# CHOOSING AN OUTPUT TRANSFORMER

The "optimum load" of an output valve is the most suitable value of the impedance of the load (i.e., speaker or other apparatus) included in the external anode circuit. Optimum load values are given for all Mullard output valves under the heading "operating data."

If the impedance of a certain speaker is not equal to the optimum load of the valve with which it is required to work, the load can be "matched" to the valve by using an output transformer of appropriate ratio, the primary of the transformer being included in the anode circuit of the output valve, while the speaker is connected across the secondary winding. The correct value of the transformer ratio can be calculated from the formula:—

$$\text{Ratio} = \sqrt{\frac{\text{Optimum Load of Valve}}{\text{Impedance of Speaker.}}}$$

The speaker impedance should be furnished by the maker of the instrument, but if it is not known, an approximate value can be obtained by taking the resistance of the speaker in the case of a moving iron speaker or $1\frac{1}{4}$ times the resistance for a moving coil speaker.

As the value of the optimum load is not very critical, the ratio found by the above method may be varied by as much as + or − 25 per cent. without seriously affecting the efficiency.

Thus a speaker having an impedance of 2,000 ohms, worked in conjunction with a valve whose optimum load is 4,000 ohms would require, according to the formula, a transformer having the ratio of $\sqrt{2}$, or 1·41 : 1. Actually, a standard $1\frac{1}{2}$ : 1 ratio transformer would be used.

In order to assist listeners in deciding the correct value of the transformer ratio, the following table is prepared. To use this table, divide the optimum load