will continue its operations from this centre with the luxury of a dual studio facility.

In preparation for this move, the Society is reviewing its stock and slowly shedding surplus records, radio magazines, radios or players and some spare components. Many VRS members are now becoming aware of this and we welcome your interest. Recent visitors to call in, have been Reg Motion, David Crozier and Doug Edgar. Contact Miles Banks (355-8399), Pete Ingram (359-5107), Austin Hadler (960-3554) or Mark Atherton (337-6632) in Christchurch if you have any queries.

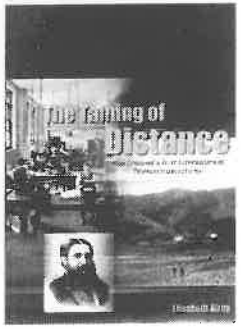
A Sampling of NZRPS Domestic Radios on Display

1924 Browning Drake 4 valve kitset.
1925 Kellogg 5 valve 'Wavemaster.'.
1925 Stewart Warner Model 300.
1928 Western 'Air Patrol 80.'
1932 Echophone 8 valve Model 80.
1936 Stewart Warner 'Ferrodyne'
1937 STC 6 valve Code 5018.
1938 Zenith 6 valve Model6-S-223
1938 Mullard 4 valve Model 12.
1949 Eddystone Model 680.
1925 Freed-Eisemann Model NR-20-5.
1925 Atwater Kent 5 valve Model 20.
1925 King Hinners 'Neutrodyne.'
1931 Crosley'Widget.'
1935 Fisk Radiolette 'Empire State.'
1936 Sparton Model 557 (mirror cabinet).
1937 Phillips V7A 'Theatrette.'
1938 Emerson 6 valve Model Z.
1946 Bush 8" television
1955 Eddystone Model S860.

BOOK REVIEWS

Reg Motion

The Taming of Distance - Elisabeth Airey - Dunmore Publishing 2005



The first major event in New Zealand's international communications was the laying of a telegraph cable from Botany Bay in New South Wales to Cable Bay near Nelson. Gone was the long delays and uncertainties in communicating with the rest of the world by sailing ship and Elisabeth Airey has adequately captured the events leading up to and following this event in her very readable book. Previous writers have covered some of these events from a world point of view but this book considers them in detail with New Zealand as its centre point The whole history of our overseas telegraph cable communications is covered from pre-cable days up to the about 1930 when wireless followed by underseas telephone cables concluded the "telegraph only" days. A feature of particular interest is the author's coverage of the social conditions endured by the cable staff, their wives and families.

Soft covered and of 187 pages this book is good reading, well presented, with plenty of excellent illustrations.

Antique Radio Restoration Guide - David Johnson - Krause publications

This book, now in its 2nd edition, is written for the person who is just getting started in collecting and restoring It covers the whole field from choosing an antique radio through the theory of valved radio operation, the practices of electronic restoration, testing and simple test equipment to cabinet restoration.
The author is a practicing radio engineer and I admire his rare ability to explain theory and techniques in clear easily understood prose without the use of mathematics. He makes excellent use of the many diagrams and photos in his book to assist the reader in understanding his explanations.

Soft covered and of 144 pages this book is recommended to the beginner and improver in the interesting hobby of collecting and restoring valved radios.

Both of the above publications have been bulk purchased by the Society and are available to Society members at considerable discount on retail prices from;

NZVRS,
P.O. Box 13873,
Onehunga,
Auckland 1132

The Taming of Distance at $30 plus $5 for P&P within NZ
Antique Radio Restoration Guide, in generally preloved but excellent condition, for $20 plus $5 P&P

THE BEAM TETRODE

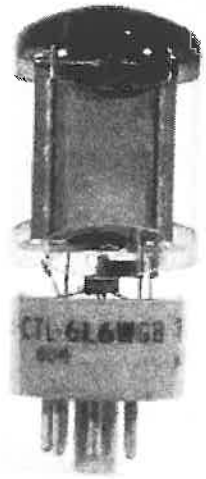
Dick Stevenson

The tetrode, with two grids, solved R.F.amplification as triodes, when used with any enthusiasm in this function, fed back through the grid and anode and oscillated uncontrollably. Many members will be familiar with the indirectly heated type 24A and 35 tetrodes so common in the mass-produced (often T.R.F.) American sets that reached our shores in the late 1920's and early 1930's. The second grid acted as a shield which prevented the oscillation and enabled much greater amplification . Also important for the first time was the need for interstage shielding.

Original metal 6L6

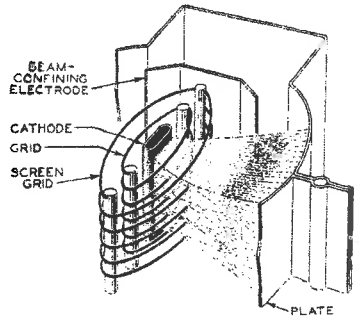
However, use of this valve as a high current power amplifier soon ran into problems. As the fluctuations of anode current could be quite large in the final stage of an amplifier, the anode voltage would change similarly, and at times fall below the screen voltage. Under these unusual conditions, electrons travelling towards the anode would go to the screen instead, as did any electrons that bounced off the anode. A graph of anode voltage and current actually had a dip or "kink" in it (negative resistance region) and this caused unacceptable distortion.

The addition of a third grid, outside the others and charged negatively, repelled these unruly electrons and this valve, the pentode, was found useful at most frequencies. As an output valve it was equally successful but in Britain and Europe patents for its manufacture were jealously guarded by the giant firm of Philips.



Later glass 6L6WGB

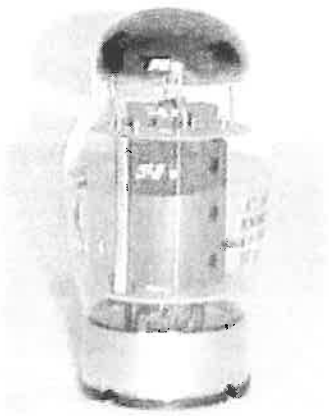
The British engineer J. Owen Harries had in 1935 discovered that if the anode was at a critical distance from the screen-grid, many of the faults of an output tetrode could be minimized. Actually in 1933 two engineers, Cabot Bull and Sidney Rodda of EMI had patented an alternative to the pentode by adding two negatively charged plates which directed the electrons into two narrow streams. These effectively repelled electrons back to the anode and the kink in the valve characteristic curve virtually disappeared.



Section through a 6L6 valve, with beam-forming electrodes.

This new design was called the "Kinkless Tetrode" but was thought by EMI to be too difficult at the time to mass-produce. As there was a cross-agreement of patents with RCA the idea was rather unwisely licensed to them. And was soon to appear as the immensely successful 6L6. This valve, after 70 years, continues to be made in Russia (2 factories), China (2 factories) and in Slovakia and Serbia. Very recently a firm in the USA has bought up the obsolete valve-making machinery which would otherwise have been scrapped and the 6L6 will be

produced again, much to the gratification of those preferring valve audio.

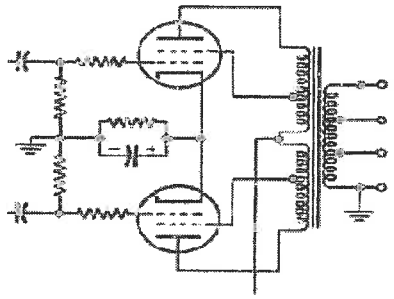


KT88 Kinkless Tetrode

As developed by RCA, the beam tetrode was manufactured with the control grid and screen grid wires in line and with the help of the beam-forming plates, concentrated sheets of electrons were sent to the anode. Because of the aligned grid wires it was found that very few electrons returned to the screen, making its current drain only half that of a typical pentode. The increased efficiency only produced one-third the amount of third harmonic distortion, a bugbear of output pentodes and particularly annoying to the ear.

The success of the 6L6 was not lost on British manufacturers. The Marconi Osram Valve company came out in 1937 with the KT66 (KT = Kinkless Tetrode), and later a more powerful version, the KT88. In fact, the "kinkless" method of construction was also used for small-signal valves such as the KTW63 and KTZ63, produced as replacements for the RF pentodes 6K7 and 6J7. For transmitting valves, versions of the 6L6 were developed in the form of the 807 and 813 valves. For television before the transistor era, the beam power principle was used for line (horizontal) output valves.

Quite high pulse voltages were handled by these output valves and few valve bases were adequate. Instead, the glass envelope had to be used so the anode connection was made to a cap on the top. This was a trap for unwary fingers so an insulated anode-cap was regarded as essential.



Ultra-linear push-pull tetrode circuit.

An improvement was the "ultra-linear circuit which connected the screen to a tapping, typically 43% of the turns, on the primary of the output transformer. The sound was found to be more "triode-like" although output was down by 25%. In fact, only certain valves were found to be suitable as the screen needed to be more robust, being connected to the output transformer thus carrying a proportion of the output signal, whereas normally it would not contribute, being earthed through the power supply. Hefty transmitting valves like the 813 could be used and also the KT88, but the 6L6, 6V6 and PL36 needed reduced voltages.

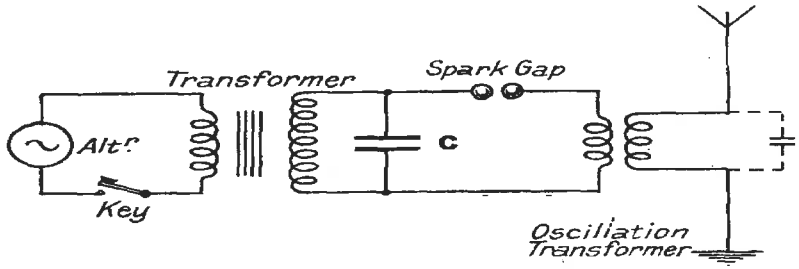
References:

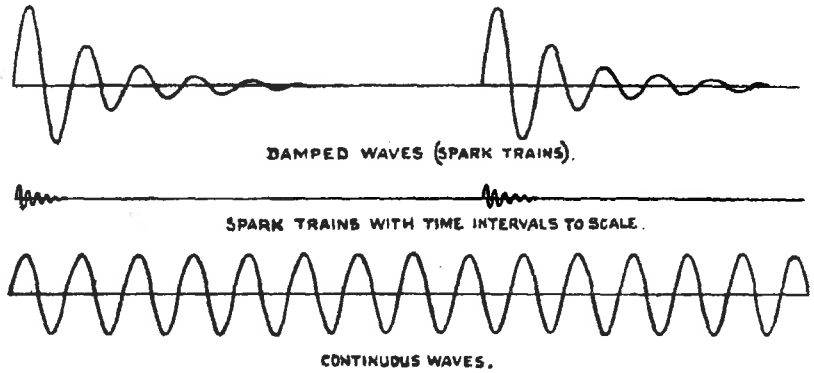
"Vacuum Tube Valley".
"Seventy Years of Radio Tubes and Valves" by John Stokes (1982).
"History of the British Valve to I 940" by Keith Thrower (I 982)"
"Modem Practical Radio and Television" by C.A Quarrington (1948).
"RCA Receiving Tube Manual" (1965).
"Images: HUPSE and AUDIOPARTS".

SPARK TO ARC -THE ARC TRANSMITTER

S.K.Wallace

The earliest radio transmitters used a spark discharge to generate radio waves, as shown in the spark transmitter circuit. When the key was pressed the alternator charged the capacitor until the voltage across the spark gap was high enough for it to spark and conduct. The capacitor discharged and a surge of current flowed through the oscillation transformer. Oscillations were set up in the aerial circuit, the aerial radiated until they died away. Another spark occurred when the capacitor was recharged. The spark rate was determined by the alternator frequency and spark gap adjustment. Spark transmitters radiated a wide band of frequencies due to the damped waveforms produced, and were inefficient because of the long intervals between wave trains. The answer was to somehow generate continuous waves at one frequency.

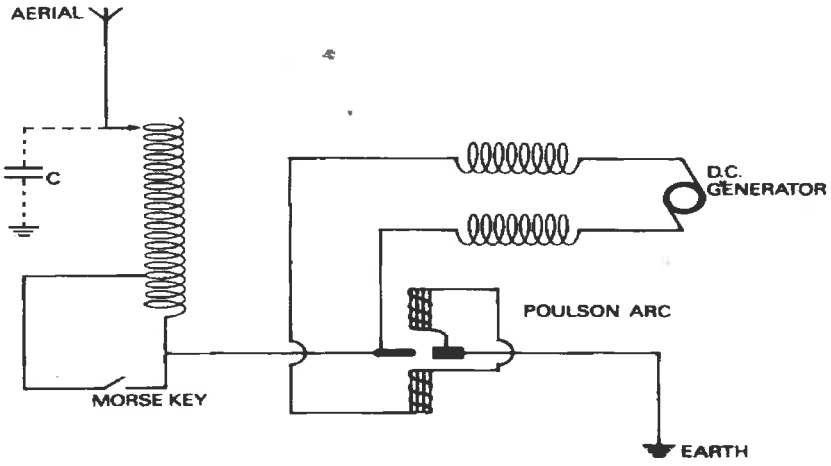




Arc transmitters were one attempt to overcome these problems. Electric arc lamps were developed in the late 19th century. Two carbon electrodes were connected to a DC supply. An arc was struck by bringing the rods into contact and then drawing them about 1/8 of an inch apart. In 1899 British electrical engineer, William Duddell, observed that an arc would oscillate at audio frequencies if capacitance and inductance of suitable values were connected across it. The circuit operates like a dynatron oscillator, the arc has a negative resistance characteristic, which compensates for any losses in the circuit, allowing oscillations to be maintained.

Danish radio pioneer, Valdemar Poulsen, further investigated this phenomenon. In 1902 he produced radio frequencies from an arc by keeping it as cool as possible. The arc was stabilised

by a powerful magnetic field provided by field coils and enclosed in a chamber filled with hydrogen, which is a better conductor of heat than air. The copper anode was water - cooled, the cathode was a carbon rod rotated by a small electric motor. Not surprisingly this device was nicknamed "canned lightning".
Poulsen patented his invention, but had problems commercialising it in Europe and Britain. In 1908 he was contacted by Cyril Elwell an Australian born engineering graduate from Stanford University in California. After some collaboration between Poulsen and Elwell the Federal Telegraph Company of America was formed, using arc transmitters for a wireless telegraphy service on the US West Coast.



Unlike a spark transmitter, an arc could not be switched off and on in a fraction of a second. Keying was done by short circuiting part of the transmitter's aerial inductance, changing its frequency. Therefore one of two frequencies were transmitted at any time. The circuit diagram is of a Poulsen Arc transmitter, as used by Federal Telegraph around 1910. The field coils are shown either side of the arc electrodes.
With their continuous output and steady frequency, arc transmitters were capable of voice transmission. Experimental broadcasts were made with the transmitter being modulated by a carbon microphone connected in series with the DC supply, but microphones had to be replaced frequently as they burnt out, and the arc produced considerable noise.
In World War One, Poulsen's patent was taken over by the U.S. Government and arc transmitters were used extensively by the U.S. Navy. After the war the patent was returned. Arc technology was developed further, with transmitters of 350 kilowatts being built. Arc transmitters were finally made obsolete by high power, valve technology.

Sources:

Popular Electricity	*W Hibbert*	*Cassell 1918*
Radio Communication	*J Reyner*	*Pitman 1940*
The Cats Whisker	*J Hill*	*Universal Books 1974*

ADVENTURES OF A TRAVELLING RADIO MAN- PART 6

AN INTERESTING LUNCH-HOUR.

During the 1940's and 50's the Post Office undertook radio installation, maintenance, and allied work, for most other government departments. This included Civil Aviation, Police, Forestry, Transport (until they set up their own radio organisations, the Marine Department and other departments such as Tourist and Justice, Lands and Survey etc.

During the 1950's the Post Office installed radio beacon equipment at many Marine Department coast stations. These International Marine Radio (IMR) transmitters, operating on frequencies below the Broadcast Band, worked in groups of three sending out accurately timed tone modulated signals which could allow ships with radio direction finders to establish their position at sea. These beacons were serviced every six months.

Bill Heinz recounts one such maintenance visit to the beacon at Godley Head at the entrance to Lyttleton Harbour about 1957.

I had spent the morning carrying out the routine maintenance of the station when a squad of soldiers put their heads around the door and enquired what I was doing? I told them and showed them. My turn to ask them; they were clearing out the magazine of the WW11 gun emplacement and burning the gun cotton; that explained the whirring noise that I had heard several times that morning. It was noon and time for lunch so I asked them if I could accompany them. Down the steps and through a tunnel into a large room we went. There, stored around the walls, were the shells. Adjacent was another room with a forbidding look - the electric lights for it were on the outside of its windows; inside were the canisters of propellant. The senior man took one, removed the top, up-ended it, shook it, thumped it, and finally it came loose. A long cylindrical package wrapped in what looked like white bandage fell heavily onto the concrete floor. That's gun cotton he said quite nonchalantly while returning it to the canister and then said that there was something else here that I may want to see.

Further along the tunnel we went and came out into a room near the cliff edge. It contained a 1940's wartime New Zealand designed and made radar station, a long bench with sloping black panelling contained two large cathode ray tubes, meters and control knobs, and a large steering wheel which I guessed was for turning the antenna for this 'A scan' radar set.

I think that the existence of this radar station was not common knowledge and what happened to it is not known, it would have made a remarkable museum piece today and be a fitting tribute to the skill of that earlier generation of radiomen who enabled it.

Fortunately the radar had detected no enemy ships but the gun actually sank a vessel; unintentionally of course, when the gun crew had to fire a warning shot across the bow of a fishing boat that habitually would not obey wartime harbour entry protocol. They should have aimed at the boat; in accordance with Murphy's Law it would have been safer!

THE CASE OF THE MISSING WHISKY

In 1960 Bill Heinz was the second in charge at the Microwave Radio Depot at Palmerston North. During the previous nine months he and many others had been working on the installation of a microwave multi channel toll bearer system between Hamilton and Palmerston North. Now that the system had been commissioned and was carrying telephone toll traffic came its grand official opening. Much to Bill's and the other technicians surprise came an individual formal invitation to attend this function. There must be something wrong here was the general consensus; us workers who spent all those months away from our families and responsible for the success of the project don't get invited to these. It's for the big heads and civil dignitaries who claim that it was by their efforts alone that the system was now a reality.

The work of the Engineers, technicians, riggers, mechanics and electricians was never recognised and it was no different at this opening. I think that this is a universal approach where usually those who have the least to do with a project claim the most credit.

So why were we invited? We soon found out! To act as guides for the tour of the facilities by the visiting dignitaries. Mind you, we could have been sent home before the refreshments were served but luckily were included in that also.

A senior clerical officer from the town office was in charge of the catering and he had organised a very large empty auxiliary equipment room for afternoon tea. Our new desks and workshop benches held the food and a various assortment of bottles and glasses. This we all tucked into with great gusto. Of course the talk amongst our table of workers was about the humorous incidents of the last nine months.

No one at our table drank hard liquor and the untouched bottle of whisky became the subject of conversation. It was suggested that this bottle would be fine for our Christmas work celebration in three months time. Since I was standing in a strategic position I was urged to grab it and put it in the bench drawer. I was not going to have anything to do with that; I knew some thing that they did not know and I still had a lot of promotional prospects ahead. No one else volunteered. The STC engineer said that they could not sack him and with a deft flick of the wrist, the whisky was in the drawer.

By that night the room was completely cleared and only the desks etc had to be returned to the other rooms. The whisky was still in the drawer the next morning and this was removed to safe keeping. That afternoon that senior clerk turned up at the depot and demanded either an empty or a full whisky bottle. He had counted all the empties and the full ones and he was one short. He demanded it, he knew it was here, and was not going to leave without it. Of course we were the pictures of innocence and suggested that one of the civic dignitaries had taken it as they were always into perks. He came again the next day and quite regularly even after that. Demanding and threatening and we realised that this was beginning to be a serious matter and not one to be caught out on The reason that I would not put the whisky in the drawer was that I knew that this clerk had once been a bar manager and on talking to him previously he had told me stories of how bar staff thieved money and liquor from the hotels. He knew all the tricks. It was a matter of professional

pride to him and he was going to recover that bottle.

Early in the piece we decided that the bottle had to be well hidden on Post Office property and the large storeroom packed to the ceiling with cartons of system spares was the place. The clerk after many efforts eventually gave up and as Christmas approached the bottle was taken to a much more accessible hiding place in readiness.

The day before Christmas it was discovered that the bottle was missing. Some thieving hound has stolen the bottle of whisky that we stole from the opening day were the words used to convey the news to the boss. Sitting at his desk he grinned, rubbed his stomach and with rolling eyes said that it had been a very nice drop.

The thieving hound, he had not been at our table when the whisky was pinched. It was just another case of those not doing the work getting all the credit.

FISHY BUSINESS

In 1967 Bill Heinz was a Senior Radio Technician in the Radio Toll Trunkline group at the Post Office Radio Section head office in Wellington. One of his jobs was to head an installation team to instal and commission a VHF multi-channel radio system between Taupo and Turangi. Head Office radio staff included a Dave and a Melvin. The antenna installation team came from the local Taupo Post Office Lines Branch, the bulk of them being young Maori men. The project took many months as it involved dismantling an existing system that had been used between Hamilton and Rotorua and its overhaul and re-installation. On such work away from home, staff were given a three day long weekend at home every four weeks with travelling time included.

The following extract from Bill's memoirs tells of the return to Turangi after one such weekend.

Taupo is well away from the sea and when the Maori antenna riggers knew we were going for our long weekend to Wellington they wanted us to bring back paua. Dave and his family, myself and family spent an afternoon at Makara gathering several bags of the shellfish. We shelled them that night and kept them chilled. Melvin on the other hand collected his elsewhere and kept them alive in water. We returned to Turangi on the Luxury Landliner bus and Melvin's sugar bag of paua, in their shells, were placed in a luggage locker beneath the bus. Now these paua, unbeknown to Melvin, had been drowned in the fresh water that he had tried to keep them alive in. They were starting to putrify. and as the time went on putrified further, to the extent that every time the bus stopped the increasing odour of rotting shellfish would pervade the bus. Murmurings from the passengers about it became clearly evident. Everyone noticed it but we remained silent. Up front was a small Maori woman nursing a bulging paper bag on her knee. The American tourist sitting next to her enquired as to what was in it. She was shown, it was a large glass jar full of sea urchin innards; it looked horrible, and she seemed to get the tacit blame. At Taihape, for our morning tea, we held a quick committee meeting about the stench. Opened the locker and surreptitiously and without ceremony threw the stinking sugar bag into an empty road works 44 gallon drum in the main street. It was Taihape's problem now, not ours! I bet there was not a single blow fly to be seen in the entire neighbourhood outside of that drum.

LETTERS TO THE EDITOR

Competition in August 2005 Bulletin.
A few entries for the identification competition were received and there was only one that was correct.

The winner was Paul Burt of Christchurch and has been sent the Handbook.

Paul correctly identified the dial as being a Companion brand made by Johns Limited around 1950 and used in their "Wellmade" receivers. Johns provided good quality kits of tuning components, a service later provided by Inductance Specialists.

As the chassis in the photo was built by me many years ago, the wording of the competition emphasised the name of the dial. Clues are provided in John Stokes' "Golden age of Radio in the Home" on pages 53 and 86 where there are pictures of Companion receivers using the same dial.
Thanks to those who entered.

Peter Lankshear

Plea For Help
I am writing to ask for some advice on how to best get some old radios, many valves (some NOS) and speakers that my father, Derek Howard (a past member of the NZ Vintage Radio Society), has in his shed, to new owners who will appreciate their usefulness and preserve them as part of our radio history as Dad did. We are not too concerned re their monetary value as long as they can find a proper home. .

Dad has suffered a major stroke and I am assisting my mother to sort a few things out.

My home e-mail address is howard.fam@xtra.co.nz for any replies of assistance that you can offer. The items are in Taupo and I live in Feilding.

Derek Howard

Perhaps some member or members in the Taupo or surrounding area could assist? - Ed

Possible Future Competitions
I was most interested in the Hikers One Construction competition the Society was holding, as such an event could possibly become an annual feature. My radio-building days are over unfortunately, but might I make a few suggestions for the future:

(1) The article in the May 2005 Bulletin, "Revisiting Tube Audio" perhaps could stimulate others to "have a go" with versions (5 to 10 watts) like:
(a) An amplifier using octal or earlier valves.
(b) An amplifier using modern valves.
I realise that transformers could be a problem with valve circuits, but perhaps credit could be given for ingenuity in using "off the shelf' components or circuits that used the *minimum* number of parts.
(c) An amplifier using transistors (we must recognise these eventually!)

(2) A valve receiver built literally around a 6 volt lantern battery. This latter would be responsible for both A and B supplies. The actual configuration could be left the constructor and would need valves with low current filaments. (The original "Hikers One" had a 6 volt B supply). Possible are:
(a) Two 3 volt valves in series like the 3S4 or 3Q5, (5Oma filaments).
(b) Three 2 volt valves in series like the 30 or 34, (6Oma).
(c) Four 1.4 volt valves in series like the lA5 or IN5 in series (5Oma) (d) Some valves, like the DL96 had only a 25ma filament and could be searched for to get an even smaller current drain.

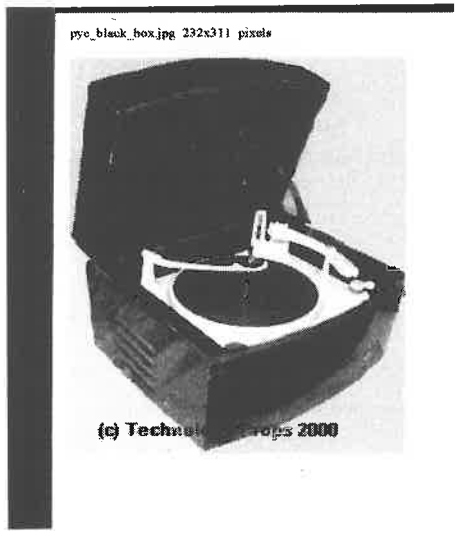
R(Dick) Stevenson

Taranaki Weekend Meets
I have to request a change in the entry to the bulletin concerning our meetings. The weekend meetings are to be held every two years not twice annually as presently shown;
i.e. bi-ennial not bi-annual!

Graeme Lea

Can Anyone Help?
We are searching for a PYE black box (see picture below) record player that does not need to be in working order. They were a top of the range table top record player released around 1954. The turntable was mounted in a distinctive wooden box with a curved front as in the photograph and the speakers were on the sides. I believe they were either imported to Waihi by PYE for distribution or assembled/manufactured there.
The record player is needed for a restoration project of the 1950s house where. the painter Colin McCahon lived in Titirangi. He owned this model of record player. He had a classical record collection and also some interesting jazz and calypso steel band records he brought back from the States. The house is being restored by a not-for-profit charitable trust and will be open for groups to visit at no cost when complete.
We are prepared to travel to collect one if somebody has one and we would be prepared to pay the going rate. Some are for sale in the UK on the internet we could use for price comparison.
Please email rick@pearsonnarchitects.co.nz ph 09/ 3761156 if you think you can help us to locate one of these.

Jane McCartney



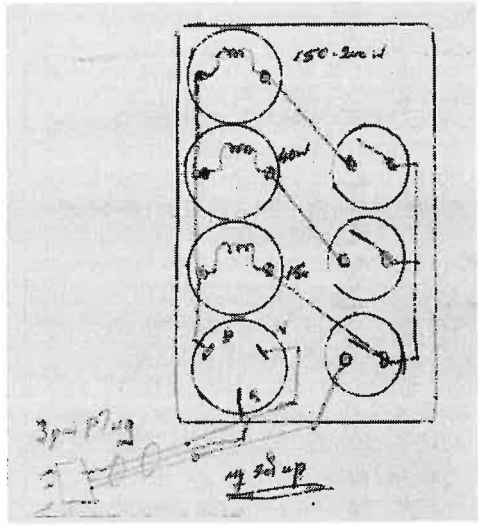
Restoring Suspect Old Valve Radios
Having just read Peter Lankshear,s excellent servicing articles in the August issue of NZVRS Bulletin you may be interested in a piece of equipment used by myself and many other older electrical servicemen.

It is the series lamp. To be used in series with a mains 230v power lead. This has the advantage of putting reduced power on the receiver when first plugged into the mains (depending on the size of lamp used). If the lamp glows brilliantly it indicates a faulty wiring or transformer.

It is also useful for applying voltage slowly to filter condensers and can at times save embarrassing bangs if there is a mains fault.

A sketch of my own setup is shown below. Switching on the bottom switch introduces a 15 watt lamp and the two switches above introduce larger lamps as required. With all lamps in use normal tests and adjustments can be made without danger of shorting the mains or blowing fuses

Frank Stretch



ITEMS AVAILABLE TO NZ MEMBERS

Please make out cheques to New Zealand Vintage Radio Society

From NZVRS Secretary, 2 Levy Road, Glen Eden, Auckland.
paul.woodcock@opus.co.nz

Ivory 3 pin Power Plugs
$1 each plus $2 P&P for up to 4 plugs.

Club Badges.
$5 each plus 50c P&P

From NZVRS, P.O. Box 13873, Onehunga, Auckland 1006.
office@nzvrs.pl.net

LR8N3 (TO-92)
HIGH VOLTAGE REGULATORS
(See pages 16, 17 of May Bulletin)
Approx $5 each. Expected end July. Email before placing order.

FAHNESTOCK CLIPS
11 for $5.50 or $6.00 posted(NZ)

Black, Polarised, Axial lead, Electrolytic Capacitors.

10uF, 450V
$1.00 each plus $2 P&P .Limited to 20 per member (larger quantities can be placed on back-order)

22uF, 450V, 85°C
$1.50 each plus P&P or 12 for $20 - P&P inclusive.

40uF, 450V, 105°C
$3.00 each plus $2 P&P or 13 for $40 - P&P incl.

100uF, 450V, 105°C
$5.00 each plus P&P or 10 for $40- P7P incl

Dial Lamps, 6.3V, 0.15A, #40 screw & #47 bayonet. 50c each plus $1 P&P

Tight Woven Nylon Dial Cord,
10 meter lengths at $5 including P&P

Residual Current Detectors
$20 + $5 P&P

MARKETPLACE

Advertisements for the next issue must reach the editor by the 14th Jan. 2006. Ads must be either hand printed, typed on a separate page or emailed. No verbal or phone ads. Remember to include your name, address and phone number. There is no charge for ads but the NZVRS is not responsible for transactions between members. Address ads to Reg Motion, 2A Hazel Terrace, Tauranga, New Zealand or email regmotion@xtra.co.nz

AVAILABLE

Books on radio valve history etc - all written or prepared by Fin Stewart - 1) "Illustrated History of Philips Radio Valves to 1935" $A 12; 2) History of GEC and the Marconi Osram Valve" $A 35 (Both these books have extensive photos of old valves and comprehensive lists of many valve types, including equivalents); 3) "The Goosens Pope Company and the Condor Valve" History of the company and the rare Philips subsidiary brand named valve - Condor. $A 6; 4) Copies of the "Valve Box" series of 16 articles printed in the HRSA "Radio Waves" on valve history up to about 1930 $A 22. Also available 1) A 14 page booklet "The American Crystal Set" listing several hundred sets from 1919 to 1926, with makers name, model name and year of introduction, $A6 and 2) an A3 double sided collage of AWA Radiolette advertisements from 1936 - 1938, including a full colour ad showing the green sets. Includes prices and a story of the "Cigarette case" $A 25. All prices include air mail postage and a discount of 15% will apply to three or more items purchased. Fin Stewart "Cockerdale" 380 Bulga Rd Wingham N S W 2429 Australia.
email ferrowatte.m.380@bigpond.com

Plain unprinted valve cartons - Small and GT $10 per 100, Medium, $12 per 100, Large $18 per 100. All plus postage. Any amount supplied. Paul Burt, 44 Hasting St West, Christchurch 8002. Ph 03/9607158, Fax 03/9814016.

AVAILABLE (cont.)

National HRO-M communications receiver (1940s design) complete with original power supply, 9 plug-in coils covering 50kHz to 30 MHz and instruction manual. Overhauled and in good working order $350. Reg Motion, 2A Hazel Tce, Tauranga. Ph 06/5768733. email regmotion@xtra.co.nz

RCA AR77 communication receiver, working OK, with circuit info also spare AR77 for parts only. $75 the lot or sell separately; working AR77 $65 other $25 ono. Siemens audio sweep set p2011 working OK with handbook $45 ono. Valve audio amps, 2 of, both working OK, Champion version of Mullard 5/10 amp, a good 10 Watts RMS, $45 ono, Rogers monoblock 10 Watts, $65 ono. Guitar valve amp Valve State 100 Watt Gunn, needs restoration work $45 ono. Wayne Griffin, ph 09/5289118 evenings, email zl1ujk@xtra.co.nz

WANTED

Lemiphone (small child's disc player about 1928 era). Going order preferred. Please contact Bill Campbell Ph 06/7532475 or email billcampbell@clear.net.nz

EZ81, EZ3 side contact rect., 6A8. Frequency counter, HP or similar with Nixie display, need not be working. Wayne Griffin, ph 09/5289118 evenings email zl1ujk@xtra.co.nz

Still looking for backboards for Bush DAC90A and Pye PZ103 (MGA p98). Also glass for Philips Plastic Mantel BZ366A. Paul Burt, 44 Hastings St. west, Christchurch 8002, Ph 03/9607158, Fax 9814016.

FROM THE LIBRARY

The following are titles and key points from articles published in other vintage radio magazines received by the NZVRS Library. Photocopies of these articles are available to members at $1 each from our Librarian, Ernie Hakanson, 17 Williamson Ave, Grey Lynn, Auckland Ph 09/3766059

885 German 'Amateurs' in WW2. Amateur operation and equipment. Mostly clandestine activities. Photos, circuit. Radio Bygones Feb/Mar 2005. p3

886 High Power Oscillators. The RCA ET4336 crystal controlled plug-in and its fully tunable plug-in. Photos, circuits, description, history. Radio Bygones Feb/Mar 2005. p8

887 The SSB Manpack and its Pioneers in South Africa. History, photos Racal company, RT14B, RT422B . Radio Bygones Feb/Mar 2005. p12

888 A Miscellany of Lab Instruments and an Oddball Radio. A British collection with photos and descriptions. Radio Bygones Feb/Mar 2005. p26

889 'Big Mama': Queen of the Cathedrals. Gulbransen model 70. Photos,description. HRSA Radio Waves, Jan 2005, p11

889 Flying Doctor Radios (part 3). Description, photos, circuit diagrams, history. HRSA Radio Waves, Jan 2005, p13

890 Reisz Microphones. Photos, description, history. HRSA Radio Waves, Jan 2005, p17

891 1936 Van Ruyten DC (32V or 6V)? Vibrator Console. Photos, description, circuit diagram. HRSA Radio Waves, Jan 2005, p23