

WIRELESS TELEGRAPHY APPENDIX, 1905.

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GENERAL REMARKS.

Wireless Telegraphy section of Annual Report.

The Wireless Telegraphy section of the Annual Report is published as an appendix.

Position of Service apparatus.

In general, it may be said that the Service still maintains its position as the most efficiently equipped Navy in wireless telegraphy. But the improvement in signalling that has been made is not on a par with the improvement in materiel. This is undoubtedly due to the want of trained operators. The need of a special branch is becoming more urgently felt daily, and until there are men available who do nothing else but wireless telegraphy, progress in results will be slow. The question is under consideration, and schemes have been forwarded recommending the introduction of a special branch in the signalling department.

Want of trained operators.

U.S. Navy.

The United States Navy are our most dangerous rivals. It is believed that ships of their fleet equipped with wireless telegraphy carry three chief petty officers to work it.

Private enterprise.

As far as private enterprise is concerned, the Marconi Company still outdistance all their rivals. In Germany the wireless companies have come to a general agreement, and have formed a powerful combination called the Telefunken Company, Berlin. The various inventors in the United States are experimenting vigorously, and good results have been obtained by Fessenden, De Forest, and Shoemaker.

Telefunken Company.
U.S. inventors.

France is behind the times. Their most notable inventor being M. Rochefort.

Experimenters in direction.

Both Professor Artom of Italy and Mr. Marconi have brought out apparatus for directing a wave in a given direction. The latter can also tell to a point from which direction a signal is coming.

Mr. Marconi has demonstrated his method successfully.

PROGRESS IN "VERNON."

A Summary.

Wireless telegraphy installed in "Vernon III."

In January 1905 the wireless telegraphy was transferred from the "Hector" to "Vernon III," where two masts had been fitted, and where arrangements had been made for facilitating both instructional and experimental work.

H.M.S. "Furious" attached for wireless telegraphy experiments.

The acquisition of H.M.S. "Furious" has been invaluable for experimental and instructional work, especially the former, by which much important information on "C," "A," and "B" tunes, electrolytics, tuned shunts, aerials, &c., has been gathered together which would otherwise have been unobtainable.

Loss of Portland station.

Much of the experimental and testing work has for some time been carried on under adverse conditions, as we have not had the use of our Portland station ("Boscawen II.") since March, owing to the paying off of "Boscawen." However, it has now been decided to fit up a station in "Sapphire II." at Portland.

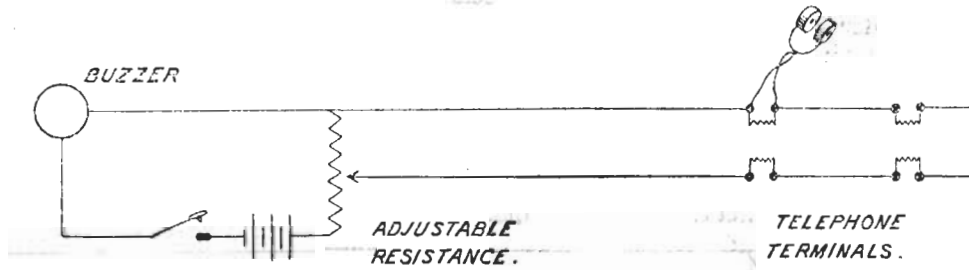
The first few months of the year were largely occupied in fitting up "Vernon III," and considerable trouble was taken in devising and making the most suitable and convenient arrangements for the furtherance of experimental and instructional work.

From experience of the inter-office interference in "Hector," it was decided to isolate each office or room, so that sparks made in one place would not effect a sensitive receiving apparatus in any neighbouring place. This has been effectually carried out by using lead covered wire for all leads connecting the offices, with the casing earthed at various places, especially where the wire passes out of one office and into another. In addition to this the bulkheads separating offices on the same deck are covered with earthed wire netting.

An experimental office on the main deck has now been fitted, a measuring room for the measurement and calibration of instruments, inductances, capacities, &c., a test room, workshop, and standard office. The standard office is fitted up as recommended for a ship's wireless telegraph office, and is kept up to date with the latest improvements.

Arrangements have been made by which nearly the whole of the instructional work can be efficiently carried out on the lower decks, so that efficient instruction is no longer incompatible with experimental progress. To attain this end three offices have been fitted up, one in the lecture room and the other two on the deck above. These offices are precisely similar to ships' offices, and devices have been fitted up out of sight, similar to those explained in Annual Report 1904, page 30, by which signalling at varying distances, with or without interference, and double reception can be practised. Two of these offices are fitted with full sets and the other with a reduced set, as in "Scout" class. There are, in addition, two stations for practice with telephone receivers, as shown in Fig. 1.

FIG. 1.



The sound in the telephones is precisely similar to that when receiving with an M.D., and the strength of signals can be varied at the sending end by the adjustable resistance, such as a firing resistance coil.

The following is a list of the officers and men instructed in wireless telegraphy during 1905.—

Torpedo Lieutenants	-	-	-	-	-	-	-	16
Lieutenants R.M.A.	-	-	-	-	-	-	-	7
Lieutenants R.M.L.I.	-	-	-	-	-	-	-	34
Other Officers	-	-	-	-	-	-	-	2
Total	-	-	-	-	-	-	-	<u>59</u>
Electricians	-	-	-	-	-	-	-	47
Torpedo Instructors	-	-	-	-	-	-	-	226
Armourers	-	-	-	-	-	-	-	43
Coast Guard	-	-	-	-	-	-	-	8
Total	-	-	-	-	-	-	-	<u>324</u>

Besides the above, many officers, including two Senior Officer classes, have received a few days' instruction without undergoing an examination.

With regard to the experimental work, much has been done in perfecting the practical application of the experimental data outlined in Annual Report 1904. Designs for a 5 K.W. station at Horsea were got out and approved early in the year; much of the gear has arrived, and the dockyard authorities are now engaged in erecting the masts. Much time has been spent on experiments with "C" tune, and, as will be seen in this report, very satisfactory practical results have been obtained with make-shift arrangements. Designs for a Service "C" tune are now being completed, and it is hoped to have, very shortly, a standard set working in "Vernon." The Admiralty have already approved of fitting certain stations with this tune. "Tuned shunts" have advanced from the experimental stage to that of practical working at sea. A few ships are already fitted with them; 90 more sets are being manufactured. Electrolytic detectors have received considerable attention and much valuable information has been obtained.

- Wave meter.** A practical wave meter has been designed and will soon be supplied to the fleets. By means of this instrument "B" tune in "Vernon," "Furious," and in the shore stations has been standardised, so that each of them transmits the same wave lengths.
- Aerials.** The question of aerials has been thoroughly investigated, a split fourfold has been recommended to ships at sea for "A" and "B" tunes and a "roof" for reception from Poldhu. A special roof aerial will be introduced for "C" tune.
- Standard installation.** Several improvements have been made in the standard installation for ships, such as the tune switch for facilitating a change of tune, and the substitution of Bradfield insulators for the cowtail and deck tube.
- Fittings for offices.** The whole of the instructions for the dockyard fitting of offices have also been revised.
A standard installation for ships fitted with a reduced set, e.g., "Scout" class, is printed in this report (see page 9).
- Destroyer set.** Experiments with wireless telegraphy in destroyers have been made, and a destroyer set is being designed which will be fitted in some of the new destroyers.
Magnetic detectors are now issued with two windings for double reception, and a few magnetic keys are under trial at sea.
- Calibration of instruments.** The work of measuring capacities, inductances, rating of instruments, &c., has gone on as before, but has been greatly facilitated by the purchase of a standard air condenser and by a new design of thermal junction.
- Signalmen telegraphists.** The question of the introduction of a special rating of wireless telegraphy signalmen has been under consideration at the Admiralty, and it is hoped that the training of a special rating will shortly be commenced.

ALTERATIONS IN THE ESTABLISHMENT.

Alterations in establishment approved.

Pattern No.	Article.	Quantity.	Remarks.
2,009	Telaupads - - -	6	For all ships and shore stations.
2,058	Condensers, sliding, large -	2	Obsolete.
2,060	Inductance tuning, 60 feet -	1	Obsolete.
2,067	Magnetic detector - -	1	Alter description to read "double wound."
2,067	" " - -	1	Allowed to "Sentinel" and "Topaze" class (reduced set).
2,074	Switch "A" and "B." - -	1	Altered to 2 for full sets, 1 for reduced sets.
1,602	Telephones for magnetic detector, with headgear complete.	2 pairs	For all ships and shore stations.
1,603	Voltmeter, hot wire - -	1	For flagships (see page 6).
1,811	Mounts, tube, bone - -	30	For Service set cancelled.
1,811	" " - -	6	For Marconi set. Remarks altered to "Until present stock is exhausted."
1,828A	Coherers, boxes, tin, for M -	2	Struck out from "Sentinel" class.
1,828	" " " -	2	Inserted for "Sentinel" and "Topaze" class.
2,061	Jigger, R. 306 M - - -	1	" " "
2,062	" R. 343 M - - -	1	" " "
2,063	" T. No. 5, C.T. type -	1	" " "
2,064	" T. No. 17, C.T. type	1	" " "
2,066	Leyden jars - - -	25	" " "
1,779	Box, screening, brass - -	1	" " "
1,793	Relay (S) - - -	1	" " "
1,797	Tappers (S) - - -	1	" " "
2,076	Trays for 6 jars - - -	1	" " "
2,077	" 15 " - - -	1	" " "

Pattern No.	Article.	Quantity.	Remarks.
2,068	Auto attachments (M) - -	1	Struck out from "Sentinel" class.
2,089	Bases for receiver (M) - -	1	" " "
2,069	Box, screening, iron - -	1	" " "
2,070	Relays, balanced - - -	1	" " "
3,071	Tappers, " - - -	1	" " "
1,899	Hoods, ebonite - - -	4	8 allowed for "Sentinel" class.
1,807	Insulators, long - - -	4	8 " " "
1,808	" short - - -	6	12 " " "
1,783A	Coherers (M) - - -	20	Struck out from "Sentinel" class.
1,783	" (S) - - -	20	Inserted for "Sentinel" class.
1,798A	Back contact for hammer (M)	1	Struck out from "Sentinel" class.
1,798	" " (S)	2	Inserted for "Sentinel" class.
1,799A	Screw, adjusting (M) - -	1	Struck out from "Sentinel" class.
1,799	" " (S) - - -	2	Inserted for "Sentinel" class.
2,066A	Leyden jars, without fittings	5	" " "
2,007	Wire, copper - - -	250 yards	Altered to 300 yards for "Sentinel" class.
1,811	Mounts, tube, bone - - -	6	Struck out from "Sentinel" class.
	Tubing for jiggers, 2.5-inch diam., 5-inch length.	2	" " "
2,073	Spark gaps - - -	—	Alter description to "Spark gap silencers."
	Plaster of paris in 1 lb. tins -	1 tin	For all ships and shore stations except "Sentinel" and "Topaze" class.
2,165	Switch tune - - -	1	" " "
23	Tubing, glass, in 1 foot lengths, $\frac{7}{8}$ -inch external diameter, $\frac{3}{8}$ -inch internal diameter.	3 feet	" " "
2,166	Wire, copper, single, silk covered, 38 gauge.	$\frac{1}{2}$ lb.	" " "
	Seccotine - - -	1 tube	" " "
	Clips, spring - - -	6	" " "

The following alterations have been suggested and are under consideration :—

Alterations in establishment under consideration.

Pattern No.	Article.	Remarks.
2,057	Bells, call, 500 w. - - -	*Reduced to 1 per ship and shore station.
2,072	Resistances - - -	Increased to 2 for "Sentinel" class (reduced set).
1,498	Bridge, Wheatstone - - -	*Struck out altogether.
1,499	Galvanometer - - -	" "
2,066	Leyden jars, complete - -	*Increased to 25 for all ships and shore stations.
2,066A	Jars, Leyden, without fittings -	Reduced to 6 in ships and shore stations, and to 2 in "Sentinel" class.
2,086	Tape, paper - - -	*Increased to 90 rolls in ships and shore stations, and to 24 in "Sentinel" class.
	Tubing for jiggers 2.5-inch diameter in 5-inch lengths.	*To be struck out.
6	Wire, copper, silk covered :—	
	25 L.S.G. - - -	" "
2,078	30 L.S.G. - - -	" "
2,079	36 L.S.G. - - -	" "
2,080	40 L.S.G. - - -	" "

* These have been approved since going to press!

Pattern No.	Article.	Remarks.
1,866	Coherer box	New type to replace present pattern.
2,169	Adjustable resistance	To replace the present resistances.
2,170	Transformer, 2½ K.W.	For ships with "C" tune.
2,171	Power regulating transformer	" " "
2,176	Rotary converter for "C" tune	" " "
	Choking coil for "C" tune	" " "
2,173	Adjustable condenser, No. 2	} To form a rejector, 1 each to ships with tuned shunts.
2,177	" inductance	
2,172	" condenser, No. 1	
2,174	Telephone condensers	" " " "
2,178	Wave-meter condenser	} One each to flagships and ships carrying officers detailed as wireless telegraphy experts. Pattern 2,180 thermo-galvanometer may be replaced by a hot wire voltmeter.
	Box A.	
	" B	
2,180	Thermo-galvanometer	
	Set of inductances	
2,181	Tuner	One to each full set except to schools, which get 1 to every 2 full sets.

Instruments introduced into the Service.
Telaupads.

The following instruments have been introduced into the Service:—

Telaupads, consisting of indiarubber pads fitted over the telephone receivers, rendering external sounds less obstructive. When there are no external sounds, the use of telaupads is questionable. Marconi's operators state that they reduce, slightly, the sound of the signals.

Hot wire voltmeters.

Hot wire voltmeters were introduced to enable "B" tune to be tuned according to the old method. This method has been found unsatisfactory and another adopted. The hot wire voltmeters have therefore been recalled, and will be issued again as part of the wave-meter. No more will be purchased, their place in future wave-meters being taken by a thermo-galvanometer.

Tune switch.

Tune Switch.—The use of this instrument is described in the Instructions for the Standard Service Installation, 1905 (see page 9).

Long-distance tuner.

Long-distance Tuners.—These were supplied to flagships and schools. They are too big for practical work. In other ships extempore tuners have been wound. A Service tuner replacing both these articles is being manufactured and will be issued shortly.

Condensers for long-distance tuner.

Condensers for Long-distance Tuners.—These were supplied with the tuner, and will die out with them.

Bradfield insulator and silent cabinet.

Bradfield insulators and silent cabinets (see page 8) have been introduced as fixtures.

Tuner.

The Service tuner is under manufacture. It consists of three drums on which are wound inductances tapped to 20 stops each. The biggest reaches 5,000 mics. by steps of 250, the second 300 mics. by steps of 15, and the third 20 mics. by steps of one.

The terminals are marked "A" and "R," and it is important that the aerial should be joined to that marked "A."

This tuner cannot be used for cutting out atmospherics by the second method.

Tuned shunts. Wave-meter.

Tuned shunts and a wave-meter have been introduced, and a pamphlet published giving directions for their use.

Electrolytic coherer.

The receiving apparatus of the Telefunken Company, Berlin, is under trial in "Vernon" and "Hindustan."

The detector consists of an electrolytic coherer, the principle of which is described on page 36.

Shoemaker set.

Two sets of receiving apparatus from the Shoemaker Company have been received and are under trial. Remarks on this system will be found on page 19.

The following alterations have taken place in instruments :—

Alterations to instruments.

Magnetic detectors are now double-wound, two pairs of telephones being provided.

Magnetic detector.

The shunt across the terminals of the inker has been re-introduced.

Inker shunt.

The present type of series resistance will be allowed to die out, and will be replaced by the Newton type. This resistance is formed of two coils of high-resistance wire placed round a circular piece of slate. Contact is made by a switch carrying an arm with two balls on it, each ball being large enough to ensure contact with the coils. This resistance is not intended to stand direct current and will not do so. Neither is it intended to be altered while the key is pressed. If alteration is made when current is flowing through, sparking will take place, to the detriment of the balls and coils.

Adjustable resistance.

CHANGES IN SHORE STATIONS ROUND THE BRITISH COAST.

Station.	Owner.	Change.
Duncansby Head - - -	Admiralty - - -	Abandoned.
Fraserboro' - - -	Marconi - - -	Receiving station.
Fraserboro' - - -	Admiralty - - -	500-mile station to be established.
Rattray Head - - -	" - - -	Abandoned.
St. Abbs' Head - - -	Lloyds' - - -	Proposed.
Withernsea - - -	Marconi - - -	Established, but suspended.
Cleethorpes - - -	Admiralty - - -	500-mile station to be established.
Easington - - -	" - - -	Abandoned.
Skegness - - -	G.P.O. - - -	50-mile station proposed.
Hunstanton - - -	" - - -	" "
Caister - - -	Marconi - - -	Established, but suspended.
Felixstowe - - -	Admiralty - - -	Established. Oil engine and alternator added.
Chelmsford - - -	Marconi - - -	Established.
Broomfield - - -	" - - -	500-mile experimental station established.
Sheerness - - -	Admiralty - - -	Established.
Dover - - -	" - - -	Oil engine and alternator added.
Newhaven - - -	L. B. & S. C. Railway -	Rochefort system. Established.
Alderney - - -	Admiralty - - -	50-mile station established.
Guernsey - - -	War Office - - -	50-mile station established and worked by Admiralty.
Jersey - - -	" - - -	" " "
Porthcarrow - - -	E.T.C. - - -	Established.
St. Ann's - - -	Admiralty - - -	50-mile to be established.
South Stock - - -	G.P.O. - - -	Experimental station.
Holyhead - - -	Marconi - - -	Suspended.
Liverpool - - -	" - - -	Instructional school.
Port Patrick - - -	Admiralty - - -	Established, but not working.
Campbelton - - -	Fessenden - - -	Experimental power station near Machrihanish golf links, building.
Isle of Skye - - -	De Forest - - -	Power station, building.
Butt of Lewis - - -	Lloyd-Marconi - - -	Proposed.
Hannan Island - - -	" - - -	"
Valencia - - -	Anglo-American Cable Company.	Power station proposed.
Olifden - - -	Marconi - - -	" " building.