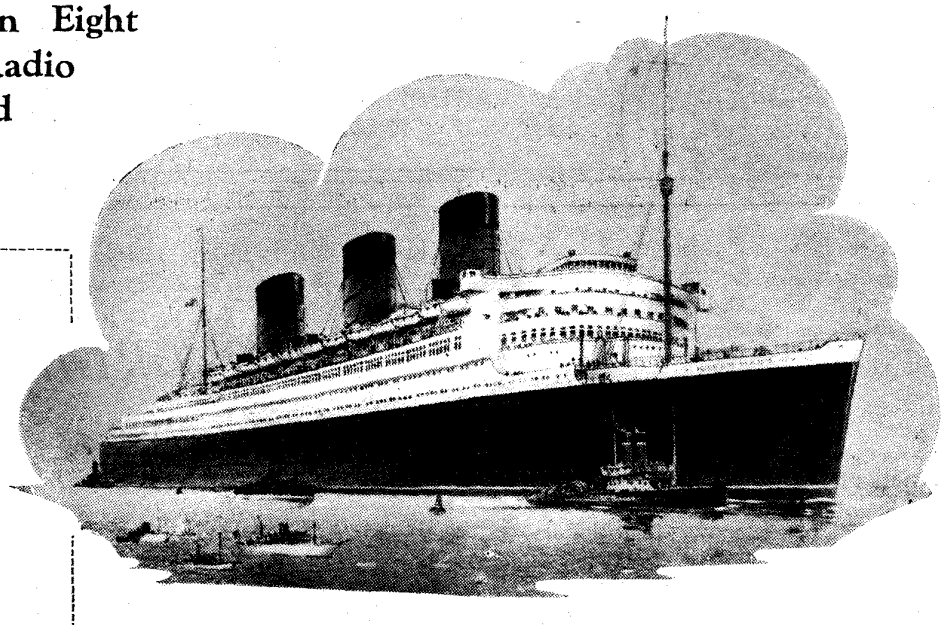
The Queen Mary's Wireless

Simultaneous Working on Eight Channels—Ship-to-Shore Radio Telephone—Broadcast and Direction-Finding Equipment



The majesty of the vessel is well conveyed by this impression from the artistic pen of Frank Mason.

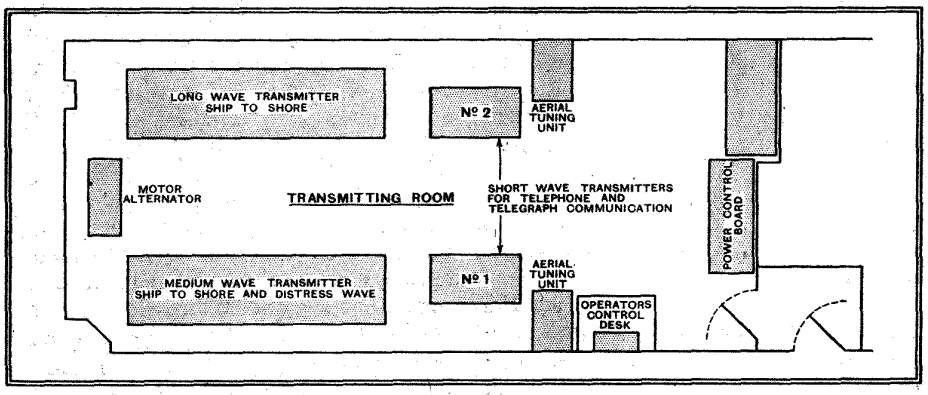
THE "Queen Mary," the finest and most stately liner ever put into service is equipped with the most elaborate wireless installation to be fitted in a passenger liner. The powerful short wave transmitters will have a world-wide range while at all times her passengers will be able to speak to nearly every continent by wireless telephone without leaving their cabins. In this article we give a brief description of the apparatus and its scope.

PARTICULAR interest attaches to the wireless equipment on the new Cunard-White Star liner *Queen Mary*, as it is one of the largest and most elaborate ever installed in an ocean-going vessel. The ship is equipped for short-, medium-, and long-wave communication, and for manual and high-speed automatic handling of messages. A wireless telephone service linked up with the European and American telephone systems, is provided for passengers' use and facilities are available for transmitting and receiving broadcast programmes, and relaying them to all parts of the ship.

Owing to the heavy wireless traffic that will have to be handled by the *Queen Mary's* operating staff it is most desirable that independent communication with several land stations should be possible at the same time, and this is an exceedingly difficult problem in the restricted space of a ship. On shore it is comparatively easy of solution since the transmitters and receivers can be separated by many miles and all messages handled from a central control station.

When the transmitters and receivers are installed on a ship, and most important of all, their respective aerials are so very close to each other, very special precautions are required to avoid mutual interference. And added to this, transmitters of very high power are installed.

A successful solution has, however, been found in the case of the *Queen Mary's* equipment, and it is possible to work eight separate channels of communication, *i.e.*, four transmitting and four receiving, simultaneously and entirely independent of each other. Each transmitter has a number of "spot" waves, and any of these can be employed at a moment's notice by an ingenious system of wavechange not hitherto incorporated in marine wireless installations.



The four transmitters are housed in a separate room and disposed as shown here.

The transmitters are housed in a room about 400 feet away from the receiving and central control room. Contrary to what one would expect in a high-power transmitting station, there is an entire absence of noise. In fact, there is no running machinery whatever, the generators being accommodated in a special compartment adjoining the engine room of the ship.

Power is generated as alternating current and the necessary DC for the transmitters is obtained from large gas-filled rectifiers.

There are four transmitters in all: one for the long waves covering a band of 1,875 to 2,727 metres, a medium-wave transmitter for the 600- to 800-metre band and two for the short waves. These can be employed on all the wavelengths allotted for ships' use between 17 and 96 metres and for telephony or telegraphy.

"Spot" Waves

Normally the *Queen Mary* will work on 32 "spot" wavelengths which have been selected after consultation with land stations and other authorities. There will be nine for telephony and eleven for telegraphy on the short-wave band, five for medium-wave telegraphy and seven for long-wave telegraphy. The call sign is GBTT.

As previously mentioned, the receiving and control room, where all incoming and outgoing messages are handled, is situated some 400 feet away from the transmitters, and adjoining it is the main accepting office where radio-telegrams are handed in and passengers can make their arrangements for radio-telephone calls.

As will be seen from the plan showing the layout of this room, running almost the full length are the operators' desks, each equipped with headphones, telegraph key and typewriter. In front of each is a control panel for two receivers covering between them all the wavelengths in use. From these desks the operators can start up or stop the transmitter, or can instantly change from one of the allotted "spot" waves to another. During busy hours four operators will be employed, while, when traffic is particularly heavy, high-speed automatic transmitting and receiving equipment can be brought into use.

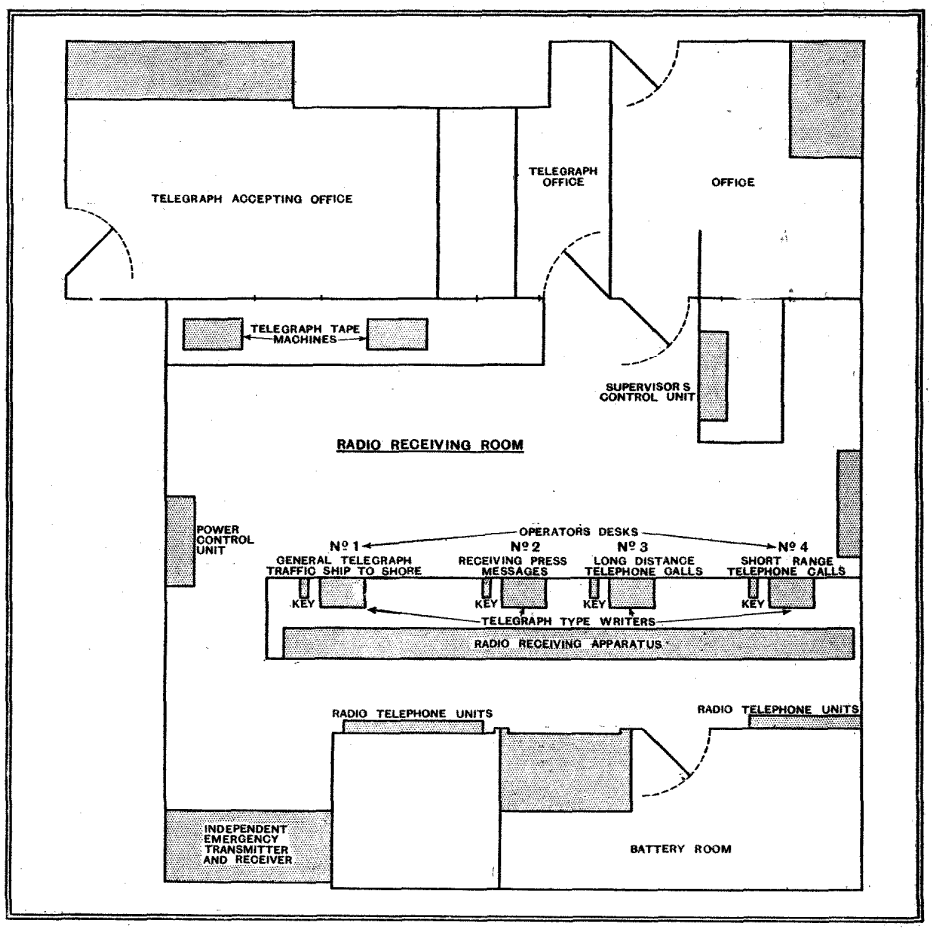
Radio Telephone Service

The various receivers are located behind the control panels that face each operator's desk, and access is obtained to them from the rear. Receivers of very high selectivity are fitted, which is a very necessary feature in view of the provision for multiplex working.

The ship-to-shore wireless telephone is also controlled from this room and is constantly under the attention of an operator whose principal work is to maintain a satisfactory volume and give the users the best possible service.

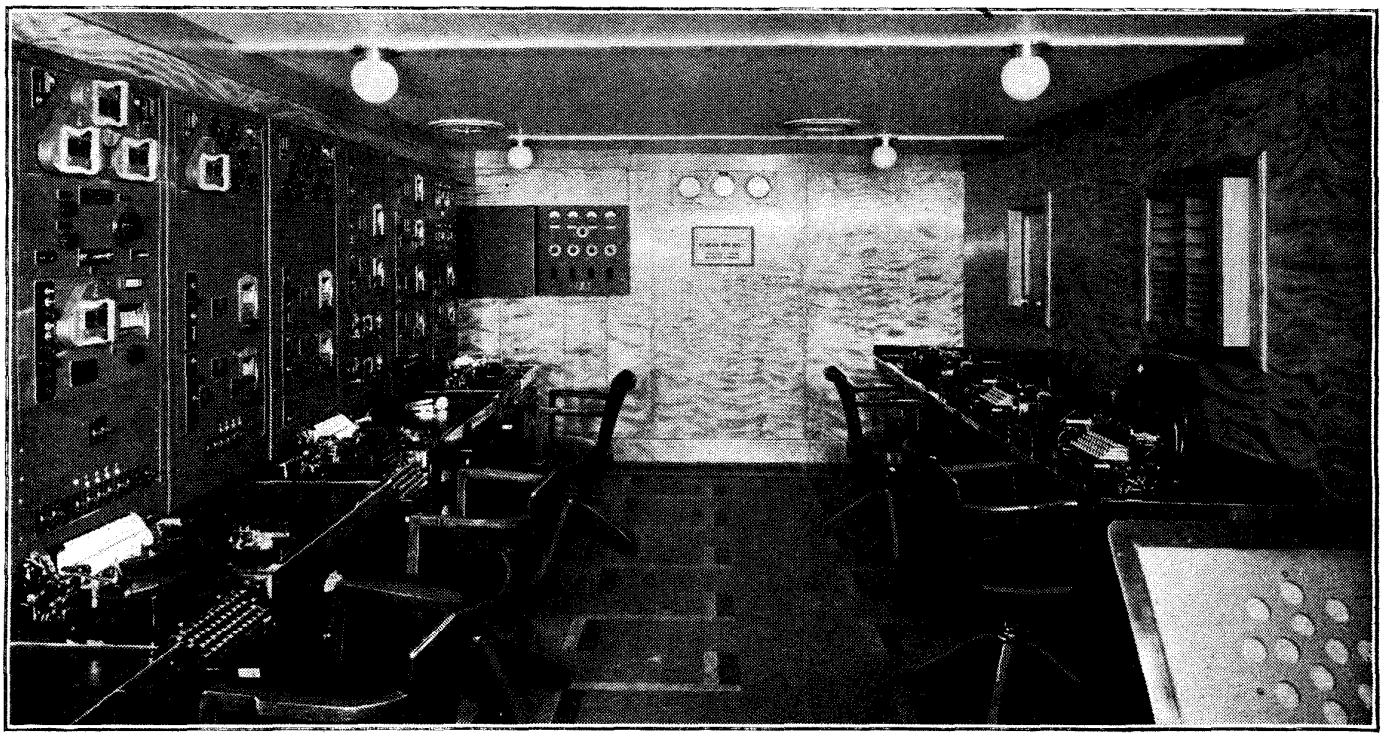
Secrecy on the ship's wireless telephone for passengers' use is ensured by adopting a system of "speech scrambling" so that private conversations are quite unintelligible to anyone listening on these wavelengths.

At the far end is an emergency transmitter and receiver built as a self-contained unit and worked by a large accumulator battery. It has a range of at least 500 miles, and is, in fact, of the same power and type usually installed as the main wireless equipment of the average ship.



Plan of the receiving room from where the transmitters, some 400 feet away, are operated by remote control.

It is not possible to give any figures regarding the maximum range of the *Queen Mary's* transmitters since all long-distance work will most likely be carried out on the short waves, and under favourable conditions her signals should be



Occupying the centre of the receiving room are the operators desks and each has two receivers covering the full band of wavelengths in use.

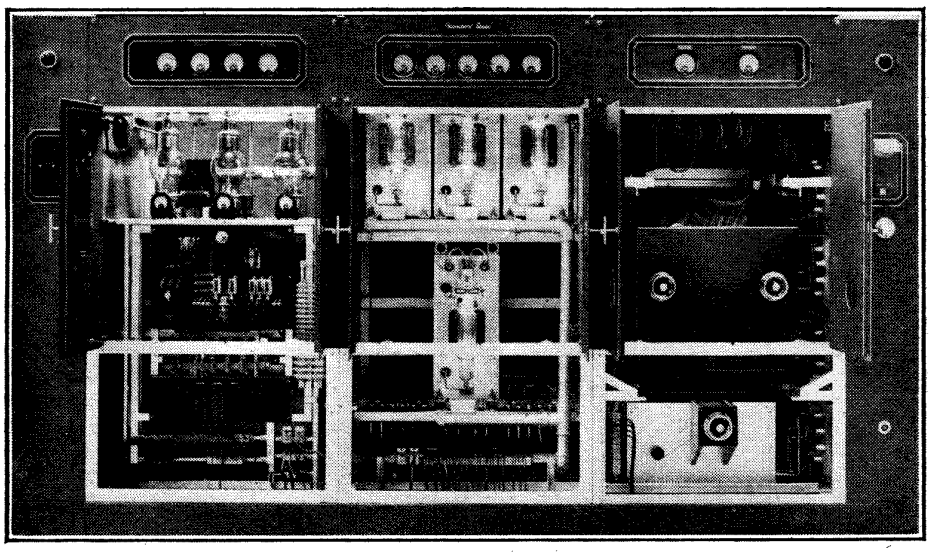
The "Queen Mary's" Wireless—

heard in all parts of the world. The power of these is amply sufficient to ensure constant communication with Europe and America at all times.

An interesting feature of the receiving room, though it is not apparent to the visitor, is that walls, ceiling and floor are lined throughout with copper sheet so as to reduce to a minimum any interference with reception that might arise from the large number of electric motors and other electrical apparatus in the ship.

essentially a wireless unit, it is not operated or controlled from the wireless room but, being a navigation instrument, is under the charge of the ship's navigating officers; it employs a loop aerial. Bearings can be taken on any fixed shore station up to distances of 300 to 400 miles.

Another interesting feature is that while two of the ship's motor lifeboats are fitted with wireless sets of the type required by the Board of Trade, they are equipped also with small wireless telephone sets such as are employed by trawlers. As



One of the high-power transmitters installed in the "Queen Mary," showing, left to right, rectifier unit, valve unit and coil unit.

A very elaborate aerial system is installed consisting of no fewer than ten separate aerials, five for receiving and four for transmitting, while there is an emergency transmitting and receiving aerial for 600 metres. Some idea of the spans possible on a boat of this size can be gauged from the fact that the main transmitting aerial for long-wave use is some 500 feet long.

Although the radio direction-finder is their operation is very simple communication could be maintained in the absence of a skilled operator. This is believed to be the first occasion on which ship's lifeboats have been fitted with wireless telephony as well as the customary telegraph sets.

The whole of the ship's wireless equipment, main, emergency and lifeboat sets have been supplied and will be operated by the International Marine Radio Company.

H. B. D.

HINTS AND TIPS

Practical Aids to Better Reception

IN the past the task of comparing the relative efficiencies of different aerials has usually been, to the average amateur unprovided with measuring equipment, a very unsatisfactory and often fruitless one. The usual method is to tune in a weak station while using one aerial and then, as quickly as possible, to change over to another, but, unfortunately, by the time the change-over has been made, one often becomes rather hazy as to just how weak the station was before. Coupled to this uncertainty was the difficulty, in pre-superhet days, that any change in the aerial system was liable to upset the reaction adjustment, besides almost invariably necessitating retuning.

Comparing Aerials

With present-day receivers, however, the aerial has little effect on tuning and still less on regeneration. Moreover, AVC, although making aural methods of comparison impossible, provides us instead with the means of actually measuring visually the relative "goodness" of different aerial systems. Any form of tuning indicator, provided it has some form of arbitrary scale, will serve the purpose, but a milliammeter is best.

Now, it is a well-known property of AVC that any increase in the overall efficiency of a receiver, such as may be brought about by improving the aerial system, will result in the same output being produced from the speaker on a given signal with less amplification from the variable-mu controlled valves, so that their anode current will fall. If, therefore, after increasing the height of an aerial, say 20 feet, the milliammeter is observed to show an appreciably lower reading on a certain station which has previously been found to provide a steady non-fading signal, one has fairly conclusive evidence that a definite improvement has taken place.

As the indications given by the meter for each aerial or each alteration can be recorded, there is no need to hurry in the fear of forgetting the previous conditions, and so ample time is available for retrimming the input circuit if this course seems likely to be necessary.

WHILST working a superhet converter in conjunction with a normal broadcast receiver, there are one or two points which should receive attention if really first-class performance is to be obtained from the combination.

Short-wave Converters

The first of these is that the receiver should be properly trimmed and adjusted for use with the converter. The fact that it was properly "in gang" when receiving the medium waves is no guarantee that it is properly ganged for use with the converter, since the removal of the aerial from the receiver may throw the aerial circuit out of tune.

Trimming can best be done with an actual signal received via the converter. Only the aerial trimmers need be touched, and an *increase* of capacity will always be required.

Having obtained the best signal strength in this way, further amplification can be had by using the reaction control of the set. For very weak signals the reaction control can be increased until the receiver is almost oscillating. To pick up a carrier-wave the receiver may even be allowed to oscillate momentarily.

ATTENTION to input circuit design of short-wave receivers has virtually cured medium- and long-wave interference on the short waves through shock excitation of the receiving aerial, even in those districts where field strength from the local station is considerable. But when a short-wave set is in use there are times when one wishes to hear a broadcast (perhaps a weather report) from the local station, without going to the trouble of changing over to a medium-wave set or plugging in the requisite medium-wave coil.

Vice Becomes Virtue

By connecting the aerial direct to the grid of the detector valve—that is, ignoring all intermediate couplings such as condensers, etc.—the local station should be heard with sufficient power and clarity to enable the weather forecast or other item to be received; in effect, one depends for reception on shock-excitation, and turns what is normally a vice into a virtue.

In the case of a short-wave superheterodyne it is sometimes possible to pick up the local station programme by the simple expedient of touching certain parts of the grid circuits with the finger.