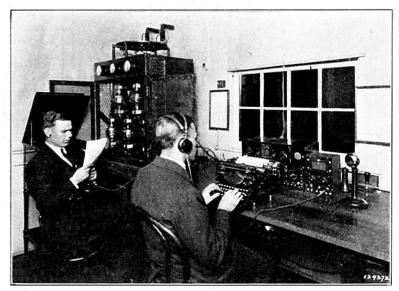
The WJZ Radiophone Broadcasting Station at Newark, N. J.



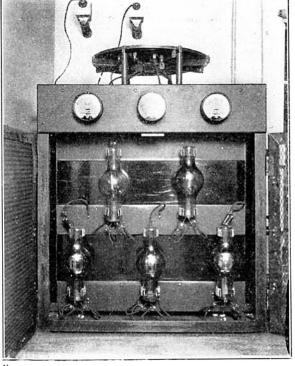
The photograph on the
left shows
the sending
set installed
in a special
room of the
Westinghouse building. The receiving set on
the table is
used to receive the news
which is immediately
broadcasted
by phone;
also, the Arlington time
signals.
Below is a
view of the
transmitting
set entirely
enclosed in a
grounded
cage.

OR the past few months radio experimenters within a few hundred miles of New York have been receiving nightly concerts, news reports, radio lectures and other special features from "WJZ," the radio telephone plant of the Westinghouse Electric & Manufacturing Co. at Newark, New Jersey. In fact, the radio waves from this new station have traveled to far greater distances, and letters expressing appreciation of the programs have been received from points as far away as Florida, Canada, Wisconsin, and six hundred miles out to sea. Never before has a radio telephone station sent out broadcast, on a regular schedule day after day, so complete and satisfactory a musical and bulletin service; as a result of this, literally thousands of new receivers are being put into operation every week, and a tremendous interest in radio telephony has been aroused.

The Newark station is located upon the roof of the Westinghouse factory building at Plane and Orange streets, near the Lackawanna Railroad station in Newark. The antenna and counterpoise are supported between a steel stack which extends 114 feet above the roof level and a special

60-foot mast mounted on top of the building about 150 feet from the stack. The aerial consists of four wires equally spaced on 20-foot spreaders; the counterpoise is identical, but instead of swinging from the tops of the stack and the mast is mounted about 20 feet above the roof. Thus the effective separation of the two sections forming the radiating system is about 94 feet at one end and 40 feet at the other, giving a net effective height of about 65 feet. Six-wire cage downleads run from both parts of the aerial to the radio station, which is in a special building on the roof, and are connected through double-throw grounding switches. The natural wave-length of the antenna-counterpoise structure is not far from 500 meters, so that for transmission on 360 meters (the normal operating wavelength for broadcasting) series condensers of 0.0005 microfarad are inserted in each connection. These are clearly shown directly below the lead-in insulators in the illustration of the interior of the sta-

The radio telephone transmitter is shown



This is the studio where the artists sing and play. It is installed on the first floor of the building and a remote control system, which may be seen on the wall, enables the operator to control the set from this room.

at the left of this same photograph. Two 250-watt three-electrode vacuum tubes are used as oscillators, and three somewhat similar but specially designed high-impedance tubes modulate the radio frequency currents generated by the other pair. The antenna, counterpoise, grid and plate leads are all connected in the splitcoil oscillation circuit to the flat spiral inductance illustrated on top of the radio set. This coil has 21 turns of $\frac{1}{32}$ " x $\frac{1}{2}$ " flat copper strip mounted on micarta spokes, and is grounded at the minimum potential point nearly midway between antenna and counterpoise.

The oscillator and modulator tubes run on 2,000 volts direct current, which is produced by a single-commutator generator driven by a direct-connected 2-phase 60-cycle 5-h.p. motor. Special filter circuits are provided to suppress the commutator hum of this machine, with the result that outgoing speech and music is heard with very little extraneous noise from the dynamo. The filaments of the five large tubes are lighted by alternating current at 10 volts, this being drawn

from a divided-circuit transformer of small capacity; in this circuit again it has been found necessary to provide a grounded filter arrangement to eliminate the foreign noise of the 60 cycle alternating current used.

The three modulator tubes are connected on the plate-modulation plan, and are supplied with voice-frequency current from a speech amplifier containing two 50-watt three-element vacuum tubes. An ingenious arrangement compensates for the inherent distortion which is so often found when vacuum tube transmitters are operated at full power for radio telephony, and the clarity of the speech and music sent out from WJZ is limited only by the characteristics of the standard long-distance wire line microphones used to pick up the sound waves and transfer them in electrical form to the speech amplifier.

Since the antenna is normally operated at a wave-length (360 meters) on which it shows comparatively high radiation resistance, the usual antenna current is only 5.5 amperes. At a total antenna resistance of 16 ohms this represents an aerialcircuit power of nearly 500 watts, a large percentage of which is actually radiated.

(Continued on page 552



SAVE MONEY_ ON YOUR "B" BATTERIES

FROM MANUFACTURER TO USER ALL BATTERIES SENT POSTPAID

Buy direct from the manufacturer and receive a Fresh Battery



All Wizard Batteries are absolutely guaranteed

(Weight 2½ lbs.)

These new types are not made of the same size cells as a small size "B Battery. The volume of one of the cells in these types it at cut inches as compared with 2.5 cu. inches, the volume of a cell used in small "B's". Inches, the volume of a cell used in small "B's". Inches, the volume of a cell used in small "B's".

OTHER WIZARD TYPES

Cat. No. Size Tare "Volt".

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WIZARD BATTERY CO. d St. Brooklyn, N. Y. Dept. R 1315 42nd St.

pedo, and left on this point a sufficient time to allow the time device to close the local circuit, as explained previously; after this it is pushed on the next dead point.

As may be understood, the blade H in the selector moves always in the same direction, as well as the handle of the controller, making it possible to have both controls in synchronism at any time. In Fig. 2, the connected points of the controller, intermediated between the dead points and bearing no indication of control, correspond to the unused point in the switch of the selector. this being only for the sake of clearness in the diagrams.

The WJZ Radiophone Broadcasting Station at Newark.N.J.

(Continued from page 482)

On 600 meters wave-length the antenna resistance drops to a point which permits an aerial current of 12 amperes. The output power is quite fully modulated.

Not the least interesting feature of the station lies in the completeness with which its details have been worked out. The com-



The Midget "FIVE-IN-ONE" Slide Rule is a combination Mannheim, Log-Log, Add and Subtract, Polyphase and Binary Slide Rule. It will instantly add, subtract, multiply and divide any combination involving whole numbers, fractions, decimals and mixed numbers of every quantity. The graduations are printed on metal coated with white celluloid and are grease and waterproof. While it is the most versatile calculator versition. It is the most versatile calculator are grease and waterproof. While the stood. Diameter 4" Instruction Book, \$1.50. Leather-ottle carrying case 50c extra. Catalog free.

Tour money back if you are not satisfied. Glisen Slide Rule Co., Niles, Mich. The Midget "FIVE-IN-ONE" Silde Rule

plete radio transmitter is enclosed in metal screening and glass, and a blower is pro-vided to hold the tube temperature at the best operating value. A switchboard is mounted on the right-hand side of the transmitter so that the set may be connected to the station microphone for announcements, etc., to the shielded pick-up device used for phonograph reproductions, or to the studio which has been built on the first floor of the factory building for concert work. A com-pletely interlocked light-signal and switch system has been arranged for control of the set from the studio, where special micro-phones for transmission of vocal, piano-forte and other instrumental music are installed.

The radio station is also equipped with a standard Westinghouse medium wave re-ceiver, with a wave-length range of 150 to 2,300 meters wave-length. After the nightly musical program, which runs from 8:30 to 9:15 p. m., the 9:55-10:00 time signals from Arlington are received on this outfit, using a long single-wire antenna, and transferred electrically to the radio telephone transmit-Thus the time-signals themselves, with the characteristic spark tone of Arlington "NAA," are retransmitted on 360 wave-"NAA," are retransmitted on 360 wave-length for the benefit of listeners having short-wave receivers. Obviously there is no appreciable time lag in this retransmission, and consequently accurate Naval Observatory time is made available in the amateur wave-length range. At 10:03 each evening a weather forecast is sent out by radio tele-

The Westinghouse Company also maintains complete radio telephone broadcasting plants at its East Pittsburgh, Penna., and East Springfield, Mass., factories. These stations operate on schedules similar to that of Newark; other stations are being installed to serve other sections of the country, and one at Chicago has just been opened. The service is being extended in opened. The service is being extended in point of time and character, also, so that before long the owner of a small radio re-ceiver will be able to enjoy in his own home, anywhere in the United States, a complete program of concerts, news and weather dispatches, market reports, church services, and even selections direct from the stages of the theatres.

W. J. Z. WEEKLY BROADCASTING PROGRAM

Monday
10:00-10:15 Résumé of the news of the day, musical selections. Weather forecast for New 10:55-11:00

York and New Jersey. 11:00-11:15

Musical program.
Résumé of the news of the day, musical selections. 12:00-12:15

Résumé of the news of the day, musical selections.

Musical program. I:00- I:15

2:00-2:05 2:05- 2:10

Marine news. 2:10- 2:20

Musical program.
Résumé of the news of the day, musical selections. 3:00- 3:15

Weather forecast for New 3:55- 4:00 York and New Jersey.

4:00- 4:15 Musical program.

5:00- 5:15 Résumé of the news of the day, musical selections. 6:00-6:15 Résumé of the news of the

day, musical selections.

Miscellaneous program. 7:00- 7:45 7:45- 7:50 Broadcasting of suppliers of

artists.

receiving equipment.
Tuning for regular evening 7:55-8:03

program.

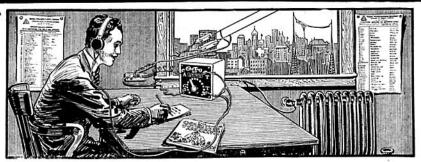
8:05-9:15 General news, résumé of football games, music and

9:55-10:00 Arlington time.

Weather forecast for New 10:03-10:06 York and New Jersey.

10:06-10:07 W. J. Z. Good night,

Tuesday
10:00-10:15 Résumé of the news of the day, musical selections.



"MARVEL" Complete Receiving Outfit An Ideal Christmas Present

The "MARVEL" is the best crystal Receiver at moderate price for telephone concerts, etc., amateur traffic, and long wave spark stations. New distance records established nightly. Write for details of prize contest.

The "MARVEL" RADIO RECEIVER, model 101, (Patents Applied For), is a Scientifically designed, Highly efficient single circuit tuner with a 15 contact, multipoint, rotary inductance switch, and a supersensitive, Tested, galena crystal detector. All parts are mounted on a panel of approved insulating material. A fixed bridging condenser of 0.0025 mfd. is connected across the telephone terminals. Cabinet is of handsomely finished mission oak.

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in-The ONLY crystal receiver on the market, with a wavelength range of 180 to 2600 meters.

2—A completely enclosed instrument; therefore not exposed to or affected by meisture, dust, etc.

3—An efficient, compact receiver, that will last as long as your station and costing less than the price of unmatched and unknown parts.

COMPLETE "MARVEL!" RADIO RECEIVING OUTFIT model 105 (as shown in picture above), consisting of a "MARVEL!" RADIO RECEIVER, model 101, 150 feet solid copper antenna wire, 5 porcelain insulators, 1000 ohm Murdock telephone, leather-covered head-band, telephone cord, antenna switch, ground clamp, code chart, abbreviation chart, booklet of 35 lessons in Wireless and full instructions for \$15.00 installation and operation

Model 110. Same outfit with 2000 ohm Murdock double head set

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headset, headband, telephone cord. Code Chart, Abbreviation Chart and Instructions, all attractively packed

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RADIO CITIZENS—We allow 5 percent discount on orders of \$10.00 or more and pay postage in 1st and 2nd zones. Write for prices.



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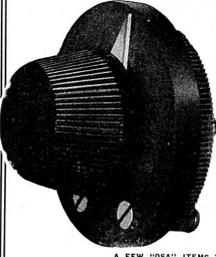
Dept. B

Peoria, Ill.

DEALERS-Write for our trade schedules. We represent some large manufacturers ex-clusively. Get our new lowest prices.

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QUALITY in the apparatus we sell, is an essential part of our dealings with you. Here is shown a panel mounting rheostat which, from the standpoint of quality, well deserves a place in our "QSA" line. Base of Thermoplax (2½ in. dia.), polished nickel-plated pointer and new Thermoplax knob. Resistor unit wound to 6 ohms and will safely carry 1½ amperes.

A high grade rheostat, very reasonably priced, at only\$1.00 ea.

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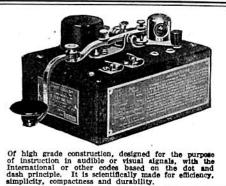
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READ the CLASSIFIED ADVERTISEMENTS on PAGES 572-574. YOU'LL FIND MANY GOOD THINGS THERE

10:55-11:00 Weather forecast for New York and New Jersey. Musical program.
Résumé of the news of the day, musical selections. 11:00-11:15 12:00-12:15 1:00- 1:15 Résumé of the news of the day, musical selections. Musical program. 2:00- 2:05 2:05- 2:10 Marine news. Musical program. Résumé of the news of the 2:10- 2:20 3:00- 3:15 day, musical selections. 3:55- 4:00 Weather forecast for New York and New Jersey. Musical program.
Résumé of the news of the day, musical selections.
Résumé of the news of the day, musical selections.
Man in the mean etermination. 4:00- 4:15 5:00- 5:15 6:00- 6:15 7:00- 7:30 7:30- 7:45 Man-in-the-moon story. Very soft music in harmony with man-in-moon story. 7:45- 7:50 Broadcasting of suppliers of receiving equipment. Tuning for regular evening 7:55-8:03 program. 8:05-9:15 General news résumé of football games, music and artists. Arlington time, Weather forecast for New 9:55-10:00 10:03-10:06 York and New Jersey. W. J. Z. Good night. Wednesday 10:06-10:07 10:00-10:15 Résumé of the news of the day, musical selections. 10:55-11:00 Weather forecast for New York and New Jersey. Musical program. Résumé of the news of the 11:00-11:15 12:00-12:15 day, musical selections. Résumé of the news of the 1:00- 1:15 day, musical selections. Musical program. 2:00- 2:05 2:05- 2:10 Marine news. Marine news.
Musical program.
Résumé of the news of the day, musical selections.
Weather forecast for New York and New Jersey. 2:10- 2:20 3:00- 3:15 3:55- 4:00 Musical program. Résumé of the news of the 4:00- 4:15 5:00- 5:15 day, musical selections. 6:00- 6:15 Résumé of the news of the day, musical selections. 7:00- 7:45 Miscellaneous program. 7:45- 7:50 Broadcasting of suppliers of receiving equipment. Tuning for regular evening 7:55-8:03 program. General news, résumé of foot-ball games, music and 8:05-9:15 artists. 9:55-10:00 Arlington time. 10:03-10-06 Weather forecast for New York and New Jersey. 10:06-10:07 W. J. Z. Good night. *Thursday*10:00-10:15 Résumé of the news of the day, musical selections. Weather forecast for New 10:55-11:00 York and New Jersey. 11:00-11:15 Musical program. Résumé of the news of the day, musical selections.
Résumé of the news of the day, musical selections. 12:00-12:15 1:00- 1:15 Musical program. 2:00- 2:05 2:05- 2:10 Marine news. Musical program.
Résumé of the news of the day, musical selections. 2:10- 2:20 3:00- 3:15 Weather forecast for New York and New Jersey. 3:55- 4:00 4:00- 4:15 Musical program.
5:00- 5:15 Résumé of the news of the day, musical selections.
6:00- 6:15 Résumé of the news of the

day, musical selections.

Broadcasting for benefit of

radio amateurs.

7:35- 7:45 Miscellaneous program.

7:00- 7:30

MEMORIZE CONTINENTAL CODE ALMOST INSTANTLY **BKUMA YRLSBUG**

Two Hundred Beginners in Forty-Four States Have Reported Mastered Code in 30 Minutes. In 45 Minutes. In One Hour, One Evening, Etc., Etc.

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Later.—Now have a licensed station all right, and would say again sincerely hope your Chart which made Continental Code so very plain and simple may be used by many and prove as helpful as in my case.

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actual user that same has proven efficient in use as well as in theory.

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Master the Code easily, quickly, permanently
Once thresome task—now pleasant pastime
Those Who Have Failed
after diligently trying all Methods heard ef
Do succeed with Dodge Short Cut
Radio Operators Do
gain better command of the Code and consequently do increase their speed.
Morse Operators Do
change to Radio quickly, easily—no mixup.
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tell the story: also give local addresses.
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the concrete and tangible expression of desire
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the road to Amateur Success—Perfect mastery of
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IN VESTIGATE

NO BEGINNER CAN AFFORD TO IGNORE

Quick and easy success of those who have used

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| 6 x 12 x 3/16 |
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KIMLEY ELECTRIC CO.

290 Winslow Ave.

Buffalo, N. Y.

| 7:45- 7:50 | Broadcasting of suppliers of |
|--------------------------|--|
| 5.55 Q.02 | receiving equipment. |
| 7:55- 8:03 | Tuning for regular evening program. |
| 8:05- 9:15 | General news, résumé of foot- ball games, music and artists. |
| 9:55-10:00 | Arlington time. |
| 10:03-10:06 | Weather forecast for New York and New Jersey. |
| 10:06-10:07 | W. J. Z. Good night. |
| | Friday |
| 10:00-10:15 | Résumé of the news of the day, musical selections. |
| 10:55-11:00 | Weather forecast for New York and New Jersey. |
| 11:00-11:15 | Musical program. |
| 12:00-12:15 | Resume of the news of the |
| 1:00- 1:15 | day, musical selections. Résumé of the news of the |
| 2:00- 2:05 | day, musical selections. |
| 2:00- 2:05 | Musical program. |
| 2:05- 2:10 | Marine news. |
| 2:10- 2:20 | Musical program. |
| 3:00- 3:15 | Résumé of the news of the day, musical selections. |
| 3:55- 4:00 | Weather forecast for New York and New Jersey. |
| 4:00 4:15 | Musical anogram |
| 4:00- 4:15 | Musical program. |
| 5:00- 5:15 | Résumé of the news of the |
| 6:00- 6:15 | day, musical selections. Résumé of the news of the |
| | day, musical selections. |
| 7:00- 7:30 | Man-in-the-moon story. |
| 7:30- 7:45 | Very soft music in harmony |
| | with man-in-moon story. |
| 7:45- 7:50 | Broadcasting of suppliers of receiving equipment. |
| 7:55- 8:03 | Tuning for regular evening program. |
| 8:05-9:15 | General news, résumé of foot- |
| | ball games, music and artists. |
| 9:55-10:00 | Arlington time. |
| 10:03-10:06 | Weather forecast for New |
| 10:06-10:07 | York and New Jersey. W. J. Z. Good night. |
| 10:00-10:15 | Saturday |
| 10:00-10:15 | day, musical selections. |
| 10:55-11:00 | Weather forecast for New York and New Jersey. |
| 11:00-11:15 | Musical program. |
| 2:00- 5:00 | Broadcasting of football game. |
| 2:00- 5:00 7:00- 7:45 | Miscellaneous program. |
| 7:45- 7:50 | Broadcasting of availage |
| , .43 / .30 | |
| 7:55- 8:03 | receiving equipment. Tuning for regular evening |
| 8:05- 0:15 | program. |
| 8:05- 9:15 | General news, résumé of foot- ball games, music and |
| | artists. |
| 9:55-10:00 | Arlington time. |
| 10:03-10:06 | Weather forecast for New |
| | York and New Jersey. |
| 10:06-10:07 | York and New Jersey. W. J. Z. Good night. |
| n | Sunday |
| 7:55-8:03 | Tuning for regular evening program. |
| 8:05-9:15 | General news, music and |
| | artists. |
| 9:55-10:00 | Arlington time. |
| | WESTHOR TOPOGOCT TOP NIE |

World's Record

10:03-10:06 Weather forecast for New

10:06-10:07 W. J. Z. Good night.

York and New Jersey.

(Continued from page 503)

there. Mr. Peterson, being a man of business, paid attention to his own affairs. However, a Negro purchasing radio material is apt to create something more than passing interest, and so it was that Mr. Peterson came to inquire of a clerk, one Arnold Fassett.

"I notice we have a new customer, a colored man. Did he give any special reason for buying so much wire? Judging from the amount he bought, I should think

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