waves is sent out into the "ether," from the transmitting station it spreads out in every direction, similarly as does a water wave. When above the surface of the earth, they cause it to move, electrically, just as a water wave causes any object to move which floats on the surface of the water.

The tuning of the receiving aerial is for the simple purpose of adjusting it so that it can vibrate electrically as much as is possible under the force wave.

Pains Should Be Taken,

the tickler too far, because when this

is done the vacuum tube oscillates, or

frequency current and this current

goes out on the aerial and causes

waves just like a sending station's, only not as powerful, and other re-ceiving stations within a distance of one or two miles can hear it and will

"Whenever you hear on your set some whistling sounds which come and go, varying in pitch, you may know that some receiving stations near you are radiating in this way because their ticklers are turned up to the This is an excellent opnor-

too far. This is an excellent oppor-tunity for practicing the gelden rule-romember that whenever your tick-ler is increased too far you are caus-ing to other stations the same inter-

forence which they cause you. Every man on his own tickler guard.

Receiver In Simple. "The single-current receiver, with

its few controls, is quite simple to

operate, and a little experience en-

ables one to get results easily. This

not as selective as the two-circuit

typs, that is, it is more likely to let brough undesired signals with the

cult receiver are the aerial circuitcalled primary—tuning, the secondary
circuit tuning, the coupling between
these two, the lickler, and the tube
filament rheostat. In short, there are
five controls to adjust. The most important and most critical one of these
is the secondary tuning. To pick up
signals, set the coupling at or near
maximum, the dettector filament
relliance properly, the primary tun-

maximum, the dettector manners to brilliancy properly, the primary tun-

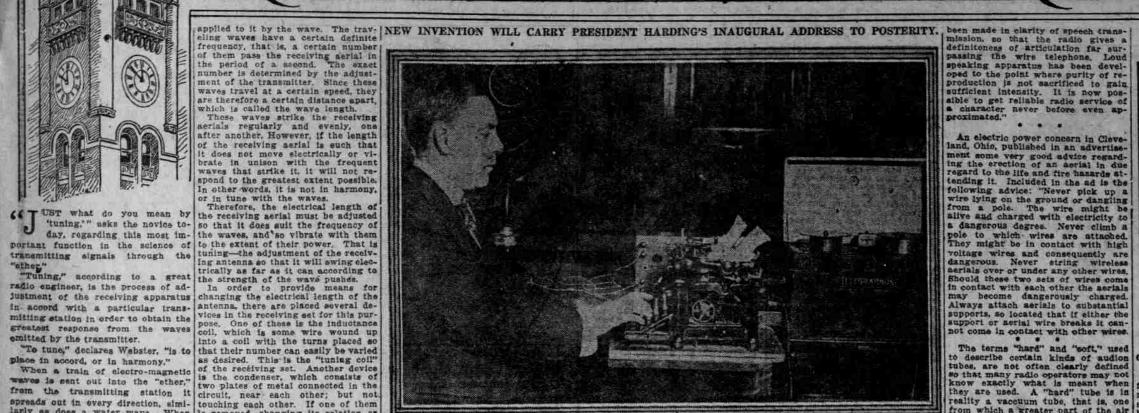
of receiver is sensitive, but is

scomes a small generator of high

in accord with a particular transmitting station in order to obtain the
greatest response from the waves
emitted by the transmitter.

"To tune," declares Webster, "is to
place in accord, or in harmony."

When a train of electro-magnetic
waves is sent out into the "ether,"
from the transmitting station it



Ten miles of steel wire wound on a spool will carry President Harding's inaugural address to posterity.

By means of a telegraphone the speech was recorded as other future speeches and programmes will be, and running these wires through a reproducing machine the full speech may be heard by people not yet born in is age. This device is so accurate that the sound of the human breath or a heart beat can be accurately produced.

OPERATION OF REGENERATIVE
RADIO RECEIVERS DESCRIBED

Engineer of General Electric Company Tells in Simple Language How
to Operate and Adjust Several Types of Apparatus.

N words of one syllable, the operation and adjustment of several ler may be increased to best position, but not so far as to oscillate the described in an article written by
T. Van Dyke, radio engineer of the wave.

A described in an article written by
T. Van Dyke, radio engineer of the wave.

A described in the transmitted wave.

The transmitted through increases in radiophone broadcasting work, radio engineers are seaking some solution of the difficulty. In the "reflected wave" there seems to be an answer to the problem which they have set out to solve.

Radio waves can be reflected, deficiently, in the "reflected and polarized, the same as light waves. Scientists now believe it is possible to reflect these waves as the beam of a searchlight is reflected, and direct the waves to ward one point to the exclusion of all other points. This would make for secrecy, lower power cost and freedom from interference.

Radio in its relation to newspapers in radiophone broadcasting work, radio engineers in radiophone through through increases in radiophone broadcasting work, radio engineers as eaking some solution of the difficulty. In the "reflected wave" there seems to be an answer to the problem which they have set out to solve.

Radio waves as the beam of a searchlight is reflected, and direct the waves as the beam of a searchlight is reflected, and direct the waves as the beam of a searchlight is reflected, and direct the waves as the beam of a searchlight is reflected, and direct the waves as the beam of a searchlight is reflected, and direct the waves as the beam of a searchlight is reflected, and direct the waves as the beam of a searchlight is reflected, and direct the waves as the beam of a searchlight is reflected, and direct the waves as the beam of a searchlight is reflected, and direct the waves as the beam of a searchlight is reflected, and

the hissing.

"The next step is to vary the wave-length control over its range very slowly, listening carefully for the desired signals. When they are heard adjust the wave-length control to best results and then increase the regenerative of tickler control until signals are best, possibly slightly readjusting the wave-length control, which may be affected by the change of the tickler is increased too far, for the tickler is increased too far, speech and music sounding mushy instead of being clear.

Page 18 bould Be Taken.

The next step is to vary the wave-length control water for each other when operations at the for each other when operations is and wait for each other when operations and the filament control of the same wave length.

It is also the cause of Secretary day in the pipe, and the ofilarly the pipe, and the operation is she had an input of close on totars.

This insures a good contact with the pipe, and the operation is the pipe, and the operation is the pipe, and the operation of the pipe, and the operation is she way in the pipe, and the operation is the pip

RADIO RECEIVERS ARE EASY

THE completion of a radio net covering the country, which the army signal corps has nearly finished, is regarded as a great safeguard to business, for the radio telephone and telegraph system of the army could take over all commercial messages.

take over all commercial messages, in case of a breakdown of the wire communications. The value of the radio net as a military measure is obvious, for it links each of the nine corps areas of the country to the other and nearly all directly to the war department at Washington.

The signal corps radio net normally handles only war department business, and its use instead of telegraph by wire has already saved the department \$3300 in two menths. The gaving for the year is expected to exceed \$18,000, which would have otherwise been spent for telegrams at commercial rates.

AG-1, the Presidio station, is in touch with Fort Douglas, at Salt Lake City, and will soon establish contact with Fort D. A. Russell, at Cheyenne, Wyo. Through these stations the Presidio will be in communication with the signal corps set at Chicago and Fort Bentario.

tion with the signal corps set at Chi-cago and Fort Benjamin Harrison, Ind., which in turn are already in direct comunication with Washing-

Ind. which in turn are already in direct comunication with Washington.

Not the least interesting outgrowth of radio telegraphy is the application of its principles to communication along wires. It has been found entirely feasible to associate a radio transmitter with a wire system running from one point to another (even though the wires be used for power transmission) and to sand along the wire a series of radio-frequency current waves which may be detected at the distant and by means of a simple radio receiver. Such "wired wireless" as the arrangement is called. Best as the arrangement is called. Best as the arrangement of this system that fails claimed for this system that the fails of the system that fails claimed for this system that the fails of the system that the sys

An electric power concern in Cleveland, Ohio, published in an advertisement some very good advice regarding the erection of an aerial in due
regard to the life and fire hazards attending it. Included in the ad is the
following advice: "Never pick up a
wire lying on the ground or dangling
from a pole. The wire might be
alive and charged with electricity to
a dangerous degree. Never climb a
pole to which wires are attached.
They might be in contact with high
voltage wires and consequently are
dangerous. Never string wireless
aerials over or under any other wires.
Should these two sets of wires come
in contact with each other the aerials
may become dangerously charged.
Always attach aerials to substantial
supports, so located that if either the
support or aerial wire breaks it cannot come in contact with other wires.

The terms "hard" and "soft." used
to describe certain kinds of audion
tubes, are not often clearly defined
so that many radio operators may not
knew exactly what is meant when
they are used. A "hard" tube is in
reality a vaccuum tube, that is, one
from which a greater part of the air
has been exhausted and the air within it greatly rarefied. These are
known to the trade as amplifying
tubes and require at least 45 volts in
the B circuit for their best operation.
"Soft" tubes are not exactly vaccuum tubes, but contain some gas and
operate on a B circuit of 18 to 24
volts. They are in trade terms known
as detector tubes, because they are
more receptive to the faint radio signals.

DPERATION OF REGENERATIVE
RADIO RECEIVERS DESCRIBED

Displace and Adjournment of the Operation and

rernaps the simplest way of avoiding this difficulty is to hang the antenna at right angles to the offending wires. For instance, if the trouble cables pass down the street on which you are living, run your aerial from front to back at right angles to the cables. This will reduce much of the trouble.

It will be found that, as a general thing, interference in radio circuits Is caused by power wires only when they run parallel to the aerial.

Motor Fuel Made From Weeds.

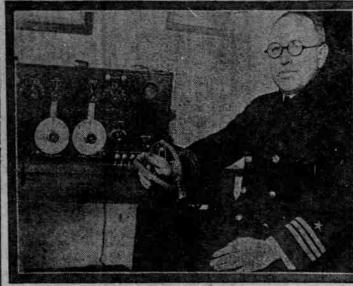
Scientific American. Professor Mailhe Toulouse helleves that thousands of common weeds can be made to yield petrol containing large percentages of benzine and toluene. His process also produces a gas said to have developed 20,000 heat calories, which alone would pay for the necessary plant installation.

MANY VALUABLE EXPERIMENTS

Signals Are Picked Up From Great Distances Now and Then When Operators Strike Some New Idea of Connecting Up Different Units.

PERFORMED BY SHIP RADIOS

PIONEER RADIO EXPERT IS HEAD OF THE RADIO DIVISION OF THE UNITED STATES NAVY.



COMMANDER STANFORD C. HOOPER, HEAD OF RADIO DIVISION OF THE NAVY, IN HIS OWN OFFICE IN THE NAVY DEPARTMENT. One of the pioneer radio experts in the United States is Commander Stan-ford C. Hooper, head of the radio division of the navy department. Com-mander Hooper is a real authority on radio communication and has done a great deal in the development of both radio telegraphy and telephony in his department.

RADIO QUESTIONS AND ANSWERS

Editor Radio News: Will you please explain fully how to operate a set consisting of three honeycomb colls used as primary, secondary and tickler, two variable condensers, and a vacuum tube detector? Would a set of this kind receive music

The operation of a honeycomb coll The operation of a honeycomb coil regenerative receiver was fully described in last Sunday's radio sectime I receive no static at all, but at right it interrupts the broadcasting. If I ran the aerial the other way would that help any? If so, very much?

8. Is induction static?

4. Do crystals wear out? If so, what by? Does handling a crystal weaken it? How long will one last?

S. B. H., Portland, Or.

1. Both length and height are

receiver. The telephone receivers are connected in the plate circuit of the second-stage amplifier tube.

3. If the two-stage amplifier is added to the regenerative receiver, the loud speaker can be used.

Editor Radio News: Please answer the following questions:

1. Would a single receiver head fone of 1000-ohm resistance be all right for the inmall crystal set described in your page?

2. Is a Galena crystal better than sillon of or this set?

1. The single phone will do, although two receivers are better to keep outside noises from interfering with the reception.

2. Galena is the most sensitive crystal set the most sensitive crystal for practical radiophone receivers are better to keep outside noises from interfering with the reception.

Editor Radio News: Please answer the following in the next Bunday's radio news:

1. I have a two-silde tuning coll, a Galena desector, a fixed condenser, a pair of 2000-ohm fones, and a one-wire serial 73 feet long and 48 feet high. How far can I hear with this set? I am eight miles from the car line. Would I be apt to get any interference from it?

8. How far would I be able to hear with a tree-bulb set, a pair of 2000-ohm fones and a two-wire aerial 79 feet long and 69 feet long and 60 fee

1. With a crystal set the receiving range is limited to short distances possibly up to 25 miles.

possibly up to 25 miles.

2. Run the aerial wires in a diagonal direction so that they are not parallel to any of the nearby telephone wires. If the aerial is not running parallel to the carline wire, you won't be bothered with any induction interference from it.

3. With a vacuum detector and two-step amplifier and favorable conditions you will be able to receive up to 1000 miles.

1. A drain pipe, unless it is metal, is a very poor ground. Use a cold

is a very poor ground. Use a cold water pipe or run a gas pipe down deep into a well. With a crystal set batteries cannot be used, but when using the vacuum tubes, a six-volt storage battery is necessary, besides a B battery of voltages from 22 to 100.

Editor Radio News: Would tickler coll wound on a ground rotor ball 3% inches in diameter, permitting thekler to come closer in the primary, set better results on the short-wave regenative set described in The Oregonian than the use of the 2-inch tube as described in the article?

2. I cannot mount a short-wave regenerative set in the cabinet on account the grid will not work when within 8 inches of any object. How can this be overcome?

3. Would a variometer made as described in Sunday Orgeonian several weeks ago be of any benefit in the short-wave regenerative set. If so, where should it be connected?

D. R. L. McMmnville, Or.

D. B. L., McMinnville, Or. 1. The use of the rotor ball will be better than the tube. Use No. 22 and wind as much as you can on the

ball.

2. If you keep the wires of the dif-ferent units of the set as far gway from each other and avoid running them parallel to each other, the ef-fect you mention will not be notice-

through undesired signals with the dealred ones, thereby interfering with the desired signals. On the other hand, the two-circuit receiver, espe-cially if provided with regeneration, is much more difficult to adjust.

"The major controls on a two-cir-cuit receiver are the aerial directit issumment. the detrector distinguishment the detrector distinguishment that detrector distinguishment the detrector distinguishment that destroy of the permits properly, the primary tuning considerable economy in operation. It is claimed for this system that fairly clear telephone community of the permits of the permits

geney.



