Joseph Waldschmitt, engineer, looks over the controls on the Western Electric 10 KW FM transmitter. A radically new type amplifier circuit makes the transmitter first of its kind to use a single tube in last amplifier stage

W71NY

New York, N. Y.

THE DEDICATION of W71NY's new Western Electric FM transmitter, marks another triumphant step forward in broadcasting history. To WOR, owner of the new station, goes the honor of launching the first full-time commercial FM station in New York City. Six stations, forming the largest FM network to date carrying a single program, broadcast the opening ceremonies.

It is estimated that W71NY will be heard by owners of FM receivers in a radius of 52 miles from midtown Manhattan. The station has an assigned service area of 8,500 square miles on a frequency of 47.1 megacycles. On the air from 8 A.M. to 11:30 P.M. programs are especially designed to bring out the advantages and quality of FM broadcasting.

W71NY's debut climaxed more than two years of planning, experimenting and testing with FM transmission by WOR engineers in cooperation with Bell Telephone Laboratories experts who designed the equipment. Although the going proved extremely difficult FM development at this station is considered a record of speedy action. Plans took form back in the summer of 1939 when the first Western Electric 1000 watt FM unit known as W2XW1 was set up at Carteret, New Jersey. First test signals went on the air in February, 1940. Four months later with the call letters changed to W2XOR the station moved to 444 Madison Avenue where a new Western Electric 1000 watt FM transmitter was installed. It was in the spring of 1941 that W71NY actually came into being.

WOR engineers who take particular pride in the new 10 KW FM voice, say that distortion at the transmitter is less than 1 per cent and that among broadcasting experts this is regarded as a spectacular technical achievement. There is no trace of noise at the carrier and the frequency stability is better than 1000 cycles.

The transmitter unit and the entire technical set-up are on the 42nd floor of the Madison Avenue building. A radically new type of amplifier circuit makes the transmitter the first of its kind to use a single tube in the last amplifier stage. "One tube—but what a tube!" is the way transmitter engineers speak of this baby giant. It weighs 55 pounds — one of the heaviest in radio usage today.

The most difficult problem to be overcome in setting up the equipment was planning ways and means for hauling it to the 42nd floor. Since the elevator only goes to the 40th floor a combination of block-and-tackle and trap door contrivances were rigged up to help do the job. Despite this handicap several tons of equipment reached W71NY's rooftop quarters without a scratch.

In case of emergency the staff is prepared to continue operations for an extensive period right around the clock. Sleeping and housekeeping facilities including refrigerator, range and well stocked larder are all there in this unique penthouse. The entire layout is as spic and span and up-to-the-minute as a model apartment displayed on the pages of Good Housekeeping.

Other FM stations now operating Western Electric equipment are Don Lee's K45LA, in Los Angeles and the Moody Bible Institute W75C, Chicago. WHN will join the roster soon when W63NY is launched and W49PH, owned by the Pennsylvania Broadcasting Company is scheduled to follow along shortly.

Theodore C. Streibert, general manager and vice-president of WOR, contends that when FM gets into its stride, competition between the different local transmitters will bring about a program superiority race which will

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Western Electric War Production Zooming

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high with crates and boxes marked "Radio Tubes", "Command Sets", "Delicate Electrical Apparatus". Looking down from the fourth floor you see the giant crane dangle its chains over a cluster of cases — clutch one in its iron claws — swing it high in the air then trolley along to the end of the platform. Back and forth it glides — carrying tons of equipment which soon will follow other Western Electric war shipments rolling over the country by rail and truck.

A freight car switched into the plant from a nearby siding is being loaded with oblong crates and neat square boxes marked "Fragile" in bold black letters. As you watch men sealing the doors you wonder what secret devices have been packed away in the car and where it will travel. But new inventions and destinations, you learn, are zealously guarded by the few who know at the plant.

Leaving this area your guide escorts you on through other sections of the building. You must travel a roundabout route since the various restricted areas are accessible only through certain stairways and doors. As you pass from one department to another special guards posted at numerous locations stop you to check on your badge. "Why are you here — where are you from?" they want to know. And you meekly tell all, heaving a little sigh for the happy days when you could walk through these same aisles without feeling like a case of smallpox. However, being heart and soul for the good old democratic way of life, momentary annoyances disappear and you are grateful to witness this example of American industry's vigilance.

During the tour you are told that Western Electric is purchasing much of its material and various parts from other suppliers, thus sharing Uncle Sam's orders and speeding up production. Approximately 40 per cent of the work has been sub-contracted — scattered among hundreds of firms. All incoming materials are carefully inspected and tested to make sure that specified standards have been maintained. Many new employees especially trained for the work have joined the forces to handle these preliminary checking and testing operations. You see groups of men at their micro-projectors, microscopes and Q-meters determining the accuracy of the various parts. In keeping with Western Electric's precision workmanship tolerances allowed are extremely small — in some cases a plus or minus of only .0005 inch.

Back of a sign reading "Poisonous and injurious substances" you watch rows of operators, wearing goggles, heavy rubber gloves and floor length aprons, dipping aviation radio parts into bubbling chemical baths. Two men in nearby booths look as though they were all set for a gas attack, but the strange contrivance worn over nose and mouth, you are told, are not gas masks but respirators. The men are spraying enamel on metal housings and the respirators protect them from injurious fumes.

One of the most interesting manufacturing operations in the shop takes place in an infra-red ray tunnel used for baking enamel. Twenty feet long the tunnel contains 64 lamps which create a temperature of 425 degrees Fahrenheit in the metal. This bakes the enamel finish from the inside out as various radio parts travel through the enclosure on a slowly moving chain conveyor.

In a nearby section you notice a group of pretty girls engraving code letters and control and operating information on command set cases. How deftly they handle the big machines and how perfectly the neat white characters stand out on the enamel finish! Certainly Uncle Sam's flyers will have no difficulty in recognizing the insignia on their control knobs. Hundreds of girls are working on war equipment, you learn. Because of their tapering fingers, they can handle many of the more delicate manufacturing processes better than men whose hands are shorter and less dextrous.

Further along you stop before a row of furnaces, fascinated by the quick tongues of flame which dart out every few seconds from the deep crimson ovens. These operators, your guide explains, are tempering permanent magnets. Using long handled tools shaped like nut crackers they slide the pieces of steel on to the hot plates — flap them over like pancakes — haul them out red hot — drop them into an oil bath where they sink to the bottom of the tank with a prolonged sizzle.

Entering the wiring and assembly department you see row after row of men and women earnestly engaged in drilling, riveting, soldering, wiring. Thousands of tiny parts like pieces of a jigsaw puzzle fall into place under the guidance of well-trained fingers. A mass of seemingly unrelated materials take form before your eyes. From one pair of hands to the next in line the units travel steadily down the long tables. Frameworks are erected, housings fitted, chassis wired, circuits tested and the finished products crated and hauled off to the loading platform — a continuous parade passing through the shops with clocklike precision.

In the course of the tour you discover that even your exclusive badge will not admit you to certain areas. All is hush-hush — and you reluctantly pass by with your curiosity completely unsatisfied. Even the men working in these particular sections do not know how or where the equipment they are building will be used by our armed forces. Blueprints, you learn, are guarded with the greatest precaution and locked away when not in actual use.

Throughout the trip you are impressed, as one always is who visits this plant, with the accuracy and durability of the craftsmanship. How priceless now the long years of Bell System research and development! How wise those laboratory experts who aim always for something better! Never in its history have Western Electric's high manufacturing standards assumed such importance. For this radio equipment is playing one of the most vital roles in America's great battle. On bombing and fighting planes, on tanks, on battleships, cruisers, destroyers and submarines and with the forces on land it must do a perfect job.

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result in decided advantages to the audience and in quality rating for broadcasters. Mr. Streibert believes that it opens up the way to a new age of program specialization whereby stations will come under program topical headings. One FM station will be known for its symphonic music, another for swing and dance tunes, a third for news, and so on. According to Mr. Streibert this is not practical on AM although in a limited way some broadcasters have attempted it.