

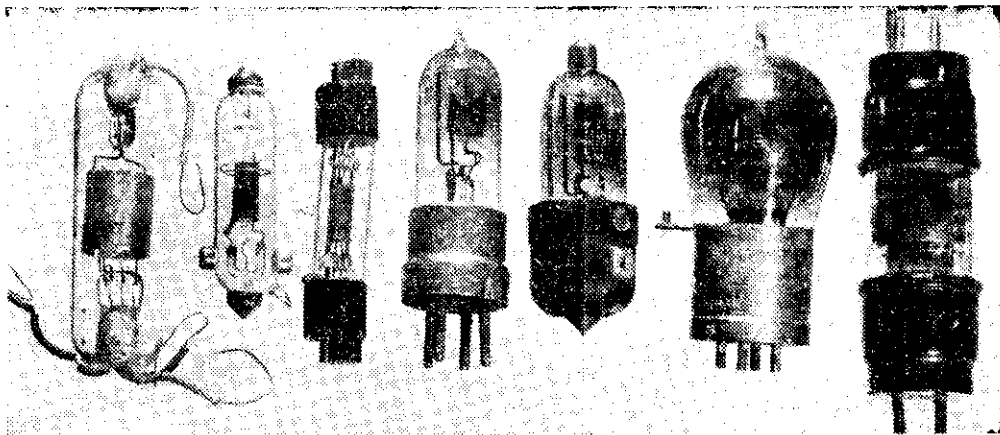
# The Thermionic Valve

**T**HE thermionic valve, or vacuum tube, or electron tube as it is called in the United States and some other countries, is a most essential part of all modern radio communication equipment. Without it I couldn't be speaking to you tonight. Depending on its size your radio receiver contains some five to ten thermionic valves, and broadcasting stations use many of them in their studio and transmitting equipment. For example, Station 2YA uses nearly a hundred valves. They vary in size and weight from a few ounces up to 250 pounds for the biggest transmitting ones.

The most common form of thermionic valve is a glass envelope or bulb containing a metal filament which can be heated, or made to glow brightly, by passing an electric current through it. This is very similar to the ordinary electric light bulb. But unlike the electric light bulb the thermionic valve has several other metal parts inside it besides the filament. In its simple form the thermionic valve has this filament surrounded by a metal coil or mesh called the grid, and this in turn is surrounded by a metal cylinder called the plate or anode. Connections to these elements are brought out from the in-

side of the glass bulb through special seals, and then all the air within the bulb is evacuated to a high degree of vacuum and the glass is then sealed off with a gas flame.

When they are connected to radio circuits — usually containing coils, condensers and resistances — thermionic valves of this kind can perform three important functions. The first is in amplifying or magnifying very small electric currents of the kind generated by a studio microphone or gramophone pickup. In general these are about a few millionths of a volt; they are amplified up to several volts. Secondly, they can generate the very high frequency currents needed for communication, without using the wires that are generally used for ordinary telephone and power systems. Hence the origin of the term "wireless." For example, our hydro-electric power stations generate power at a frequency of 50 cycles per second, and this must be transmitted along wires, but the transmitting valves of Station 2YA gen-



A.P.S. photograph

TYPES OF RADIO VALVE USED IN THE 1920s

The patent office ruled that the Fleming valve was fundamental

erate electric power at over 500 kilocycles per second, or half a million cycles per second, and it can then be transmitted through space without wires.

Thirdly, the thermionic valve can rectify, or detect, in your radio receiver, the radio currents picked up by your receiving aerial. It enables these high frequency currents to be converted into such a form that they can energise the loud speaker or headphones, and you can hear them physically with your ear.

Today the thermionic valve is the most vital part of all radio broadcasting and other radio communication equipment. But it wasn't always so. In the early days of wireless communication—at the end of the last century and the beginning of this century—one of the biggest handicaps in communicating between countries and with ships at sea was the poor sensitivity of the receiving devices then in use. Two of the most common of these devices were the coherer, in which a tube of iron filings cohered or stuck together when radio currents were



Make thick, rich, brown gravy the easy Bisto way. Simply mix Bisto with water and boil up in the tin you roasted your meat in. The family will love it.

**BISTO**  
MAKES THE MEAL!

Trade enquiries to A. A. Stichbury Limited,  
27, Blair Street, Wellington.

**ROAMER**  
MAKERS OF FINE SWISS WATCHES SINCE 1888

ROAMER WATCH CO. S.A. SOLEURE

THE FAMOUS ROAMER WATERPROOF  
FROM WATCHMAKERS AND JEWELLERS EVERYWHERE

Kindest to  
your hair



Won't dry your hair like harsh shampoos. Won't dull your hair like heavy soap shampoos. Makes your hair easy to handle, lovely to look at.



*mild*  
**PALMOLIVE**  
**OIL SHAMPOO**

LARGE BOTTLE, 3/-  
Sufficient for 14 shampoos.

All chemists and stores.

COLGATE-PALMOLIVE LTD., PETONE

PO1.4

N.Z. LISTENER, DECEMBER 17, 1954.