

Pioneer NBC Stations Modernized

By RAYMOND GUY

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THOROUGHLY up to the minute new RCA 50-B broadcast transmitters replace the old sets so familiar to the audiences of WEAF and WJZ, the key stations of the NBC Red and Blue Networks. The old high power transmitter at WJZ was installed in 1925 and the old high power transmitter at WEAF was installed in 1927. Improvements in the art since that time have been so rapid that the newest and latest type of equipment was installed at both stations.

At each of these stations the old transmitters have been remodeled somewhat and are retained as spare transmitters. In addition to the advanced design of the new transmitters which includes 100% modu-



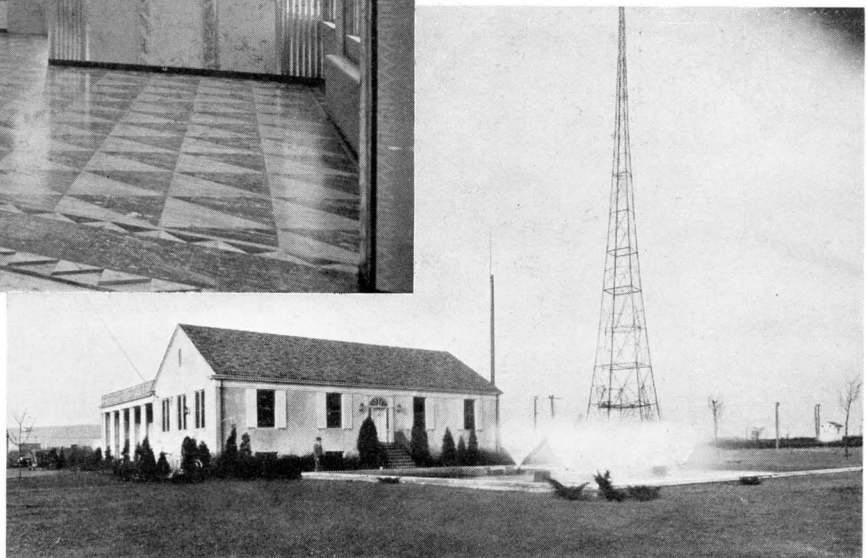
SOMETHING DIFFERENT IN INTERIOR DECORATIONS FOR BROADCAST STATIONS. THIS IS THE VISITOR'S ENTRANCE TO STATION WEAF. NOTE THE INTERESTING MURALS



and the three transmitters at WJZ (WJZ No. 1, WJZ No. 2, and W3XAL, W3XL) cooling ponds approximately 50 feet square and 4 feet deep have been provided at each station. The ponds are divided into two parts with duplicate spray heads and interconnecting valves so that either or both transmitters may operate through either or both of the sections. Automatic check valves isolate the two cooling systems from each other so that the systems are entirely automatic. Each cooling system consists of two water circuits, one distilled water system which includes the water jackets of the tubes, and the pond water system. Heat is transferred from the distilled water circuit to the pond water through a brass heat transfer unit so that the distilled water system is an independent closed circuit. Circulation of pond water is automatically controlled to keep the temperature of the distilled water within predetermined limits. The pond water is sprayed ten feet in the air when the valves are wide open. It is seldom necessary to operate in this manner, three feet being sufficient. Brass pipe and copper storage tanks are used throughout the distilled water system. The standard cooling towers are retained as auxiliary cooling systems to be used in the event that the heat transfer units are being

lation, precise crystal control, simplicity of design, improved suppression of spurious harmonics, and uniform frequency response, there has been a number of special features introduced by the Engineering Department of the National Broadcasting Company to meet the high performance standards and rigid operating schedules of NBC.

To provide for the heat dissipation of the two transmitters at WEAF



EXTERIOR VIEW OF STATION WJZ, AT BOUND BROOK, N. J. THERE ARE TWO TOWERS LIKE THE ONE SHOWN IN THIS VIEW, AND THE ANTENNA IS MAINTAINED AT CONSTANT TENSION BY A 4000 LB. CONCRETE COUNTERWEIGHT

cleaned or are otherwise out of service. The capacity of the cooling ponds is about 50,000 gallons. With this system either one or all transmitters may be operated at full power with very little change in water temperature regardless of the ambient temperature.

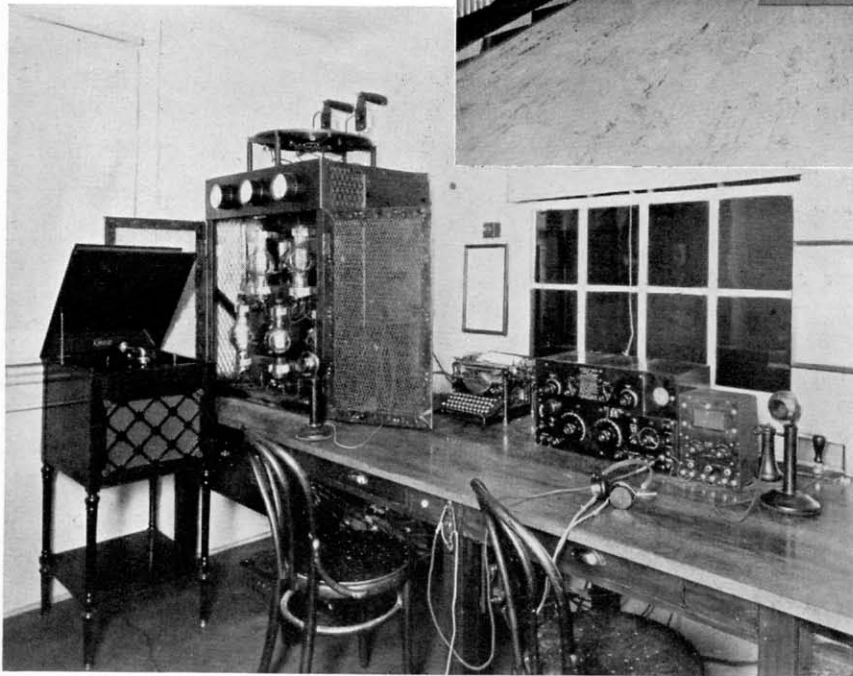
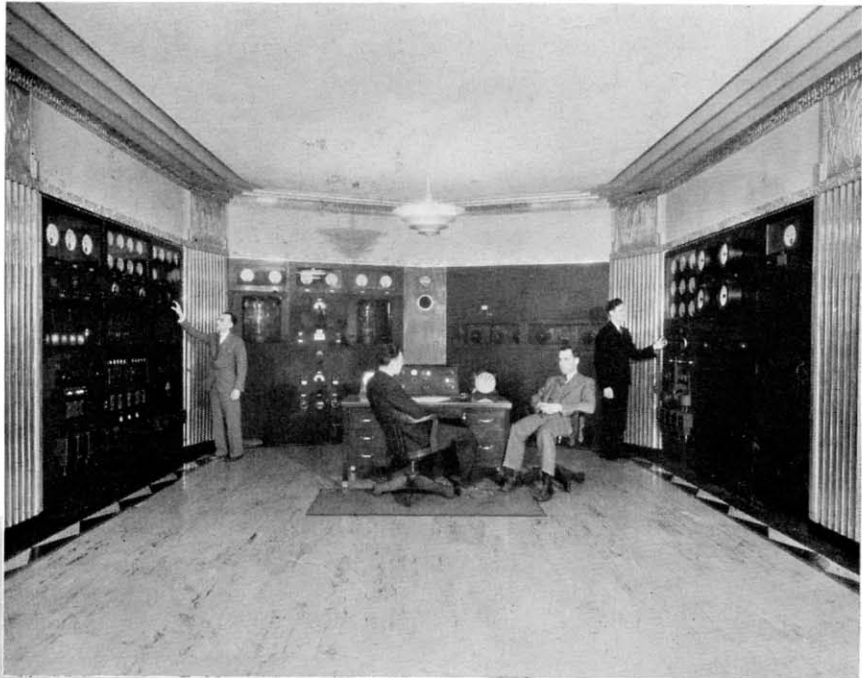
Standby Equipment Maintained

The old transmitters are retained as spare equipment and to facilitate a quick transfer from one to the other there have been provided motor operated switches which are controlled by push buttons located on the operators control box. These switches operate practically instantaneously and are electrically and mechanically interlocked so that either transmitter may be connected to either the regular or the dummy antenna, but so that both transmitters cannot be connected to one antenna or one transmitter be connected to both antennas. Signal lights indicate to each operator the condition of the

by the simplicity and fine appearance of these stations and have commented upon the departure from the ordinary mechanical appearance of most power

To guard against prolonged outages caused by power failures, duplicate power lines are provided over separate routes to separate sources of

MAIN TRANSMITTER ROOM OF THE NEW WJZ INSTALLATION RECENTLY COMPLETED AT A COST OF \$300,000. THE MANNER IN WHICH THE DECORATIONS HAVE BEEN CARRIED OUT REFLECTS THE DEPARTURE OF NBC TRANSMITTER INSTALLATIONS FROM THE CONVENTIONAL POWER HOUSE ATMOSPHERE



THE ORIGINAL 500 WATT TRANSMITTER OF OLD WJZ, AT NEWARK, N. J., AS IT LOOKED IN 1921

circuits of both transmitters and the changeover switches.

Both of these transmitters are at times synchronized with other stations, WJZ with WBAL and WEAJ with WTIC. Facilities are provided to permit instantaneous transfer from crystal to synchronous excitation by means of push buttons. Through a special coupling circuit the grid of the UV-860 amplifier may be connected to either the output of the crystal control unit or the synchronized exciting apparatus.

Casual visitors, of which there have been many, have been impressed

plants. The decorations and the manner in which the transmitters are installed surpass all previous transmitter installations in beauty of appearance. Aluminum decorations in the transmitter room contain figures symbolic of radio broadcasting and augment a large plaque with the NBC insignia opposite the visitors entrance. The transmitter is actually built into one end of the transmitter room and the rear of the equipment is surrounded by glass observation windows so that visitors may not only see the front of the transmitter but may inspect the rear in detail without danger.

power. These lines terminate in power vaults in the basements of the transmitter buildings. To guard against outages caused by a collapse of the antenna system or damage to the tuning house, an emergency antenna is provided for each station which may be coupled into the spare transmitter without the use of the transmission line or tuning house.

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J. GULLENS ON DUTY BEFORE NO. 2 CONTROL ROOM APPARATUS AT REBUILT WJZ, OF THE NATIONAL BROADCASTING COMPANY AT BOUND BROOK, NEW JERSEY. THE OSCILLOGRAPH, ON THE RIGHT CENTER, IS USED TO MONITOR THE STATION OUTPUT. A MOTION PICTURE OF THE MUSIC OR SPEECH IS PROJECTED ON A REVOLVING MIRROR SHOWING ALL IMPORTANT DETAILS OF THE PERFORMANCE

NEW BULLETINS ISSUED

The following new bulletins have just come off the press, and are available to those interested in the subjects upon request to the Transmitter Sales Section, RCA Victor Company, Inc., Camden, New Jersey:

Bulletin No. 10—Precision Frequency Control Equipment, Type EX-4170

Bulletin No. 11—Condenser Microphones,—announcing Type 4AA1, Suspension Type 4AS1, Program Type 4AP1

Bulletin No. 12—Frequency Monitoring Equipment, Type EX-4180

Bulletin No. 13—Field Intensity Meter, Model TMV-21

Bulletin No. 14—Universal Amplifier, Type 24-B

Bulletin No. 15—Monitoring Amplifier, Type 14-B

Bulletin No. 16—Volume Indicator, Type 13-C

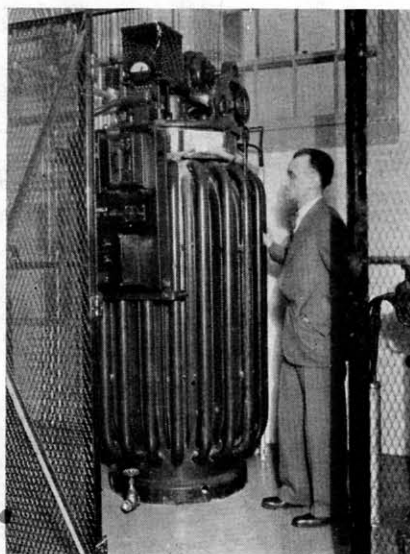
Bulletin No. 17—Program Amplifier, Type 12-B

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PIONEER NBC STATIONS MODERNIZED

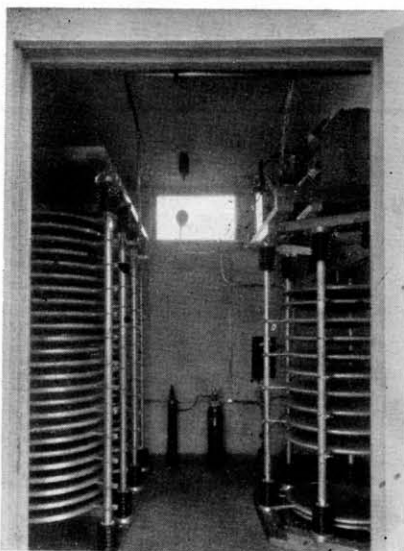
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Recent hourly frequency measurements over a complete period beginning at 6:30 AM and ending the next morning at 1:00 AM, showed a drift of only 4 cycles from a mean frequency. On a percentage basis the crystals therefore remained within .00053% of the assignment. Neither of these stations has ever been reported outside of its assigned frequency band.



D. N. STAIR IN CHARGE OF WJZ, INSPECTING THE AUTOMATIC VOLTAGE REGULATOR USED TO MAINTAIN CONSTANT POWER OUTPUT FROM THE RECENTLY INSTALLED RCA 50 B TRANSMITTER.

WEAF has operated with 50 kilowatts since the previous installation in 1927 while WJZ operates with 30 kilowatts.



HUGE AIR SPACED TUNING CONDENSERS USED TO TUNE RADIATING SYSTEM AT THE RECENTLY REMODELED TRANSMITTER OF STATION WJZ OF THE NATIONAL BROADCASTING COMPANY, AT BOUND BROOK, NEW JERSEY. THESE CONDENSERS WILL SUCCESSFULLY HANDLE OVER 150,000 VOLTS OF ELECTRICAL SPEECH ENERGY. THEY ARE OF SPECIAL NBC DESIGN BUILT TO WITHSTAND DIRECT STROKES OF LIGHTNING WITHOUT INTERRUPTING SERVICE.

It is interesting to compare the most recent WJZ transmitter installation with the pioneer 500 watt WJZ located on the Newark, N. J. works of the Westinghouse Company in 1921.

When this picture was taken O. B. Hanson, NBC, Manager of P. O. & E. was with WEAF; C. W. Horn, General Engineer was Supt. of Radio Operations for Westinghouse; the Writer was Engineer Announcer at WJZ, Newark.

BROADCAST FROM TRAIN

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engineers, communications department executives and operations chiefs of the railroad worked with Cohan and A. B. Chamberlain, Chief Engineer of Columbia, on such preliminary tests as were possible. As a result of these surveys, it was decided that the exact zone of broadcasting would start outside of Washington.

One of the regular Colonial type dining cars of the Baltimore and Ohio was used as the broadcasting studio. These cars, the latest models in equipment, have rubber shock absorbers, ball bearings and permanently sealed windows. They are air cooled, and when stripped and fitted up technically—with the control room where the kitchen is normally located—approximate a broadcasting studio. For the actual broadcast, a special crew of mechanics went over the car from end to end to reduce to a minimum vibratory noises and other possible sources of interference.

Preliminary tests indicated that it was desirable to use two short wave pickup stations in order to secure proper reception at all times. One point of pick-up was located at Beltsville, Md., approximately ten miles out of Washington; the other at Laurel, Md., close to twenty miles out of Baltimore. The master control station was located at Laurel, and the Beltsville pick-up was fed by special circuits to Laurel, whence the program was transmitted over the nation-wide Columbia network. Because of the pioneering nature of the broadcast, it was carried also to foreign countries over Columbia's regular short wave stations, W2XE and W3XAU.

Due to the fact that the broadcast was introduced from New York and begun directly from the temporary station at Laurel before switching to the speeding train, two-way communication between the train and Laurel was necessary. For this purpose the special short wave transmitting station, W2XDZ, at Laurel carried instructions to the moving train. The train carried both sending and receiving short wave sets, and special antennae were installed on the roof of the studio car. More than \$20,000 worth of special broadcasting equipment was used and the entire expenditure for the experiment probably reached \$50,000.

The train from which the broadcast was made was running at speeds varying from 40 to 70 miles an hour in order to determine whether or not the rate of speed would affect reception.

The program broadcast was the Ever-Ready Radio Gaieties.