

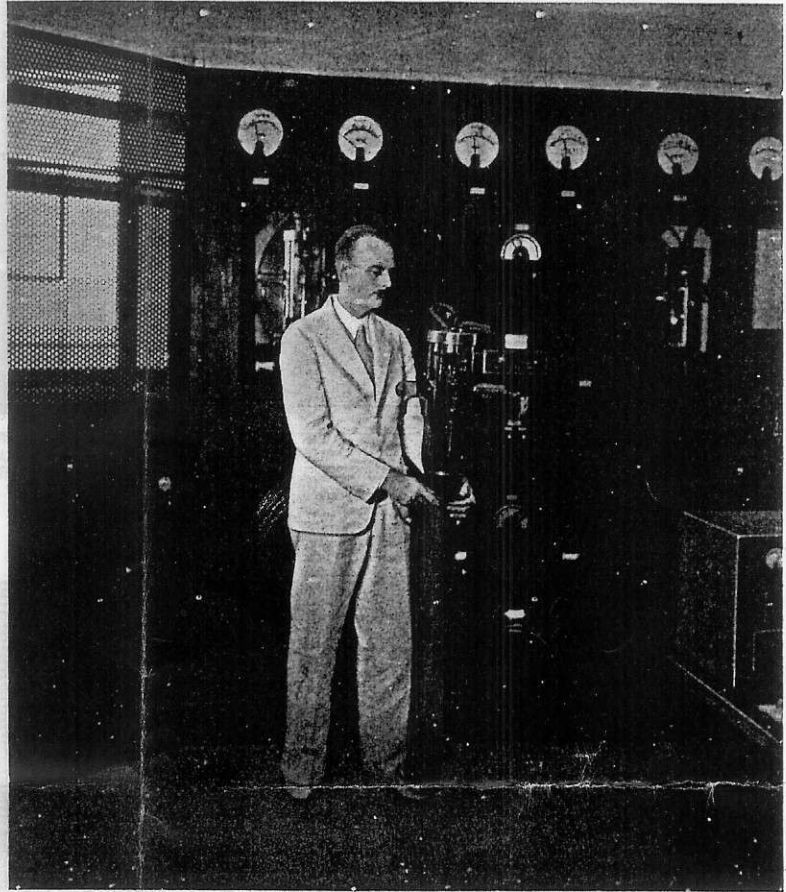
Increased Power for WOC-WHO

By P. A. LOYET, Technical Director, Central Broadcasting Co.

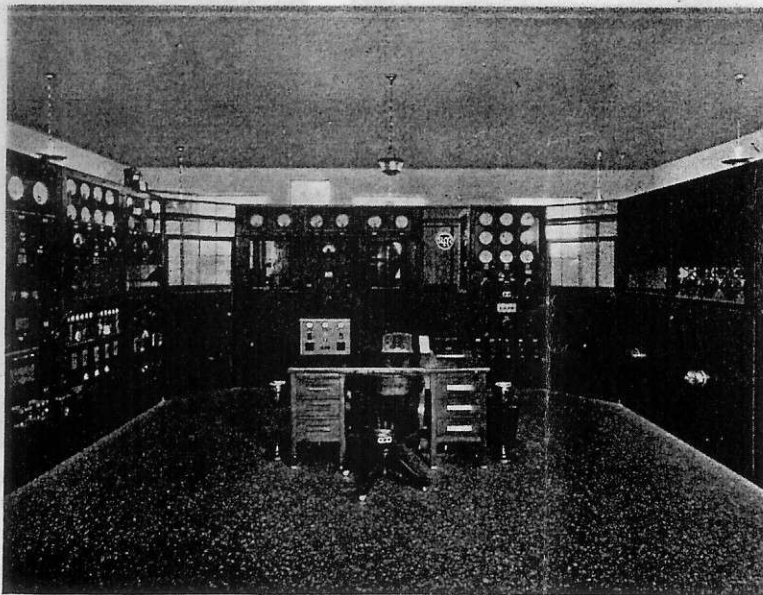
APRIL 22nd, 1933, marked the inaugural of another giant of the ether, the fifty kilowatt station of WOC-WHO, Des Moines, Iowa. The two old and well known 5,000 watt stations of the middle west went off the air to make way for the new RCA 50,000 watt transmitter located at Mitchellville, Iowa, fifteen miles airline east of Des Moines.

In the middle of a short dedicatory address by Col. B. J. Palmer, Managing Director of the Central Broadcasting Company, the two synchronized 5,000 watt stations in Davenport and Des Moines were shut down and the new fifty kilowatt station made its debut.

Three days later, on April 25th, a formal opening program was presented the station by the National Broadcasting Company, which was carried by the Red network. For three-quarters of an hour a wonderful array of talent was presented from Washington, New York and Chicago, after which the program was fed directly from the WOC-WHO studios in Des Moines and Davenport. Outstanding on this part of the program was the excel-



P. A. LOYET, TECHNICAL DIRECTOR OF THE CENTRAL BROADCASTING COMPANY, HOLDING ONE OF THE HUNDRED KILOWATT RADIOTRONS BEFORE THE MAIN TRANSMITTER OF WOC-WHO



MAIN TRANSMITTER ROOM OF THE NEW RCA 50 K. W. STATION FOR WOC-WHO, DES MOINES, IA.

lent congratulatory talk by Governor Clyde E. Herring of the state of Iowa.

The opening of the new fifty kilowatt plant occurred almost to a day on the first anniversary of the dedication of the new WOC-WHO studios in Des Moines.

Location of Transmitter

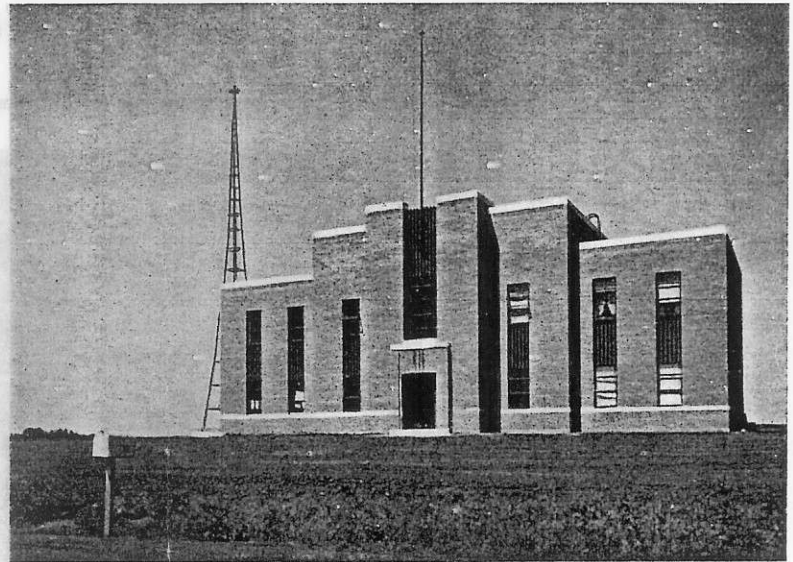
As far as radio aspects are concerned, Iowa with its corn land presents one of the best prospects in the United States. After extensive field strength measurements the conductivity of the soil was found to be 180×10^{-15} EMU, which is probably the best inland conductivity ever measured. In actual measurement this transmitter lays down a

1,460 mv/m signal in a park in Davenport, 143 miles away, which is greatly in excess of that calculated. The whole of the 23 acres used for this installation has a 3½ foot black loam topsoil underlaid with blue clay, which bears water at three gallons per minute, the static head standing only 5½ feet below the surface. Truly, this is the ideal site for a wonderful buried ground system.

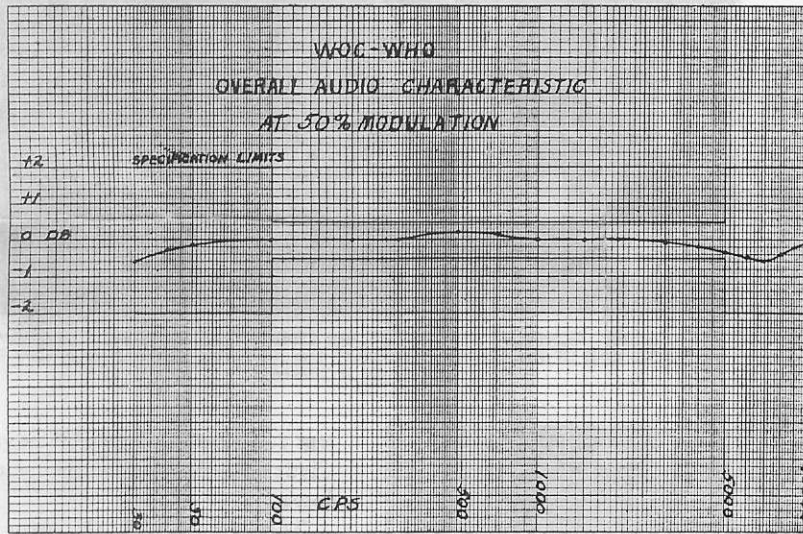
The site is located fifteen miles airline east of Des Moines, and one half mile south of National Highway No. 6, which is most desirable from a publicity and accessibility standpoint.

Power and Telephone Facilities

Two substations feed the transmitter and are both situated at opposite ends of the property, each



THE TRANSMITTER BUILDING OF WOC-WHO, DES MOINES, IOWA. HERE THE RCA 50 KILOWATT TRANSMITTER AND AUXILIARY EQUIPMENT IS INSTALLED. THE BUILDING IS ATTRACTIVELY FINISHED IN WHITE ENAMEL, EXCEPT FOR THE VERTICAL PANELS OF DIAGONALLY SET BRICK, WHICH ARE GREEN. ONE OF THE 300 FOOT STEEL TOWERS MAY BE SEEN IN THE BACKGROUND



900 feet away from the transmitter building. The 2,300 volt supply from both substations is fed the whole 900 feet underground. The regular supply is from a 44,000 volt line and emergency from 6,900 volt line. Manual switching in the transmitter building is used for changeover.

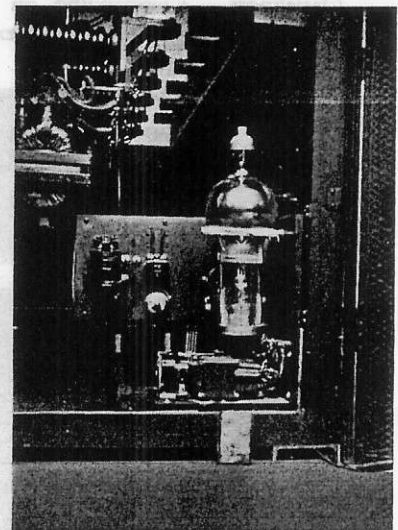
A ten pair telephone cable, buried three feet underground for a distance of 3,000 feet away from the transmitter building, brings broadcast loops and telephone line to the building. Both regular and emergency broadcast lines are equalized within 1.8 DB from 30 to 14,000

cycles, giving the station two of the finest transmitter feeds in the country. The telephone at the transmitter is a long line adjunct of the studio PAX system through the control room, and can be used to call and talk to any station in the broadcasting system, as well as dial any number on the Des Moines exchange.

Housing

The transmitter building is a completely fireproofed brick structure of two stories above ground and a large basement for water pumping and heating apparatus exclusively.

The building is rather unique in that completely conditioned air is used throughout. All air enters the building through a set of cleaning sacs and is forced by blower through a monstrous set of radiators, constructed much the same as an automobile radiator, except for size. In the winter the oil burning boiler supplies hot water to this large radiator and the air is preheated



VIEW IN BACK OF MAIN RECTIFIER AT WOC-WHO, SHOWING STAND-BY UV-857 HEATER PANEL.

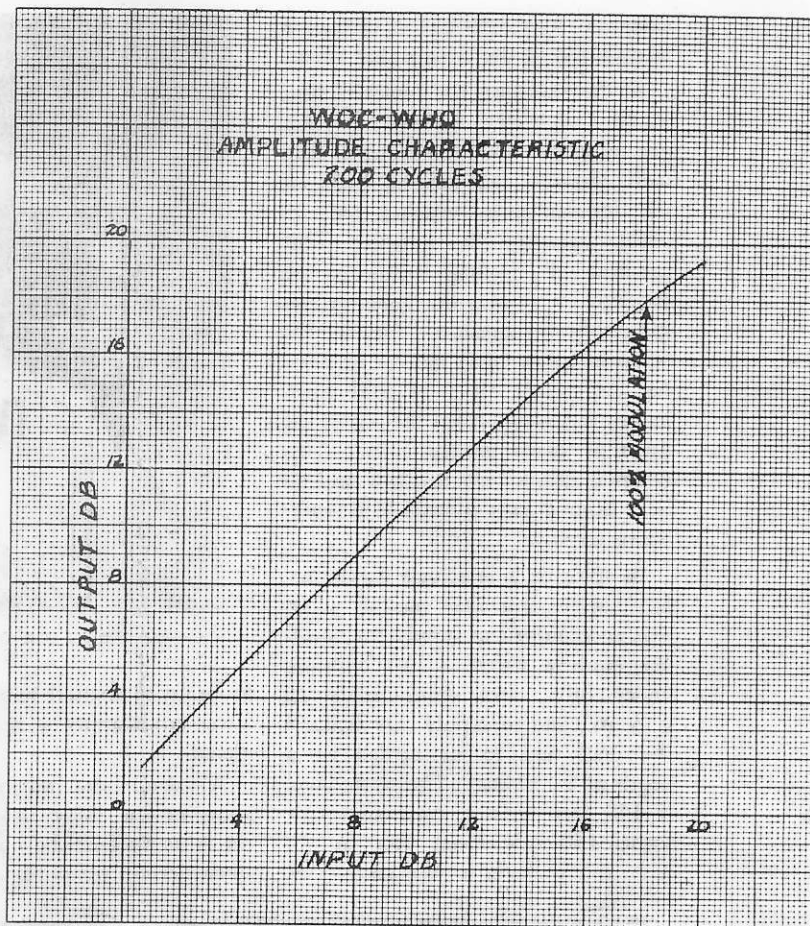
before entering the heating tunnels. The air is automatically humidified by spraying water controlled by a

To the rear of the pump room is the one-story high cooling room and supply switching vault.

Upon entering the second floor entrance from the stair well, one faces the U-shaped conformation of panels making up the transmitter, with the 50 KW amplifier and control panel forming the center of the U. The transmitter is completely enclosed by grill work, leaving enough space for maintenance inside the cage and a four foot aisle all around the outside for visitors inspection of the rear of all units.

It is interesting to note that there are no insulators or tubing fastened to the ceiling. All tubing is carried by the frames of the units or the grill work itself. The lower half of this grill is solid sheet to within six inches of the floor. This latter space is left to facilitate cleaning the floor.

Immediately to the front of the transmitter and to the left of the stair well is found the control room. It is a room 10 feet x 14 feet and double shielded. The outer or grounded shield is common copper fly screen and the inner floating shield No. 16 copper three mesh to the inch. The two are separated by tile walls and floor. The control room is as acoustically correct as a studio. It has a reverberation time of 0.5 second and the material is well distributed over the wall and ceiling areas above a four foot wainscot.



WOC-WHO AMPLITUDE CHARACTERISTIC

Three seven foot speech racks carry the speech input equipment which is entirely operated by A. C. The hum level is well below 90

DB in spite of the flat 30-10,000 cycle response of the speech input equipment, and the proximation of eliminator units. The monitor is mounted in the center bay of the speech rack assembly, providing an extremely rigid and large sized baffle, which together with the acoustic balance of the room provides the best of monitoring facilities.

The Antenna and Feeders

A 400 meter antenna is used, operating at 75% of the fundamental and slung between two 300 foot insulated towers spaced 750 feet apart. The towers are operated grounded following many tests of detuning.

The antenna tuning equipment is fed by means of a three wire feeder system, rather than the conventional two wire design. The center wire is grounded at both ends, serving as a metallic connector between the antenna ground and the transmitter ground systems.

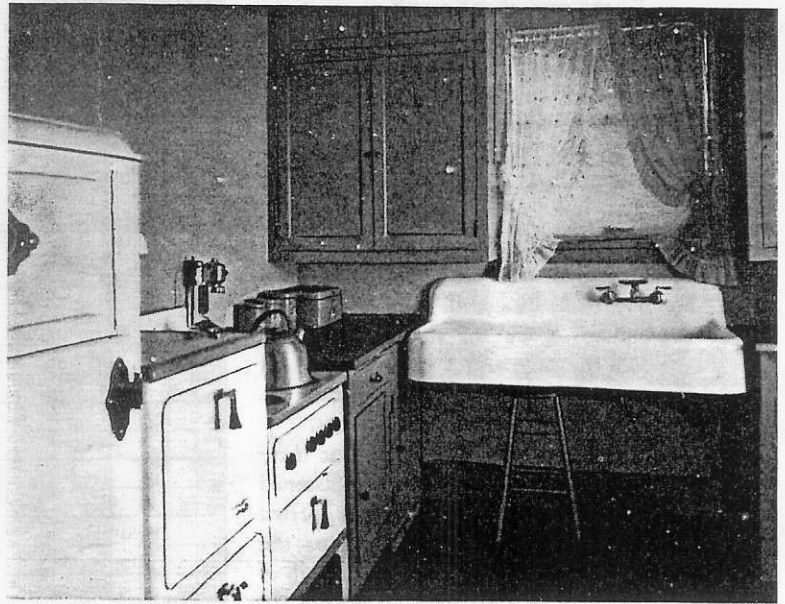


RADIOTRON STORAGE ROOM AT WOC-WHO—HERE THE "SPARES" ARE KEPT IN CONVENIENT AND ORDERLY FASHION.

solenoid valve actuated in turn by a humidistat in the transmitter room.

In the summer, the boiler is shut down and fifteen gallons of water per minute is pumped from a deep well through the heating coils of the blower unit, cooling the air before entering the tunnels. This method of cooling seems to be superior to other spray types in this geographical location, due to the dehumidifying effect gained by passing the warm air over cold coils, extracting water from the air in the form of sweat on the coils. This water is drained off the unit and on very humid days considerable water seems to flow.

In spite of a relatively large surface supply, not near enough water was encountered to supply the building cooling needs. The building under full water drain needs 25 g. p. m., and to supply this demand the well had to be drilled to a depth of 1,150 feet. The static level is 150 feet with a draw down of some 150 additional feet at 25 g. p. m., making it necessary to set



A GLIMPSE INTO ONE OF THE APARTMENTS PROVIDED FOR THE OPERATING STAFF IN THE TRANSMITTER BUILDING OF WOC-WHO

fountain in a small pool. All of the latter landscaping is yet to be completed.

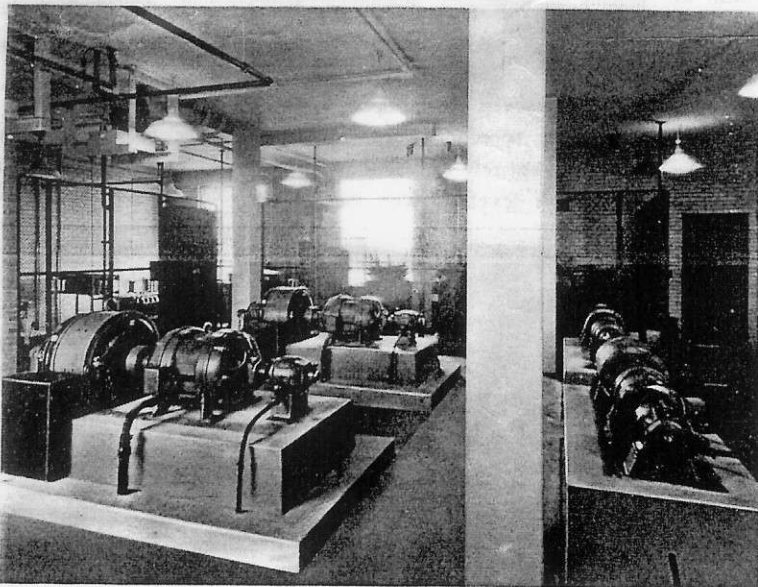
All water and heating equipment occupies the large basement under the front half of the building. This construction simplifies the air con-

ing the radio equipment and large entrance. The two horizontal legs would represent the two wings of the building.

A spacious three car garage occupies the first floor of the left wing. A large office, a shop and a tube storage room, form the upper floor of this wing. The right wing is reserved exclusively for personnel, with private entrance and separate stairway. This wing can be completely isolated from the transmitter section for privacy. The single men's apartment, comprised of bedroom, bath and kitchen, occupies the first floor, and the plant supervisor's apartment, consisting of living room, bedroom, kitchen and bath, complete the wing's second floor.

On each side of the spacious entrance, first floor, is a large store-room for spare equipment with a small store-room off the garage for building and ground equipment such as hose, sprinklers, mowers, etc.

The large room immediately confronting the spectator entering the first floor entrance, houses the rotating machinery and power transformers. The continuity of the grill work around the high voltage transformers is not broken in the rear of the room, but is carried out by the wall closing off the water and pump room. The still and spare storage tank are also included in this room.



POWER ROOM ON THE GROUND FLOOR OF THE TRANSMITTER BUILDING, AT WOC-WHO

the pump cylinder at a depth of 330 feet. This setting requires a real man-sized pumping unit.

After the water is passed through the cooling coils it is either wasted in a large tile drain field or used from the sill cocks to water the shrubbery and lawn, and supply a

conditioning problem in that the heating tunnels are run the whole length of the building and risers from the tunnels are carried in the walls to the two floors above.

A bird's-eye view of the building would show a large cross, the vertical leg or main structure house