

Operation of a Naval Radio Station

By A. P. PECK

MANY amateurs listening in on 600 meters and higher, and hearing the high-pitched note of a spark transmitter, do not realize the efficiency and dispatch with which messages are handled by the naval stations. Those who have some of the cheaper receiving sets are greatly annoyed at times by the naval stations when they are listening to broadcasting on 360 meters wave length. This, of course, is due to the broadness of tuning in their receiving set, and is not due to any discrepancy on the part of the transmitting station. When a radiophone "bug" is listening-in to the programme of a broadcasting station, and hears a fairly high-pitched note come roaring in, he should not start to berate the city, the state, the country and the world in general for this interference, but should go at once to the heart of the trouble, and install a selective receiver or tuner.

The naval station which we take as our model, is located in New York City. Its call letters are NAH, and it is the standby of old-time radio-telegraph fans when they wish to practice a little by copying navy messages. In the years before the war, which may very aptly be termed, in radio language, the years before broadcasting, the messages transmitted from NAH and similar stations, were practically the only ones the radio bug could listen to. We therefore find among those who know, a sincere respect for the operators of these stations.

When one enters the operating room of NAH, which is located on South St., New York City, his first impression is that he has got into the *wrong room*, as the sounds of many telegraph sounders and relays are heard. However, he then sees two operators sitting at desks with the "cans" (receivers) on, and becomes reassured.

Besides many other duties, the operators at NAH also have to chart the location of ships, the bearings of which are sent to them by the various compass stations along the coast of the third naval district.

As seen in one of the accompanying photographs, an operator sits at a desk with several telegraph keys and relays in front of him. To his left is a telegraph sounder, and on the wall beside him is a large map with the compass stations marked thereon. In the third district these stations are located at Manassquan, Sandy Hook, Fire Island, and Amagansett, the first being the furthest south, and the last the furthest north.

When a ship at sea wants to obtain a very correct bearing on her position, the ship's operator sends out his call letters, repeating them for 50 seconds. In sending these out, he prolongs all the dashes in his call, or if the call does not include any dashes, he prolongs all the dots. This is the new regulation for obtaining bearings, the old one being that the ship was to send out the letters MO for a specified length of time followed by its call letters. This, however, caused much confusion at the compass stations, and therefore the latter method has been substituted. Now at the various compass stations along the coast, this prolonged call is heard, and the operators swing their loops until they locate the exact direction in which the ship is located from their particular station. The direction is noted, and is sent by land wire telegraph to Brooklyn Navy Yard, where the operator receives it and notes it down. The operator at NAH has also been listening in for these *compass calls* on his own receiver, so that he will be ready to get the bearings from the compass stations. These he soon obtains. The operator then repeats this information back to the compass station for verification. This process is gone through with all four of the above-mentioned compass stations, and then the operator at NAH plots the position

of the ship on a chart. The triangulation method is used; four stations being used for more accurate results. Next by means of one of the telegraph keys located on his desk, he signals to the station at Fire Island that he is ready to transmit. The operator at Fire Island starts his motor-generators, and the operator at NAH sends out the location of the ship by means of Fire Island's transmitter. His telegraph key closes a relay at the Fire Island station, which in turn closes the primary circuit of the transformers, or, in radio terms, the transmitter at Fire Island is remotely controlled from NAH.

Many ships avail themselves of this compass service, as it forms a very accurate check on their own observation bearings. It is very easy to see therefore, that the operators are at times kept extremely busy.

At another desk in the operating room, an operator sits with a pair of receivers on, one of which is connected to a set tuned to 600

an everyday part of the operator's duty and it is therefore necessary for him to be able to read both Morse and Continental.

As before stated, the transmitting apparatus proper of NAH is located in Brooklyn at the navy yard. Hence, the common name for this station, Brooklyn Navy Yard. In the transmitting room, there is a desk at which is located a receiving set similar to those found in the operating room, which is used for various general utility purposes.

On a large panel to the left of the operator's table, is located the transmitting apparatus, together with the wave-changing switch. The wave-changing switch throws into or out of the circuit various combinations of inductances and capacities. For instance, for 600 meter transmission, the condensers are in series and a certain amount of inductance is in circuit, while for 800 the compass wave length and higher waves the condensers are in parallel, and various other predetermined amounts of inductance are used. This transmitting set has a power of 5 K.W., and is capable of working on 600, 800, 975 and 1832 meters. The latter is the working wave of this station for general, commercial and naval traffic.

There are ten pancake type inductance coils used in this transmitter. The condensers are of the commercial mica type, and the gap is a series of quenched gaps.

On another panel is located a ½ K.W. transmitter, which operates on 507 meters, and is used for communication with air-craft.

The current for both of these sets is obtained from a motor-generator outfit located in another room.

The transmitting antennæ are shown in an accompanying photograph. There is a large one which is about 250 feet long, of the "T" type, composed of 11 wires. This is used for all work above 600 meters. There is also a small aerial of the inverted "L" type composed of 4 wires, each about 100 feet long. This is for all short wave work. Several experiments have been made with a cage type antenna but this is not being used at the present time.

There is a complete squad of operators on duty day and night, and it is easily seen that our navy is well up-to-date in radio work, and handles traffic in the most up-to-date manner.

Some people may think that the life of a "gob" is an easy one, but if they would visit the operating room of Brooklyn Navy Yard, they would speedily become convinced that such is by no means the case. At times when the Atlantic fleet is in the harbor at New York, or on the Hudson River, the operators are continually transmitting and receiving for the entire length of their shift. At such periods, all the business between the ships and headquarters is handled by this station, and when the entire fleet is in, the volume of traffic can be readily imagined.

During periods of storms at sea, the compass stations are always over-taxed by ships desiring to know their bearings in order to avoid wrecks. At these times, the operator at Brooklyn Navy Yard who charts the positions, has his hands full, as it is up to him to receive the positions from the various stations along the coast, lay them out on the chart, compute the position of the ship, and then by means of Fire Island's transmitter, inform the ship as to its exact position.

This is one of the greatest services that radio gives to the sea, rivalling almost the Radio Doctor which has recently been put into service, whereby ships are able to get medical advice by radio when they do not carry a competent physician.

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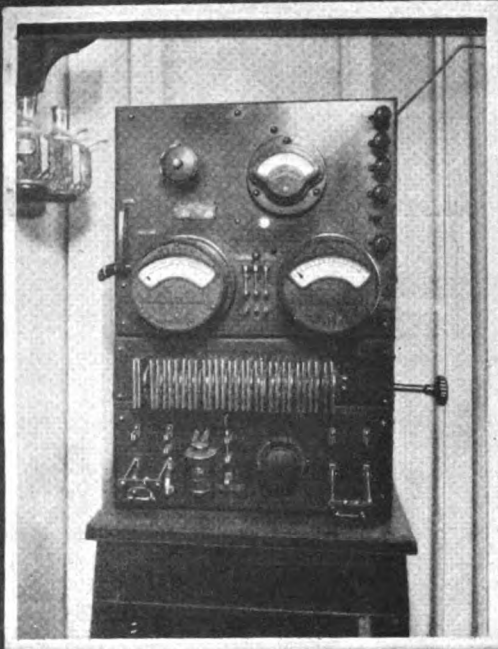
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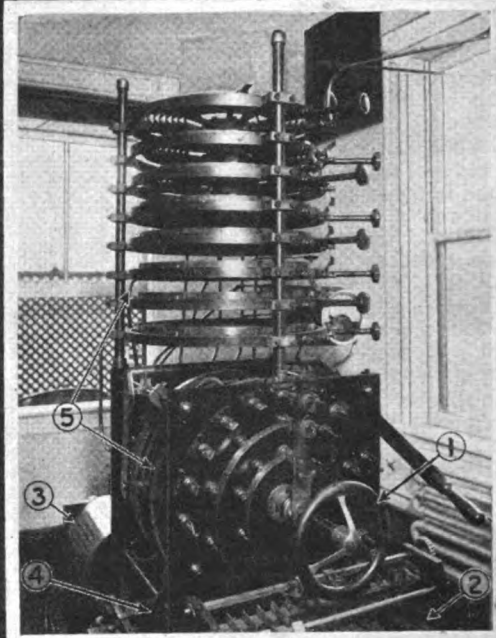
meters, and the other to another set which is tuned to 975. These sets are of the standard navy type, employing a detector and two stages of audio-frequency amplification. The tubes used are Signal Corps type V. T. 1's throughout. Literally speaking, he listens with one ear to commercial traffic, and with the other to naval traffic. His work is to handle any commercial business between ship and shore and between naval vessels and naval headquarters, which may be intended for his station. When he hears NAH being called, he signals to the transmitting station, which is located in Brooklyn, and will be described more in detail later, that he wishes to transmit. He also tells the operator at the transmitting station, what wave he wishes to use. He then gets the message from the ship, and answers it or forwards it as the requirements may be. All his transmitting is done with one of two ordinary telegraph keys, one of which controls a 5 K.W. transmitter, and the other, a ½ K.W. transmitter. His receiving is done over an aerial placed on the top of the building in which the operating room is located.

In still another part of the operating room there is a switchboard similar to a regular telephone board. This board connects with telegraph lines extending to various points from Washington, D. C. to Maine. In connection with this board there are several relays and keys which are used for transmitting naval business by land telegraph. When a radio message comes in that is to be delivered by land line to some point, the line is selected on the switch board, and the message sent by regular telegraphy. This

BROOKLYN NAVY YARD

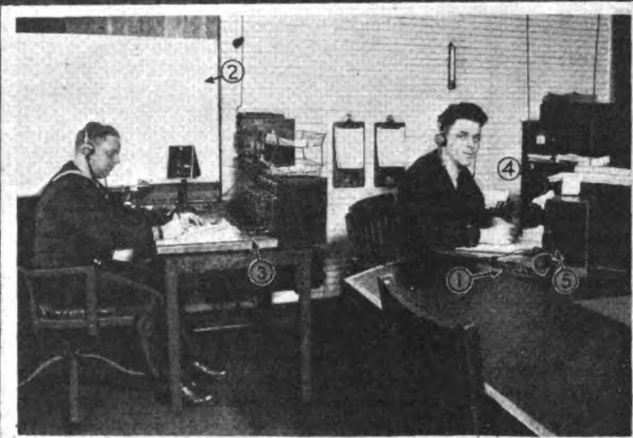


A very compact and powerful spark transmitter is shown above. It is rated at 1/2 K. W. and is used for experimental purposes as well as communication with air-craft.



In the above photo, 1 indicates the wave changing switch, 2 the quenched gap, 3 the transformers, 4 the condensers and 5 the oscillation transformers.

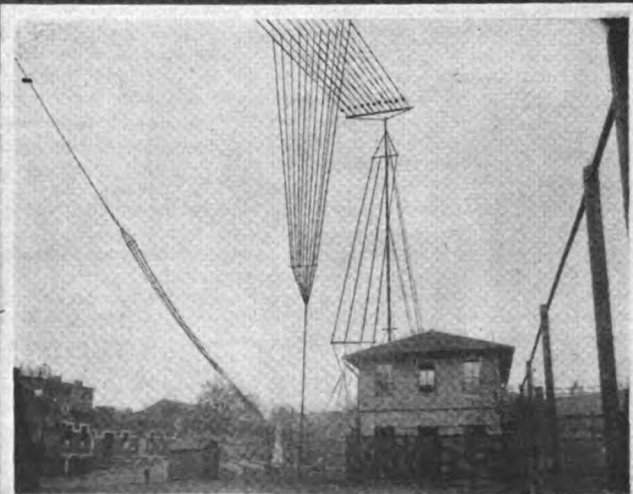
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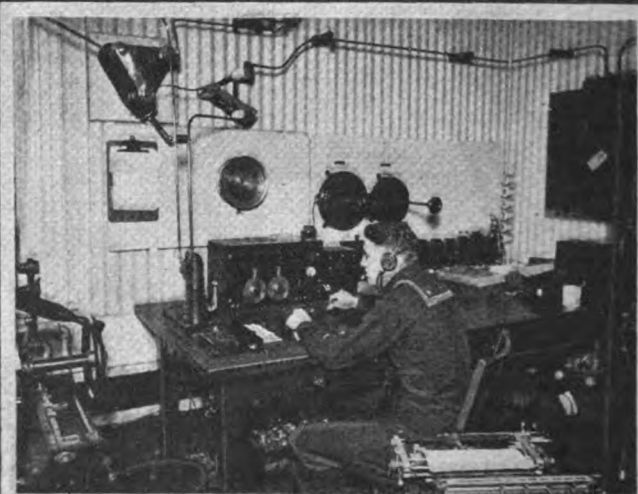
A view of one corner of the operating room is shown above. 1 indicates the keys used to control the transmitter shown in the upper right hand corner, 2 the compass chart, 3 the keys communicating with the compass stations, and 4 and 5 receiving sets tuned to 900 and 600 meters respectively.



In the left background of the above photo may be seen the switchboard connecting with various points along the Atlantic coast. On the right hand side of the picture are the relays and keys used in connection with these lines.



The large 11-wire antenna shown herewith is used for transmission, while the shorter 4-wire one is used for reception. The "cage" aerial is used for experimental purposes. These antennae are located in the Navy Yard at Brooklyn.



The receiving set situated in the transmitter room is shown herewith. The motor-generators are controlled by a switch on the lower left hand corner of the table. The wheel controlling the wave changing switch can be seen at the left hand side of the photo.