

INVENTIONS VIEWED.

Gardner's Interference Preventer.

Mr. Gardner overcame the difficulty of deliberate interference caused by an enemy sending messages, by using lengthened symbols, the longs being roughly of 10 seconds duration and the shorts of 3.

This method was used in the Atlantic Manœuvres of 1903.

Mr. Gardner had an instrument by which the tape only recorded the "long" signs.

As this method is not new, and does not overcome the interference caused by an enemy sending longs, it was not considered advisable to introduce it.

Roos's Relay.

This is a polarised relay, having four electro-magnets instead of two. At a trial it recorded signals through 200,000 ω resistance. The best Siemens relay in "Vernon" failed at 150,000 ω . Five have been asked for for trial at sea.

REPORTS FROM SEA.

The following is an abstract of remarks on wireless telegraphy and the bearing it may have on signalling generally, from the Commander-in-Chief, Mediterranean:—

Letter from Commander-in-Chief of Mediterranean.

1. This article describes briefly the introduction of wireless telegraphy into the Service and its subsequent naval and commercial development. Although barely seven years old, great strides have been made and whilst it is fully recognised that by its means orders and messages of the utmost importance have been transmitted at long distances unobtainable by any other method of signalling at present known, yet it must be continually borne in mind that atmospheric disturbances, thunderstorms, outside interference, defective instruments, and unskilled operators render communication at present absolutely unreliable.

2. It is for the above stated reasons that wireless telegraphy must not be given a precedence over other signalling that it cannot at present justify. As far as our present knowledge goes, wireless telegraphy may in war time play a very important part, although we have no definite information of its employment to any great extent in the Russo-Japanese war.

Enormous improvements may take place in efficiency of wireless telegraphy as regards sending, receiving, and reliability, surpassing anything at present contemplated, but to rely at present on wireless telegraphy as a means of communication in war time would be absolutely wrong.

3. The remainder of the article referred to the personnel of the wireless office. When first introduced, owing to the fact that electricity formed the chief features of the system, it was found necessary to turn it over to the electrical branch. Also, on account of a knowledge of Morse being essential, the wireless operators were selected from the signalmen qualified in higher standard, 1st class, and were usually yomen. This was a temporary step, and at that period the wireless operator could usually be depended on to assist in visual signalling on the bridge; but since such a large proportion of ships are now fitted with wireless, it has resulted in a great weakening of the visual signalling branch, especially, that it is now recognised that to obtain a reliable operator, he should be constantly on duty in the office, thus making him a complete loss to the bridge.

4. To overcome this difficulty it is proposed to introduce a rate of wireless telegraphist, and for the higher standard ratings at present employed in the wireless office to turn over to this rating, which should further be recruited by the most promising of the junior signal ratings. This step is looked upon as most likely to cripple the signal department, since the work of that department is increasing daily, both in volume and importance.

5. The following remedies are suggested:—

- (a) That the work of wireless telegraphy be entirely removed from the signal department.
- (b) If it is necessary, in order to obtain efficiency, to keep standing watch in the wireless office, a rating of "wireless telegraphist" should be established.
- (c) These men should combine the electrical work of the ship with these duties.
- (d) In order to provide for the near future, a very limited number of the present operators, if required, should be allowed to change their ratings.

REMARKS BY "VERNON."

The unreliability of wireless telegraphy is largely due to the present operators being unskilled in this particular branch, and to some extent to insufficient use and practice.

No system can be absolutely reliable, and much that is stated to the detriment of wireless applies to some extent to other systems of signalling. In a fog wireless is a very valuable means of communicating, sound signals being objectionable in many respects, especially in war.

Additional signalmen are provided in ships with wireless telegraphy. In ships not so fitted these men are not borne, and it is reasonable to suppose that the actual signal work of the ship can be efficiently carried out without the ratings added for wireless telegraph duties.

It does not appear to be at all desirable to allow any large number of yeomen of signals to become exclusively wireless telegraphy operators, as these men have been advanced on account of their special ability as signalmen.

In any case, no reason is seen why men for wireless telegraphy should not be selected from the lower signal ratings without being in any way detrimental to the efficiency of the signal branch.

The smart signalman is not a necessity as an operator, and it is probable that many men who would never make good signalmen might become excellent operators.

It would therefore only be necessary to enter sufficient signal boys to fill the requirements of wireless operators in addition to those required for the signal branch.

The arguments point to the necessity of separate telegraphists, who should be gradually introduced to supersede the system now in force.

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EXTRACTS FROM MEMORANDUM ISSUED TO MEDITERRANEAN FLEET, MARCH 1905.

I.—*Supervision.*

1. Flag Lieutenant of Cruiser Squadron to supervise wireless signalling of the Fleet, assisted by Flag Lieutenants of other divisions, each one looking after his own division.
2. A wireless officer, other than the Lieutenant (T.), to be appointed in each ship, to be responsible for exercises, adjustments, wireless log, and confidential wireless books.
3. Lieutenant (T.) to be responsible for installation and efficiency of instruments and instruction of operators.
4. Lieutenant (T.) of "Bulwark" to be electrical expert and adviser in all electrical matters, assisted by Lieutenant (T.) of "Leviathan" (Flag Cruiser Squadron), also by such other officers as may be found necessary.
5. The above officers will be given authority under S.O. to visit any ship when requisite.
6. Flag Lieutenant to Rear-Admiral, Cruiser Squadron, and Fleet electrical expert to forward monthly joint report on progress of each individual ship.
7. Electrical experts to assist ships when first fitting new installation, if required.
8. Once in tune, no alterations are allowed without concurrence of electrical expert, except during atmospheric disturbances, &c. Failure to attain 50 miles on "A," 70 on "B," to be reported at once.

Extract from Memorandum issued to Mediterranean Fleet.

II.—*Operators.*

Two higher standard first-class ratings and two of rating of qualified signalmen or upwards to be trained as wireless telegraphy operators, three of which to do wireless duties, the remaining one ordinary bridge duties, changing rounds each month.

Detached ships to keep standing wireless watch; when in company, one or more to be detailed to keep wireless watch, the remainder being excused from 8 p.m. to 6 a.m.

III.—*Conduct of Signalling.*

Instructions in handbook entitled "Wireless Signalling" to be absolutely adhered to. Special form of wireless log has been found necessary.

Wireless Log of H.M.S. " ."

Date		190 .		Place				Remarks. — Distance, Irregularities, &c.
Code Time.	Time of		Tune and Length of Spark.	From	To	Signal.	Signification, &c.	
	Commencing to Send or Receive.	Finishing Sending or Receiving.						

Every ship to read and log each signal passing.

Exercises.

Daily, Saturday and Sunday excepted, from { 9.30 to 11.45 } Harbour.
At sea as ordered. { 1.30 to 3.45 }

Objects of Exercise to Improve.

- (a) Procedure of calling up, answering, &c.
- (b) Sending accurate marking and spacing at a uniform speed.
- (c) Use of special signals employed in wireless.
- (d) Control of signalling to avoid confusion.
- (e) Use of magnetic.

Scheme of Exercises.

When sufficient ships are present, one ship, called "Conducting Ship," should stand off to watch signalling and correct any errors.

(a) To train men in manipulation of instruments. Pair of ships signal to each other; no external interference. Ship, commencing, making signals requiring an answer to give conducting ship an opportunity to correct.

(b) Three ships, one "A" tune, one "B," and third both "A" and "B," sending messages to each other.

(c) Ships as above using one tune only, with a fourth ship calling up as if joining from a distance, alternately or "A" and "B," without waiting for or taking notice of signals, except in reply to her calls.

(d) Two pairs of vessels signalling simultaneously, or "A" and "B."

(e) Conducting ship to call up all ships present, sending messages to bring in special signs, &c.

(f) Ships to be detailed to represent chain of cruisers extended in wireless touch, and to use "A" tune. One ship to represent flag in centre of chain to receive reports on "A" and pass to conducting ship on "B," signals being passed first out, then in.

(g) As above, with flag at one end, efficiency of line being judged by time taken to pass signal and its reply correctly through whole line and back to ship originating it.

As progress is made the magnetic detector should be introduced into the exercises.

During exercises the name of operator to terminate first call or message that he sends, to facilitate individual records of progress being made.

IV.—Approaching Malta.

All ships approaching to commence calling up when 100 miles distant. First ship or station receiving call to reply, and then inform C. in C.

If when 60 miles distant communication is not good, report to be forwarded, giving reasons and following details:—

1. Time and date of arrival at Malta.
2. Speed of ship.
3. Interval between calls.

V.

It has been suggested that a shore station be adopted at a standard, for preference Gibraltar, so that fleets may check the accuracy of their tuning at intervals and especially before effecting a junction.

"VERNON'S" REMARKS.

Concur throughout and suggest that similar orders be issued to each fleet. The following remarks are added:—

Referring to the selection of wireless officers (Section I.), certain officers have been through a course of wireless telegraphy in the "Vernon," and hold certificates.

"A" is given to officers qualified to take charge of wireless telegraphy installations.

"B" to those who have been through a course, but who are not qualified as for "A."

Should one of these be borne on the ship's books, he should be the officer detailed, provided his certificate is not more than four years old.

Officers holding "A" certificates should be sent, as far as practicable, to flagships and to ships fitted for wireless which are not allowed Torpedo Lieutenants, and as Intelligence Officers to Gibraltar, Malta, and other places with shore stations.

Referring to Section II., the introduction of wireless operators will entirely obviate the difficulty of men forgetting their bridge work when employed at wireless, and vice versa.

With regard to Section V., it is suggested that both Gibraltar and Malta (Gargur) should be carefully standardised.

These stations should be under the direct control of the Intelligence Officer or the Admiral Superintendent's staff, and every officer appointed for that duty should be required to hold an "A" certificate not more than four years old.

Only the best operators should be employed at these stations, and they should be kept in constant practice.

Extract from Commander-in-Chief's Covering Letter.

3. "The question which is at present of vital importance is the supply of operators."

5. "If three wireless operators were allowed to each ship fitted with wireless apparatus, they could perform all the duties now carried out jointly by signal and torpedo ratings."

8. "To cope with the want of wireless ratings on the Mediterranean Station, I have ordered special classes of instruction to be formed."

Extracts from Lieutenant Silvertop's Report to the Commander-in-Chief, Mediterranean.

1. All the aerial wires were brought to the standard laid down in "Instructions for A and B tunes, 1905."

3. In certain cases the four parts of the aerial "are taken up side by side, and are taken 6 feet apart to an 18-foot spar hanging from the gaff and then led forward. "This arrangement" . . . "appears to be quite as efficient as the cross-spreader method." It "has the advantage for ships whose office is in the central line, that the two aerials can be led one each side of the main gaff, reducing "screening" to a minimum.

12. Whilst waiting for the Atlantic Fleet, the cruisers were spread in a long line, with "Bulwark" 30 miles in rear of the centre. She was in efficient and rapid touch with every ship.

13. When the Atlantic Fleet did approach, they endeavoured to "jam" the transmission of the news by "Leviathan." This unfortunately succeeded, but only from the lack of skill on the part of an operator in "Bulwark."

17. The screening effect of funnels, masts, &c. has at all times been found very marked. It appears to be rather less so for "A" than for "B" tune.

27. The following points were brought forward.

(a) That spark gap tuning on "A" is reliable, and is confirmed by actual practice.

(b) It is of great advantage to tune "B" practically at 50 or 60 miles.

(c) That even "A" tune was sometimes rendered useless by atmospherics in June, July, August.

(d) The very marked screening effect of rigging as exemplified when a ship is steaming round a target.

(e) The importance of keeping the aerial as far away from mast and rigging as possible, even at a sacrifice of height.

(f) Longer distances are usually obtained on "A" tune than on "B" tune

(g) The marked reduction in the strength of "B" signals with the split aerial.

(h) The bad effect of roof aerials extending abaft the mainmast on the ordinary signals.

(i) The advantages of upper deck offices, in the central line.

(j) That sparking direct into a roof aerial with inductance in the foot does not seem successful.

(k) The entire uselessness of endeavouring to block by putting down key when anyone commences to signal. The only way to block is to keep the key pressed continually on both "A" and "B" tunes. This is liable to damage coils if carried out for over a quarter of an hour, and a system of relief in the Fleet must be arranged with a good overlap.

(l) The superiority of a T. aerial for receiving "A" tune.

(m) The bad effect of the spark gap silencer.

(n) The extraordinary difference in the signalling efficiency of a ship produced by a good or bad operator, and that these good operators are rare, and never more than one per ship, if as many.

(o) With a split aerial an inductance in series with the "B" jigger for receiving certainly is of advantage, more so than with the old aerial.

(p) The effect of an incandescent lamp on the coherer. If signals are very weak and broken, they can generally be made legible by laying an incandescent lamp bulb (burning) on the coherer. This effect is not due to heat as it is instantaneous in action.

Extracts from Letter of Vice-Admiral Grenfell to Commander-in-Chief, Mediterranean.

"This method of communication between a fleet and a friendly port, and also between a fleet and detached cruisers, may be looked on as reliable and most valuable."

"I submit that it is worth consideration whether a special rating of wireless telegraph operator should not be established."

Extracts from Observations by Lieut. C. Lambe, forwarded by the Captain of the "Leviathan," and concurred in by the Rear-Admiral Commanding the Cruiser Division.

"The lack of operators is probably due to the fact that wireless telegraphy is not fully recognised as being an important factor in war time, the value of which, if successful, it would be difficult to over-estimate."

"The remedy exists only in separating wireless telegraphy from the signalling department, and having a special rating of skilled operators known as telegraphists."

"The signal officers agree that" men who have been doing the duty of wireless telegraphy operator "are useless on the bridge after six months, but, on the other hand, are skilled operators for wireless purposes."

Letter from the Captain of the "Lancaster."

"Submitted. I entirely concur with Lieutenant Lambe's remarks with reference to the urgent necessity for skilled and practised operators, and from personal observation am convinced that a very large percentage of failures in sending and receiving is entirely due to the inaptitude or want of skill of the operators."