VINTAGE RADIO

By JOHN HILL

A pair of old AWA C79 chassis

Fixing vintage radio receivers for other collectors can be quite a challenge. This is the story of how a couple of old 5-valve TRF console receivers were resurrected.

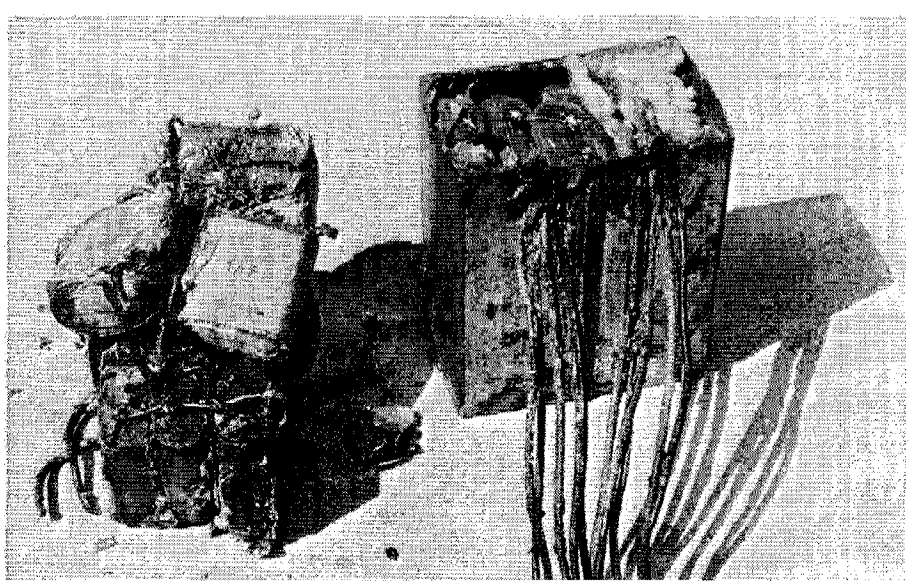
I recently met a vintage radio collector by the name of Dick Howarth. Never have I come across a collector with Dick's enthusiasm. In a time span of less than nine months (at the time of writing), Dick has collected no fewer than 15 early console radios with turned legs. This style of receiver is about the only type he is interested in.

There is little doubt that consoles from the late 1920s and early 1930s are very collectable items and to obtain more than a dozen such receivers is evidence of Dick's enthusiasm. It is not unusual for him to drive interstate just on the off-chance of finding an interesting old radio.

Personally, I don't care how many radios Dick finds or where he finds them. In fact, I hope that he keeps on finding them. Why am I so supportive? Because Dick wants me to do his repairs – that's why! Not only is it paying work, it also helps extend my repair knowledge and supplies me with interesting material for my monthly column, as is the case this month.

Two of Dick's radios share similar chassis. They are a 1930 AGE 44A and a 1931 AWA 45E. Both use the AWA C79 chassis and I had these to repair at the same time. One was almost completely original while the other had been recently worked on by someone else.

For the purpose of this article I will refer mostly to the near original set. This one was worked on first so that I could become familiar with it before moving onto the modified one.



The C79 chassis uses a considerable amount of paper capacitors. The capacitor block on the right contains many individual units, wired together internally, & has no less than 10 colour-coded lead-out wires.

Capacitor blocks

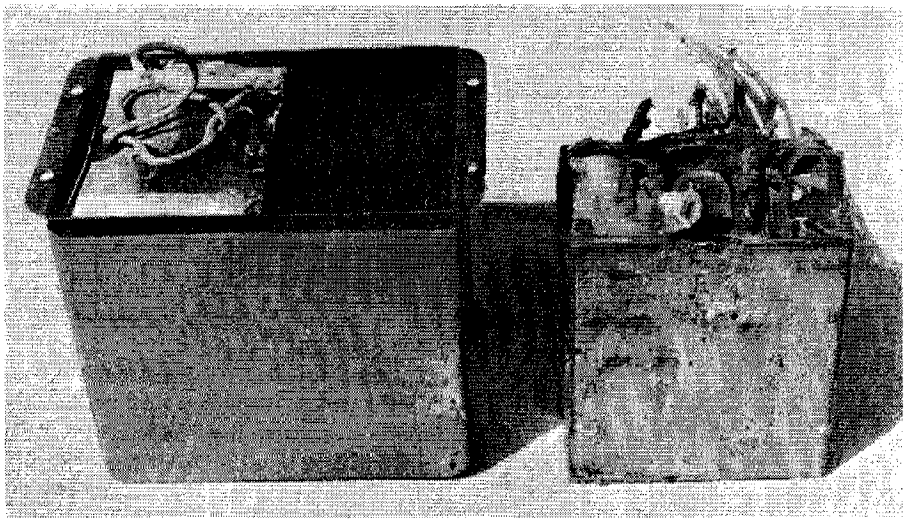
The chassis that had recently been worked on had already cost Dick $150 and yet no attempt had been made to replace the numerous paper capacitors throughout the set. The only capacitors replaced were three 15µF electrolytics.

Now some of these old receivers are a bit daunting to work on if one is unaccustomed to sets of this vintage. Although the C79 is a relatively simple 5-valve TRF type receiver, it does not look at all simple when you are working on it.

One of the main problems is the use of capacitor blocks which contain multiple units of bulky paper capacitors. Along the front of the chassis there are three metal cans, each containing three 0.25µF 1000V capacitors, while a much larger block capacitor is housed under a pressed steel cover mounted on top of the chassis. This cover also houses a tapped high-tension choke.

The big block capacitor is a bit of a nightmare because there are 10 coloured leads coming from it that go to various connection points throughout the circuit. One has to be careful when disconnecting this block capacitor because it has to be duplicated with modern capacitors and reconnected as it was originally.

It is necessary to make an accurate sketch showing which coloured wires go where. As there are two black, two light brown and three blue leads, one must be attentive. The fact that the



This large pressed steel can houses the tapped high tension filter choke (still in the can) & a huge block capacitor.

colours have faded doesn't help either.

Block capacitors have been dealt with in a previous story. It should be sufficient to say that, in the case of these two C79 chassis, the capacitors were more than 60 years old and it is unreasonable to expect them to still be in working order. They were replaced without hesitation!

Tuning setup

These two old radios from the early 1930s have other odd characteristics apart from the huge wad of paper capacitors. Following is a brief description of some other notable aspects of the C79.

The tuning setup is unusual in that it uses three single tuning capacitors which are interconnected (ganged) by a network of steel belts and pulleys.

To find mechanically coupled independent tuning capacitors in 1930-31 receivers was a surprise. I had been under the impression that that idea had gone out of fashion several years before.

The valve line up for the C79 is fairly standard for the era and consists of three 24As, a 45 output and the usual 80 rectifier. The 24A is a radio frequency (RF) tetrode, while the 45 is a directly heated output triode.

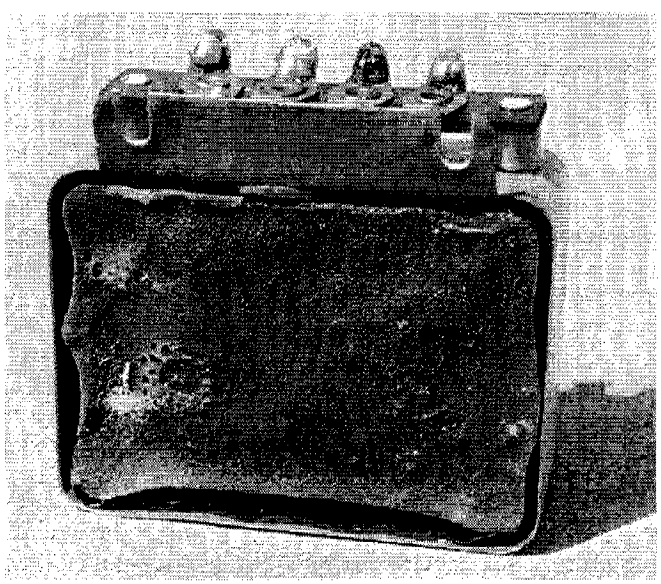
The volume is controlled by a wirewound potentiometer which varies the screen voltage on the RF valves. This technique differs from the more usual cathode bias arrangement. The volume control was in good condition.

Another oddity is the electrodynamic loudspeaker. First the speaker cone has a soft leather outer rim suspension to give it flexibility. And second, the field coil has a fairly high impedance of 7500 ohms and is placed directly across the high tension supply.

It is unusual items such as the C79's speaker that makes repairs to these early AC receivers fairly difficult – especially if the set is to remain reasonably original.

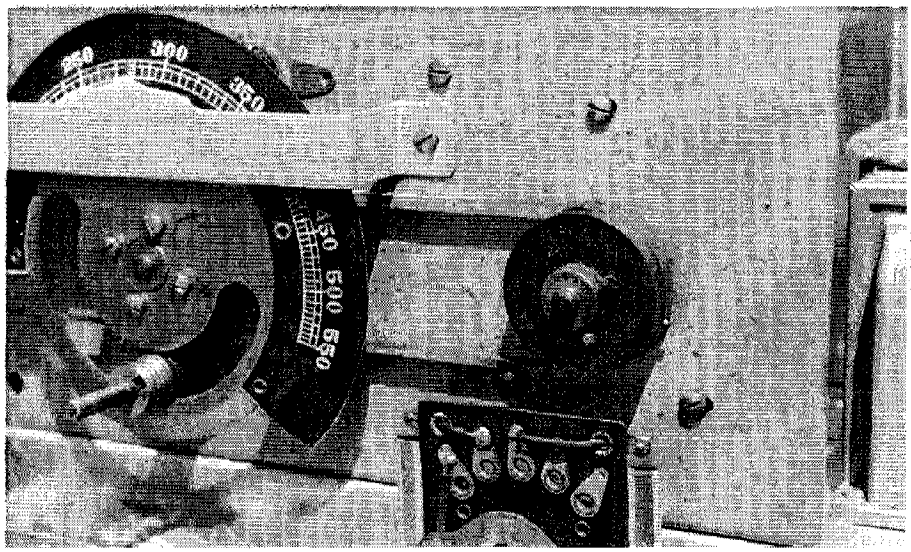
As far as I'm concerned, hard to find spare parts are Dick's problem. He has to chase around and locate these out-of-the-ordinary bits and pieces – not me. While both C79 chassis are driving speakers of the original type, one of them came from Queensland and it was possibly sheer good luck that it was found when it was needed. Usable spares in good condition are becoming quite difficult to find.

The tapped high-tension choke has been previously mentioned and, as luck would have it, both chassis had their chokes intact. There is also a much smaller choke mounted at one end of the chassis in a pressed steel can. There are two such cans actually; one houses the choke while the other

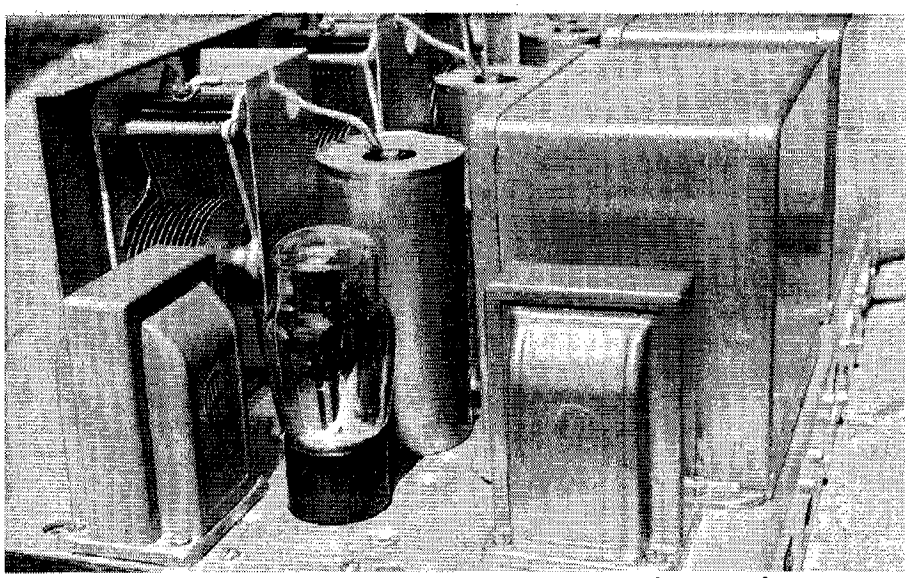


This metal can contains three 0.25µF paper capacitors. After 64 years, the wax that sealed the capacitors from atmospheric moisture had shrunk away from the can & had become useless.

The paper capacitors have been replaced with modern polyester types. Faulty capacitors cause many problems and their replacement is a logical step in the restoration of old radio receivers.



This front view of chassis shows the dial & one of the two drive belts & pulleys used to interconnect the three separate tuning capacitors. The tone switch is in the foreground.



The 80 rectifier valve sits between the coupling choke on the left & the output transformer on the right. Both these units were open circuit. The transformer was replaced, while a 0.5MΩ resistor was connected across the choke terminals.

contains the output transformer. In one chassis, both units were open circuit while in the other chassis they were OK.

Incidentally, this small chassis-mounted choke is used as a coupling device (in conjunction with a capacitor) to couple the detector valve to the output valve. It serves as a plate load for the detector. A previous repairer had inserted a 100kΩ resistor across the open choke connections which seems a logical and easy way out of the problem. However, it was discovered later, when the set was working, that a 0.5MΩ resistor gave much better results.

It seems to me that many of these early AC-powered receivers were more complicated than they really needed to be. In later years, all these elaborate and expensive chokes were removed from radio circuits. The field coil alone served the dual role of a high tension choke and an electromagnet for the loudspeaker – without the need for additional chokes in the high tension.

As previously stated, a 0.5MΩ resistor was an adequate replacement for the open circuit coupling choke; so there wasn't much need for that particular component!

(Editorial note: choke-capacitance coupling enjoyed a brief period of popularity, prior to the universal acceptance of resistance-capacitance coupling. The aim was to provide the highest practical plate voltage for the driving valve, while still providing a high value plate load. This would be particularly important considering the high drive requirements of the type 45 valve. Subsequently, higher gain output valves made the more economical resistance coupled system a better proposition).

The open circuit output transformer could not be repaired and a replacement was installed. As the new unit was a little smaller than the original, the 3-piece steel can that housed it had to be held together with an epoxy resin adhesive (Araldite®), otherwise it would have fallen apart. The original output transformer filled the can and held the three pieces in place.

Switching on

After many hours of work, the receiver was finally ready for a tryout. Two seconds after switch on, it was apparent that all was not well. A dreadful loud buzzing sound was all that could be heard through the loudspeaker – not the sound I expected to hear.

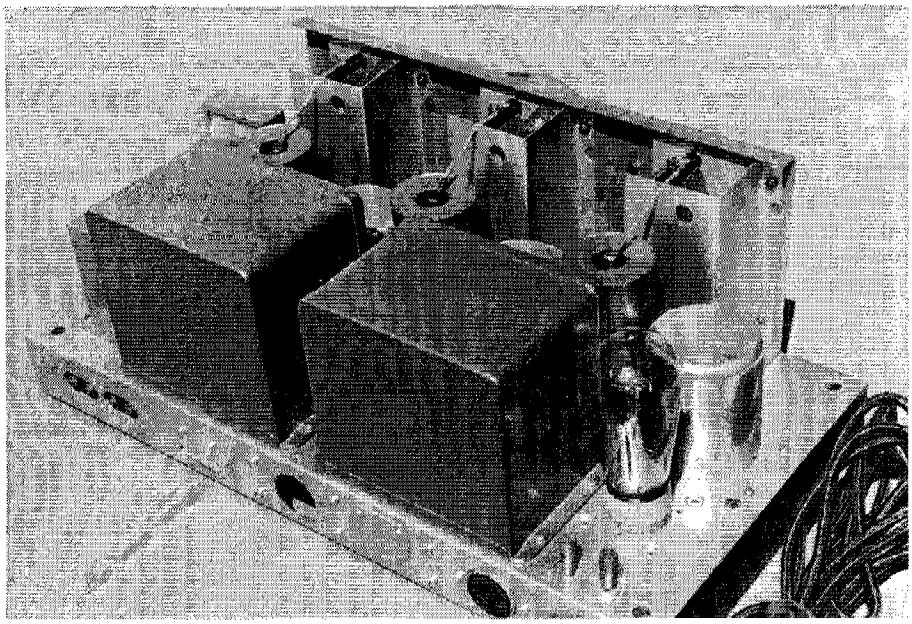
Now this speaker was the one that came from Queensland and I had been told that it was in good working order. It had been plugged into another working set and it functioned quite OK, so I had no reason to doubt it.

But what I wasn't told was that the speaker plug had been removed and the pin connections resoldered but not checked. As a result, the plug leads had been inserted into the wrong pins, resulting in the voice coil being wired across the high tension supply. No wonder it made such a noise!

It took quite some time to work out what the problem was, for the simple reason that I had been told that the speaker was OK. It was only after trying another loudspeaker that I realised what was wrong.

There is a good lesson to be learnt there. Don't believe anything anyone tells you until you have checked it yourself!

After a tune-up to align the three tuning capacitors, both sets were working really well. They are not brilliant performers by superhet standards but give the sort of performance one would expect from a 5-valve TRF type receiver.



This rear view of chassis shows the power transformer cover (left) & the high tension choke & capacitor block cover (right). Also shown is the type 45 output valve at the end of the chassis.

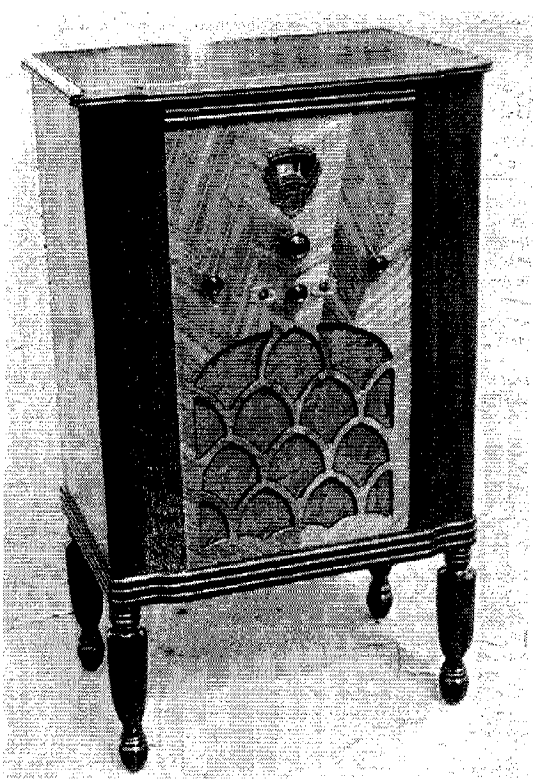
The pair of C79s consumed a fair amount of time and there were a few worrying moments. However, they are now back inside their elegant cabinets and they look and sound really good.

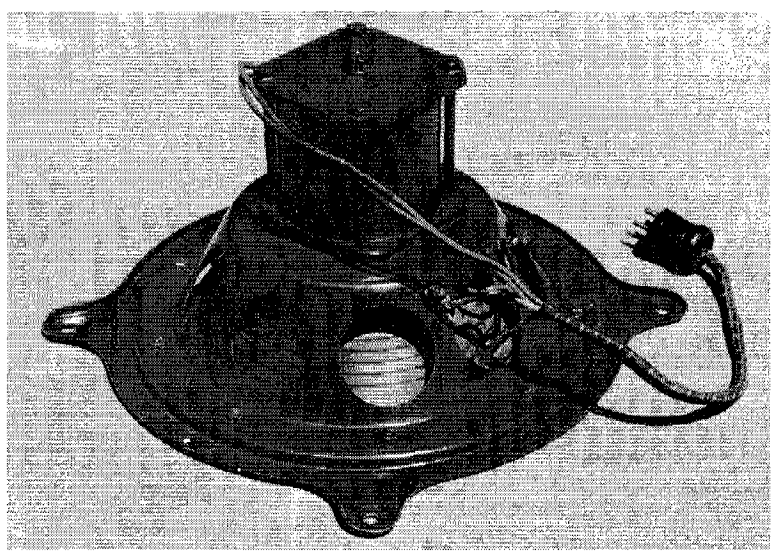
Cabinet restoration

My favourite is the AWA 45E. It is an attractive looking set and Dick has put a lot of time into restoring the cabinet. In this instance, an entirely new front panel has been made to replace the original, which had a broken fretwork.

The replacement panel has a lighter coloured veneer than the original and the two toned effect is most pleasing. Dick does his own cabinet refinishing and they get better with each one he does.

So next time you're at an auction where there are a few old radios going under the hammer, say "Hello!" to Dick – he's bound to be there! **SC**





Above: this massive old electrodynamic loudspeaker works surprisingly well for its age. The 7.5kΩ field coil is wired across the high tension, not in series with it, as was the case in later years.

Left: the Radiola 45E in all its glory. This particular cabinet had badly damaged fretwork & a new front panel has been made to replace it. The lighter tone of the new panel looks even better in real life than it does in a black & white photograph.