BROADCAST NEWS

"WELCOME NAB MEMBERS"

CONVENTION NUMBER

RCA MANUFACTURING COMPANY, INC., CAMDEN, N. J.

RCA Manufacturing Company, Inc.

A Service of Radio Corporation of America

Camden, N. J.

"RADIO HEADQUARTERS"

DAVID SARNOFF, Chairman of the Board

E. T. CUNNINGHAM, President — G. K. THROCKMORTON, Executive Vice-President

L. B. MORRIS, Vice-President and General Counsel

J. M. SMITH, Vice-President in Charge of Mfg., RCA Radiotron Div.

J. W. BURNISON, Vice-President in Charge of Mfg., RCA Victor Div.

J. C. WARNER, Vice-President and General Mgr., RCA Radiotron Div.

LEWIS M. CLEMENT, Vice-President in Charge of Research and Engineering, RCA Victor Div.

J. T. CLEMENT, Vice-President in Charge of Washington, D. C., Office

F. H. CORREGAN, Vice-President and Secretary

F. R. DEAKINS, Manager
ENGINEERING PRODUCTS DIVISION
AND INTERNATIONAL DIVISION

TRANSMITTER SALES SECTION

(OF ENGINEERING PRODUCTS DIVISION)

I. R. BAKER, Manager

S. W. GOULDEN, Commercial Engineer
J. P. TAYLOR, Sales Engineer
A. R. HOPKINS, Sales Engineer
BEN ADLER, Power Tube Sales
E. C. HUGHES, Jr., Amateur Radio
T. A. SMITH, C. B. S. Contact
C. L. BEACH, Affiliated Co. Contact
T. W. ENIS, Ass't Affiliated Co. Contact
P. A. ANDERSON, Police Radio Sales
A. H. CASTOR, Factory Contact

E. T. JONES, Engineering Products Advertising

1 **EASTERN DISTRICT**— T. A. Smith, Manager, 1270 Sixth Ave., New York City; R. P. May, Assistant

MAINE	RHODE ISLAND	PENNSYLVANIA	WEST VIRGINIA
VERMONT	CONNECTICUT	MARYLAND	DELAWARE
NEW HAMPSHIRE	NEW YORK	NORTH CAROLINA (Broadcast)	VIRGINIA
MASSACHUSETTS	NEW JERSEY		

2 **CENTRAL DISTRICT**—H. C. Vance, Manager, 111 North Canal St., Chicago, Ill.; R. A. Wilson, Assistant

NORTH DAKOTA	MISSOURI	ILLINOIS	OHIO
SOUTH DAKOTA	IOWA	INDIANA	MICHIGAN
NEBRASKA	MINNESOTA	KENTUCKY	KANSAS CITY (KANSAS)
WISCONSIN			

3 **WESTERN DISTRICT**—W. H. Beltz, Manager, 170 Ninth St., San Francisco, Calif.; Edmund Frost, Assistant

WASHINGTON	IDAHO	UTAH	MONTANA
OREGON	NEVADA	ARIZONA	WYOMING
CALIFORNIA	HAWAII (Police)	ALASKA (Police)	

4 **SOUTHWESTERN DISTRICT**—W. M. Witty, Manager, 2211 Commerce St., Dallas, Texas

TEXAS	ARKANSAS	KANSAS (Except Kansas City)	NEW MEXICO
OKLAHOMA	LOUISIANA (Except New Orleans)	COLORADO	

5 **SOUTHEASTERN DISTRICT**—D. A. Reesor, Manager, 490 Peachtree St., N. E., Atlanta, Ga.

TENNESSEE	SOUTH CAROLINA	ALABAMA	FLORIDA
NORTH CAROLINA (Police)	GEORGIA	MISSISSIPPI	NEW ORLEANS (LA.)

LONDON, ENGLAND—B. Gardner, European Manager, Radio Corporation of America, Electra House, Victoria Embankment.

POWER RADIOTRONS — **BROADCAST TRANSMITTERS**
POLICE TRANSMITTERS — **POLICE RECEIVERS** — **AVIATION RADIO EQUIPMENT**
SPECIAL COMMUNICATION EQUIPMENT

Tentative Program, NAB Convention

Stevens Hotel, Chicago—July 6-8

MONDAY, JULY 6
9:30 A. M.

Call to Order.
Address of Welcome:
Address of the President: Leo J. Fitzpatrick, WJR, Detroit.
Address of the Chairman, FCC Broadcast Division: Judge Eugene Octave Sykes, Washington, D. C.
Address of the Treasurer: Isaac D. Levy, WCAU, Philadelphia.
Report of the Managing Director: James W. Baldwin, Washington, D. C.
Appointment of Committees.
Announcements.
Adjournment.
No Afternoon Sessions Scheduled.
Committee Meetings (at call of chairman).
Nominating Committee.
Commercial Committee.
Engineering Committee.
Resolutions Committee.

TUESDAY, JULY 7
9:30 A. M.

Call to Order.
Cooperative Bureau of Radio Research; Arthur B. Church, KMBC, Kansas City.
Discussion.
What the Radio Business Census Means to the Radio Broadcasting Industry: C. H. Sandage, Chief, Division of Transportation and Communications, Bureau of the Census, Philadelphia.
Discussion.
A Panel Discussion: Organizing a station for selling Radio Advertising: H. K. Carpenter, WHK, Cleveland.
Discussion.

2:00 P. M.

Call to Order.
Report of Nominating Committee.
Election of Officers.

7:00 P. M.

Annual NAB Banquet:
Presentation of Broadcasting Trophy to winner of Golf Tournament.
Entertainment.

WEDNESDAY, JULY 8
9:30 A. M.

Call to Order.
Report of Commercial Committee: Arthur B. Church, Chairman, KMBC, Kansas City.
Report of Engineering Committee: J. H. DeWitt, Chairman, WSM Nashville.
Report of Resolutions Committee.

2:00 P. M.

Call to Order.
General Discussion.
Report of Elections Committee.
Installation of Officers.
Adjournment

GENERAL INFORMATION

Registration Desk will be open from 10:00 A. M. until 1:00 P. M. Sunday, and from 8:30 A. M. until 5:00 P. M. on Monday, Tuesday and Wednesday.

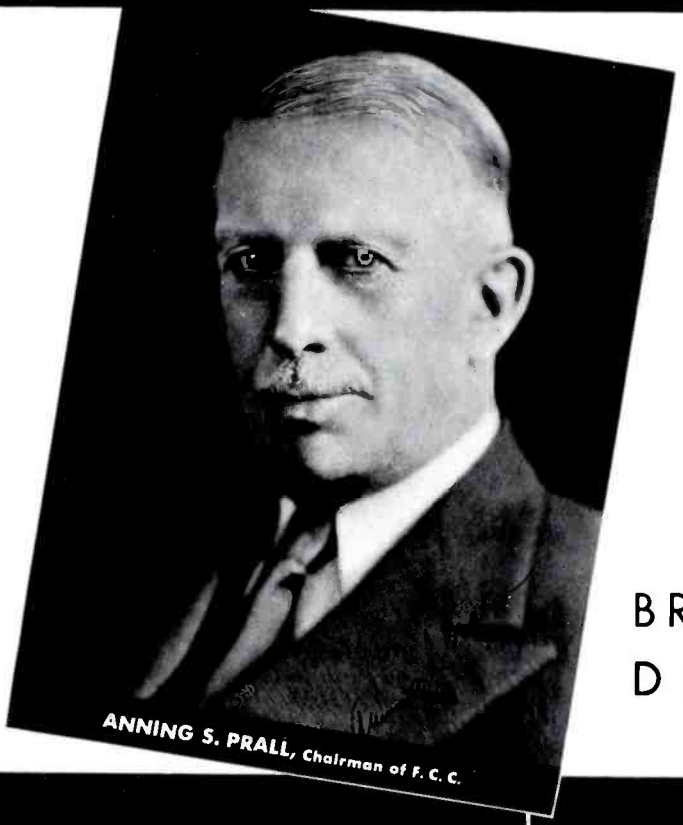
Registration fee $10 per person. Banquet tickets may be purchased at Registration Desk at $3.50 each.

Sixth Annual NAB Championship Golf Tournament will be held Sunday for Broadcasting Magazine Trophy. First foursome will tee off at 10:30 A. M.

All general sessions start promptly at 9:30 A. M.

All motions and resolutions offered by delegates must be in writing and handed to the Presiding Officer after presentation.

MEMBERS OF THE FEDERAL COMMUNICATIONS COMMISSION



ANNING S. PRALL, Chairman of F. C. C.

BROADCAST DIVISION

EUGENE O. SYKES, Chairman, Broadcast Div.

NORMAN S. CASE, Vice-Chairman, Broadcast Div.

Officials of the National Association of Broadcasters

LEO FITZPATRICK
President

CHARLES MEYERS, First Vice-President

EDWARD A. ALLEN, Second Vice-President

ISAAC D. LEVY, Treasurer


At the Convention with NBC
A. H. Morton
N. Trammel
R. M. Brophy
William Hedges
John F. Royal
Lenox R. Lohr
Frank M. Russell
O. B. Hanson
Easton C. Woolley
Frank Mason
Don Gilman
Keith Kiggins
Lloyd Egner
C. W. Horn
E. P. H. James

At the Convention with CBS

WORLD CONGRESS OF BROADCASTERS MEETS IN PARIS

International Radio Problems Discussed at Sessions in French Capital*

THE first inter-continental meeting of broadcasting organizations held in Paris on February 27 to March 7, 1936 was organized under the direction of the International Broadcasting Union (UIR), an organization of broadcasting administrations of Europe. The inter continental meeting followed the annual meeting of the UIR.

There were in attendance representatives of over forty nations and organizations. From the United States, the Columbia Broadcasting System and National Broadcasting Company were represented.

The conference was divided into three committees, Technical, Program and Juridical. The following extracts from the minutes of the three committees give the results of the meeting.**

TECHNICAL COMMITTEE

Section 1

Exchange of Information on the Propagation of Waves

a. Efficiency of transmitting antennas of the anti-fading type permitting an increase of the direct and a reduction of the indirect radiation.

1. The use of transmitting antenna is of the anti fading type is highly desirable in order to permit an increase in the satisfactory Service Area of each station.

However the use of such antennas does not involve the reduction of interference at great distances (of the order of 2,000 km.) and can even result in an increase in the field strength at such distances

It is possible to reduce the indirect radiation in certain desired directions and at certain distances, without reducing the efficiency of the station in its normal zone, by the use of certain devices reducing the oblique radiation in the desired direction e. g. station WLW, Cincinnati, 700 kc/s (500 kw.)

In any case and even without such special equipment, the advantages which result from the use of anti-fading antennas very greatly outweigh the comparatively slight inconvenience resulting from the increase, at great distance, of indirect radiation.

2. **Interaction of waves.** The effect of the "interaction of waves" has been very generally experienced in Europe where use is made of long waves in stations of considerable power (100 kw. and upwards.)

A reduction of this effect of interaction can be expected from the use of anti-fading antennas, resulting from the fact that less energy would reach the ionosphere in the neighborhood of the transmitter, the maximum radiation being confined to the lower angles.

b. Strength of the indirect field at very great distances.

The study of the results of the tests organized by the UIR on the initiative of Dr. Dellinger (Bureau of Standards, Washington) during the course of the last two winters, has given rise to the following conclusions:

1. The strength of the field observed at great distances (up to 12000 km.) does not depend entirely on the distance, but also on the path of the waves in relation to the position of the terrestrial magnetic pole and to the direction of the earth's magnetic field.

2. The fields are generally greater and relatively less variable for situations remote from the magnetic pole and when the direction of propagation is North South and not East West.

It has been decided to follow up and to extend the observations with the collaboration of other countries. The Checking Station of the U. I. R. at Brussels has been entrusted with the preparation of a new program of tests and with centralizing the results.

c. Results obtained with the synchronized or quasi-synchronized stations. Influence of frequency variation, depth of modulation, type of antenna.

When the stations transmit the same program, it is desirable that the synchronization should be as perfect as possible, which has not yet been fully realized except by the use of synchronizing lines between the transmitters.

However, when economic and physical conditions do not permit the use of such lines, very good results can be obtained by individual frequency stabilization at each station (quasi-synchronization) with departures of the order of 1 c/s.)

When the stations transmit different programs the use of a synchronizing line is generally impracticable, and the optimum difference between the two frequencies cannot yet be strictly defined. However, this frequency departure ought to be such that the resulting beats are below audibility. In any case the stability of the individual transmitters must be great enough to ensure the constancy of the chosen difference of frequency.

SECTION 2

Bands of Frequencies Allocated to Broadcasting

1. The frequency bands now allocated to broadcasting are sufficient in certain regions for present requirements, but this does not obtain in certain other localities, notably in Europe and in tropical countries, by reason of certain

* This rpt of the proceedings submitted by Dr. C. B. Jolliffe

** The complete text of the minutes is available for consultation if desired

special conditions—geographical, political, linguistic, demographic, climatic, cultural, economic, etc.

2. It is hoped that at approaching conferences, the governments will take a broad view of the ever growing importance of broadcasting and will insure that, without prejudicing the interests of other services broadcasting will be given all necessary and sufficient facilities to ensure its satisfactory development.

3. This result would to a large extent be achieved, by the rigid and general observance of all the resources provided by the latest technique of radiocommunication.

SECTION 3

Short Wave Broadcasting

1. An examination of the existing situation, as shown on the Brussels charts Nos. 105C and 105D and the list of stations prepared by the U. I. R. Secretariat Document No. 5672, revealed considerable congestion notably in the 49 metre band. The existing use of short waves by certain countries for local broadcasting was considered, taking into account article 7, paragraph 19, of the General Radiocommunication Regulations of Madrid. It was deemed desirable that wavelengths between 1500 and 6000 kc/s should be available for such services when it is impracticable for them to use medium waves.

2. A consideration of probable future conditions indicated a general increase of congestion notably in the 17 metre band which is only 50 kc/s wide. In general it was feared that the existing wave bands available for short wave broadcasting services would become insufficient for future needs.

It was noted that no waveband has been allotted for the use of broadcasting services between 1500 and 6000 kc/s, and it was recognized that the use of waves between 3000 and 4000 kc/s. might be necessary for certain long distance broadcasting services, and under certain conditions of solar activity.

3. It was considered necessary that regular observations be continued at the Brussels checking station of the U. I. R. and that similar observations should be made in other parts of the world. It was agreed that centralization of results should be carried out by the U. I. R. station at Brussels.

4. Having regard to paragraphs 1 and 2 above, it was clear that an inter-continental wave plan would become necessary in the near future to avoid chaos among short wave broadcasting services.

5. It was considered that when such a plan is made it will be necessary to fix a minimum separation of 10 kc/s between all frequencies allotted to short wave stations in view of the world wide nature of the services and the desirability of safeguarding the possibility of good reception. A greater separation, consisting of two or three 10 kc/s channels between stations receivable simultaneously at normal strength in the same region, was considered necessary.

6. The figure given for the stability of short wave broadcasting transmitters in appendix 1 of the General Radiocommunications Regulations, Madrid, 1932, namely plus or minus 0.01% was considered insufficient for future use. It was agreed that a very high degree of stability, of the order of one or two parts in a million, might become necessary to cover future contingencies. Accurate synchronization might make it possible for certain transmitters to share a channel in special circumstances. Nevertheless it was noted that the nature of short wave services does not permit of transmitters being synchronized under the same conditions as obtain on "medium" and "long" wavelengths.

7. It was agreed that while the use of directional aerials was desirable from the point of view of insuring satisfactory reception, such an expedient only partially reduces the possibility of interference between stations on adjacent frequencies. Nevertheless it was considered highly desirable to use directional aerials, as a matter of principle, to avoid the radiation of considerable fields to areas where reception is not required.

SECTION 4

Interference and Control at a Distance of Transmission

It is recognized that a technical control, from a distance, of broadcast transmissions is indispensable.

To be effective such a control must satisfy the following principles:

1. It must be permanent. It must in fact, detect without delay the sudden variations of frequency which, at times, affect even modern broadcast transmitters, and which frequently escape the vigilance of the operators.

2. The intervention must be immediate either by telegraphic or telephonic advice.

3. The precision of the measurements must be above criticism and conform constantly, to the progress of the technique of transmission.

The standards ought to be verified as frequently as possible.

4. The results should be communicated to the interested organizations.

SECTION 5

Standardization of Recording Processes

With a view to facilitating the exchange of recorded programs between the broadcasting organizations of the different countries, it is desirable to standardize certain technical characteristics involved in the process of recording. The extra-European representatives indicated the possibility of their organizations conforming to the standards already adopted by the U. I. R.

(To be concluded in our next issue)

WELL KNOWN LEADERS IN THE INDUSTRY

E. A. HANOVER
WHAM

POWEL CROSLEY, JR.
WLW

WILLIAM FAY
WHAM

JAMES M. COX
WHIO

DONALD FLAMM
WMCA

H. C. LUTTGENS
NBC

L. B. WILSON
WCKY

JOHN CLARK
WLW

FROM THE BOARD OF DIRECTORS

NATIONAL ASSOCIATION OF BROADCASTERS

RALPH R. BRUNTON
KJBS-KQW

GORDON PERSONS
WSFA

EDWIN W. CRAIG
WSM

I. R. LOUNSBERRY
WGR - WKBW

ARTHUR B. CHURCH
KMBC

GARDNER COWLES, JR.
KSO - KRNT

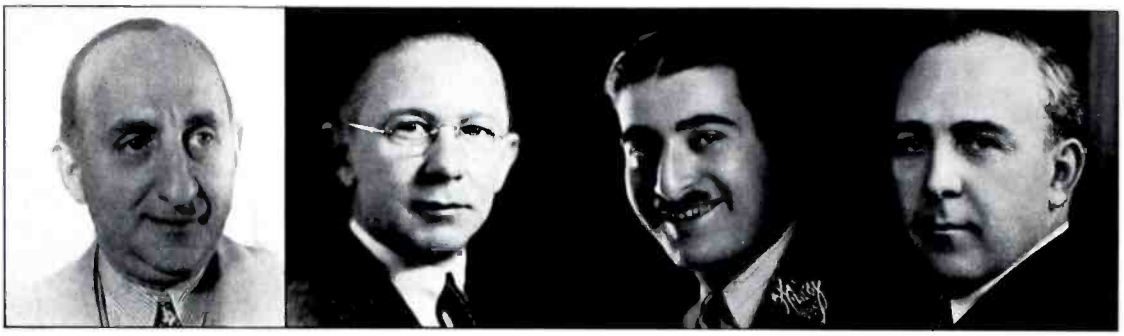
H. K. CARPENTER
WHK

JOHN GILLIN
WOW

ALFRED J. McCOSKER
WOR

J. O. MARLAND
WHO

LEADING STATIONS WELL REPRESENTED



S. S. FOX
KDYL

EDGAR T. BELL
WKY

PHILIP G. LASKY
KSFO

EARLE C. ANTHONY
KFI - KECA

J. R. POPELE
WOR

MRS. H. O. HICKS
WSGN

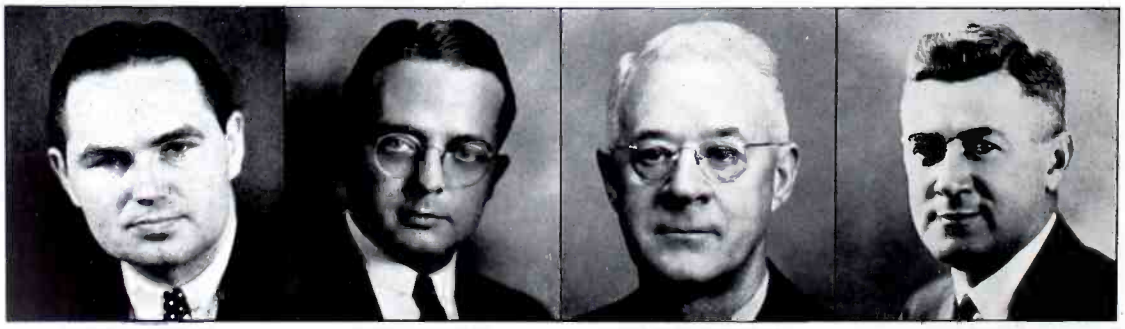
EDWIN M. SPENCE
WBAL

EDGAR H. TWAMLEY
WBEN

DON SEARLE
WIBW

JAMES M. COX, JR.
WHIO

GERALD KING
KFWB



STEVE A. CISLER
WSGN

FORD BILLINGS
WCAE

CLARENCE WHEELER
WHEC

P. J. MEYER
KFYR

PROMINENT PERSONALITIES WILL ATTEND

LAMBDIN KAY
WSB

LAWRENCE W. McDOWELL
KFOX

E. N. NOCKELS
WCFL

DANIEL A. READ
WTIC

MAYNARD MARQUARDT
WCFL

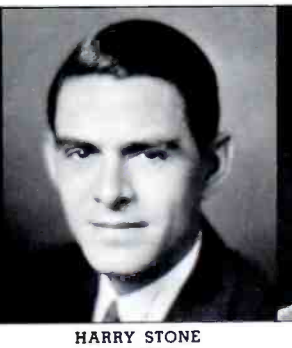
FORD STERLING
WOAI

EUGENE G. PACK
KSL

LESLIE G. HEWITT
KFWB

PAUL A. LOYET
WHO

FREDERICK WHEELER
WREN



HARRY STONE
WSM

H. L. BLATTERMAN
KFI-KECA

PAUL MORENCY
WTIC

M. H. PETERSEN
Hearst Radio

BERTHAM LEBHAR, JR.
WMCA

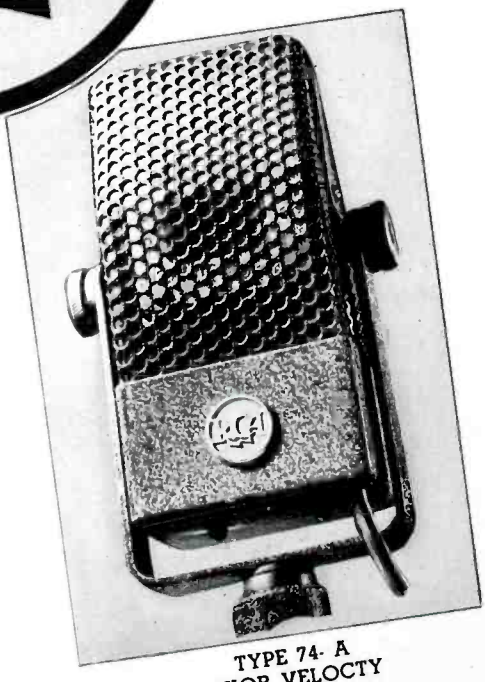
HOWARD C. BARTH
WSYR

TYPE 44-B
VELOCITY

TYPE 50-A
INDUCTOR

RCA Microphones for Every Purpose

TYPE 77-A
UNIDIRECTIONAL



TYPE 74- A
JUNIOR VELOCTY

NEW RCA SPEECH INPUT EQUIPMENT

Advancing the Standards of Excellence in

- PERFORMANCE
- ACCESSIBILITY
- FLEXIBILITY
- RELIABILITY
- APPEARANCE
- STABILITY
- EASE OF OPERATION

Type 100-E

100 W. BROADCAST TRANSMITTER

OUTSTANDING IN PERFORMANCE

KROC

KIUN

WEMP

WMFR

KPDN

WMFJ

WRAW

WMBQ

W9XPD

W5XAU

W9XOK

W8XH

W8XWJ

W3XEY

W4XBW

Type 100-F
Ultra High Frequency
Broadcast Transmitter

A PIONEER—
Penetrating New Fields . . .
Setting New High Standards

LR-1

KVSO

WNBC

WBNY

WDZ

WHBL

Type ET-4250

100/250 W. BROADCAST TRANSMITTER

KFJZ

CKTB

KHSL

KHBC

WLEU

WOC

A BASIC UNIT FOR THE
GROWING STATION

Type 1-D

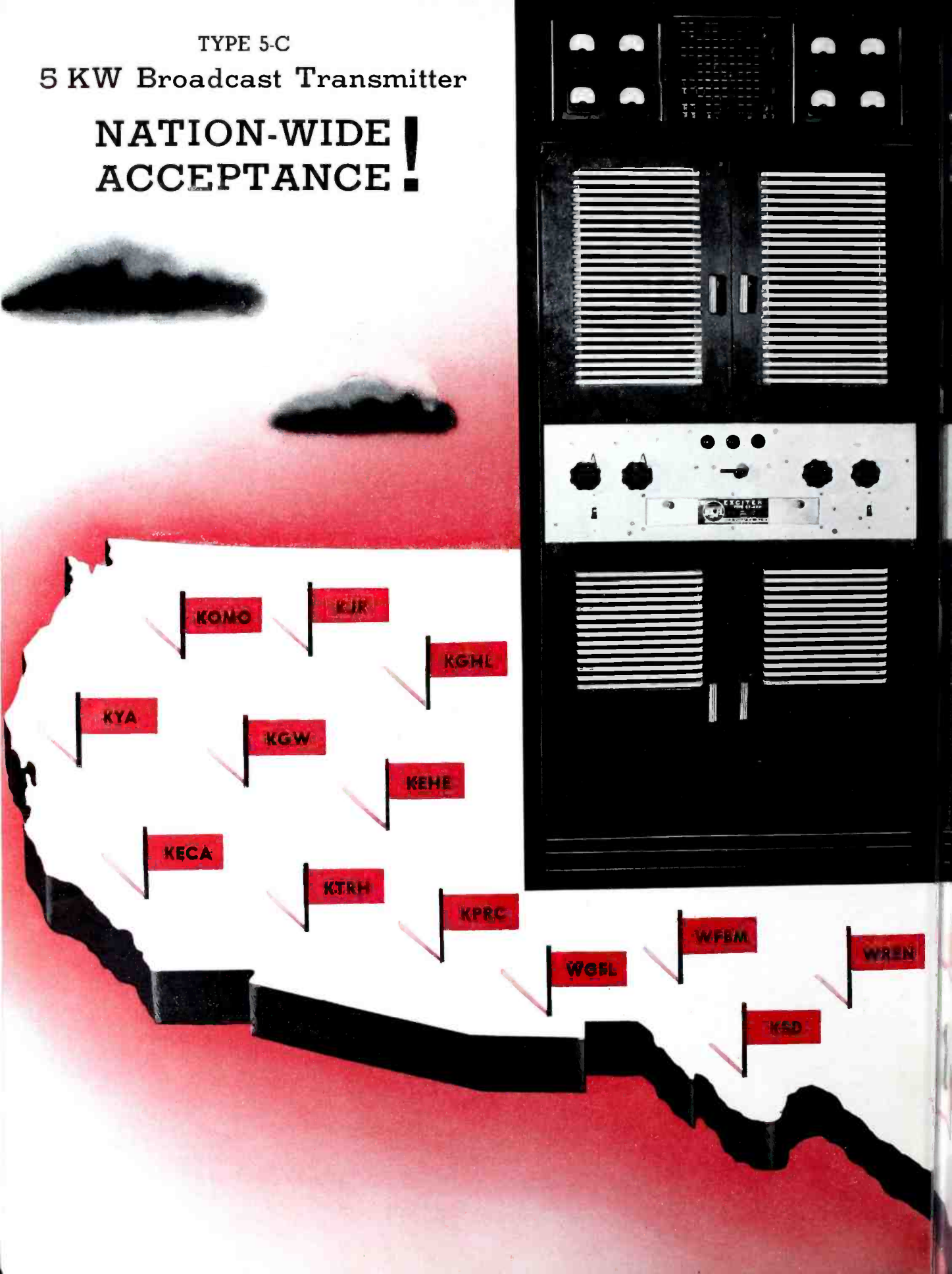
1 KW. BROADCAST TRANSIMTTER

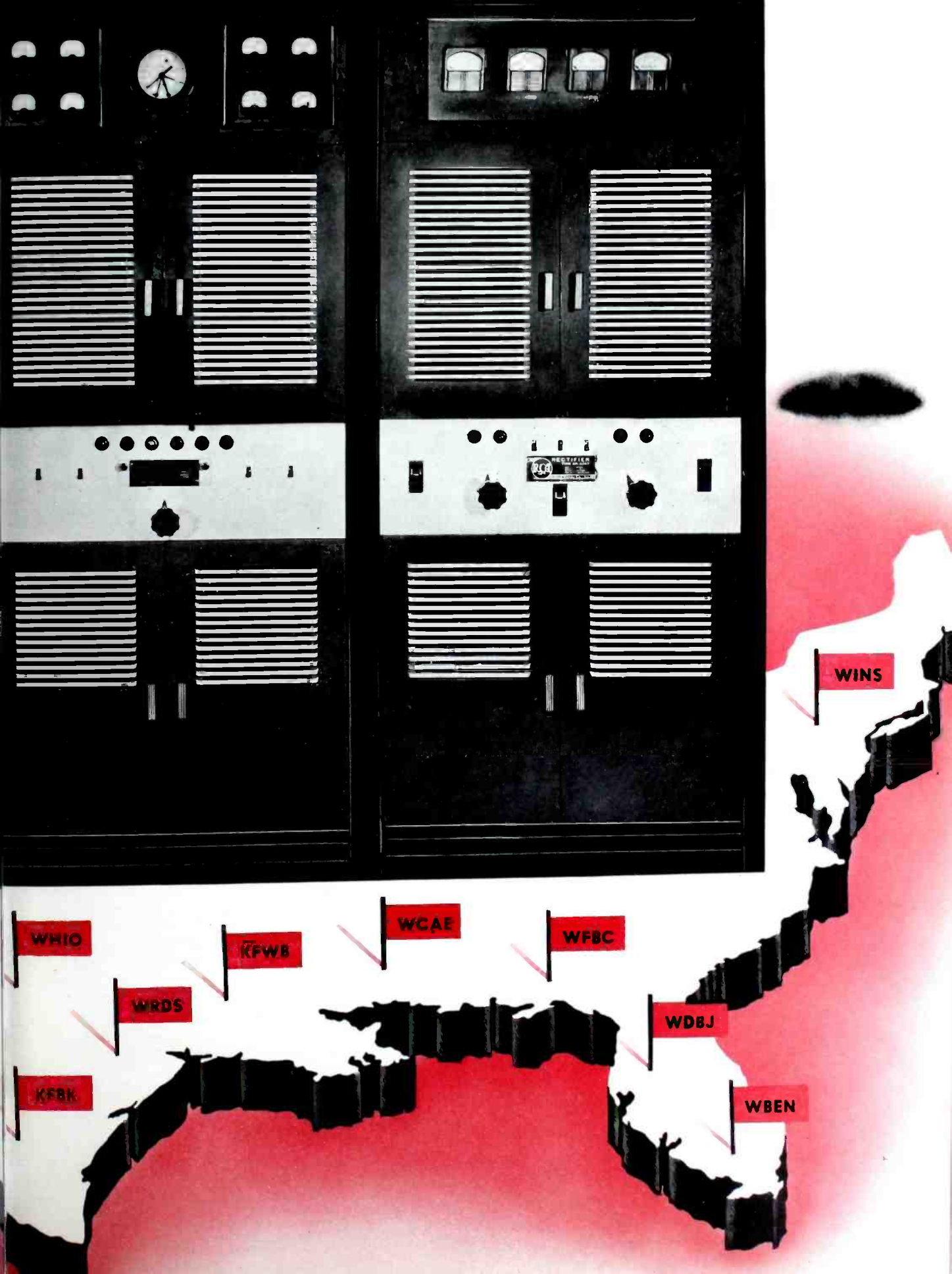
FOR BETTER AND BETTER BROADCASTING—

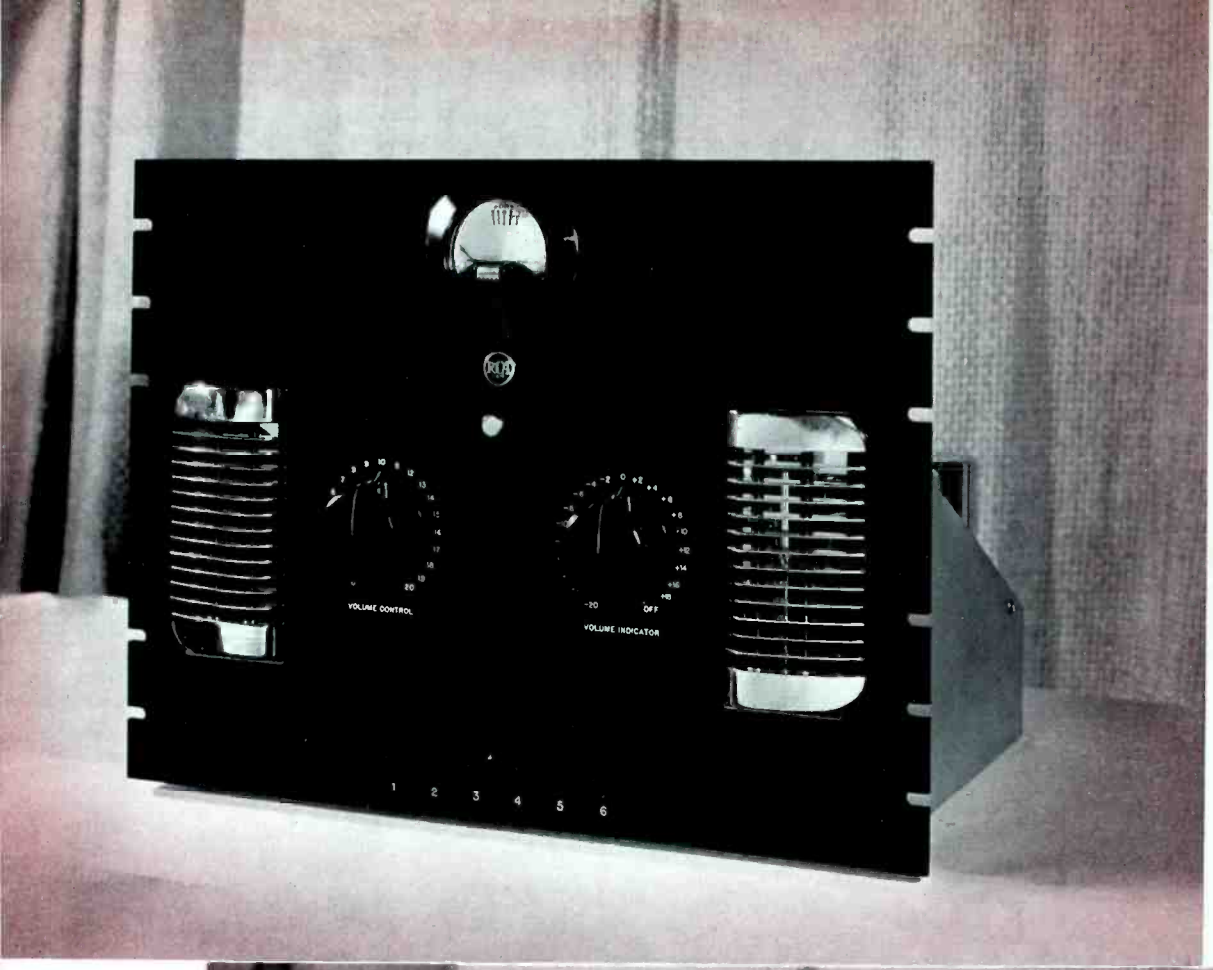
TYPE 5-C

5 KW Broadcast Transmitter

NATION-WIDE ACCEPTANCE!



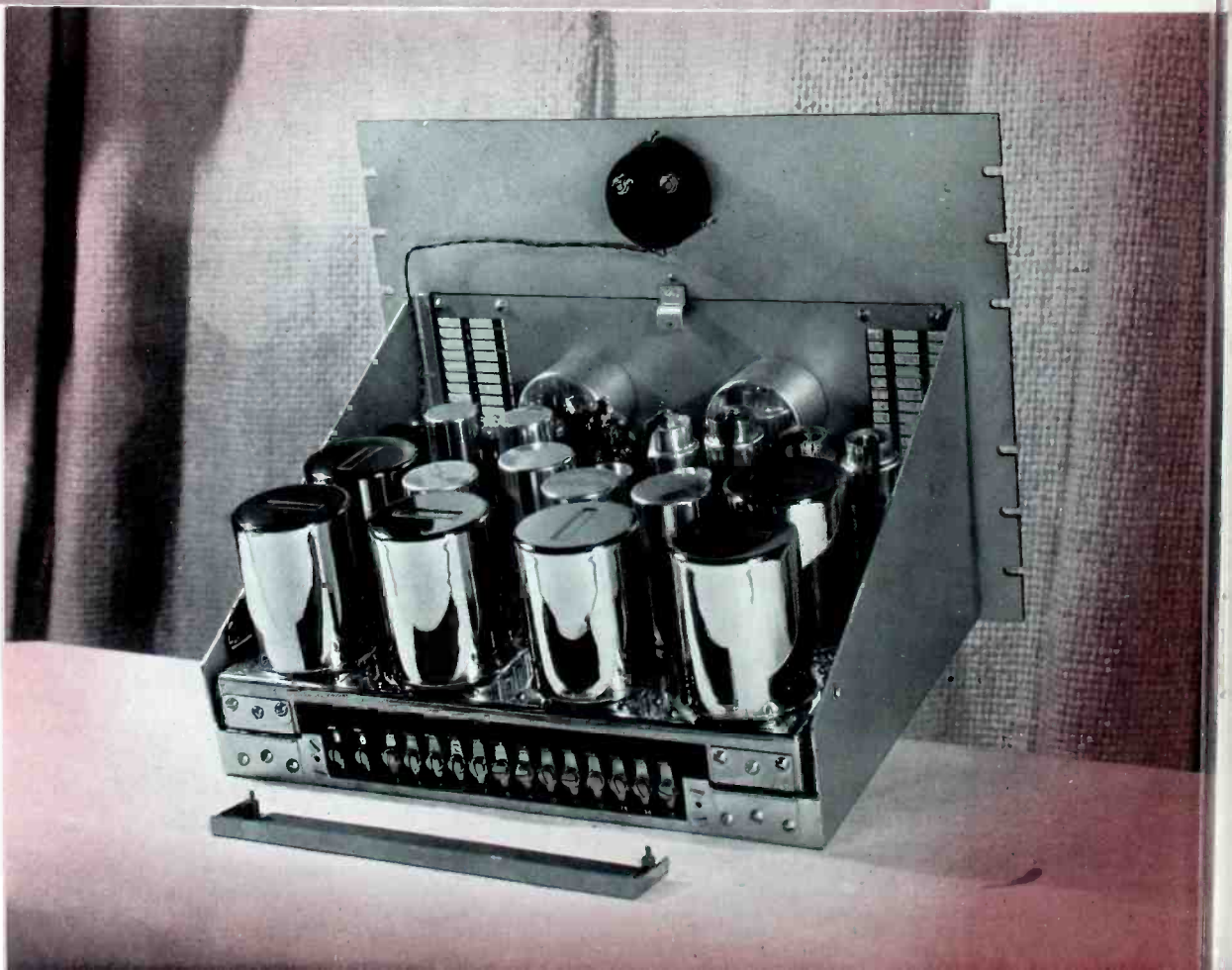

WINS
WHIO
KFWB
WCAE
WFBC
WRDS
WDBJ
KFBK
WBEN

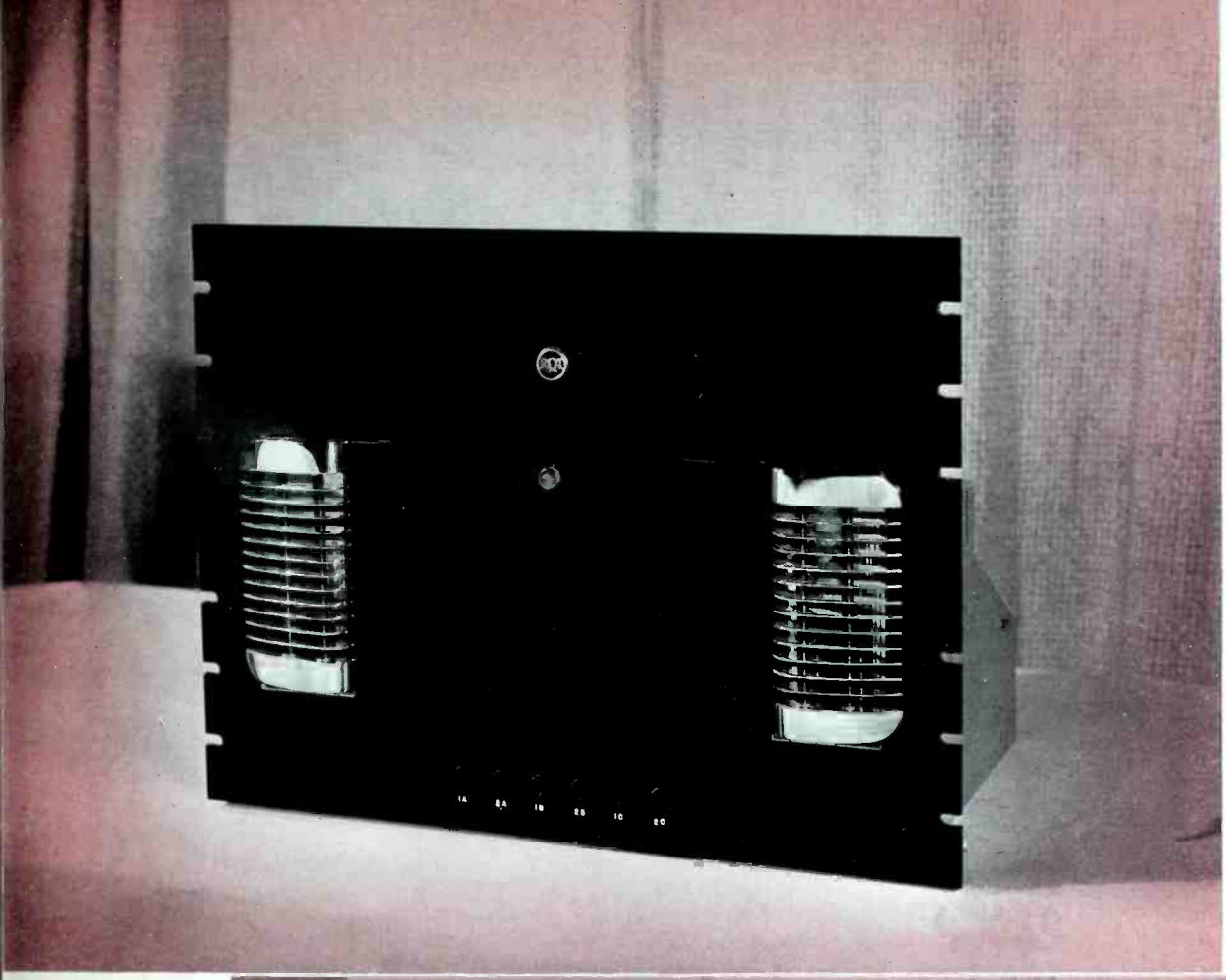


FOR TODAY

RCA
TYPE 40-D
PROGRAM
AMPLIFIER

SIMPLICITY

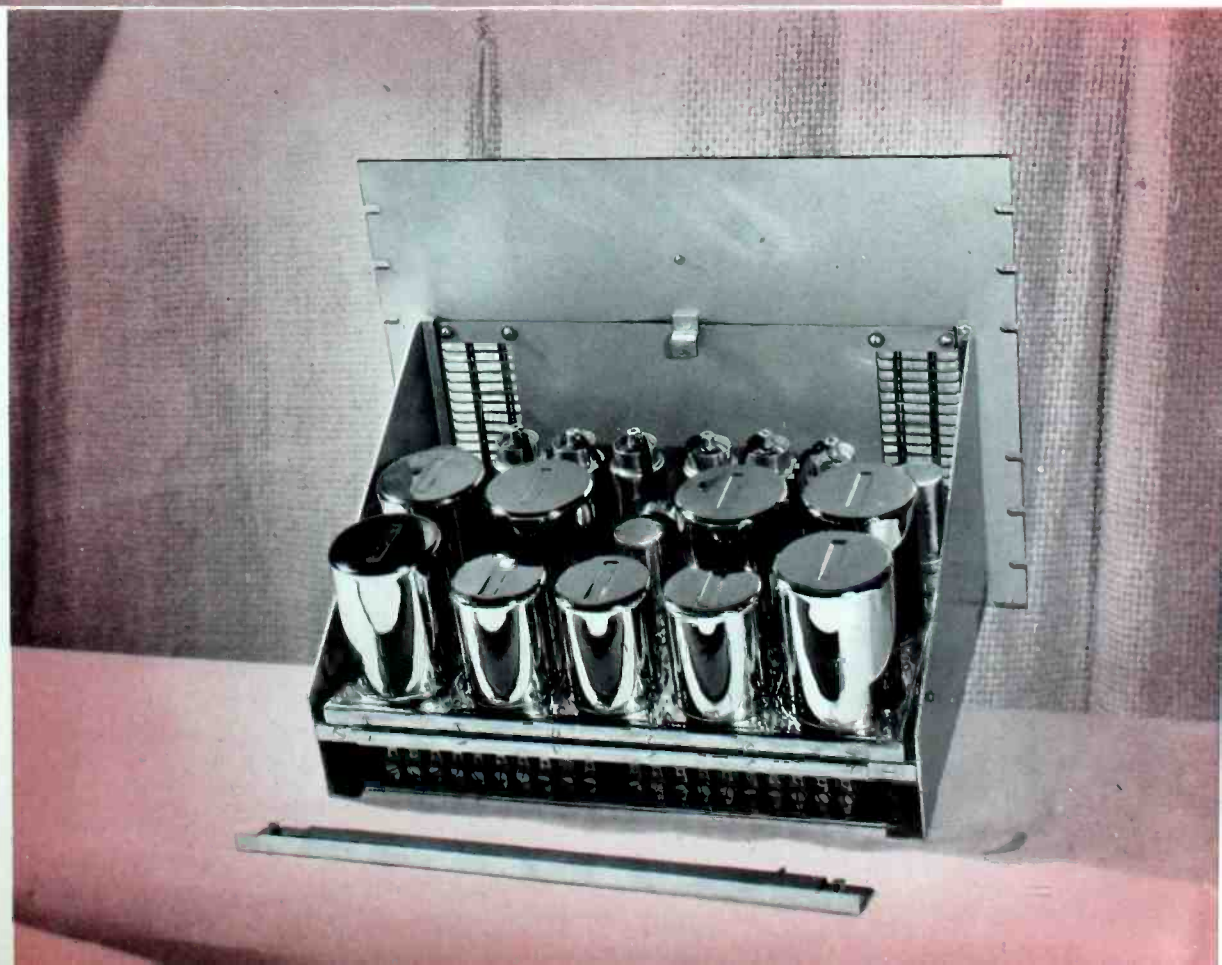


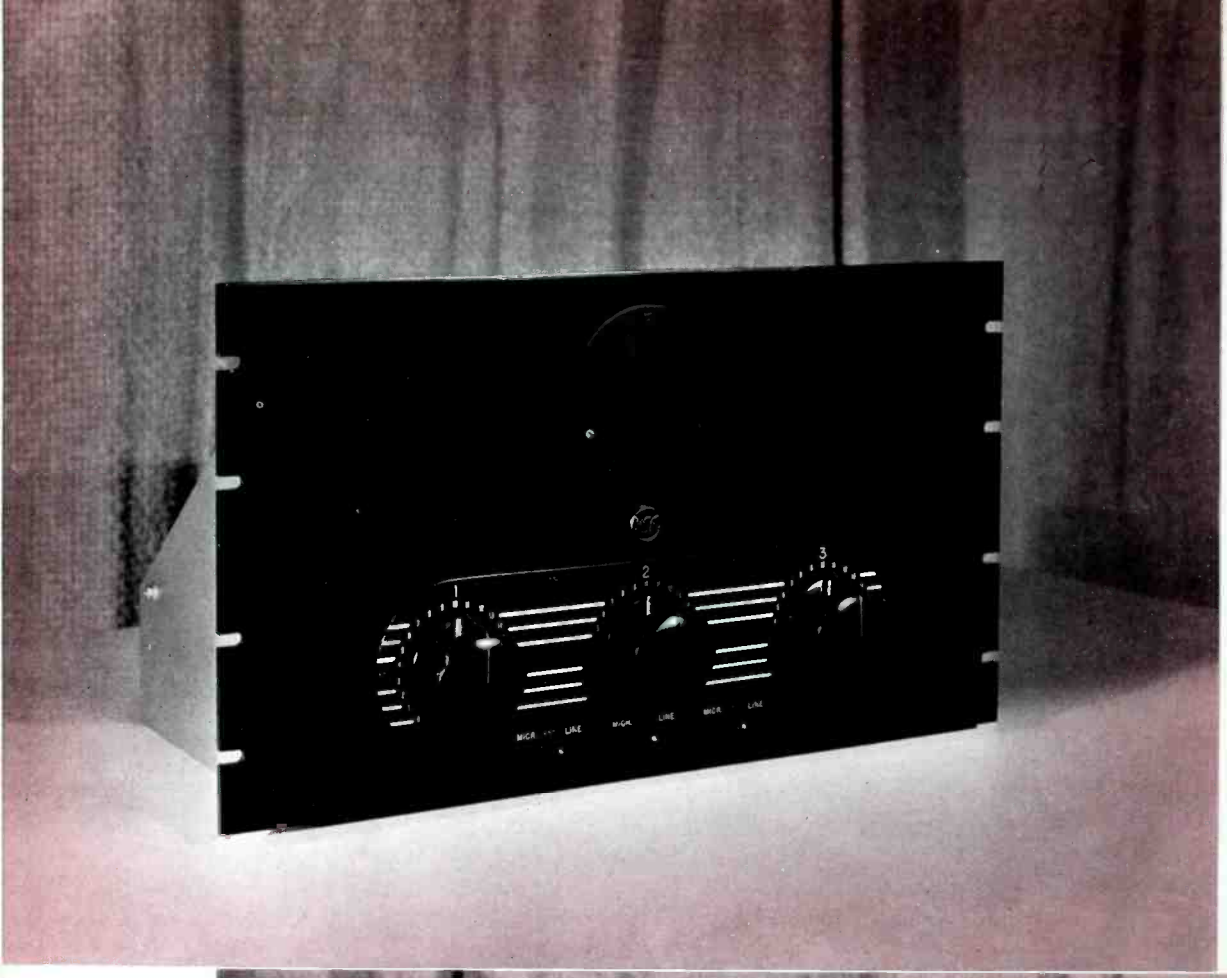


MODERN

RCA
TYPE 41-C
PRE-
AMPLIFIER

RELIABILITY

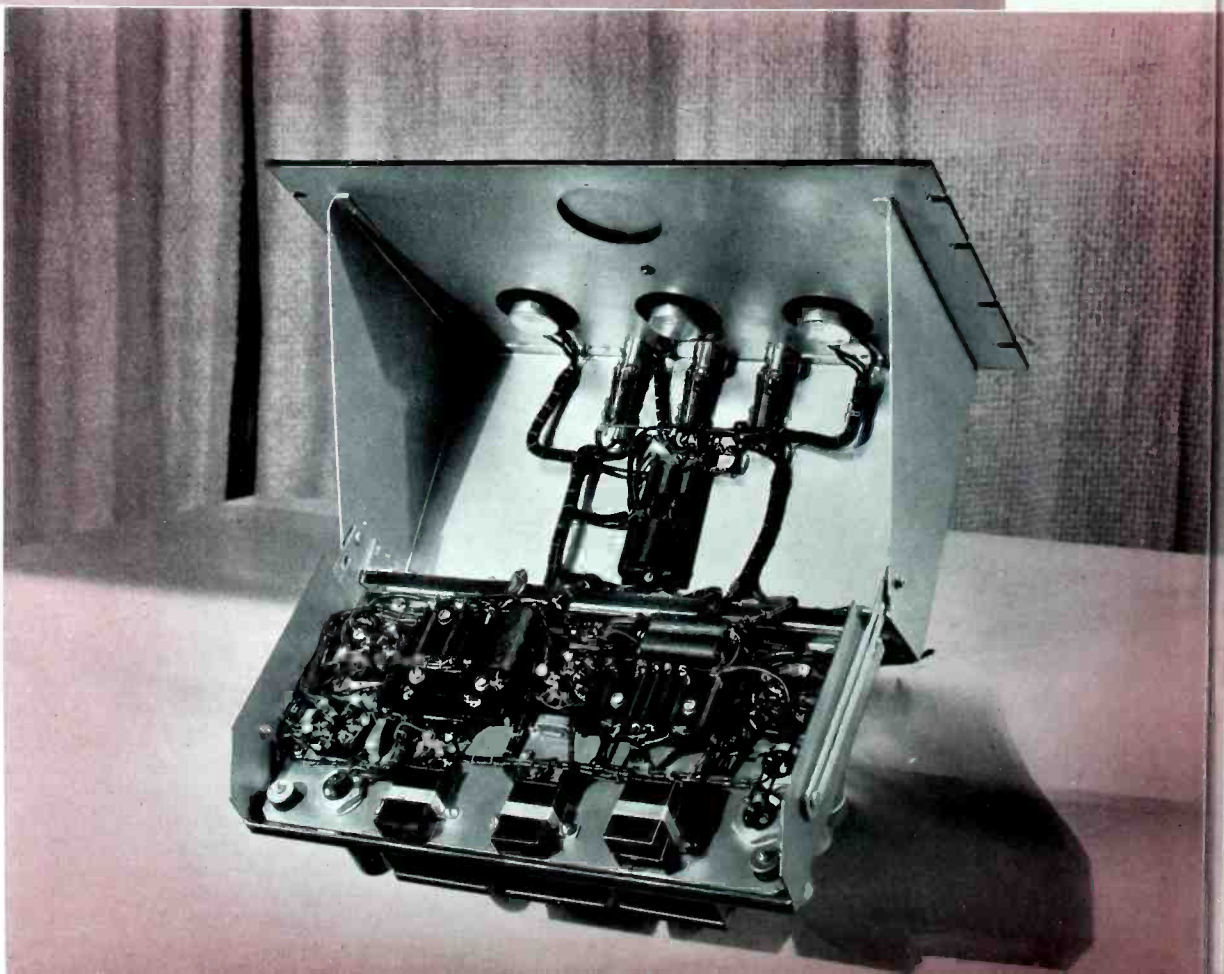




ADVANCED

RCA
Type 58-A
TRI-
AMPLIFIER

ACCESSIBILITY



Type 64-A
Monitoring Speaker

TOMORROW'S EQUIPMENT AVAILABLE TODAY

NEW MODULATION MONITORS

Type 66-A

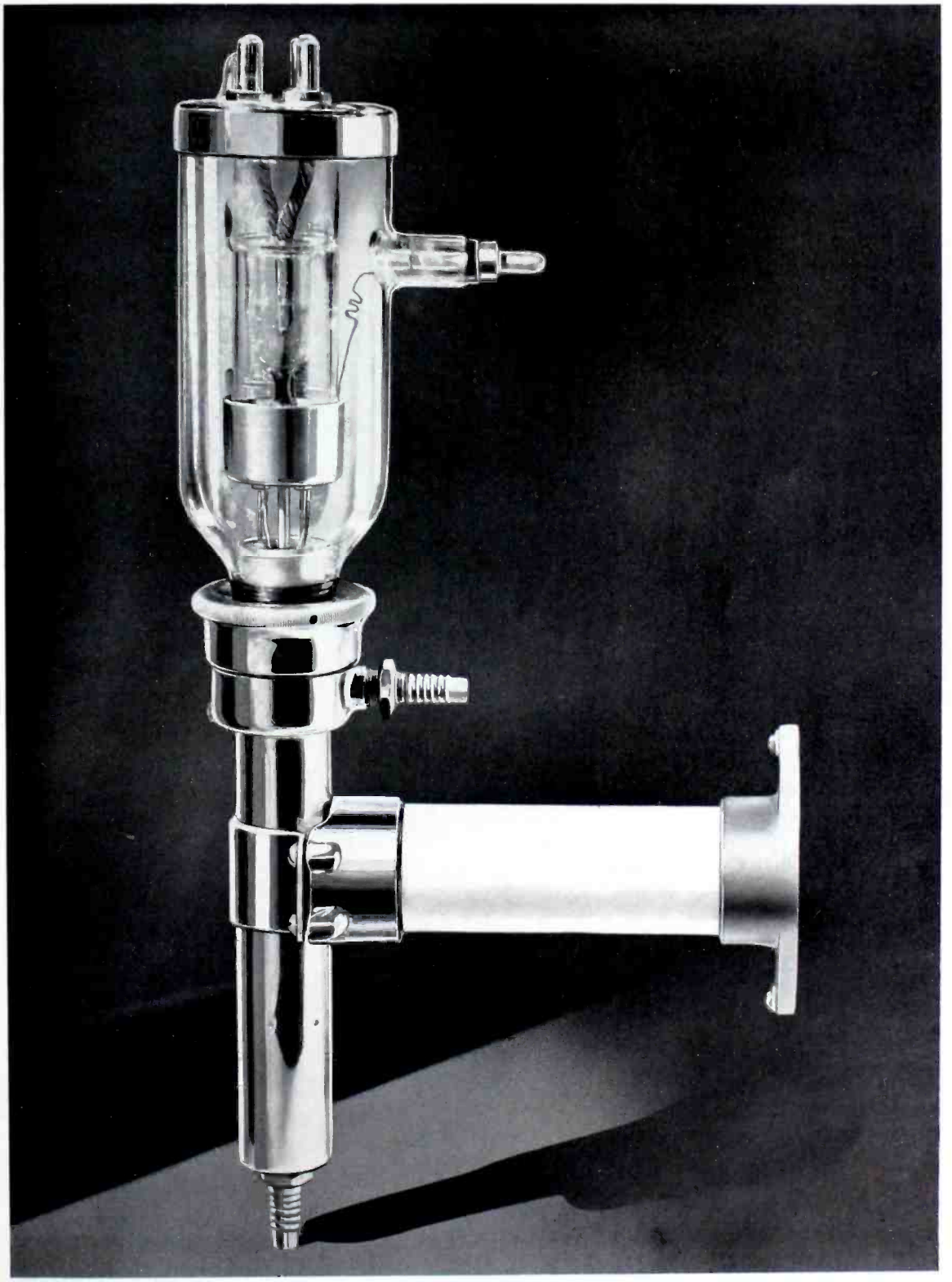
LARGE METERS

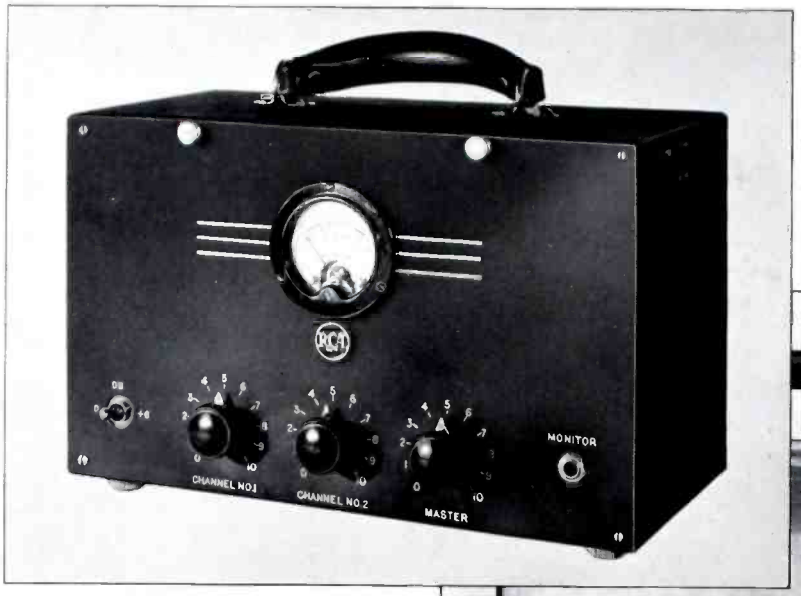
Type 66-B

FAST ACTION

Type 892

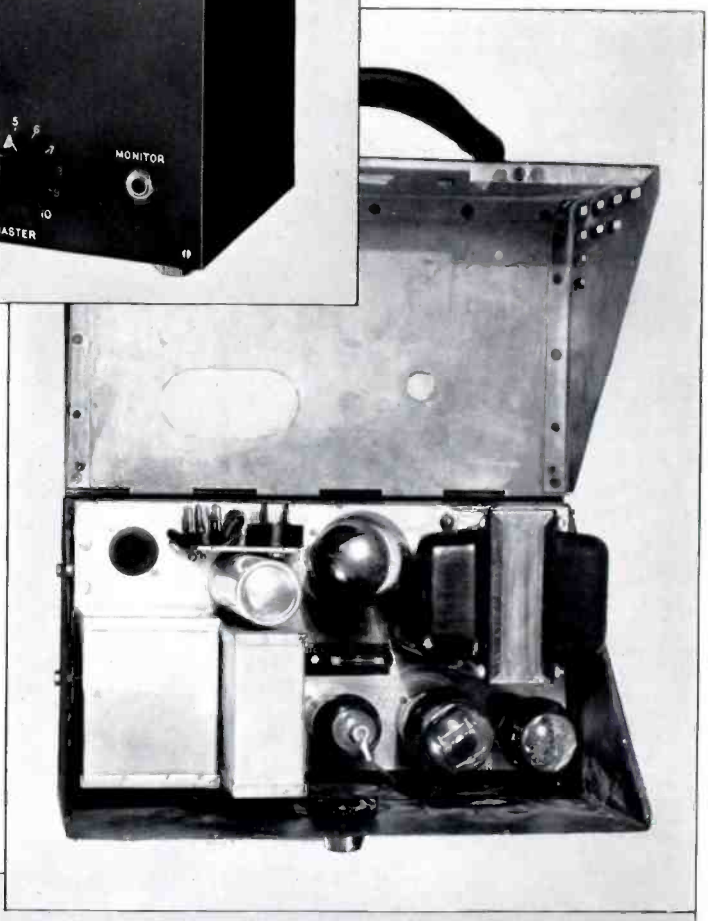
A NEW TUBE FOR THE MODERN STATION





Type 62-A

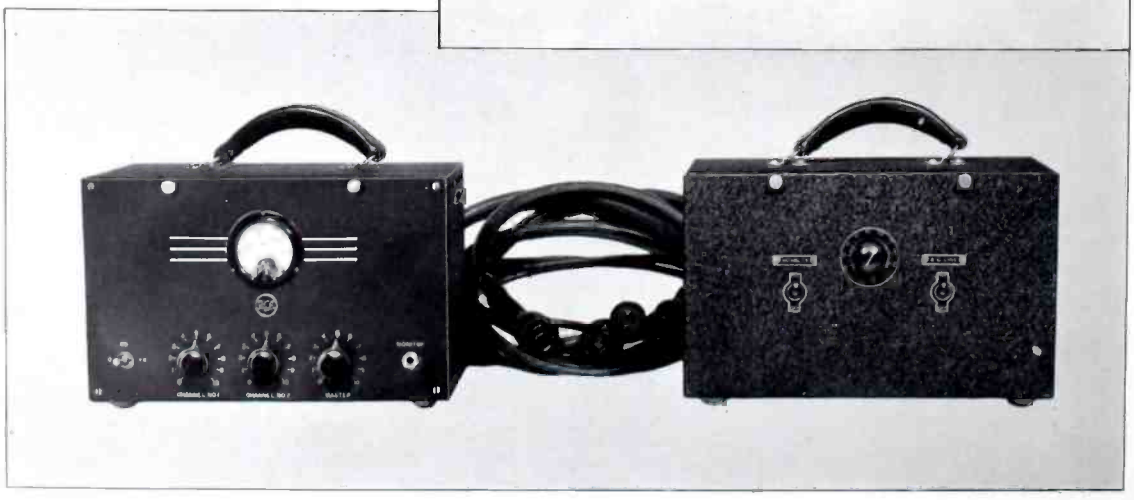
PORTABLE
AMPLIFIER



HIGH QUALITY

LIGHT IN WEIGHT

REGULATED
A-C OPERATED
POWER UNIT



HIGH QUALITY STUDIO MONITORING AMPLIFIER

Type 94-C

New Design Featuring

Accessibility of Tubes and Component Parts

• • •

Appearance

• • •

Reliability

High Quality Performance Featuring

High Gain

• • •

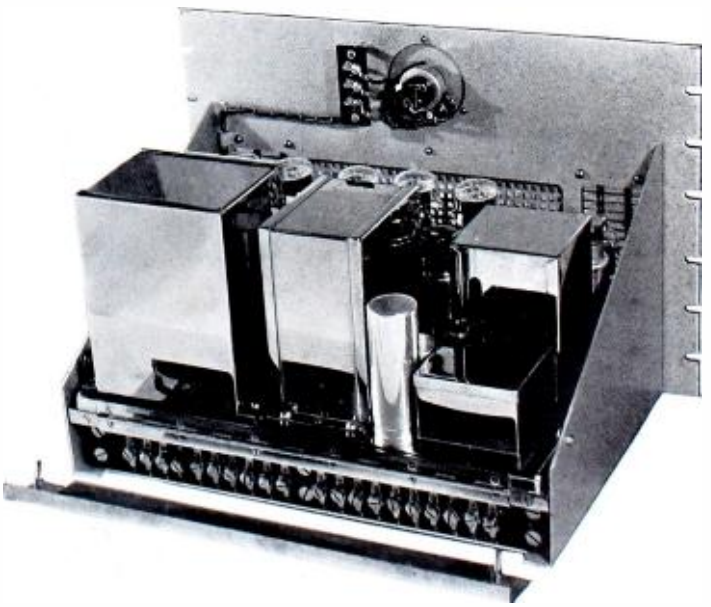
High Undistorted Output

• • •

Wide Frequency Range

• • •

Low Noise Level



ENGINEERING DEVELOPMENTS AT CBS

A Brief Resume of Some Interesting Activities During the Past Year

By A. B. CHAMBERLAIN, Chief Engineer, CBS

TECHNICAL activity at the headquarters of the Columbia Broadcasting System has been very extensive during the past year. From the studios of the network's key station, WABC in New York City, alone, more than twenty thousand programs were produced and transmitted. In addition, thousands of auditions and program rehearsals took place, as well as numerous "special event and spot-news" broadcasts of both national and international interest. Over four hundred programs from foreign countries were relayed by short-wave to this country and broadcast to CBS audiences.

This represents only a part of Columbia's technical operations, however, as many important programs originate at other key cities of the network, the more active points being WBBM, Chicago; W C A U, Philadelphia; W J S V, Washington; KMOX, St. Louis; and KHJ, Los Angeles.

During this period the General Engineering Department at CBS has been busily engaged in numerous technical problems related to the art and science of broadcasting. Steady progress has been made in the advancement of existing radio facilities. The fidelity of transmissions has been continually improved upon in order to meet not only present-day high-fidelity standards, but also the possible future requirements. In anticipation of these coming needs, equipment is developed and tested under actual operating conditions, prior to being commercially manufactured for regular service.

The CBS Engineering Department, under the direction of Mr. E. K. Cohan, has continued to maintain a very close contact with the manufacturers of broadcast equipment in order to assist them in the design of equipment which will be of maximum benefit to the industry, from a physical, electrical and economic viewpoint.

To facilitate regular development work, CBS maintains several engineering laboratories, completely equipped with the most modern test and measuring equipment, together with suitable tools for typical "model" work. Mr. Howard A. Chinn is in charge of the New York laboratory, assisted by a competent staff of "specialists."

Some of the special work conducted by the engineering staff includes: sound isolation and acoustical planning of broadcast studios; antenna design and construction, including high-frequency and ultra-high-frequency types; broadcast station field intensity surveys; radio station location and relocation; study of soil conductivity and radio transmission in various areas of the country; radio and audio-frequency equipment design, construction and installation; design, construction and operation of experimental high-frequency and ultra-high-frequency transmitting, receiving and measuring equipment; design of suitable radio station transmission measuring sets; investigation of means to improve present-day standard volume indicators; test and measurement of all standard manufactured equipment and component parts, to determine suitability for regular broadcast operation; preparation of engineering data for presentation at hearings before the Federal Communications Commission; preparation of special studies covering all phases of radio communication. Many additional problems, too numerous to mention here, are presented to this group for solution.

A few specific engineering projects completed during the past year by the CBS Engineering Department include:

1. The installation of new vertical radiators at stations WBT, WJAS and WDRC.

2. The complete reconstruction and re-equipping of the CBS New York studios. Details concerning this project were presented in the April, 1936, issue of "Broadcast News."

3. The design and assembly of a new antenna measuring set.

4. The design, construction and installation of two new high frequency experimental broadcast stations—W2XDV, New York, and W9XHW, Minneapolis.

5. The design and construction of modern ultra-high-frequency and intermediate-frequency relay broadcast stations for "special event" pickups.

6. The construction and installation of permanent speech input equipment at additional auditorium studios, Columbia's 44th Street Playhouse, and the Ford Rotunda, Dearborn, Mich.

7. The design and installation of a duplex broadcast antenna system, utilized by radio stations WJAS and KQV, Pittsburgh. Suitable filter circuits permit these stations to operate with a single vertical mast antenna, simultaneously, although the frequency separation of these two stations is only 90 kc/sec, and the power ratio is 10 to 1.

8. The collaboration with a well-known manufacturer of radio measuring equipment, resulting in the design of a practical, inexpensive transmission measuring set which has proven to be a real contribution to broadcast engineering. This equipment, intended primarily for routine observation of radio equipment performance, has been installed at more than 40 CBS stations. This has resulted in a remarkable improvement in station transmission, and has met with enthusiastic acceptance by broadcast engineers. In many cases, stations were able to lower hum and/or noise level, decrease audio-frequency harmonic distortion considerably, and thus, increase the dynamic volume range

(Continued on Page 29)

WITH THE ENGINEERS AT NBC

A Few of the High Spots from the Year's Engineering Program

By O. B. HANSON, Chief Engineer, NBC

DURING the past twelve months there have been a number of technical advances in the broadcasting field, all of which materially assist in bringing to the public better, and more reliable radio reception. Notable among these advances is the improvement in the design in transmitting antennas.

Factors for designing vertical radiators of specified characteristics are now well known and it is possible to erect antenna systems to give any desired radiation pattern even to marked directional effects, and such antennas can be so regulated that control is maintained not only over horizontal pattern, but also over the high angle radiation. A successful example of this type of design has been placed in service in the NBC station KOA in Denver, and at WMAQ in Chicago. The WMAQ antenna is an example of what can be done where height restrictions are imposed, as this antenna is equipped with a tuned top having the electrical characteristics of a 200 degree antenna which produces a field strength of 1700 millivolts per meter at one mile, and pushes the fading zone out to a distance of approximately one hundred miles from the station,—high angle radiation having been reduced to a minimum. This antenna is of constant cross-section from the base to the top.

Some interesting developments have also come out of NBC's micro-wave experiments, considerable publicity having been given to the successful use of a small micro-wave transmitter weighing but four pounds complete from microphone to antenna including its power supply, and radiating approximately two-tenths of a watt. Reliable communication has been obtained with this transmitter up to a distance of five miles.

This development alone opens up a new field for light weight portable broadcast pick-up services. The transmitter makes use of the RCA Radiotron 955 acorn tubes and operates on a frequency of approximately 320 megacycles. Such a frequency seems to be, at present, entirely free from interferences of any kind. The application of directive antenna systems to micro-wave equipment is most practical and will further extend the range and reliability of such services.

The development of a satisfactory non-distortionable automatic audio gain control suitable for broadcast purposes has been put in use by the National Broadcasting Company for certain types of pick-up work and has been used in conjunction with automatic relay stations and for the controlling of level on cue circuits and at points where a number of miscellaneous pick-ups are used to produce a single program in alternate or sequential use.

Outstanding among Engineering achievements were the broadcast facilities provided by NBC for the U. S. Army National Geographic Stratosphere flight which provided constant two-way communication with the gondola during the entire flight. The equipment in the gondola operated without technical supervision during the flight, all controls being locked, and the audio gain being controlled by NBC's automatic audio gain control. The antenna power was but eight watts on 13050 kcs., and satisfactory signals were picked up simultaneously on both coasts. Similar technical achievements were accomplished during the flight of the China and Philippine Clippers in their respective flights from Baltimore via Panama to San Francisco, and across the Pacific to the Philippines.

Considerable work has been done in the preparation of the NBC plant for the coming RCA television tests which is designed to extend the laboratory experiments in to practical field operation and to determine the transmission, production, and economic problems of operating a television system. It is expected that such practical tests will be is full operation by July, 1936.

DEVELOPMENTS AT CBS

(Continued from Page 28)

and the modulation capability of their transmitters. Of course, in order to obtain a complete picture of station performance, a wave analyzer must be used with the transmission measuring set. This requirement does not, however, detract from the value of the measuring set, as a routine measuring and monitoring device.

9. The design and installation of new field intensity equipment in an automobile for surveys in the field. Cars are maintained for this purpose, located at both Chicago and New York.

Obviously, an interesting paper could be written on any one of the above subjects. They are mentioned here in order to give some idea of th scope of the work, other than the technical operations that are continually being handled by the network's staff.

Great progress has been made by the CBS Engineering Department during the past year and, at present, numerous engineering projects are under way which will further improve the technical facilities of the network. This is in keeping with the long-established policy of the Columbia Broadcasting System to render, continuously, high fidelity program transmission service, consistent with the swift development of the art of broadcasting.

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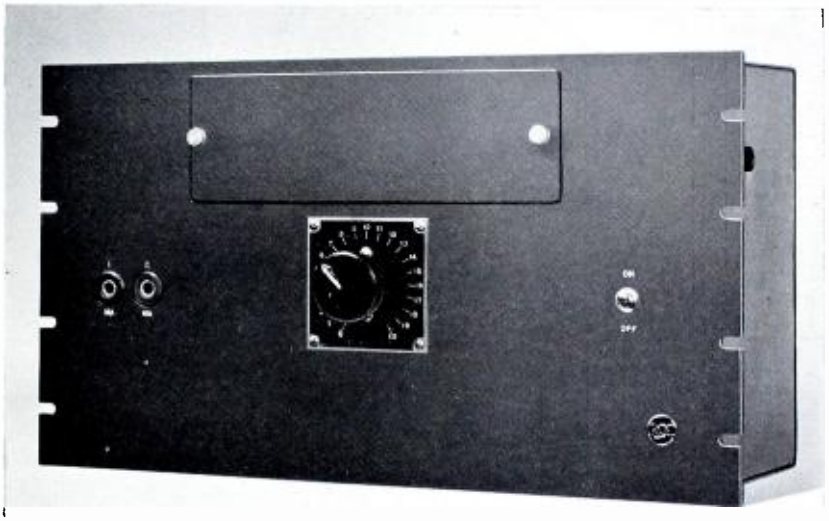

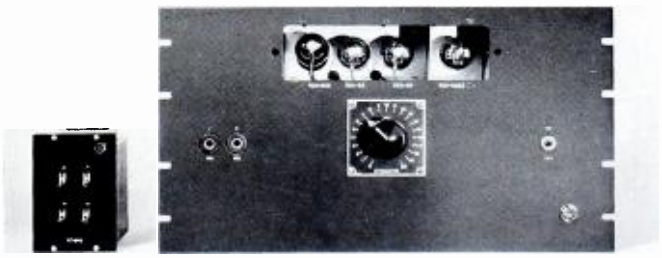

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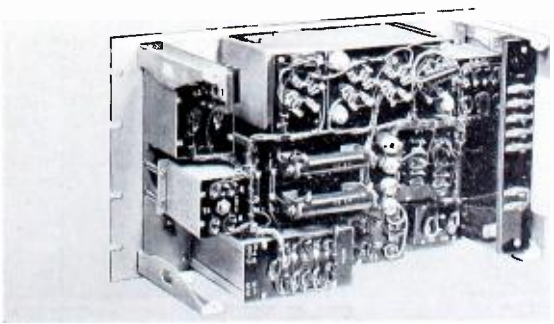

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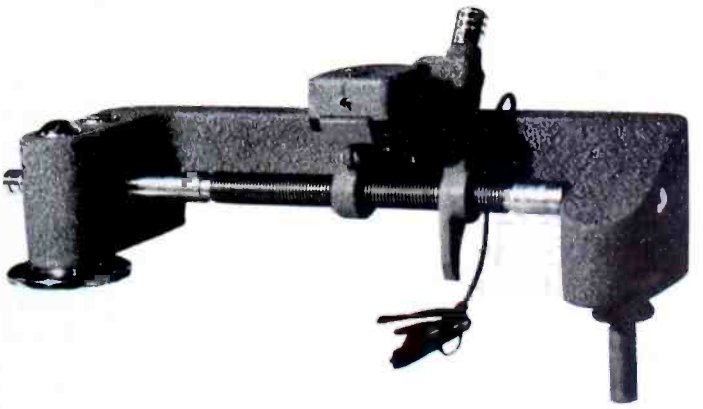

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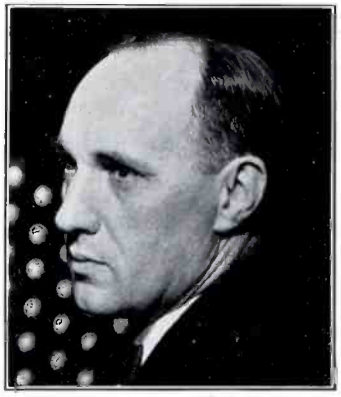

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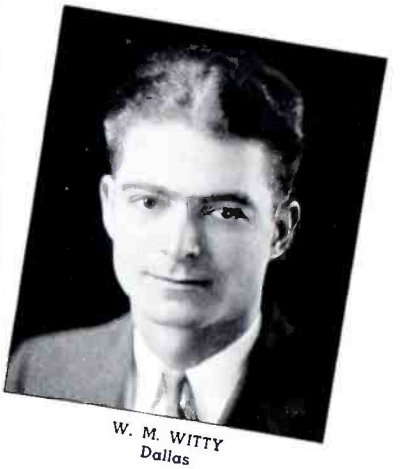

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