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RADIO REPORT No. 124.

Title:           Improvements in Transmissions from  
                  Fortishead Radio Station.

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Date:                           November 1928.

Case No. 449.

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IMPROVEMENTS IN TRANSMISSIONS FROM FORTISHEADRADIO STATION.

The following report describes adjustments which have been made to the transmitting sets at Fortishead with the following objects:-

(1) improving the note of the 2013 metre transmissions, (2) changing over the wavelengths of the transmitter so that the highest power was available for the 2013 metre transmission, (3) examining the possibility of self-exciting one transmitter through the internal capacity of the glass valve stage and (4) increasing the power of the 6 K.W. Sets without extensive modifications of plant.

1. Complaints had recently been received with regard to the poor quality of the note from the 2013 metre transmissions, and adjustments have now been made which appear to have considerably improved its quality.

The transmissions from the other transmitters had also occasioned one or two isolated complaints, but the quality of the note has only been impaired in this case by transient effects (due to such causes as temporary variations of filament voltage supply to the Tuning Fork units) and is normally good in both these transmitters.

A poor quality note is usually due to one of three causes - inadequate smoothing of the H.T. Supply to the transmitter, unsteadiness or ripple in the L.T. Supply to the tuning fork Unit, or ineffective filtration of harmonics in the tuning fork unit.

As the poor note was peculiar to the 2013 metre transmission, it appeared that the last of these causes was primarily responsible. The coupling of the filter stages in the final frequency of the tuning fork were therefore loosened as far as possible without appreciable loss of output. Reports from Burnham and ships were sought when these adjustments had been made, from which it was gathered that a considerable improvement had been effected. The operator on the Leviathan, on the way to New York from Southampton, reported on the note and strength at intervals; the last report was received when the Leviathan was 2000 miles out, to the effect that the note and strength were particularly good.

The results of observations on the quality of the transmissions which were subsequently made at Dollis Hill are given at the end of this report.

2. In view of the jamming which had been experienced in the 2013 metre transmission, it was thought advisable to change over this transmission to the high power set for a preliminary trial.

The change over of the transmitter wavelengths involved a rearrangement of aeriols. No. 1 Set (25 K.W.) is now tuned to 2013 metres and connected to one of the short aeriols, No. 2 set (6 K.W.) is tuned to 2479 metres on the long aerial and No. 3 (6 K.W.) to 2100 metres on the other short aerial.

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The aerial current in No. 1 set is considerably lower than when transmitting on 2479 metres - 45 amps for an input of 1.8 amps to the silica valves. The readings for the three sets under the new conditions are given below:-

|                          | Anode Feed Current (Amps) | Grid Current m.a. | Inter-stage Amps (H.F.) | Primary Amps (H.F.) | Aerial Amps | Grid Bias Volts | T.F. Output |
|--------------------------|---------------------------|-------------------|-------------------------|---------------------|-------------|-----------------|-------------|
| No. 1 set on 2013 metres | 1.8                       | 50                | 4                       | 26                  | 45          | 165             | 1.2         |
| No. 2 set on 2479 metres | .6                        | 10                | 3                       | 12                  | 26          | 165             | 1.2         |
| No. 3 set on 2100 metres | .55                       | 12                | 3                       | 13                  | 26          | 165             | 1.2         |

The necessary alterations have been left in a temporary state. It is proposed to make them permanent at a later date if reports indicate that this arrangement is satisfactory.

3. No. 3 Set (2100 metres) is used solely for calling and is therefore idle for long periods; if the wavelength however could be quickly changed, the set could be used for traffic when not in use for calling. The following test was therefore made. The set was self excited by using the internal capacity of the glass valve as coupling between the grid tuned circuit (represented by the output circuit of the tuning fork unit) and the anode tuned circuit of the exciter stage. A reduction in grid bias volts down to 20 or 30 volts was necessary before the circuit oscillated freely; in the final arrangement no external grid bias voltage was used, a grid leak of 5000 ohms being introduced.

The following readings were taken:-

| Anode Feed Current Amps | Grid Current m.a. | Inter-stage Amps (H.F.) | Primary Amps | Aerial Amps |
|-------------------------|-------------------|-------------------------|--------------|-------------|
| .75                     | 11                | 3.5                     | 12.5         | 31          |

This method of excitation has the advantage that the transmitter may be quickly retuned to another wavelength for traffic purposes.

4. The power input was increased on No. 3 set, using two silica valves in the main amplifying stage. Readings are given below. This transmitter has been left in this condition for a few weeks' trial. It is proposed later to make the increase permanent in Nos. 2 and 3 sets if higher power on all wavelengths is thought desirable.

|                                       | Anode<br>Feed<br>Current<br>(Amps) | Grid<br>Current<br>m.a. | Inter-<br>stage<br>Amps<br>H.F. | Prim-<br>ary<br>Amps | Aerial<br>Amps | Grid<br>Bias<br>Volts | T.F.<br>Output |
|---------------------------------------|------------------------------------|-------------------------|---------------------------------|----------------------|----------------|-----------------------|----------------|
| Highest<br>Tap on<br>Trans-<br>former | 1.05                               | 20                      | 4                               | 12                   | 43             | 165                   | 1.3            |
| Middle<br>Tap on<br>Trans-<br>former  | .9                                 | 13                      | 3.5                             | 10                   | 38             | 165                   | 1.3            |

The middle tap of the transformer is at present being used.

#### REPORT ON OBSERVATIONS CARRIED OUT AT DOLLIS HILL.

Subsequently to the adjustments made at Portishead a series of observations were taken at Dollis Hill on the quality of the transmissions as a result of which the following points were noted:-

1. The quality of the note on all three transmissions from Portishead is good, and a definite improvement has been effected.

2. There is still a certain amount of modulation discernible, more particularly on the 2015 metre transmission. The frequency of this modulation appears to be of the order of 100 cycles. (The ripple of the smoothed H.T. main supply at Portishead has a frequency of 150 cycles).

3. It is not thought, however, that this modulation is likely to have any harmful effect on reception or to cause undue interference.