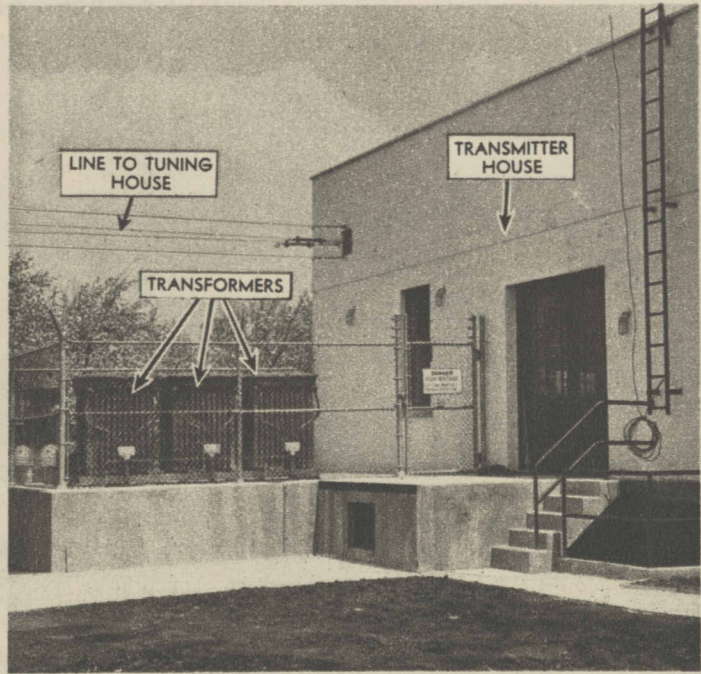
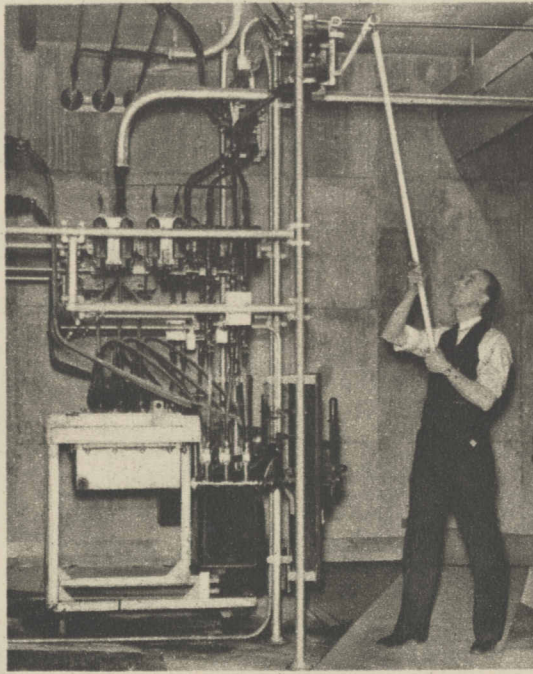


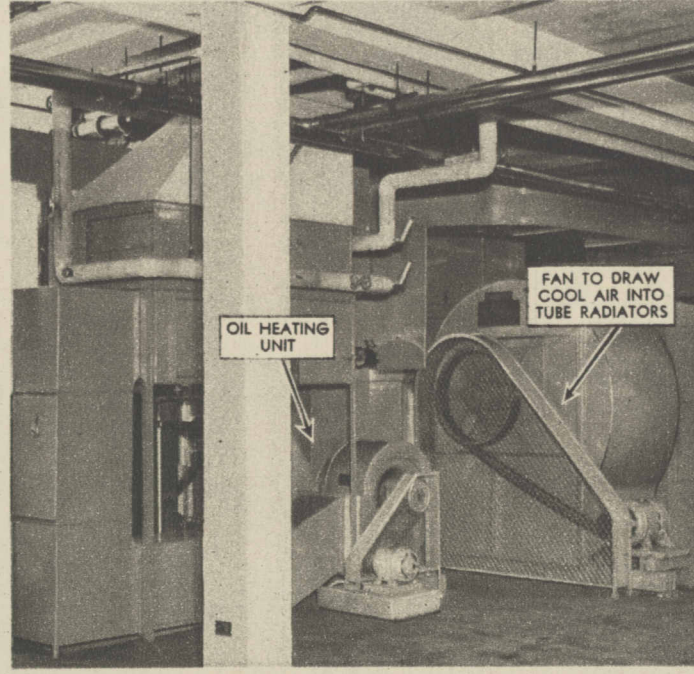
# Putting "Voice of the People" on the Air



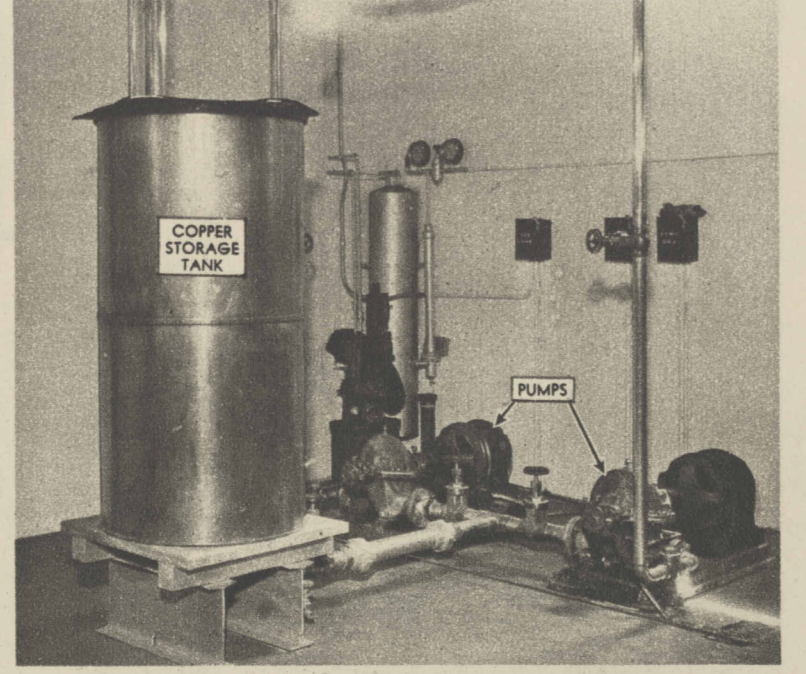
Rear view of the transmitter house, where voltage is received from commercial power substations.



"Hot stick" in use to close switch in the power distribution room. It safeguards the operator.



Heating unit for transmitter house and part of cooling system for tubes used in transmission.



Basement tank storing distilled water, and pumps that circulate it through tube cooling system.

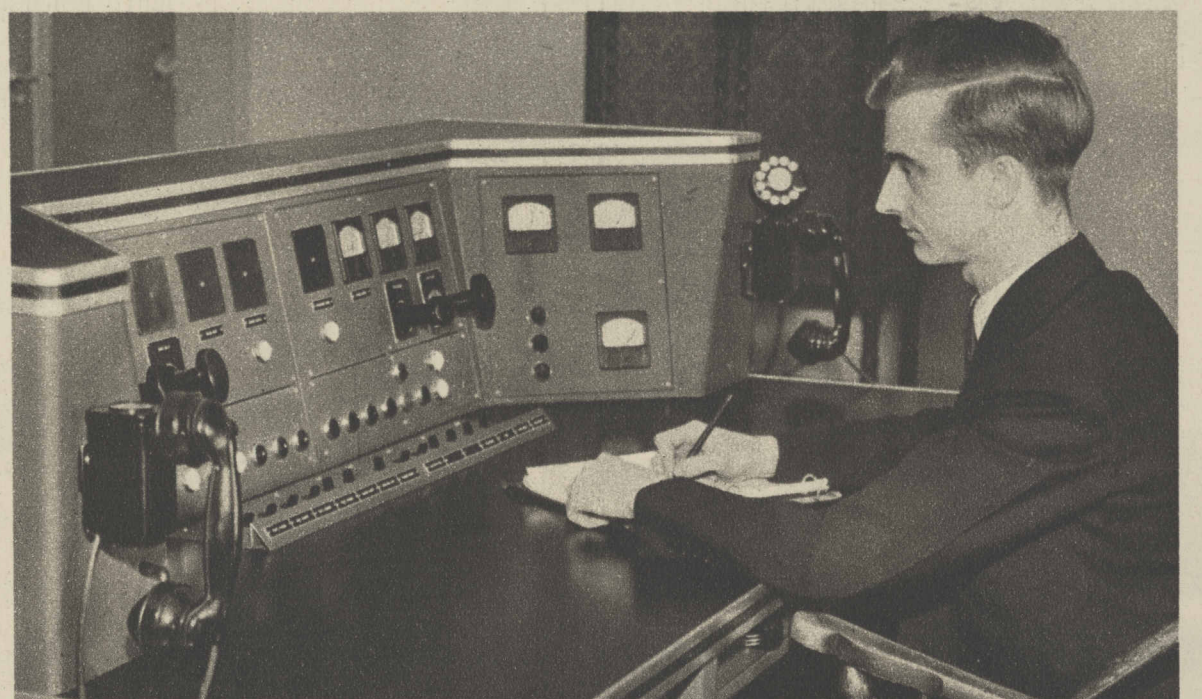
(Continued from page four.)  
 magical new transmitter plant let us start at the beginning:  
 A pianist, let us say, strikes a note—middle C—in W-G-N's big audience studio. Before the person in the last row has heard it radio will have carried the tone around the world. For radio travels with the speed of light—more than 186,000 miles a second. Sound waves travel just a little over 1,000 feet a second. For radio, then, it is necessary to combine sound waves with radio waves. A sound wave sets air in motion. The pitch determines the number of vibrations. For middle C it is 256 vibrations

## The Story of a Mighty Transmitting Station

alternate or emergency source. These substations are just off the road on the W-G-N site. The substations contain transformers for reducing the voltages to 2,300 volts. In this state the power is carried by underground cable to the basement of the transmitter house. Here it is metered and distributed. That portion of the power which is to be used in the transmitter proper must undergo con-

about what it says. Like a horse, it carries a "rider," the rider in this case being the middle C note that has been sent out to the transmitter from the studio. This "load" is brought from the studio through special telephone wires. The signals from the studio encounter the modulator, which unites them with the radio waves, created by a crystal oscillator. The loaded carrier must

of spares must be kept on hand at all times.  
 High power in radio transmitters is possible only because of water cooling in the tubes. The tubes are not very efficient. They waste power in the form of heat. Air-cooled tubes of more than 5,000 watts are impractical. But water-cooled tubes of 100,000-watt capacity are practical and in regular use. W-G-N uses two such tubes.  
 An elaborate water-cooling system is employed to keep the tubes cooled to a safe operating temperature. One hundred gallons of distilled water is pumped through the jackets of the tube system each minute. Some of the heated water is diverted through a ventilating system and provides regular heat for the building in the winter time.



W. R. Crane of W-G-N staff at the master control board, where are located automatic devices to maintain continuity of broadcast. This is the nerve center of the transmitter unit.



Front view of the transmitter house, in which are located instruments pictured on this page.

a second. For higher notes the number of vibrations would be correspondingly greater.  
 These vibrations in the air are converted into electrical impulses by the microphone. When middle C is struck the microphone will vibrate 256 times a second. Behind its surface flows electric current. As the microphone responds to the middle C vibrations, so does the electric current.  
 The microphone converts sound waves into electrical frequencies in exact accordance with those set up by the sound waves.  
 These vibrations of electrical energy in this form will not carry through space. So they are conducted by telephone wires to the radio transmitter.

operate in a given pathway. That is the station's frequency. W-G-N is assigned to 720 kilocycles. Each station must stay exactly on its pathway of frequency. In the transmitter house are instruments to check on its adherence to the channel on which it is licensed to operate.  
 A cannon cannot be fired without ammunition. That is true of radio waves, too. Before they are ready for projection they must be tremendously strengthened, or amplified. This takes place in the tubes of the transmitter. There are six stages of amplification. Four types of tubes are used. These vary in size. The largest cost \$1,650 each.  
 A whole set of tubes costs around \$7,000. A complete set

to any one but a technical expert. To him they are filled with meaning. They give him control over mighty forces with his finger tips. This type of control makes for greater efficiency in operation, as well as for safety.  
 A radio station is never unattended. Even when it goes off the air it requires the presence of technicians to care for it.  
 After the radio cargo has been given its last boost in amplification it leaves the transmitter house, whence it is sent by a transmission line to a little cubicle at the base of the insulator called the tuning house. Here it is given one final touch before it is ready to go out on the air.  
 And then comes the final dramatic step of transmitting, or the flashing of the signals through space.  
 To capture this electric cargo you must know the roadway it is traveling. In this instance set your dial at 720 and the receiver will do the rest. In a flash middle C will be sounding in your ears. While it took many minutes to read this article, it required only the tiniest part of a second for this note to reach you. Such is the magic of radio.

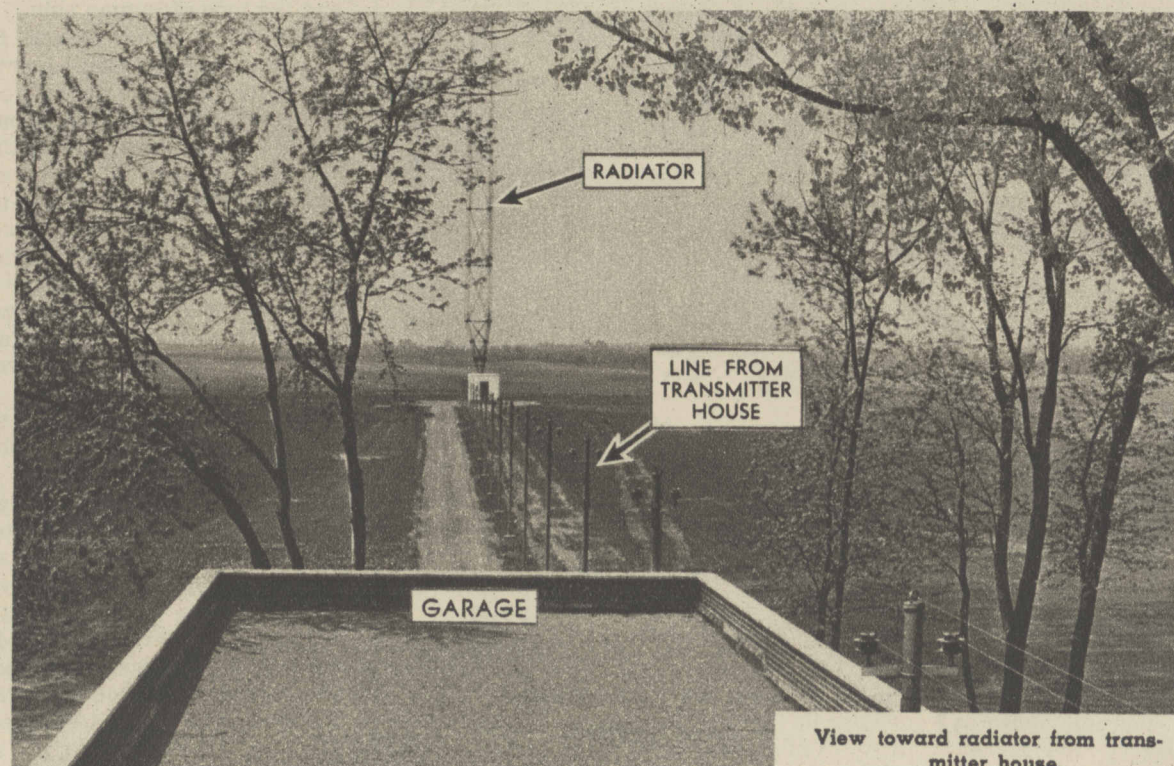
In describing a process that is exceptionally elaborate it is easy to err on the side of simplification. A transmitting station is a vastly complicated combination of electrical and mechanical units. These play many rôles, some obscure to laymen, but all necessary.  
 The transmitter house is filled with automatic devices designed to keep a broadcast on the air in the event of many types of failure—electrical, mechanical, or human elements. In the event of the failure of a normal source of power supply a selector switch will employ an auxiliary or emergency line.  
 Complicated organisms require a nerve center to operate and control them. As may be expected, a modern transmitter has such a coordinating center. It is called the master control desk. In it are located a score or more controls. Many indicators are watched by an operator who sits in a comfortable chair.  
 Some of the things indicated or controlled on its panel are:  
 Power line voltage and current.  
 Plate voltages on various transmitter units.  
 Current in the antenna.  
 Audio program level going into the transmitter.  
 Percentage of modulation.  
 Deviation from the assigned frequency.  
 Lights indicate the proper operation of numerous units in the complete transmitter. There are many other controls and indicators—baffling and mystifying

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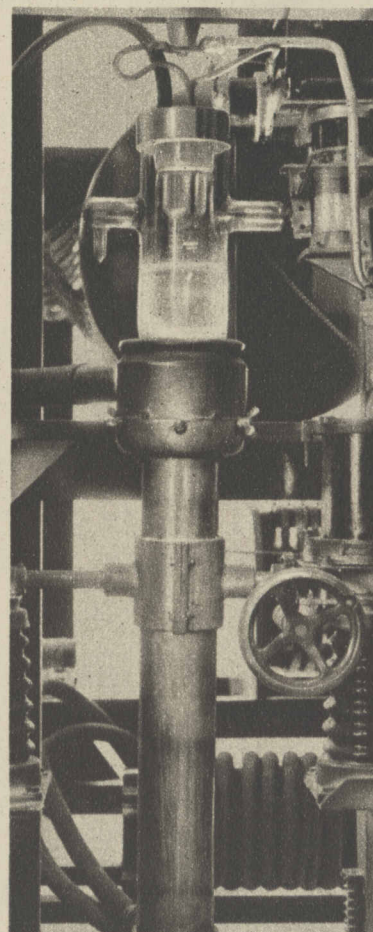


Telephone amplifiers through which pass electrical impulses carrying program from W-G-N studios. Checking panel is used to keep tab on equipment.

Here these electrical equivalents for sound are built up to tremendous intensities; they are "modulated," or superimposed on radio waves. Finally they are radiated from the transmitter system into space. In the receiving sets of the nation they are reconverted into sound.  
 All this takes place practically instantaneously. But it is a vastly complicated matter. There is the matter of obtaining a supply of electrical power and preparing it for broadcasting.  
 Two power lines carry to the W-G-N plant the electricity necessary to operate the many units that are needed. One line carries 33,000 volts from Waukegan to W-G-N's "north" substation. The other carries 12,600 from Maywood to a "south" substation. The first is the regular source of power, the second an



View toward radiator from transmitter house.



One of the giant tubes used in transmitter and mentioned in connection with picture at right.



Transmitter front panel. Behind doors are giant tubes used to amplify power. (Tribune photos.)