NAVAL SHORE WIRELESS STATIONS.

General Progress.

High-Power Stations.

A. stations.

Two of these are being erected in England—one at Cleethorpes, near Great Grimsby, and the other at Horsea. They will be 100-K.W. stations, and are designed to send 1,000 miles at all times. At present only two tunes, "X" and "Y," are being arranged for.

Both these stations will be completed and working in the early part of 1909.

A similar station is also being erected at the North Front, Gibraltar, and will be completed about a month or six weeks after the other two stations.

Cleethorpes is to be used for receiving messages from the Admiralty and transmitting them to the Fleet on "X" wave.

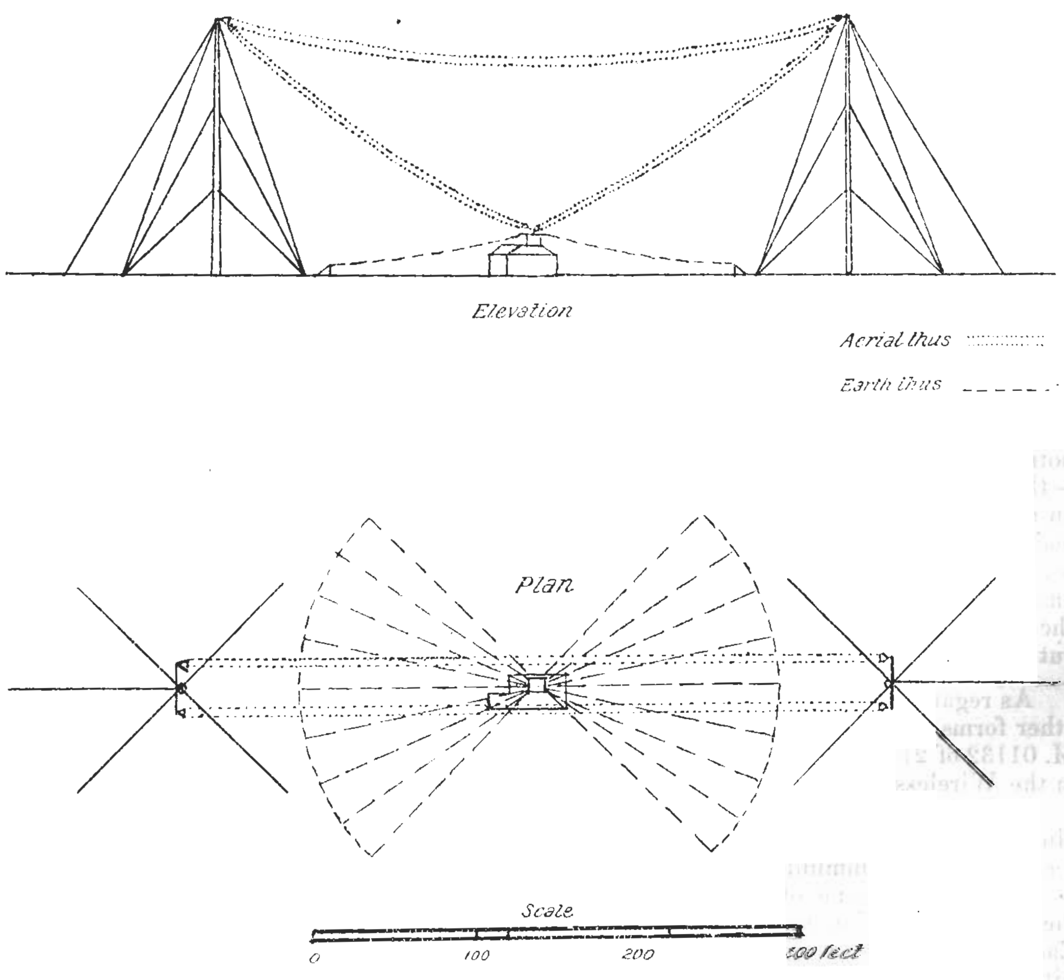
Horsea is chiefly experimental and instructional, and will also be used for communicating with Gibraltar on "Y" wave and as an alternative station to Cleethorpes in time of war. Cleethorpes and Horsea will be manned by Coast Guard ratings, Gibraltar by active Service ratings and pensioners.

Medium-Power Stations.

B. stations.

Three stations—at Pembroke, Aberdeen, and Ipswich—are now in course of erection, and should be completed in the above order before the middle of 1909. All these stations will be fitted with Service Mark II. gear, and should be capable of signalling 500 miles at all times on "W" wave-length.

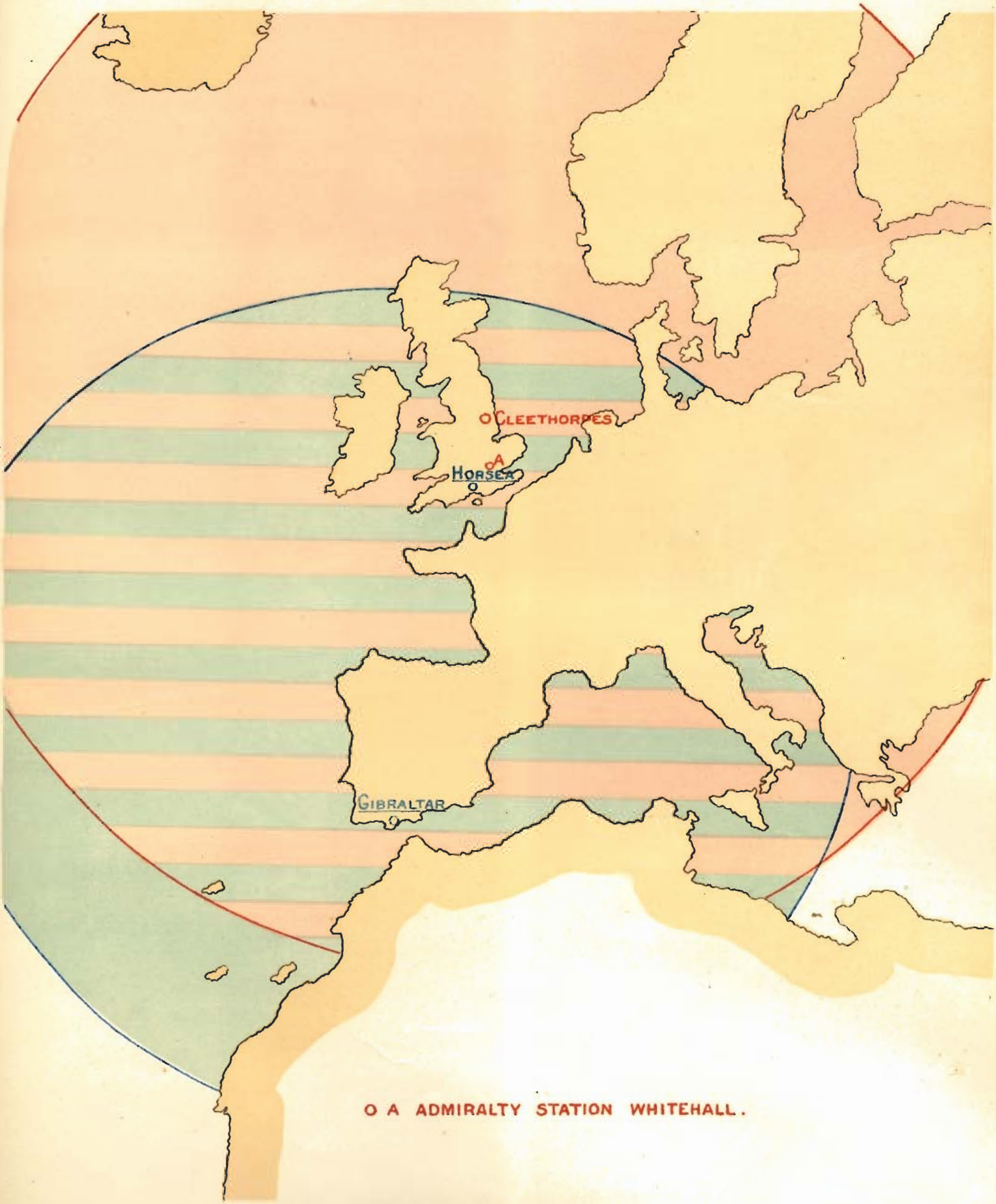
By the present organisation the primary object of these stations is for communication between the Commander-in-Chief of Fleets and the Admiralty.



Typical arrangement of Masts, Aerial, and Earth, at Medium Power W.T. Shore Station.
Actual Station is Aberdeen.

The three stations are as nearly similar as possible, the arrangement of aerials and earths differing slightly; in every case the aerial used is bigger than that in a seagoing ship.

HIGH POWER SHORE STATIONS.



RANGE 1,000 MILES

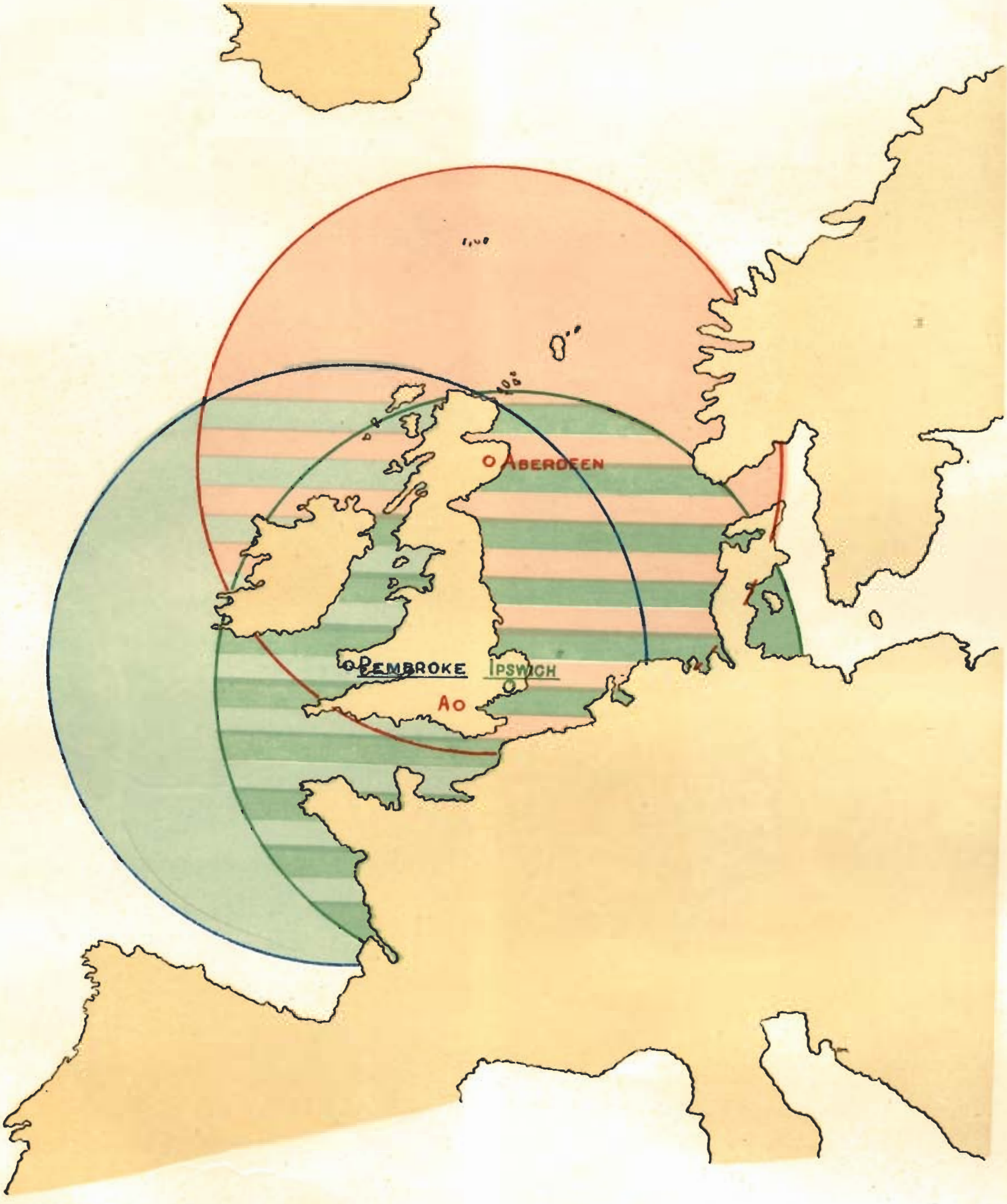
PART COLOURED RED X TUNE FROM CLEETHORPES

" " BLUE Y " " GIBRALTAR TO HORSEA

HORSEA ALSO SENDS Y TUNE, THIS IS NOT SHOWN

CHART ON MERCATORS PROJECTION.

MEDIUM POWER SHORE STATIONS.



A O ADMIRALTY STATION WHITEHALL

THESE STATIONS OPERATE ON "W" WAVE

RANGE 500 MILES

Low Power Shore Stations.

The range of all these stations is taken as 100 miles

Part coloured Blue shows area of U Wave
" " Red " " " P "

Miles

0 100 200 300

St. Angelo, Malta, has also been equipped with a set of Service Mark II. apparatus. This station, however, serves a different purpose from the stations in England fitted with the same type of installation. St. Angelo, Malta.

Messages can be sent to Malta by cable and thence transmitted to the Fleet on "U" wave; or messages may be sent by Horsea or Gibraltar to a ship of the Mediterranean Fleet specially detailed to look out on "Y" wave, and re-transmitted by that ship to Malta on "U" wave. (*See* Plate II.)

The reason for preferring "U" wave-length to "W" for this station is to enable the smaller cruisers of the Mediterranean Fleet to communicate with St. Angelo at a greater distance than would be possible on the longer wave, their range on "U" being greater than on "W."

Low-Power Stations.

These consist of all the remainder of the Admiralty stations round the coast of the British Isles; they are fitted with various types of gear, and are all capable of sending 100 miles on "U" wave. By the present organisation the primary object of these stations is for communication between H.M. Ships and the Senior Naval Officer of Ports, and *vice versâ*. They may also be used for reports from detached ships to Admiralty, the messages in such cases being passed on by the shore station by land wire. C. stations.

Private telegrams from ships may also be sent from H.M. Ships to these stations, provided that Service messages are not interfered with.

The station at Roches Point has been replaced by one at Cork Beg.

Felixstowe Station will probably be reduced to a destroyer station when Ipswich is completed; it will then communicate on "D" wave.

Plate V. shows the area covered by the Low-Power shore stations. The three red stations, Dunnet Head, Cullercoats, and Hunstanton, are commercial stations, which in time of war would be manned by naval ratings and act as naval shore stations, using the naval procedure but sending and receiving on "P" wave. Reference to Plates.

Plate IV. shows the area served by the medium-power station.

Plate III. shows the area served by the high-power stations.

Whenever a new Wireless Station is being built, and whenever an old one is being reconstructed, the earth is made in the form of a circle (sometimes incomplete), with the station as centre, of galvanised steel plates buried about 2 feet 6 inches deep, with earth wires led from them to insulated supports, and thence to an earthing ring or device round the deck insulator. At Cleethorpes the radius of this earth circle is 300 feet, at medium-power stations 150 feet, and at low-power stations about 100 feet. In A. and B. stations the transmitting rooms are totally enclosed in rabbit netting which is bunched together round the deck insulator, and there joined on to the earth wires. Shore station, earth.

A detailed description of the "Organisation of Naval Wireless Telegraphy Communication" and its relation to shore stations is given on page 5 *et seq.*, and will be included in the Wireless Signal Book which will shortly be issued to the Fleet.

DETAILS OF NAVAL HIGH-POWER SHORE STATIONS.

With the exception of the arrangements of the aerials and the earth connections, and a few minor details due to differences in the shapes of the buildings, the three High-Power Stations are identical, and the plant and instruments interchangeable between them. The main principles governing the design are the same as for the Service Mark II. installation; the musical note is, however, lower, approximately the middle C (250 sparks per second), the wave-lengths are about 10,000 and 12,000 feet, and glass plate condensers are used in lieu of ebonite. The main transmitting condenser will have a capacity of about 450 jars, and the spark length is 20 mms. at full power. General scheme.

In order to simplify the station as far as possible, to obviate the necessity of a large staff for working it, and to reduce to a minimum the chances of breakdown, the power to work the station has been taken from an outside electrical supply, and is not specially generated by steam or oil engines on the site. The power for Horsea comes from the Portsmouth Dockyard Electric-generating Station, that for "Cleethorpes" from the Great Grimsby Corporation Electric Light Station, and that for Gibraltar from the Dockyard Generating Station. In each case the connecting cable is of considerable length: 3½ miles to Horsea, 3 miles to Cleethorpes, and 2¼ miles to Gibraltar. To enable a cable of small section to be used and to keep down the transmission losses, alternating current, three-phase, at 2,200 volts and 50 cycles per second, has been adopted for transmission. The direct-current supply, which varies from 440 to 500 volts at the different supply stations, is converted by motor alternators at the generating station into the three-phase. Two motor alternators are used at each generating station, a large one with an output of 130 kilowatts for use when the Wireless Station is working, and a small one of 25 kilowatts for supplying light, heat, &c., when the Wireless Station is not working. Power supply.

At the Wireless Station the greater part of the three-phase 2,200-volt supply is used for running a large motor alternator, which gives an output of 70-K.W. single-phase with a frequency of 250 cycles. This output is used for the wireless transmitting circuit. The rest of the 2,200-volt three-phase supply is transformed down to 100 volts and used for lighting and heating, for a small motor dynamo which provides the necessary direct current, and for the blowers and other auxiliaries. The direct current is used for exciting the fields of the main machine, for working the magnetic key, &c. It is also used for lighting the station while signals are being sent, as the voltage of the three-phase supply is not then steady enough for lighting purposes, due to the drop in pressure in the long transmission cable, which varies considerably with the variable current taken while signalling.

General arrangement of buildings.

Each Wireless Station contains a fairly large transmitting instrument room, a power room, a receiving room, a workshop, an office, together with certain living accommodation, store-rooms, &c. The transmitting and power rooms are divided from one another by a glass screen fitted with a door; the former contains the condensers, spark gap, primary, aerial and mutual coils, blower, &c., in fact all the gear that would be placed inside the safety screen in a Mark II. set; the latter contains the motor alternator, motor dynamo, and all the switch gear for control of the transmitting apparatus, and lighting, heating, and auxiliary gear. The whole inside of the walls, floor, and roof of the transmitting instrument room is covered with rabbit netting to screen the rest of the station from inductive effects. The aerial and the earth wires enter the station through a small tower above the roof of the transmitting instrument room. Space has been left in the power room for a spare motor alternator and spare motor dynamo; these spare machines are being installed, and switches have been arranged for changing over quickly from one machine to another.

The receiving room opens out of the office and contains an extra large silent cabinet with the receiving instruments and signalling key.

The office is fitted with telegraph and telephone instruments in connection with the ordinary land telegraph and telephone services. There is a direct telephone connection between the power room and the electric supply station, also a signal circuit between the silent cabinet and the power room.

Description of transmitting instruments.

The transmitting condensers consist of 288 small units connected together, six in series, 48 in parallel. They are arranged in four groups, each group containing two stories.

The condensers have been subdivided in this way to make the replacement of a damaged unit as easy as possible.

Each unit weighs about 70 lbs. and is built up from 25 sheets of $\frac{1}{8}$-inch sheet-glass about 17 inches square, covered with tinfoil in the same way as the seagoing ebonite condensers. The glass is supported by a wooden frame inside a light galvanised steel case which is filled with oil. In order to allow for the expansion of the oil with temperature variations, and also for the escape of gases, a small oil expansion tank and pipe is fitted to each condenser when in place.

Primary connections.

The connections between the different units of the condenser and from them to the primary coil and spark gap are made with $\frac{1}{2}$ inch diameter copper tubes, 24 tubes being used in parallel to carry the main primary current. These tubes are held in groups, one vertically above the other, and so arranged that each tube will carry its fair share of current, and that the self-induction of the whole is as low as possible.

Primary coils.

The primary coils have been arranged on wheels and are easily detachable from the primary connections. To change tune, one primary coil is disconnected and wheeled away and the other is put in its place and connected up. The primary coils themselves are built from a conductor 3 inches diameter. The conductor contains 270 insulated copper wires, each $\frac{1}{16}$ inch diameter, so arranged that the current equally divides between the different wires. This rather complicated arrangement has been adopted as it has been necessary to provide a very large surface for the primary connections, and a single variable primary is not considered a practicable scheme.

Spark gap.

The spark gap consists of a cast-iron box lined, inside with Uralite, outside with a soft packing, and covered overall with sheet brass. The two main connections, each 6 inches diameter, come in through two porcelain insulators at the back. The whole front opens and is divided into two hinged doors. The spark plugs are of copper, hollow and water cooled. The top and sides of the box are fitted internally with water cooling tanks. The cooling water is pumped through radiators placed outside the box. The two sets of radiators, pumps, pipe connections, &c., supplying the two spark plugs are, of course, insulated from one another and from earth; the motors driving these pumps have ebonite pulleys to insulate them from the pumps.

The air inlet nozzles and blower are similar to those used for Mark II. sets, but larger. The blower is driven by a 4-H.P. motor and supplies air at 16 inches water-pressure.

The spark plugs are removable. Their tips, of solid copper, are soldered on to the hollow part in which the cooling water circulates, and can be unsoldered and renewed as required.

The magnetic key is placed in the high-tension leads from the transformer to the spark gap and interrupts the high-tension supply to the spark gap. The key works on the same principle as that in use at Clifden (*see* page 31), and the arc formed in breaking the circuit is blown out with an air blast. Four breaks are arranged in series, two in each lead, and each break has, working in parallel, three pairs of contacts which break rapidly one after the other; the first two pairs in each case switch resistances into the circuit and the last pair of contacts finally break the circuit, the action being similar to that of the Service Mark II. magnetic key. — Magnetic key.

The contacts are mounted on porcelain insulators on a sheet-iron table; the air-blast blower and the electrically operating solenoid are placed below.

Transformer and impedance coil. The transformer is oil insulated, and very similar to that used for Mark II. installation, but larger. The impedance coil is also very similar to that used for Mark II., but larger.

Safety circuit. All the doors leading into the transmitting instrument room are fitted with safety switches. A safety circuit similar to that used for Mark II. has been fitted and controls a relay switch in the same way. Illuminated "Danger" notices and alarm gongs have also been added, to give men who may happen to be in the transmitting instrument room warning of the shutting of the doors, and prevent men trying to open the doors and enter the transmitting instrument room when the apparatus is ready for sending.

Send-receive switch, &c. The send-receive switch is electrically operated and controlled by a small key in the silent cabinet. It consists of an insulated metal arm which normally makes contact with the copper pipe connection between the deck insulator and the aerial coil. This arm forms the receiving connection, and is drawn away from aerial connection while sending. There is a small break in the transmitting earth lead which is bridged by a small switch while sending.

This earth switch, together with a switch that earths the receiving aerial while sending, and a switch that earths the two sides of the transmitting condenser when not sending, work in conjunction with the send-receive switch.

Aerial and mutual coil. The aerial and mutual coils are about 20 inches diameter and wound from $\frac{1}{2}$ inch diameter copper tubing held in insulated frames.

The mutual coil hangs from the ceiling over the primary, and is so arranged that it can be hoisted up or down and the coupling thus varied.

Method of operations. When in working order there are never less than three men on watch. In the power room one man has charge of the transmitting instruments, the switch gear, and machinery. The telegraphist in the silent cabinet has charge of the receiving gear and signalling key. One man in the office has charge of the land telephone and telegraph, and is responsible that the telegraphist is not disturbed. Shortly before commencing to send, the telegraphist moves a switch in the silent cabinet which rings a gong in the power room and thus warns the man in charge there that the transmitting instruments will be required, so that he can make the necessary preparations for sending.

The power-room man then telephones to the supply station, where the larger motor alternator is started up and put on to the cable in lieu of the smaller one that is normally running. As soon as the large machine is on the cable, he starts up the motor dynamo and the wireless motor alternator, and puts in a switch which starts up the blowers, spark gap pumps, and all auxiliaries. He then sees that the doors of the transmitting room are shut, and finally closes a master switch.

If everything is ready and all the doors of the transmitting room shut, the closing of the master switch completes the safety circuits and lights up a signal light in the silent cabinet which shows the telegraphist that everything is ready to send. The telegraphist now has control of the transmitting apparatus by means of the key that operates the send-receive switch, &c., and by means of the signalling key that operates the magnetic key.

The telegraphist has another switch in the silent cabinet by which he can ring a second gong in the power room when he has quite finished with the transmitting gear and is not likely to require it again for some time. This second gong lets the man in charge of the power room know he can switch off all the machinery, &c.

It is estimated that the total time taken to get started up ready for sending, from the making of the "prepare to send" signal from the silent cabinet until everything is ready, is about 15 to 20 minutes. It is considered that this time will be reduced to about 5 or 10 minutes with a little practice. Once started up the station will change from send to receive as quickly as a ship can. Under ordinary conditions these large-power stations work at stated, predetermined times, and the time taken to get started up is of no importance.

External arrangements. ***Cleethorpes.*** The site of the Cleethorpes Station is a flat field which gives a clear space a little more than 600 feet square. There are nine masts, one of which is 180 feet high in the centre, four at 160 feet symmetrically placed round the central mast at the corners of a square having sides 300 feet long, and four of 60 feet outside, again at the corners of another square, having sides 600 feet long.

The Wireless Station buildings are in the centre of the site near the central mast, the centre of the aerial tower being about 12 feet away from it. The aerial is in four independent sections; each section extends from the central mast to a jackstay between two of the 160-feet masts, thence outwards and downwards to a jackstay between two of the 60-feet masts. Sets of feeders are taken up from the aerial tower and the four jackstays between the 160-feet masts to feed the four sections.

The galvanised steel earth plates are buried on edge in a circle 300 feet radius round the central mast as centre; 200 galvanised iron earth wires are taken from the aerial tower out radially to the earth plates. These wires are supported at one end on a ring of poles running round near to the earth plates, and at the other on the aerial tower, the wires being kept overhead and just out of reach at their lowest point.

Horsea.

At Horsea the arrangements are very similar, with the exception that there is no central mast, and that the four outer 60-feet masts have been replaced by eight. The site is very much cut up by the torpedo range and the area of the earth plates limited. The buildings are at the side and outside the 300-feet square formed by the four 150-feet masts. The aerial is in four sections and very similar to that at Cleethorpes, but slightly smaller and lower. The centre is supported on a pair of jackstays stretching in the form of a cross between the diagonally opposite masts. Four sets of feeders, one from each section of the aerial, come down from four points near to the centre of the aerial; each feeder consists of eight wires in the form of a cylinder 4 feet diameter.

Gibraltar.

At Gibraltar the aerial wires are taken from the Wireless Station up to the top of the rock. There are twenty wires of hard drawn copper trolley wire about ¼ inch diameter.

The wires are suspended by a chain that has been run along the edge of the rock anchored at intervals.

The lower ends of the wires are fastened to a flexible steel cable supported by two short strong masts placed just beyond the station, suitable anchors being arranged. The insulators at the top are so arranged that the top of the aerial wires are about 30 feet out from the rock. The height of the rock is about 1,200 feet, and the lower anchorage is about 1,300 feet out horizontally from the vertical line through the upper suspension; the wires are 2,000 feet long each, and fairly taut; they have an ample factor of safety even in a severe gale. The upper ends of the wires have been spread out as much as possible, and are about 15 feet apart. The lower ends have been drawn in to about 2 feet apart. A great amount of difficult and nerve-straining work has had to be carried out in putting up these wires, and many difficulties have had to be overcome, but now that they are in position they promise to form a very good and permanent aerial. The ground on the North Front is of soft dry sand, but salt water that rises and falls slightly with the tide is met with at a depth of about 8 feet. The earth connections are made with galvanised iron pipes. There are about 160 pipes driven in round the circumference of a circle of about 400 feet diameter, but the space available has not allowed a full circle to be obtained. The pipes stand vertically and have been driven down until their lower ends are 2 or 3 feet below the water level. Galvanised iron earth wires radiate in from the tops of the pipes to a ring round the top of the aerial tower.

Staff.

The staff at each station consists of one commissioned officer in charge, six telegraphist ratings, one torpedo gunner's mate, two armourers, and four pensioners (or hired labourers) as working party.

Temporary living accommodation has been provided for an officer and six men in each Wireless Station. Buildings and suitable permanent living quarters are being arranged for the staff and their families on or near the sites.

Range of Messages from Shore Stations and Ships under ordinary Conditions of Atmosphere.

Sending Station.	Receiving Station.	Day.	Night.	Name.	Wave-length.	Remarks.
					Feet.	
Clifden - - -	Glace Bay (Cape Breton I.)	2,000	2,000	Z.	14,000	Transatlantic communication.
	*Battleships and 1st Class Cruisers:					
	East and West - -	1,500	1,500	—		
	North and South -	700	700	--		

* For 2nd Class Cruisers reduce the range by 20 per cent.
„ 3rd „ „ „ 30 „
„ Scouts „ „ „ 40 „

Sending Station.	Receiving Station.	Day.	Night.	Name.	Wave-length.	Remarks.
Poldhu - - -	*Battleships and 1st Class Cruisers:				Feet.	
	East and West - -	1,000	1,000	—	8,000	At present reserved as an experimental long-distance station for Marconi Company. Will be brought up to date as an alternative to Clifden to work with Cape Cod, if money is available.
	North and South -	700	700	—		
High-Power Stations.						
Cleethorpes - -	*Battleships and 1st Class Cruisers.	1,000	1,000	X.	10,000 approx.	Under construction; should be working by April 1909. The station for transmitting Admiralty messages to the Fleet.
Horsea, Gibraltar - -	*Battleships and 1st Class Cruisers.	1,000	1,000	Y.	13,000 approx.	Under construction; should be working by March and May 1909. For communicating with each other and with the Mediterranean Fleet.
Medium-Power Stations.						
Aberdeen, Pembroke, Ipswich.	*Battleships and 1st Class Cruisers.	500	800	W.	6,500	Under construction; should be working by June 1909. For communicating with Commander-in-Chief on "W" and transmitting to Admiralty on "V."
Service Mark II.						
All battleships "King Edward VII." class and later, and armoured cruisers, except "C" tune ships.	*Battleships and 1st Class Cruisers.	200	400	P.	1.000	Ships are being fitted as they come into Dockyard hands.
		400	800	Q.	2,000	
				S.	3,300	
		500	800	U.	5,000	
				W.	6,500	
"C" Tune.				S.	3,300	These ships will be fitted with Service Mark II. during 1909.
"Exmouth," "King Edward VII.," "Hindustan," "Dreadnought," "Duke of Edinburgh," "Drake," "Good Hope," "Devonshire," "Argyll."	*Battleships and 1st Class Cruisers.	250	500	U.	5,000	
				W.	6,500	
Service Mark I.*						
H.M. Ships other than those mentioned above.	Destroyer parent ships, *Battleships, and 1st Class Cruisers.	100	200	D.	700	These ships will be fitted during 1909.
		150	300	P.	1,000	
		200	400	Q.	2,000	
				S.	3,300	
		150	250	U.	5,000	
				W.	6,500	
Low-Power Stations.						
St. Angelo - -	*Battleships and 1st Class Cruisers.	500	800	S.	3,300	Communication between H.M. Ships and Senior Officer of Port.
		500	800	U.	5,000	
Rosyth, Felixstowe, Dover, Sheerness, Culver, Portland, Alderney, Rame Head, Scilly, Cork Beg, Port Patrick, Gibraltar (Windmill Hill).	*Battleships and 1st Class Cruisers.	150	300	S.	3,300	
		150	300	U.	5,000	
Destroyers, River, and Tribal Class.	All ships and destroyers -	50	60	D.	700	Destroyers can only transmit on "D" wave, but can receive all Service wave-lengths.

* For 2nd Class Cruisers reduce the range by 20 per cent.
" 3rd " " " 30 "
" Scouts " " " 40 "

Note.—The above ranges are calculated for the present Service Receiving **Instruments, and can only be considered approximate. They are intended** as a guide **to the comparative ranges of the different installations.**

The ranges will be increased as improvements to the receiving instruments are effected.

REPORT OF WIRELESS TRIALS WITH MARK II. SETS BETWEEN H.M. SHIPS "INDOMITABLE" AND "VERNON."

The first two sets of Mark II. apparatus were installed in "Vernon" and "Indomitable," and advantage was taken of the "Indomitable's" voyage to Quebec and back to carry out certain trials under seagoing conditions with the new type of installation.

The following report is based partly on the log and other records kept in "Vernon," and partly on information supplied by the officers of H.M.S. "Indomitable."

The results of this first trial, under Service conditions, of the Mark II. installation are eminently satisfactory and completely justify the forecasts made as to the probable capability of this design.

Range of signalling.

With the Mark II. sets, communication between battleships is practically assured at ranges of 500 miles by day and 1,000 miles at night, under all ordinary conditions; and in the case of large cruisers, where the distance between the masts allows of a greater spread of aerial, longer ranges will usually be obtained with most of the Service wave-lengths.

With the wave-lengths "S," "T," "U," "V," and "W," the *day* range is considerably greater than that of the shorter waves "Q" and "R." At night "Q" and "R" were found to carry further than the longer waves, the night ranges of which appeared to decrease in direct proportion to the length of wave.

But on every wave-length the night range is greater than the best day range on any wave-length.

The longest ranges at which "Vernon's" signals were received were:—

At night, 1,400 miles on "Q," "R," and "S."
By day, 730 miles on "S," "T," and "U."

Musical note.

The greatest triumph of the Mark II. design is considered to be the ease with which the musical note overcomes atmospheric and other interference. The note was consistently good throughout the trials, and allowed of messages being received through interference even when the latter was so close as to be actually louder than the signal being read.

Electrolytic detector.

The magnetic detector and another form of detector made in "Vernon" on the electrolytic principle were both used for reception of signals; the latter, at its best, was about 30 per cent. stronger than the magnetic detector, but it must be remembered that it was used by expert operators who were well acquainted with its idiosyncrasies.

Smoke effect.

At times, especially during the homeward passage, the "Indomitable's" smoke was found to weaken incoming signals. As might be expected, the longer waves were the ones most affected. This smoke effect is well known, but seldom assumes serious proportions.

Necessity of training in "Vernon" for Telegraphist ratings.

The success of the trials and the absence of any serious breakdown was largely due to the fact that all the wireless work in the "Indomitable" was carried out by two chief petty officer telegraphists, who had recently been through a course in "Vernon," and were familiar with the new apparatus in use. Men not so trained could not be expected to get such good results out of instruments and appliances which were strange to them; and the absolute necessity of training Telegraphist ratings in "Vernon," and giving them opportunities, periodically, to go through courses in the Torpedo School, during which they may be instructed in the various improvements being introduced into the Service, becomes increasingly evident.

Working of instruments.

As regards the working of the instruments in the "Indomitable," the following information, supplied by the officers of that ship, is of interest:—

Spark Gap.—About four hours of intermittent signalling burns up one pair of spark gap plugs.

Magnetic Key.—Required a good deal of attention, as the ship was signalling at full power nearly all the time. A simpler method of adjustment is required.

Alternating Current and Voltage.—With 430 volts, which appeared to give the best results, the total current with condensers in parallel was about 110 ampères on all tunes; with condensers in series it was about 85 to 90 ampères.

TRIAL BETWEEN H.M. SHIPS "ANTRIM" AND "VERNON."

In September a trial was carried out between H.M.S. "Vernon" and H.M.S. "Antrim," the latter ship having just been completed with the Mark II. installation.

Ranges of 1,000 miles at night, and 500 miles by day, were obtained on all tunes.

The "Antrim" had trouble with the insulators of back stays, which, owing to their close proximity to the aerial feeders, burnt away.

A new form of rigging insulator will shortly be introduced. Care must be taken not to black over these insulators, as the coating of tar will form a conducting surface and probably catch fire.

Trial between "Vernon" and Malta (St. Angelo).

Trials were carried out on the 7th, 8th, 9th, and 10th of October between the "Vernon" and the newly-fitted medium-power station at St. Angelo, Malta.

The average strength of signals at night was as follows:—Q 7, R 8, S 6, T 6, U 5, V 3, W 3.