

INSTRUMENTS UNDER TRIAL.

Magnetic
detector.

An instrument of this description was made on board "Vernon" and tried. Signals could only be heard in the telephone about 30 miles, this was probably due to the windings not being of the right length.

The instrument as tried consisted of a small horse-shoe permanent magnet, revolving in front of another iron horse-shoe. Round this latter was a primary and secondary winding, the aerial being joined to the primary, whose other end was earthed, and a telephone receiver to the secondary.

This form of instrument has certain advantages over the coherer, but has the disadvantage of having no means of call-up and of leaving no permanent record. Accordingly further experiments have been suspended.

Popoff-
Ducretet
apparatus.

This is another form telephonic receiver possessing the same disadvantages. Its range also was about 30 miles.

By Admiralty letter N.S. 6095/01/5251 of 25th April 1902, the experiments were ordered to be concluded.

Motor trans-
former.

A motor transformer for reducing the voltage from 80 to 20, for use with the induction coil and hammer make-and-break, in order to do away with the secondary batteries, has been under trial and has given good results. Its chief disadvantage is the buzzing noise it causes.

High resistance
shunt across
coherer
terminals.

Various forms of high resistance shunt have been tried with the object of increasing the sensitive of the coherer.

The best results were obtained with a graphite resistance of two megohms, but the beneficial effect is not sufficiently marked to warrant its adoption.

Kites.

These are still under trial.

An example of their successful employment was shown during a visit of H.M.S. "Jaseur" to Alderney. By means of a box kite, by which the vertical height of aerial wire was increased from 95 feet to 160 feet she was enabled to communicate with Culver Cliff shore station, I. of W., a distance of 75 miles.

Aerial wire.

The aerial wire Patt. 1816, described on page 104 of A.R., 1901, has not been found entirely satisfactory owing to deterioration of the insulation due to the india-rubber being directly exposed to the air and cracking in places where insulation is of importance. In consequence two samples manufactured by Messrs. Siemens are under trial, and it is hoped that better results will be obtained.

Accumulators.

Two 5-cell accumulators manufactured by Pritchetts and Gold are under trial. They are of the Planté type and the chief advantage claimed lies in the construction of the positive plate, which renders it less liable to buckle, and accordingly is better calculated to withstand rough treatment.

Potentio-
meters.

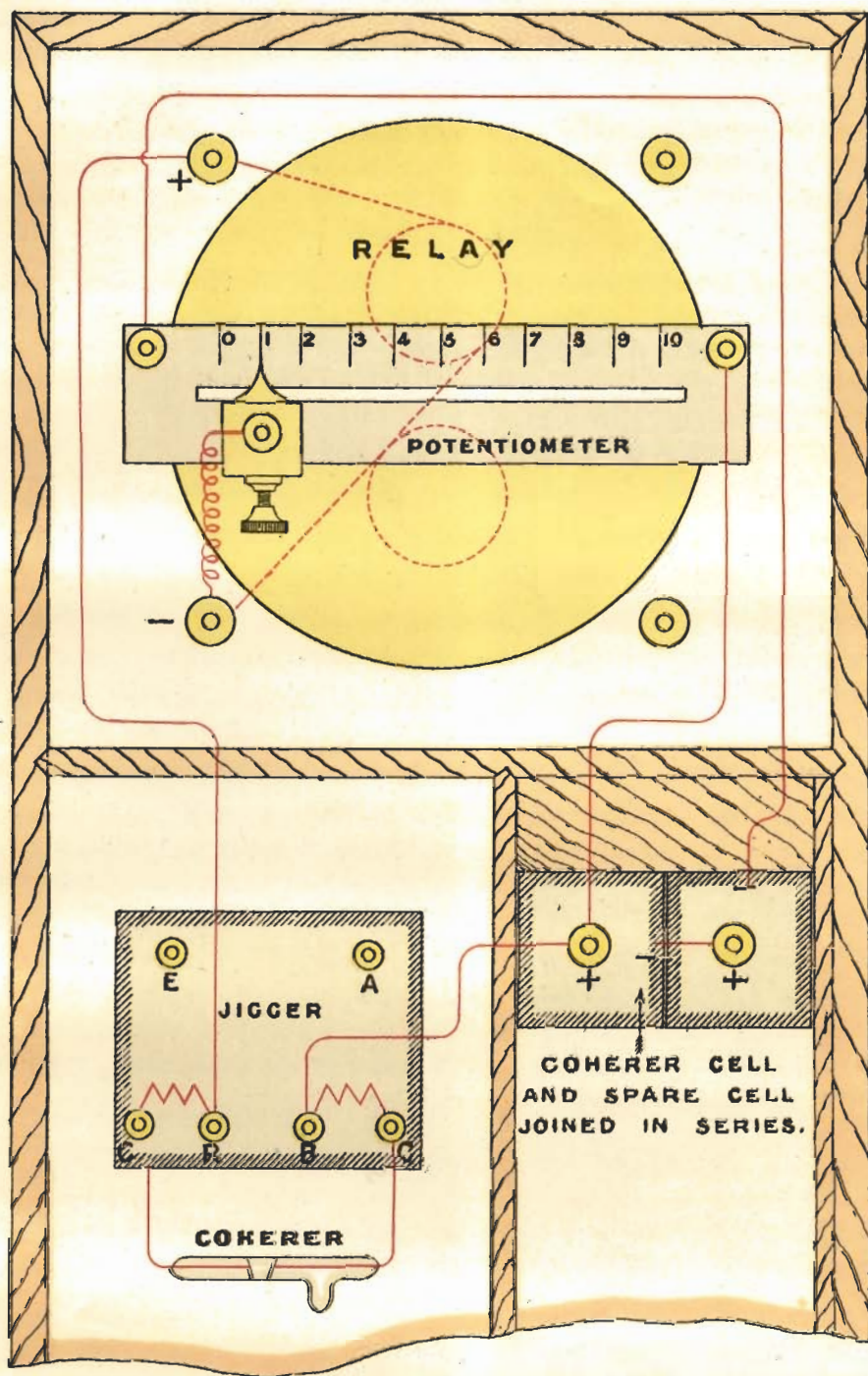
Several of these instruments of varying resistances have been supplied to the "Vernon" by Mr. Sullivan for trial. It is found that they have a beneficial effect on insensitive coherers and on those inclined to give extras, and it has been authorised by A.L.N.S. 5736/12219 of 11.10.02 to issue six each to the Flagships of the Mediterranean and Channel for distribution and trial.

The following is a description of the instrument and method of use (see Plate XXXII.) :—

The potentiometer is an instrument for altering the potential at the terminals of the coherer.

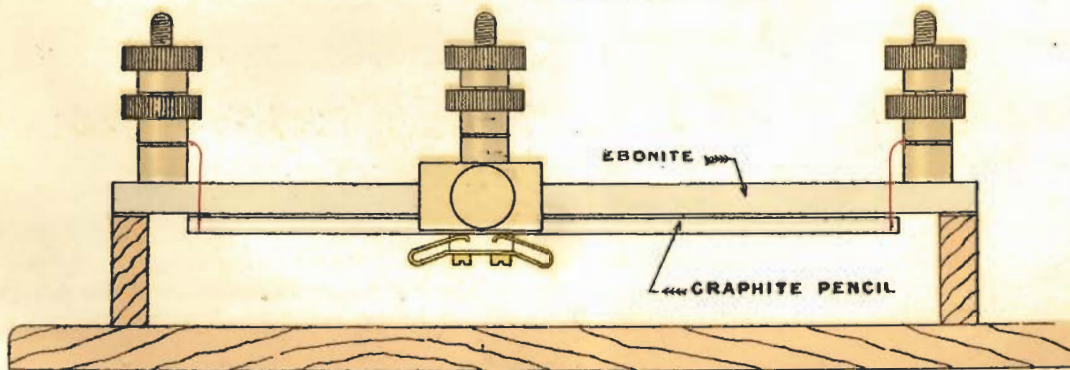
It has been found that increasing the voltage, above that of a single Obach cell has a beneficial effect on insensitive coherers, whilst decreasing that voltage has a good effect on highly sensitive coherers, which under the ordinary conditions give extras.

**METHOD OF CONNECTING UP POTENTIOMETER.
IN THE SERVICE RECEIVER BOX.**



SECTIONAL VIEW OF POTENTIOMETER.

SCALE, FULL SIZE.



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Weller & Graham. Ltd Litho. London.

It consists of a graphite resistance of 10,000 ohms between two terminals to which are connected the poles of the two cells used. A sliding contact with terminal is fitted to slide over the resistance, contact being made by a spring. A binding screw is provided to fix it in any position.

The whole is in a small wooden case the top having a slit in it for the slider to travel in, and being marked from 0 to 10. The slider has a pointer to indicate what portion of the resistance is included in the circuit. In the sketch of the circuit the instrument has been placed on top of the relay, as this will be found a convenient position for it whilst adjusting it.

The connections are as shown. It will be seen that the resistance is in shunt across the terminals of the two coherer cells; the current for the coherer and relay is tapped off at a voltage depending on the position of the slider, the maximum being when the pointer is at 0.

LODGE-MUIRHEAD'S SYSTEM OF WIRELESS TELEGRAPHY.

A demonstration of the working of the instruments used in this system was given by Sir Oliver Lodge on November 10th, 1902, at the works of Messrs. Muirhead & Co., Elmers End.

Messages were exchanged between a station erected in the grounds close to the works, and one at Down, distant 7 miles, a chalk hill intervening between the two stations.

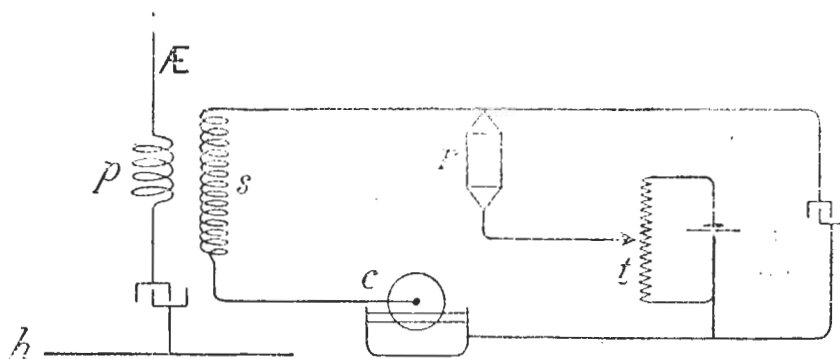
The transmitting apparatus consisted of a 10-inch induction coil worked off accumulators (15 volts), one ball of which was connected to the aerial wire, 70 feet in height, the other to one plate of a condenser (tin-foil and glass), the other plate being in connexion with the instrument hut, which was built of corrugated iron.

The interrupter for the coil was worked automatically. It consisted of a bent steel rod, connected to a vibrating armature, which in its lower position dipped into mercury, contained in a glass jar, whilst in its upper position the rod was clear of the mercury, the break taking place under oil.

The vibrating armature was worked off a battery of three dry cells, the circuit being completed by means of an ordinary Morse key, which was used for signalling.

The chief feature of the receiving apparatus was the coherer invented by Sir Oliver Lodge, which being self restoring in its action did not require a tapper.

A sketch of the receiving circuit is shown in the figure below:—



- p* Primary of jigger.
- s* Secondary of jigger.
- r* Siphon recorder.
- h* Corrugated iron hut.
- t* A potentiometer, by means of which the required voltage which will just not break down the resistance of the coherer can be tapped off.
- c* Lodge coherer.

The coherer consists of a steel wheel whose lower edge dips into a cup containing mercury, on the top of the mercury there is a layer of thick lubricating oil; the wheel is kept revolving by clockwork.

In the ordinary state there is an imperfect electrical contact between the steel wheel and the mercury, a thin film of oil intervening; when, however, the electrical pressure between the two is raised, due to the Hertzian wave effect on the aerial, the resistance of the oil film is broken down, and the current from the single cell works the siphon recorder.

A number of messages were exchanged between the two stations without any repetitions, and the instruments worked in a perfectly satisfactory manner. Messages were also satisfactorily transmitted by an automatic sending apparatus similar to that used in submarine telegraph work, where a roll of parchment tape, on which the message has previously been punched out, is inserted in the automatic sender.

In view of some of the advantages which this system offers, especially as regards the coherer, Messrs. Muirhead and Co. have been asked to supply a complete set of this apparatus to "Vernon" for trial, and the instruments are expected shortly.

PROGRESS IN SYNTONIC TELEGRAPHY.

Information received from Captain Jackson with reference to his Syntonic System of Wireless Telegraphy.

(Reference Sheet, 3rd June 1902, from Captain Jackson to "Vernon.")

The recent negotiations with the Marconi Company have shown that in the opinion of the members of the Board it is very desirable for the Navy to possess a syntonic system of wireless telegraphy. The continual delays in the above-mentioned negotiations, and the present uncertainty of bringing them to a close in the near future, render it desirable that we should take some steps to obtain some system for ourselves, so as to be, if possible, independent of outside assistance in this respect.

The trials carried out in the Mediterranean last year with the apparatus designed by me were sufficiently promising at their close to show that syntonic telegraphy was obtainable with it, although the apparatus was then in what has since been proved to be a half-tuned adjustment. This was due to an error in one of the calculations, which has now been corrected.

A trial with the instruments in correct adjustment will probably give improved results, and seems desirable, for the above reasons. Should you concur, and if the "Vernon" can assist by making two sets of apparatus, and giving them a trial, I will forward you the necessary particulars for the construction and adjustments of the instruments.

Four oscillators of Captain Jackson's latest design have been made in "Vernon."

They have been set up on board "Hector," "Minotaur," and "Jaseur," and at Culver Cliff, W/T Station, Isle of Wight.