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HARMSWORTH'S WIRELESS ENCYCLOPEDIA

For Amateur & Experimenter

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201 New "Action" Photos & Diagrams

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GRID CIRCUIT
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(Giving both Light and Music)
HIGH-FREQUENCY AMPLIFIERS
HIGH-FREQUENCY AMPLIFICATION

SPECIAL PHOTOGRAVURE PLATE:

SELF-CONTAINED 6-VALVE HANGING SET

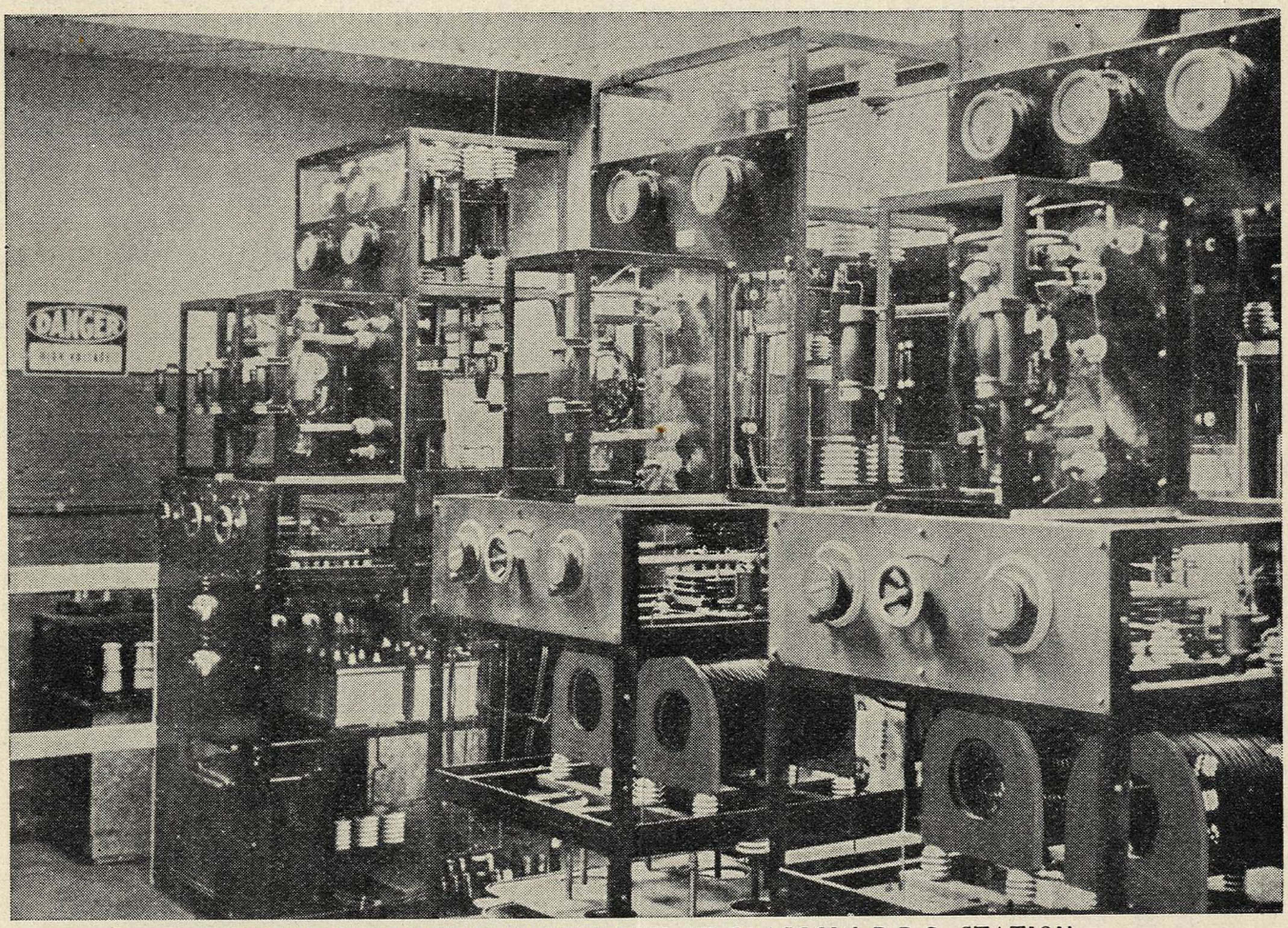
J. LAURENCE PRITCHARD, F.R.Ae.S., Technical Editor, with expert editorial and contributing staff

The Only A B C Guide to a Fascinating Science-Hobby

packing gland of a Bradfield deck insulator. It is usually made of forged steel. The semicircular portion is made to fit the circumference of the gland, while a little projection on the tip of the inside radius of the key fits into holes made for it. Considerable leverage is obtained by using this shape of instrument, and slipping of the spanner round the object to be tightened is almost entirely obviated. *See* Bradfield Insulator ; Deck Insulator.

GLASGOW BROADCASTING STATION (5 SC). This, the first broadcasting station established in Scotland, was opened on March 6th, 1923. The station proper is situated in the tower of the Glasgow Corporation's power station at Port Dundas, the studio being located more centrally in the city at a distance of about a mile. The power supply is 500 volts direct current from the Corporation mains, this being transformed by a rotary converter to 500 volts alternating current at 300 cycles. After being led to the instrument room at the top of the tower, the alternating current is supplied to a static transformer with two secondaries, one used for high tension at about 10,000 volts, the other for lighting the filaments of the rectifying valves. The high tension having passed through the rectifying valves and become pulsating direct current, is "smoothed" by chokes and condensers until an almost perfect direct current is produced. The high tension is then supplied to the "drive" valve and power valve plates, the purpose of the drive valve being to cause the power valve to oscillate, but not of its own accord (Fig. 1).

The transmitting station is linked with the studio by a cable laid through the existing Post Office conduits. At the studio there is a microphone and also an amplifier of special type, further amplification and modulation being effected at the transmitting station. The aerial is of the cage type, consisting of four wires separated round hoops of about 4 ft. 6 in. diameter, and is about 180 ft. long. The insulators, consisting of porcelain reels strung in series, are about 7 ft. long. The range is given officially as 75 miles, but in practice



INTERIOR OF INSTRUMENT ROOM AT GLASGOW B.B.C. STATION

Fig. 1. About a mile separates the transmitting department from the studio of the Glasgow broadcasting station. In the instrument room, shown above, high-tension current is rectified by valves and "smoothed" by chokes and condensers until almost perfect direct current is produced. Power valves are caused to oscillate by a drive valve, which is supplied by the high-tension current

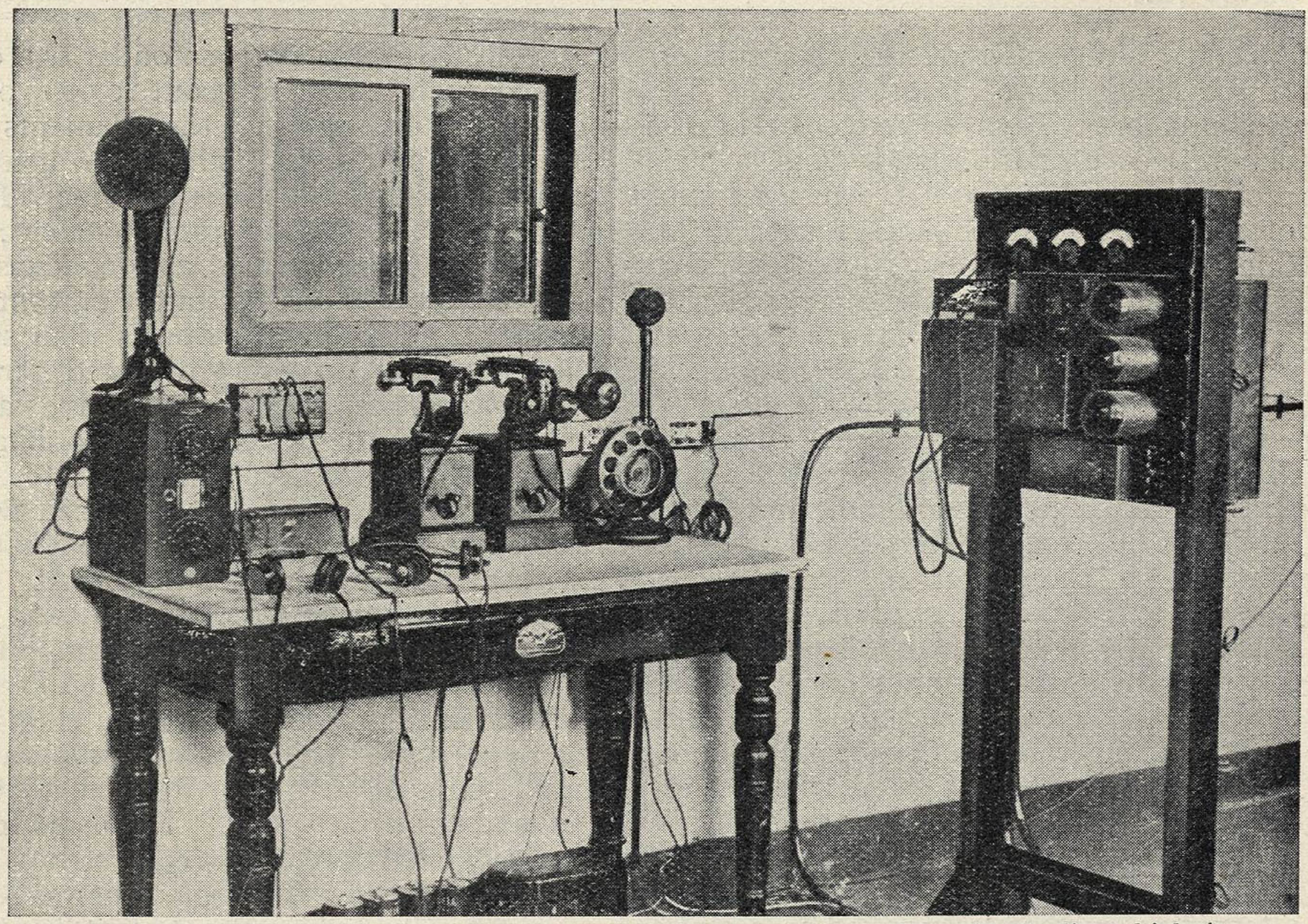


Fig. 2. During the actual broadcasting period the room attached to the studio, which is seen in this photograph, is occupied by the control man, whose duty it is, by the aid of the signal lamps seen on the right and the telephones on the table, to control the technical quality of the transmission. This operator receives the transmission on a special receiver

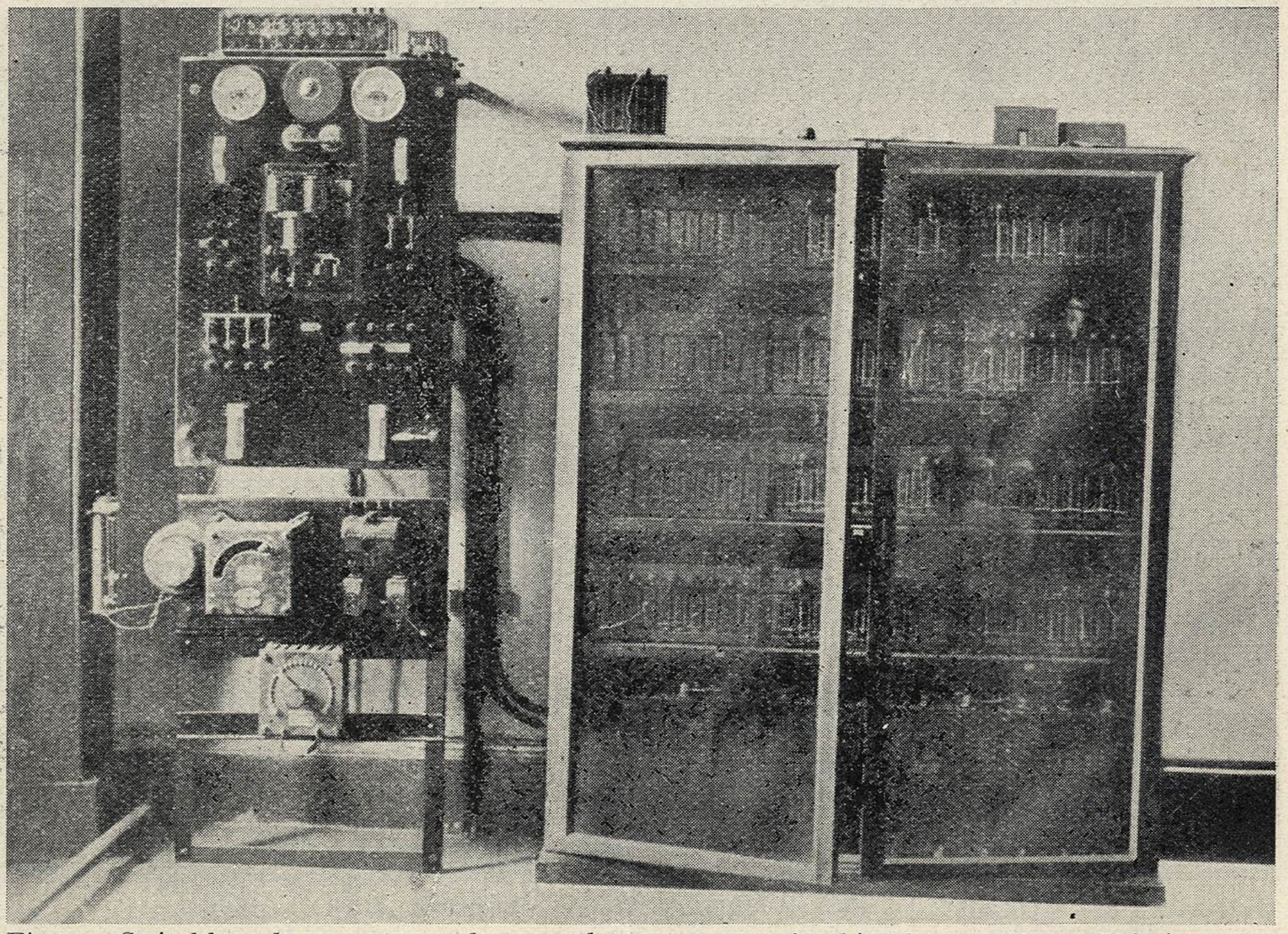


Fig. 3. Switchboard apparatus and accumulators are seen in this photograph. This is one of the several departments which are controlled by the operator in the room seen in Fig. 1

this has been largely exceeded, and the station is a favourite one for reception by English amateurs. The transmitting apparatus was installed by the Marconi Company, while the studio gear is of "Western Electric" manufacture.

GLASS. Brittle transparent mixture of fused silica and two or more alkaline bases, such as lime and soda or potash. When heated it becomes soft and workable. In the hard state it can be cut with a diamond or very hard steel cutter. It can be ground and polished, and is resistant to practically all acids except fluoric acid.

Glass is used in wireless work in several forms, including ordinary sheet glass, made by blowing molten metal into a cylinder which is then cut and flattened. Plate glass is poured on to a table and compacted and rolled to uniform thickness.

There are numerous names given to many different glass compositions, mostly due to the presence of a predominating metallic oxide, as for instance, soda glass, or lead glass, or because of the manufacturing process, such as blown glass, roller glass and the like. Toughened glass is subjected to a chemical and heat treatment calculated to reduce the brittleness.

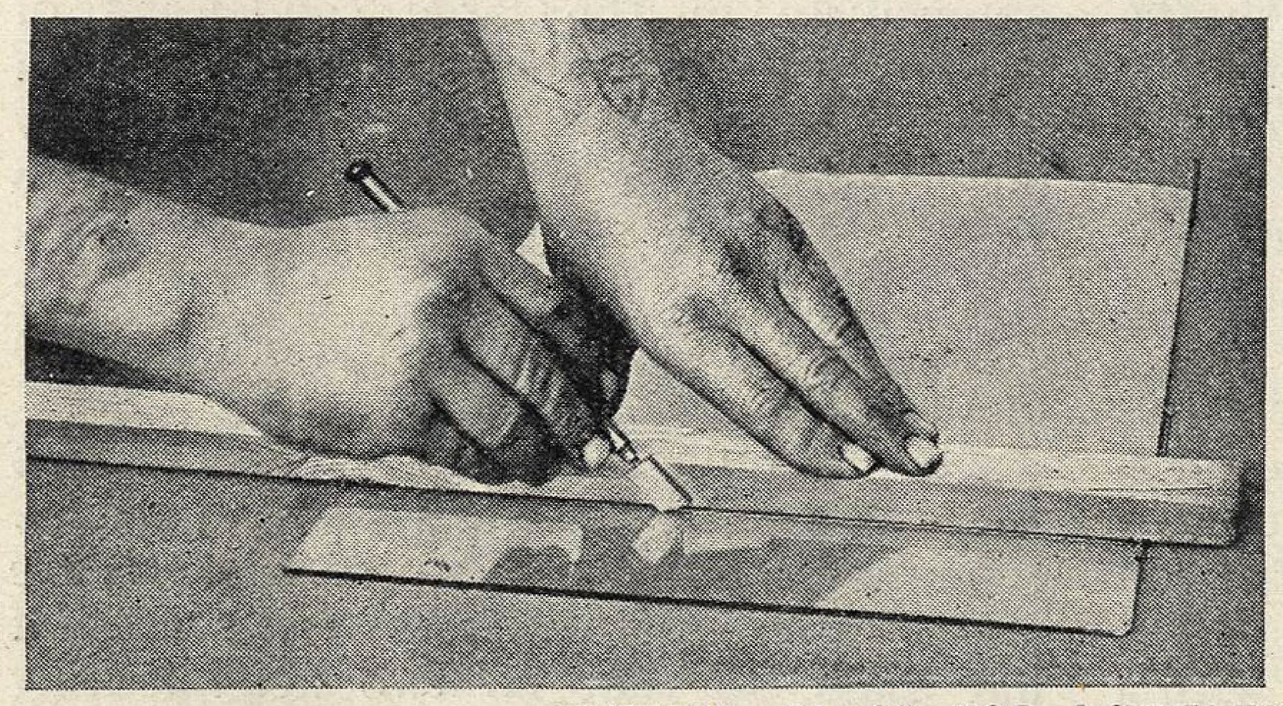
Glass is used for the globes or bulbs of valves, as containers for the electrolyte in accumulators, and as the dielectric in some forms of condensers. The specific inductive capacity of glass varies considerably even for the same kind of glass. That of crown glass lies between 3·11 and 6·96, and of flint glass is from 6·61 to 9·0. Glass has a specific gravity of about 2·9 and a density of some 180 lb. per cubic foot, and the melting point is in the neighbourhood of 2,000° F.

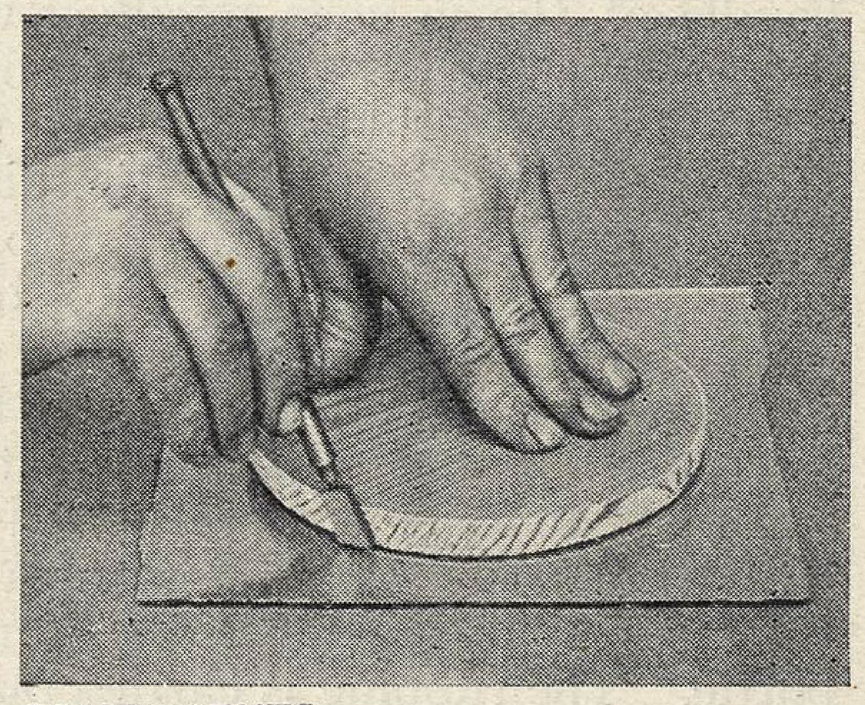
The cutting of ordinary sheet glass for such purposes as the front window of a cabinet receiving set is not a difficult matter. The glass should be placed on a flat surface covered with a piece of felt or cloth. One edge has next to be cut straight by holding a batten or straight edge on the glass and pressing it down firmly with the left hand. The glass is cut with a diamond or a cutter. The diamond is generally considered preferable, but is an expensive tool. Quite satisfactory results are given by a cutter with a small diameter hard steel wheel, and these are inexpensive.

Both cutters are manipulated in the same way, by gripping the handle between the thumb and second finger with the first finger on the top of the handle, as shown in Fig. 1. The cutter is held at a small angle and inclined towards the body; the cut is made by drawing the cutter towards the body. It is important to get the correct angle. This is indicated by the glass making a clean, ripping noise, as against a dull tearing sound when incorrectly held.

The glass is not cut through by the cutter, but only a shallow scratch made on the surface, and it is necessary only to make one cut. The glass is then rested on a smooth piece of wood with the edge of the wood exactly under the cut. Gently tapping the glass with the back of the holder of the cutter will cause the glass to break. The subsequent cuts are made in the same way, but the lines are marked with a square, and the cuts made to them. Rubbing the surface with a piece of soap will make the marks clear.

A circular piece of glass such as may be needed for a galvanometer case can be cut with a special tool, but in its absence the amateur will find that a disk of wood or metal can be used, as shown in Fig. 2. The size of the disk must be smaller than





CUTTING GLASS FOR WIRELESS COMPONENTS

Fig. 1 (left). Straight cuts can be made in glass with a glass-cutter guided by a wood rule or straight edge. The cutter should make a clean, ripping noise, not a dull tearing sound, if it is being held properly. Fig. 2 (right). A wooden guide disk is used to control the direction of the cutter in making glass disks