FROM THE PRESIDENT

SINCE ITS INCEPTION, radio has played a vital part in our lives. Saving lives, entertaining, communicating with families across the globe, guiding essential services - in peace and war - keeping in touch with public and private air, land and sea transport and much more. In just two generations, the world has gone from no wireless, to an inundation that is almost incomprehensible. (As a side issue, all those radio waves touch our bodies as they head for distant destinations.) At the turn of the last century, an excited reporter referred to a spark transmitter, boldly predicting, 'In future, the world will be able to have more than one conversation by radio at the same time!"'

Radio progressed and had spin-offs, like Radar, Television and Wi-fi. Yet radio and television, the most technological equipment in our lives and homes, rarely are recognised, rather taken for granted. How many history books have little or no mention of radio? So it's outstanding to see Colin McKinnon's article, via John McIlwaine, on the first offical direct wireless messages from UK to Australia on September 22, 1918 - 100 years ago. It comes as no surprise that commercial interests and politics slowed advancements, but we got there and now enjoy communication with any country on earth.

As we attend more HRSA downsizing sales, we can see the importance of private collections. I hope to put labels on some equipment, so family can see which are important and why. Some of us have specialities, mine is PYE Telecommunications. It is to be hoped that the collection will interest another member in the future.

All the best in the lead up to Christmas.

Kevin Poulter
President.

MEMBERSHIP RENEWAL

1/ Membership is currently $40 /per year, including *Radio Waves.*

2/ Please use the form in the April issue yellow pages (the account number was incorrect on page 2). Or visit www.hrsa.asn.au and scroll down the side panel to the bottom for the online form, or www.aaa1.biz/mem.pdf

3/ Pay on-line by Direct Deposit, or at your bank via Direct Deposit (both preferred) or by cheque, money order to the address on the form

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Cover: AWA Radiola portable with Ilma Adey (actress), c 1953. Max Dupain photographer. Courtesy Eric Sierins. **Inside front cover:** Fleetwood range, Nov. 1958 **Inside Rear cover:** New System Radio c1930s **Rear cover:** 'Air Hostess' Stromberg Carlson, Sept. 1948

HISTORICAL RADIO SOCIETY OF AUSTRALIA, Inc.
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Please send all correspondence **except *Radio Waves* articles and *Marketplace* ads** to the relevant office-bearer (president, secretary, treasurer, membership secretary) at HRSA, PO Box 2283, Mt. Waverley. Vic. 3149

RADIO WAVES

Radio Waves is published quarterly in January, April, July and October

Please send *Radio Waves* articles to the Editor, either by email: billsmith@netspace.net.au *or by post to* Bill Smith, 17 Creswick Street, Glen Iris Vic., Australia 3146. Ph. (03) 9822 3456

ARTICLES AND PHOTOS are most welcome, either on disc, typed or handwritten. Articles submitted on disc (3.5inch DVD or CD), memory stick, or by email should be IBM-compatible. Suitable software: Word Pro, W4W & most common WP software running under Windows. If you are running unusual software, save files as Text or RTF. **Formatting of any kind is not to be done** since all articles will need to be reformatted to fit the available space.

MARKETPLACE ADVERTISEMENTS

Bill Smith, 17 Creswick Street, Glen Iris, Vic. 3146. billsmith@netspace.net.au
Advertising is free to members; see *HRSA Marketplace* for further details.
Deadline for October 2018 *MARKETPLACE* issue: Friday, 1 September
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HRSA ACTIVITIES: JULY TO OCTOBER 2018

SYDNEY

Contact: John McIlwaine (02) 4384 5608;
jajdmac1@bigpond.com

Meetings are held on the first Saturday of every second month at the Winston Hills Public School hall, cnr Junction Rd & Hillcrest Av., Winston Hills Enter via car park in Junction Rd. Setup from 9.30 am, workshop 10.00 am; **Auctions begin at 11 am**.

Saturday 4 August. 10 am. Centenary of the direct wireless messages from England on 22 September 1918. . Theme: Centenary memorabilia. Auction at 11 am

Saturday 6 October 10 am Talk: Military. Theme: Military equipment. Auction at 11 am

Saturday 1 December 9 am members' swap meeting: bring & buy - set up your own table; mini auction if required

NSW NORTH COAST

Contact: Joe Bass (02) 6656 9112
Dave Small (02) 6653 2364.
dnksmall@yahoo.com.au

Social Meetings

Sunday 29 July. Host: Morrie Carlton. Theme: Portables

Sunday 16 September. Host: Bill McPhillips. Theme: 1930s radios

Sunday 26 November. Hosts: . Ross & Roslyn McMaster Theme: Crystal Sets

.

ACT & REGION

Contact: Richard Begbie (02) 6238 2246, email rb@bordernet.com.au

Saturday 7 July, 2018. Midwinter meeting at our regular O'Connor venue. This one's an auction with special entries. Don't let the Canberra chill frighten you off – we always have a great fire blazing in the hall. Set-up & yarn from 10.30, auction around noon.

Saturday 1 September, 2018. Regular September gathering at O'Connor, this time our annual bring, buy and swap meeting. Make the most of this annual event.

Saturday 3 November, 2018. End-of-year, biennial BBQ Woolshed Meet on the Begbie farm. Always a great get-together with a bumper auction in the old wool shed. More detail in October's issue.

.NSW CENTRAL WEST

Contact: Wal Peters 0487 114 640
tetrode@bigpond.com We meet in February, May, August and November. Any members passing through are always welcome.

GIPPSLAND (Vic.) GROUP Contact: HRSA Gippsland Group. Ron Bowley, yeolde@dcsi.net.au 0490 106 111. Meetings bi monthly.

MELBOURNE

Contact: Kevin Poulter (03) 9558 3652
image@netspace.net.au

Our meeting room for 2017 is St Michael's Primary School, corner of Victory Boulevard and High Street, Ashburton. Entry is from Victory Boulevard. Parking is available on-site Meetings begin at 2 p,m,

Saturday 21 July; Crystal sets. Bring your favourite crystal set. Talk on portable crystal sets by Tony Maher**. Mini auction.**

Saturday 18 August Military radios. Bring your favourite military radio. Talk by Ian Batty. **Mini auction**.

Saturday 15 September AGM; Mini auction

Saturday 20 October. Talk by Ron Soutter and Sanjay Jain: 'Discover the HRSA website' **Mini auction.**

Other events

Saturday 28 July Auction at Stirling Theological College 44-60 Jacksons Road Mulgrave Melway 80 K3. Viewing begins at 11am. Auction at 12.00 pm.

Saturday 8 September Swap Meet (Radio Market) at St Michael's Primary School, corner of Victory Boulevard and High Street, Ashburton. Entry is from Victory Boulevard, parking is available on-site. Set-up from 11 am; start 12. 30 pm.

Friday 21 September Members' Dinner, Celebrating 100 years from the first official wireless transmission from England to Australia. Date, price and location to be confirmed.

ADELAIDE

Contact the Secretary Alan Taylor 08 83446708 0417859074 or email alantaylor47@bigpond.com

SOCIETY NEWS

NSW NORTH COAST GROUP
by DAVE SMALL

ELEVEN people gathered at the home of Dave and Kay Small on the 25th of March for our bimonthly social meeting. As usual, the urn earned its keep and conversation flowed freely in-between sampling the goodies on offer.

Our theme for the day was 'Transmitters' and four examples were on display. Two 'hollow state' and two solid state, along with an amplified crystal set designed to drive a 1mA meter. The purpose of the crystal set was to indicate relative transmission power so that alterations to the transmitter could be monitored.

Recent workshops had highlighted the need for one or more sessions on using a C.R.O. and Ron Barlow had volunteered to present a lecture. Dave's workshop area was also considered the better layout for the presentation and so that became our main activity for the day.

Following morning tea those interested adjourned to the workshop where Ron had set up an oscillator, C.R.O. and monitor. Ron's presentation via PowerPoint display & practical demonstration removed a lot of the mystery around C.R.O. use and members are now much better equipped to have a go to see what can be done.

Following lunch and more socialising we adjourned to the workshop again so that Ron could finalise his presentation. Morrie then demonstrated his 'crystal set' putting two of the transmitters to the test. The result being a clear win to his solid state unit. With the C.R.O. still on hand both were used in a demonstration on what can be done and seen which also showed how deficiencies can be identified.

Still more socialising and eating followed before it was time to leave.

A great day was had and a big thank you to Ron Barlow for the work he put in, preparing and presenting the lecture. Very well done and well received.

ACT & REGION GROUP
by RICHARD BEGBIE

ONLY ONE meeting to report on since the April issue, and that was our annual trip to Goulburn and the splendid Scout Hall that Richard Cudaj organises for us each year. As well, he tries to find an angle on the meeting which might interest local and regional newspapers, and this year he did it again.

Like most other groups, we are constantly dealing with complete or partial collections from either deceased estates or from collectors unable to keep their interest going for one reason or another. Our own long-term foundation member John Carr has had a serious stroke, and while everyone is delighted with the progress he has made in rehabilitation, he quickly recognised he would be unable to continue the meticulous technical work which has been his signature for as long as we have known him. When John and Margaret had to put their home on the market in a hurry, a small group of us undertook to sort through, uplift, and take a lifetime of tools, components, and restored or partially restored radio and equipment to the Goulburn meeting.

Consequently we had one of the largest auctions of recent years, and it was wonderful to see members rallying around to ensure a full clearance of John's catalogue, particularly as it all had to take place within such a limited time window.

So I'm able to report a 100% clearance of John's collection, as well as an excellent (80-85%) clearance in the general auction. The auction ran from shortly after 10am until around 2,45pm, with a lunch break just long enough for us to support the scouts in their sterling barbecue efforts. Around sixty members ensured the success of a day which had turned into something of an epic.

On a much smaller scale we'll have a lifetime collection of superior literature, as well as a small number of beautiful original radios from the 1920s at our July meeting.

Keep watching the calendar for other events this year, particularly our end-of-year Woolshed Meeting – always a great day.

SYDNEY GROUP
by JOHN MCILWAINE

GOOD ATTENDANCE at our June meeting including two visitors from WA and recently joined new members.

The meeting opened with a short slide presentation of the history of TECNICO, The company Eastern Trading Co. (E.T.C) was first registered in 1918, and proposed a name change to Tecnico in 1937, finally in 1942 became Tecnico. Tecnico and was heavily involved in wartime production of magnetos for aircraft and servicing of these for the Allied Corps. Tecnico established a joint venture with Bendix USA know as Bendix Tecnico in 1951. Always in the electrical field Tecnico made famous and first 10 inch electric mower in 1948. This, along with vacuum cleaners, floor polishers, ETC capacitors was a major seller through the 1950s, and radios from 1946 to 1955. Following heavy financial losses Tecnico was taken over by shareholder Pye UK in 1955

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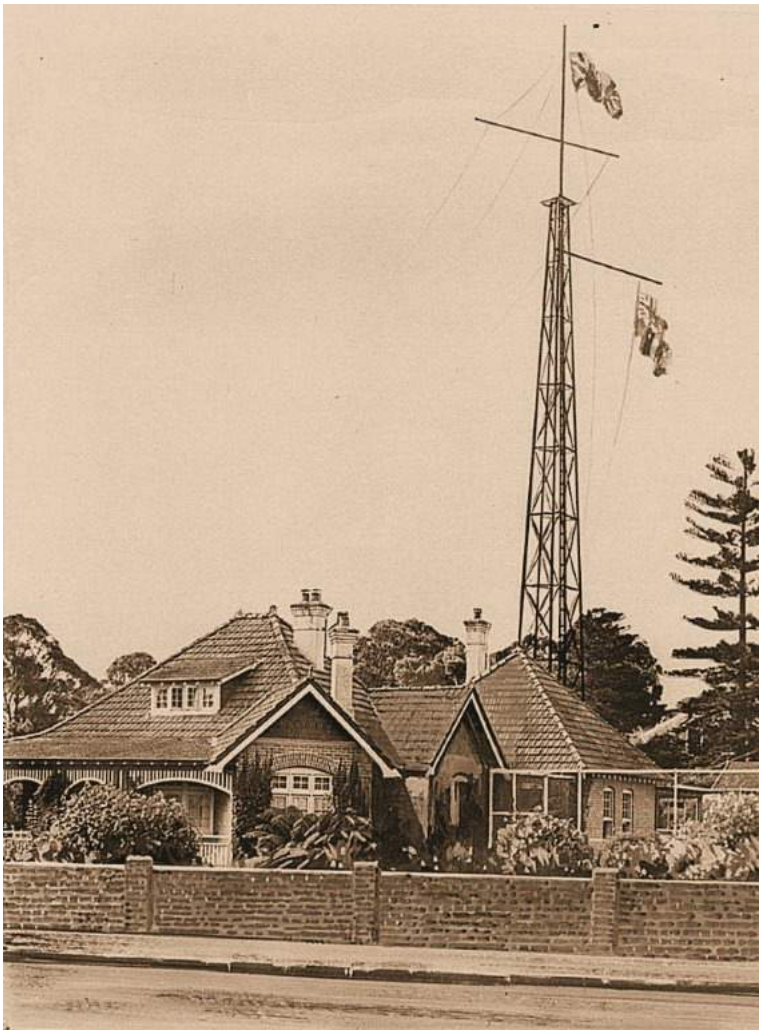
THE FIRST DIRECT WIRELESS MESSAGES FROM THE UNITED KINGDOM TO AUSTRALIA

By COLIN MACKINNON

ON 22ND SEPTEMBER 1918 direct wireless messages from the U.K. were received in Australia, creating considerable public interest and causing a political controversy. The messages were transmitted from the big Marconi station at Carnarvon in Wales and were received at the home of Ernest Fisk, the Managing Director of Amalgamated Wireless (Australasia) Limited (A.W.A.).

Two communications were sent, one from the Prime Minister of Australia, Mr. W.M. 'Billy' Hughes, who was in England trying to raise enthusiasm for the Australian war effort in Europe because public support was waning and the disastrous English military leadership of the Australian forces was under serious question. The second message was from the Minister for the Navy, Mr. Joseph Cook, who accompanied Hughes. Australia's efforts to sell its farm produce to England were being frustrated by the English farmers and unions, which explains the jingoistic tone of Hughes' and Cook's wireless messages.

As it happened, Germany capitulated soon after this event and both men then took part in the Peace Conference and negotiations in November 1918.



Fisk's residence, *Lucania,* on the corner of Stuart and Cleveland Streets, Wahroonga.

The two messages were as follows:

1 1.15pm Sydney time.
'I have just returned from a visit to the battlefields where the glorious valour and dash of the Australian troops saved Amiens and forced back the legions of the enemy, filled with greater admiration than ever for these glorious men and more convinced than ever that it is the duty of their fellow-citizens to keep these magnificent battalions up to their full strength. W.M. Hughes, Prime Minister.'
2 1.25pm Sydney time.
'Royal Australian Navy is magnificently bearing its part in the great struggle. Spirit of sailors and soldiers alike is beyond praise. Recent hard fighting brilliantly successful but makes reinforcements imperative. Australia hardly realises the wonderful reputation which our men have won. Every effort being constantly made here to dispose of Australia's surplus products. Joseph Cook, Minister for Navy.'

AWA published a souvenir document of the event with the heading 'The First Direct Wireless Messages from England to Australia.' with a reproduction of the actual message forms as supposedly written down in Sydney and the following additional information:

'These messages were transmitted by arrangement with Senatore G. Marconi, G.C.V.O., D.Sc. and Godfrey C. Isaacs Esq. Managing Director, Marconi's Wireless Telegraph Company, Limited, from the Marconi Transatlantic Station. at Carnarvon, Wales, at 3.15am & 3.25am (Greenwich mean time),

September 22nd, 1918.
Received instantaneously at 1.15pm & 1.25pm (Sydney time) by Mr. E.T. Fisk, Member Institute of Radio Engineers & Managing Director, Amalgamated Wireless (Australasia) Limited, - at his Experimental Wireless

General Description and Working Instructions.

The "Expanse" Type 103 Triple Magnifying Valve Receiver is designed for the best possible efficiency when used on installations employing an aerial of dimensions suitable for transmission on the standard ship wave lengths of 300 and 600 metres. Its normal range of adjustment is 300 to 6000 metres, but this may be extended by using additional units, which can be supplied, if required; the receiver combination then is known as the Type 103a.

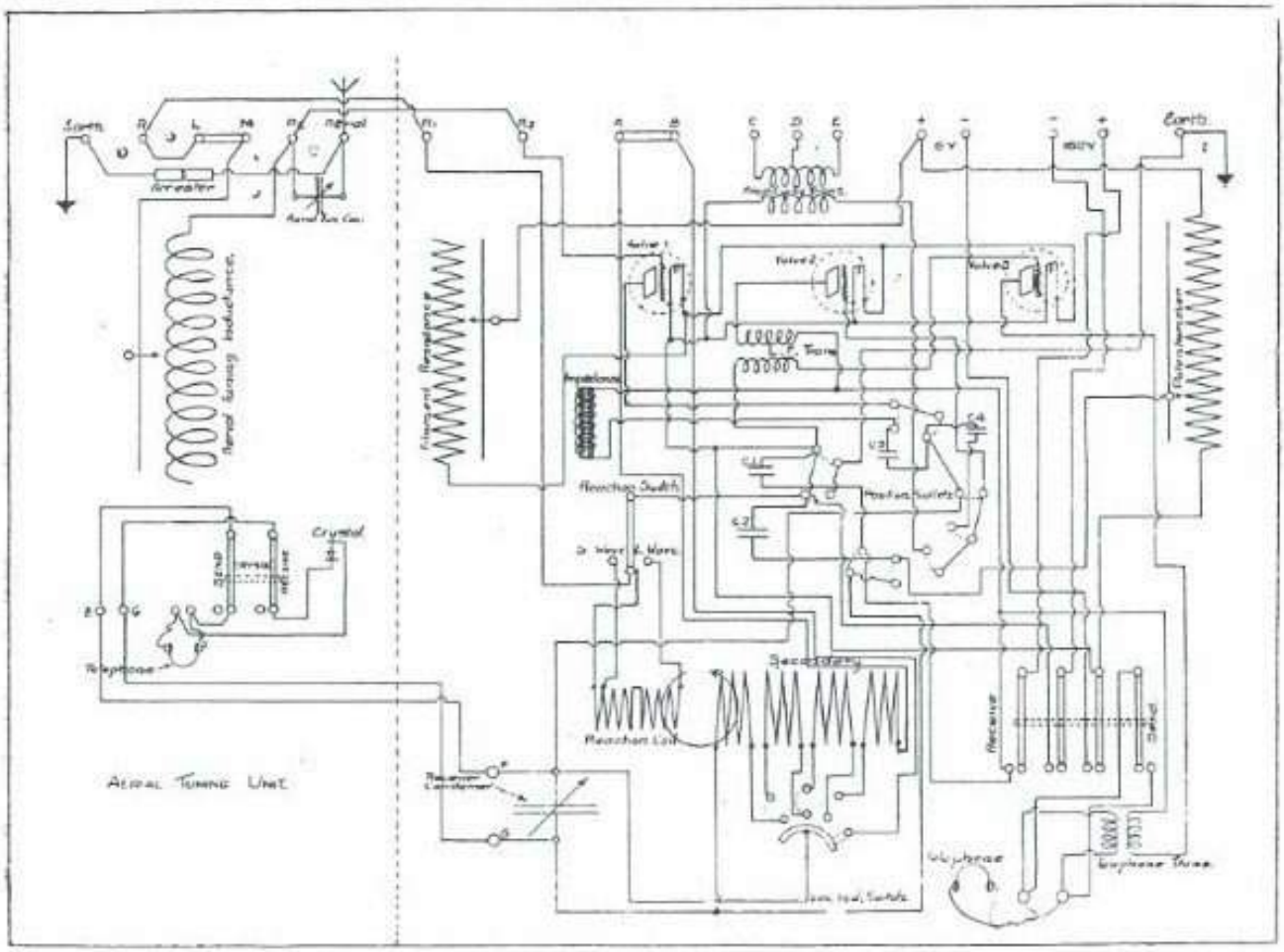
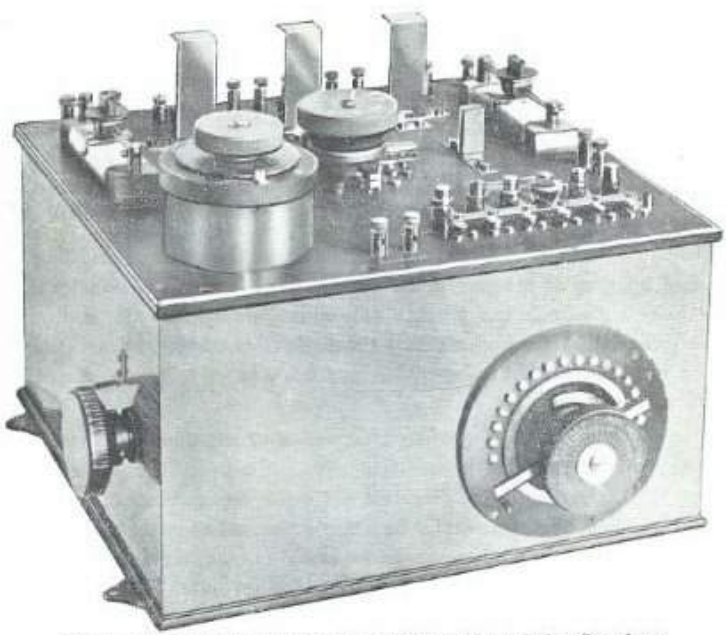


Fig. 1.



Valve and Secondary Tuning Unit of Magnifying Valve Receiver.

Designed and Manufactured in Australia.

Station, Wahroonga, New South Wales, with apparatus designed and manufactured in Sydney by Mr. Fisk and the Staff of Amalgamated Wireless (Australasia) Limited.'

Spectacular as the event was, these were certainly not the first wireless signals received in Australia direct from England. During WW1 signals from the big transmitting station at Nauen in Germany had been heard regularly in Australia, so there was every chance signals could be received from England. In fact AWA had been carrying out experimental work for more than a year prior to the official messages. At the AWA general shareholders meeting in August 1918 Ernest Fisk explained:... .we are able to read messages direct from Berlin. These messages can be heard practically all day,' .

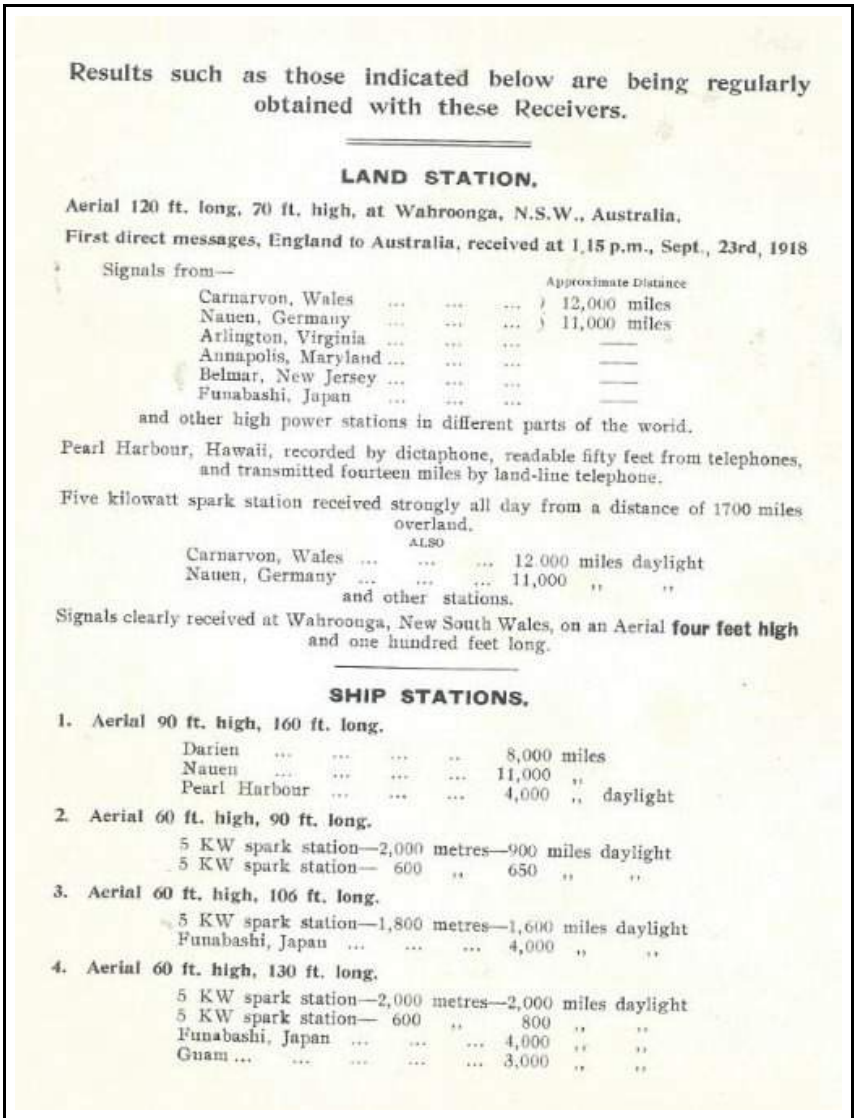
In late 1916 Fisk had travelled to England where he discussed with Marconi the German wireless intercepts and the possibility of reception of

wireless signals direct from England. It was agreed that AWA should set up a suitable receiver to listen for the Wales/Canada traffic from the Marconi Wireless Transmitting Station at Carnarvon in Wales. The UK Admiralty (which controlled the station during the war) later agreed to operate at other times, sending test messages for AWA.

On 26/2/1917 Fisk sought Australian Navy permission to erect an aerial at *Logan Brae*, Station St., Pymble in Sydney, in one of the houses that AWA maintained for its staff, in order to listen for signals from the UK. (Fisk and his staff also carried out secret transmitting tests with the Pennant Hills wireless station from this time, using the call sign AWY).

The reception equipment set up at Pymble was improved during the year and by December 1917 it was clear that signals from England could be received on a regular basis. So the installation was moved to Fisk's residence at *Lucania* on the corner of Stuart and Cleveland Streets, Wahroonga. There, Fisk erected a large square wooden tower about 25 metres high, with two antenna wires spaced about 3 metres apart and about 30 metres long, running from the Southeast to Northwest across to a mast on the western side of the property. Even though signals were being received, results were variable and it took until September of 1918 before any real results could be achieved and publicised. The new valve technology that became available during WW1 was crucial to the successful reception.

The receiver was the first that AWA manufactured, although it closely followed typical Marconi design and appearance. It included an 'Aerial Tuning Unit' which consisted of a large vertical aerial tuning coil about 500mm high by 150mm diameter with a sliding contact running down the side to select the number of turns of the coil, along with a variable capacitor mounted on a wooden base plate. The same unit was used with the Marconi long wave crystal set and the tuning range was 10,000 - 30,000 metres (30kHz - 10kHz). The valve and secondary tuning unit, called a 'Magnifying Valve Receiver', Type 103, was similar in appearance to the Marconi crystal receivers but was fitted with three Marconi type Q valves. AWA engineers used up to three of these receivers as amplifiers. Note that the AWA Type 103 receiver is nothing like the Marconi Type 103. They raised the High Tension voltage to around 300 volts (normal HT was about 160 volts) and were able to minimise unwanted feedback by individually adjusting the filament voltage to each valve. This setup ran from a high tension battery supply and a number of filament batteries which were charged from a wall mounted charging board.



Results such as those indicated below are being regularly obtained with these Receivers.

LAND STATION.

Aerial 120 ft. long, 70 ft. high, at Wahroonga, N.S.W., Australia.

First direct messages, England to Australia, received at 1.15 p.m., Sept., 23rd, 1918

Signals from—

	Approximate Distance
Carnarvon, Wales	12,000 miles
Nauen, Germany	11,000 miles
Arlington, Virginia	——
Annapolis, Maryland	——
Belmar, New Jersey	——
Funabashi, Japan	——

and other high power stations in different parts of the world.

Pearl Harbour, Hawaii, recorded by dictaphone, readable fifty feet from telephones, and transmitted fourteen miles by land-line telephone.

Five kilowatt spark station received strongly all day from a distance of 1700 miles overland.

ALSO

Carnarvon, Wales	12,000 miles	daylight
Nauen, Germany	11,000 ,,	,,

and other stations.

Signals clearly received at Wahroonga, New South Wales, on an Aerial **four feet high** and one hundred feet long.

SHIP STATIONS.

1. **Aerial 90 ft. high, 160 ft. long.**

Darien	8,000 miles	
Nauen	11,000 ,,	
Pearl Harbour	4,000 ,,	daylight

2. **Aerial 60 ft. high, 90 ft. long.**

5 KW spark station—	2,000 metres—	900 miles	daylight
5 KW spark station—	600 ,,	650 ,,	,,

3. **Aerial 60 ft. high, 106 ft. long.**

5 KW spark station—	1,800 metres—	1,600 miles	daylight
Funabashi, Japan	4,000 ,,	,,	

4. **Aerial 60 ft. high, 130 ft. long.**

5 KW spark station—	2,000 metres—	2,000 miles	daylight
5 KW spark station—	600 ,,	800 ,,	,,
Funabashi, Japan	4,000 ,,	,,	
Guam	3,000 ,,	,,	

The Carnarvon 200 kW transmitting station, call sign MUU, was actually located near the village of Waenfawr, 10 km SE of Caernarfon (the Welsh spelling). It had been built to communicate with Montreal in Canada and consequently the aerials were not aimed in the best direction for reception in Australia. The frequency of Carnarvon was 14,300 metres (21 kHz) and it was classed as only a low power station because the great circle distance between Carnarvon and Montreal is only 4,800 km. and high power was not necessary. Despite this, there was enough signal to spread around the world and once it was shown that signals meant for Canada could be received in Australia, special tests were arranged at times thought to suit communications to Australia.

Unveiling the monument: E.T. Fisk (l.) and The Rt Hon. W.M. Hughes (r.)

The monument at 'Lucania' , Stuart and Cleveland Streets, Wahroonga, Sydney, N.S.W.

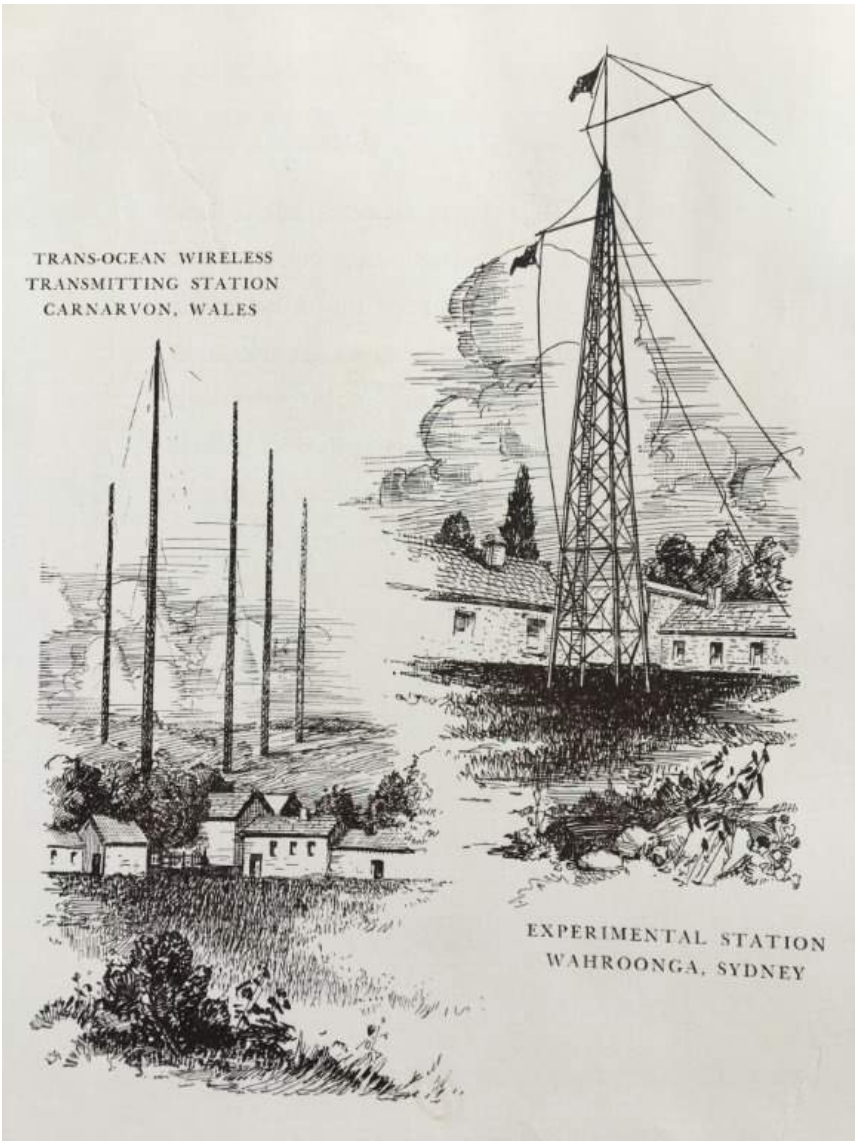
At this time the science of propagation was unknown and it was believed that the best conditions were during full daylight, using very low frequencies and lots of power Now that more is known about propagation effects, we know that this is not the most propitious time for reception. It was not appreciated till 1922 that signals tend to follow the great circle route of maximum darkness between stations. There are two such paths that wireless signals can take; the short path, i.e. the shortest distance between the two points - or the long path, the reciprocal distance between them. Signals are strongest over the short path between England and Australia (15,200 km across Asia) when both cities are in darkness. During September that is at 7.30 pm (1930 GMT) in Carnarvon and 5.30am in Sydney. A second lower peak occurs around 6.00 am (0600 GMT) at Carnarvon and 4.00 pm in Sydney when the signals travel the long path (20,800 Km) across South America and towards Antarctica, although during September there is no long path overlap of darkness at the two cities so signals would not be particularly strong. Luckily the sunspot cycle was at a peak in 1918 because the time chosen to send the messages was in between the optimum times for strongest signals.

The messages were actually sent at 3.15 am Carnarvon time (at sunrise) and received in Sydney in the middle of the day at 1.15 pm local time. However, strong long path VLF signals do start to become audible from about 12 noon Sydney time so it appears the Fisk team achieved success early in the period of opportunity and copied the full text well before the signal peaked. It is probable that Fisk invited the press and dignitaries to arrive around noon and, after suitable introductions and perhaps refreshments, planned for a listening period of a couple of hours during which he would be sure the signals could be copied.

Because there was no two way communication between Sydney and Wales, the messages were sent several times, commencing 15 minutes after each hour. The log book shows that the messages were taken down again at least twice more that afternoon but then atmospherics became very bad.

Although Fisk received the kudos (and throughout his life he was very committed to extracting maximum personal publicity), in fact it was AWA technicians who built and operated the equipment and carried out the extended trials before the public success was orchestrated.

As the trials extended over 12 months it is hard to determine all who were involved but they probably included Harry Wiles, Alton F. Vipan, T.W. Bearup, Harry M. Lamb, George Apperley, Raymond E. McIntosh and Eric Burbury. McIntosh was the one who actually



took down the messages even though 'Fisk' is the name on the message forms. McIntosh transcribed the morse code into a log book that had been in use for the experiments and the 'official' message form was written out later and signed by Fisk. The log book is now in the Mitchell Library.

Obviously Prime Minister Hughes and Navy Minister Cook were not standing by at Carnarvon at 3 o'clock in the morning. Their messages had been sent previously by wireless, or perhaps cable, from London to Wales. (Some cynics might even suggest that the entire text was known to Fisk and his staff before the event). Sydney had no facilities for replying by wireless so AWA sent a cable to England to proclaim the success.

In 1934 the Wahroonga Community Service Association, Ku-ring-gai Municipal Council, the Royal Australian Historical Society and AWA subscribed to the cost of a commemorative monument which was erected on a corner of the property *Lucania*, on land donated by the then property owner, Mr. Marc J. Rutty. The monument comprises a marble plinth with 4 horizontal arms, each surmounted by a 'British' lion. In the centre is a column with a globe of the world on top and a figure of the winged god, Mercury, with one foot on the globe. Engraved plaques on the plinth describe the event. Ernest Fisk unveiled the monument on 14/12/1935, following speeches from Prime Minister Hughes and other dignitaries. AWA produced 1000 numbered commemorative booklets of the occasion titled *An Epoch of Radio Communication* and they are now collectors' items. Over the years Mercury was stolen several times, (one time he was found in the local tip) so, as a Bi-centennial project in 1988, the monument was raised up onto a tall marble cylinder and a smaller version of Mercury was securely fixed on a very tall spike rising from the globe, out of harm's way. Patterns exist for a back-up Mercury if needed! The original Mercury is in council safekeeping. A small plaque was affixed to the steps stating the monument is now the 'Fisk Memorial'.

On September 22, 1993 the Wahroonga Amateur Historical Radio Society, call sign VK2WAH, the Kuring-gai Municipal Council and dignitaries from AWA and the Fisk family, along with children from local schools, commemorated the 75th Anniversary at the site, *Lucania*. Later, wireless contact was made from the Wahroonga home of Mrs. Jo Harris, call sign VK2KAA, with the Dragon Amateur Radio Club in Wales, operating from the Welsh site of the Marconi transmitter and using the amateur call sign GB2VK.

Lucania still exists much as it was in 1918, but all evidence of wireless activity, apart from the monument on the street corner, is long gone. The land was subdivided many years ago so the area is smaller than in Fisk's time when Wahroonga was a rural area with large land parcels and dirt roads. The concrete foundation for the tower remains and is located on the north east corner, just inside the boundary of the property next door.

Lucania has an attic, but despite the vision conjured up of an avid experimenter hidden away in his upstairs shack, Fisk and his engineers operated from a spacious ground level back room. Even so, that room was not suitable for a group photo so the equipment and assorted dignitaries were assembled out in the yard for a publicity photo of the equipment. It should also be noted that illustrations of the house showing the tower are artistic

licence ... it was not there when photos were taken and has been drawn in.

EPILOGUE

The fact that messages could now be sent direct between England and Australia caused a political controversy and added to the animosity felt between governments and the Marconi Co. Prior to WW1, Germany had set up an extensive wireless chain in its colonies around the world as well as in other friendly countries. This gave it economic, political and military advantages that were envied by the British Imperialists, but attempts to build a similar British colonial system had been frustrated by the commercial demands of the Marconi company and political intrigue in England, up to WW1.

Following the war there were renewed moves to establish a wireless network between the British colonies. The English Marconi offer to build and rent a private network was rebuffed and the Post Office pushed ahead with plans for relay stations using Poulsen (USA) wireless equipment. At the end of 1918, after successful tests, the Marconi Wireless Telegraph Company submitted a proposal to establish a direct wireless service between England and Australia, but Australia would not agree to a private foreign company controlling Australia's wireless lifeline.

In 1920 AWA (even though it was 50% owned by the Marconi Co.) submitted a similar proposal to a sympathetic Prime Minister Hughes but any action was delayed pending a 1919-1920 study by an English committee which came up with the Norman Report, named after its chairman, Sir Henry Norman. This report confirmed the Post Office thinking and recommended a chain of very high powered, very costly VLF wireless stations no more than 2000 miles (3,300 km) apart, with relay stations in Egypt, India, Singapore and then to Darwin or Perth, Australia, with a branch from Egypt to South Africa. Prime Minister Hughes, having seen that direct communications with the UK was possible, did not fancy Australia being at the end of a very vulnerable chain of stations, so he rejected any co-operation with the UK recommendations.

Instead, he signed an agreement with AWA for a direct service to the Marconi stations in England and soon after (1922) arranged for the Federal Government to take up a 50% plus one share, controlling interest in AWA by paying £500,001 for newly issued shares. That put the cat amongst the pigeons because the English government, which had had enough of the activities of the Marconi company, refused to grant it a licence to transmit to Australia, and did not appreciate a colonial Prime Minister using his new government controlled wireless company to muscle in on Mother England's rights to communicate with its colonies! Much diplomatic wheeling and dealing ensued to get the governments and antagonists to talk again. The UK Government determined to proceed with the Imperial Wireless Chain with the English Post Office to build and run the relay stations, cutting Marconi out of the action. The first two stations were finally opened at Leafield, England and Abu Zabal, Egypt. While this was going on the Marconi organisation was rapidly advancing the state of the art, with valve receivers, high power valve transmitters and research into propagation and short waves.

The September 22, 1993 commemoration by the Ku-ring-gai Historical Society of the 75th Anniversary at the site, *Lucania*.

Then in February 1924, in great secrecy, Marconi cabled AWA, asking them to build a receiver for 90 metres (3.3 MHz) and listen for 2YT at Poldhu in the south of England. The two receivers that AWA built, literally overnight, had two RF stages with tuned plate and tuned grid circuits (called a TPTG circuit) followed by a detector, whilst outboard audio amplifiers could be added to boost the signal, as required. It was installed at the Willoughby transmitting location of public radio station 2FC which had a long, tall dipole antenna and was managed by AWA. The first signals were heard at good strength (up to S8) at 5.30 am Sydney time on 6/3/1924 (1930 GMT), i.e., with both cities in darkness.

Later tests showed that 25 metres (12 MHz) gave the best all round results, including good daytime reception. Marconi was now able to demonstrate reliable direct communication to any of the British colonies, using short waves with low power and far less costly aerials and stations. He probably took fiendish delight in making his revelations in a speech to the Royal Society of Arts in July 1924. That news put the UK Government in a very difficult situation and changed all the plans for the VLF chain wireless scheme which was then abandoned in favour of what became the Beam Wireless Scheme, operating at high frequencies.

With its newfound bargaining ace Marconi was able to negotiate very profitable deals to build the stations, provide staff to run them and train local personnel. In Australia the Beam Wireless station was built by AWA, using Marconi equipment and designs, with the transmitter at Ballan, Victoria, where the small settlement that grew to house the staff was named 'Fiskville'. The receiving station was at Rockbank, also in Victoria. After several technical and political delays it opened in April, 1927.

See also article 'Ships' Wireless Receiveres' p. 35.

REFERENCES

AWA Archives, courtesy of Mrs. Margaret White, AWA Librarian.
(Many of these items are now in the Mitchell Library, Sydney)
Australian Archives.

Article and photos supplied by John and Janice McIlwaine

HOW TO REPAIR HANDLES

by RAY ROBINSON

I WAS repairing a signal generator and upon completion noticed that the plastic handles were disintegrating. This is how I repaired them.

The handle consists of a metal strip with a plastic covering. The metal was still good, but the plastic was hard and brittle. The handle normally rested flush in a recessed cavity. When the handle was used, it flexed and the plastic fell off in small pieces. The photograph in Figure 1 shows, two test instruments, one with a good handle (on the right), and the remains of a handle (on the left). In the centre, is an old leather belt.

Figure 1: Handle Metal Strip, Old Belt, Good Handle

If you select a suitable belt, you can repair the handle. The belt must be long enough (of course), and be made of two pieces of leather, and sewn down each side. Cut the belt so that it is the correct length. Slide the metal through the belt. Screw the handle back on to the test equipment.

Figure 2: Sliding the Leather Belt on to the Metal Strip

Figure 3: Finished Handle

Figure 4: Handle Attached

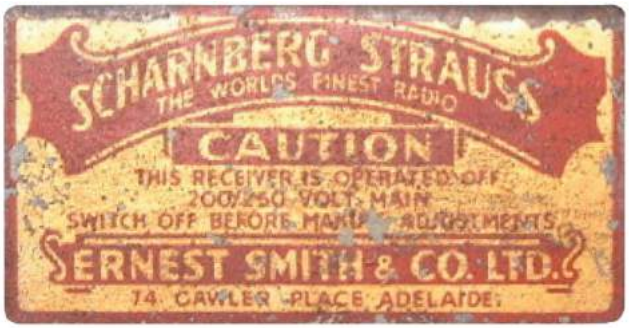
Figure 5: Handle in Use

SCHARNBERG STRAUSS ART DECO CONSOLE RESTORATION - TRIALS & TRIBULATIONS

by PHILIP LEAHY

ORIGIN

SCHARNBERG STRAUSS radios were made by National Radio Corporation, a manufacturing subsidiary of Ernest Smith & Co. Ltd. of Adelaide, from c.1932 - c.1939 and then by ErnSmiths from 1946 - 1978, the history of which is documented in Neville Ellison's book *"Adelaide's Early Radios and Tape Recorders"*.



Label on the Scharnberg Strauss radio after the removal of the spray paint

CONDITION:

When this set was purchased, the thing which stood out when viewing the back was that a previous owner had taken out the chassis and the speaker and had sprayed both with a thick coating of aluminium paint - all over the chassis, the external wiring and all external components except the valves, then put them back in. The 8" Rola speaker and output transformer and wiring had similarly been heavily spray-painted with aluminium paint. I must say that I was somewhat dismayed to find such wanton destruction of originality, applied with such diligence as would defy any intelligent being, and for no apparent purpose.

REMOVAL OF DAMAGE

I decided to try to remove the covering of sprayed aluminium paint as far as possible and started with the speaker using a cloth dampened with automotive thinners. This worked reasonably well but the thinners also removed some of the underlying original paint.

The transformer cleaned up OK and using a toothbrush and thinners I was able to get about 90 per cent of the paint off the cotton-covered wiring. The spray was removed from the speaker coil insulation which revealed the original 2000 ohm value of the winding marked there. Under the aluminium paint, the original colour of the speaker was a pale sage green with slight iridescence.

Removing the spray paint from the chassis and its components was a much bigger job. Next I took off the variable condenser, geared dial mechanism and dial lighting wiring from the chassis. All the foregoing were covered with sprayed paint, and it looked so awful and hideous I just had to get it off. There was such disgust at the spray I just had to get rid of it as soon as possible! I didn't have time even to get my camera and take photos so I dismantled the gear drive and brushed thinners over the spray. After two or three wash-downs with fresher thinners and a wash with hot water and detergent, the paint was mostly gone from the gear drive and dial backing-plate. Next the dial light wiring and globe sockets were so heavily coated with spray paint that I decided to soak the wiring as far as practicable in a tin containing thinners. I left it in for about 15 minutes and then brushed the cotton covered wiring with a toothbrush and fresh thinners over a stainless steel trough and mopped the wiring dry with an absorbent cloth. After several attempts the red and black cotton cover started to look as it should, but the rubber inner insulation was not adversely affected! Similarly, the variable condenser responded to washing down with thinners applied with a long-bristle paint brush. The power transformer was mostly above the chassis and the sprayed laminations were gradually freed of paint with thinners applied with a short bristle brush. The chassis I rubbed over with a cloth and thinners and worked around the maker's and ARTS & P decals (which also had some spray on them)!

Eventually after a couple of days toil the aluminium paint was gone and the chassis components were again visible. The chassis was affected by a few rusty patches where rodents had previously left their droppings. Little of the original paint remained but in places where it was visible, the colour was the same pale iridescent sage green as the speaker.

What to do? Should I try to mask up the remaining components on top of the chassis and spray it the original colour? Should I now leave it in this patchwork and spoilt state?

Just then along came a radio colleague to view the remnants of the set in all its despoiled glory and to try to identify which model it may be with a view to obtaining a circuit. That was actually my Waterloo, as my colleague

persuaded me that all the wiring and other components just had to come out of the chassis now, to allow it to be properly painted in the original colour! *Sacrŭ bleu!*

RESTORATION PROCESS

Two days of work got everything out of the chassis! I made several diagrams of wiring connections which had to be disconnected, and took several photographs to aid me in reassembly as at that stage a circuit diagram was not available. Some special tools were required, especially a nut-runner of the correct size (one-eighth Whitworth).

ALUMINIUM CANS

In the meantime I thought I would clean the four aluminium component-covers, valve shields and the three electrolytic capacitors, all of which had a brownish discolouration on the alloy which was evident once the spray paint had been removed. I used a solution of Cream of Tartar and hot water for cleaning the alloy. For those wishing to use this excellent method, place the components into a large stainless steel saucepan and measure how much water is needed to cover them. Add one tablespoon of Cream of Tartar proportionately for each pint of water and bring to the boil, then simmer for 10 minutes. Then wash and dry the components which are by then quite clean and as new. The Cream of Tartar solution is super-saturated but can be bottled for reuse. Do this whilst still quite warm otherwise the Cream of Tartar will precipitate.

Chassis after paint removal

WIRING DISCONNECTION

Taking out the wiring meant unsoldering the components which were mounted on the top of the chassis. Before doing this I sketched the wiring configuration and tagged each wire as it was unsoldered. In several places the earth bus was soldered to the chassis, and to unsolder these points required a large, heavy-duty soldering iron.

The two pots and wave-change switch were carefully pushed back into the chassis, and with all components unbolted or disconnected, the wiring was tipped out of the chassis (photo).

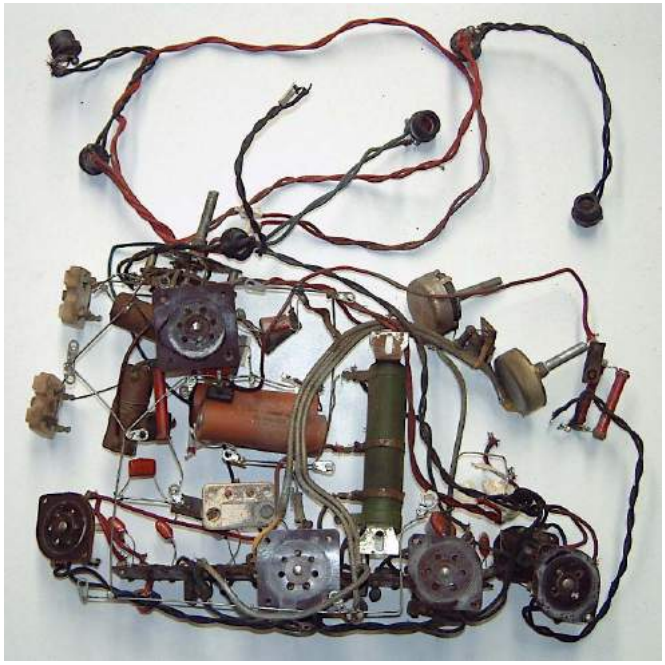
REPAINTING CHASSIS AND SPEAKER

The chassis was rubbed down dry with 240 grit aluminium oxide paper, the decals being carefully masked off with a margin of 1/16" all around. I wiped the steel chassis with *Prepsol* solvent and treated the steel with *Wurth* Rust Converter to oxidise the surface rust. The latter dried overnight to a matt black to which the undercoat could be directly applied. I masked off the drillings and cut-outs in the chassis by applying 50 mm wide masking tape to the underside, and covered the open bottom of the chassis with a sheet of paper and masking tape to prevent any overspray entering the underside of the chassis which I had decided to keep in the original sparse matt-black finish, as it was not damaged.

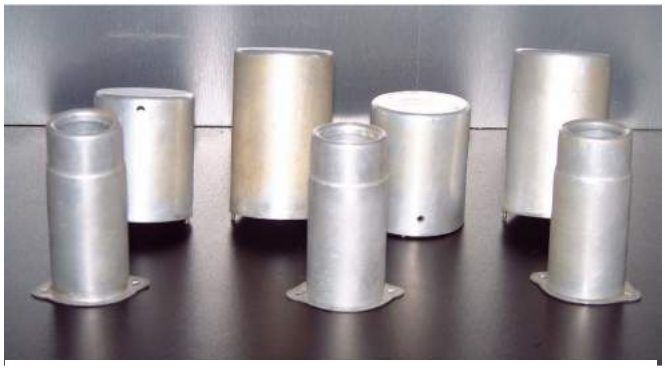
The speaker case and magnet were also suitably masked, and automotive acrylic undercoat was mixed 50/50 with thinners and strained into a spray gun pot. Two coats of undercoat were applied with the spray gun and allowed to dry for 30 minutes then lightly rubbed with dry 600 wet & dry paper.

MATCHING ORIGINAL CHASSIS PAINT

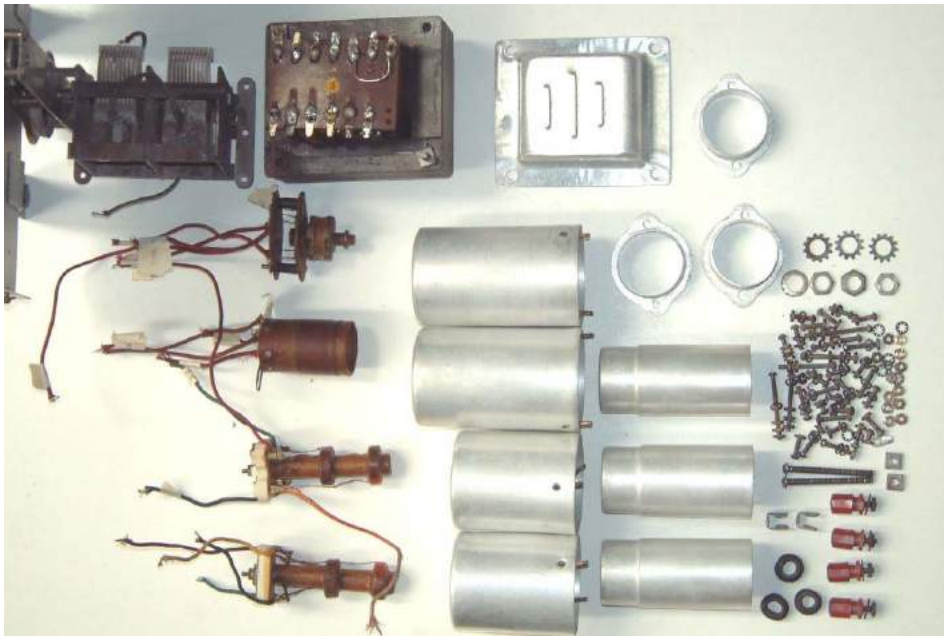
I had previously taken the stripped chassis with remnants of the original paint to the chaps at Complete Auto Paints in Westall Road. They will mix-up paint to match remnants of colour while you wait, and if needed put the matched paint into a spray can which is primed ready for use if needed. In my case I got half a litre of the matched paint with a little matting agent added to give a dull surface. Back at the workshop, the paint was mixed 50/50 with thinners and two full coats applied to the chassis and speaker parts, and it was all back to what it was like originally. Now all that was left to do was to reassemble it all and get it going. What a job!



Removed wiring and components



Alloy cans before cleaning



Cans and other components after treatment

RE-ASSEMBLY

New mounting grommets to fit 3/8" chassis holes with a 1/8" hole to take the mounting bolts were obtained from Clark Rubber at 95ў each. These were inserted in the chassis, four to carry the variable condenser, two for the dial frame mounts and four for the chassis mounts. All the 1/8" bolts with which components were attached to the chassis carried some rust on the heads but had brass nuts, so I tried polishing the surface rust from the heads but the result was a bright head subject to more rust in the future so I decided to do it properly, and have them plated in passivated zinc finish together with the dial-lamp-cases and dial holding brackets. The nuts were all brass, so I cleaned them by soaking them over-night in standard brass cleaner. The brass cleaner is made up in concentrated form and then diluted 1:10 with water for cleaning. After immersion in the cleaning solution, brass parts are then rinsed in hot water and dried. The concentrated brass cleaner is made up of 1 part of Oleic acid (*Symex*), 2 parts acetone and 4 parts strong ammonia (8/80).

The large dial was made up of two sheets of glass cut in an octagonal shape. The first was marked with the normal Australian broadcast band stations, and the inside dial marked only with the short wave bands. Both glasses are lit when the broadcast band is selected, and the short-wave glass is lit independently when that band only is selected on the selector switch. This separation was very effective. Both sheets of glass had a layer of dust which needed to be removed. How to do it? I took each sheet of glass and carefully dusted it with a lens brush; the type available for camera lenses. I then carefully washed over the outside of the glasses with a tissue in warm water with just a couple of drops of detergent, then rinsed and lightly dried off with another tissue. When dry I lightly polished the glass with a microfibre lens cloth. The glass had a backing sheet of black card, and a further sheet of masonite (or similar) behind. The sandwich of glass and backing board was held to the metal backing stand-plate with four small brackets bearing on the glass through a piece of 1/16" cork gasket material which I replaced.

Accurate reassembly of the chassis and wiring relied on the taking of good legible notes during disassembly. As each component was replaced, it was necessary for me to consult my

notes and the temporary tags placed on each disconnected wire to know where to solder it in again. I also had to consult photographs of the wiring to check the original routing of the wiring which I considered to be well done originally, and my objective was to get it back together in the same way. A circuit diagram from a National Radio Model 48 was located but was different from the circuit in the Scharnberg Strauss. The circuit was subsequently traced by a colleague and drawn up by the author.

I replaced each component one at a time and reconnected the wiring, and at the same time checking it against the circuit diagram. Most of the capacitors had previously been replaced with polyester circuit-board type caps. Once I had all the components in place and wired up, I then set about replacing all the capacitors with the more-correct axial-pigtail type which fitted better and looked considerable neater than the parallel-pigtail type. I took out earlier replaced Ducon electrolytic capacitors which were 16mfd instead of the design 8mfd, I also replaced the two 25mfd 50v electrolytic with 22mfd 63v.

Reassembly of the 8" Rola speaker was more complex as it had to be done in two stages. Firstly I assembled the humbucking coil and electromagnet onto the heavy base plate and stood that assembly on the back of the electromagnet. This gave me the opportunity to get a uniform clearance around the pole of the electromagnet where it enters the base plate and make sure it was evenly spaced all around (where the voice coil resides). To get this space even, with the pole in the exact centre, I measured the two diameters and concluded that the clearance was equivalent to 0.040" or 19 gauge. So I looked for some 19 gauge copper wire but eventually settled for six or seven wire brads which were the exact size when placed in the gap to equalise the gap all around (see photo). I aligned the screw holes, placed a couple of small dabs of epoxy between the base plate and the electromagnet case, temporarily tightened the screws and left to set overnight. All I had left to do then was to remove the spacer brads and screws, and carefully place that assembly onto the speaker frame with the voice coil centred in the gap, and bolt it all together.

The speaker transformer was open circuit, and from enquiries I found that I could get a replacement winding of the correct size (13/16" x 11/16" x 1") with the required 7000 ohms, 2 ohms. This I did instead of rewinding the original. After it arrived, I wondered which windings were which and how to connect it (in a positive and absolute way) to the original speaker cable where black and yellow disappeared into the electromagnet on the speaker, and the other two (green and brown), went directly to the speaker transformer winding. Was the latter the primary winding? How can you tell, can you distinguish which one it is with a multimeter? I decided to inspect the set wiring. The black and yellow went to the two fat pins of the plug at the back of the chassis, these in turn went to the rectifier valve (yellow) and the output valve screen (black). Of the two slim pins, one was connected to the voltage divider and was also bridged to the screen of the output valve (green) and the brown went to the anode of the 42 output valve. (I concluded that as the black and yellow were fed by the rectifier, these two pins were probably the primary winding of the transformer, and that was the case). The core was inserted into the new transformer winding, and this assembly was inserted into the case (making sure that the paper spacer was in place between the E and I of the core laminations) and the two pairs of wires brought out of the transformer to the correct location at the speaker terminal strip. The primary winding leads were joined to the original wiring harness and brackets attached and bolted up. This left the hum bucking coil and secondary winding to connect to the speaker terminal strip.

BRINGING IT 'TO LIFE' - A TESTING PROCESS!

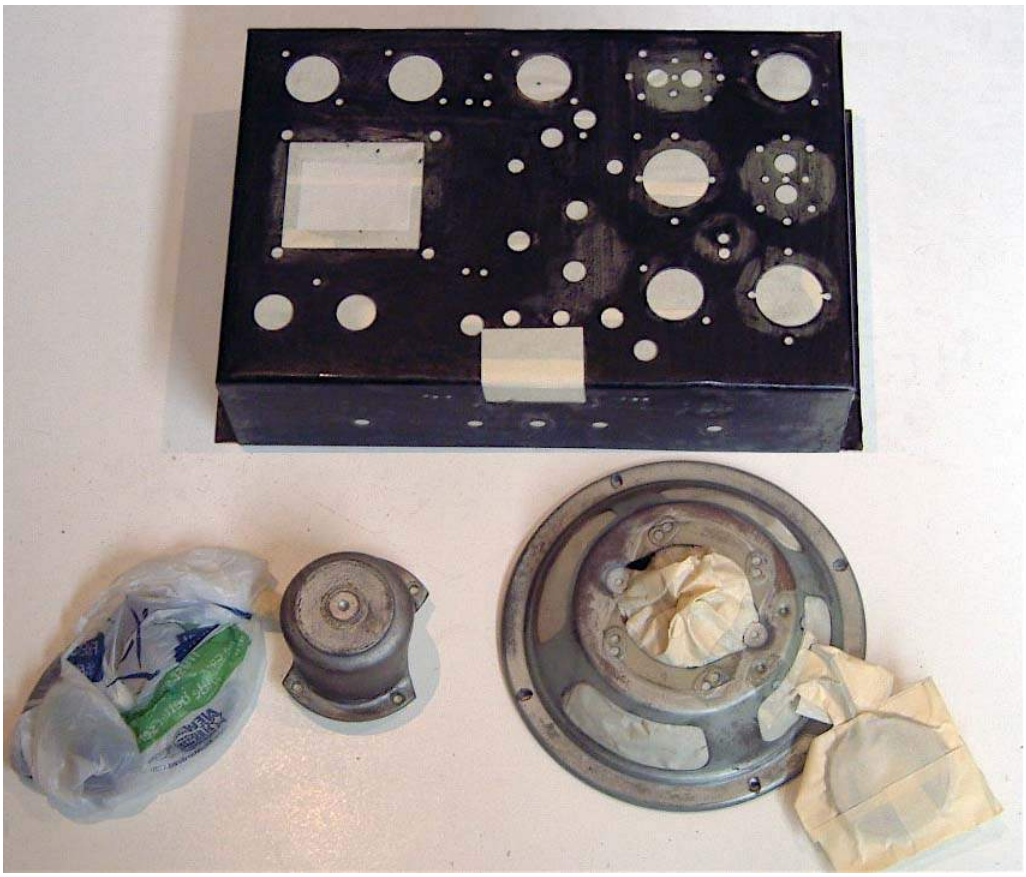
After checking that there were no shorting connections between the power transformer tappings and the chassis, valves were inserted. Did I have a Variac to incrementally limit the power as the set was powered up? No, so with the utmost confidence the power was turned on. At that moment there was a distinct and ominous 'pop', so the power was immediately disconnected! Too late; I should have used a Variac! It then became clear that the 'pop' had come from the mouth of a radio colleague who, I believe, has perfected the production of such a distinctive pop at the precise moment someone turns on the power to a set which is undergoing restoration. Quite a heart-stopper when executed to perfection as it was on this occasion!

Dial lights were operating and were switched with the wave-change switch, but no sound from the speaker. Voltages were checked and 80 volts was found on the pickup terminal which indicated a faulty resistor to be replaced. Better karma now as a heavy hum appeared in the speaker. More checking for continuity between the chassis and the valve screens - one screen had no connection with earth so a serrated spring-washer was fitted between the valve base and the chassis which solved that immediate problem as the hum had disappeared, but still no reception.

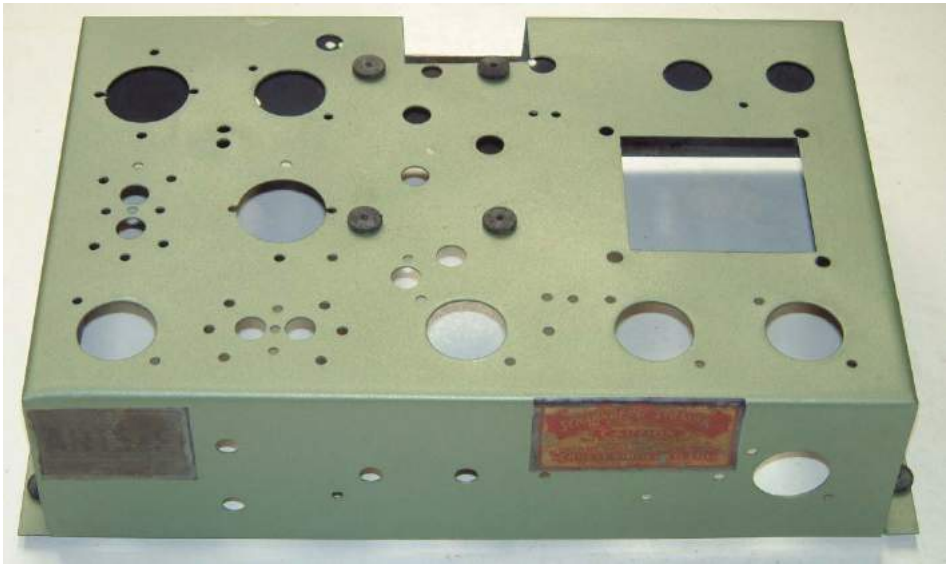
After turning the wave change switch to SW, what seemed like a weak and distant station sound was evident, but still silence on the broadcast band. Further investigation was obviously needed at the signal reception end of the circuit. The oscillator coil windings were checked for continuity and lo and behold! the primary winding was open-circuit. As I disconnected the faulty coil and tagged the wiring, I wondered if this was the last fault to be found before the set would spring into life. The coil was covered in its original wax coating and

contained two windings, one much longer than the other. It was the smaller primary winding which was open. Was this the broadcast band winding, and could it be rewound readily? This called for a conference with a club colleague who offered to rewind it, as he was fortunate enough to have a reel of the correct cotton covered wire for it.

As soon as the oscillator coil was rewound and fitted to the set, power was applied, the valves glowed, and the set burst into life. What a relief it was to hear such a rich sound out of the speaker after those seven weeks of endeavour! The set was very selective and powerful, and the reconstructed speaker had a strong rich sound - great! But it's not finished yet! What about the dial, the power cord and getting it back into the lovely cabinet, and what about the speaker cloth?



Treated chassis and speaker, ready for painting



Painted chassis, with grommets

The dial 'sandwich' of two cleaned glasses and the backing piece was set up centrally on the frame and attached with newly plated brackets and cork between the brackets and glass. There were six dial lamps altogether, two on each side which were switched with the selector switch, and two at the top. The globes were discoloured so a new set was obtained and installed with the three tubular reflector cases screwed to the dial frame. It was very effective when lit. The power cord was white plastic two core, which looked quite wrong for this set, so I found a piece of cotton covered rubber flex in good order from the 1930s, and a nice bakelite plug which I then wired in.

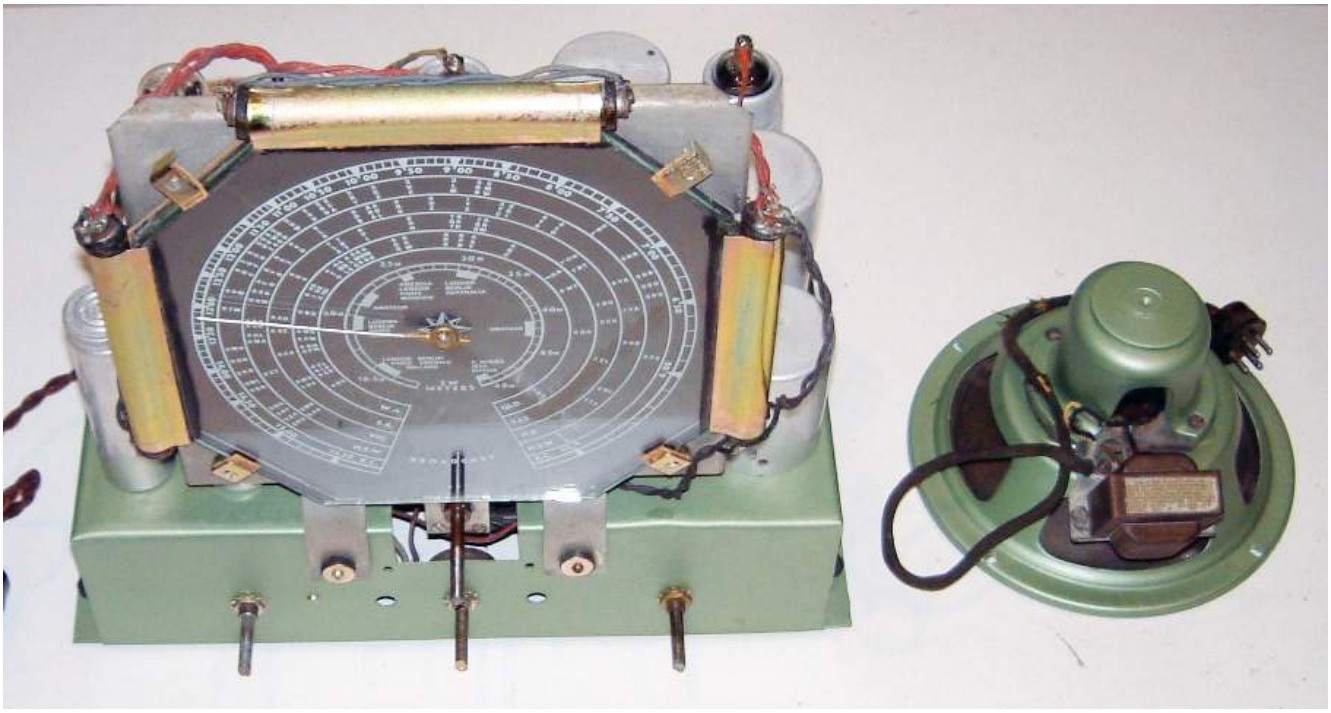
CABINET

The speaker cloth was a concern to me as it looked too whitish, but on closer inspection I could see it was in fact an amber colour and had a striking diamond pattern in the weave (see photo). It can't be right, I said to myself, so I carefully extracted the tacks which held it to the edge of the baffle board and had another look at it. Each tack hole was original, there was no evidence of any other or previous attachment, no glue, no other tack holes no evidence at all of there ever having been any other cloth, so it had to be the original cloth. It was a rather

Speaker assembly, with pole clearance wire brads

in the tapped holes at the back of the escutcheon to hold the glass brackets. I inspected the thread in the tapped holes and found that it was one eighth Whitworth and that the threads weren't badly damaged by self tapping. The bakelite was dirty and dull, and the glass had small pieces of perished rubber in places along the edge. To restore the escutcheon was essential. So I cleaned and polished it with the ubiquitous Brasso, cut some 1.5 mm synthetic rubber into a 4 mm wide strip (a small sheet of which I obtained from Spotlight) and glued it to the outside periphery of the glass aperture with a light application of easily-removable Art-Gum rubber cement. Great! The cleaned glass fitted in snugly and I found the correct one-eighth by three-eighth round-head Whitworth brass screws and re-fixed the brackets. As the focal point of this lovely set is surely the dial and its escutcheon, it had to look original and correct.

The cabinet was pure Art-Deco with light coloured cross-banded fiddle-back veneer down each side of the front and darker walnut veneer elsewhere, set off simply by



Restored chassis and speaker

heavy cloth which on closer inspection turned out to be woven in linen. The lovely diamond pattern is part of the complex weave, and on holding it up to the light the open weave was more evidence that it was the original speaker cloth, and as such had to go back, even though I didn't care much for it! I soaked it in wool-mix and after a couple of rinses and a light press from the back, it looked ready to go back.

The eight-inch dial escutcheon is brown bakelite and holds a plain glass through which the dial is viewed. An earlier owner had used inappropriate self tapping screws

two pairs of two horizontal black grille elements over the amber cloth, with wider black vertical bands each side of the front and at the corners all setoff with magnificent black deco pedestal assembly. The proportion of the cabinet elements with the 20 cm dial and four black knobs is a credit to the designers at Earnest Smith's National Radio in 1936. The timber case had a lovely patina which resulted from all the polishing and dusting it had received over the last 80 odd years, so it looked its age in a well-cared-for way. To strip it and refinish the cabinet would have ruined a fabulous, original cabinet which looked so stunning as it was, and I also wanted to

avoid the 'newness of a freshly refinished cabinet, so I decided to leave it as it was and have it look like a well cared-for 80 year old wireless. All I did was to carefully clean it up and polish the lovely timber using antique wax and elbow grease.

CONCLUSION

Although I had not previously intended to collect console sets due to their size, I have found the restoration of this lovely old Scharnberg Strauss (even though it took nearly eight weeks), to be not only a challenge in bringing it back to originality from being once despoiled, but a project which kept on giving me pleasure on each occasion there was a small success in the restoration process. I commend originality to everyone as a worth-while objective in any restoration, especially in sets which are well on the way to becoming antiques in not so many years. My thanks to other radio colleagues for much wise technical advice and support.

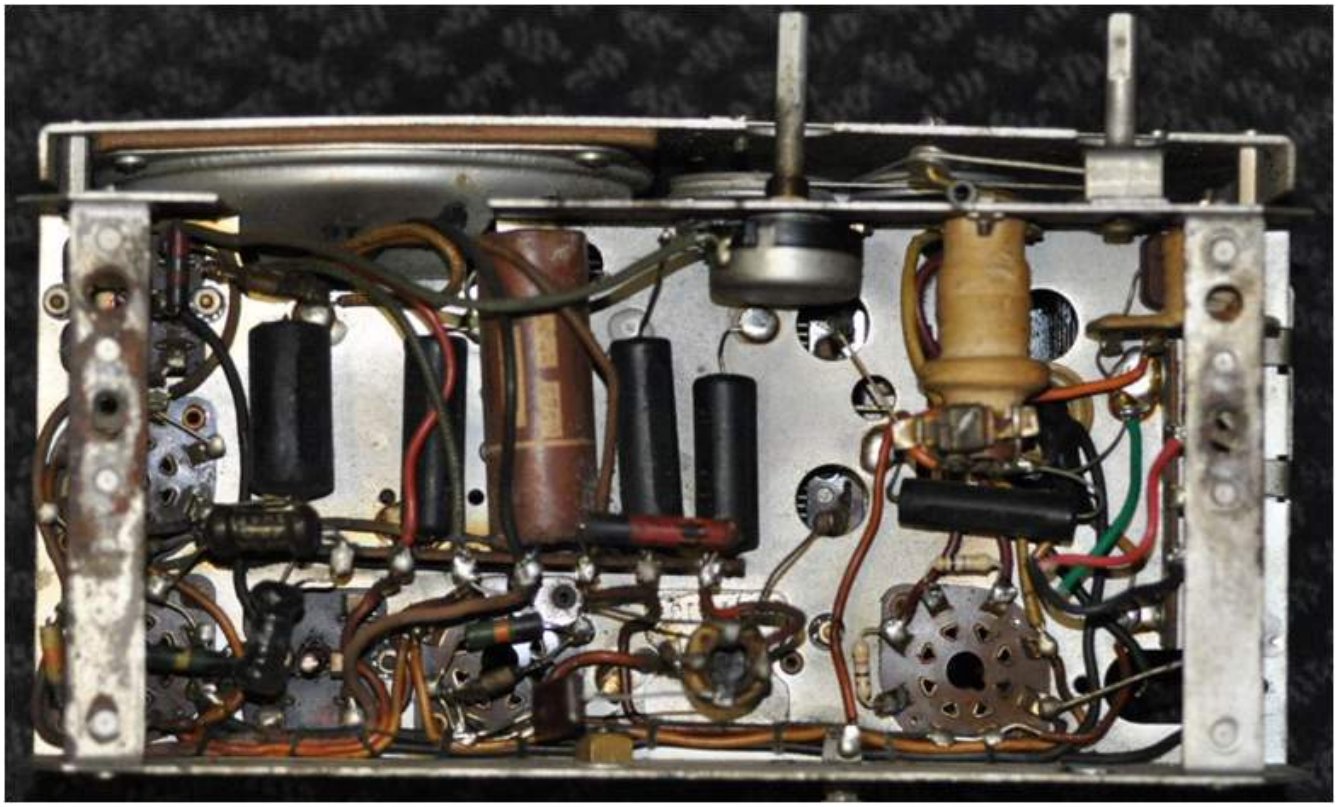
AWA RADIOLETTE 500MY AND ITS PROBLEM

by JIM GREIG

THE RADIO was bought at Ian Johnson's auction. It was in very good condition, no cracks in the case, no rust and the speaker cone undamaged. The dial glass was cracked but a replica will replace it.

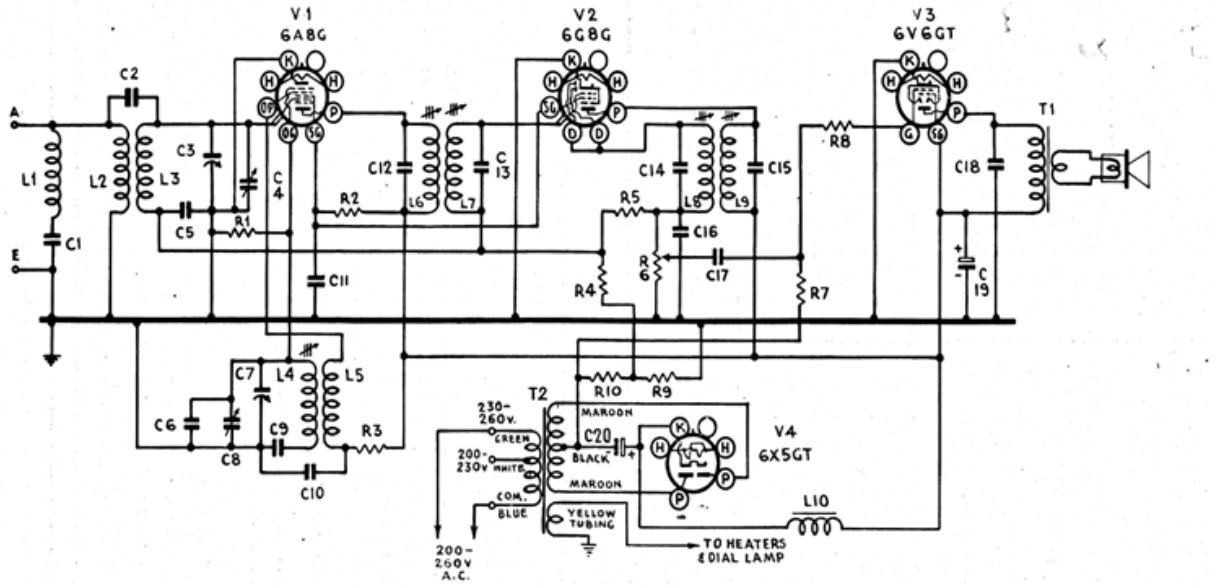
Under the chassis was clean and generally original. There were two newer 47 ohm resistors to the 6X5 plates as current limiters. The AWA literature suggests 100 ohms.

All the paper and electrolytic capacitors were replaced along with the limiter resistors and the 40k screen resistor for the 6A8 which was 53 k. The power cord was replaced and restrained with an approved clamp. The oscillator padder capacitor looked new with longer wires than would be expected. Checking showed it to be 350 pF, not the stated 440 pF and it was replaced with two 220 pF styroseal in parallel. The 20k resistor supplying the oscillator coil was found to be connected to



Under the chassis, before restoration

CIRCUIT DIAGRAM AND CODE



Circuit Code No.	Description	Stock Code or Part No.
	INDUCTORS.	
L1	Filter Choke + C1	9382
L2, L3	Aerial coil 1600-540 kc.	7647
L4, L5	Oscillator coil 1600-540 kc.	7638
L6, L7	1st I.F. transformer	17638
L8, L9	2nd I.F. transformer	17643
L10	Loudspeaker field 1,000 ohms	
	RESISTORS.	
R1	50,000 ohms, ½ watt	
R2	40,000 ohms, 1 watt	
R3	20,000 ohms, 1 watt	
R4	1 megohm, ½ watt	
R5	2 megohms, ½ watt	

Circuit Code No.	Description	Stock Code or Part No.
R6	0.5 megohm volume control	
R7	0.5 megohm, ½ watt	
R8	50,000 ohms, ½ watt	
R9	40 ohms, 3 watt	
R10	200 ohms, 3 watt	
R11	100 ohms, ½ watt	*
R12	100 ohms, ½ watt	*
	CAPACITORS.	
C1	50 uuF mica	
C2	4 uuF mica	
C3	12-430 uuF tuning (ganged)	17839
C4	1-25 uuF air trimmer	

Circuit Code No.	Description.	Stock Code or PartNo.
C5	0.05 uF paper	
C6	9 uuF mica	
C7	12-430 uuF tuning (ganged)	17839
C8	1-25 uuF air trimmer	
C9	440 uuF ± 2½% mica (padder)	
C10	0.05 uF paper	
C11	0.1 uF paper	
C12	70 uuF silvered mica	
C13	70 uuF silvered mica	
C14	70 uuF silvered mica	
C15	70 uuF silvered mica	
C16	200 uuF mica	

Circuit Code No.	Description	Stock Code or Part No.
C17	0.02 uF paper	
C18	0.02 uF paper	
C19	8 uF 525 P.V. electrolytic	
C20	8 uF 525 P.V. electrolytic (NOTE: In some cases C2 is mounted as integral part of Aerial Coil, L2, L3.)	
	TRANSFORMERS.	
T1	Loudspeaker transformer	
T2	Power transformer 50 cycles Power transformer 40 cycles	
	LOUDSPEAKER.	
	5 inch Electromagnet	*A16

* 100 ohm ½ watt resistors incorporated in plate leads of 6X5GT Rectifier as Limiters.

the raw DC rather than the filtered on an adjacent tag, so one end was relocated.

The radio was turned on with no valves and left to run for a while. The transformer remained cool, a good start. The test was repeated with all but the rectifier and again

Under the chassis, after restoration

the transformer remained cool. Filament volts were 6.4 and the high voltage 300-0-300. The rectifier was inserted and the DC high voltage checked, 300 at the 6X5 and 250 after the filter choke. I cannot find voltage charts for the 500M/MY/MZ but these are typical of small AWA sets of the time.

The local radio stations were received with a minimal aerial, but a small hum was noticed, loudest with the volume about half way. A check of the restoration work showed no deviations from the circuit. The frequency was checked on the oscilloscope and found to be 100 Hz, suggesting power supply ripple rather than filament pickup (50 Hz). Grounding the center-tap of the volume removed the hum. Grounding the input made no difference to the hum level. These simple tests suggested the hum was being injected to the grid of the 6V6 audio amp from the back (negative) bias resistors (R9 and R10) through R7, 500k ohm. To test this theory a 25 uF capacitor was connected across the two bias resistors and the hum disappeared.

Negative voltages (bias) are connected to the valve grids to set the operating point (current flow at given anode (and screen if applicable) voltages) to values selected by the radio set designers. One way to develop this negative voltage is to connect the high voltage winding's centertap to ground through a resistor rather than grounding it; in this set the voltage is -12.5.

Using the output 6V6 as an example, the cathode in this circuit is grounded and if the grid voltage was also zero a significant current would flow through the valve, destroying it. The bias resistors set the grid to around -12.5 volts. The anode curves for the 6V6 show it draws around 45 mA with this bias and 250 volts on the anode. An alternative is to ground the grid through a suitable resistor and raise the cathode to +12.5 volts by adding a cathode resistor. This resistor is always bypassed with a capacitor of around 25 uF, otherwise the audio signal dropped across it opposes the input, providing unwanted negative feedback and reducing the gain of the stage.

I have not worked on this set before and I don't know if the hum is just something people ignored, especially as it was worst with the volume half way and most likely swamped by the received station signal.

I checked a number of circuits of radios employing back bias from the AWA in the 30s to some Kriesler sets of the mid 60s and most do not bypass the bias resistors. The AWA 173 from 1938/39 does include a 25 uF filter capacitor, but it is a much more complex radio and it sold for around 32 pounds while the 500 was around 18 pounds. So I assume that a residual hum was accepted as a consequence of keeping the set simple and the selling price low.

So the question arises, to leave the radio 'original' (though with many new parts) or add a filter capacitor to improve the sound. I chose to add it and it is just visible in the lower right of the picture above.

The set was aligned as the new oscillator padder capacitor would have shifted frequencies significantly. The IF was a little out, and to receive the 540 kHz lowest frequency with the gang fully meshed required many turns of the oscillator slug. The trimmer capacitors are wire wrapped and I did not feel tempted to adjust them at the 1600 kHz upper limit. Higher frequency performance could possibly be improved but it receives the local stations well and with a longer antenna a number of more distant stations were received.

I am interested to know from readers if the residual hum is normal or if I should be looking further for a problem.

SOCIETY NOTES *from page 4*

With the arrival of television they ceased manufacturing radios and made or assembled English Pye designed T.V. receivers with PYE finally selling out to Philips in 1977.

With our AGM now in June, xxx President John gave an annual report to members along with an interim financial statement prepared by Treasurer Geoff Taylor and thanked committee members for their assistance, with special acknowledgement to members Narelle and Albert Taylor for providing refreshments at our meetings,

All positions were declared vacant and once again silence from the floor until Brian Lackie proposed John McIlwaine be re-elected President and the current committee members Ron Langhans, Peter Eldridge, Barry Poor and John Pratt all confirmed their acceptance, and following no further nominations from the floor all were re-elected unopposed for 2018/19.

A larger than usual auction followed, first clearing a ute tray load of component trays, boxes of valves and components which went for $5 to $10 per lot. Then a large quantity of members' items along with clearance of a deceased estate of radios, albeit many with damaged cases, but with some good timber table sets. All went for rock bottom prices, bargains for all and some of the first time newer members went home elated.

STC 1941 MODEL 831

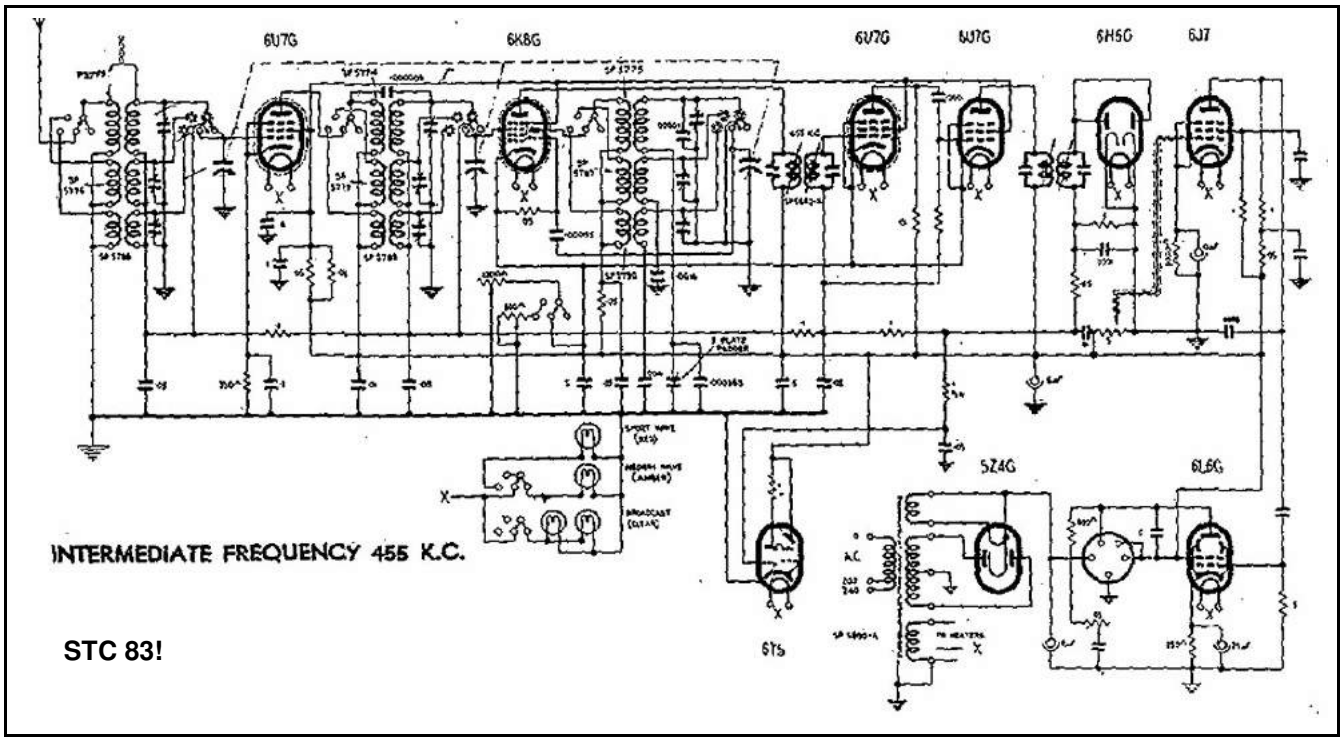
A STORY WITH A NOT ENTIRELY HAPPY ENDING

by GRAHAM PARSLOW

A COLLECTION begins with a first item and this STC was the beginning of my vintage radio collection, back in 2004. It was from a collectables shop in Yackandandah. The family that ran the shop were grieving for the death of their grandfather and it was from some of the descendants that I bought this radio. The people in the shop were not the regular proprietors, just helping the family out. They were trying to dispose of as much of grandpa's estate as possible, to clear space. At that stage I had no idea how much the radio was worth and neither did the sellers. I offered them $200 and everyone was happy. The radio got me started on finding literature to learn more about my treasure. I purchased Brian Smith's reprinted 1938 STC sales manual and that book did not have my console case in it. A picture in Rod Smith's *Best Years of Australian Radios* p.125 dates the case to 1941. The ARTS&P is stamped with a 'G'. All information suggests that 1940-41 is the correct period for this one.

The STC 831

The ARTS&P designation as No. 7 is also informative because it indirectly indicates the number of valves in the



radio. More precisely No.7 refers to the number of electron paths that are subject to royalty payments. Most radios are licensed with No. 5 decals. The STC 831 is a top shelf design with nine separate valve envelopes. Unusually, the diodes for AGC and detection are in a stand alone 6H6 miniature octal valve. This small valve is nevertheless enclosed in a full size valve shield.

The top of the case was physically abraded and affected by heat from the valves, but otherwise the case was in reasonable condition. I stripped the entire case and lightly stained the centre section of abraded plywood with a Rosewood tint. The case was then finished with polyurethane.

The radio worked and so it was left without electrical modification. The electrolytics and most paper capacitors had been replaced previously. Those previous replacements included the out-of-keeping blue axial capacitor added above chassis in place of a canned electrolytic. The enjoyment of this project started me on the path to acquiring many more vintage radios and more knowledge about them.

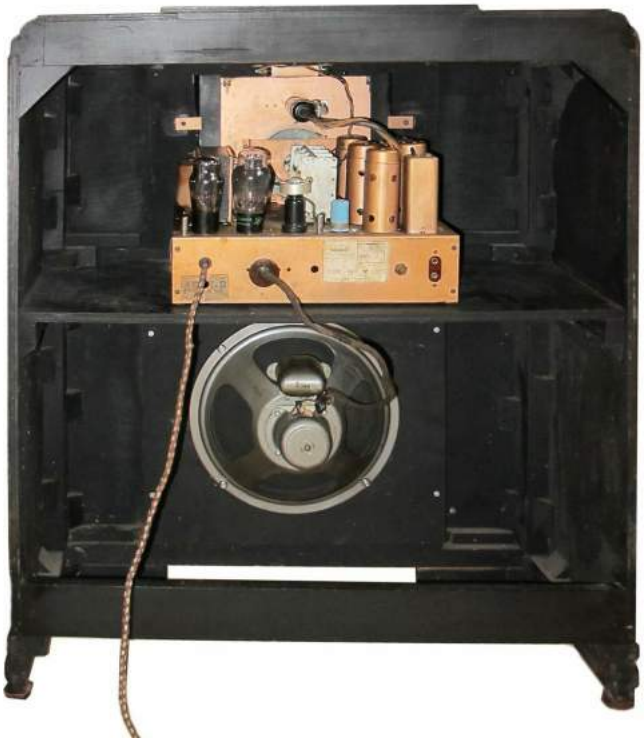
This radio stopped working in 2010 when it was producing only 50 Hz hum. It was relegated from the dining room to a spare room, waiting for a rainy day. That day was precipitated by Michael Justin (HRSA auction manager) who restored a comparable console radio and was ecstatic about the quality of the sound it produced. I was prompted to revisit my favourite console radio.

The chassis and speaker of the model 831 were installed on my workbench while the case was left in the spare room. This seemed like the heaviest chassis I had ever carried and it probably is. It weighed 10.6kg which is around twice the weight of most valve mantel radios. The power transformer on this radio is hefty and accounts for much of the weight. Everything about this chassis is solidly engineered. This radio is dense with components and built in three dimensions. Assembling stacked components is fine in the factory, but it makes repair work a challenge. Murphy's Law (at least one variant of it) states that any faulty component will be highly inaccessible. Murphy must have trained on this model radio.

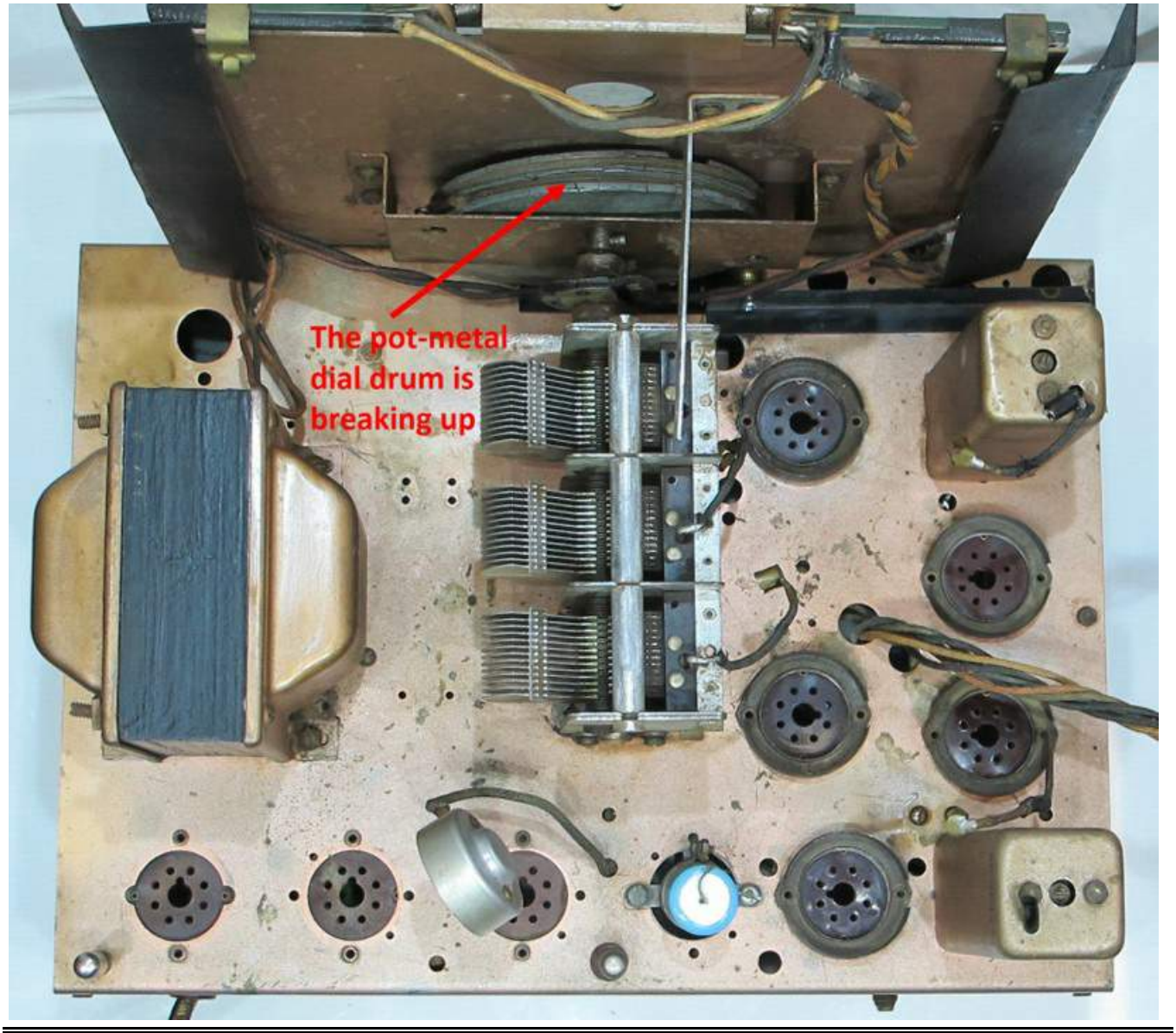
The first operation in revisiting the radio was a thorough clean of everything above and below the chassis. Copper-tinted enamel spray paint was then used to bring the shield cans and other corroded items back to good appearance. All valves were removed to expedite this process and the hope was that it was only a poor valve pin connection that had caused the failure.

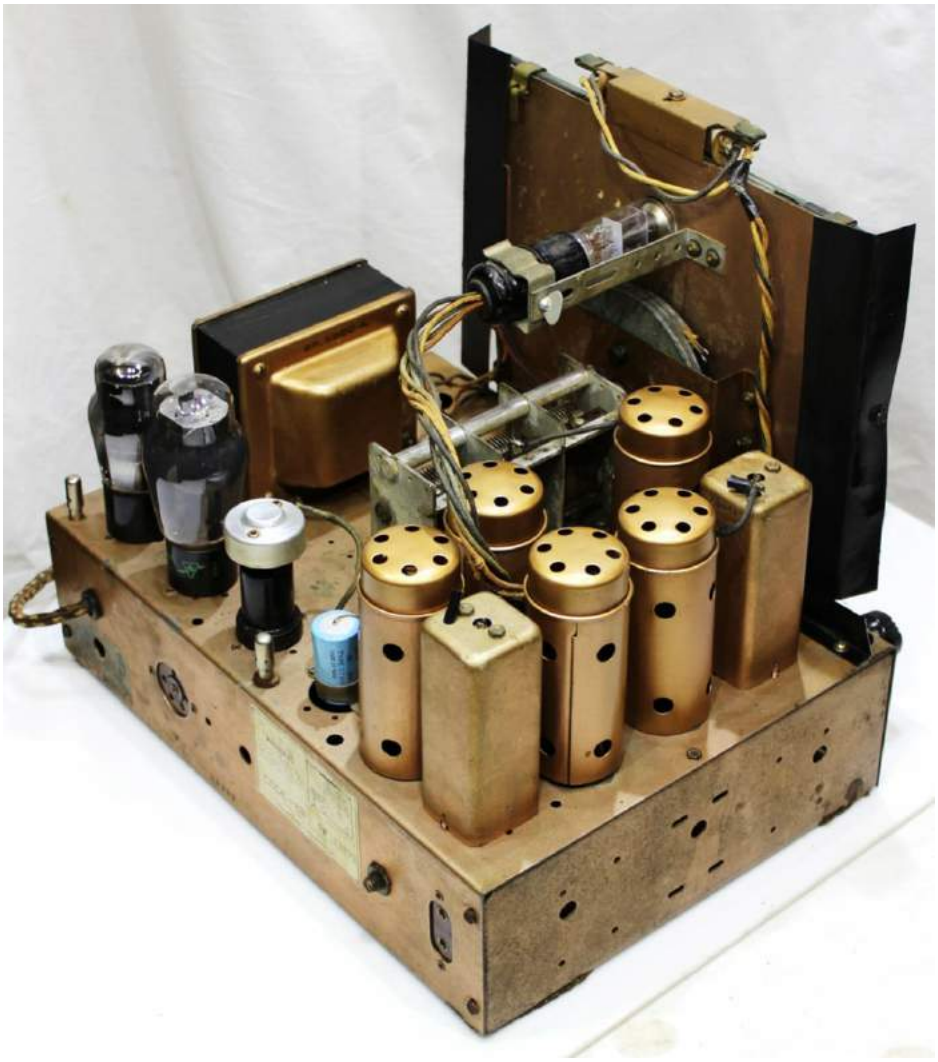
And so it proved to be. First power up was without the high tension rectifier. This tests the power transformer for stable operation and lights up the dial lamps (all came on). When the valves and speaker were added the radio worked. This was good news, but the distortion and crackle were not so welcome. Power consumption at this time was 72W; high but not too surprising. The first fault to tackle was the distortion. My immediate suspect was low bias to the 6L6 output pentode.

The relevant voltages for the 6L6 were: Cathode +1. 2V, grid +1. 9V. This means that the bias was +0. 7V and easily explained the distortion. The cathode resistor was a custom-made wire wound unit measuring 32W, surprisingly low. The Radiotron Valve data book (AWV 1944) suggests using 220W so this value was installed. The cathode voltage rose to +9. 0V, but the grid also rose to +4. 2V. This indicated a leaky coupling capacitor between the 6L6 and the 6J7 preamplifier. Replacing the 10nFcapacitor (unfortunately buried at a low level and not replaced during the previous recapping) brought the grid back to 0V. The effective grid bias was then -9V. Power decreased from 72W to 67W. The radio was now producing sound with good fidelity, but there was constant crackle. I have learnt that mica capacitors are the most likely source of crackle. Happily, the crackle was fixed first time by replacing the 200pF mica capacitor that decouples high frequencies from the plate of the 6J7 audio preamplifier to ground.



The band select switch is a 4-position oak switch with multiple wafers. Two of the positions are identical in function and tune the broadcast band. Presumably





Oblique chassis view

off-the shelf wafers to perform the multiple switching tasks came in 4-position sets. The band switch on this radio was not always making solid contact first time when switching bands. After 78 years it is no surprise that some of the contacts became unreliable through corrosion and dirt. My response was to spray the contacts with WD-40. This spray lubricant has remarkable cleaning and penetrating properties and I had never encountered any problem when I had used it on other wave change switches.

There is a first time for everything. At switch-on, the middle wafer loudly arced then stopped arcing as the radio warmed up. Ignoring the arcing was not really an option as it became worse at each new switch on, presumably due to carbonising the wafer substrate to create conductive paths. The arcing was not a simple point to point discharge either, but multi-focal. The most accessible set of switches on the wafer selected combinations of different dial lamps to receive 6. 3V depending on the selected band. It was possible that the 6. 3V line, which is capable of high current, was causing the sparking and burning. This was the easiest cause to investigate so the 5Z4 rectifier was removed to eliminate high tension circuits. It was soon evident that the 6. 3V was not the source of the arcing. There were three more switch sections on the wafer.

The semi-enclosed unit containing the wafer switches has all of the band-dependant coils and associated alignment capacitors built in. It must have been assembled as a prefabricated unit before installation and is fiendish to work on. Some patient wire-tracing established that one section of the middle wafer fed high tension to the plate of the 6U7 RF preamplifier plate. The high tension passes through one of three alternative coupling transformers linking the RF preamplifier to the input of the 6K8 mixer-oscillator.

The most practical way forward was to disconnect the three sources of HT from the wafer and observe. That was the answer, no more arcing. Since I was happy enough to have the radio dedicated to broadcast only, the short wave feeds were insulated and left floating. The high tension broadcast feed was hard wired direct to the 6U7 RF-preamplifier plate.

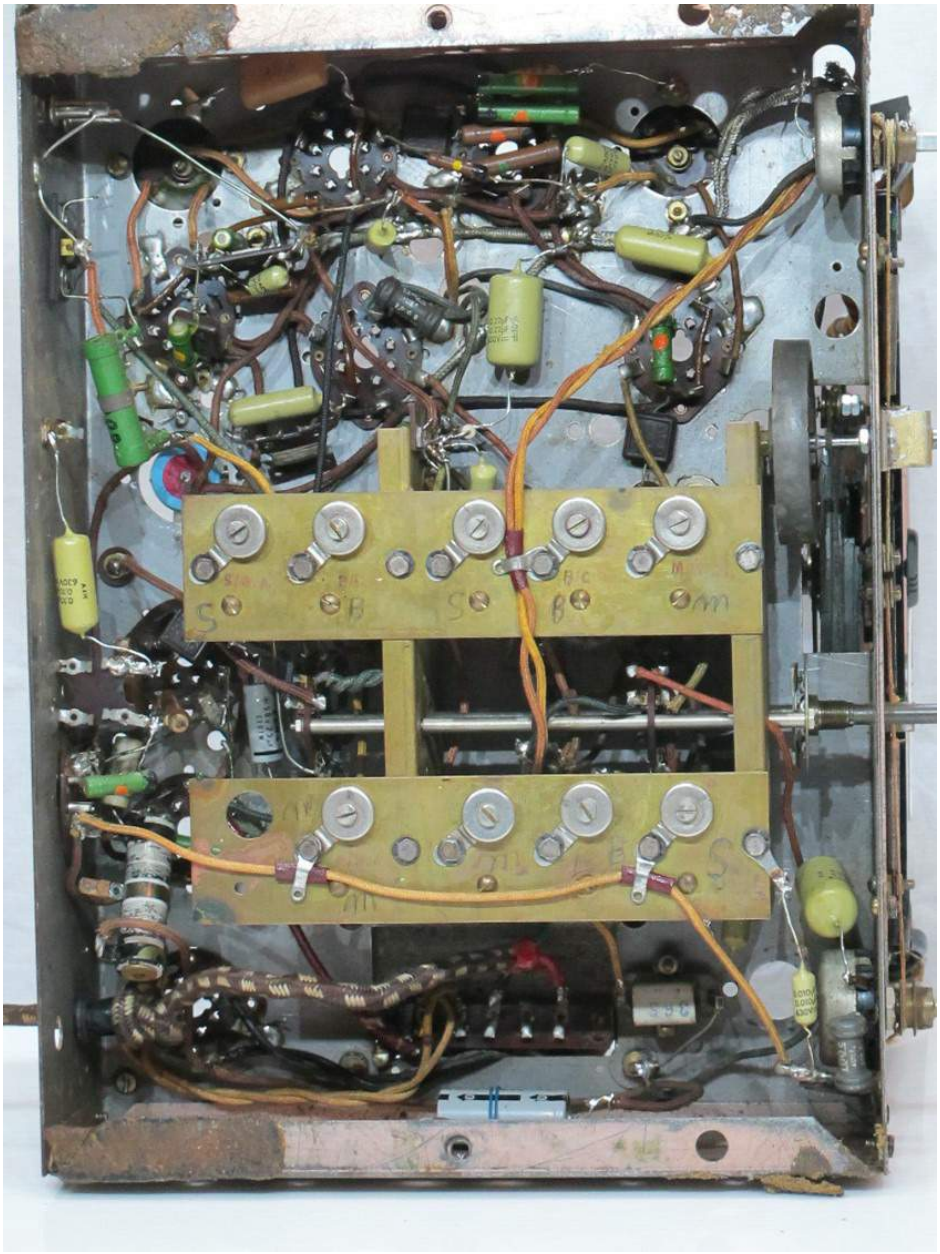
The raw high tension produced by the 5Z4 rectifier in this radio is a staggering 465V. Because the 5V cathode of the rectifier is directly heated it functions immediately producing maximum voltage that feeds through to all components in the high tension lines. After warm up, when valves begin conducting, the filter circuitry and series resistors drop the voltages throughout the set to the working values. The plate voltage at the 6U7 RF preamplifier was measured at switch on and immediately went to 465V, then fell to 140V after warm up. The 20 seconds or so in between is when the wafer arcing problem had occurred.

As the onset of the arcing coincided with spraying WD-40, it was likely that this was the cause. The web relates numerous examples of WD-40 causing problems with electrical equipment, while other users have had no problems. WD-40 is known to leave an oily residue and that residue may have been involved. After sharing my experience with Michael Justin, he replied:

A lot of people use WD40. I have tried to warn people of it, but they swear by it until they find what has happened to you. Years ago my father lubricated the wafer switch on his stereogram with WD40 and that was the end of it. I tried everything to fix it but it made the wafers conductive and no matter what I did I couldn't fix it. I could even measure the conductivity between contacts with a multimeter. In the end I had to change it.

For the future I will use CRC NF electronic cleaning solvent that is meant for such an application and leaves no residue after cleaning is finished. I purchased CRC NF Contact Cleaner from eBay for $39.95. The online seller was biz24128 located in Melbourne. It makes contacts come up sparkling clean. The slide contacts seen in the foreground of the picture below were grimy before using the CRC product. The radio had become a one-band radio. Sadly it also progressed to a radio with restricted station selection. The elegant dial with a pointer sweeping through 270 degrees is driven by a gearing system enclosed in a pot-metal dial drum. The pot metal is now breaking up and the internal gears no longer mesh as freely as they should. The result is that the dial drum is hard to rotate. This can be done manually by directly turning the drum by reaching over the chassis. However, when using the tuning knob the high internal friction of the gears causes the dial cord to slip on the spindle connected to the tuning knob. Adding extra tension to the dial cord did not entirely rescue the situation. In warm weather the tuning knob is completely ineffective in rotating the drum. In colder weather some control of rotation returns, but never over the full bandwidth. The radio can at least be left tuned to a favourite station.

The radio remains in the spare room where it can be enjoyed, from time to time, to listen to ABC Radio National. The good news is that It sounds like the high-end radio that it truly is.

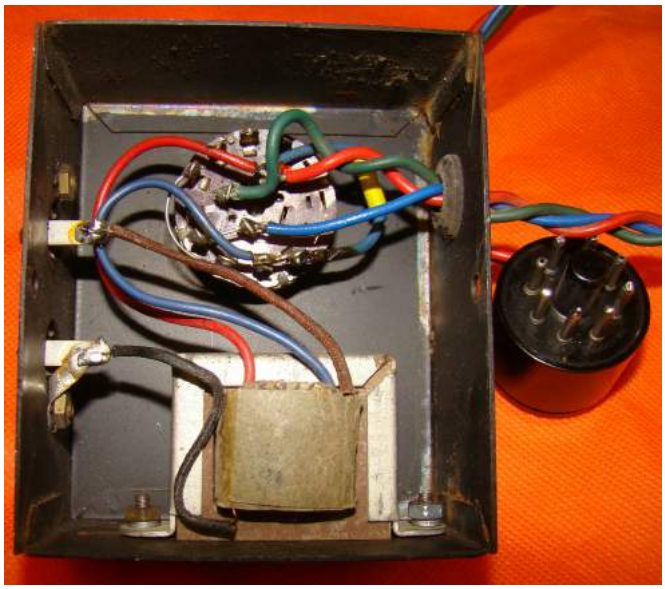


AEGIS REMOTE CONTROL SWITCH BOX WITH LEAD AND PLUG

by BRIAN GOLDSMITH

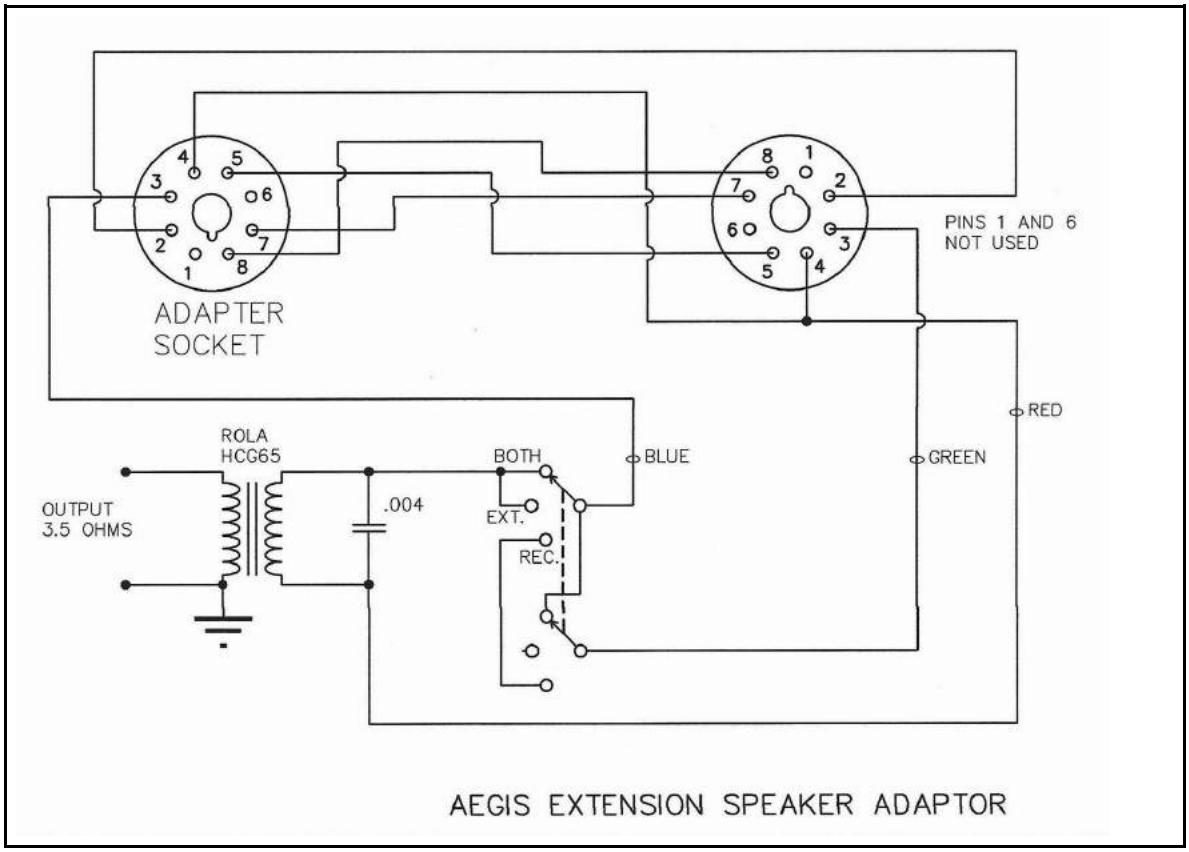
I CANNOT recall where or when I found the Aegis extension speaker control. Probably, it was many years ago after which it was consigned to the 'might fix it one day' box. Recently, while clearing out stuff I came across it again. It was missing its octal plug/socket adapter and I had no idea of how to connect a replacement adapter.

I searched through my 1940s *Radio and Hobbies* and found an advertisement for the Aegis Extension Speaker with Control (in 1949 the cost was 42 shillings and sixpence for the control box and sixty eight shillings for the round extension speaker cabinet complete with a Rola 6 inch speaker).



Now I was able to ascertain that the power output valve was removed from its socket, the control switch box was plugged into the vacant output socket and the output valve was then plugged into the piggy back adapter. Out came a pencil and paper to reverse engineer the circuit of the control box.

continued on page 31



A STEREO WALKMAN VALVE AMPLIFIER

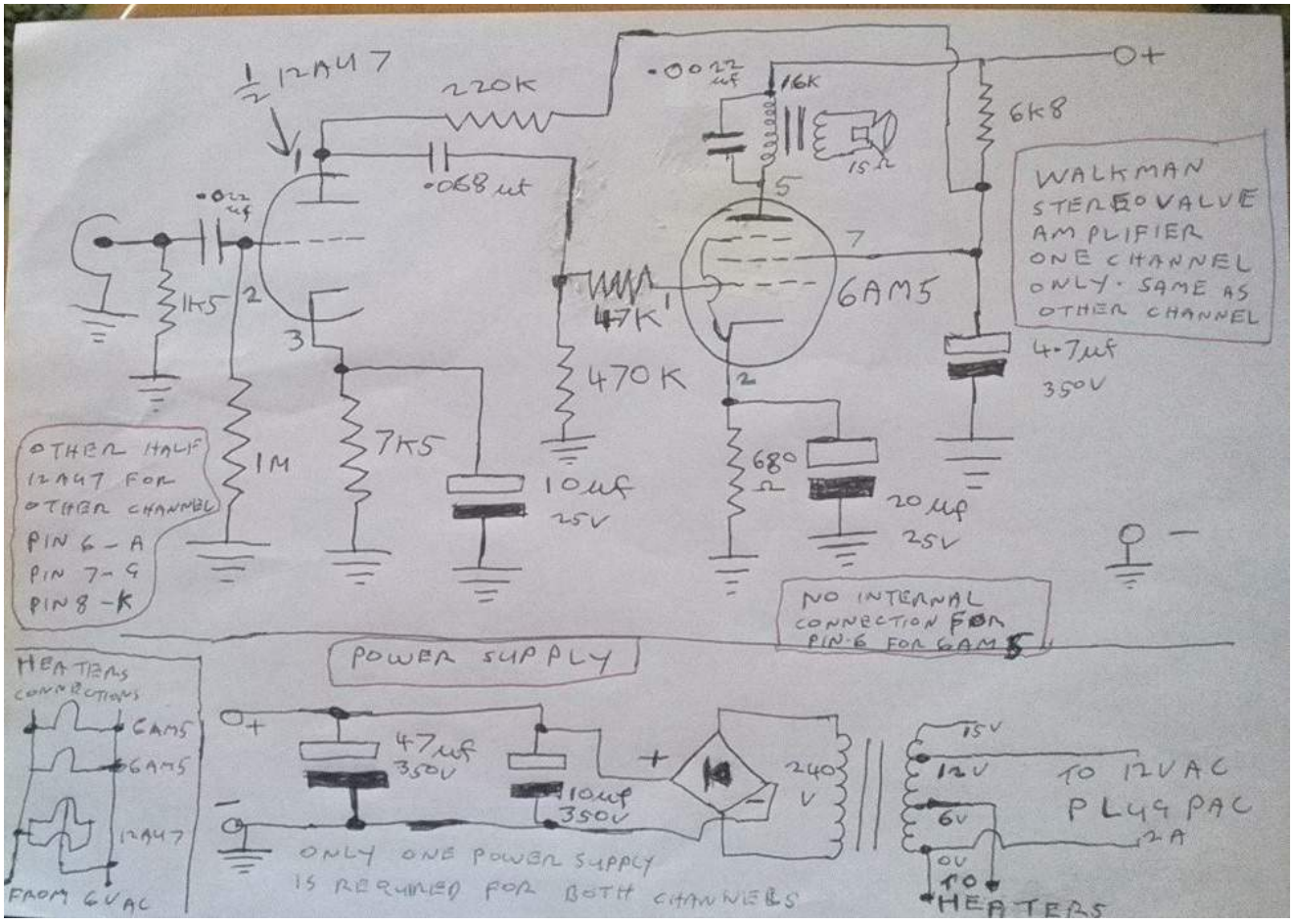
by STEPHEN KANDILIOTIS

I HAVE BUILT A STEREO Walkman valve amplifier which I have described in greater detail below. I designed this amplifier to amplify the headphones or headset devices, so that I can drive a pair of speakers from the headset or headphone device. I designed this amplifier, naturally, from a valve data book (also an electronics handbook).

The valves for this amplifier are:

- 12AU7 first stage (twin triode); and
- 6AM5 output stage (pentode), one for each channel.

The twin triodes, (left and right triodes) drive the left and right pentodes, respectively. Note, this is not a push pull amplifier. You may ask, why would I use 12AU7 valve rather than the 12AX7? The answer is so as not to over amplify - headphones and headset devices have a small amplifier, and the 12AU7 valve has a smaller amplification factor than the 12AX7. It also eliminates (or reduces)



distortion. In my opinion, the 12AU7 also produces a better sound.

Volume, balance and tone can be controlled by the headset devices. Devices that I connected to that amplifier thus far include a Walkman CD player, a Walkman cassette player, a Walkman DAB radio and a mobile telephone. A lead is required to connect a device to the amplifier. The lead has a stereo 3.5mm plug (3 contact) to twin RCA plugs. Mobile telephones have a lead with 4 contact 3.5mm plug to 3 RCA plugs, however, only 2 RCA plugs are required as one of the plugs is for video. To use iPods with the amplifier, I would suggest checking the headphones and headset plug or user manual to confirm how many contacts the plug has.

I have attached photos of the amplifier. The first photo is the of the amplifier itself. The second photo provides a view inside the jiffy box (plastic chassis) of the amplifier, showing, its electronic components. The third photo is the circuit diagram of that I drew, and the fourth photo was taken in the dark and show the two valves glowing. The valve in the middle is glowing too, but the magnesium oxide covers the glow.

The audio output power is approximately 1.4 watt RMS per channel at 15 ohms. The whole system is powered by a 12 volt AC 2 amp plugpack, (the plugpack only has a transformer inside). The lead from the plugpack is wired to 0 and 12 volt tappings to the transformer, mounted on the amplifier, in other words, two transformers connected back-to-back. The 240 volt wires from the amplifier's transformer are connected to the bridge rectifier. I also connected the heaters to the 0 and 6 volts trappings on the amplifier's transformer.

This amplifier sits in the living room at home with a pair of two-way speakers that I bought from work. I play my CDs and cassettes on this system and I also listen to FM radio via a mobile telephone. Downloaded music on the mobile telephone should work as well, although I have not tried this so far.

When I transport it to other places, I take everything except the speakers. I take with me another pair of speakers which I mounted in a pair of speaker cardboard boxes. The speakers are Plessy branded and have double cones. They are lightweight and are easy to carry. It would be a simple matter to take the entire setup to small parties, barbecues, and other social functions. I demonstrated the setup to people at work and at a HRSA meeting to much enthusiasm.

This system shows just how simple it can be to create a small and mobile valve-driven system to play all of your tunes from your favourite mobile device.

AEGIS REMOTE CONTROL *from page 29*

When this was completed I still had the problem of how to make and connect a new piggy back adapter. The socket/plug problem was easy - an eight pin base was removed from a defunct 6V6G (Hint: immerse the valve base into a container of methylated spirit to soften the glass cement. When the base rotates slightly under a twisting movement, use your solder sucker to remove the solder from the pins).

For the socket part, I used an old octal socket that had a wavy spring washer to anchor it to a chassis. I sat down and drew several socket/plug combinations until I hit upon the magic connection details, (see the schematic). I wired up the socket plug combination after drilling a 6mm hole in the side of the plug. After testing for shorts and continuity, I applied some super glue to the socket walls and clamped it into the plug. A check of continuity revealed that the control box speaker transformer primary was open circuit. Checking with the Rola data manual, I found I had an 8000 ohm to 3.5 ohm transformer in my junk box. Problem solved and I could get on with repairing the myriad of other interesting little doo dahs I have accumulated.

A RADIO MAN AND HIS COLLECTION

by John McIlwaine

THE S.T.C. SHED

We visit the Central Coast of NSW to meet popular STC collector John Montgomery. Although I have known John for many years I had never visited his home and I was surprised indeed to see THE SHED and his outstanding and extensive collection of STC radios. In John's words,

MY RADIO SHED has a long and varied history. It was built in 1945 as an egg sorting shed and incubator on a chicken farm, with an orange orchard at Wyoming N.S.W. My family bought the property in 1961 and the shed has been used to house many and varied things until it became The STC Radio Shed.

My interest in collecting radios began in 2002 when I bought my first computer and checked out what everyone was talking about 'EBay'.

The best Christmas present I remembered as a kid was the AWA transistor model B24 my parents gave me when I was 13, so I looked on EBay to see if I could get that model. A few weeks later there it was, and all of a sudden a collection had started and I joined the H.R.S.A shortly after.

I collected transistor radios for two years and then moved to valve radios. When I was young we had an STC mantel model 5017. I was always impressed with the green dial, so onto EBay I went and I found it. A local man had one that needed restoring. After months of waiting for a professional to get around to French polishing the case and listening to the advice of my radio club members I gave it a go myself, and was happy with the result.

Part of John's STC collection 1928 to 1960

My son's best mate had a father who collected radios. After a year or two of 'you have to meet Frank' (another HRSA member), I eventually met him and started to meet up with him weekly. He was very keen to teach me how to repair old radios and I was happy to learn. He had worked at AWA and had vast knowledge and experience of radios and early television. I tried hard but was probably not his best student; I think I remain an eternal apprentice. Repairing and restoring old cabinets is where my real interest lies. Bob Hagedoorn was willing to share his advice and was as generous an adviser as you will find.

I was not going to collect consoles as they take up too much room. Unfortunately STC made a lot of radios long after many other radio manufacturers had closed. Although STC was a world-wide company most of the STC radios were made in Australia. A few 1920s radios were made in England but they were all I could find. As I was a collector at heart, the number of my console radios steadily grew.

The 8 valve model 830W

Generic 1932 model 635

Most of the consoles in The Shed are connected to power and aerials so that they can be listened to at any time. It is important to me that the collection is functional as well as aesthetically satisfying.

For the safety of the radios The Shed has an external lightning arrestor fitted to the aerial. For ease of cleaning and maintenance the consoles on floor level are placed on their own dolly – a platform with castor wheels. A centre island shelf- 1.2 m off the floor holds 11 consoles and 12 on the floor below. This allows 23 consoles to be in the centre of the shed using only 3 square metres of floor space.

An example of one of the earliest would be the 1928 Supersonic 8 of which I have two, one in walnut and one in teak. The walnut one has been owned by a couple of well known people and I am the current custodian. One

was owned by Richard Begbie and then Rex Newsome. It is the radio photographed in his book *Early Radios in Australia: How to Collect, Understand and Restore them.* (2002) It was then owned by Peter Eldridge who sold it to me.

I have had some fun procuring my radios. I started using a furniture removalist early in my collecting... He was a fair and decent bloke taking great care that the radios made it to me in the condition in which he picked them up. My STC Cape Heart had a trip with him to Dubbo, settled a while in his storage shed in Bundaberg then came to me on the Central Coast of N.S.W. Not bad for a radio that started off just south of Melbourne.

To pick up my STC model 630Q I got an early morning flight to Melbourne, picked up a hire car and drove the couple of kilometres out of the airport to meet the owner.

We had a cup of coffee and I checked out the radio, He said, 'Tell me how much is that radio *really* worth.' Considering my journey, I said 'Exactly what I paid you.' Nothing more was said about it and I was home that evening. The cost of the flight and the hire car I was happy to pay to have the radio in my collection.

The 8 valve model 830W came to me in 2016 from John Graham in Gympie, Queensland. During a radio meeting one Saturday morning John Murt bought in some radios for sale pamphlets. I picked one up and saw the 830W and walked out of the meeting to call John Graham. I committed to be in Gympie two days later.

On the Monday I drove to Newcastle and caught a plane to Brisbane, hired a car and drove on to Gympie and picked up the 830W. I arrived back on the Central Coast early on the Tuesday morning so that the hire car was back before I had to pay for the second day's hire. The 830W came with a bonus dial glass and a couple of 5Z4s. As I have never been able to buy that radio before or since, it was worth the travel.

After years of looking at STC console radios, something in Noosa came up that I hadn't seen before, I believe it was a generic version of the STC 635; it was an unbranded radio that had an STC escutcheon but had the STC logo missing, and the circular enamel badge was plain blue.

The case was very unusual; the speaker cut out was styled after an early gothic window and although it was sold without the speaker cloth, knobs or the 6 valve STC chassis, I had all of these spare in my collection. The STC 635 that I already had in my collection is the same as that generic radio. The STC chassis that I had fitted straight into the case.

A radio does not have to be rare to make into my STC collection; if I don't have it I am interested in acquiring it. It is not about having the rarest piece; to me it is about having a full collection of what was available at the time of production. Along with the radios themselves, I have amassed many interesting pieces of STC paraphernalia including advertising and photographs.

I had terrific luck in finding an original program from a farewell dinner held at the Carlton Hotel in Sydney for Mr H.C. Trentham; it was signed by over 60 people including Mr Sandy McPhee, a very prominent figure in the beginning of STC in Australia. There is a photo of the old STC factory from the 30s and also a photo of the 1947 Annual Ball of the Social and Athletic Club and an original 1945 *50 years of STC* book.

Well, that's the end of the STC SHED story - well not quite; I did wonder what had happened to John's transistor collection he had mentioned earlier. After a nice cup of tea with our ladies back into his home John said, 'Would you like to see more?'

There certainly was more to see, other rooms with his transistor collection and many brands of all models, several in complete sets of range and colour were nicely presented on shelves.

Thanks to John Montgomery for sharing the history of THE SHED and his passion in collecting STC radios.

John Montgomery with his STC 1938 radiogram model 520

SHIPS' WIRELESS RECEIVERS: 40 YEARS OF DEVELOPMENT

COHERER TO MULTI-VALVE

Article transcribed and edited from early *AWA Radiogram*

by JOHN MCILWAINE AWA Historian, 2018

THE FACT that in 1918 AWA was fitting a new type of multi-valve radio receiver on practically every ship in the Australian mercantile marine recalls to mind the development that has taken place in wireless receivers used for marine purposes since the first experiments of Marconi at the end of the 19th century.

In the beginning, such wireless communications were carried on between shipping or ship to shore. They employed a receiver known as the coherer detector. This instrument consisted of a loose metallic powder or granules packed into a small space between two pieces of metal, the whole thing being enclosed in a glass or ebonite tube.

Nevertheless, the coherer was effective over short distances and as far back as 1897-98 it was used by Marconi to establish communication over relatively short distances. Also, he employed the coherer in one of the earliest uses to which wireless was placed in England, namely, establishing of communication between the East Goodwin lightship and the shore. One of the few radio men in Australia who have practical experience of the old coherer was Mr. E. T. Fisk, then chairman of Amalgamated Wireless Australasia Ltd.

In 1905 came the Magnetic Detector and Multiple Tuner. The tuner consisted of three circuits with a switch on the top whereby the receiver could be placed in what was known as thee Std-bi (standby). In that position the tuning was very broad, allowing the instrument to respond to a fairly wide range of wavelengths. By throwing the switch into the tune position, tuning was considerably sharper.

The magnetic detector used in connection with the multiple tuner consisted of a clockwork motor revolving two ebonite pulley wheels on which was an endless iron band, passing continuously through the field of two permanent magnets. Owing to the effects of magnetic hysteresis, the incoming signal made an alteration in the magnetisation of the iron band and this caused the current to flow through the headphones connected with the detector.

The magnetic detector remained on many ships until 1914 and rendered excellent service in its time. Under good conditions it would afford reception up to 2,000 miles or more at night, although 600 to 1,000 miles was usual.

The magnetic detector was efficient but not foolproof. The operator had to make certain that his pulleys were revolving. If he failed to wind up the clock work about every hour no signal would be heard, and as the pulleys were black, it was not always easy to see whether they were revolving unless something white was passed over the pulleys. It was usual to stick a piece of stamp paper on the pulley. Sporting operators would use pictures of race horses which pursued each other perpetually as the pulleys revolved. One operator achieved fame by covering his pulleys with the picture of a girl running for dear life with an angry alligator in pursuit. Happily the alligator never caught up. Occasionally an operator would sit for half an hour with no signal coming through; then he would wake from his ruminations and realise the pulleys were not revolving.

The magnetic detector was superseded by the crystal detector which was later used in the early days of broadcast reception. In using a crystal detector it was necessary of course, to find a sensitive spot. This was done by means of a testing buzzer, but some of the crystal holders used by the operators were rather crude, although they gave good results. The crystal was screwed into a clip and the contact point consisted of a safety razor blade attached to a wire and connected to the other terminal of the crystal holder. The operator would move the blade over the crystal until the most sensitive point was found.

The magnetic detector and crystal were used concurrently until superseded by the three-electrode valve. The first valve receiver made by AWA for Australian ships was known as the 103, consisting of one stage of radio, a detector and a stage of audio.

It was designed and built by A.W.A. in Australia and was an item of importance in the year 1918, when a receiver of this type was used for the First Direct Wireless Communication with England on 22 September 1918. Three Q valves were used. At the same time A.W.A. was using on some of the small cargo ships the 101 balanced crystal receivers. About 1921, the P1 panel type of receiver, using Expanse B valves, practically superseded the earlier type.

Changes were made in the P1 receiver from time to time, and they gave excellent service.

The early valves used in the P1 receivers were 'soft'. In other words, some gas remained in the valve in contrast to the modern valve in which a very high vacuum is obtained. A soft valve may be working very nicely until the door of the wireless cabin was opened. A cold draught of air blowing on the receiver would alter the characteristics of the valve and perhaps make it impossible, temporarily, to carry on reception.

Modern research with the new screened grid valves followed and later developments in valve design permitted rapid advances in receivers. The modern marine receiving set comprised highly selective and sensitive equipment and was undoubtedly the finest type of receiving apparatus on ships in the world at the time. Not only in superheterodyne principle used both on short and medium waves but for the wave bands up to 20,000 metres extremely efficient tuned radio frequency receivers had been developed.

By the simple means of a switch the requisite tuning arrangement to cover any particular band of frequency is selected at will. This feature represents one of the most efficient means of covering the frequency spectrum and is quite different to most of the older types of receivers where losses were incurred through coils being in circuit, although not actually required for the frequency in use.

One precaution is still taken. If an unexpected calamity occurred - suppose every valve in the set was burnt out and every valve was broken-the A.W.A man would still carry on with the aid of a standby crystal receiver.

Later developments with semiconductors and intergraded circuit devices replacing the old valve technology would again revolutionise receiver design.

DETAILS OF AWA RECEIVER TYPE 103 USED IN SEPTEMBER 1918 DIRECT COMMUNICATION WITH BRITAIN

The new valve technology that became available during WW1 was crucial to the successful reception. The receiver was the first that AWA manufactured, although it closely followed typical Marconi design and appearance. It included an "Aerial Tuning Unit" which consisted of a large vertical aerial tuning coil about 500mm high by 150mm diameter with a sliding contact running down the side to select the number of turns of the coil, along with a variable capacitor mounted on a wooden base plate. This same unit was used with the Marconi long wave crystal set and the tuning range was 10,000 - 30,000 metres (30Khz - 10Khz). The valve and secondary tuning unit, called a "Magnifying Valve Receiver", Type 103, was similar in appearance to the Marconi crystal receivers but was fitted with three Marconi type "Q" valves. AWA engineers used up to 3 of these receivers as amplifiers. Note that the AWA Type 103 receiver is nothing like the Marconi Type 103. They raised the High Tension voltage to around 300 volts (normal HT was about 160 volts) and were able to minimise unwanted feedback by individually adjusting the filament voltage to each valve. This setup ran from a high tension battery supply and a number of filament batteries which were charged from a wall mounted charging board.

Melbourne Group

HRSA PICNIC AND COMPETITION APRIL 2018

FOR this year's picnic the weather threw its worst wet and windy conditions ever. . Despite this, numbers were hardly down if at all, although some had to leave early. Tee and I were very appreciative of the attendance and support, despite the weather.

The competition judging was accomplished under the most adverse conditions, rain on the roof, very high electrical interference, and some weak stations severely attenuated. Also Mike Justin and I were fill-in judges, so a little longer time was needed. The criteria were the same as used as in previous years.

The theme this year was valve portables. The five entries, owners, and final scores respectively, are shown below:

Healing 502B	Laurie Harris	55
Diason P58	Bill Smith	70
Philips 148	Graham Parslow	testing not completed
Peter Pan BPR 538	Ormond Randall	59
AWA model 451P	John MackIntosh	28

The clear winner was Bill Smith's Diason. The radio's lack of electrical interference was a notable feature. Compared to the others, this was possibly due to some excellent design in the loop aerial. The set was also most attractive in appearance and well presented.

Second place went to Ormond Randall's Peter Pan, a very respectable performer.

Congratulations to all entrants and particularly to Bill and Ormond.

Laurie Harris

Philips 148 (1951)

Photos by Geoff Trengove, Laurie Harris, Jim Easson, John Mackintosh and Graham Parslow.

Peter Pan BPR 538

Healing 502B

Diason 58P

AWA 451P

Letters to the Editor

VIDEO EDITING

from Bob Forbes

Reading Andre Switzer's article on early editing on videotape brought back a lot of memories. My experiences began back in 1966 after several years of radio communications with the likes of the PMG (Telstra to you Newbies) New Guinea and Navy Dockyard I was given a position at Austarama TV, then Channel 0.
At that time all editing was either in film or the process explained by Andre. The process was regarded as a somewhat 'black art' with videotape operators like Randall showing the way with videotape.

All videotape in those days was the 2 inch quadrature recording machines and where it was possible a machine was installed in the OB (Outside Broadcast) van for site recording, usually entertainment shows which needed the editing expertise to maintain the script focus.

As shown in Andre's article, this was not as straight forward as film editing where you could actually see the individual frames but required the 'developing' of the videotape so that the frames and the spaces between them were apparent. This is, of course, important to avoid flicker and synchronisation errors in the picture. Yes, even in the old monochrome format.

Oh, and recording in film created problems only if it was needed to transfer the end film product to video. The result was generally of poorer quality, the transfer process involving a camera pointed at a dichroic screen on which the segments of film were displayed. Virtually low scan speeds were used to get around the flicker effects caused with viewing film directly on videotape, so image quality tended to suffer.

Anyhow, enough of repeating Andre's descriptions, I would like to describe a video editing experience I had whilst working at the National TV station in Riyadh.
It was the late shift, only one of the international support crew on site, me. I heard a kerfuffle from the tape room much Arabic which I assumed wasn't nice words flowed by one of the operators running down to where I was monitoring incoming/outgoing program material. The gist of his problem was that the tape he had been setting up for replay that evening was faulty. Not being a videotape person, this was not what I wanted to hear but went off behind him to investigate. I was shown a reel of 2 inch quad tape with a large section physically scrunched. The operator indicated I should fix the problem but when I asked where the magnetic developing gear and splicing tool was I got a definite '*what*?'.

Oh dear, I thought, or words to that effect. So having spliced 8mm film in the past I figured I might give it a go.

The process involved laying the videotape out on a flat surface, part of the Ampex VR1000 machine itself, overlaying the tape, cutting the scrunched section out then overlaying again, oxide up, on a piece of masking tape. Coincidentally 2 inch. A cut was made with a sharp knife straight down across the tape through both sections at the same time and pressing the tape hard into the masking tape.

Now, as anyone from that era knows the head gap for quad was not all that lenient but there was no other choice for a videotape that had to go to air in an hour or so.

About this time I noticed my shift was up (if you're not there it wasn't your fault routine) but had the operator run the fixed section of tape through the machine to see how good/bad my luck was. The poor old head let out a heart wrenching shriek as the masking tape went through but, amazingly, the program did not even flicker.
That's enough good luck for one night I thought and told the operator to re-cue and not run it again in case the head crashed completely. As I walked out the door I heard the poor old VR1000 screaming for mercy several times and headed off.

On arriving back at our quarters I banged on the Pommie videotape engineer's door to pass on the advice that he would have a quad head to replace in the morning. He was in hysterics of the amused type when I detailed the problem, we both agreed that luck often plays a big part in our world.

Apparently the head survived, no idea how or why.
Bob Forbes

AUCTION APPRECIATION

from Lou Albert

I wish to comment on Richard Begbie's article in the January 2018 issue. Although Richard had covered the event (my auction) in his usual impeccable manner I just wish to add my own thoughts.
I still cannot come to grips with the complete excellence of the event - not one hitch, everything going according to plan and on time.
It turned out to be quite a massive event - well beyond my imagining. I am amazed and extremely grateful to all who gave of their time and expended such energy.
There is not much more I can say, except to give my utmost thanks to Captain Marvel (Richard) and his magnificent nine. Absolutely unreal!
Lou Albert

TWO-VALVE RADIO

from Alan Ford

I was very impressed with the Two-Valve Radio described in the July 2017 issue. The finish and general appearance inside and out are magnificent, and is evidence of enormous amounts of patient work by Ron. But I was at first horrified by the remark that '…a chassis mount 2.5mm socket allows the incoming AC power supply to be easily disconnected.' Then on afterthought I realised that despite the apparent mains transformer on the top of the chassis, that 2.5mm plug only carries low voltage AC from a plug pack. At least, I sincerely hope that's right, or else the arrangement would be lethal if 230v appeared on the exposed end of a 2.5mm plug.
Alan Ford

DIASON P58 PORTABLE RADIO AT THE PICNIC COMPETITION

from Jim Easson

Unofficial congratulations on the Diason's win. I think it won in every category including performance and handsomeness. I just don't understand how so few components can beat a radio with 2 or 3 times as many. Apparently the others struggled to pick up any stations at all above the hash of poor reception. Oddly enough at least one of the others also had a front end RF stage as well. The Diason engineers certainly knew what they were doing.
Jim Easson
[See the article 'A Rejuvenated Diason' in *Radio Waves* for October 2017 pp. 12f]

TWO MATTERS

from Richard Begbie

Congratulations on another splendid issue of *Radio Waves*. For a relatively small society the magazine continues to punch well above its weight, in both content and production values. I wonder how many of us, as we devour each new number, have any idea of the work involved for regular contributors like Ian Batty, Ray Robinson and Philip Leahy. The quality of their contributions, as of others like (in this issue) Robert McGregor and John Gillies, is outstanding.

And this is not to mention Kevin Poulter's work on our spectacular covers, or the painstaking detail involved in assembling the most-read section of the magazine – the yellow pages. Ours is indeed a journal to savour and be proud of.

Two matters in the April number prompt further comment. The issue of digital radio threatening the continuation of mainstream broadcast on AM and FM bands has reared its head regularly in these pages for more than a decade now. Thus far, the threats have been more imagined than real, and for what it is worth, I remain confident that the large number of regional, rural and remote radio listeners (who often rely on the radio far more than their city counterparts) would constitute far too great a demographic to be ignored in any switch-over. There are never guarantees in life, but my observations suggest we're a long way from losing the familiar bands, particularly with the unexpectedly poor take-up of DAB+.

The other issue comes out of George Newlands' thoughtful and considered article on the disposal of collections, once again a matter much discussed in the pages of this magazine and beyond. Those of us most closely associated with the dispersal of whole or part-collections, either by private treaty of club auction, have long recognised that collections which have been amassed over two, three and four decades will increasingly come onto the market, and that we must have as orderly a method of dealing with those as possible.

For what they are worth, here are some of the provisional conclusions I (in discussion with others) have come to:

1. Formal museums are a dead loss, except for pieces of exceptional historical association or significance. These are rare in the extreme. Anything else left with a museum will almost certainly be swallowed up in a storehouse repository, never to see the light of day.

2. The practice of sending the 'good stuff' off to a commercial auction house will usually be counterproductive. HRSA members will attend and bid at the club auction of a collection if they know that the whole collection is on offer, in a way and with an enthusiasm that will desert them if they hear it has been picked over for the gems. On top of that, buyer and seller premiums will well and truly take the shine off prices realised by a commercial house. If you're planning to sell your collection, make one good auction of it.

3. It is important for all of us in groups across the country to remain in constant touch over any proposed `special auctions'. This way we can at least prevent double-ups and a string of sales close together, which can quickly saturate our fairly limited market.

There is much more to be said on this subject, and it would be good to hear any ideas that others might have, since it's an issue that won't go away.

Richard Begbie

Editor's note. *In his comments on* Radio Waves *Richard omitted one thing - the series 'On the Circuit'. Written by Richard Begbie, this popular series goes back many years and highlights the lives and achievements of our members. May it long continue*

From the Serviceman Who Tells

AN EARLY KRIESLER TRANSISTOR RADIO

AN OLD MAN brought an old transistor radio in to my shop recently
'I hope you can fix thus radio,' he said. 'I've had it since I was a teenager and it's gone perfectly until now.'
'I'll see what I can do,' I replied. I never make promises, especially with old appliances For one thing, the parts needed to get them going are likely to be no longer available.

The radio was a Kriesler 41-20, produced in 1958 and was Kriesler's first transistor radio. (Details may be found on the radiomuseum site at https://www.radiomuseum.org/r/kriesler_41_20.html)

As received it was in its original condition and so before applying power all electrolytic and wax paper capacitors were replaced. The bypass capacitors are all ceramic. One was tested and as it was found to be close to its 0.05 uF all of the others were left in place.

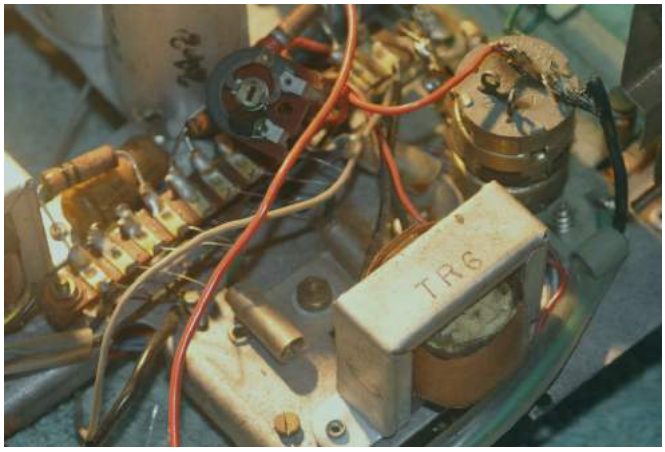
Power was applied from a current limited 9 volt supply and immediately the current limit (60 mA) was tripped. 60mA from 9 volts is 150 ohms maximum, probably less and the most likely cause of the DC input resistance being that low is one or more of the following:

The bias is set wrongly

A fault in one or both of the output transistors.

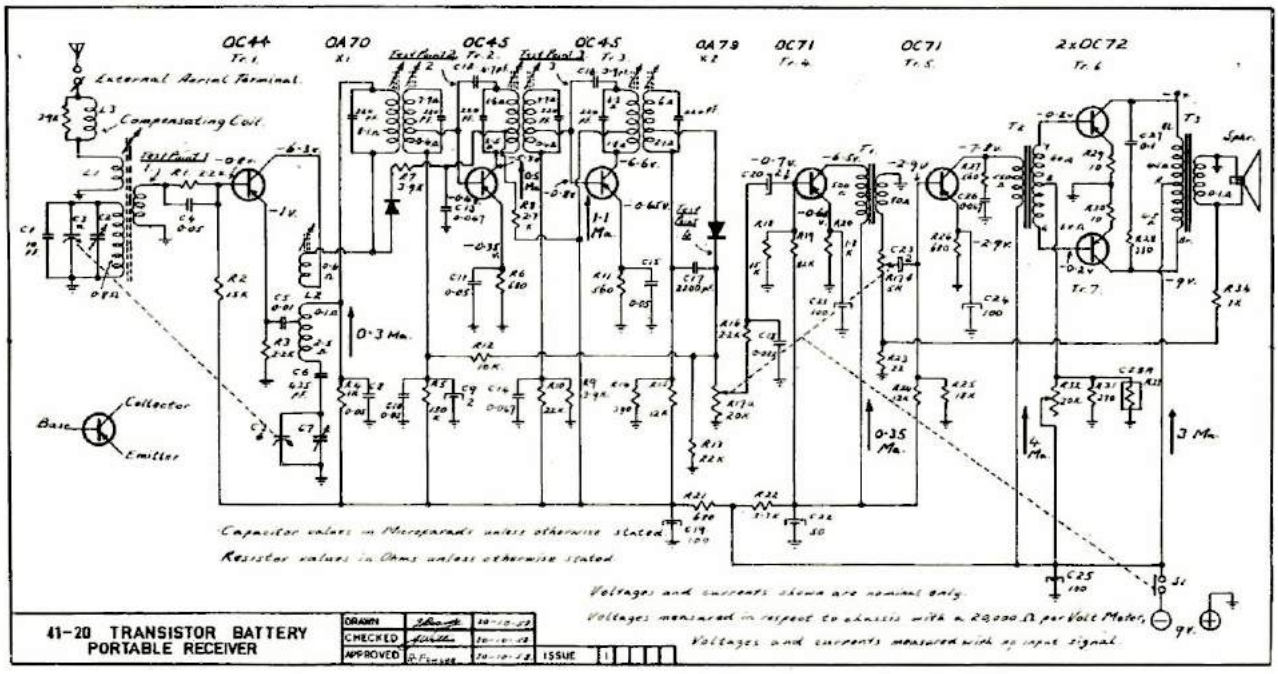
A transformer with a frame to winding short, but that is less likely

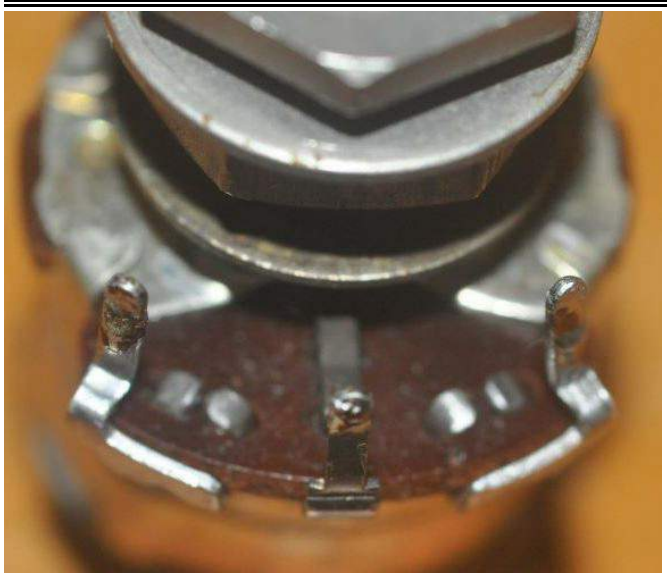
The bias pot setting was changed but it made no difference, making it a likely transistor problem. The tag board construction of this early Australian transistor radio made servicing easy. The untidy wire to the switch suggests some work has been undertaken previously.



The Kriesler 41-20's output stage

Both of the output transistors were removed as any replacement would require a reasonably matched pair.





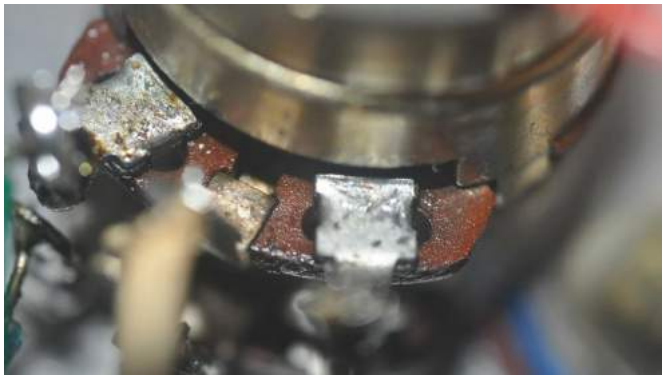
Volume control crimped lugs

With a PEAK DCA analyser the transistors were tested for gain and reverse leakage. One was showing as 'no component' and the other as shorted emitter to base. As the variable bias current setting resistor R32 was set initially to zero ohms, the transistors could have been destroyed with excessive current.

The no-component 'transistor' tested as a zener diode when connected only between emitter and collector. The collector was the cathode, so it could act as a forward biased diode in circuit, conducting heavily. Both were faulty and both could contribute to the faulty current.

While the output transistors were out the bias pot was set for 200mv on the base as specified. Both were replaced with a pair of OC79 gain 46 and 47, reverse leakage 156 and 190 micro amps. Not brilliant for OC79 but all right as an OC72.

When power was applied the current drawn was under 10mA and there was a lot of noise from the speaker. Tuning found a loud local station. The volume control had little effect, but at least the radio was working.



Volume control with leads replaced

All leads were removed from the volume control and it was removed for cleaning in alcohol. Some contact spray was applied for lubrication. It is a DUCON dual switch pot, 5k and 20k and a replacement was not available. The two units tested end to end as 9k and 27k but the resistance varied to open as the leads on one end were moved. The wiper contact was not involved. A close examination of the potentiometer showed the leads connected to a lug crimped on to the pot, connecting to the element underneath by the applied force.

The crimps on the faulty lug were carefully spread and the lug removed. The surfaces exposed were gently scraped and cleaned to remove contaminants and the lug replaced and re-crimped. Fortunately, no crimps broke off and the lug was fixed in place. The two units tested again at 9 and 27 k ohms but with no variation and the wiper resistance changed smoothly. Ideally both ends would be cleaned but the risk of breaking something outweighed the possible benefit.

Back in the radio the volume control worked as expected. The IF and RF stages were aligned with only small changes needed.

The next week, my customer collected his radio and I collected my fee. And that was that - or so I thought as I went back to my workshop.

For in a week or so he was back. Here's trouble, I thought. But no:

'I've come to rhank you for the care you've taken in repairing my radio,' he said. 'Not only does it go better than ever, but you've polished up the cabinet as well. You are obviously one who takes pride in his work and I shall recommend you to my friends and neighbours.

'That comment made my day.

Kriesler 41-20. *Photos: Jim Greig*

HMV MODEL 660 (1940)

by TONY SMITH

THEY don't make radios like this any more.

Weighing 20 kilograms, this receiver is definitely not a mantel set, but rather a table one that surely needs a sturdy table to support it. With a cabinet incorporating one-inch and a chassis constructed like the proverbial outhouse, this radio is not for the faint-hearted. Just take a look at the bolts securing chassis to cabinet.

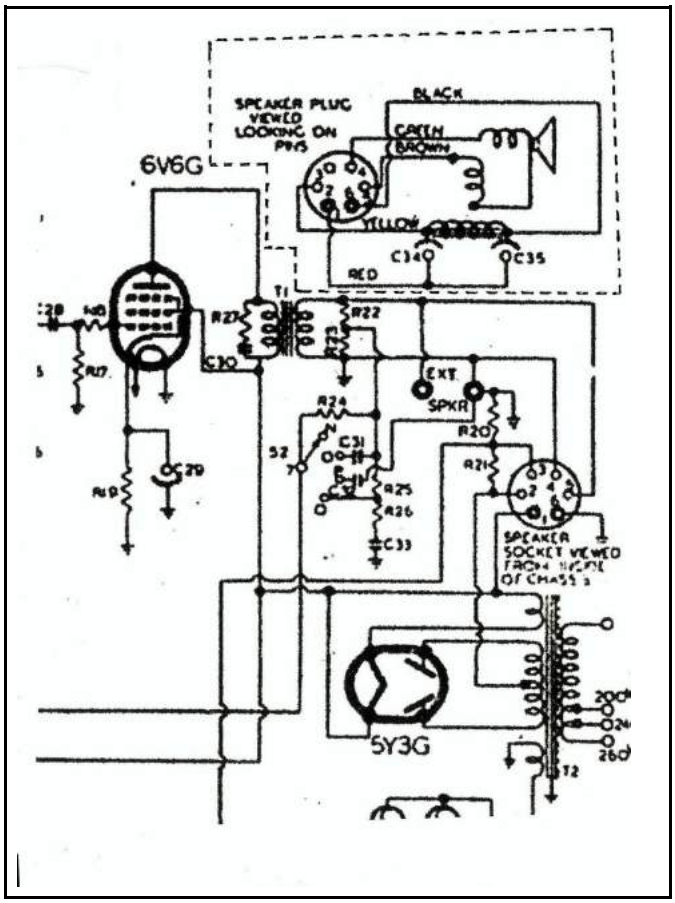
The radio includes some interesting items.

First, the cabinet was made so that the loudspeaker faces out of one of one of the corners Perhaps this was done to reduce slightly the set's width and at the same time enable a decent-size speaker to be fitted.

Secondly, there is the use of a small chassis (shown in the photo) as an addition to the main chassis and holding the HWT smoothing electrolytics. On checking this unusual arrangement it was seen that, in fact, HMV sets from 1937 through to this one in 1940 used 'external' electolytics. Could it have been to facilitate replacement? Perhaps in those early days such capacitors may have been unreliable or having only a short life. Ease of replacement could have been a selling feature.

The circuit clearly depicts this system, as is shown here. Also clearly shown is that with this set the speaker field and capacitors are wired into the negative side of the HT supply, rather than the positive side like most other sets. Could this method of smoothing in the HT negative side be in order to minimise the potential difference between field coil and earth, thus reducing the strain on the field coil's insulation?

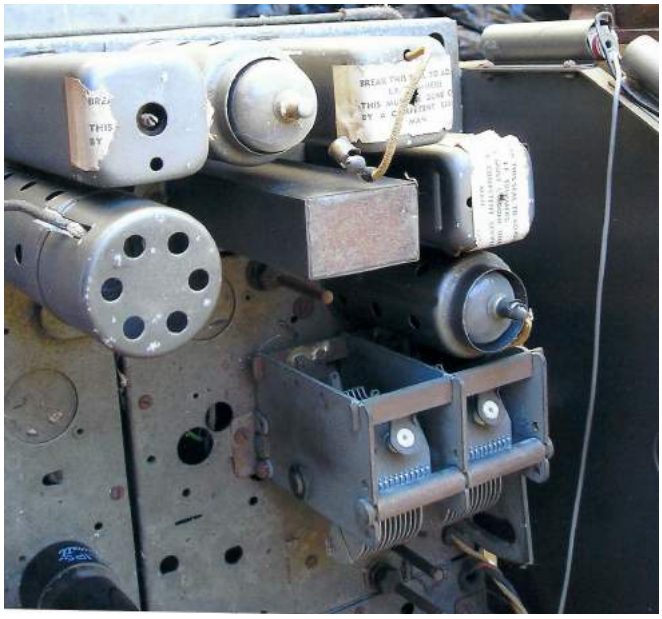
The dial is impressive. Its mechanism is also special. There are two concentric knobs for the tuning. The outer



one is geared to turn the tuning capacitor quickly while the inner one is geared down, making easy the tuning of short wave stations.

The dial glass was fitted with two sets of dial lights, with the printing of medium wave mrkings in one colour and those of short wave stations in a different colour. The wave change switch also changed the sets of lights so as to light up the appropriate markings. At night the dial is quite spectacular. Also written on the dial is a mark indicating space in the spectrum for future AM stations.

Another interesting feature of the set is the use of component boards for sections of the circuit. Some of these boards can be seen in the photo of the underside of the chassis. The boards and their components are shown in the circuit diagrams in the *Australian Official Radio Service Manual.* It does appear that HMV was one of the first to use such boards. Several HMV sets from 1949 used such boards.in their wiring.



While the cabinet was in a bad way (storing in a shed does not help) the chassis looked in good condition Even the instructions on the adjustment of the IF transformers were intact. Inspection showed a large value and large size paper capacitor. This and similar components were replaced. As well, the electrolytic capacitors were

replaced and fitted on the same mini-chassis as the original ones. Since the original power cord had become brittle with age, it was replaced with a new, 3-core cloth-covered one that looked in keeping with the age of the set.

As the radio was now performing very well, even on short wave I decided not to check its alignment

The original treatment of the cabinet included black paint to cover the end grain of some of the woodwork, but the paint had deteriorated to the point that had to come off. The idea of having to mask each trim was a bit much, so the remainder of the black was removed. I then decided to coat the whole cabinet as you see it in the photograph.

The finished product

It is fair to say that the result is a spectacular looking and excellent performing radio.

MAGAZINES RECEIVED
COMPILED BY SANJAY JAIN

1. *Wireless Review* Volume 19 Issue 4. 'Trouble with an AWA 429MA', ‘'Bad Coils in Mullard Meteor', 'Improving Crystal Set (2),

2. *Wireless Review* Volume 20 Issue 1. 'Instability in a HMV524B"', 'HiFi Power Supplies', 'Improving Crystal Sets' (3),

3. *NZVRS Bulletin* Volume 38(Annual) . ‘ Radio Development Laboratory- Additional information”; “Wright 555 SSB Transmitter and VO5 VFO”;” An elusive Hum problem “;” Tuneable or Modulation Hum”; “ A tale of Two Radios”;“ Audio Transformer Replacements”;”Repair of Phiclo Shadow Meter”;”Surgical Procedure for QUAD II Capacitor Refurbishment”

4. *Radio Historisch Tijdschrift*. Number 164.1-2018 In Dutch.

5. *Radiofil magazine* no 84 Jan-feb 2018- In French

6. *Radiofil magazine* no 85 Mar-April 2018 In French

7. *The AWA Journal* (Antique Wireless Association,USA). Vol 58 No.2 Winter 2018. “Superhet Alignment : How and why ?”; “Restoration of an Aero Shortwave Convertor –Part1 and Technique for Constructing a bobbin for Audio Transformer Rewinding”

8. *The AWA Journal* (Antique Wireless Association,USA. Vol 58 No.3 Spring 2018.”The Zenith 1000 Z Stratosphere”; “Restoration of an Aero Shortwave Convertor-Part 2 and Technique for Constructing a bobbin for Audio Transformer Rewinding”;”Hacking the LM Frequency Meter”

9. *The Michigan Antique Radio Chronicle* Vol 32 Fall 2017 ,”Notes form the Service Shop NO 97”;”A 1934 Sears Model 7091 table Radio”

10. *The Michigan Antique Radio Chronicle* Vol 32 Spring 2017 ,”Notes form the Service Shop No. 99”;”Hayes Products Company Battery Radio 1926”

11. *Bulletin[BVWS]* Vol 42 Winter 2017 . ‘ The Chakophone Junior two Radio’;’Building a Pulse Counter FM tuner’; ’A tale of three DAC’s’; ‘Restoration of a Zenith 7-A-28A from 1936’;’Pre-amps for single valve record players’

12. *Bulletin*[BVWS] Vol 43 Summer 2018 . ‘ The Windsor 45B Valve Tester’; ‘A short history of Chakophone’; ‘Restoring a Ferguson 203U Radio’;’Gecophone Smoker’s cabinet receiving set’;’The Ferranti Nova 3 valve superhet’

13. *Antique Radio Magazine* No.140 In Italian. 'Old Crow 8 transistor radio';’National Panasonic

14. *Antique Radio Magazine* No.141 In Italian. 'The Marconiphone'; ' Transistor radios sing who they are';’Radio safari’

SPAT NEWS Sound Preservation Association of Tasmania

NEW MEMBERS

The President and Committee are pleased to welcome to the HRSA the following new members.

New South Wales
Penelope Lyons, Alexander Piggott, Warren Gibson, Russell Nightingale, Craig Harrison.

Australian Capital Territory
David John Collier, Dimitrios Tsifakis, Matthew Allan

Victoria
David Tuck, Barry Wilkinson, Rodney Marrow, Rod Izzard, Tony Nguyen, Quan Tran, David Stuart, Ralph Longthorp, David Melrose, Janet Melrose, Jane Greig, Ian Christopher Matheson, Gary Ayre.

Western Australia
Marco Hobbs