

BROADCAST NEWS



In this Issue



**REMOTE CONTROL
IN ALASKA**



**KOB PICKS
50-E**



**SPEECH INPUT
SYSTEMS**

WORKING FOR DEFENSE



RCA Manufacturing Company, Inc.

A Service of Radio Corporation of America
Camden, N. J.

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ENGINEERING PRODUCTS DIVISION

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RCA MANUFACTURING COMPANY, INC.
CAMDEN, NEW JERSEY, U. S. A.

A DIRECT STATEMENT OF FACT



WE at RCA recognize the National Emergency as a period when our own desires and preferences must be shelved. While it has always been our wish to give the utmost service to our customers, today we find that much of our effort has to be diverted in order to cooperate to the fullest with our Government's all-out Defense Program.

Much of our plant space, facilities and a large number of our engineers are being devoted to defense work. We feel that you will agree it is only proper that we concentrate our energies in this direction **AND MAKE OUR NUMBER ONE JOB THAT OF NATIONAL DEFENSE.**

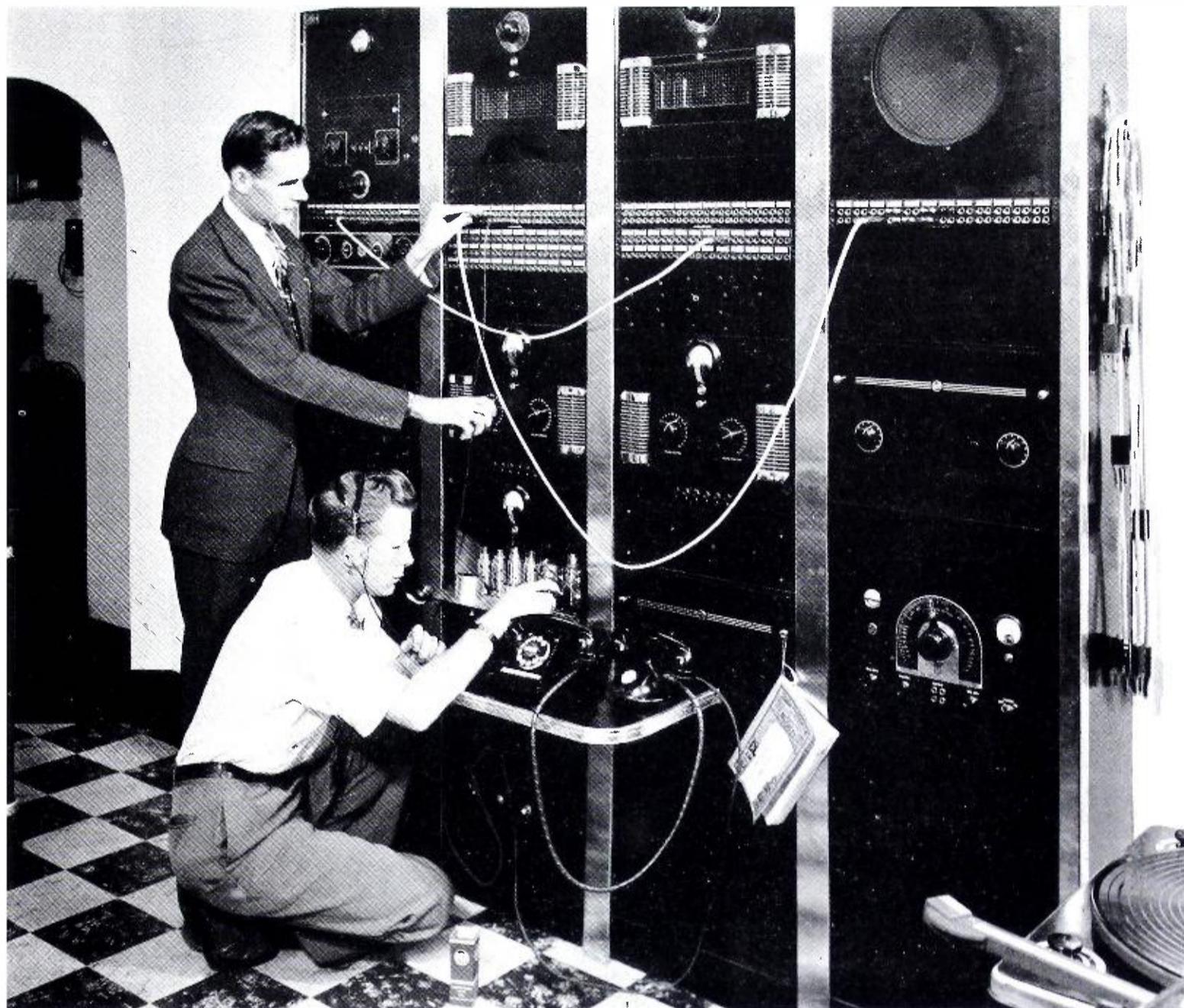
If, as time goes on, we are unable to render the same degree of service to our customers that we have rendered in the past, we hope you will be patient with us and have a sympathetic understanding of our problems. Rest assured, though, that there will be a redoubling of our effort to do everything possible to provide you with equipment that is essential to your

operations. This will naturally mean greater effort on the part of all the men and women in the RCA organization—engineering, purchasing, manufacturing and other departments. This cooperation they cheerfully give because they recognize the important role broadcasting must play during the period of emergency.

It should be borne in mind that even though great sacrifices were willingly made by us; even though we had ample plant capacity to take care of both defense and customer requirements; lack of essential materials would still make it impossible for us to give you the type of service to which you are accustomed from RCA.

We all realize that the present emergency will pass. Things will some day return to their normal status. When that very happy moment arrives, RCA hopes to walk into your station with the feeling that we have not only fulfilled our obligation to national security, but also, our obligations to our best friends, our Customers.





Chief Engineer Hubert Brown and Operator Wilson Pace checking RCA Speech Input Equipment.

UP-TO-DATE EQUIPMENT FEATURED AT WFBC

Greenville, S. C., Station Modernizes Studios

STATION WFBC, Greenville, South Carolina, recently opened its new modern air-conditioned studios, in the Poinsett Hotel in Greenville. WFBC's new quarters were constructed with an eye towards compactness in an effort to effect a maximum of comfortable efficiency in operation from the available working space. The studios were designed by H. A. Clarke of the engineering staff of the National Broadcasting Company in collaboration with WFBC's staff.

The reception room and business offices are located in the en-

trance wing of the station. Two large audience studios and two small announcers and news studios form a battery of four which faces the master control room. The announcers room is adjacent to the two news studios. The master control room is reached by a long corridor running from the reception room past the business office, by the battery of studios and transcription department to the control room workshop, which opens into the master control room. Lighting throughout is provided by a new fluorescent lighting system, and

as protection against any possible emergency, an auxiliary lighting system has been installed.

The control room has four racks of new RCA equipment built into the wall behind the operator's desk. Three consoles and four turntables form a half circle in front of the racks. There is one console for each of the two large audience studios and one for the two small studios and the control room. Each console is able to handle three mikes, two turntables, a remote and the network . . . the net being available

(Continued on Page 36)



The RB-2 meets incoming Pan American Electras and Lockheed Lodestars now on 4 times weekly schedule to Seattle.

REMOTE CONTROL IN ALASKA

Special Problems Presented by Conditions in the North

By STANTON D. BENNETT
Chief Engineer, KFAR

TRANSMITTING special events in the vast territory of Alaska presented a new problem to station KFAR,¹ Alaska's only interior broadcasting station, with often fifty to a hundred miles between cities connected only by airplanes on skis during winter months and by river boats and Alaskan airlines during the summer. The telephone lines in Alaska suitable for program transmission could undoubtedly be rolled up on one not-too-large spool.

With program lines virtually non-existent, relay broadcasts were the logical answer. Equipment requirements included a de-

¹ KFAR—1000 watt RCA installation described March 1940 issue, Broadcast News.

sign permitting selection of a wide range of carrier frequencies, sufficient power to cover several hundred miles, self-powered yet portable and light weight for easy installation in the smaller aircraft that are sometimes used to land on notoriously short and narrow Alaskan landing fields.

Street corner quizzes, airport remotes, dog races, ice hockey and local special events required even greater portability than could conveniently be obtained in low frequency mobile equipment. Two separate relay transmitters seemed to be the best solution. Complete freedom from fixed antennas was most desirable, especially during winter months when snow, ice and occasionally 20 or 30 below zero

weather makes it neither desirable nor comfortable to make unnecessary connections.

The most practical, completely portable pack transmitter found on the radio market, was the RCA RB-2 with telescoping antenna operating on the 30 MC relay broadcast band. The 2 watts output from push-pull 1H4G's might seem off hand a bit low-powered for high quality relay work, and we installed a special 9-meter receiver on top of the Lathrop Building in our downtown studios in contemplation of only a 1 or 2 mile haul. We were both surprised and pleased to find the pack putting through R5 S9 high quality signals at our transmitting plant receivers over miles from the local airport,

which incidentally, is lined with metal hangars partially in the path of the signal.

Since the early spring of 1940 the RB-2 pack transmitter has covered events, from airport arrivals to the Fairbanks Dog Derby Classic, including several broadcasts made directly from airplanes. The light and compact 30 pound transmitter neatly strapped on an announcer's back has carried many an interesting interview with the governor, visiting senators, airline officials, tourists, etc., many of whom might have eluded the microphone except for the complete mobility of such a unit in airport crowds.

Regularly scheduled "Curb Stone Quizzes" have also many times proved the worth of this portable unit especially when it is often necessary to walk across the street to find an interesting interview. Among other novel uses, the RB-2 has been in a kennel of howling Alaskan Husky dogs while making sound effect recordings and, only recently, was on an army base practice range to pick up the chatter of new machine guns under test.

An interesting point is the affect of cold weather on the performance of this transmitter, which has been subjected to temperatures at both ends of the thermometer, but mostly on the cold end. Many an airport remote and several ice carnival events have been carried at 20 and 25 below zero with the transmitter never yet failing us during a program.

It has been found however that relatively new and live batteries are a requisite at these low temperatures, a point we learned well on a relay broadcast being carried from the campus of the University of Alaska last winter. Dr. Vilhjalmur Stefansson, famous arctic explorer, was speaking to the University student body while on a recent trip north. The relay transmitter had been tested just before the broadcast, but at room temperatures. All went well for the first few minutes until the antenna current began to steadily fall as did also the plate voltage when the transmitter assumed outside temperature. A few bor-



The RB-2 goes up with instructor pilot Dick Ragel and announcer Bud Foster for an aerial commentary on the University of Alaska's Civil Pilots Training Course.

rowed batteries from the physics department saved the day but not without holding a few temporary connections during the latter minutes of the broadcast. Fortunately the temperature was not much below zero.

KFAR's special events department often journeys beyond the range of the 31 MC pack transmitter, which requires the more powerful mobile unit, a 40 watt 5 channel rebuilt aircraft transmitter operating 2.5 to 6 megacycles. The chances of covering an Alaskan remote from an airplane are many times greater than by boat, auto, or the one Alaska railroad, so all equipment is designed to work from a 12-volt aviation storage battery with transmitter, microphone and cables weighing less than 35 pounds.

The winner of the 160 mile Annual Dog Derby Classic tells KFAR audience what he plans to do with \$3000 First Prize Money.



PORTABLE PERFECTION IN RECORDING

RCA OR-1 Equipment Does a Real Job

By W. L. LYNDON

RCA Manufacturing Co., Inc.

Courtesy of A-T-E Journal

THERE was a time during the growth of broadcasting when practically all programs originated from the studio or from the same building in which the studio and transmitter were located. This condition, however, did not exist for long as it was soon realized that many of the important events which had excellent broadcast value could not be brought into the studio. Such items as sports

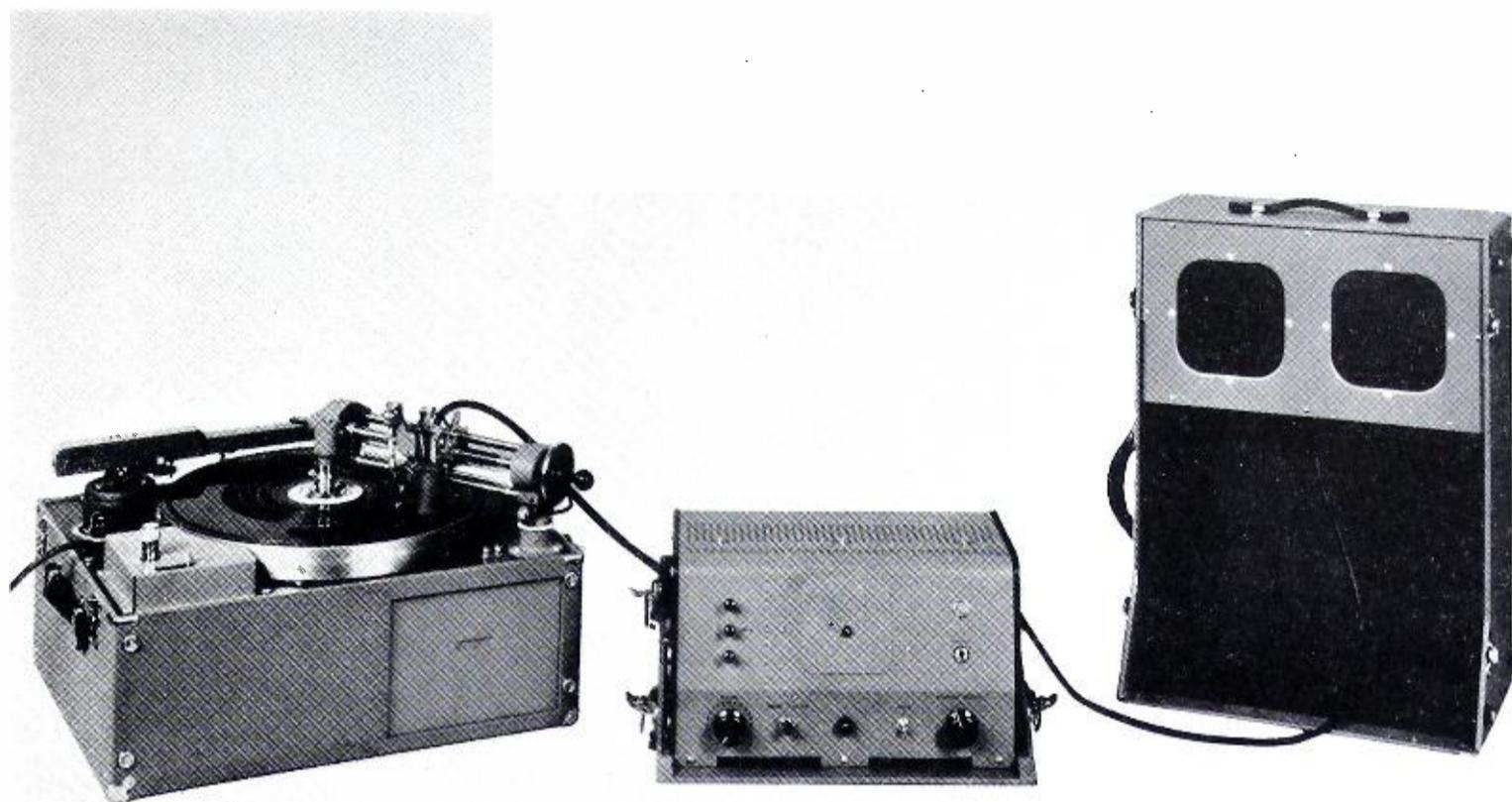
events, dedicatory programs and religious meetings had considerable appeal and, therefore, added a new phase to the system of broadcasting. The demand for handling such remote programs ultimately resulted in the development of remote pickup equipment which, in addition to providing quality comparable to that of a studio channel, also had to be reliable, rugged, easy to set up and operate and be portable in

nature. Remote facilities have so expanded that today many a so-called remote job involves a technical layout of equipment that exceeds that required for the most elaborate studio pickup.

The art of making instantaneous recordings has gone through the same cycle of progress. It was started purely as a studio adventure in which the recording apparatus was set up in the control room and recordings made of



Showing the compact design of the Recording Unit for the OR-1.



The three basic units in the RCA OR-1 Equipment.

a local studio show or a network program. Such an adjunct to broadcasting was immediately exploited by the advertising and sales departments of many of the stations, which resulted in the demand for equipment that could be brought to the spot to make instantaneous recording, as well as to reproduce transcribed programs for prospective clients.

In recording equipment there are several factors, such as fidelity of recording and playback facilities, slippage, "wow" content, background rumble and scratch level, that do not enter into regular broadcast remote pickup requirements. Such items as slippage, "wows" and background rumble are of a mechanical nature and certain basic principles of mechanical design must be followed in order to insure satisfactory performance. If 16" records are to be used for recording or reproducing this will have a direct bearing on the ultimate overall size of the equipment. This also determines to a great extent the weight of the equipment,

since in order to arrive at the overall performance, the turntable platter must have the correct flywheel effect, especially when rim type of drive is employed. Ample driving torque is required, which more or less determines the size of the motor to be used. Reliable means of transmitting power from the motor to the turntable platter must also be used. We must also consider the background noise which may result from the motor, and, therefore, shock mounting and means of acoustically isolating the motor from the turntable platter is necessary. Equipment used to demonstrate recorded programs must have a good frequency characteristic with low distortion and it should be capable of satisfactorily reproducing records made by different manufacturers. Some such type records are lateral cut while others are vertical recordings. Instantaneous recording blanks are coated with a soft material and it is highly advantageous to use a light weight pickup which considerably in-

creases the playing life of this type of record.

It was with these main considerations in mind that the OR-1 was developed and designed so that good quality in both recording and reproducing might be obtained and still have equipment that could be considered portable.

The RCA Type OR-1 Portable Recording and Reproducing Equipment consists of three basic items; namely, the MI-11211 Portable Turntable and Reproducer, MI-4877-A (Type 72-C) Recorder and the MI-11212 Amplifier and Speaker Assembly.

The equipment is housed in two carrying cases covered in umber gray leatherette with reinforced corners. Handles are provided on each unit so that they may be conveniently carried by two persons when so desired. Provisions have been made for carrying and storing the 72-C Recorder in the portable turntable case. The above three items are basic units required for recording and to this may be added a num-

(Continued on Page 33)



The RCA V-225 with automatic record changer.

SHEER MAGIC IN AUTOMATIC RECORD CHANGER

*New Model Approaches Human Intelligence
In Action*

RIGHT: Close-up of the mechanism.



THE "Magic Brain" with the Tandem Tone Arm, a revolutionary new type of automatic record changer which plays both sides of phonograph records without turning them over, has been perfected in the RCA Research Laboratories and is being introduced in the new series of 1942 RCA Victrola Phonograph radios. The new instrument provides two hours of uninterrupted music at the touch of a button.

Further, the "Magic Brain"

mechanisms eliminate the use of old fashioned needles, extend record life indefinitely, and set a new standard in tone quality for home entertainment instruments. One of the Magic Brain Changers, equipped with the Tandem Tone Arm, makes it possible to play both sides of a record without removing it from the turntable.

The "Magic Brain" is really a combination of several important developments perfected by RCA research engineers after many

years of study and experiment. That it represents one of the major advances in the 43-year history of the phonograph is evident. As a matter of fact, the only development of comparable importance in that time was the introduction of electric recording and phonograph methods a number of years ago.

Among the other new features of the device are the Magic Tone Cell (the pickup cartridge), the Flexible Tone Bridge and the

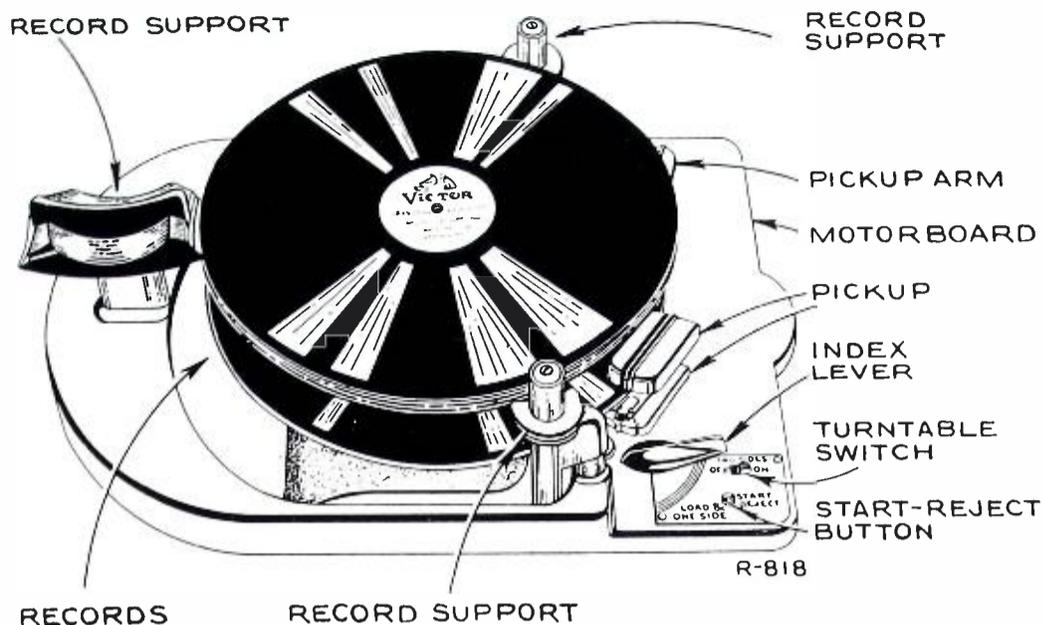


Figure 1—Automatic Record Changer

Jewel-Lite Scanner. The new model equipped with these innovations and the Tandem Tone Arm will play both sides of 15 records without attention once a starter button has been pressed.

How the Magic Brain With Tandem Tone Arm Works

To operate a Magic Brain record player equipped with the Tandem Tone Arm it is only necessary to stack the records on the automatic mechanism and press the starting button. The Tandem Tone Arm, which is actually two arms and two pickups (one for playing the top side of a record and the other for reproducing the lower side) shaped somewhat like a tuning fork, swings over and plays the top side of the bottom record of the stack which has been dropped to the turntable. After reaching the end of the record, the Tandem Tone Arm swings clear of the record while the direction of the turntable's revolution is reversed. Then it rises far enough to make contact with the bottom side of the record.

When the under side has been played, the Tandem Tone Arm swings away so that the record may be deposited gently into a felt lined compartment, after which another record from the bottom of the stack drops into place. The cycle is repeated until all the records have been played. The Magic Brain then automatically shuts off the mechanism.

Secret of the remarkable tone quality achieved with the new in-

strument is the Magic Tone Cell, which is an important part of each tone arm. The cell is made up of Flexible Tone Bridge and the Jewel-Lite Scanner. The former is a fine wire filament scientifically designed to eliminate at the source all objectionable needle chatter. The scanner is a carefully ground sapphire point which replaces the needle. The perfectly balanced Magic Tone Cell exerts a minimum of pressure on the record which combined with perfect tracking, assure indefinite life for the sapphire point and the records and avoids chatter. Grueling laboratory tests, running into many hundreds of hours, have indicated the life-span of the Scanner and Bridge to be far beyond the heaviest demands imaginable.

With the phonograph compartment open and the "Jewel-Lite Scanner" running in the record

groove without amplification, the Magic Tone Cell creates substantially less sound from mechanical vibration than the sound which escaped past the very effective Tone Guard in last year's instruments. With the instrument in normal playing position and the minimum amount of amplification, there is no distortion from needle chatter. This is a tremendous forward step, as needle chatter until today has been one of the biggest negatives remaining in the reproduction of recorded music.

The vibrating parts of the Magic Tone Cell weigh less than a postage stamp despite their effectiveness and rugged construction. The Magic Tone Cell exerts approximately one-half the pressure on the record of ordinary pickup mechanisms, and there is no difference in the pressure regardless of whether the top or the bottom of the record is being played.

The Magic Brain has been incorporated in the 1942 RCA Victrola Model V-225, the most advanced home entertainment instrument ever to leave the RCA Victor laboratories. Housed in a Chippendale Style cabinet with the Magic Brain and all controls available from the front, the instrument incorporates a highly efficient chassis with 12 watts of output through a push-pull audio system. The new RCA Victor Teletube for increased R-F amplification provides increased sensitivity. All other radio features are of the most advanced design.

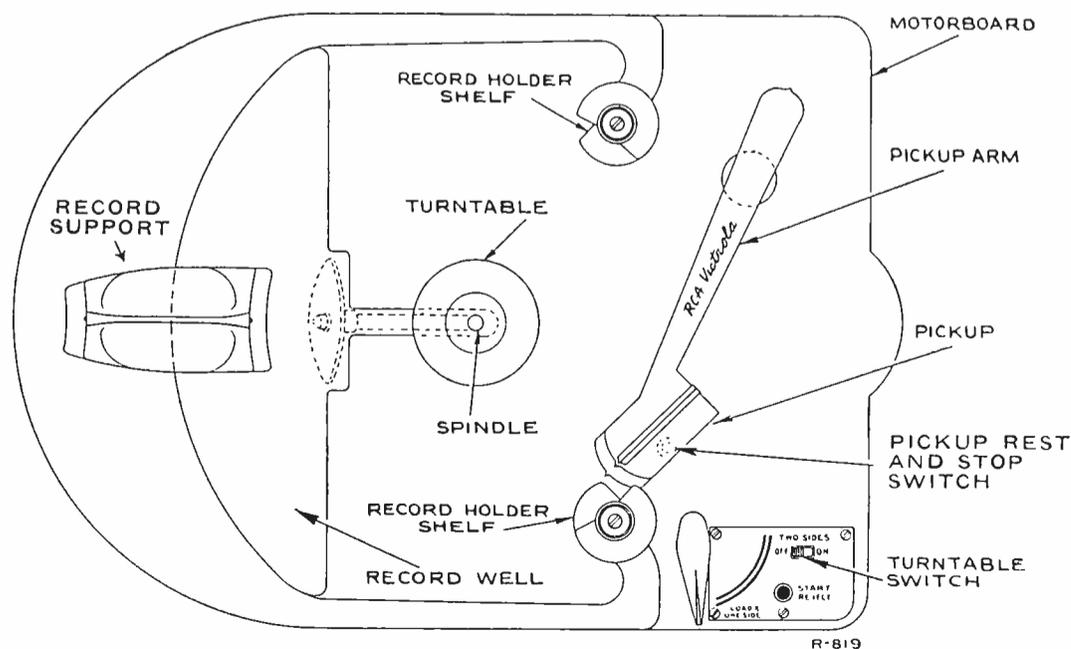


Figure 2—Phonograph

INTERESTING NEW SCHOOL INSTALLATION

*Samuel Gompers Trade School in San Francisco Puts
1000 Watt Transmitter in Operation*

By K. L. DRAGOO
Chief Engineer, KALW

tor, RCA 322-A modulation monitor, 5" oscilloscope, square wave generator, overload circuit breakers for the entire unit, RCA 78-A Beat Frequency Oscillator, 89-A noise and distortion meter and the associated attenuator panel.

Monitor speakers, monitors and VU meters are all terminated on two double jack strips to allow full use and flexibility of this equipment. Six telephone lines, incoming from remote studios at other schools of the city are also terminated at this point and then fed to the control position.

The control bay is triangular in shape and houses the RCA 76-B2 Console, two RCA 70-B turntables complete with 71-B vertical pickups, 72-B recording heads, associated power supplies and amplifier. Mike equipment consists of four RCA 44-BX's for

studio use while RCA 88-A's are in use with the OP-5X and OP-6 remote amplifier's used for pickups at other schools.

The FM-1B transmitter feeds an RCA MI-7823-A co-axial antenna now mounted atop the roof on a temporary tower available for that purpose. A new 150 foot tower however, is under construction, which will raise the effective antenna height to 250 feet above the street level.

Mr. E. S. Winlund, RCA Engineer; E. J. Frost, RCA West Coast Sales Engineer and K. L. Dragoo, KALW Chief Engineer, did the installation and the test work on the transmitter with the assistance of several advanced communication students from the school.

An equipment test period of several hours a day was run from March 10 to 21 with very satisfy-



Student operators Ralph Abry (left) and George Mathiesen (right) do some "high" work while mounting the RCA MI-7823-A Antenna atop one of the temporary towers at KALW.

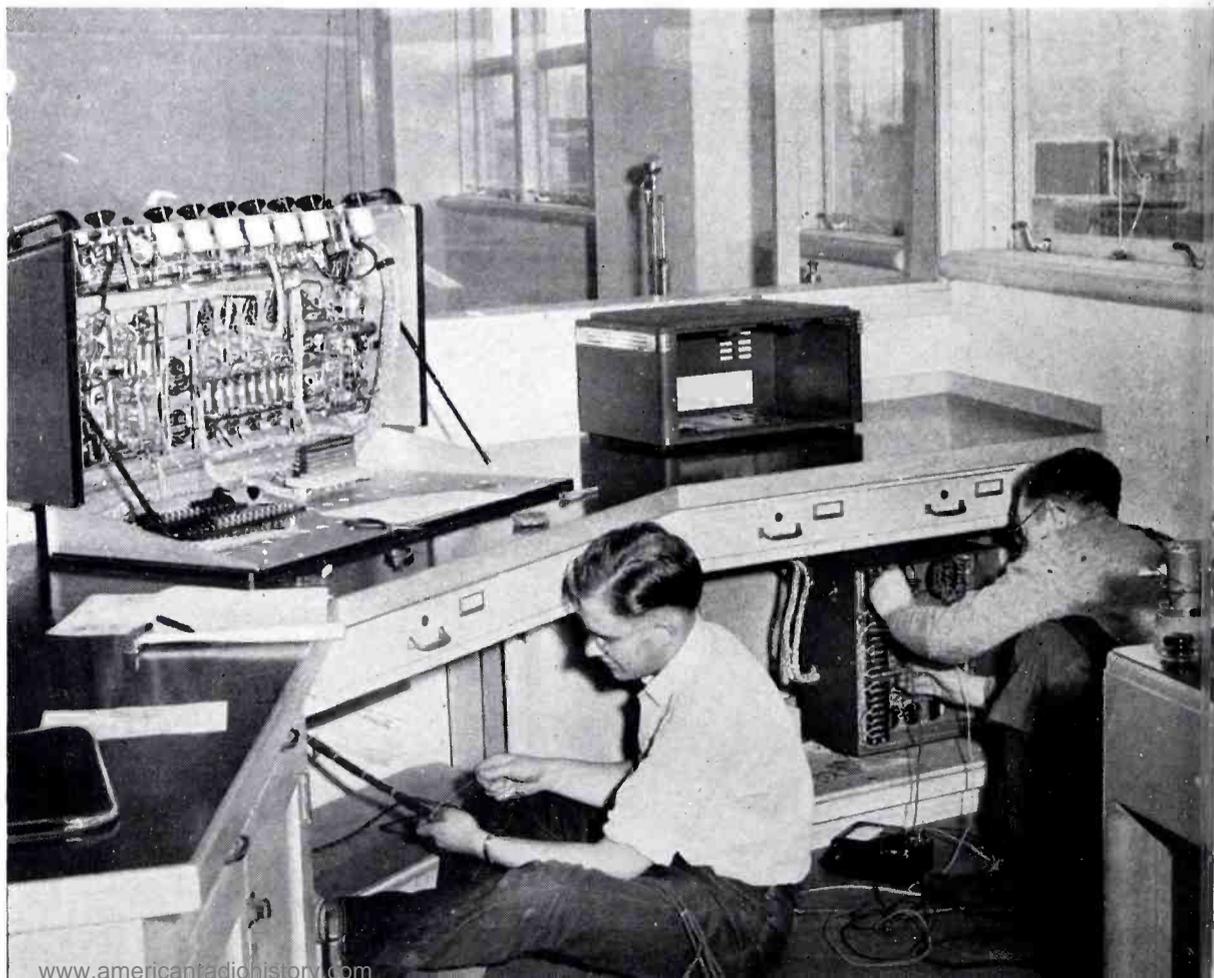
ON March 10, 1941, KALW officially went on the air as the first FM broadcasting station on the west coast.

During a period of three years, this station has been carefully planned and quarters provided in a new building as a part of the Samuel Gompers Trades School, a unit of the San Francisco Public Schools.

After undergoing numerous application changes, due to the change from AM to FM by all educational stations, a construction permit was obtained and an order placed for the RCA FM-1B, 1KW transmitter and associated equipment.

KALW's station housed on the fourth floor of the Gompers' School, includes a reception room, office, shop, control room and one large studio. Six bays of built-in relay racks are provided to house three special receivers for re-broadcast work, frequency moni-

George Mathiesen (left) and Ralph Abry (right), student operators at KALW, install 76-B-2 and Power Supply.





▲ K. L. Dragoo, Chief Engineer at KALW, adjusts frequency while student operator Ralph Abry (right) looks on, and Cecil Dutton, another student operator checks frequency monitor.

ing results. With a temporary antenna, reliable reports from up to 35 miles were received, while astonishing results of local coverage behind San Francisco's rugged terrain were reported and verified.

During the test period noise tests indicated an overall level of under -70DB at normal operating levels and less than .3% overall distortion. A frequency run indicated satisfactory operation, flat from 20 to 15,000 cycles. By use of the preemphasis network incorporated in the FM-1B, brilliant highs and well balanced audio result, which is a real pleasure to hear. Listeners have reported absolute absence of background noise, distortion and marvel at the signal.

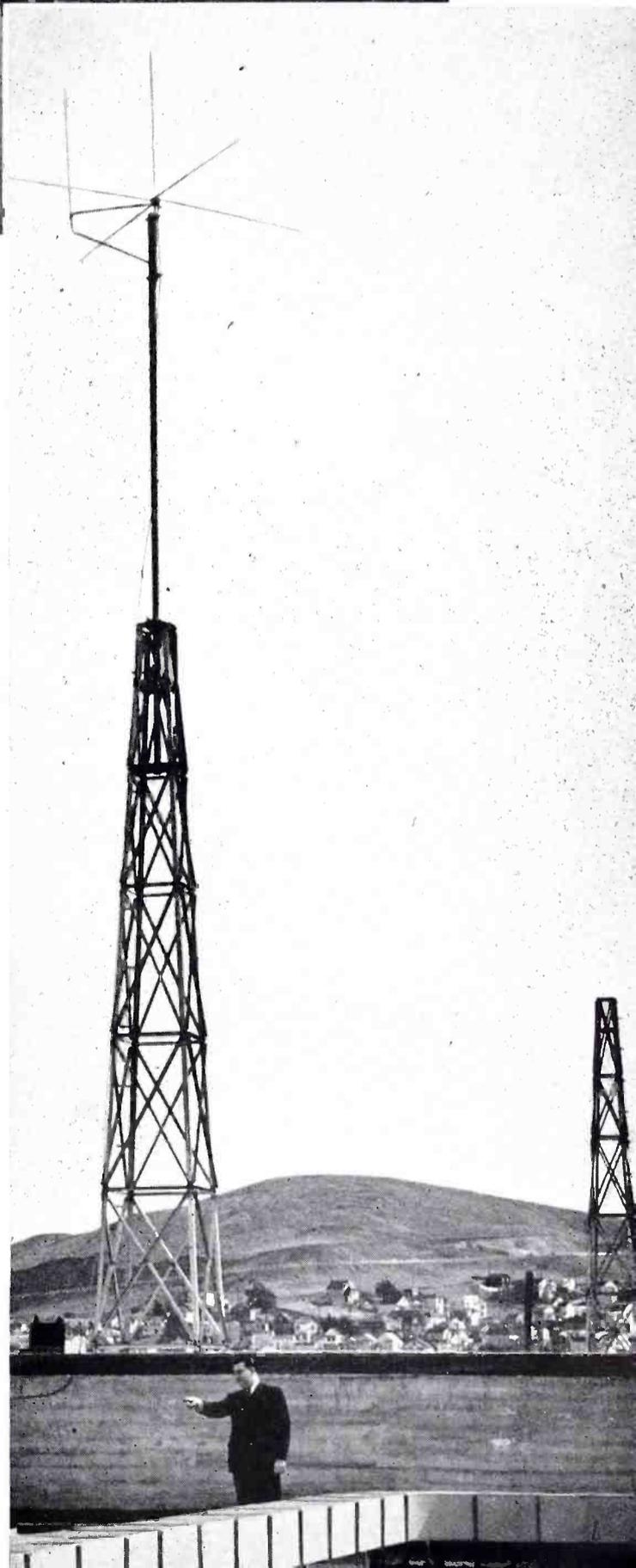
Recently a new RCA OR-1 portable recorder with a 2 turntables have been purchased with a 1000 watt special 115V lighting plant to furnish power for recording educational features in the field for future broadcast use. This station is used as a training school for radio men in the bay area and to broadcast educational programs to the 125 public schools of the city of San Francisco.

● KALW antenna and feed system. ►

Since the inauguration of KALW a majority of the commercial operators of the Bay area have been enrolled in special work on FM and instruments under the instruction of Al Towne, KSFO Transmitter Engineer and Mr. Dragoo, KALW Chief Engineer. This advanced training is sponsored by a committee of employers and IBEW-B-202 representatives as an attraction and opportunity for operators to use the very latest FM equipment.

K. L. Dragoo, as Technical Director, has charge of all engineering and legal phases of operation.

As the first west coast station to use FM, an open invitation is offered to engineers and operators to visit KALW at any time. As the leading radio school on the coast, Samuel Gompers is proud to have gone RCA all the way and to be able thereby to offer free trade instruction to operators on the latest professional equipment.





B. Megatherium magnified 9000 times with the electron microscope operating at 50 KV.

HIGHER VOLTAGES FOR THE ELECTRON MICROSCOPE

Greater Field Opened for Exploration

AS part of a continuing program of research on electron microscopes and their applications, RCA Laboratories announced today that it has operated an electron microscope at approximately five times the voltage previously employed, in order to see deeper into the sub-microscopic world. The purpose of using such high voltage is to permit exploration of thicker materials and organisms than have previously been suitable for inspection under the electron microscope.

The electron microscope as developed by RCA scientists of Camden, New Jersey, permits useful magnifications fifty times greater than is possible with optical instruments, because electrons

—infinitesimal bits of electricity—are used in place of light rays. Magnetic and electrostatic fields replace glass lenses. Thus, with the electron microscope, a blood corpuscle may be enlarged to the size of a two-foot pillow; a human hair to the size of a giant California redwood tree.

The experimental use of potentials as high as 300,000 volts does not increase the resolution of what may be seen through the electron microscope. However, it does make it possible to see internal details of some specimens to better advantage. It also may permit study of cell tissues to a greater extent than previously has been possible. It is expected that the use of these higher voltages

will be applicable particularly to the fields of biology and bacteriology.

The experimental, high-voltage microscope utilizes a large steel tank to house the high-voltage supply. This large container is approximately six feet high, five feet in diameter, and filled with oil, weighs three tons. Also incorporated in this instrument is a unique radio circuit using radio broadcasting type vacuum tubes for generation of the high potential. Because the electrons generated in the experimental instrument travel at great velocity, X-rays are generated—consequently the apparatus has been shielded with heavy lead sheet.

The use of the high voltage in

this experimental instrument causes the electrons to travel with two to three times the velocity of the commercial instrument. The increased velocity provides the greater penetrating power which often reveals more detailed structure of specimens.

Development of the new high-powered microscope, which makes it possible for the electronic "eye" to penetrate objects two to three times as thick as heretofore, has been in progress in RCA Laboratories for many months, under the supervision of Dr. V. K. Zworykin, James Hillier and Arthur W. Vance. The goal of their early work in development of the electron microscope was to obtain maximum resolving power and to simplify construction, so that a practical instrument could be designed to plug into an ordinary light socket for operation. This they did. Now, in a report on their latest success in further development, Dr. Zworykin, Hillier and Vance state:

"In order to investigate the possibility of obtaining images of the internal structure of thicker

specimens by the use of high voltages for the acceleration of the irradiating electrons, we have constructed in the RCA Research Laboratories an experimental magnetic electron microscope capable of producing images of high resolving power with 300-kilovolt electrons. Except for the design of the high-voltage generator and a few modifications of the microscope column resulting from the change to higher accelerating potentials, the instrument is the same as that which already has been made available commercially."

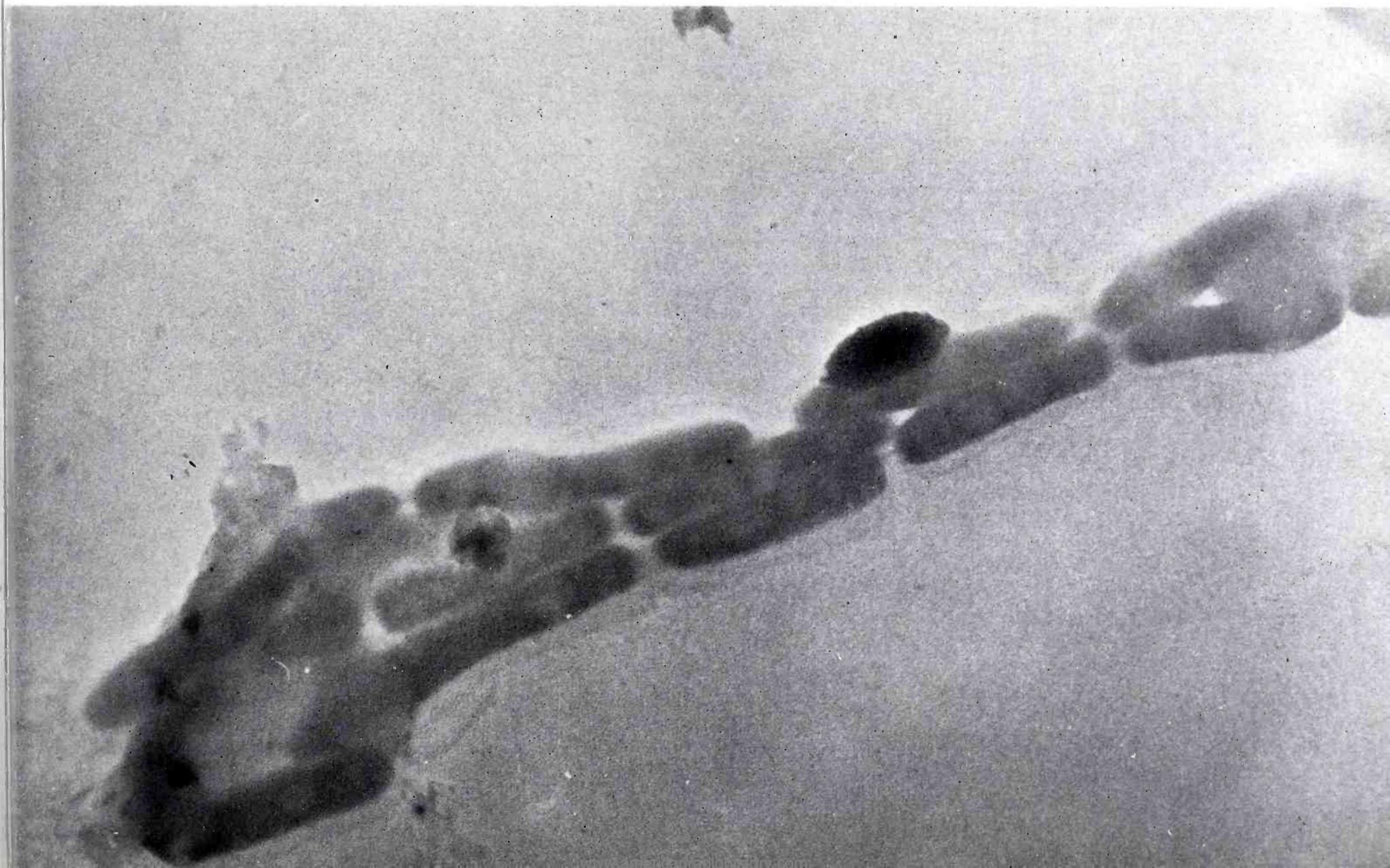
Describing preliminary results from operations with the 300,000-volt instrument, which at present is classed as "developmental," the scientists continue:

"While it is not yet possible to describe any quantitative results obtained with the new installation, it is possible to show a few examples of the results that are being obtained, and which demonstrate the increase in penetration obtained with the use of higher accelerating potentials.

"A series of micrographs of an ordinary blood smear on collodion were taken at 50, 100 and 200 kilovolts. The exposure times of the negatives and the prints were adjusted so that the intensity of the image of the clear space in the specimen is the same in each case. The red cells and the thick serum appearing in the micrograph taken with 50-kilovolt electrons were completely opaque, while with 200-kilovolt electrons they were transparent. . . . A comparison between the micrograph of bacillus megatherium taken with 50-kilovolt electrons and the same group of organisms with 200-kilovolt electrons shows that a considerable amount of structure becomes differentiated in the inner part of the organisms when it is viewed by 200-kilovolt electrons."

Development of the high-voltage electron microscope has been an experimental project, with no immediate plans for commercialization. The project is one of a series being conducted by RCA Laboratories to determine new methods and applications for the instrument.

The same specimen magnified 9000 times with the microscope operating at 200 KV. Note the vastly greater penetration and clarity of structure discernible.



SUPER INSTALLATION FOR PENNSYLVANIA'S SUPER HIGHWAY

Efficient System Devised for Application to Highly Specialized Requirements

▲ Radio control desk at Pennsylvania Turnpike Police headquarters showing policeman on duty with modern RCA radio equipment conveniently at hand.

Photo of high-frequency antenna on top of mountain with cable leading to a relay station. Similar antennas are located on five other mountain tops and ▼ at the Turnpike police headquarters.

THE Pennsylvania Turnpike radio communication system, unique in the annals of radio installation, is a "party line" over which one person may speak from any control point on the highway and be heard simultaneously at every other point.

The system uses transmitting and receiving sets on each of the twenty-six patrol cars of the Turnpike Commission, assigned to its exclusive use by the State Motor Police; twenty-four two way sets in ventilation buildings at each of the seven tunnels through which the highway passes, on maintenance and fire trucks, each of the toll booths where other highways enter the Turnpike system, cars of the three toll tellers, the superintendent of Fares, headquarters of the State Motor Police and the Turnpike Commission, both at Harrisburg, and the Turnpike Police headquarters at Bedford. There are twenty-five strategically located additional points for reception only.

This set-up affords the motoring public a safeguard for accident prevention, the like of which does not exist anywhere else in the world; it provides a new and speedy means of police communication for crime prevention and detection; it provides a system of radio transmission and reception

that can be of incalculable value in the movement of troops or mobile equipment in national defense.

Since police cars operating in both directions pass any given point on the turnpike every twenty minutes, a complete twenty-four hour check-up is obtainable on road conditions, fog, flood, or for sudden emergencies.

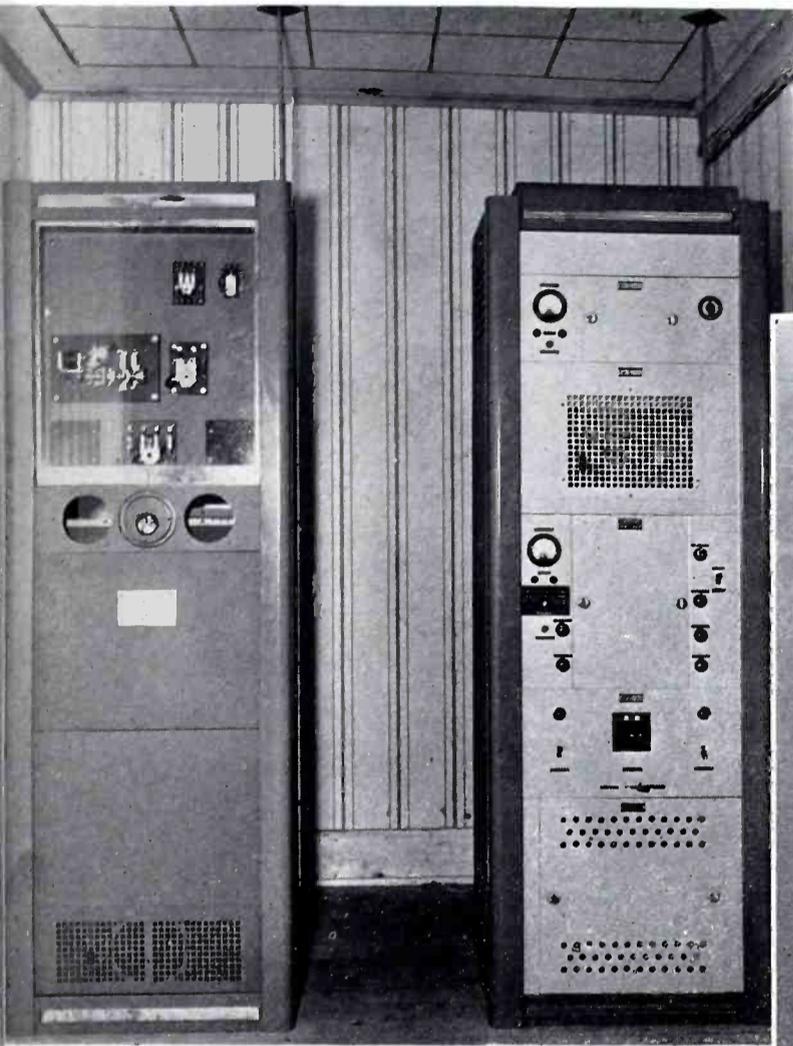
Should a patrol car whistle down a reckless driver and the latter fail to stop, a few words spoken into the hand set telephone, located on the dash board of the car, and the reckless driver can be halted within a few minutes. The same speed in service applies likewise in meeting any other emergency.

Three important factors in the Turnpike radio communication system stand out to make its construction, installation and operation noteworthy.

It spans the 160 miles of highway with a continuous, uninterrupted service, maintained over mountainous country by the use of ultra-high frequency equipment.

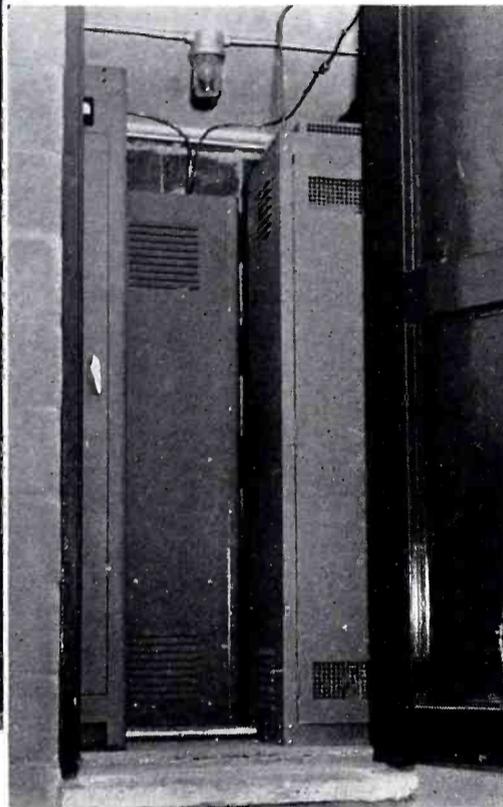
Each piece of apparatus is designed, not as a single unit, but as an integral part of a complete, coordinated network.

In its construction and installation, the use of ultra-high frequency radio waves, which move



◀ Close-up of receiving and transmitting equipment as installed in police headquarters.

Inside view of a relay station showing RCA automatic receiving and transmitting equipment. These stations are so constructed that they are virtually tamper-proof.



in a horizontal plane instead of following the curvature of the earth's surface, has been made possible by the erection, thirty-five miles apart, of specially designed antennas with booster transmitting and receiving equipment. This equipment is the heart

of the Turnpike system. The transmitters and their associated pick-up receivers were specially designed. They are located on mountain tops between Harrisburg and Pittsburgh and operate automatically in either or both directions.

Because of the approximate line of sight direction of the radio waves, had there been only two antennas, one located at each end

of the Turnpike, they would have had to tower 19,000 feet into the air. Had there been three, they would have had to be erected to a height of 4,900 feet each.

Under the booster arrangement, the antenna nearest the point of transmission picks up the radio waves before they get out of range and its associated relay transmitter shoots them along to the next relay point in either direction.

One of the requirements laid down by the Turnpike Commission was that all equipment had to be installed within the confines of the Turnpike right of way—a distance of 200 feet.

This introduced a serious interference problem which necessitated the use of specially designed antennas. This was done at the RCA research laboratories, in Camden, N. J., by Dr. G. H. Brown, internationally famed authority on antennas. Horizontal and vertical polarization was used in order to transmit and receive messages from fixed stations, patrol and other cars, and to relay such messages from mountain to mountain.

Much of the radio equipment is installed in unattended, unheated buildings on the mountain tops. To insure continuance performance, that factor has been met by the installation in each of a gasoline motor which drives a generator. These spring into operation automatically in case of interruption of the regular power, which is carried from the source

(Continued on Page 16)



▲ Two-way radio set is installed in all motor police patrol cars. In case of an emergency the patrolman on duty can receive as well as send messages to various control points along the super highway.

Motor police are available constantly.



SUPER INSTALLATION

(Continued from Page 15)

of supply over five miles of cable to these remote stations.

The mountain-top relay stations are similar to those used in giving distance to television transmission. To make them tamper-proof they are encased in steel. The antennas are embedded in more than seven feet of concrete and are built to withstand a gale of 150 miles an hour velocity even when encrusted with an inch and a half of ice. They function in temperatures ranging from thirty degrees below zero to 120 degrees above.

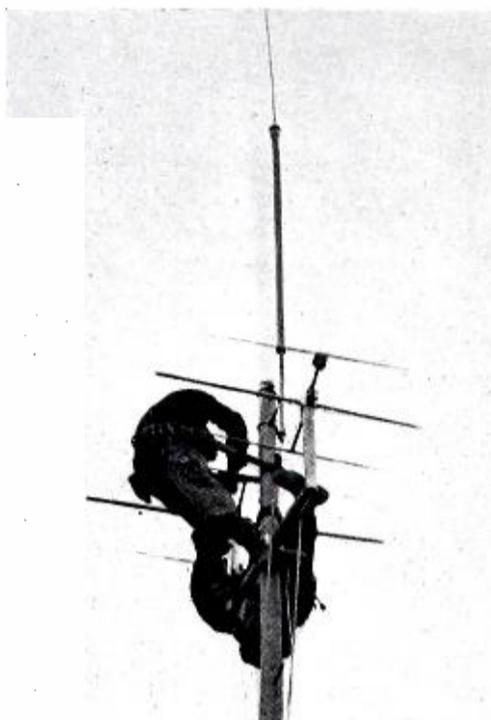
The system was designed by L. P. Clark, engineer for Raymond Rosen and Company of Philadelphia, which installed it. The equipment was furnished by the RCA Manufacturing Company of Camden, N. J. Seventy five persons, working under the direction of Mr. Clark, D. N. Lapp, chief engineer for the Rosen Company and Herman Miller, Jr., resident engineer for the Turnpike Commission, were employed for six months on the installation.

To perform the various functions required of the Turnpike radio communication system, and at the same time conform to the rules and regulations of the Federal Communications Commission, several different types of equipment were installed.

This apparatus may be divided into three classifications; the amplitude modulated apparatus, operating in the 30-40 megacycle band; the frequency modulated apparatus, operating in the same band; and the amplitude modulated apparatus, operating in the newly assigned 116-119 megacycle band.

In radio equipped cars on the turnpike it is essential that any particular car be able to travel from one end of the highway to the other and still be constantly in two way communication with headquarters.

To provide for this, single mobile transmitting and receiving frequencies are utilized. This al-



A close-up of the top section of an antenna.

lows all cars to be interchangeable. Interference is eliminated through the use of frequency modulated apparatus.

The 116-119 megacycle receivers operating in the relaying circuits are highly selective. Connected to the directional antenna they may receive a signal transmitted over a distance of thirty-five miles, without receiving a similar signal transmitted on an adjacent frequency by a transmitter located within 200 feet of the receiver.

In order to follow the path of a typical message, which, sent from one point of transmission, is heard simultaneously by each of the seventy-five receiving points along the Turnpike, let it be assumed that the call originates in a toll booth at Irwin, the western terminus of the highway.

The operator uses an ordinary, French style telephone hand set. With a flick of his finger he throws the switch to transmit. This action controls an exciter transmitter located at that point.

Out through the ether go the ultra-high frequency radio waves, to be picked up by the first automatic reception and relay transmission station located on top of Laurel Hill, 33 miles eastward from the toll booth.

At that point the received signal energises a relaying transmitter which operates in the 116-119 megacycle portion of the radio spectrum. It also energises a frequency modulated transmitter likewise located on top of Laurel Hill, which passes the incoming message along to all mobile units within its coverage area, or about thirty five miles. Concurrently, the 116-119 megacycle transmitter is passing the same message along to the balance of the toll booths in its area and to the various maintenance buildings along that end of the Turnpike.

The 116-119 megacycle transmitter also performs an additional function of great importance. It relays the message along to the top of the next mountain, which, in this case, is the Allegheny Mountain. There another relay station, operating on a like frequency, boosts the radio waves along to the next relay point eastward on Ray's Hill.

These performances are repeated similarly by RCA equipment installed by Raymond Rosen and Company, on the tops of Sideling Hill, Tuscorara Mountain, and Blue Mountain from which point the message arrives at the Headquarters of the Turnpike Commission or the State Motor Police in Harrisburg.

The time required for the message to travel from one end of the turnpike to the other is just as long as it takes the man in the toll booth to speak it. During its journey eastward from Irwin, the frequency modulated transmitters pass it along to both fixed and mobile units (police cars and crash trucks) within the particular coverage range of each transmitter.

In this "party-line" communication, any message may have its origin in any mobile or fixed equipment along the Turnpike tied in with the system, be it a patrol car, maintenance shed, toll booth, crash truck, or the State Police headquarters at Harrisburg and Bedford, and be heard by each and all.

KOB PICKS 50-E

Vast Area Covered by New High Power Equipment

By **GEORGE S. JOHNSON**

Chief Engineer, KOB

KOB, Albuquerque, New Mexico, located in the heart of the great Southwest, is serving a huge open country of over 150,000 square miles. The greater part of the radio listeners in this area depend solely upon KOB for radio reception. KOB has long realized the need for 50,000 watts of power to cover its service area which is as large as the combined states of New York, Pennsylvania, New Jersey, Rhode Island, New Hampshire and Massachusetts. Reception in this huge open country is extremely important to every person as radio is often their sole source of education and entertainment. Radio is a vital need to isolated homes in New Mexico. When RCA announced the economical operation of the 50-E transmitter, it gave KOB the first opportunity to increase to 50,000 watts.

The leaner population density in New Mexico makes it necessary to strictly limit station operating expense in order to keep the KOB advertising dollar com-

parable with major markets, so it was important that we find a transmitter with clever engineering features that would result in minimizing our installation cost, yet make no sacrifice in program quality or service.

There were a good many reasons why KOB chose the RCA 50-E transmitter. The high level Class B modulation system requires a minimum of power input. Then too, the 50-E transmitter was designed for a very small floor space, so that KOB was enabled to minimize the size of the addition needed for the transmitter building. The simple pi output circuit on the 50-E power amplifier and its associated push-button control, enabled KOB to eliminate an expensive over-all voltage regulator, because the push-button tuning system on this transmitter makes it possible to vary the coupling to the antenna and so compensate for the change in power output, due to line voltage regulation.

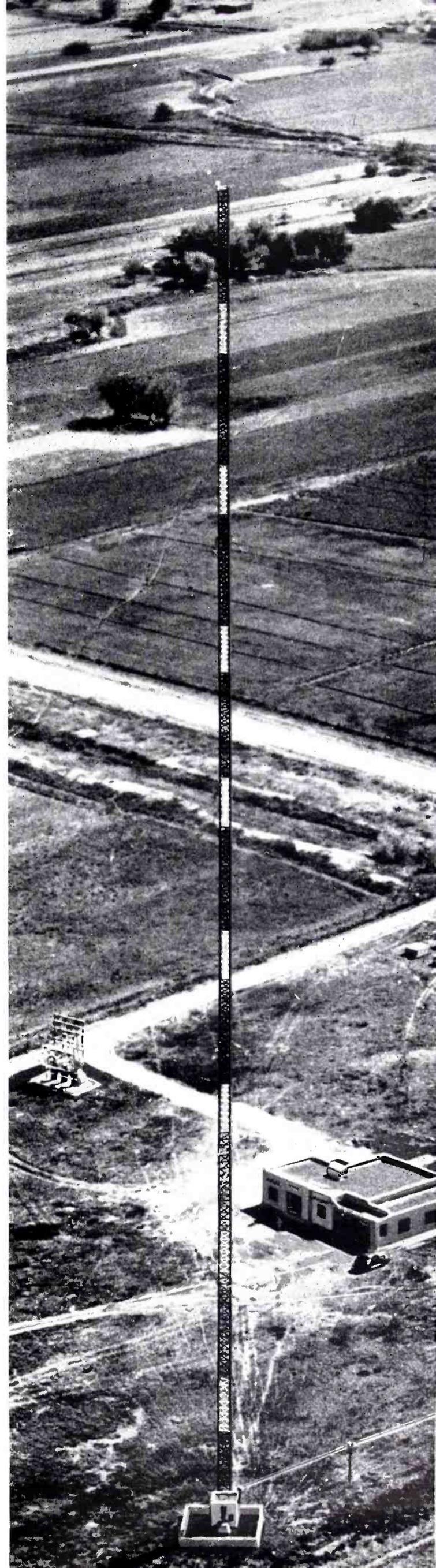
KOB has already found another use for this tunable pi output circuit. The two variable condensers in this circuit are tuned by means of push-buttons on the front panel. With this push-button tuning, the coupling to the antenna can be varied over a wide range. The FCC has given KOB license to operate 50-kw day and 25-kw night, until a directional system can be erected. The pi output circuit is so exceedingly flexible, that we are able to reduce power from 50-kw to 25-kw by merely pushing the coupling condenser button. No retuning of the plate circuit is required and the power reduction is accomplished without the slightest pause in carrier or program.

This pi circuit also is instrumental in reducing maintenance
(Continued on Page 20)

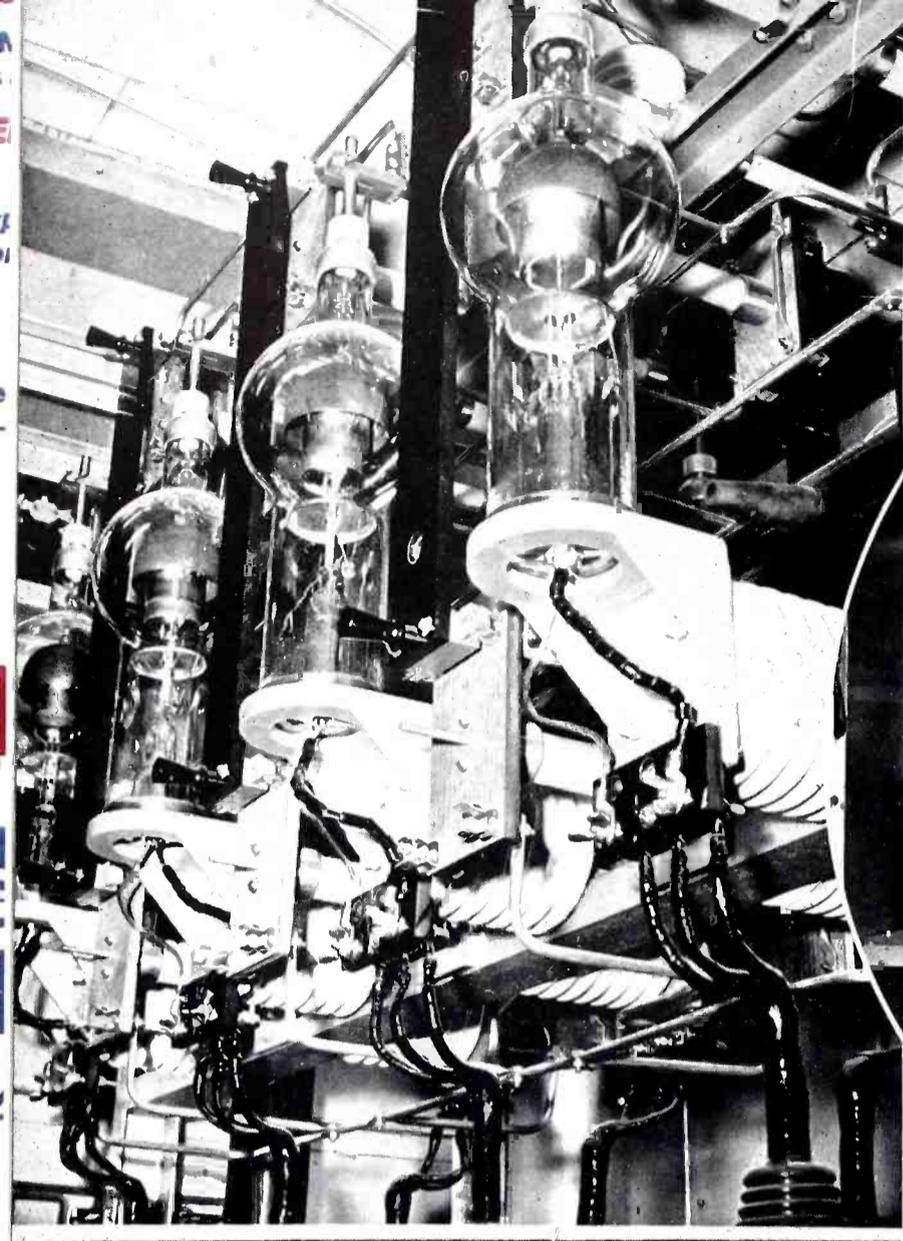


George S. Johnson, Chief Engineer at KOB.

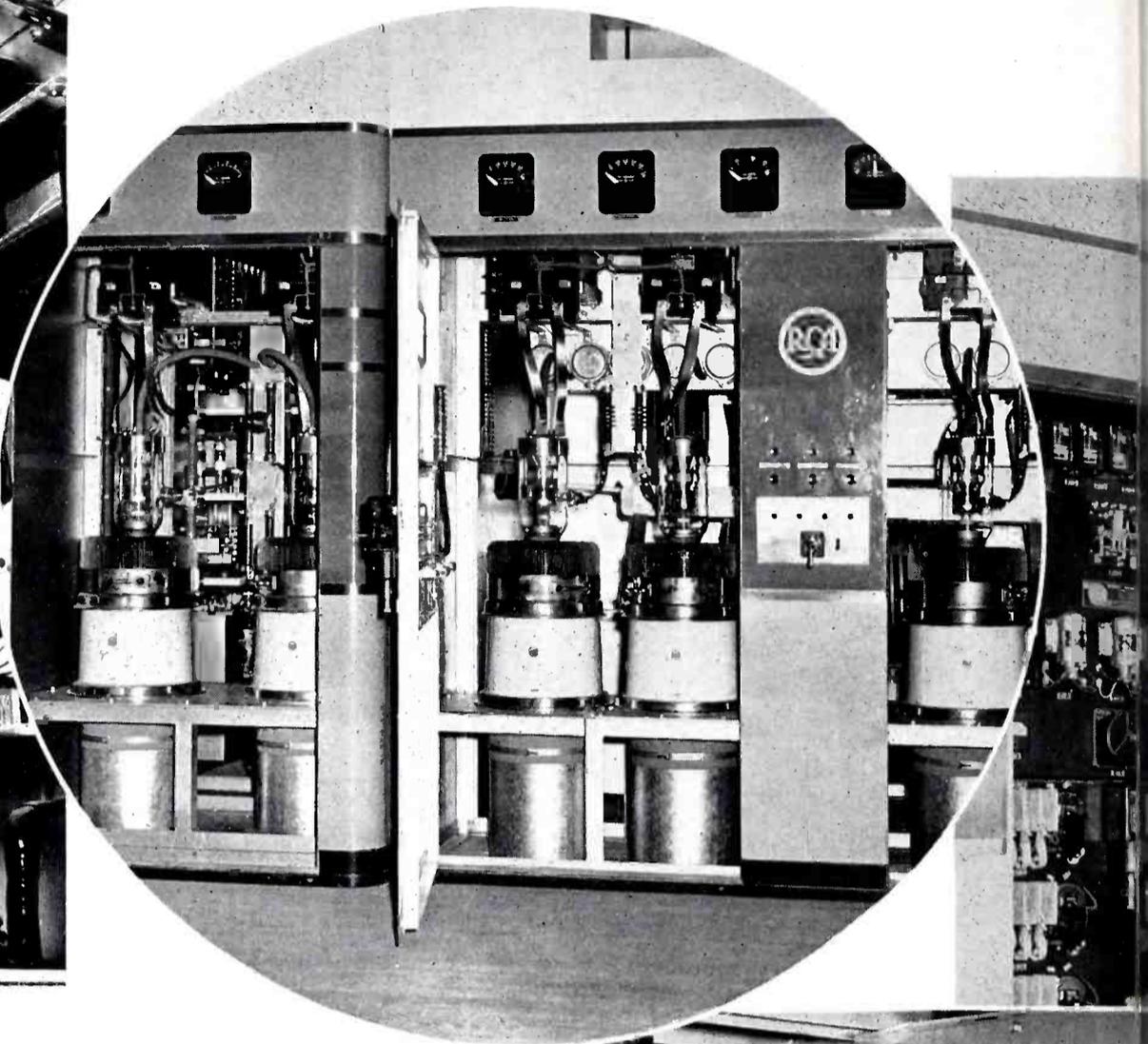
KOB's 445 ft. uniform tower.



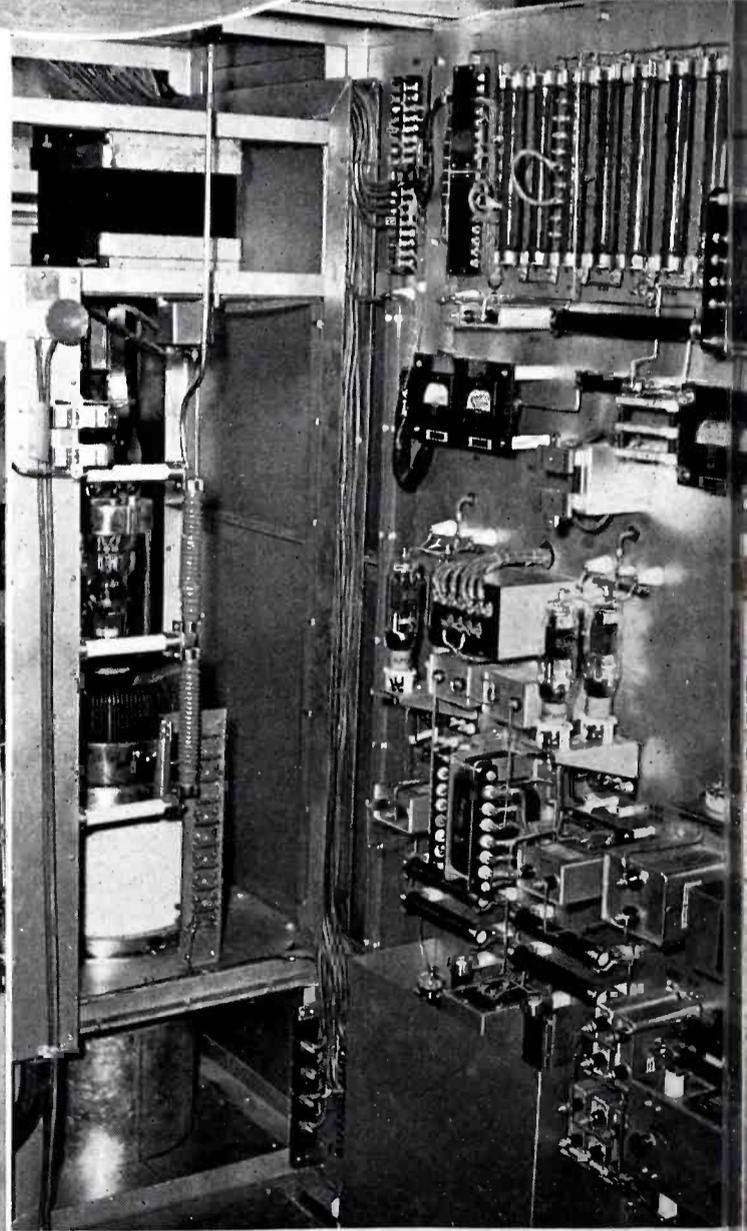
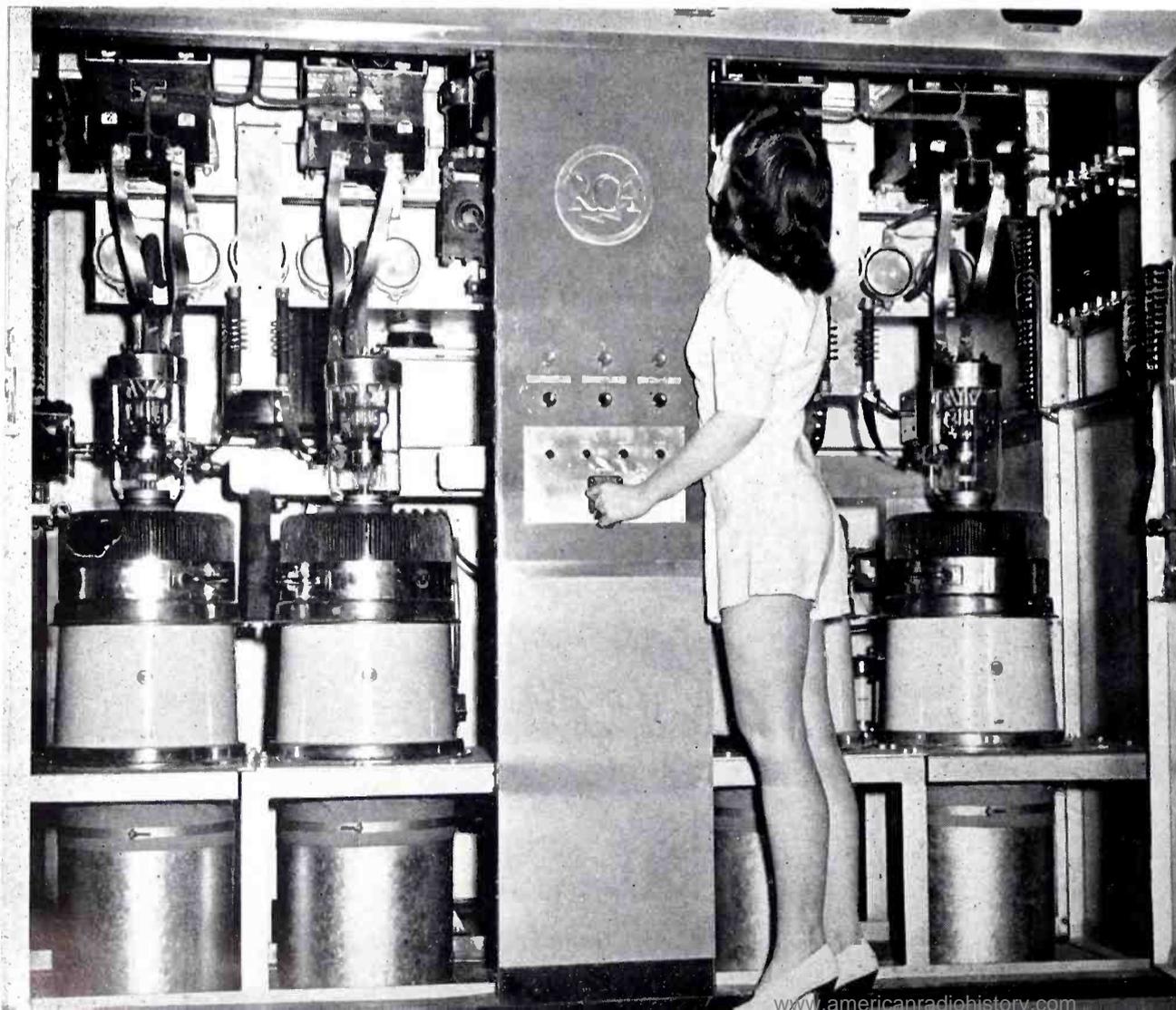
KOB—PROGRESSIVE STATION GREAT SOUTHWEST



Showing a tube array in the rectifier unit.



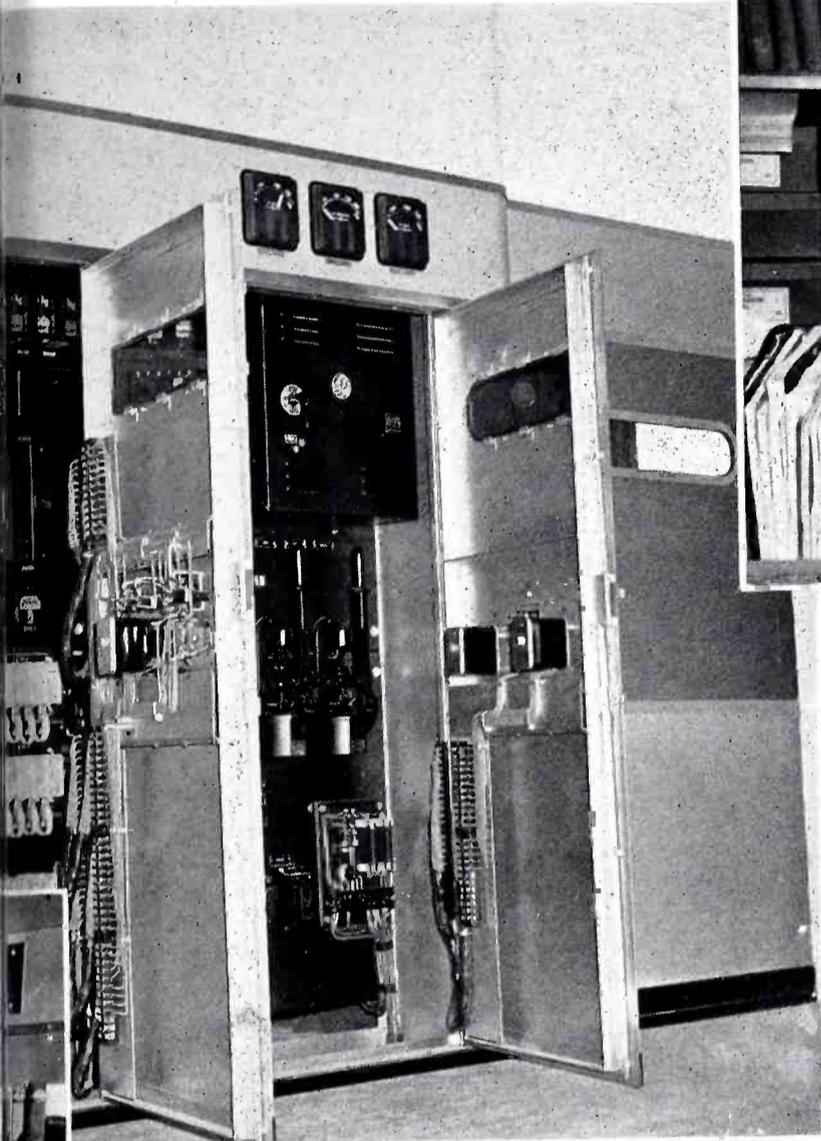
IN CIRCLE: Portions of the Modulator and Power Amplifier Units in the Albuquerque station.



ABOVE: Control and distribution panel.

LEFT: Air Cooled Tubes in the 50-E Power Amplifier. Note: External unit is KOB development—not supplied by RCA.

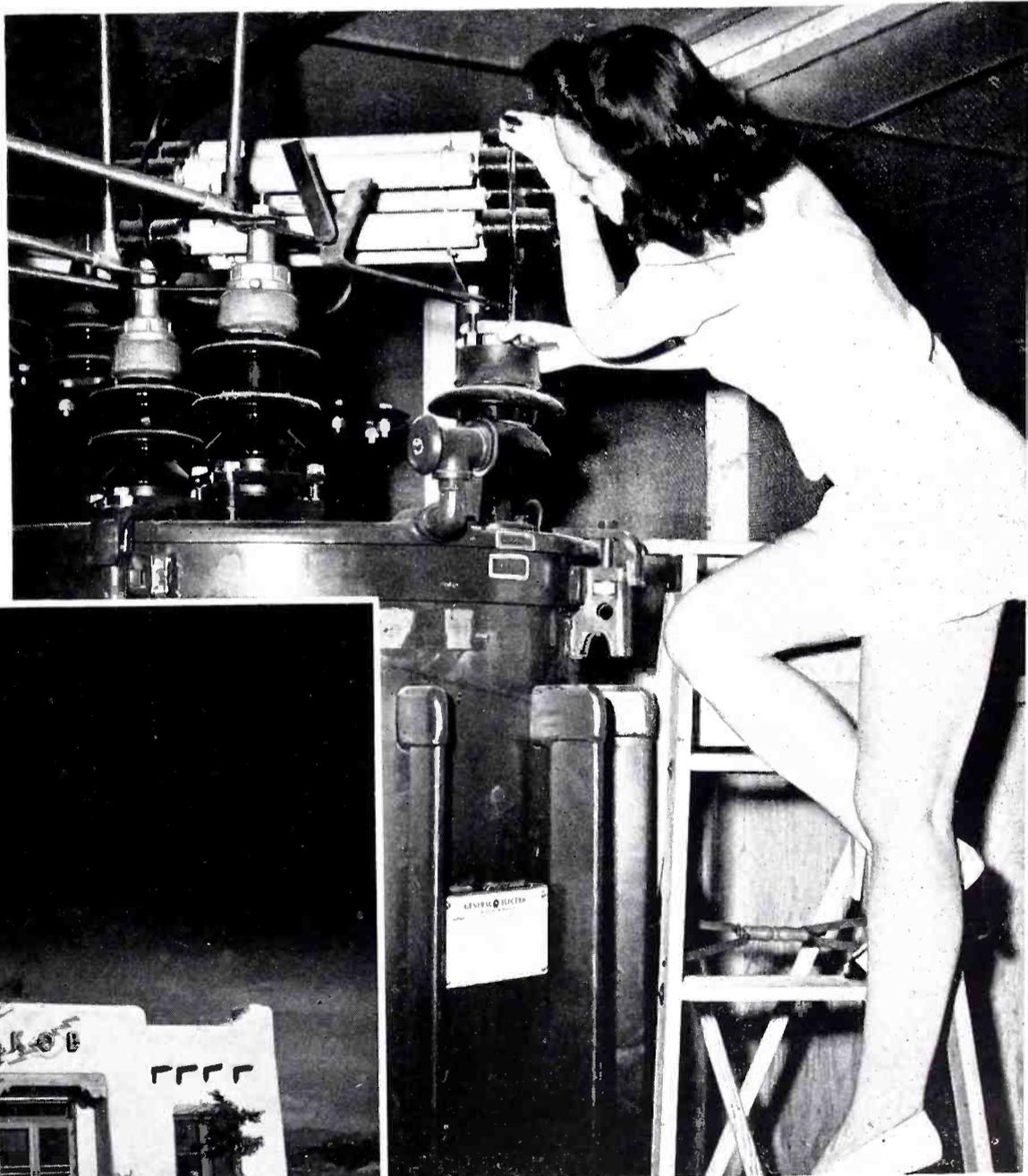
ATION OF THE VEST



ABOVE: Audio Amplifier-Modulator in the RCA 50-E at KOB.



KOB Technical Staff—Left to right: Geo. S. Johnson, Chief Engineer; Jack Phillips, Ass't.; James Stapleton, Ass't.



ABOVE: Stepping up power at KOB was accomplished with a complete absence of shorts—in the equipment.

LEFT: The Spanish Pueblo type transmitter house for this high power station.



KOB PICKS 50-E

(Continued from Page 17)

schedule and is required to keep the amplifier in tune. All necessary retuning can be done during regular operation.

The audio equipment used to drive the modulator in this transmitter is extremely simple, using only four of the 828 beam power tubes to drive the modulator tubes. All the audio equipment is conveniently mounted on the back door of the modulator stage so when the door is open, all the tubes, meters, transformers and common bias rectifier are exposed. Tubes can be changed or possible sources of trouble located with a minimum of effort.

The rectifier equipment supplying the high voltage is of a standard type, using six type 857A tubes. It has in addition a very unique and efficient type rectifier starting circuit, which eliminates all of the initial surges and resulting arc-over troubles of the past. The rectifier operates so smoothly that KOB has had absolutely no arc-backs, even during the initial test which placed a 70-kw load on a new set of green tubes.

The Albuquerque temperature has been known to rise considerably during the summer and this, coupled with the rarified air at

5,000 feet altitude, made us extremely doubtful about accepting one of the first air-cooled 50,000 watt transmitters. Now that the air-cooling has been given a thorough test in Albuquerque, we have found it has many advantages over the old water-cooled system. Most important, it eliminates the old water leak troubles when changing tubes and the expense of buying and trucking distilled water to our plant. The new cooling system is very efficient. There is very little temperature rise between the incoming air and the outgoing air.

There are other good features about air-cooling that are not so obvious. We have found that the air-cooling system is much quieter, having eliminated the old sizzling which frequently occurred in the water jackets when air got into the water system, and too, the air-cooling is much more flexible. In our climate, parts sometimes get extremely hot and we have already found it convenient to by-pass a small amount of air from the main duct and direct a stream of air on a hot piece of equipment. Of course, this could never have been done with the old water-cooling system. The blower equipment for the 50-E is sufficiently large to supply the extra air needed.

We are especially pleased with the low plate voltage requirements for the power amplifier and modulator in the transmitter. KOB is getting the 50-kw output with only 9850 volts on the plate. This very low plate voltage minimizes the peak surges arising from over-modulations, lightning, line voltage surges and other disturbances. It minimizes the possibilities of arc-overs and gassing tubes when these unforeseen disturbances occur. The entire equipment is operating with a correspondingly greater factor of safety.

The broadcasting station engineers have a great responsibility in maintaining the radio service for the public. Their job is easy or difficult, depending on the character of the equipment. At KOB, our 50,000 watt transmitter type 50-E has already assumed the character of a trustworthy slave; a rugged servant with a very calm disposition. There is a real thrill in snapping the switch which starts a full 50,000 watts 100% tone modulated, with as much confidence and as simple as turning on an electric lamp. Our 50-E has given such splendid results and is so reliable, that we predict this design will be one of RCA's most successful 50,000 watt units.



RCA AR-77 being operated on China's battlefield.

Radio operators at Chinese Station XGOY in Chungking, China, are on the air sixteen times a day, in spite of daily bombings. Station XGOY broadcasts news in nine languages and

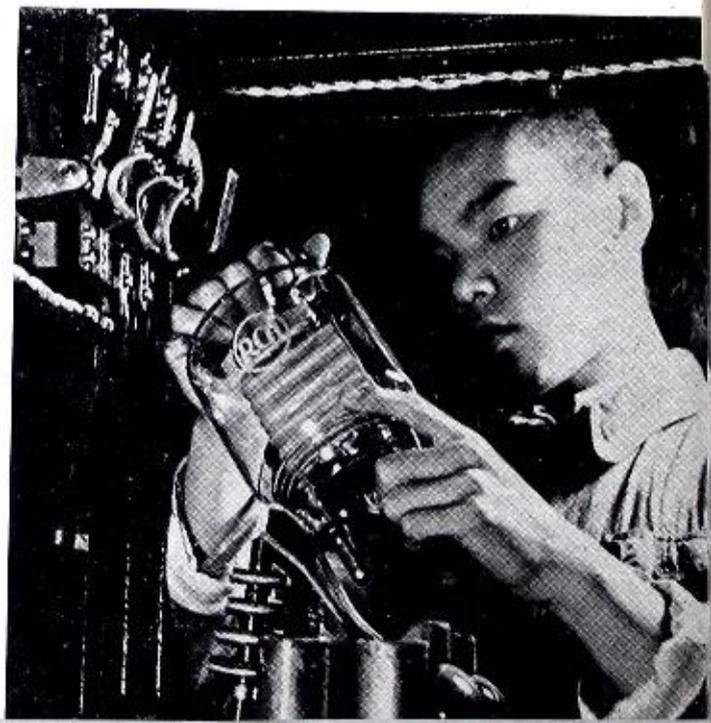
IN EMBATTLED CHUNGKING RCA EQUIPMENT CARRIES ON

is heard around the world, according to a letter received by United China Relief. The station receives hundreds of letters from "Hams" every month, giving minute descriptions of radio reception conditions, weather condition at time of reception, type of antenna and receiver used, etc. Transmission equipment for XGOY is installed in a cave dug out of solid sandstone mountain some miles outside Chungking Broadcasting Station. Much of the transmission equipment used by China's XGOY and XGOX are made by Chinese technicians using American parts.

The Chinese government today is training dozens of radio technicians, operators and engineers

to man contemplated new short-wave stations. Short wave stations already are in operation at Kweiyang, Chengtu, Kunming and Chungking.

RCA tubes play their part on the Chinese front.



PORTABLE RECORDING

(Continued from Page 7)

ber of accessories which are listed here.

MI-11211 Portable Turntable

The MI-11211 Portable Turntable consists of a 16" turntable platter with its associated drive and reproducer mechanism. The turntable is rim driven by a high quality synchronous motor. A unique feature is the use of two simultaneously operated rubber tired driver wheels between the motor and the turntable rim. These two wheels provide a positive means of power transmission and the actual slippage is held to considerably less than 1%. In order to prevent flats from developing on the driving wheels the "on-off" switch, in addition to disconnecting the power, also releases both drive wheels in the "off" position. The driver wheel employs a special rubber which is capable of providing quiet operation and long service. The motor drive assembly is shock mounted from the turntable platter in order to eliminate motor rumble from being transmitted to the turntable platter. Associated with the "on-off" power switch is a speed change mechanism which allows a rapid and positive change from 33 1/3 to 78 R.P.M. This speed change is made by turning a single knob. The combination of motor and driving method provides a "wow" factor of less than .5 of 1%.

Located on top of the motor board are two pin jacks which provide a terminus for the recording head audio supply. There is also a five conductor receptacle which is used to connect the output of the pickup and the recording head to the amplifier. A ten foot power cable with plug is provided and is arranged so that it may be stored within the unit when the equipment is not in use. A power fuse is located near the "on-off" switch and a spare fuse is mounted on the recorder saddle assembly. All equipment is mounted on a common motor board which will permit it to be removed from its cabinet and installed in a recording table if so

desired. A compartment is provided in the carrying case for storing the 72-C attachment when it is not in use. An opening is provided in one end of the cabinet over which is located a slide door. This door can only be opened after the turntable lid has been removed. A saddle is provided for holding the 72-C Recorder and sufficient straps are furnished so that when the mechanism is slid into place, there is no danger of its becoming loose or damaged during transit.

One outstanding feature of this turntable is the fact that it employs the new RCA MI-4875-B High Fidelity Combination Pickup Head with tone arm. This pickup is equipped with a permanent polished diamond stylus, has a very flexible armature and is capable of reproducing from either vertical or lateral cut records. It has a frequency range of from 30 to 10,000 cycles and the weight of the head on the record is only one ounce. Special compensating filters are provided for the pickup and are selected by means of a rotary switch mounted on the motorboard. Four lateral positions permit proper reproduction of all standard home and lateral transcription records. Two vertical positions provide the correct response for new and used vertical transcriptions.

Technical Data on MI-11211

- Power Required**—105-125 volts
60 cycles (MI-11211)
50 cycles (MI-11217)
45 watts
- Turntable Diameter**—16 inches
- Turntable Speeds**—33 1/3 and 78 r.p.m.
- Controls Provided**
 - (a) Motor Switch
 - (b) Speed Change Control
- Slippage**—Less than 1%
- Regulation**—0.5% or better
- Pickup Output Level**—-64 db., below .001 milliwatt.
- Pickup Frequency Response**—50 to 10,000 cycles, within ± 3 db. for both vertical & lateral reproduction.
- Pickup Filter Load Impedance**—Output of pickup filter should be connected to the unloaded input transformer of an am-

plifier (flat response) designed for operation from a 250 ohm source.

Physical Specifications

- Width 24"
- Depth 21"
- Height 12 3/8"
- Weight approximately 56 lbs.

Portable Amplifier and Speakers

The MI-11212 Portable Amplifier and Speaker Assembly is the companion unit for the MI-11211 Portable Turntable. Its carrying case divides into two sections, one of which contains the amplifier and cables and the other two "accordion edged" loudspeakers enclosed in a sealed compartment. The carrying case is finished to match the MI-11211 Portable Turntable.

The amplifier utilizes five stages of amplification having an overall gain of 110 db. as measured from a 250 ohm source to a 15 ohm load. It has a rated power output of 12 watts with less than 3% rms. distortion at any frequency between 50 and 7,000 cycles. The frequency response is well within ± 2 db. from 30 to 15,000 cycles, using 1,000 cycles as a reference level, and for normal gain setting with input terminated, the noise level is -60 db. below a 2 watt output rating. The high quality performance, from the viewpoint of frequency response, distortion and background noise, is on a par with the excellent reproduction obtainable from the two-way combination reproducer head as employed on the MI-11211 Portable Turntable.

A complete single stage pre-amplifier with input and output transformers is included as part of this amplifier. This provides a 600 ohm link circuit after the preamplifier for the insertion of equalizers when desired. All recording equalizers have a certain insertion loss. Therefore, in order to compensate for large variations in gain, a fixed pad is connected into the circuit. When an equalizer is employed, this pad is removed and the equalizer connected into the circuit. This arrangement provides substantially the same overall gain from the amplifier.

All the amplifier components are mounted on a simple type of chassis construction and all components are arranged so that electrostatic and electromagnetic couplings will not be a factor to contend with in obtaining a low background noise level. The tubes and components are protected by an overall metal housing. The front part of this housing acts as a front panel for the amplifier on which is located three binding posts for bridging input circuit, cut-out for vu meter, head phone jack, power switch, fuse, play-back-record switch, step-by-step volume control and a "bridge-match" input switch. In the match position of the latter switch, the output of the microphone receptacle and the output of the pickup may be fed directly to the 250 ohm input of the amplifier. In the bridging position the three binding posts are connected to the 250 ohm input of the amplifier through a 20,000 to 250 ohm fixed "H" pad. This arrangement makes it possible to record or monitor program from a zero level bus.

The microphone receptacle is located on the left end of the cabinet. It requires an MI-4630-B Cannon Plug which is not furnished as part of this equipment.

Careful consideration has been given to providing a means for easy servicing of this amplifier. The lid of the amplifier shield is readily removable to permit changing of tubes. The complete amplifier may be removed from the case for servicing the components located on the underside of the chassis by removing five thumb screws. The chassis frame and the housing shields are perforated to provide adequate ventilation. The amplifier is mounted approximately one-half inch from the bottom of the case to insure an ample flow of air around the component parts.

A terminal board is located along the back of the amplifier. Associated with this board are three cables, each equipped with plugs. One of these is the connecting cable between the turntable and amplifier, another the AC power cable and the third the speaker cable. Sufficient space is

available between the back of the amplifier and the cabinet to house the cables when the equipment is not in use. Terminals are available to permit either the MI-4894 Automatic Equalizer or the MI-4916 Fixed Orthacoustic Filter to be connected into the circuit.

The two loudspeakers provided with this unit are mounted in a closed compartment in one-half of the amplifier case. These speakers are of the permanent magnet type, employing accordion edged cones. The use of two speakers permits a wide angle of distribution and mounting them in a closed cabinet provides proper loading for the speaker cones. The resultant overall acoustical response is essentially uniform from 60 to 7,000 cycles. For those who wish to obtain higher quality of reproduction the amplifier has sufficient undistorted power output to satisfactorily drive the RCA Type 64-B Monitoring Loudspeaker.

Technical Data on MI-11211 Amplifier and Speakers

Power Required—105-125 volts
50/60 cycles
120 watts

Tubes

5 RCA-1620
2 RCA-1622
1 RCA-5U4G

Source Impedances—250 and
20,000 ohms

Gain—250 ohm source to 15 ohm
load—110 db. 20,000 (bridg-
ing 600 ohms) to 15 ohm
load—30 db.

Load Impedance—7.5/15 ohms.

Noise Level—-61 db. below 1
watt output, with normal
gain settings.

Frequency Response of Amplifier
 ± 2 db. (1000 cycle refer-
ence) from 30 to 15,000
cycles with 50 ohm source
and 15 ohm load.

Power Output—12 watts with
less than 3% total rms. dis-
tortion 50 to 7500 cycles.

Physical Specifications

Width 18½"
Depth 23½"
Height 14"
Weight 63 lbs.

72-C Recording Attachment

The 72-C Recording Attachment has been designed for use with the 70-C Studio Turntable and MI-11211 Portable Turntable.

Almost every known device for assisting operators in producing highly satisfactory recordings has been included in the design of the 72-C. The efficient cutting head has a uniform response between 60 and 6000 cycles. An inertia type float stabilizer is employed which prevents flutter and vertical modulation on recordings.

A swivel mount casting is provided on the OR-1 which has a knurled thumb nut permitting ready adjustment for horizontal alignment. This recorder has a unique lowering device for the head which permits the operator to gently lower the cutter on to the record, thus avoiding styli breakage or deep cuts from sudden dropping. The angle of the stylus and the depth of cut may be conveniently adjusted even during operation. A spiraling hand wheel permits spacing between musical selections without breaking continuity of the groove. A timing scale is provided which gives an accurate indication of the remaining recording time. It is calibrated for both 33-1/3 and 78 r.p.m. The lead screw is precision machined and hand honed, thus insuring smooth operation and uniform spacing between recorded grooves.

A standard high quality magnetic cutting head is furnished with the equipment. It provides highly satisfactory reproduction between 60 and 6000 cycles. Where higher recording fidelity is required, the MI-4887 Recorder Head is recommended. The MI-4887 reproduces within ± 2 db. from 50 to 10,000 cycles and permits recording with high levels without distortion.

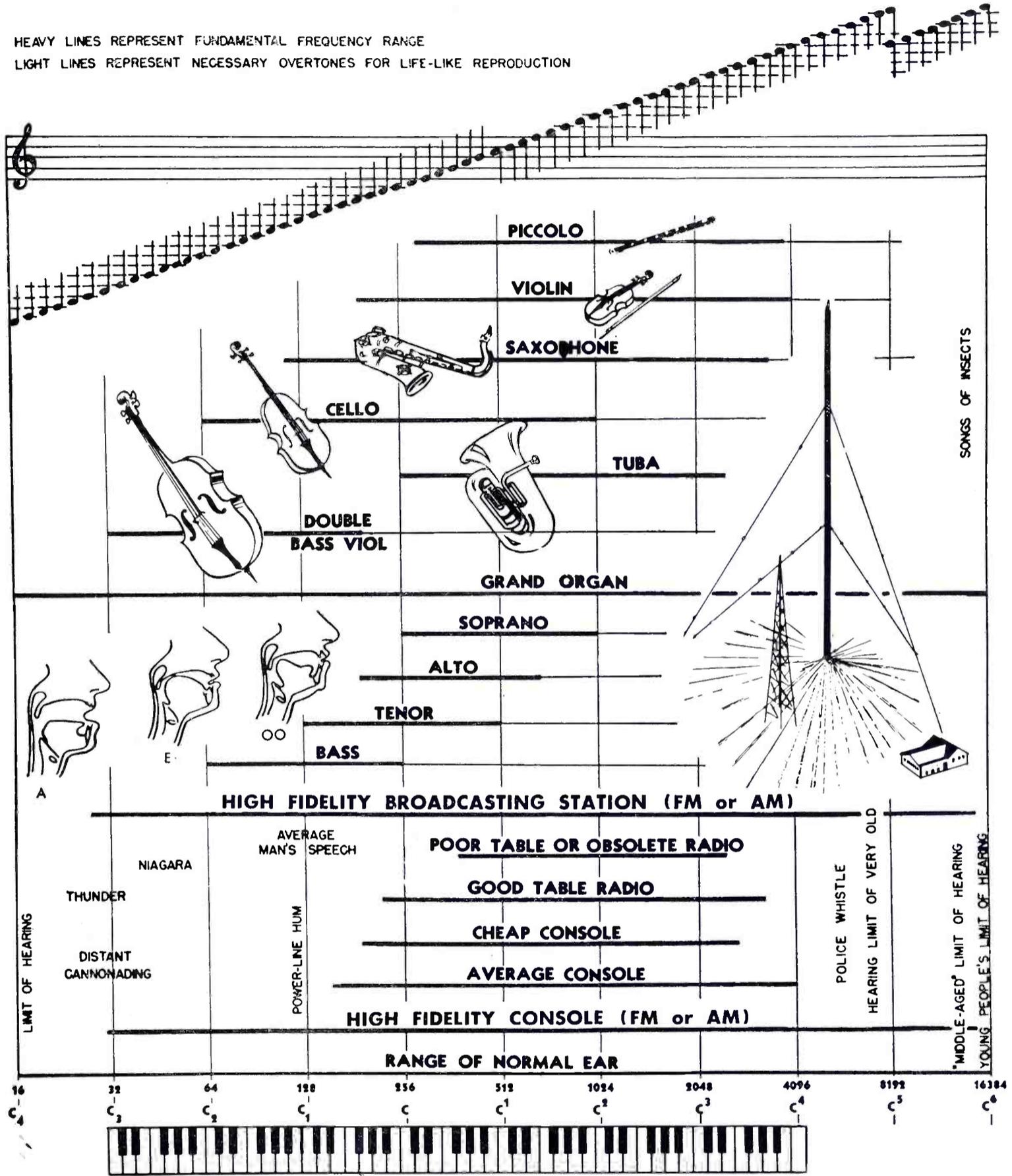
Specifications

Power Input—3 watts
Input Impedance—15 ohms, nominal
Frequency—60 to 6000 cycles

(Continued on Page 36)

WHAT YOU HEAR

HEAVY LINES REPRESENT FUNDAMENTAL FREQUENCY RANGE
 LIGHT LINES REPRESENT NECESSARY OVERTONES FOR LIFE-LIKE REPRODUCTION



The chart shown above depicts in a graphic manner the range of orchestral instruments and the human voice. It also pictures the reception of various types of radio receivers. This presentation was arranged by Mr. J. D'Agostino, of the NBC Engineering Department.

WFBC

(Continued from Page 3)

to all three consoles. It is possible, under normal conditions, to handle three programs or remotes at once. Four can be handled if facilities are pushed. The racks contain five line amplifiers—one being used to feed the Blue Ridge Network. Also found in the racks are: monitoring amplifiers and

the latest test equipment. Mounted on the wall above the center console is one of RCA's new high fidelity speakers.

The control room was designed and wired by Hubert Brown of WFBC's engineering department. All equipment was planned with thought of a possible future use of FM.

The managers office and cli-

ent's room each have one of the RCA high fidelity speakers and an 82-C amplifier with four programs—local, network, audition, or radio—available on push buttons.

B. T. Whitmore, manager, W. H. Clews, commercial manager, Jim Reid, program director, Clyde Etheridge, chief engineer, and Hubert Brown, chief audio engineer, form the staff of WFBC.



Program on the air from Studio A at WFBC.

PORTABLE RECORDING

(Continued from Page 34)

Feed Screw Pitch—112 lines per inch

Recording Time—15 minutes on 16" record at 33-1/3 r.p.m.

Accessories for OR-1

The following accessories are available for use with the OR-1 Recording equipment:

1. Spare input plug for MI-11211 Turntable, Stock #26126.
2. MI-11259 Tube Kit for MI-11212 Amplifier.
3. MI-11251 VU Meter Kit for MI-11212 Amplifier.
4. MI-4894/4913-2 Automatic Equalizer for 72-C.
5. MI-4916 Orthacoustic Recording Filter.
6. Microphone Plug MI-4630-B.
7. MI-4887 High Fidelity Recording Head for 72-C.
8. MI-4876 Outside-In Lead Screw for 72-C.
9. MI-4879-A Steel Recording Styli for 72-C.
10. MI-4878-B Sapphire Styli for 72-C.
11. MI-4842 Sapphire Recording Styli (70°) for 72-C.

Lieutenant W. L. Garnett

Shortly after the last issue of Broadcast News was distributed, we received word that Lieutenant W. L. Garnett had been killed in an automobile accident near Camp Dix.

Lieutenant Garnett, who was widely known among broadcast station engineers, was a member of the RCA engineering group, devoting most of his time to speech input equipment. He left RCA to enter the army and had only been in the service a few months prior to the accident.



ALBUQUERQUE BROADCASTING COMPANY
 P. O. BOX 1319 420 WEST GOLD AVE.
 ALBUQUERQUE, N. M.

July 22nd, 1941

Phone
4411

Mr. I. R. Baker
 RCA Manufacturing Co., Inc.
 Camden, N. J.

Dear Bake:

Our new 50E RCA transmitter has been in operation for nearly two months. We believe the performance of this equipment and its erection is unique in many respects.

As you know, the equipment we received is the first of a new model. It was shipped to us in the usual disassembled manner, packed in approximately twenty different packing cases.

Upon its receipt, the equipment was removed from the packing cases and the entire job of erecting, assembling, interconnecting and adjusting was done by our own staff. I believe in most cases, it is customary for broadcasting plants of this sort to be erected under the supervision and by engineers supplied by the manufacturer. As you know, in our case, the whole job was done by our own staff. I believe everyone will agree that this is a most unique undertaking, when it is taken into consideration that we are nearly 2000 miles away from your plant.

Naturally, you supplied wiring diagrams and other data for our convenience. However, the unusual simplicity and the correctness of the design, particularly with the first of a new model, make this undertaking extremely unusual.

After the plant was assembled and all connections made and circuits tested, 50-kw of power was obtained on the third day of the usual testing period authorized by the FCC. Naturally, with a new model and a plant of this size, it is usually expected that some serious difficulty might result, but in this particular case, there has not been a single major irregularity and the transmitter has operated continuously in the most satisfactory manner since June 4th.

I would like to say that we are delighted with the way everything has turned out and believe that the installation of the first model of a radically changed design from preceding models and installed by the regular station personnel, is the more conclusive evidence of superiority of the RCA broadcasting equipment.

With best regards, I am

Sincerely yours,
 ALBUQUERQUE BROADCASTING COMPANY
T. M. Pepperday
 T. M. PEPPERDAY

TMP:66



E. P. HARRIS, Vice-President

LEE B. JENKINS, Secretary-Treasurer

WLBJ

"THE FRIENDLY VOICE"

• 250 WATTS DAY AND NIGHT

The Bowling Green Broadcasting Co.
 INCORPORATED
 New Radio Building and Tower Corner Fairview and Lehman Avenues

BOWLING GREEN, KENTUCKY

June 25, 1941.

Mr. A. R. Hopkins
 RCA Manufacturing Company
 589 East Illinois Street
 Chicago, Illinois.

Dear Mr. Hopkins:

Today is our anniversary here at WLBJ....yes, we are one year old.

I thought that you might be interested to know that WLBJ has gone through these first twelve months without a mechanical or electrical failure, and without the replacement of a single transmitter tube in our RCA-250-K transmitter.

Maintaining an average daily schedule of seventeen hours on the air, we feel that the service rendered by our equipment can be termed EXCELLENT. We surely feel justified in suggesting RCA all the way to any station contemplating new or replacement equipment.

Sincerely yours,

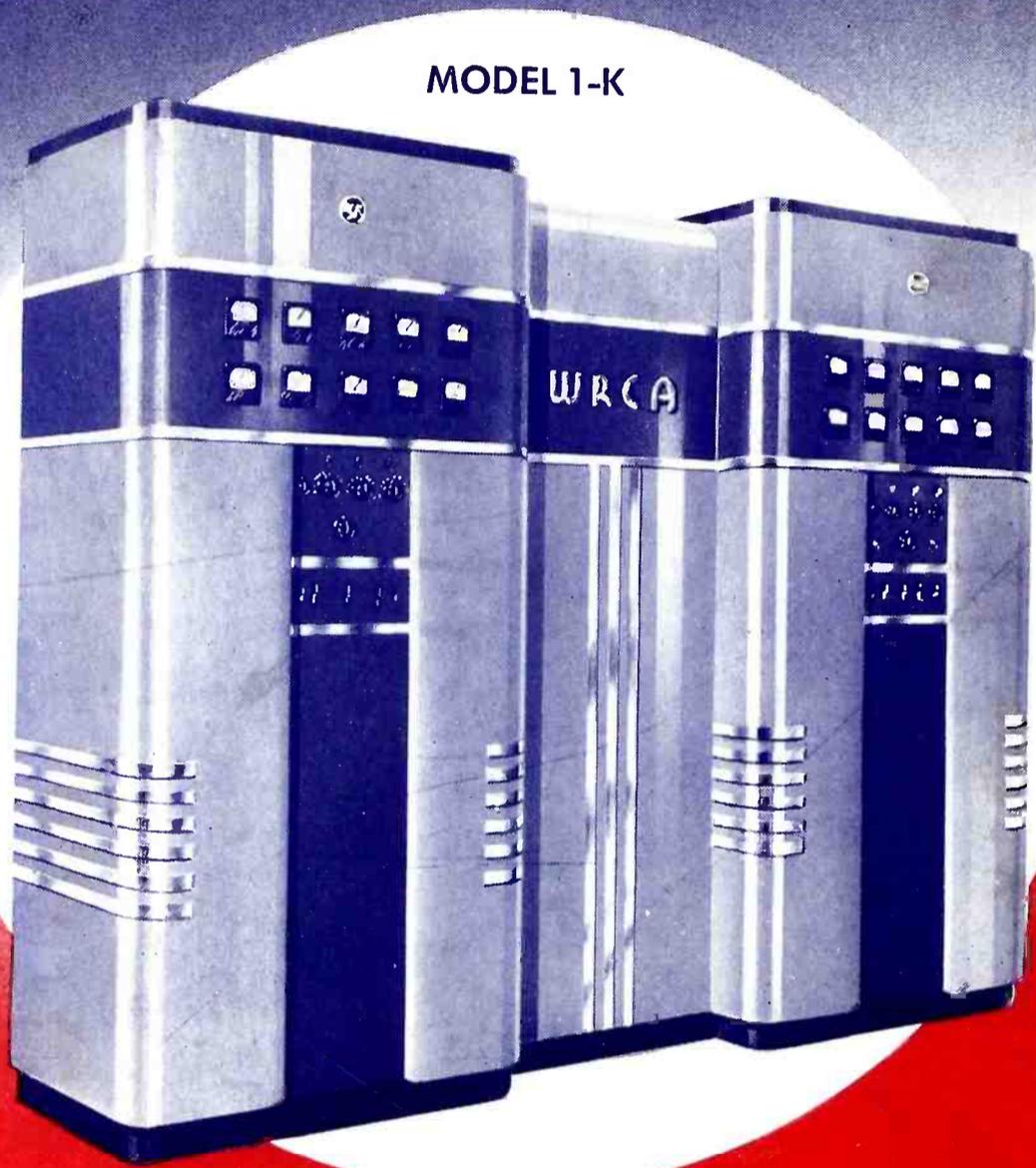
Bowling Green Broadcasting Co.,

Jim Turner
 Jim Turner.

JT:ga

High Fidelity at Low Cost!

RCA 1,000 Watt Transmitter



MODEL 1-K

- Flat within 1.5 db., 30-10,000 cycles
- High-efficiency Class B Modulation
- Distortion less than 3%, 50-7,500 cycles
- Carrier frequency exact within ± 20 cycles
- Less than 5% Carrier Shift

SIMPLICITY and accessibility... extended frequency-response and low distortion... with extremely low overall operating costs... make the RCA Type 1-K Transmitter your logical choice when you go to 1,000 watts!

Excited by the famous RCA 250-K transmitter unit, the 1-K offers unusual flexibility, operating at 1,000 watts, 500 watts, 500/1000 watts, 250/1,000 watts, and 250/500 watts. Stations already equipped with the 250-K can increase their power to a maximum of 1,000 watts simply by the addition of the amplifier unit (RCA Type MI-7185), and power unit. Write for complete story, yours on request.

The RCA Model 1-K consists basically of the Model 250-K transmitter plus a matching amplifier unit. 250-watt stations with Model 250-K can increase power to 1,000 watts easily and at very low cost.

Use RCA Radio Tubes in your station for finer performance



Broadcast Equipment

RCA Manufacturing Company, Inc., Camden, N. J. • A Service of the Radio Corporation of America
In Canada: RCA Victor Co., Ltd., Montreal

New York: 411 Fifth Ave. Chicago: 589 E. Illinois St. Atlanta: 530 Citizens & Southern Bank Bldg. Dallas: Santa Fe Bldg. San Francisco: 170 Ninth St. Hollywood: 1016 N. Sycamore Ave.

