THE SCR–79–A AND THE SCR–99 SETS.

Equipment.

1 SCR–79–A (set box BC–32–A only).
1 SCR–125–A wave meter.
3 4-volt storage batteries (BB–14).
3 VT–1 vacuum tubes.
2 VT–2 vacuum tubes.
2 22½-volt batteries (BA–2).
1 antenna system, type *A9A* (complete).
1 dynamotor, type DM–1.
1 head set, type P–11.
2 cords, type CD *38* (battery connectors).
1 cord, type CD *48* (12-V lead).
1 cord, type CO *49* (key lead).

GENERAL CONSTRUCTION OF THE SCR–79–A.

Information.

The SCR–79–A and SCR–99 sets differ from each other only in wave-length range, the SCR–99 set having a range of from 900–1,900 meters. For this reason the SCR–79–A set only will be described.

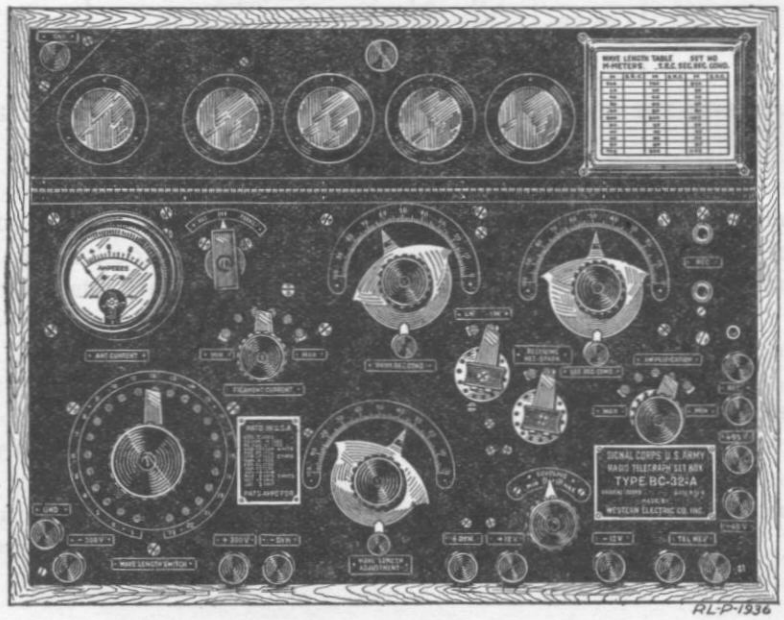

Fig. 68.—Set box BC–32–A of the SCR–79–A set.

In addition to using a vacuum tube as a detector and amplifier of radio signals, one may also use it to generate currents of a high frequency when it is connected to the proper apparatus. In this capacity the vacuum tube, known as an *oscillator*, may be used in a radio transmitter to generate the high-frequency current which is radiated from the antenna system as electromagnetic waves. The waves sent out by a spark transmitter, such as the SCR–74 and the SCR–105, are called "damped" waves. The waves emitted by a vacuum tube transmitter are called "undamped" or continuous waves.

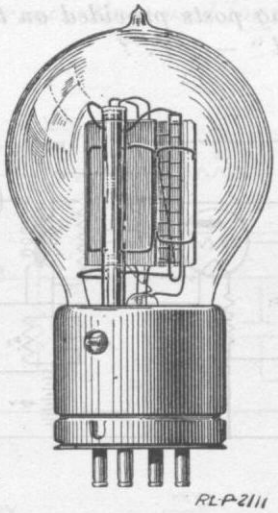

Fig. 69.—The type VT–2 vacuum tube.

The SCR–79–A is a vacuum tube set (see Fig. 68) designed for transmitting undamped wave signals and for receiving either damped or undamped signals. The wave length range of the set, for both transmitting and receiving, is from 500 to 1,100 meters. Two VT–2 vacuum tubes (see Fig. 69) are used in the transmitter and three VT–1 tubes are used in the receiver. Two sets of this type can communicate over a distance of about 30 miles.

Directions.

1. Examine the front of the panel of the BC–32–A. Carefully note the markings of all binding posts, knobs, dials, and meters. Pull the small knob in the center of the top edge and open the door. Note the construction of the tube socket mountings. (The VT–2 sockets have the slot in the socket offset about 45° from the

position of the slot in the VT–1 socket.) Note how the " B " batteries are connected and carried.

Questions.

(1) *Which sockets are used for the transmitting tubes? Which sockets are used for the receiving tubes?*

(2) *How are the " B " batteries carried in this set?*

(3) *How is the connection made between the " B " batteries and the receiving set?*

(4) *Why are binding posts provided on the front of the set box marked " + 45V." and " — 45V."?*

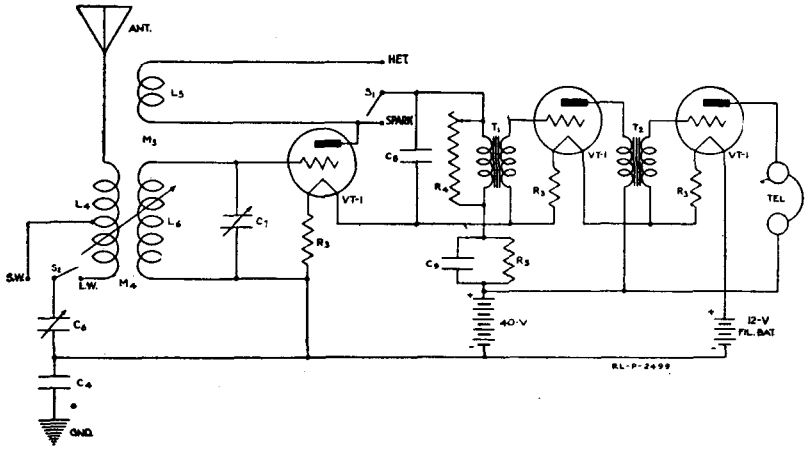

Fig. 70.—Schematic diagram of connections in the receiver of the SCR–79–A set.

(5) *To which binding post is the antenna connected? The ground?*

(6) *Where is the storage battery connection made? Does this supply the filaments of both transmitting and receiving tubes?*

(7) *Why does the storage battery have a voltage of 12 volts with this set when the VT–1 requires only a 4-volt battery to light its filament?*

(8) *What controls are varied on the front of the panel to change the primary receiving wave length?*

(9) *Which controls are varied to change the secondary receiving wave length?*

(10) *Which controls are varied to change the receiving set from a damped wave receiver to an undamped wave receiver? What does this switch do to the receiving set? (See Diagram, Fig. 70.)*

(11) *How is the strength of the received signal varied?*

(12) *What is the purpose of the two binding posts marked "REC"?*

(13) *How many pairs of telephones can be plugged into this set?*

(14) *Can the filament current of the receiving tubes be varied or is it constant? Explain the answer.*

(15) *Why are rubber mountings used for the tube socket strip?*

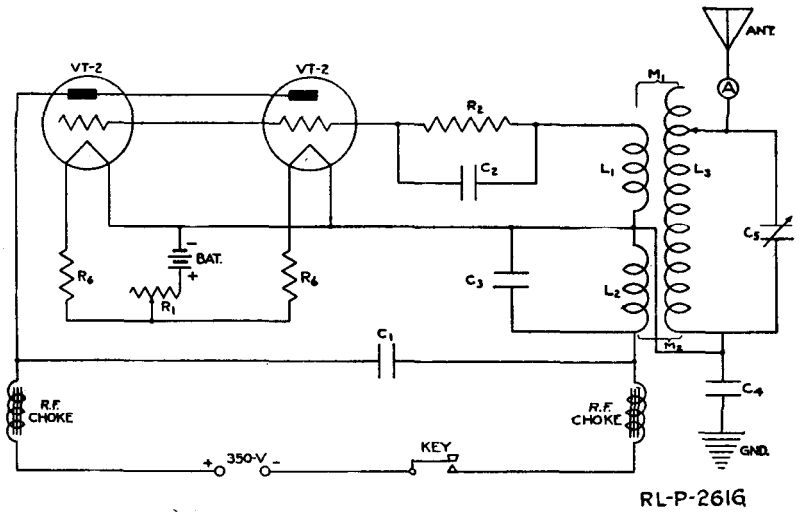

Fig. 71.—Schematic diagram of connections in the transmitter of the SCR-79-A set.

(16) *What is the purpose of the switch "S_2" on the front of the panel?*

(17) *How is the transmitted wave length varied?*

(18) *Is the filament current of the transmitting tubes fixed? Explain the answer.*

(19) *For what are the two binding posts marked "+300 V" and "−300 V" used?*

(20) *What connection is made to the two binding posts marked "+Dyn" and "−Dyn"?*

(21) *To what binding posts is the key connected and what circuit is it in?*

(22) *What is the purpose of the "Wave length adjustment" condenser? (See Fig. 71.)*

Directions.

2. Look at the VT–2 vacuum tube (See Fig. 69) and note how it is constructed. The filament, grid, and plate are somewhat similar to the elements of the VT–1. Notice, however, that they are spaced differently. The wide spacing of the plate in the VT–2 is necessary on account of the high voltage used. Compare the base of the VT–2 with the base of the VT–1. (See Fig. 72.)

NOTE.—The amount of current consumed by the filament of the type VT–2 vacuum tube is approximately 1.3 amperes.

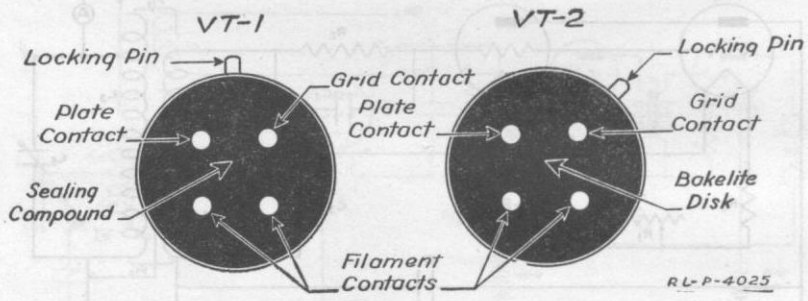

Fig. 72.—Relative positions of locking pins on type VT–1 and VT–2 vacuum tube bases.

Questions.

(23) *Is the position of the locking pin on the side of the VT–2 base different from the position of the locking pin on the VT–1 with respect to the four contact prongs?*

(24) *Will a VT–1 vacuum tube fit in a VT–2 socket? Explain the answer.*

(25) *Why were the tubes and sockets designed as explained in your answer to the preceding question?*

Directions.

3. Open the door at the top of the panel and remove the two screws holding the panel frame to the bracket. Remove the two screws from the lower corners of the panel. Lift the panel out of the box. Inspect the parts in the rear of the panel carefully. (See Fig. 73.) Move the control knobs on the front of panel and note what moves in the rear.

Questions.

(26) *Where is the primary inductance of the receiving circuit?*

(27) *How many taps are there on the primary receiving coil? What switch varies the number of turns being used?*

(28) *Which is the secondary receiving coil? How many taps on it?*

(29) *Which is the tickler coil? To which coil is it most closely coupled? Why?*

(30) *What kind of coupling is used in this receiving set? How is it varied?*

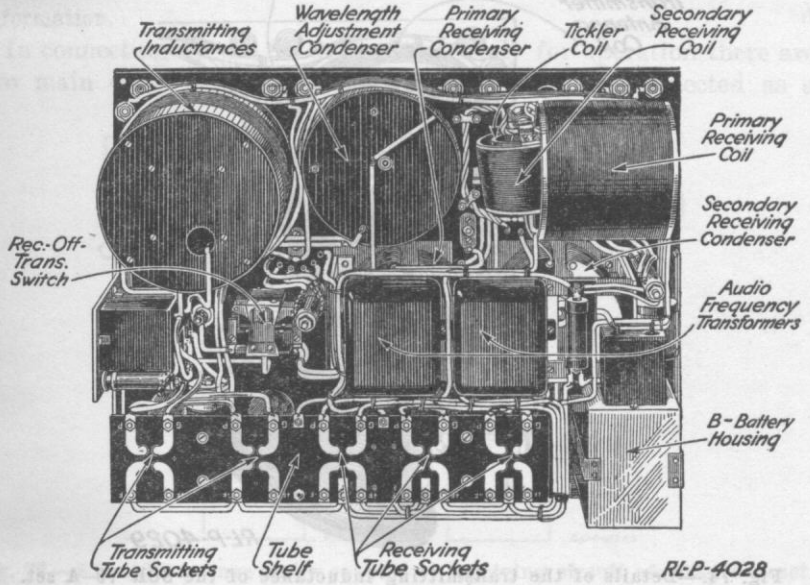

Fig. 73.—Rear, panel view of set box BC–32–A.

(31) *Why are stops placed on the coupling controls on the front of the panel?*

(32) *Where is the resistance and condenser unit in series with the plate of the detector and the "B" battery?*

(33) *What is the purpose of the above resistance and condenser?*

(34) *Where are the resistances R_3? Why are they placed in the circuit?*

(35) *Where is the ground lead condenser? Why is it used?*

(36) *Where are the primary and secondary variable condensers?*

(37) *Where are the transformers of the first and second stages of audio frequency?*

(38) *Which is the detector tube socket? Which are the amplifier sockets?*

(39) *How many tubes are used for receiving in this set?*

(40) *How many stages of amplification are used?*

(41) *What type of tubes should be used in the receiving circuit?*

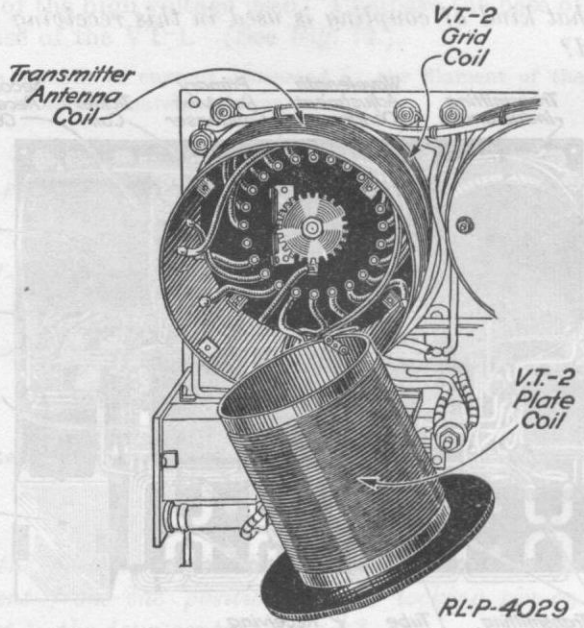

Fig. 74.—Details of the transmitting inductance of the SCR–79–A set.

(42) *What type tube is used in the sockets of the transmitting side?*

(43) *How many transmitting tubes are used?*

(44) *Which are the transmitting tube sockets?*

Directions.

4. Remove the four screws nearest the center of the rear of the transmitting inductance and lift out the end. (See Fig. 74.)

Questions.

(45) *Which is the grid coil, the plate coil, and the antenna coil?*

(46) *What does the "wave length switch" do?*

(47) *What kind of coupling is used between the plate and grid coils?*

(48) *Can the filament current of the receiving tubes be varied? Explain the answer.*

(49) *Locate the resistance R_2 and the condenser C_2.*

(50) *Explain exactly what circuits the switch S_2 makes and breaks in each of its three positions.*

EXPERIMENT No. 1.

TO CONNECT UP AND TUNE THE SCR–79–A SET.

Information.

In connecting up the SCR–79–A set ready for operation there are two main divisions of the work, namely, the set connected as a

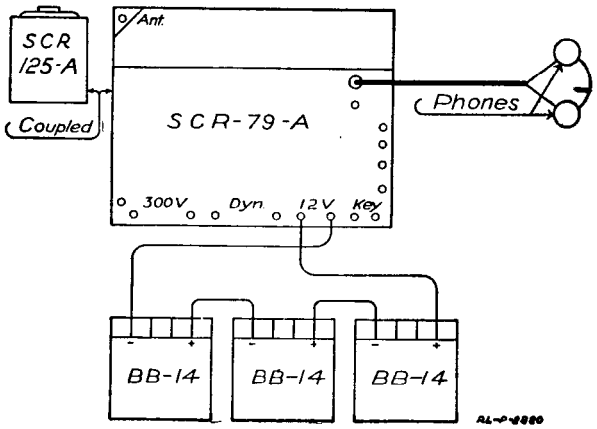

Fig. 75.—SCR–125–A wave meter coupled to receiving circuit of SCR–79–A set.

receiver and the set connected as a transmitter. The set may be connected up as a transmitter without fully connecting it up as a receiver, and vice versa. (See Figs. 75 and 76.) In like manner the tuning of the set as a receiver is separate and different from the tuning as a transmitter. A definite method must be followed in performing of these various operations.

Directions.

1. To connect up the set as a transmitter:

a. Place three BB–14 batteries in the form of a triangle on the ground near the foot of the mast holding the point of the "V" antenna. Connect the three batteries in series. To the negative

terminal of the 12-volt battery thus formed connect the longer black lead of the cord, type CD–48. Do not connect the red lead.

b. Place the carrying chest of the set on top of the three storage batteries so that it is firmly supported and open up the top and front of the chest. (One of the storage batteries should be partly under the operating shelf formed by the front cover of the chest when open.)

c. Open up the top hinged portion of the panel by pulling on the knob in its center and insert two VT–2 tubes in the two left-hand sockets. Close the panel.

d. Place the "Trans.-Rec." switch on the "Off" position.

e. Connect the high voltage dynamotor leads (with the proper polarity) to the binding posts marked "+ 300 V" and "— 300 V."

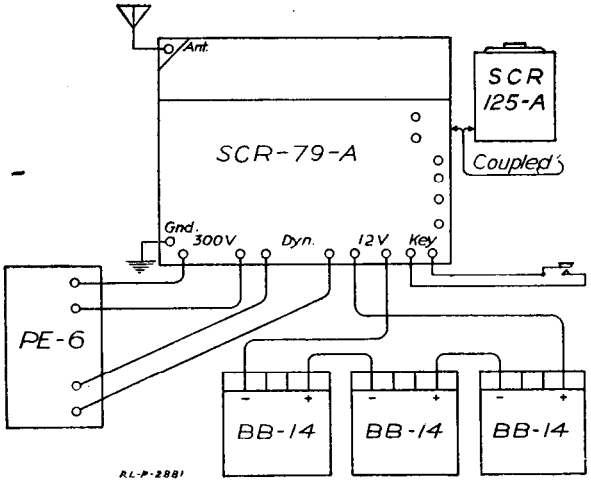

Fig. 76.—SCR–125–A wave meter coupled to transmitting circuit of SCR–79–A set.

f. Connect the low voltage dynamotor leads to the two binding posts marked "+ Dyn." and "— Dyn." with the correct polarity.

g. Connect the antenna lead-in wire to the post marked "Ant."

h. Connect the wire from the counterpoise or other ground system used to the post marked "Gnd."

i. Connect the short red lead of the cord, type CD–48, to the binding post marked "+ 12 V" and the short black lead of the same cord to the post marked "— 12 V."

j. Insert the key in its holder on the operating shelf and using the cord, type CD–48, connect it to the two binding posts marked "Key."

k. Check all connections to see that they are correct.

l. See that the double-pole single-throw switch on the dynamotor is closed.

m. Connect the long red lead of the cord, type CD–48, to the positive terminal of the 12-volt battery. The set should now be ready to transmit by throwing the "Trans.-Rec." switch to the "Trans." position and by pressing the key.

Questions.

(1) *Why is it necessary to follow certain steps in a definite and particular order when connecting up this set?*

(2) *Why is the proper polarity important on any radio set?*

(3) *Why is the 12-volt battery circuit left incomplete until the last step in connecting up the set?*

(4) *Why is the "Trans.-Rec." switch placed on the "Off" position while connecting up the set?*

(5) *Why is the carrying chest placed on top of the storage batteries?*

Information.

The transmitter of the SCR–79–A is of such a type that the wave length on which it transmits is dependent upon the antenna system with which the set is used. It is therefore impossible to calibrate the transmitter permanently, and it is consequently necessary to use a wave meter to set it for any one of a number of wave lengths each time the antenna system is moved or changed in any way. Moreover, it is advisable to determine the settings of the transmitter for the different wave lengths on which it may be required to work before actually starting to handle traffic in a net.

Directions.

2. To tune the transmitter to a given wave length:

a. Set the filament rheostat at "Max."

b. Set the "Wave Length Switch" approximately at the wave length desired. (Suppose that the wave length desired is 700 meters. Seven hundred meters is a little less than halfway along the wave-length range of the set. Therefore, place the "Wave Length Switch," as a trial setting, a little less than halfway around toward "Max.")

c. Set the control of the "Wave Length Adjustment" condenser at the middle point of the scale.

d. Light the lamp in the SCR–125–A wave meter and adjust it to a dull red glow.

e. Close the key and throw the "Trans.-Rec." switch to the "Trans." position.

f. Couple the wave meter to the transmitter by holding the side marked "Plane of coil" against the knob of the "Wave Length Switch" with the dial of the wave meter up.

g. Slowly turn the wave meter dial until the lamp glows most brightly.

h. If the wave meter lamp glows brightly at a wave length greater than that desired, decrease the antenna inductance by turning the "Wave Length Switch" down two or three taps; and if it glows brightly at a shorter wave length than the desired value, increase the antenna inductance by turning the "Wave Length Switch" up two or three taps.

i. Again turn the wave meter dial until the lamp glows most brightly. Continue this process until two inductance taps are found, one of which is above and the other below the desired wave length.

j. Set the "Wave Length Switch" on either of the two taps found in Direction *i* above. Set the wave meter to the exact wave length desired and vary the "Wave Length Adjustment" condenser until the lamp on on the wave meter glows brightly. The set is now transmitting on the desired wave length.

Questions.

(6) *Why is the "Wave Length Switch" first set on approximately the correct position?*

(7) *Why is the control of the "Wave Length Adjustment" condenser first set at the middle point of the scale?*

(8) *What condition exists when the wave meter lamp glows most brightly?*

(9) *Why is the transmitter of this set not calibrated for use at all times?*

(10) *Why must the key be closed when tuning the transmitter?*

Information.

Although the receiver of the SCR–79–A is built in the same box as the transmitter and some of the parts are common to both, yet it is possible to connect up the set for receiving only when it is so desired. (See Fig. 75.) However, it is only for some special purpose that the receiver alone is connected up. The following directions explain how to connect up the receiver after the transmitter has been connected. Connections of the complete set are a combination

of the operations involved in connecting up the receiver and the transmitter, and will be given later.

Directions.

3. To connect up the set as a receiver: After having made all of the connections given under the directions for connecting up the set as a transmitter the following additional connections will be needed in order to place the receiver in operation:

a. Open up the top hinged portion of the panel and insert three VT–1 tubes in the three right-hand sockets. Place two BA–2 batteries in the compartment, which is on the right side of the opening, and connect the leads from the batteries to the Fahnstock clips on the side of the compartment, making sure that the connections are correct in polarity. The two BA–2 batteries are thus connected in series in the receiver circuit. Close the panel.

b. Plug in one or two head sets, type P–11, into the jacks provided on the face of the panel. (If the cords of available head sets are not provided with plugs, the cord tips may be connected to the two binding posts marked "Aux. Tel.")

c. Put on one of the head sets and adjust it to fit the head comfortably. (The stirrups holding each receiver should slant " in " and not " out." If they slant " out," remove the receiver from its stirrup and turn the stirrup halfway around and replace the receiver.)

d. If the receiver only of the set is to be used, omit the items given under directions *c*, *e*, *f*, *j*, and *l*, describing the connections of the set as a transmitter.

Questions.

(11) *Why are the items given under Direction d, above, omitted where the set is to be used as a receiver only?*

(12) *For what reason are the two binding posts on the edge of the panel marked + and — 45 volts?*

(13) *Must the VT–2 tubes be placed in their sockets when the set is used as a receiver only?*

Directions.

4. *To connect up the set both as a transmitter and as a receiver—*

a. Place three BB–14 batteries on the ground in the form of a triangle near the foot of the mast holding the point of the " V " antenna. Connect the three batteries in series; and to the negative terminal of the 12-volt battery thus formed, connect the longer black lead of the cord, type CD–48. Do not connect the red lead.

b. Place the carrying chest of the set on top of the three storage batteries so that it is firmly supported and open up the top and the front of the chest. (One of the storage batteries should be partly under the operating shelf formed by the front cover of the chest when open.)

c. Open up the top hinged portion of the panel by pulling on the knob in its center and insert two VT–2 tubes in the two left-hand sockets. Insert three VT–1 tubes in the three right-hand sockets. Place two BA–2 batteries in the compartment which is on the right side of the opening and connect the leads of the batteries to the Fahnstock clips on the side of the compartment, making sure that the connections are correct in polarity.

d. Place the "Trans.-Rec." switch on the "Off" position.

e. Connect the high voltage dynamotor leads (with the correct polarity) to the binding posts marked + and — 350.

f. Connect the low voltage dynamotor leads to the two binding posts marked "+ Dyn." and "— Dyn." with the correct polarity.

g. Connect the antenna lead-in wire to the post marked "Ant."

h. Connect the wire from the counterpoise or other ground system used to the post marked "Gnd."

i. Connect the short red lead of the cord, type CD–48, to the binding post marked "+ 12 volts" and the short black lead of the same cord to the post marked "— 12 volts."

j. Plug in one or two head sets, type P–11, into the jacks provided on the face of the panel. (If the cords of available head sets are not provided with plugs, the cord tips may be connected to the two binding posts marked "Aux. Tel.")

k. Put on one of the head sets and adjust it to fit the head comfortably.

l. Check all connections to see that they are correct.

m. See that the double-pole single-throw switch on the dynamotor is closed.

n. Connect the long red lead of the cord, type CD–48, to the positive terminal of the 12-volt battery. The set is now completely connected and ready to operate both as a transmitter and as a receiver.

Information.

In tuning the receiver to pick up desired signals several different cases will occur. They are as follows:

a. Tuning in a C. W. signal of known wave length.

b. Tuning in a damped wave signal of known wave length.

c. Tuning in a C. W. signal of unknown wave length.

d. Tuning in a damped wave signal of unknown wave length.

Each of the above cases will be taken up separately and the necessary operations given under each case.

In the following tuning operations it will be noted that nothing is said about either the "Coupling Control" or the "Amplification" switch. The coupling control should be set on "Max." in all cases and only placed on "Min." after the desired signal has been tuned in and it is necessary to get rid of interference. When the coupling is changed from "Max." to "Min." it will require some little readjustment of the primary and secondary condensers. The "Amplification" switch should normally be left on "Max." and only turned toward "Min." when signals come in with so much volume that wearing the head set or reading the signals is uncomfortable.

Directions.

5. To tune the receiver of the set to a C. W. signal of known wave length proceed as follows. After the receiving side has been connected up as directed above:

a. Throw the "Trans.-Rec." switch to the "Rec." side.

b. Place the "Spk.-Het." switch on "Het."

c. Set the "LW-SW" switch and the secondary condenser to the desired wave length as given by the calibration of the set.

d. Vary the primary condenser until a distinct double click is heard and set the primary condenser about 5° to either side of the point where this double click is heard.

e. The receiving side of the set should now be in tune on the desired wave length, but due to inaccuracies which may occur the setting may not be exact enough to pick up the signal sought. It is therefore advisable to swing the secondary condenser slowly over an arc of about 10° (the middle point of which is the setting given by the set's calibration) until the sought for signal is heard.

f. A small further adjustment of the primary condenser may now be made in order to increase the loudness of the signal.

6. To tune the receiver to a damped wave signal of known wave length proceed as follows:

a. Same as *a* above.

b. Same as *b* above.

c. Same as *c* above.

d. Same as *d* above.

e. Place the "Spk.-Het." switch on "Spk."

f. Same as *e* above.

g. Same as *f* above.

7. To tune the receiver to a C. W. signal of unknown wave length proceed as follows:

a. Same as *a* under Direction 5.

b. Same as *b* under Direction 5.

c. Set the "LW–SW" switch on "SW." Set the secondary condenser on about 5° and vary the primary condenser until the double click indicating resonance is heard.

NOTE.—For every position of the secondary condenser there should be a corresponding position of the primary condenser at which the primary or antenna circuit is in tune with the secondary circuit. In searching for a signal of unknown wave length the method should be to vary both condensers at the same time, attempting always to keep the primary condenser close to that point where its circuit is in tune with the secondary.

d. Starting with the secondary condenser at about 5° and the primary condenser at the point where it is in tune, slowly turn both condensers as outlined above over their entire scale. Repeat this several times until you are sure that the signal is not obtainable. (The primary condenser should increase as the secondary is increased.)

e. Set the "LW–SW" switch on "LW" and repeat *d.*

f. When the desired signal is found under either *d* or *e*, adjust very carefully the primary and secondary condensers for a loud, clear signal of a readable pitch.

8. To tune the receiver to a damped wave signal of unknown wave length proceed as follows:

a. Follow exactly the procedure outlined under Direction 3 until the desired signal is found. When found the natural tone of the damped wave will be badly distorted.

b. Throw the "Spk.-Het." switch to "Spk." and if necessary retune slightly both the primary and secondary condensers. The damped wave signal should not be heard with its natural tone but much weaker than when heard under *a.*

NOTE.—Damped waves may be received with the "Spk.-Het." switch on "Het.", if change in tone is not objectionable. The receiver will be far more sensitive than with the switch on "Spk."

Questions.

(14) *Why is it necessary to use different methods in tuning "known" and "unknown" wave lengths?*

(15) *If your receiver is not calibrated, what method would you use to tune in a C. W. signal of known wave length?*

(16) *After setting the secondary circuit of a receiver to any given wave length, why is it necessary to vary the primary circuit until a double click is heard in the head set?*

(17) *In tuning in a signal of unknown wave length, why is it necessary to vary both primary and secondary controls at the same time?*

(18) *In tuning in a damped wave signal, why is the "Spk.-Het." first turned to the "Het." position?*

EXPERIMENT No. 2.

CALIBRATION OF RECEIVER.

Directions.

9. Connect up the SCR–79–A set for receiving only as outlined under Direction 3 *d*, of this Unit Operation. Throw the "Trans.-Rec." switch to "Rec."

METHOD "A."

About 5 feet away from the set, couple the SCR–125–A wave meter to the ground lead by wrapping one or two turns of the lead around the wave meter. Set the wave meter on 500 meters and start the buzzer going with a smooth even note. Return to the set and place the coupling on maximum with the "Het–Spark" switch on "Het." Place the "SW–LW" switch on "SW" for wave lengths up to 800 meters and on "LW" for the wave lengths above 800 meters unless it is found impossible to tune in the primary circuit on the position stated. Vary the secondary condenser until the note of the wave meter is heard and then vary the primary condenser until a maximum signal strength is obtained. After adjusting the primary condenser it will be found that the secondary condenser will need a slight readjustment. In a table similar to the one shown below fill in the settings of the primary and secondary condenser and the "LW–SW" switch which have been found to give the greatest signal strength with the wave meter.

Wave length.	Primary condenser setting.	Secondary condenser setting.	Setting of "SW-LW" switch.
500			
550			
600			
650			
700			
750			
800			
850			
900			
950			
1000			
1050			
1100			

Adjust to 500 meters. Repeat the above operations with the wave meter adjusted successively to wave lengths 50 meters apart until the entire wave length range of the set has been covered.

METHOD "B."

Set the SCR–125–A wave meter on 500 meters and start the buzzer going. With the various switches set as given in "Method A," hold the wave meter about 1 foot in front of the panel of the set. Vary the secondary condenser until maximum signal strength is attained. Shut off the wave meter buzzer and without moving the secondary condenser vary the primary condenser until a sharp and definite double click is heard. This click indicates that the primary circuit is now in tune with the secondary. Prepare a table similar to the one prepared under "Method A." Repeat the above operations for successive settings of the wave meter, 50 meters apart, and record in the table. Proceed until the entire wave-length range of the set has been covered.

Information.

In "Method A" both the primary and secondary circuits are tuned by reference to the wave meter, while in "Method B" the secondary circuit only is tuned to the wave meter, and the primary circuit is then tuned to the secondary. The normal way of tuning or calibrating the receiving side of the set should be by "Method B." However, if it is found impossible to obtain the definite click indicating that the primary circuit is in tune then "Method A" should be used. If, in "Method B," trouble is experienced in finding the point of maximum strength, due to interference from other radio sets, the antenna may be disconnected while the secondary circuit is being calibrated, but it must be connected again for calibration of the primary circuit.

Questions.

(19) *Can the primary circuit be set to a given wave length by holding the wave meter in front of the panel of the set?*

(20) *Why is the receiver calibrated with the coupling control on maximum?*

(21) *Why is the receiver calibrated with the "Spk.–Het." switch placed on the "Het." position?*

(22) *Why is the wave meter coupled to the ground lead when calibrating a set by "Method A"?*

(23) *Which, "MethodA" or "Method B," gives the more accurate setting of the primary condenser?*

EXPERIMENT No. 3.

TO TUNE THREE OR MORE SETS TO THE SAME WAVE LENGTH.

Information.

A number of SCR–79–A sets are operating in a net. They are all operating on the same wave length. In other words, all the sets are adjusted to transmit and to receive on exactly the same wave length. Any set in the net may start transmitting. All of the remaining sets in the net will receive the transmitted signals without readjustments of the secondary condenser control.

A number of SCR–79–A sets are being operated in a net on slightly different wave lengths. In other words all of the transmitters are not adjusted to exactly the same wave length. As a result, every time a different set starts transmitting, it is necessary for the remaining sets to readjust the secondary condenser control when receiving the transmission.

Questions.

(24) *Which of the two conditions, as outlined above, is the better for rapid and accurate exchange of messages in a net?*

(25) *If an operator is listening in under the second condition (as outlined above) during a silent period, what does he have to do constantly in order to receive any communications which may be transmitted?*

Information.

In tuning the SCR–79–A receiver it was noticed that the slightest movement of the secondary condenser caused the beat note to disappear. From this fact an idea may be obtained as to the amount of accuracy necessary when tuning to the same wave length all SCR–79–A transmitters in a net. There is sometimes a variation of as much as 25 or 30 meters between the readings of different SCR–125–A wave meters when they are used to measure the same wave length. For this reason it is not possible to tune all the transmitters in a net to exactly the same wave length by using a different wave meter for

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each set. In the following experiment a method will be used by which it is possible to adjust all sets in a net to exactly the same wave length.

Directions.

10. Set up and place in operation three or more SCR–79–A sets at a distance of at least 300 yards between each set.

11. One set is designated as the NCS (net control station) of the net and all stations are advised regarding the wave length to be used. Call signs are assigned to each station.

12. The NCS uses his SCR–125–A wave meter and tunes his transmitter to the designated net wave length (explained under "Tuning the transmitter" in Experiment No. 1). The NCS station then transmits as follows: $\overline{\text{VE}}$ ZVL ZVL V NCS NCS II ZVL ZVL ZVL (transmit signal ZVL for one minute) II $\overline{\text{AR}}$.

13. Each of the other or "secondary" stations must tune in the above transmission on the NCS in such a way that the best possible signal will be received.

14. The operator at each secondary station, without disturbing the adjustments of his receiver in any way, now tunes his transmitter to the designated net wave length in the usual way, that is by the use of a wave meter. The "Trans.-Rec." switch is then thrown to "Rec." and the buzzer on one SCR–125–A wave meter started. The wave meter is held in front of the panel and its dial slowly turned until the maximum sound is heard in the head set. Without changing the adjustment or position of the wave meter, throw the "Trans.-Rec." switch to the "Trans." position. Since the transmitter is already on about the correct wave length, it will only require a slight readjustment to make it exact. The "Wave Length Adjustment" condenser is therefore turned until the wave meter lamp glows most brightly and is then locked in this position. The adjustment of the transmitter and receiver should now be exactly on the wave length on which the NCS station is transmitting. Since all of the secondary stations are adjusted to the wave length of the NCS station, they should all be on the same wave length.

15. The NCS station will call each secondary station in turn, and when the secondary station replies, will note the position of the secondary condenser on which the reply is received. All secondary stations other than the transmitting station will also note the position of their secondary condenser dials where the transmission is received.

16. If all stations are received on the same setting of the secondary condenser by the NCS station, the experiment will be considered complete; if not, it will be repeated until they are so received.

Questions.

(26) *Why is it important that when a net is working on one wave length all of the stations in the net transmit on exactly the same wave length?*

(27) *Are the calibrations on the SCR-95 wave meters at secondary stations used in making the final accurate setting of their transmitting wave length?*

(28) *Did your wave meter check with the calibrations of the wave meter used by the NCS?*

(29) *Were you able to hear all of the stations in the net without moving the secondary condenser?*

(30) *How much was it necessary to move the "Wave Length Adjustment" condenser from the position on which it was set with the wave meter when it was changed to the wave length of the NCS?*