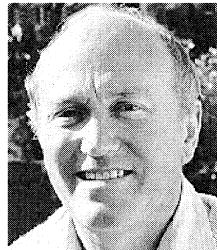


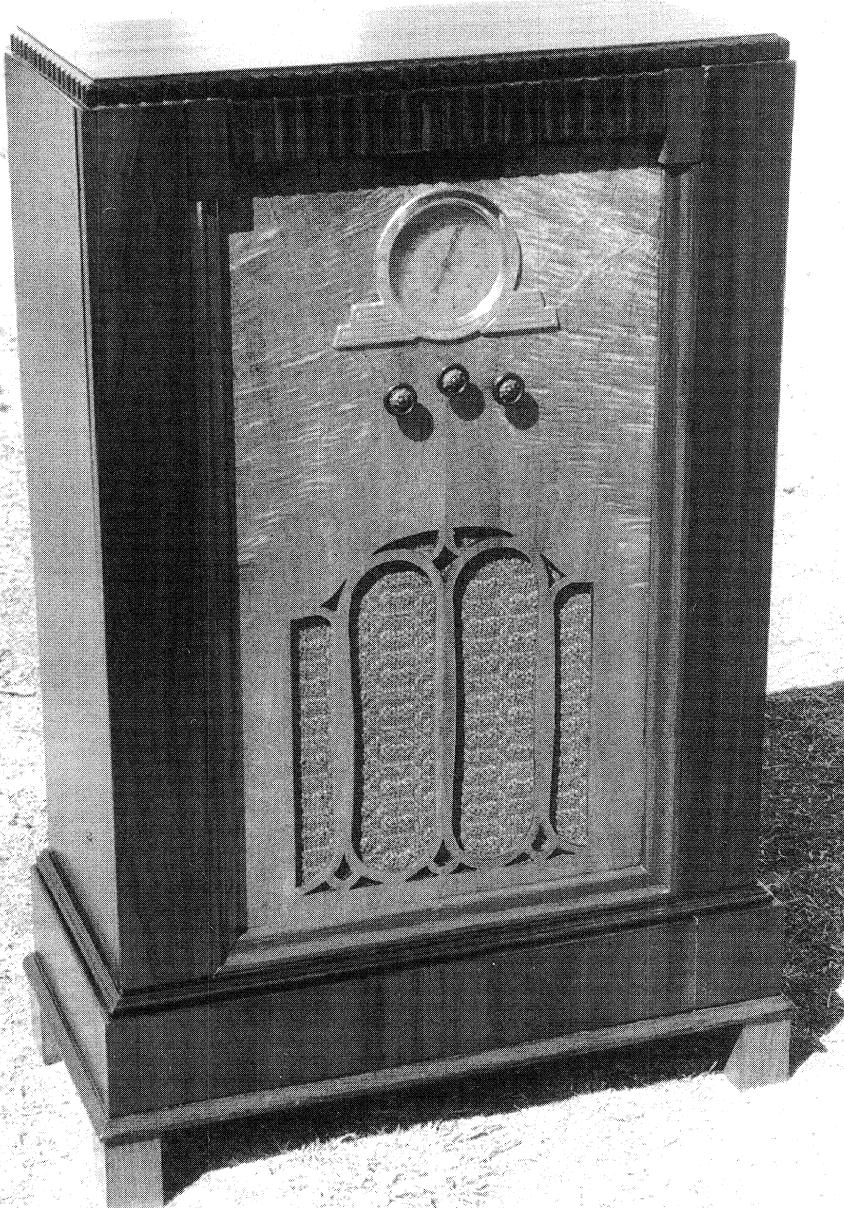
# VINTAGE RADIO

By JOHN HILL



## Clean audio for old Henry

**It has now been 12 years since I first became interested in collecting and restoring vintage radio receivers. Over that period, I have found it necessary to rework some of my earlier restorations, for the simple reason that they were not done correctly in the first place.**



Experience is not something that is acquired overnight. As one slowly advances in the art of valve radio repairs, there is a gradual realisation that some past restorations may not be as good as they could have been.

This was the case with old "Henry", a massive 7-valve console receiver of early 1930s vintage. Henry was so named because of his masculine appearance. With square corners, chunky proportions and sheer bulk, Henry looks quite imposing and takes up plenty of space.

Henry is one of those numerous receivers that bear no manufacturer's name. These sets were made by well-known companies for various retail outlets which often (but not always) put their own trading name on them.

In Henry's case, the chassis could have been built by almost anyone and has no recognisable parentage. However, it certainly looks impressive, being built from large early 1930s components.

While the original restoration was broadly successful, there was slight audio distortion. Although unnoticed at the time, I have become increasingly sensitive to vintage radio receivers with less than perfect audio.

Many cases of audio distortion in old receivers are due to the anode bend detection method that was in common use during the early 1930s. However, in Henry's case, diodes in the 2A6 first audio valve handle the

Henry is an early 1930s 7-valve superhet receiver of rather large proportions and is typical of the era. The challenge was to cure his audio distortion problems, which have been present since restoration many years ago.

detection and AGC functions. Therefore, any distortion must be due to causes other than the detection circuit.

So, like several of my early restorations, Henry required a reworking session.

## Common problems

When this old receiver was originally restored, I found that there were three common vintage radio problems in need of attention - leaky paper capacitors, dead electrolytics and an open circuit output transformer.

The replacement transformer was selected mainly for its size (so that it would fit the existing mounting holes) rather than for its impedance specifications. But unknown to me at the time, the correct output transformer for this particular receiver has quite different specifications from most.

Henry has an unusual output stage which consists of two type 59 output pentodes in parallel, rather than push-pull. The two valves are wired grid to grid, plate to plate, etc. This arrangement provides twice the output power but is not as good as push-pull which has a number of advantages, including lower distortion.

A parallel output stage requires an output transformer with half the primary impedance of that used for a single output valve. In the case of parallel 59s, an output transformer with a  $3\text{k}\Omega$  primary is required but that is not what was installed when the set was restored. The transformer used would have been more in keeping with a battery receiver, as it had a  $10\text{k}\Omega$  primary.

So a bad impedance mismatch needed to be corrected for a start.

On top of that, one of 59s had an open heater. Readers unfamiliar with this output pentode may be surprised to learn that the valve has two heaters and will still work reasonably well when one is open. However, as there was a distortion problem to correct, a replacement valve was required.

Next was the problem of resistance values. The set used a particular brand of resistor that is notorious for going high, so it was not surprising that some were up to 100% out of tolerance. All the cathode bias resistors were wirewound types and the bias voltages were OK.

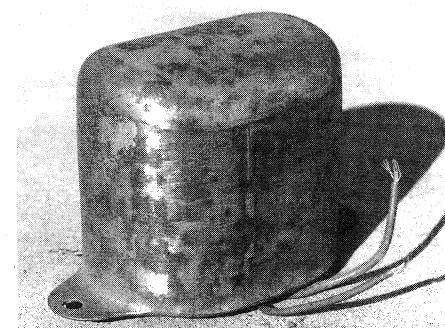
It was obvious that the partly defunct valve, the out-of-tolerance resis-



The high tension choke (left) and high tension power transformer (right) are mounted on the top of the chassis.

tors and the output transformer would all have to be replaced. The replacement transformer was a  $2.5\text{k}\Omega$  "Isocore" type in a pressed steel can. While it looks a few years too modern for the set's age, it was the only transformer that came near the required  $3\text{k}\Omega$  primary. Being an Isocore type, with floating, "hot" laminations, it should be relatively troublefree.

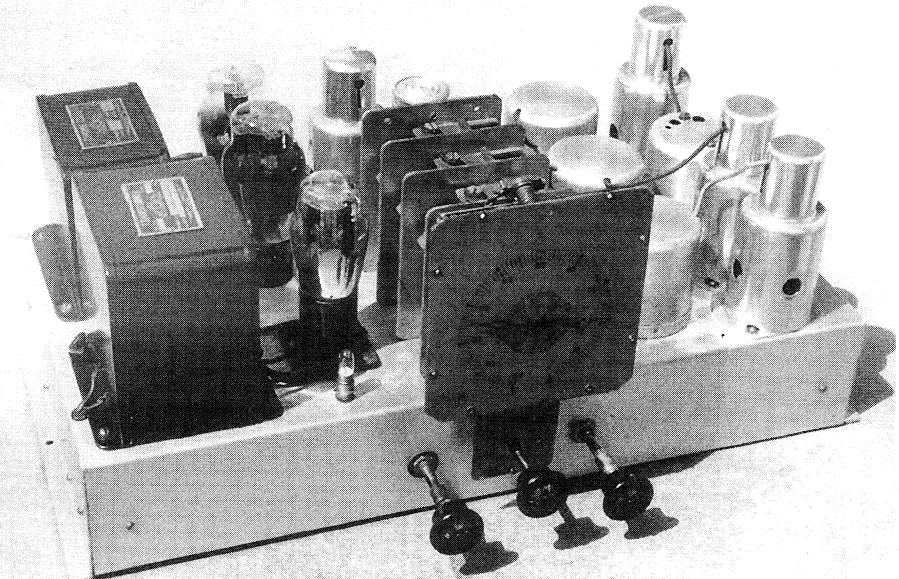
The modifications had the desired effect and the sound from the old receiver was greatly improved. It is quite amazing how well some ancient loudspeakers perform. While they may not be equal to modern equipment, they are OK with the limited range of frequencies covered by AM radio.



A  $2.5\text{k}\Omega$  "Isocore" output transformer was used to replace the earlier  $10\text{k}\Omega$  unit. This was necessary because the primary impedance required for parallel connected output valves is half that of a single stage.



This close-up view of the chassis shows the two 59 output pentodes which are wired in parallel. The old 59 was in production for only a short time and was superseded by the 2A5.



Old Henry was built using very large 1930s-style components and boasts no less than seven valves, including two 59 output pentodes wired in parallel.

So old Henry is working noticeably better than before and I was pleased with the outcome. While there really wasn't much to do regarding this par-

**The receiver is impressive because of its size alone.**  
Inexperienced collectors should note that there are a number of unprotected high voltage connections on the top of the chassis.

ticular repair, it does demonstrate how attention to details can make a difference.

### Hernry's attributes

As Hernry is an unusual receiver, I will finish off this month's column by

describing some of his more interesting attributes.

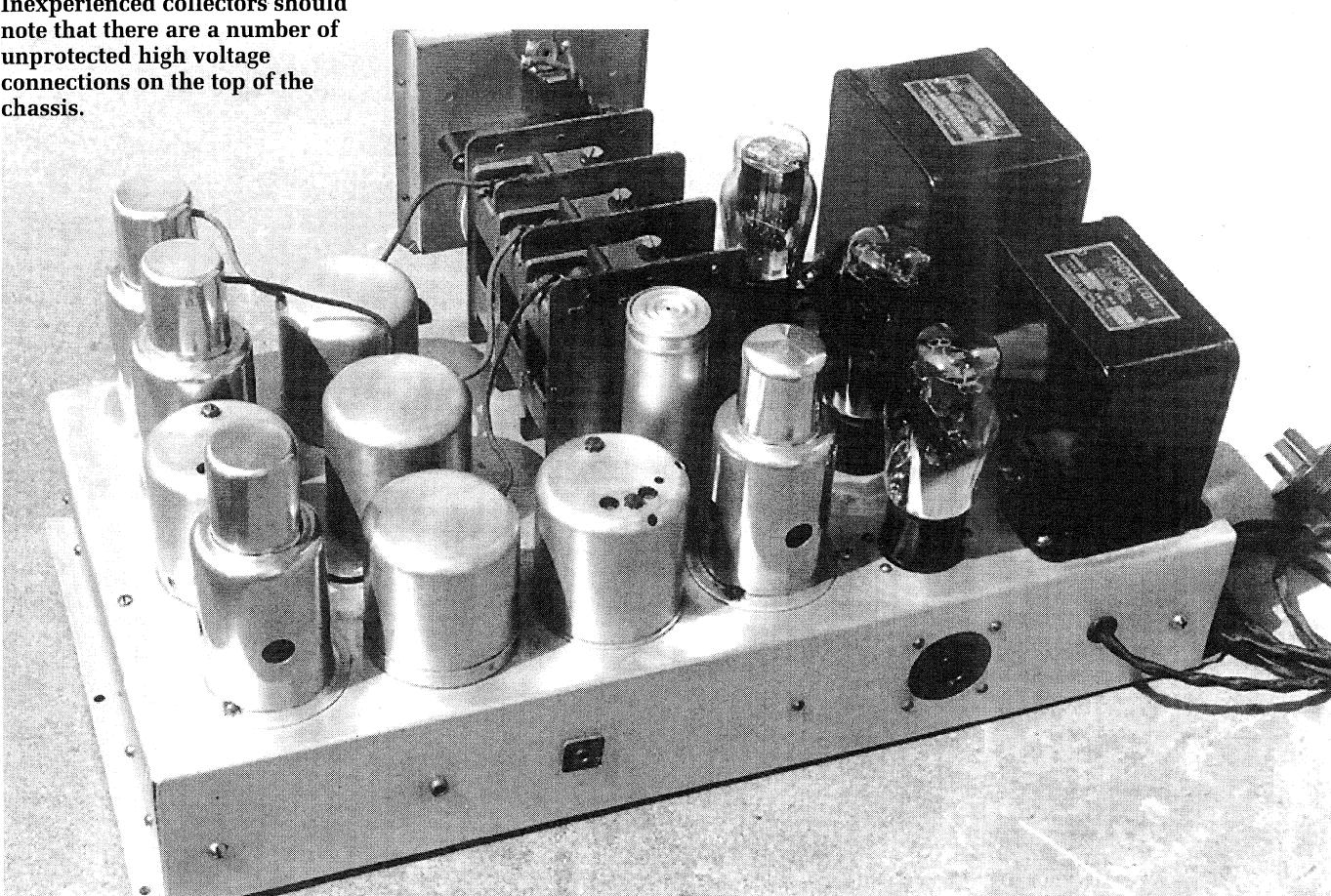
Perhaps the most striking aspect about the chassis is its size and the choice of components used. In many ways, it appears to be over-engineered, the power transformers being one such example. There are two power transformers, one mounted above the chassis, the other below.

The high tension transformer is on top. It has two secondary windings: (1) a centre-tapped high voltage winding for the type 80 rectifier plates; and (2) a low voltage winding for the rectifier filaments.

A separate filament transformer is mounted underneath and supplies the remaining six valves. It delivers 2.5V and is rated at many amps. As the valve heaters collectively draw 8A, this transformer is quite large and of robust construction.

There is also a huge 30H, 85mA high tension choke mounted above the chassis next to the HT power transformer. These two units weigh quite a few kilograms and concentrate a lot of weight at one end of the chassis.

Both power transformers and the high tension choke operate at barely



warm temperatures even after several hours operation. Even then, the temperature increase is mostly due to the close proximity of the rectifier and output valves.

The front end valve line-up is: 58 RF amplifier, 57 autodyne oscillator/mixer and 58 IF amplifier. The gain of the two 58s is controlled by AGC. There is no AGC applied to the frequency converter as the autodyne circuit was unsuitable for AGC. The IF is 175kHz.

## The 59 pentode

Mention has already been made regarding the 59's twin heaters and cathodes. The old 59 has other peculiarities that are also worth mentioning.

The 59 has a large 7-pin base which is marginally bigger than the standard 7-pin base of other valves such as the 6A7 and 6B7. As a result, 59s will not fit some valve tester sockets without the aid of an adaptor.

Another oddity of this valve is that its suppressor grid has its own base pin connection (hence the 7-pin base). Other pentodes have six pins, with the suppressor internally connected to the cathode.

Some servicemen of yesteryear do not speak very highly of the old 59 valve, claiming that it was weakly constructed, troublesome and inclined to go gassy. Personally, I've encountered none of these problems.

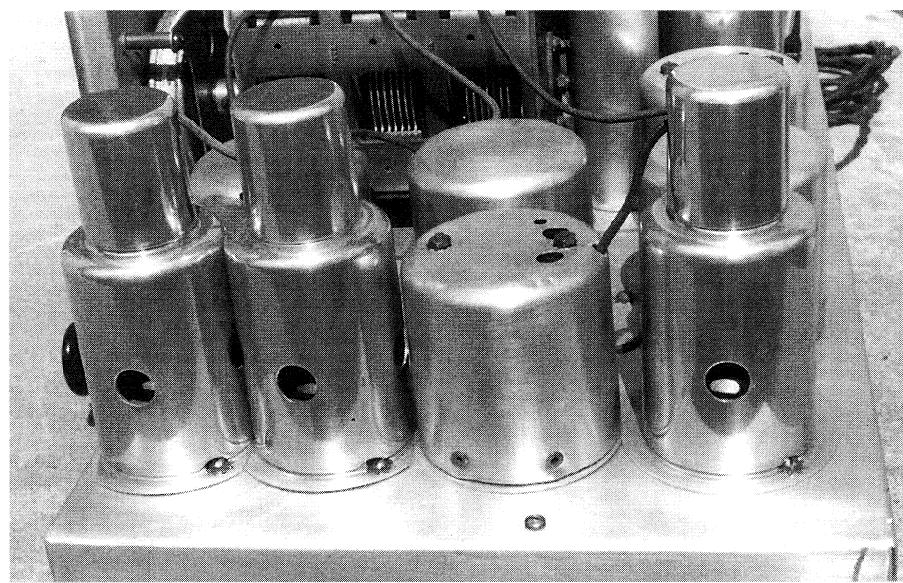
(A staff member who was familiar with these valves recalls that they were prone to what was virtually instant destruction in the event that the plate voltage was lost – as with an open speaker transformer which caused a red hot screen. No-one ever reached the switch in time!)

The 59 was in production for only a short time and was replaced by the 2A5. The 2.5V series of valves was, in fact, short lived, being superseded by 6.3V types at about the time Henry was built.

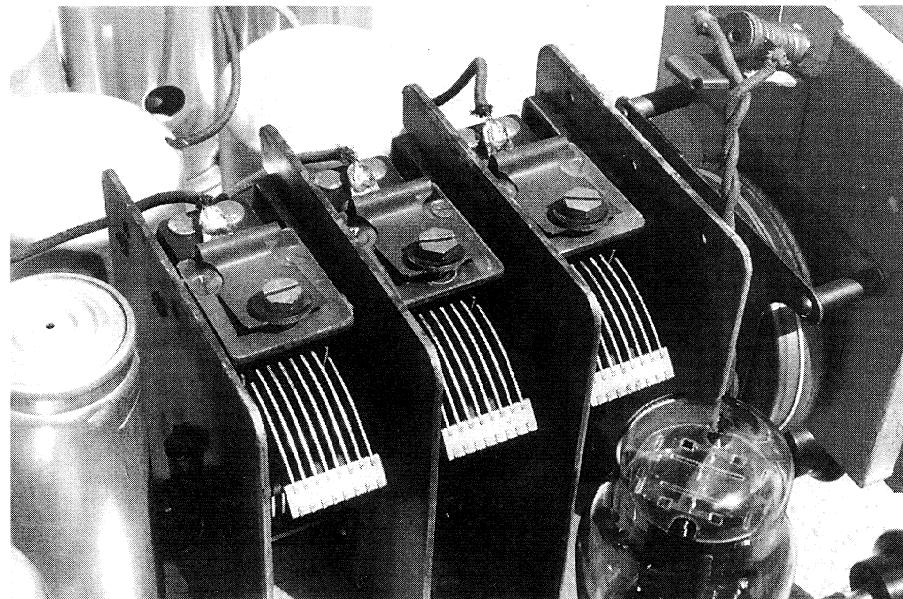
## Dangerous voltages

Perhaps the worst aspect of Henry is the unprotected – and potentially lethal – high voltage connections above the chassis, where one would least expect to find them. Inexperienced collectors/repairers should take note of the following.

Most manufacturers of the era endeavoured to keep high voltage nasties confined underneath the chassis.



The front end or RF part of the receiver. The valves inside the shield cans are: 58 RF amplifier, 57 autodyne mixer and 58 IF amplifier.



This large 3-gang tuning capacitor is typical of many early 1930s receivers. Miniaturisation had not been thought of then.

However, this was not always the case, as an examination of Henry clearly reveals.

The rectifier socket is mounted above the chassis. Its bare external connections are within easy reach of any careless fingers that may venture close enough to touch those high plate voltages.

Similar bare connections (in the form of terminals) are to be found on the high tension choke. These connections are easily reached (even when the chassis is in its cabinet) and they have a DC potential in excess of 300V.

Finally, another dangerous and po-

tentially fatal nasty is on the high tension power transformer. A bare unused 240V primary connection protrudes from the transformer cover. It seemed prudent to tape over this hazard. Mains voltages, by reason of their low source impedance are by far the most dangerous.

So that's about all there is to report on old Henry. He has always been one of my favourites and now he's better than ever.

In fact, Henry is one of those nice old receivers that makes collecting vintage radios such an enjoyable hobby.