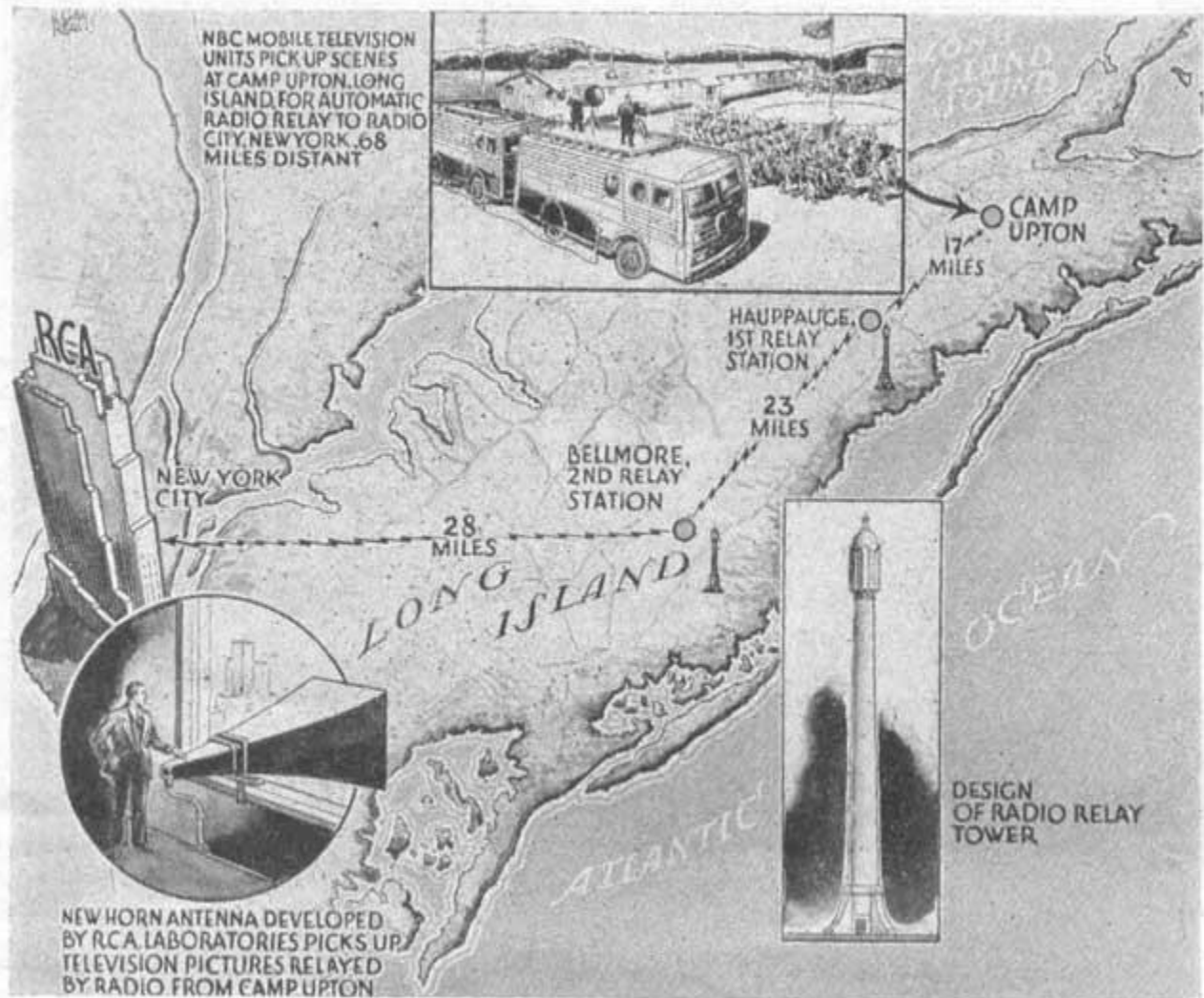


MAY, 1941

## Radio Relay Circuit



Map showing routes of RCA's radio relay circuit on Long Island. Two unattended intermediate relay stations are used between Camp Upton and the RCA building in New York City.

# RCA DEVELOPS NEW TYPE RADIO RELAY FOR TELEVISION

## Unattended Repeater Stations Open Many New Possibilities

The automatic radio relay of scenes from Camp Upton, Long Island, to New York, brings into use the new unattended radio stations which "bounce" television pictures across the countryside without the use of wire connections.

This radio relay system, developed by RCA Laboratories, incorporates a number of engineering features and innovations in communication. The relay towers, as designed for future use, are envisaged dotting the landscape to make possible inter-city television and eventually a television network on a national scale.

Inside the "beacon" on top of the tower is a new horn antenna sharply directional in reception and transmission of ultra-short waves. The towers vary in height, depending upon the terrain and distance to be covered. The automatic apparatus for amplifying and relaying is located in the base of the tower. In a split-second after the pick-up and amplification of the signal, the pictures are "search-lighted" in the desired direction.

### Ultra-high Frequencies Used

The mobile units of the National Broadcasting Company, stationed on this occasion at Camp Upton, televise and flash the army pictures on the 165 megacycle channel to Hauppauge, 17 miles distant. Hauppauge's automatic relay station intercepts the images and tosses them across 23 miles on 474 megacycles to a horn antenna 200 feet up on a mast formerly used by WEAJ at Bellmore. There again, amplification strengthens the picture-carrying impulses for relay on 506 megacycles to New York, 28 miles beeline.

Protruding from a window on the 62nd floor of the RCA Building at Radio City, two horn antennas with their open mouths pointed in the direction of Bellmore, pick up the incoming ultra-short waves that carry the telepictures. These horns, from their 4 by 6-foot openings, taper along the 8-foot length to an apex about 1½ feet square, where a dipole antenna is located. The impulses are fed into the television sets at Radio City, and are also sent over a special wire line to the New Yorker Theatre for projection on the 15 by 20-foot screen. The pictures are 441 lines, 30 frames.

In no instance does the power of the intermediate relay stations exceed 5 watts, an accomplishment attributed in part to the highly directional horn antennas.

### Utilizes New Type Tube

Another device of considerable importance to the system is a new RCA tube technically described by the engineers as of "the inductive output type." With this tube, amplification of the television signals at

the relay stations is effected at radio frequencies instead of the original frequency of modulation. This tube makes possible the streamlining, simplification, efficiency and economy of operation of the radio relay stations.

Taking further advantage of new development in radio tubes, the relay system in the low power stages (receiving circuit) utilizes a new "orbital beam" tube. Operating in general on the electron multiplier principle, this tube is a new means of obtaining high amplification on ultra-high frequencies.