been buried in the ground to form the earthing system. The erection of the remaining arms of the whole antenna system is now being proceeded with and will eventually comprise 72 towers.

The first power-house section is located in the centre of the tower line, shown in Fig. 3, and covers a space of 130 ft. by 60 ft. (Fig. 2). It accommodates two 200 kW. high-frequency alternators with auxiliaries and equipment (Fig. 4). These machines, with the necessary switchboard, tuning coils, etc., are each capable of a continuous output of 200 kW. at any wavelength between 15,800 and 20,000 metres.

A signalling speed of 100 words per minute is attainable for each of the transmitting units, so that the equipment at present completed is thus capable of despatching traffic at the rate of 203 words per minute.

The reports of the reception of the opening message and of the preliminary test signals have shown that the range of the station is practically world-wide since its signals have been heard in all parts of Europe, in Australia, in South America and in Japan.

The Community House for the staff is a low one-storeyed building containing 16 single rooms, an official suite, a large living-room and dining-room, as well as quarters for servants, the engineer-in-charge with a staff of 15 assistants, comprising the *personnel* at present necessary to maintain the station in operation. The final installation will include ten Alexanderson high-frequency alternators which, when all operating together, will give a total power output of 2,000 kilowatts.

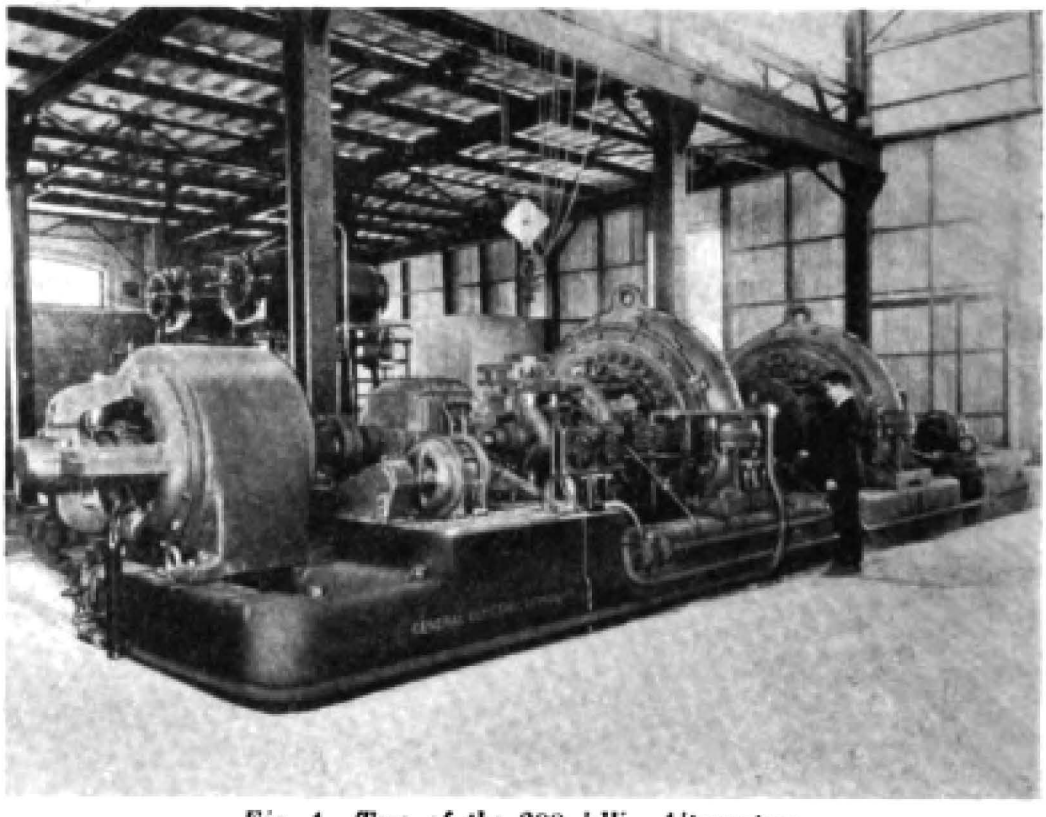

Fig. 4 Two of the 200 kW. Alternators.

The Transatlantic Tests

FURTHER DESCRIPTIONS OF APPARATUS USED FOR RECEPTION

IN our last issue we published descriptions of the apparatus used by those British amateurs who were most successful in the reception of the American signals during December. In the following pages we are printing accounts of the other sets on which the signals were heard. These will be found to contain several features of interest, and they also show that the reception of American amateur signals during the most favourable transmission periods has been effected with quite simple apparatus. In view of this there is not the slightest reason why many British radio experimenters should not listen in at any time for the signals from our American friends, since it should be remembered that all the American stations who were taking part in the special tests during December are working every night of the week handling amateur traffic amongst themselves, and passing relay messages across the continent. In addition to this telegraphic traffic between both spark and C.W. stations, there are regular telephone transmissions from a number of stations. Of these one in particular may be mentioned, viz., WJZ at Newark, N.J., which is operated by the Westinghouse

Electric Co. This station makes daily telephonic transmissions on a wavelength of 360 metres between 1.20 a.m. (0120) and 2.15 a.m. (0215) G.M.T. We shall be glad to hear from anyone in this country who hears the transmissions from this station, or those from any other American amateur station.

We have recently received reports from various parts of the country of the interception of telephonic transmissions on 200 metres from two stations using American call signs, and inquiries are on foot to verify these transmissions, if possible. Should these signals really turn out to have an American origin, and to be sent under amateur license conditions, another milestone would have been reached in the road of progress with short-wave transmission. For the moment, however, we must wait for further reports, but in the meantime it is hoped that particulars of all interceptions of this nature will be forwarded to this office for investigation or verification.

P. R. C.

Description of Apparatus used by A. E. Greenslade and E. McT. Reece.

Stations heard were **1 BCG** (special station—see last issue of *The Wireless World*), and **1 RU** (R. S. Miner, 68, Quaker Lane, Hartford, Conn.).

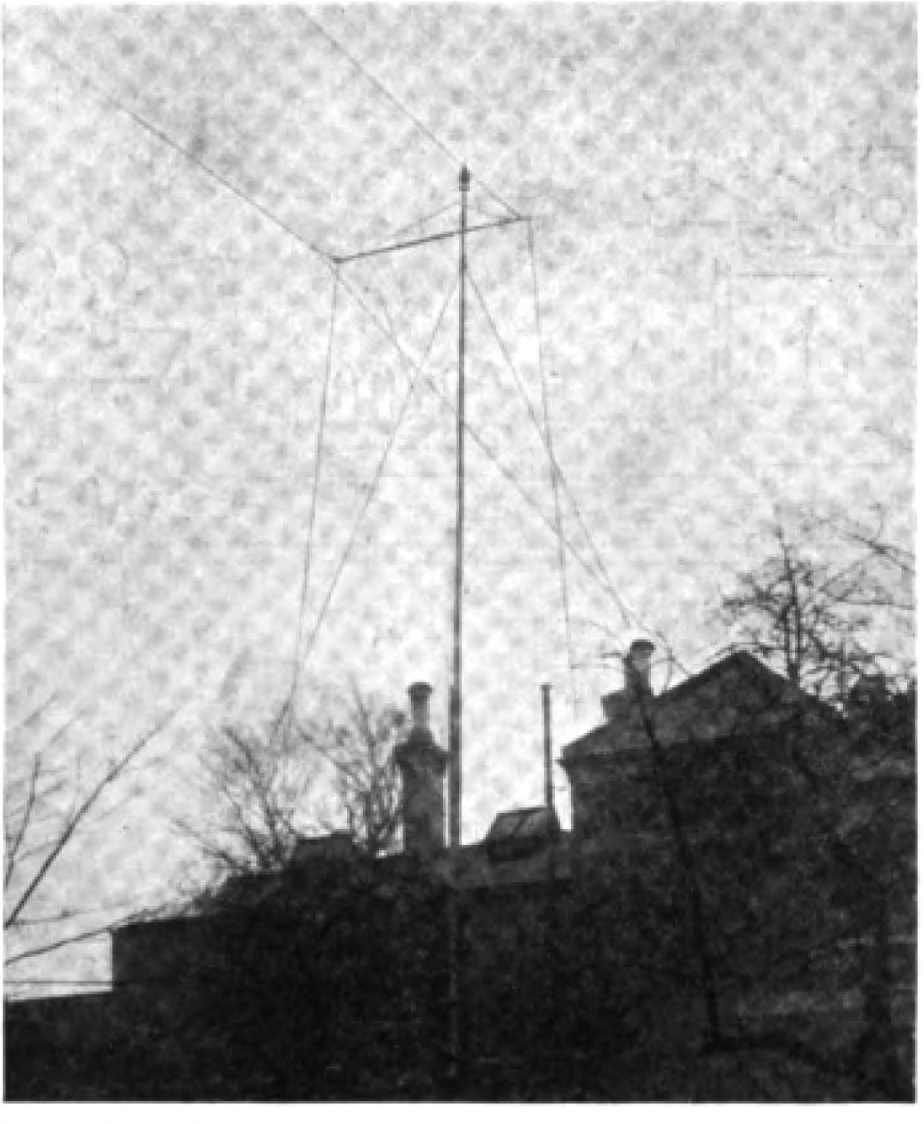

Fig. 1. Aeriale used by A.E. Greenslade and E. McT. Reece at the British School of Telegraphy.

Location.—The British School of Telegraphy, 179, Clapham Road, S.W.9.

Aerial.—Inverted "L" type of 7/20 phosphor bronze. Marconi strop insulators. The horizontal portion approximately 35ft. long, down leads 35ft. Height of aerial about 45ft. Aerial lies N.N.W. by S.S.E. with free end pointing to N.N.W.

The aerial is badly situated with regard to surrounding trees and buildings, etc. Lead roof nearby and corrugated iron roof immediately under aerial. This with the direction of aerial gives a bad situation to an otherwise good aerial. (Fig. 1.)

Earth consists of a copper earth mat, buried 3 ft. deep, directly under aerial.

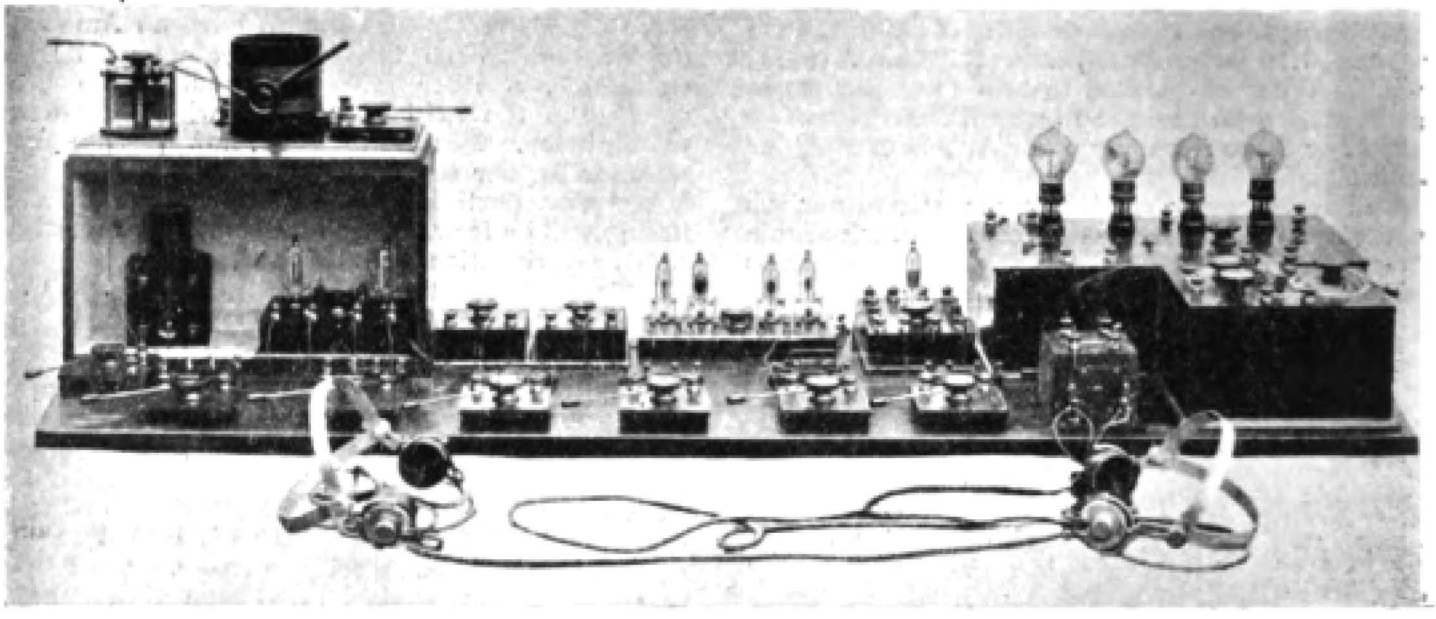

Fig. 2. First Apparatus used by A. E. Greenslade and E. McT. Reece.

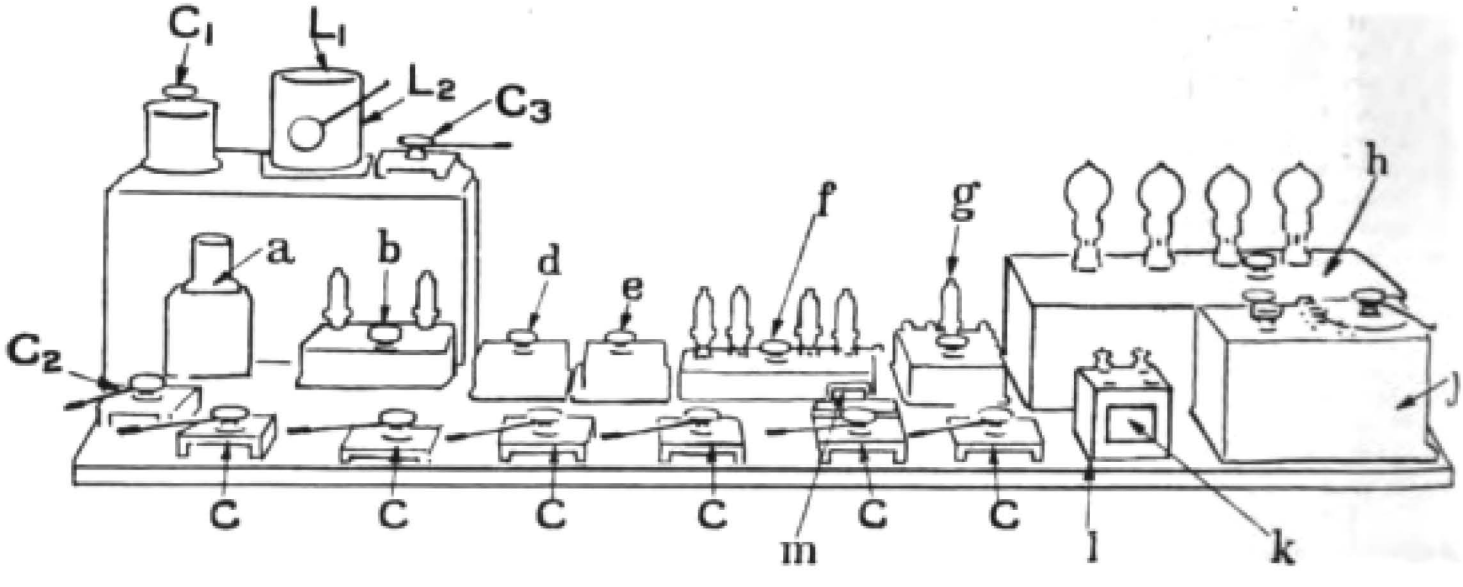

Fig. 3.—Outline sketch of Apparatus shown in Fig. 2.

L_1 = Primary of coupling coil in aerial circuit (Ball winding inside L_2).
L_2 = Secondary coil.
C_1 = Aerial series tuned condenser.
C_2 = Vernier condenser in shunt to C_1.
C_3 = Vernier condenser across secondary.
C = Condensers across secondaries of high-frequency intervalve transformers.
a = Buzzer, with capacity and inductance circuit adjusted to 200 metres wavelength, and used for tuning purposes. This was placed on roof during tests.
b = Two high-frequency stages (subsequently discarded).
d = Potentiometer for H.F. valves.
e = Potentiometer for rectifying valve.
f = Four-valve panel (H.F.).
g = Rectifying valve panel.
h = Low frequency amplifier.
j = Separate heterodyne.
k = Telephone condenser.
l = Telephone transformer.
m = Grid leak and condenser used occasionally when V.24 valve was used for rectifying.

The H.F. intervalve transformers can be seen in the photographs immediately behind the Vernier condensers C.

The lettering in this sketch corresponds wherever possible with the lettering of the diagram in Fig. 5.

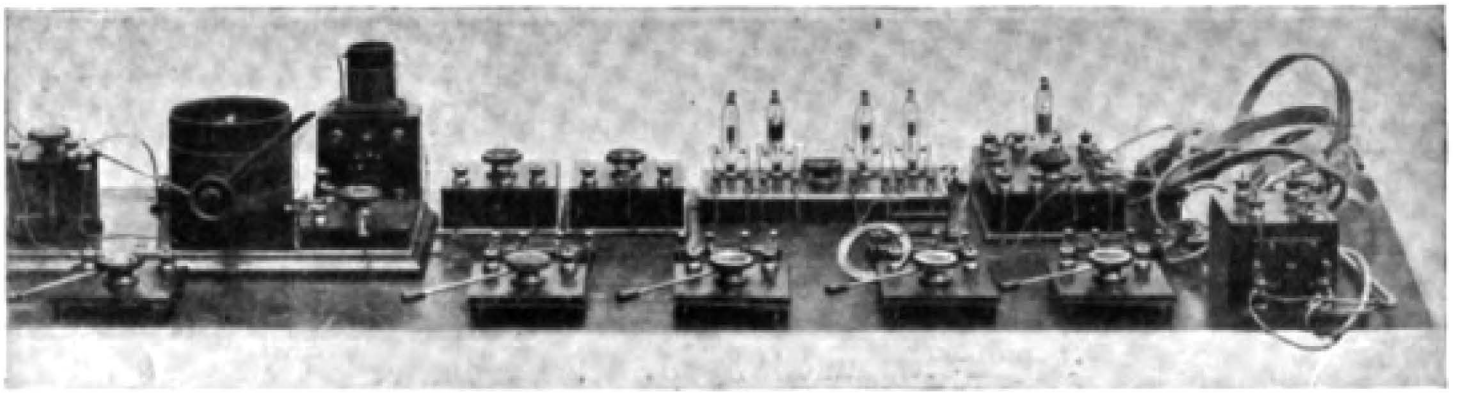

Fig. 4. Simplified Apparatus used by A. E. Greenslade and E. McT. Reece.

Apparatus.—The aerial circuit shown in the accompanying sketch (Fig. 5), consists of a primary winding L_1 wound on a ball former and capable of rotation through 90 degrees for coupling variation. It is connected in series with a variable (air) condenser C_1, of maximum capacity of 0·0005 microfarad, this condenser being shunted by a vernier condenser, C_2, to obtain the necessary fine adjustment.

Six H.F. valves, transformer coupled, come next, the first of the series being connected to the secondary winding L_2.

Across the secondary a vernier condenser C_3 is connected to obtain a range of wavelengths from approximately 180m to 230m.

Owing to only 24 hours' notice of tests taking place on wavelengths higher than 200 metres no time was available in which to construct a further series of transformers to tune to waves up to 375 metres. This rendered listening after certain times mentioned in the schedules useless, especially the last few days of the tests when the experience gained in the manipulation of the apparatus would have been most valuable.

Marconi V24 valves were used for H.F. amplification (V_1 to V_6). Next came a "Q" valve (V_7) for rectifying (occasionally a V24 with a grid condenser and leak was used).

A four-valve L.F. amplifier, which could be switched in if desired was also installed, but was seldom used on account of the noises from the A.C. lighting mains, etc.

"Clifton" accumulators were used for filament lighting.

S. G. Brown's telephones, type "A" 8,000 ohms, were used.

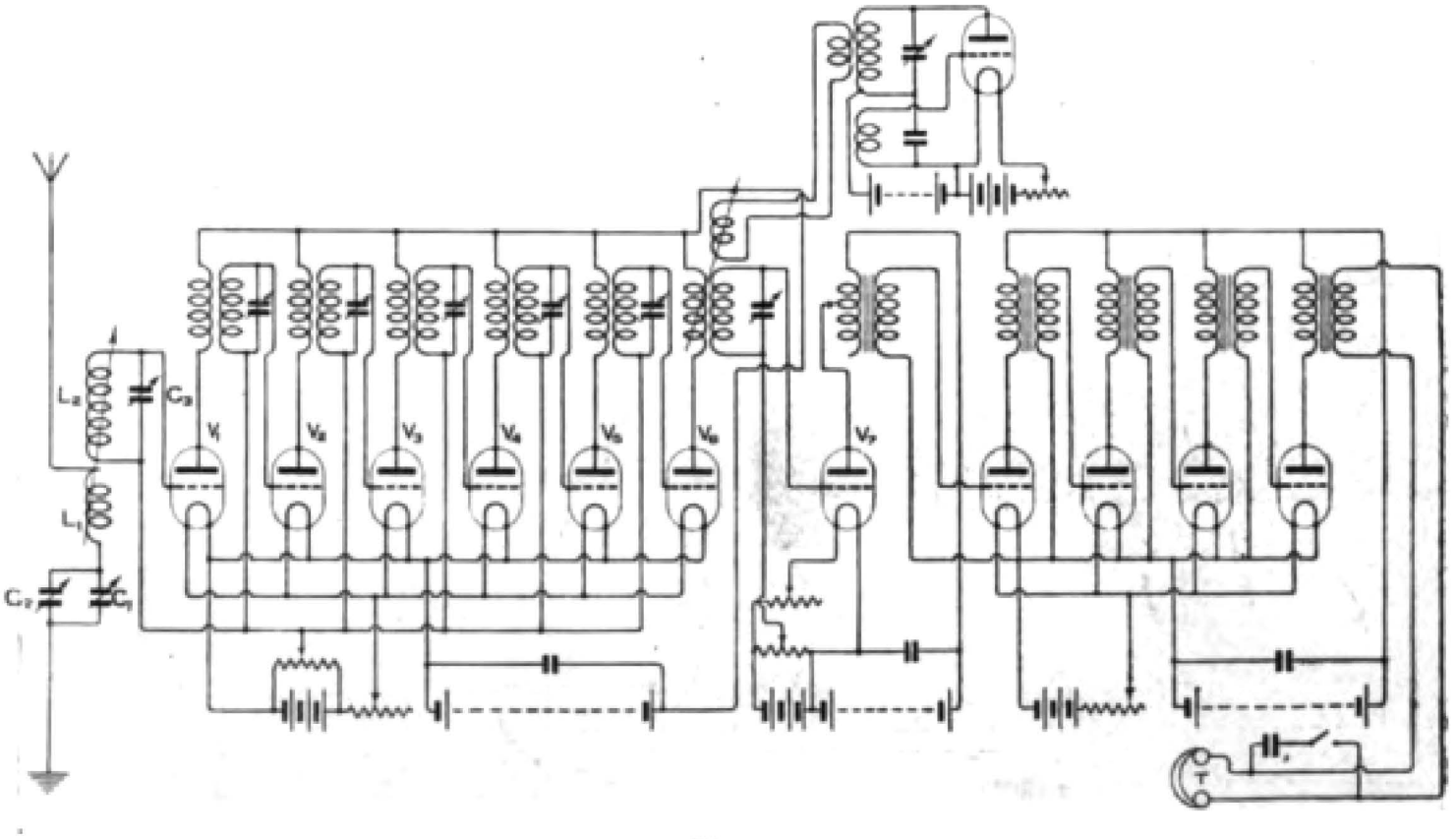

Fig. 5.

An illustration of the complete apparatus is given in Fig. 2, and an outline sketch in Fig. 3, with the parts labelled to enable them to be identified in the photographs.

With the exception of the valves, telephone receivers, and accumulator battery every piece of apparatus, used in the reception of the Trans-atlantic short-wave signal tests, was of my own design and manufacture—(Trade Mark "Oojah.")

Owing to the difficulty in management two steps of H.F. amplification were discarded after the first two evenings.

The actual short-wave signs from America were therefore received on 5 valves, viz., four H.F. and one rectifying, and this simplified apparatus is shown in Fig. 4.

A separate oscillator, built from the instructions issued in *The Wireless World* was used.

Apparatus used by J. R. Forshaw.

Station heard 1 BCG.

Location.—Westville, St. Helens Road, Ormskirk, near Liverpool.

Remarks.—I did not enter my name to take part in the American amateur tests, the reason being that my set was not working well I could only use two valves, the third inter-valve transformer (low frequency) having the primary burnt out. Two valves and a crystal (Perikon) were used when the signals were received, the circuit arrangement being shown in Fig. 6.

The strength of signals was, I should imagine, between six and eight—and they were sent at the rate of about 15 words per minute. They were continuous wave signals.

Signals failed gradually until they were inaudible, and then without moving anything they slowly came on again, faint to normal strength. I noticed that the signals failed as a steam train passed my house which is near the L.& Y. Railway Liverpool to Preston Line, and it is not the first time I have noticed such failing, which is probably caused by the cloud of steam and smoke emitted by the engine. The railway runs on the west side of my house, therefore it would be between me and the source of signals.

The general arrangement of the apparatus may be seen from Fig. 7. It will be noticed that the centre valve socket is empty, as a crystal detector was used for the reason given above.

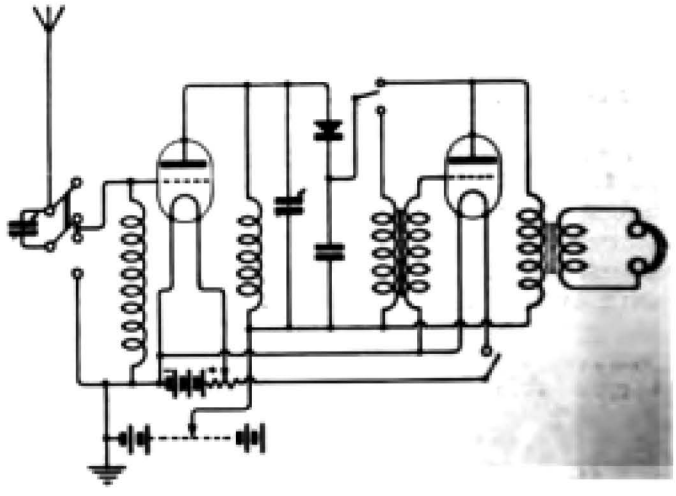

Fig. 6. Circuit diagram of arrangement used by J. R. Forshaw. Both the inductances shown had 30 turns; and the Aerial Tuning Condenser was used in series with the Aerial Circuit.

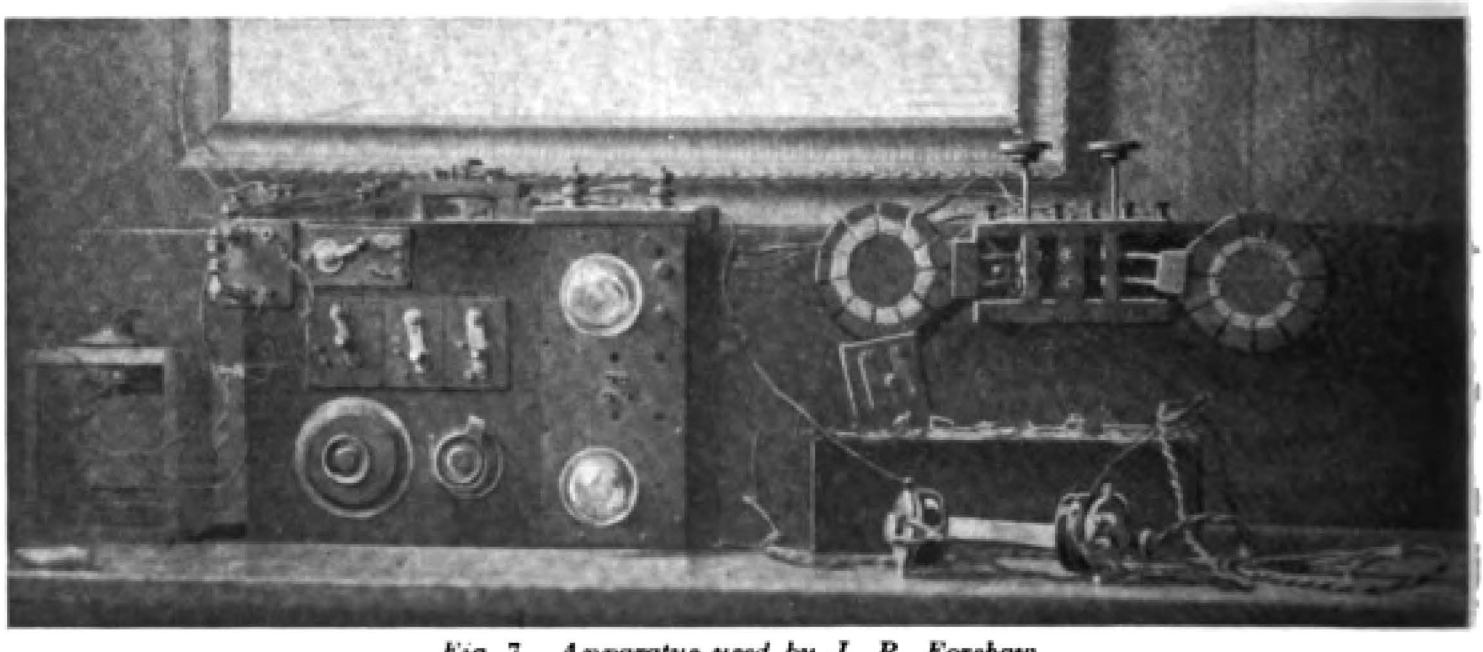

Fig. 7. Apparatus used by J. R. Forshaw.

Apparatus used by T. Cutler.

Station heard **2 ZC.**

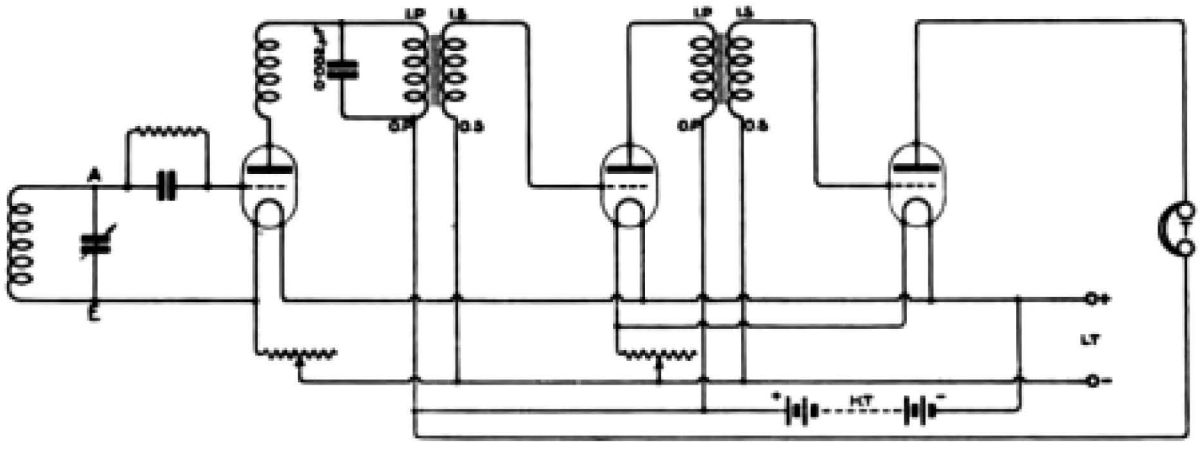

Fig. 8. Diagram of Apparatus used by T. Cutler.

Location.—24, Floating Bridge Road, Southampton.

Station, situated on edge of sea front.

Aerial.—140 ft. of wire. Directional to Atlantic. Height of poles = 60 ft. and 38 ft.

Apparatus used.—A three-valve set, consisting of one detecting and two low-frequency valves, arranged as in Fig. 8, made up from the following components; the source from which each was purchased being indicated in brackets in each case: 1 German detecting valve (Disposals Board); 2 Note-magnifying valves (Disposals Board); 1 Naval condenser (Hadley, Sheffield); 1 Marconi variable condenser (Disposals Board); 2 Intervalve transformers (Southern Counties Wireless School, Southampton and Leeds) [1 to 5 ratio]; 1

Fig. 9. Apparatus used by G. J. Eschauzier.

Cylindrical coil, wound with No. 22 gauge D.C.C. tapping every 5 turns (Disposals Board); 1 Ball reactance inside coil, wound with No. 36 D.S.C. (Disposals Board); 1 Townsend wavemeter (Disposals Board); 1 pair of Western Electric telephones, American make (Wall, Colbury, Hants); Accumulators and H.T. batteries (Smethwist, Southampton); Marconi double pole switches (Disposals Board); 0·002 microfarad condenser (own make); Grid leak and condenser (own make); filament resistance (Vivian, Southampton); Switch arm and contact studs (Disposals Board).

Signals were only listened for during three nights.

Apparatus used by G. J. Eschauzier (Holland).

Station heard 1 BCG.

Location.—19, Parkweg, The Hague (Holland).

Aerial.—Three wires, 60 ft. long, 35 ft. above house which is 45 ft. high.

Apparatus.—A four-electrode Schottky valve was used as detector, with a two-stage amplifier using soft Phillips valves. The receiving sets that were used were:—

(1) A two-circuit receiver with variometer coupling.

(2) A special receiver type "Bivario" manufactured by the Nederlandsche Radio Industrie.

The general arrangement of the complete set may be seen from Fig. 9, while Fig. 10 gives a more detailed illustration of the "Bivario" receiver.

Fig. 10. The "Bivario" Receiver used by G. J. Eschauzier.

A Useful Coil from Oddments.

A USEFUL multi-layer coil for shorter wavelengths can easily be constructed with discarded Litz wire from the formers of an old Mark III tuner. If at the same time the amateur has available the ebonite tube used for the inductance and reaction coil of a 65-metre Mark I rear set, the construction of the coil is further facilitated. Take this latter tube and saw it into two equal portions. Round the edges of either portion drill a set of holes equally spaced and of such a size that half a wooden match will just fit in each of them. Eight holes round each edge will be enough, the two rows being staggered in relation to one another. When the holes have been made, stick half-matches tightly into them and wind a single layer of Litz between the rows. Next zig-zag the wire for a complete turn, winding it in and out of the matches and wind on the next layer, as described by Mr. Coursey in *The Wireless World* for December 11th, 1920. p. 635. About half of the wire of one Mark III. former will make a coil of sufficient inductance to tune 600 metres, with about 15 to 20 divisions of a 0·0015 Mark III condenser in parallel. Plug mountings for these coils can be purchased from the dealers in wireless materials. After the complete coil has been wound on, withdraw the matches one by one and thread a piece of twine through the loops and the hole in which the matches have been placed. When the thread has been taken through all the holes and loops the ends should be secured by tying.

French Experimental Licenses.

FROM the January issue of *La T.S.F. Moderne* we learn that the French Authorities have at last granted transmitting licenses to French Amateurs for Experimental transmissions. Up to the present, we have heard of only four licenses being issued, one of these being to the Managers of *La T.S.F. Moderne*, the wavelength authorised being 200 metres and the power 100 watts (in the aerial!); system, spark or C.W.

It appears then that although the French authorities have been slow in giving sanction to amateurs to transmit this has been compensated for by the very liberal terms of the licenses now granted. From the wording of the letter of authorisation there appear to be no restrictions imposed as to the nature of the transmissions or the number of stations with which communication may be conducted. The power (100 watts in the aerial) will strike envy into the hearts of British Amateurs, who with their restrictions of 10 watts input would consider an output of 5 watts in the aerial an achievement in efficiency.

In the near future then we may look forward to being able to listen-in to the transmissions of our amateur friends in France, and we are justified if we feel somewhat apprehensive that they may wrest from us the honour of the first short wave transatlantic transmissions from this side.