

THE BROADCAST ENGINEERS' JOURNAL

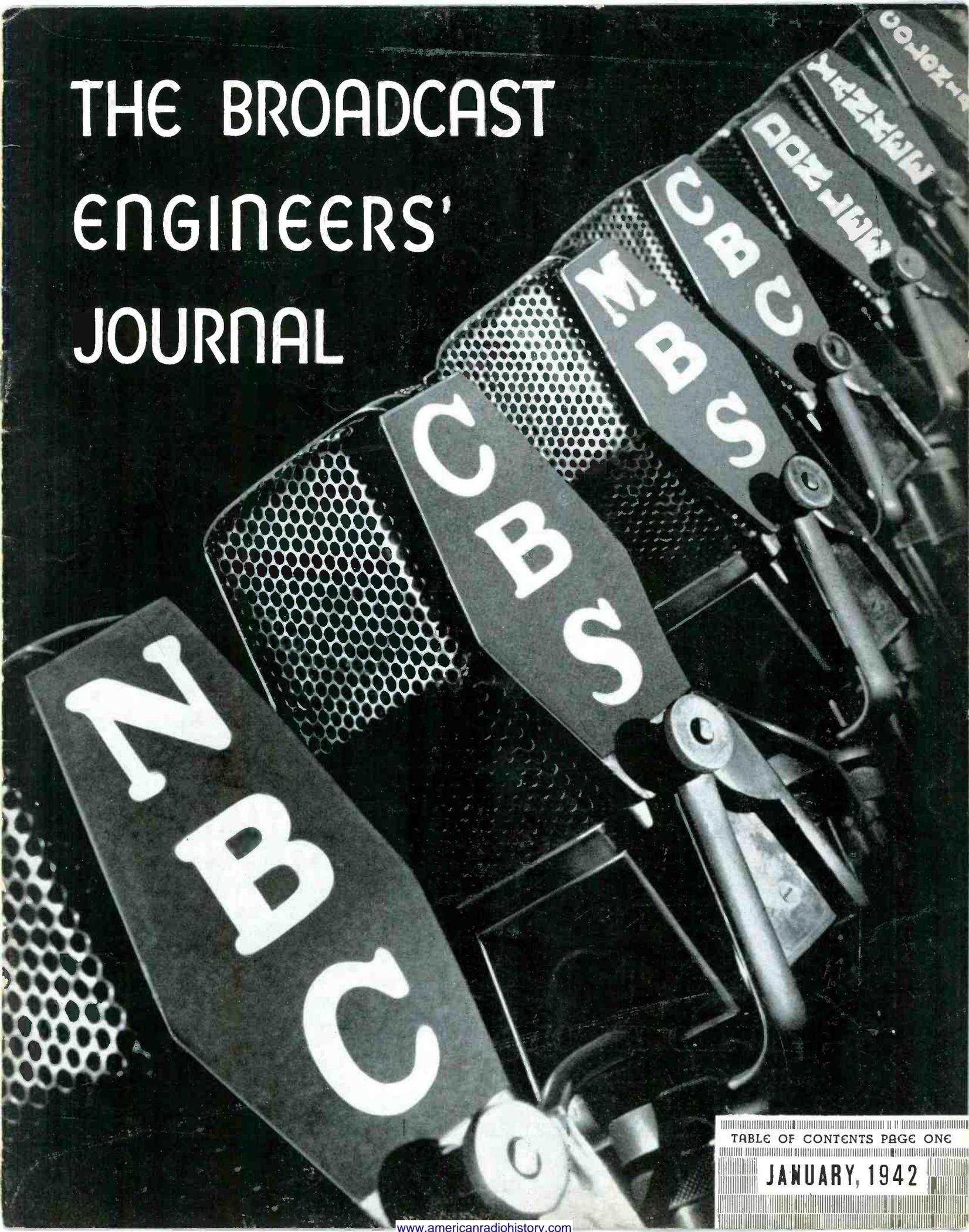


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JANUARY, 1942

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THE BROADCAST ENGINEERS' JOURNAL

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A Suggested Logarithmic Voltage Unit

By

Paul J. Moore, Transmission Engineer, NBC Chicago, and

B. F. Fredendall, Audio Facilities Group, NBC Engineering Department

IN AN earlier article on the design of voltage loss pads, it was pointed out that no logarithmic voltage term then existed which would properly express, either in absolute terms or in terms of ratio, the voltage which existed across the terminals of a load in comparison to some reference voltage.

In this earlier article the term "voltage db" was used to express, in logarithmic units, the voltage ratio existing between the input and output terminals of a four terminal network. In using this term no reference level was implied since only a relative comparison of two voltages was being considered. Note that the term "voltage db" was called upon rather than "voltage VU" because a ratio was being expressed rather than an absolute quantity.

Chronologically the db came first, as the result of a need to express the ratio of two powers on a logarithmic scale. Next came the VU as the result of a need to express power on a logarithmic scale but containing two additional defining conditions, namely: (1) the use of a specific meter having certain definable dynamic characteristics, and (2) a one milliwatt reference power to which all measurements would be referred. However, for routine gain measurements, and other obvious advantages in being able to ignore impedance magnitude, there is need for a unit based on voltage rather than power.

It might be expected that since the VU meter now in use is calibrated in terms of power in a 600 ohm load that 600 ohms would be encountered in nearly every circuit, but such is not true. Actually the magic number 600 in radio plants is rare indeed, so when one measures power with a db or VU meter, a correction factor is nearly always necessary.

When a 600 ohm circuit is considered, the VU will define absolutely the voltage as the power and impedance are known. In practice the VU meter is often connected across a circuit other than 600 ohms. To determine the power in these cases, the impedance must be known. In every case the voltage is known, since the meter is a voltage operated device. It is impossible to determine the VU level when using a VU meter unless the circuit impedance

is known as the VU is a measure of power. In many cases it is more convenient to ignore impedance and use voltage measurements only.

Consider a microphone mixer system. In the design of a mixer system a wide range of impedances are encountered. Some of these impedances are: the input and output impedance of the fader, the impedance of the fader series resistor, the shunt impedance of the combined fader and series resistors, the input and output impedances of the matching or isolation coil, the input and output impedance of the "vernier gain" and the input and output impedances of the "main gain." As these devices operate at very low power levels, well within the power capabilities of the system, power consideration only complicates the calculations, as the primary consideration is the input voltage and output voltage, since distortion is not involved. In the maintenance of such a mixer system, it is convenient to ignore the impedances. By applying various known voltages across predetermined points it is possible to compare the produced output voltage with the calculated and test voltage previously obtained.

Again, where large gains or losses are involved or with peak to peak voltage measurements, a log function is preferable to such expressions as "10,000 or 1,000,000 times the input." These gains or losses are frequently encountered in video and radio circuits on a peak to peak voltage basis.

Other workers also recognize the need for a logarithmic voltage unit. For example, Strieby and Weis of the Bell Telephone Laboratories, writing in the July 1941 I.R.E. Proceedings, on page 377, state: "The lowest level to which the television signal may drop without encountering interference from the telephone circuits varies widely. In areas we have tested where the circuits are all in cable, the lower limit is the order of 65 decibels below 1 volt." Note that the authors use the term "decibel" to express a voltage level—not a power level.

From the above examples and reasoning we recognize the need for both a log voltage ratio and an absolute log voltage unit. In looking for a suitable term it is obvious that the DB cannot

be correctly used as it is by definition the ratio of two powers, and the formula

$$DB = 10 \log (\epsilon^2 / Z_2 / \epsilon^2 Z_1)$$

is a ratio of power. When $Z_1 = Z_2$, this formula simplifies to

$$DB = 10 \log (\epsilon^2 / \epsilon^2) \\ = 20 \log (\epsilon_1 / \epsilon_2)$$

which is still a ratio of power even though it contains a simple voltage ratio and the last formula may only be correctly used when $Z_1 = Z_2$.

In a similar manner, the VU may not be used to indicate a voltage ratio, since by definition it is a unit of absolute power.

What then shall we call the unit—a logarithmic voltage unit (LVU) or "voltage db" or "voltage VU"? One advantage of the LVU is that the VU symbol is included as part of the term so that a reading expressed in LVU signifies that the voltage is numerically equal to that of a VU into 600 ohms.

The desired log voltage scale is now standardized and available in the voltage scale represented by holding one milliwatt into 600 ohms. However, some term or name is required to distinguish this unit from the VU, permitting an absolute voltage to be defined across any impedance. The new unit should also be defined so as to show a voltage ratio if desired. It is suggested that if the term is preceded by a plus or minus sign it denotes an absolute voltage, equal to that numerical voltage defined by the VU and using the reference voltage of 0.775 volts (1 mw into 600 ohms). In the absence of a sign the term is employed as a ratio and is defined as

$$LVU = 20 \log_{10} (\epsilon_1 / \epsilon_2)$$

By adoption of the above unit much uncertainty will be eliminated from such statements as "plus 4VU" when the impedance is other than 600 ohms. At present, one is never certain whether this statement means a power level 4 db above one milliwatt or the voltage equal to 4 db above 0.775 volts.

The suggested voltage scale is as follows:

LVU (Logarithmic voltage unit)	Volts	LVU (Logarithmic voltage unit)	Volts
minus 20	0.077460	0	
" 19	0.086913	plus 1	0.86913
" 18	0.097519	" 2	0.97519
" 17	0.10949	" 3	1.0949
" 16	0.12275	" 4	1.2275
" 15	0.13773	" 5	1.3773
" 14	0.15454	" 6	1.5454
" 13	0.17323	" 7	1.7323
" 12	0.19458	" 8	1.9458
" 11	0.21830	" 9	2.1830
" 10	0.24495	" 10	2.4495
" 9	0.27485	" 11	2.7485
" 8	0.30838	" 12	3.0838
" 7	0.34742	" 13	3.4742
" 6	0.38823	" 14	3.8823
" 5	0.43557	" 15	4.3557
" 4	0.48873	" 16	4.8873
" 3	0.54838	" 17	5.4838
" 2	0.61531	" 18	6.1531
" 1	0.69036	" 19	6.9036
0	0.77460	" 20	7.7460

Examples of use of this unit are as follows: plus 11 LVU would absolutely define a voltage of 2.7485 volts across any impedance. Minus 11 LVU would likewise define 0.21830 volts across any impedance. However, 9 LVU (notice absence of sign preceding the term) would represent a voltage increase or decrease of 9 LVU, which would correspond to a 9 db increase or decrease of level across equal impedances.

CQ

Although this call won't be heard among us for quite a while, we have a live reminder of it in our feathered friend the pigeon. CQ is one of his many names. Now and then he pays a visit to the engineers' lounge on the fifth floor of NBC, Radio City, by way of the



window (probably to avoid presenting any passes to the guards). Except for the known fact that he is a "Homer", his origin is very mysterious. Ed Whitaker insists that he is THE "Sea-Pigeon" whom he used to send with P. L. messages to the Master at 589 during his tours with the G. E. Hour of Charm.

CQ is seen here giving Engineer Markle an invaluable tip on how to play rummy.

Most of us like him . . .

The Broadcast Engineers' Journal for January, 1942

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POPULAR DAVEN SERIES 750 DECADE RESISTANCE BOX



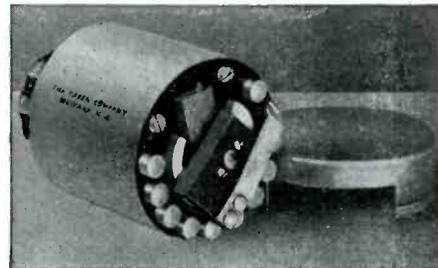
Designed for use as Laboratory Standards, as components in Bridge Circuits, and in other types of precision measuring equipment . . . the Decade Resistance Boxes are complete assemblies consisting of two or more Type 225 DAVEN Decade Units mounted on an engraved metal panel and enclosed in a shielded walnut cabinet.

Three terminals are provided, two for the resistance circuit, and a third as a ground connection. There is no electrical circuit between the resistance elements and the metal panel. Available in 12 models with resistances from 11 to 1,111,100 ohms, in from 0.10 to 10. ohm steps.

DECADE RESISTOR UNITS

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THE DAVEN COMPANY
158 SUMMIT STREET • NEWARK, NEW JERSEY

The Business Side of Television

By Noran E. Kersta

Manager, NBC Television Department

Part V: Half a Year in Commercial Television

THIS is a report on the progress of television after it emerged from the laboratories into the commercial world on July 1, 1941. Due to the fact that television is recognized as the nation's Number One pilot industry during these troubled times, with unlimited promise of absorbing a considerable amount of labor and production facilities after this war, it has progressed encouragingly.

There are four main channels in which the commercial progress of television might be measured.

(1) The growth of broadcasting and receiving facilities.

(2) The service rendered to the public in the form of program entertainment, and education.

(3) The headway made toward becoming a self-supporting industry.

(4) The contribution of broadcasting to national defense.

Broadcasting Facilities

According to a report of November 19, 1941, there were two commercial television stations in the United States, plus six experimental stations transmitting some kind of program service.

The commercial stations were:

New York

WNBT—National Broadcasting Company

Philadelphia

WPTZ—Philco Radio & Television Corporation

The experimental stations were:

Chicago

WTZR—Zenith Radio Corporation

W9XBK—Balaban & Katz Corporation

Los Angeles

KTSL—Don Lee Broadcasting System

New York

WCBW—Columbia Broadcasting System

W2XWV—Allen B. Dumond Laboratories, Inc.

Schenectady

WRGB—General Electric Company

In addition to these experimental and commercial stations actually transmitting programs, there were 22 stations in various stages of planning and construction in the following cities:

New York

W2XBB—Bamberger Broadcasting Service, Inc.

W2XVT—Allen B. Dumont Laboratories, Inc.

W2XMT—Metropolitan Television, Inc.
Philadelphia

W3XAU—WCAU Broadcasting Company

W3XPP—National Broadcasting Company

W3XEP—RCA Manufacturing Company, Camden, N. J.
Washington

W3XWT—Allen B. Dumont Laboratories, Inc.

W3XNB—National Broadcasting Company

Los Angeles

W6XHH—Hughes Productions, Division of Hughes Tool Company

W6XYZ—Television Productions, Inc.

W6XCB—Columbia Broadcasting System

KSEE—Earle C. Anthony, Inc.

San Francisco

W6XDL—Don Lee Broadcasting System

W6XHT—Hughes Productions, Division of Hughes Tool Company

Chicago

W9XCB—Columbia Broadcasting System

Cincinnati

W8XCT—Crosley Corporation
Schenectady

W2XD—General Electric Company

Milwaukee

WMJT—The Journal Company

West Lafayette, Ind.

W9XG—Purdue University

Ft. Wayne, Ind.

W9XFT—Farnsworth Television & Radio Corporation

Iowa City, Iowa

W9XUI—State University of Iowa

Manhattan, Kans.

W9XAK—Kansas State College of Agriculture and Applied Science

The accompanying map (Fig. 1) is a Population-distorted map showing the areas in the country presently served with various types of service. The population coverage of each station is an estimate from the best information at hand put forward by the television broadcasters based on their observations and experience. Twelve and seven-tenths per cent of the nation's population is within

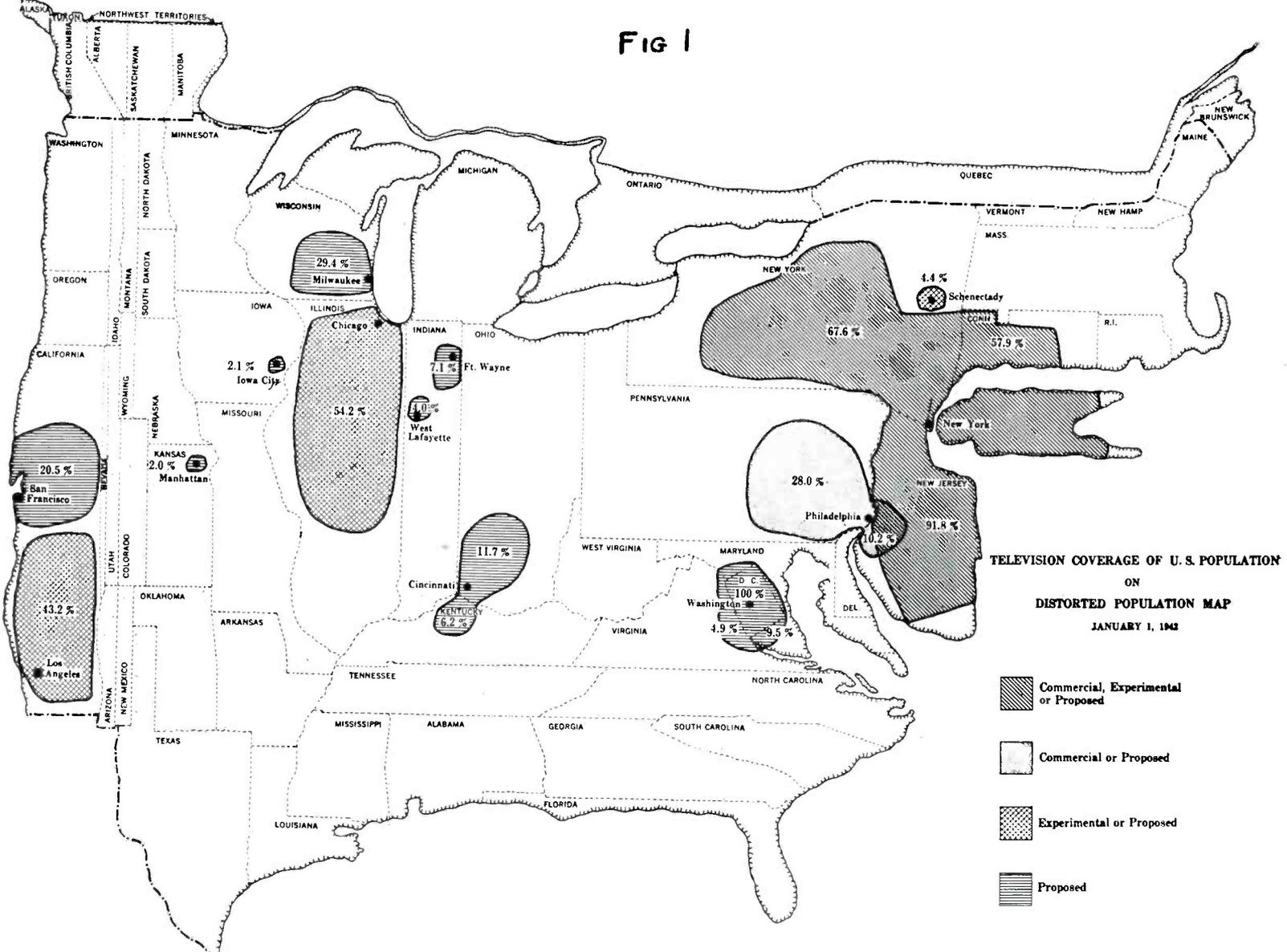
range of commercial service. An additional 6% is within range of experimental service. Thus, at the end of the year 1941, approximately 18.7% of the nation's population is within range of actual television program service. Another 3.6% is within range of authorized stations planning to go on the air. This means that within range of all stations actually programming and planning to program is 22.3% of the nation's population. (Fig. 2) shows these relative percentages.

Fig. 3 shows the first steps taken to extend local broadcasts into a network service. The links branch from New York City northward to the General Electric Company's station in the Albany-Troy-Schenectady area by a radio path from the NBC-WNBT, Empire State transmitter 129 miles to the General Electric relay station atop Helderberg Mountain where the signal gets its one boost for three miles to the main transmitter for rebroadcast to the Albany-Troy-Schenectady three market area. This link to Albany underwent a series of tests last year, and arrangements to resume this work were established in December.

To the south, there are presently two network links, the Telephone Company's coaxial cable, and a radio relay link established by the Philco Radio & Television Company. The coaxial cable got its first real program service test a year and a half ago during the Republican National Convention when the entire proceedings were sent to New York through this cable for rebroadcast. It is interesting to note that during this June 24th to 28th, 1940 broadcast, three major markets were receiving the same television program simultaneously; in Philadelphia, through the Philco Company; in New York, the National Broadcasting Company; and the General Electric Company in the Albany-Troy-Schenectady area, by radio relay pickup of NBC's broadcast.

Since October 15, 1941, the Philco Company in Philadelphia has been rebroadcasting some of NBC's WNBT programs to the Philadelphia audience, through the use of W3XP, the relay station at Wyndmoor, Pennsylvania, which is 82 miles from WNBT in New

FIG 1



TELEVISION COVERAGE OF U. S. POPULATION
ON
DISTORTED POPULATION MAP
JANUARY 1, 1942

- Commercial, Experimental or Proposed
- Commercial or Proposed
- Experimental or Proposed
- Proposed

York, and 8 miles from WPTZ, the Philco main transmitter in North Philadelphia.

To study the technical progress of the Philadelphia link, two surveys have been conducted to date in the Philadelphia area among approximately 300 receiver owners in that area. A third survey is planned for the end of January. Fig. 4 compares the results of the two surveys, one conducted during the week of October 17-26, and during the week of November 24-30; one month later. On a basis of 0 for "Poor," 1 for "Fair," 2 for "Good," and 3 for "Excellent," the Philadelphia audience rated Philco's direct transmissions 2.15 on the first survey and 2.37 on the second, showing an improvement in local service. On the rebroadcasts of NBC's WNBT transmissions after going through the relay link at Wyndmoor and the main Philco transmitter, the audience rated the technical reception 1.76 on the first survey and 2.16 on the second, which reflects

considerable improvement in a short time. These ratings compared with the direct reception of the New York signal in the New York area of 2.30 during the first survey and 2.40 during the second.

Additional improvements in this radio link are being made, and it is expected that the next survey will show still better reception. There have already been requests by advertisers for network television. It is very likely that the next time this networking is heard of, it will be because one of television's clients will have considered the technical results sufficiently good to justify his participation in the work and thereby encourage its progress.

Receiving Facilities

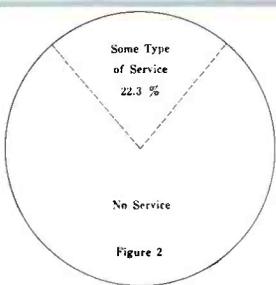
So far, only transmitting facilities have been discussed. Now to the other end of the circuit—the television receiver situation. Roughly, here are some estimates of distribution of the receivers in various markets:

New York	5,000
Philadelphia	400
Los Angeles	450
Chicago	200
Albany	75
Miscellaneous	100

NBC keeps in its files as much information as possible on the type and location of all receivers in the New York area. The files are approximately 75% to 80% complete and the facts which follow are based thereon.

During the six months of commercial operation, additional receiver owners have been added to the files at an average of 90 per month. The main deterrents to this growth were:

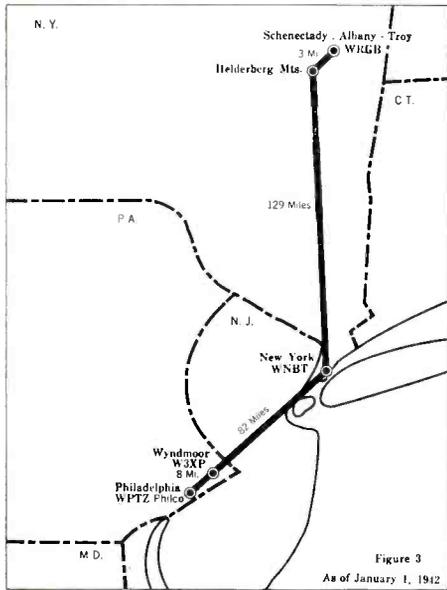
1. The time required (from the first of July to the middle of October) to convert the receivers which were already in the field on July 1st, to the new FCC commercial broadcasting standards.



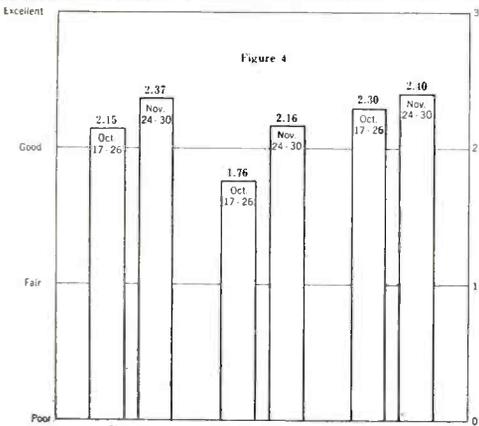
HOW THE 22.3 % IS DIVIDED

57.0 % Commercial, Experimental or Proposed	26.9 % Experimental or Proposed	16.1 % Proposed
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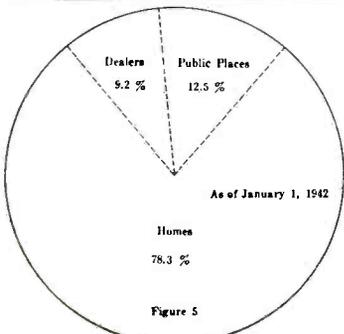
TELEVISION COVERAGE OF U.S. POPULATION
As of January 1, 1942
TOTAL U. S. POPULATION



EXPERIMENTAL TELEVISION NETWORK SERVICE



TECHNICAL RECEPTION RATINGS OF NEW YORK PRODUCT PROGRAMS REBROADCAST IN PHILADELPHIA



Television Set Ownership in New York Market

2. The lack of any receiving set promotion on the part of receiver manufacturers.

Manufacturers have been busy with the defense effort and could not see their way clear to conduct a strong promotion campaign. However, during the past month there were reports that effort was being exerted by the industry to divert some of the materials and labor being allocated to sound receiver production to the production of television receivers. It has been difficult to determine the exact status of this plan.

Based on the information collected to date in the NBC circulation file, Fig. 5 shows the distribution of ownership of television receivers by type of owner, as follows:

Private Homes	78.3 %
Public Places	12.5 %
Radio Dealers	9.2 %

General feeling in the industry is that most of the television receivers are in public places; however, these figures indicate that only one-eighth of the receivers are in these establishments.

There are two ways of increasing the actual number of individuals in the television audiences:

1. Increase the number of receivers in the field.
2. Increase the number of people viewing at each receiver.

It is logical that the increase in the number of receivers in the field is related to the number of persons who can receive their first introduction to television on someone else's receiver. It is difficult to use direct methods to increase the number of viewers per receiver in home installations; however, in public places where the main objective of having a receiver is to make use of the drawing power of television to gather as large a number of individuals as possible, this type of installation is one of the vital factors in additional receiver sales.

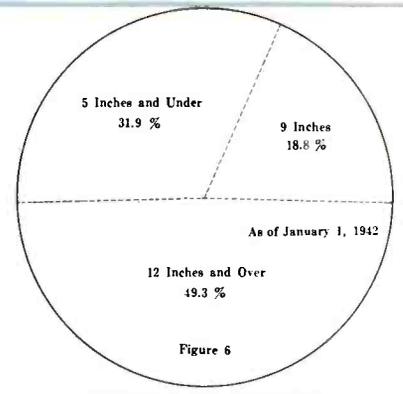
Fig. 6 shows the breakdown of the type of receiver in the New York area by size of screen. The dimension refers to the approximate diameter of the viewing tube. The percentages are:

Inches:	Percentage
12 and over	49.3 %
9	18.8 %
5 and under	31.9 %

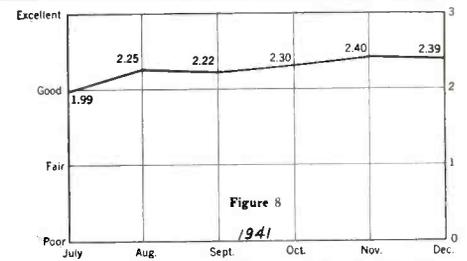
In reference to the adequacy of screen size the trend is to bigger pictures. Various large screens have been successfully demonstrated during the year. Consensus in the field would indicate an increase in screen size to approximately 16" by 24".

The prices of receivers during the past

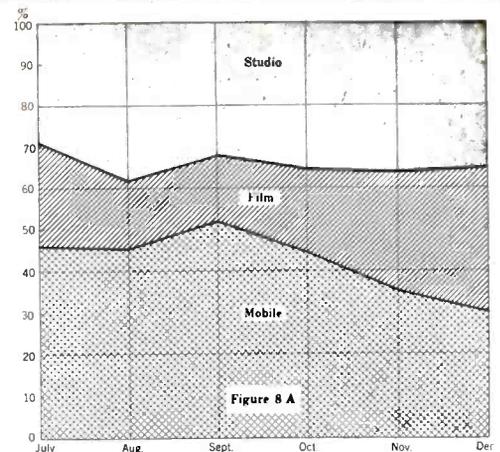
The Broadcast Engineers' Journal for January, 1942 **6**



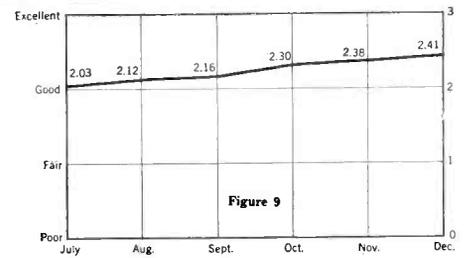
TELEVISION SET OWNERSHIP BY SIZE OF SCREEN IN NEW YORK MARKET



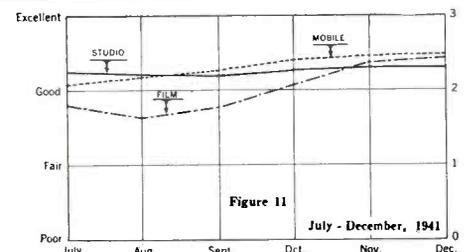
TECHNICAL RATING OF WNBT PROGRAMS BY NEW YORK AUDIENCE



DIVISION OF WNBT PROGRAM HOURS BY PROGRAM SOURCE July - December 1941



PROGRAM RATING OF WNBT PROGRAMS BY NEW YORK AUDIENCE



MONTHLY COMPARISON OF WNBT PROGRAM RATINGS BY STUDIO, FILM AND MOBILE UNIT PRODUCTIONS

six months ranged from around \$100 for kits with 3" screens, to approximately \$400 for the large receivers with the 12" tubes.

Fig. 8 shows the progress of the technical reception as rated by the WNBT audience. It can be noted from the curve that after the middle of October, the date when all the receivers in the area had been converted to the commercial standards and given a general check-up, the technical rating rose to approximately 2.40 and has held there during November and December.

The Program Service

Since July 1, 1941, WNBT has been broadcasting a minimum of fifteen hours a week. This fifteen hour minimum is the requirement of commercial operation. Three basic programming sources were used—a three-camera live-talent studio, a film transmitting studio, and portable equipment for field pickups. Fig. 8-A shows the average percentage of program time originated from each source by months. Referring to this chart, it will be noted that the studio operation has accounted for approximately one-third of the program hours and that for the first three months, the mobile equipment in the field accounted for almost half of the service and then tapered off to approximately one-third in December; resulting in an even split among studio, film, and field pick-ups. The reason for the drop in field pick-ups was because of the season of the year. In the fair weather months, there are many more outside events such as baseball, football, tennis, track, and civic events that make good program entertainment. They are not available during the winter months.

From the live talent studio, came full length dramatics, variety entertainment (basically, vaudeville acts), civilian defense instruction, and various types of service programs such as "How to Make" and "How to Buy." From the film studio, came all types of film presentations, both 16 MM and 35 MM, full length feature films, shorts, educational films, and various slides and posters. The mobile equipment accounted for a complete evening of boxing every week from the Jamaica Arena, another evening offered professional wrestling; professional boxing came from Ebbets Field. Professional football, the Columbia University football games, tennis, baseball, hockey, basketball, swimming meets, a ship launching, the recruiting line at 90 Church Street the day after war was declared, pickups direct from the Town Hall during "America's Town Meeting

(Continued on Page Eight)

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Journal for January, 1942

TWO VALUABLE NEW FEATURES HAVE BEEN ADDED TO THIS PRESTO RECORDER!



Here is a more versatile recording turntable, a recorder with variable cutting pitch, one that can be quickly adjusted for discs of varying thickness, a machine that will operate "faster" in busy control rooms. It's the new Presto 8-C recorder with . . .

INDEPENDENT OVERHEAD CUTTING MECHANISM: The cutting mechanism of the 8-C is rigidly supported at one end by a heavy mounting post $2\frac{1}{4}$ " in diameter. The other end is free of the table so that the alignment is independent of the disc thickness. A thumbscrew above the cutting head carriage adjusts the angle of the cutting needle *while cutting* for any direct playback or master disc from .030" to $\frac{1}{4}$ " in thickness. The cutting mechanism swings clear of the table for quick change of discs.



VARIABLE CUTTING PITCH: The buttress thread feed screw is driven by a belt and two step pulleys beneath the table giving accurate cutting pitch adjustments of 96, 112, 120, 128 or 136 lines an inch. Changing the cutting pitch is a matter of seconds. A hand crank and ratchet on the feed screw spirals starting and runout grooves up to $\frac{1}{4}$ " apart.

Other specifications are identical with the well-known Presto 8-N recording turntable described in our complete catalog. Copy on request. Cabinets are available for mounting single or dual turntable installations. If you are planning to improve your recording facilities write today for price quotations and detailed specifications.

PRESTO
RECORDING CORP.
242 WEST 55th ST. N. Y.

In Other Cities, Phone . . . ATLANTA, Jack. 4372 • BOSTON, Bel. 4510
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Ch. 4277 • DETROIT, Univ. 1-0180 • HOLLYWOOD, Hil. 9133 • KANSAS
CITY, Vic. 4631 • MINNEAPOLIS, Atlantic 4216 • MONTREAL, Wel. 4218
PHILADELPHIA, Penny. 0542 • ROCHESTER, Cul. 5548 • SAN FRANCIS-
CO, Yu. 0231 • SEATTLE, Sen. 2560 • WASHINGTON, D. C., Shep. 4003

World's Largest Manufacturers of Instantaneous Sound Recording Equipment and Discs

of the Air," sound network broadcasting, and a number of other pickups, including taking the audience by television to celebrate New Year's Eve on the spot in the Rainbow Room are on the list.

How did the television audience react to these programs? Every week the NBC mails each television receiver owner on file a program schedule which has a detachable self-addressed return card questionnaire. This questionnaire offers the opportunity to the audience to express their opinions on each program on the basis of Poor, Fair, Good, and Excellent. Also, other types of information are collected periodically, such as,

- (1) the rating of technical reception
- (2) the number of adults and children present before receivers during various broadcast periods.

The mailing of these schedules and report cards are coded so that the reactions of specific groups of our audience such as television dealers, public places, and

private homes can be studied separately. An average weekly return of these cards is between 10% and 15%. Over a period of a month, an average of one out of every six receiver owners is heard from.

Fig. 9 shows the average monthly rating of all programs for the six months. The graph shows a steady improvement from "Just about Good" to almost halfway between Good and Excellent. This is purely a case of studying the audience's likes and dislikes very closely and improving operating technique during program production. The curve shows considerable improvement for this short period. Each week the audience ratings are compiled in the form of a chart as shown in Fig. 10 and put into the hands of each member of the staff. In this way, program and operating techniques can be made to conform closer and closer to the audience's program preferences and changes, with very little lag. It is through the dissemination of such in-

WEEK OF JAN. 12th—JAN. 18th, 1942—No. 29

DAY	TIME	PROGRAM
MONDAY Jan. 12th	3:30-4:30	(1) The Luck of Roaring Camp—feature with Owen Davis, Jr. and Joan Woodbury.
	9:00-11:30	(2) Amateur Boxing Matches from Jamaica Arena.
TUESDAY Jan. 13th	3:30-4:30	Radio City Matinee: (3) Adrienne Ames. (4) Maria Shuko and Otto Klemperer. (5) Red Cross. (6) Christopher Rule.
	8:30	(7) Thrills, Chills from Everywhere with Doug Allan and Ray Scott.
WEDNESDAY Jan. 14th	8:55	(8) Jose Iturbi, Pianist—Musical Film.
	9:05	(9) Civilian Defense—Fire Auxiliary.
THURSDAY Jan. 15th	9:15	(10) The Face of the War—with Sam Cuff.
	9:30-11:00	(11) Adam Hats Sports Parade—Professional Wrestling Bouts from Ridgewood Grove.
FRIDAY Jan. 16th	9:00-10:00	(12) America's Town Meeting direct from Town Hall.
	3:30-4:30	(13) Rolling Westward—Film with Tex Ritter.
SATURDAY Jan. 17th	8:30-9:40	(14) Dead Men Tell No Tales—Film Feature with Emily Williams and Marius Goring.
	3:30-4:30	Children's Matinee: (15) Marion Bishop's Marionettes. (16) Captain Tim Healy.
SUNDAY Jan. 18th	8:30-9:30	(17) Zeke Manners and his Broadway Hillbillies.
	3:15-4:30	(18) Hockey—Atlantic City vs. New York Rovers at Madison Square Garden.
	8:30	(19) False Witness—Drama.
	9:00-9:30	(20) In the Spotlight. (21) Time by Bulova. (22) Bonds by Botany.

all programs subject to change without notice

Test Pattern Generally On For One Hour Preceding Afternoon and Evening Programs

Help Us To Present Better And More Popular Programs By Giving Us Your Candid Opinions On The Following Shows: (Make X's)

NAME	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
ADDRESS																							

EXCELLENT
GOOD
FAIR
POOR
SET NOT IN USE

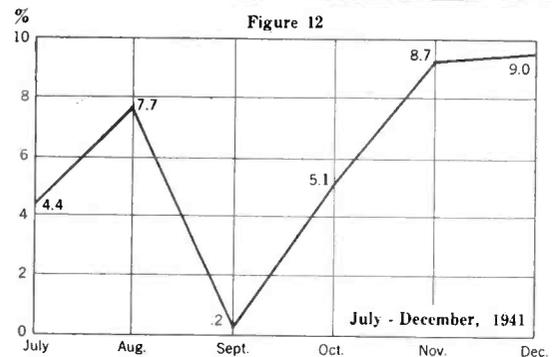
AUDIENCE RATINGS OF WNBC TELEVISION PROGRAMS #24

WEEK OF DECEMBER 8-14, 1941

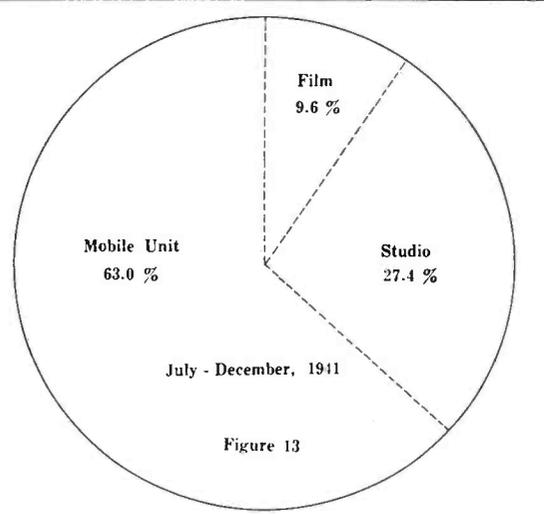
Figure 10

PROGRAM	PERCENT MENTIONS	AVERAGE RATING			
		Poor 0	Fair 1	Good 2	Excellent 3
Studio Features					
None					
Studio Varieties					
GOLD MARK HOSIERY CO	TUE DAY 49.3			1.98	
SEARCH FOR BEAUTY					
Radio City Matinee	TUE DAY 50.9			2.25	
Christopher Rule	TUE DAY 46.5			2.04	
Consumers Union Talk	TUE DAY 44.1			1.95	
Jelesnick Trio	TUE DAY 44.6			2.00	
Adrienne Ames	TUE DAY 44.4			2.24	
Civilian Defense	TUE EVE 76.5			2.32	
False Witness	FRI EVE 72.1			2.59	
Helen Tamiris, Dancer	FRI EVE 62.4			1.93	
News by Sam Cuff	FRI EVE 82.2			2.07	
Children's Matinee	SAT DAY 54.6			2.34	
Marion Bishop's Marionettes	SAT DAY 62.7			2.43	
Capt. Tim Healey	SAT DAY 59.5			2.31	
Your Pet	SAT DAY 61.4			2.27	
Zeke Manner's Hillbillies	SAT EVE 84.6			2.55	
"The Americas"	SUN EVE 72.8			2.40	
Film Features					
"Something to Sing About"	WED EVE 81.2			2.61	
"Romance of the Limerlost"	FRI DAY 58.7			2.02	
"Gun Smoked Trails"	SUN DAY 68.4			2.35	
Film Varieties					
"Thrills & Chills"—Doug Allen	TUE EVE 80.4			2.69	
"Submarines at Sea"	FRI DAY 57.2			2.63	
Mobile Unit					
Boxing at Jamaica	MON EVE 84.6			2.49	
ADAM HATS SPORTS PARADE					
Wrestling at Ridgewood	TUE EVE 83.8			2.61	
Basket Ball at Madison Square Garden	SAT EVE 73.9			2.39	
Service Spot					
TIME BY BULOVA	VARIOUS 85.9			2.60	
WEATHER BY BOTANY	VARIOUS 86.7			2.60	

COMMERCIALS	
AVERAGE RATING	
DAYTIME	2.38
EVENING	2.50



WNBC COMMERCIAL TELEVISION HOURS AS A PERCENT OF TOTAL HOURS BROADCAST



DIVISION OF WNBC COMMERCIAL PROGRAMS BY PROGRAM SOURCE

formation to every member of the Department that the best types of programs and the best techniques can be integrated very quickly with the program efforts right at hand.

Fig. 11 shows the comparative audience ratings by months for film, live-talent studio shows, and field pickups. It is very interesting to note how weaknesses in each of the three categories were corrected during the early months to the point where on January 1, each program source was delivering programs of practically uniform audience acceptability.

Commercial Broadcasting

During the first six months of commercialization, the NBC signed thirteen different advertisers on television representing seven different industries. They were:

INDUSTRY

Clothing, Fashions and Shoes

(Client)

Abraham & Straus and Bloomingdales
Adam Hat Stores, Inc.
L. Bamberger & Company
Botany Worsted Mills
Gold Mark Hosiery Company
Hat Style Council, Inc.
Frank H. Lee Company

Jewelry and Silverware

(Client)

Bulova Watch Company

Laundry Soaps and Housekeepers' Supplies

(Client)

Proctor & Gamble Company
(Ivory Soap)

Food and Food Beverages

(Client)

Lever Brothers (Spry)

Petroleum Products

(Client)

Sun Oil Company

Radios and Musical Instruments

(Client)

RCA Manufacturing Company

Travel and Hotels

(Client)

Missouri Pacific Lines

Fig. 12 shows the percentage of total commercial broadcast time which was commercial for the first six months.

Fig. 13 is a pie chart showing the percentage of commercial time based on the three types of program sources. It was live-talent studio 27.4%, mobile unit pickups in the field 63.0%, and film 9.6%.

The accompanying photographs are pictures of commercials taken directly from the kinescope or receiving screen. These are not included here as technical exhibits but as candid photographs taken from the kinescope screen during broadcasts.

Fig. 14 shows a scene from a fashion show put on by Bloomingdale's and Abraham & Straus.

Fig. 15 shows part of a commercial



FIG. 14 (TOP) Scene From a Commercial Fashion Show Photographed From Television Receiver

FIG. 15 (BOTTOM) One Scene From the Adam Hat Gift Certificate Campaign. Photographed Directly From Television Receiver

during the Adam Hat Christmas campaign.

These photographs are included to give a general idea of the nature of commercials. They do not reflect or tell the story of the full appeal made by the advertisers.

What have been some of the results of these programs in terms of satisfaction for the advertisers? Starting with Adam Hats, soon after the first broadcasts of the series, audience mail began to come in along the following vein:—"Enjoy

the Adam Hats Sports Parade on television so much our entire men's club went to the local Adam Hat Store and purchased Adam Hats." Another Adam rooster has a rule in his home that any of his friends who come in to see the Sports Parade on television have to show that they wear Adam hats. During the Adam Christmas Campaign on Hat Gift Certificates, the advertising manager of the company related that members of the television audience told the local Adam Hat dealers and store managers

(Continued on Page Nineteen)

Through the Finder

By Jerry Renneck

[This is another in a series of articles presented for our photographically inclined readers. We would appreciate your reaction.—ED.]

IN THE November issue I said I would tell you how to set up an elementary dark-room, but the matter of Christmas came along and it was much easier to do something else. As a matter of fact, "Toners" had already been written so we used it. And now something else comes along to prevent or rather defer the dark-room stuff for a while. And talking about deferment . . . how's yours?

It's along these lines that I want to talk to you this trip. Deferment brings to mind National Emergency and that stirs up thoughts about supplies and allotments, of which you guys probably know plenty. But how does it affect the camera industry? There have been a lot of calamity howlers, and I must admit that I have been doing a little of myself, and I have found out that there was no need for it.

Sure . . . there have been and will be more shortages of certain photographic supplies, but at the present writing, you can go along your merry way and make your picture without thinking too much about shortages. But, and it is a BIG BUT, if we are not careful in the use and care of our material and equipment, we may find a very sorry situation on hand.

For instance, the film companies have sent out a notice to all photographic dealers requesting that they collect all film spools, cassettes, and cases in which packs come, as well as the little aluminum cans for 35 m/m film. This is so that they will have material on which to spool and in which to pack film this coming Spring. If you've ever stopped to think about the tremendous amount of metal that has been thrown away in the past by photographers you would be astounded. The problem is not the film itself, nor the acetate base upon which the film is coated, but the containers for same.

I am not sure at the moment if it is a matter of getting materials from which these can be made or if it is a matter of manufacturing time involved, but suffice it to say that the manufacturers may find it necessary to have the dealers demand an empty spool or film case from you when you go to buy some fresh film. Some fun, heh?

As far as cameras are concerned, they have been very slow in coming through for about six months. Not that you cannot get a camera that will fill your needs, but there are certain ones that have been so scarce as to command full list price over the counter. For you folks out of New York, you may not know what this means, but in all the larger centers, it has been the practice, pernicious without a doubt, but still it has been customary to give discounts, thereby sacrificing something else. But today, we are paying as I said before, full list price for a lot of merchandise. This is due to the fact that these certain items are difficult to obtain, or manufacture has been stopped entirely. Particularly so on some of the plastic tanks and aluminum reflectors, etc.

A question now comes up as to "how I can use my camera in Civilian Defense?" That's a cinch. Most O.C.D. councils have a public relations committee or a press bureau. If you are equipped with flash equipment and can turn out a real good print, you can offer your services to your local Civilian Defense Council and believe me, son, they'll be tickled to get you. Everyone has volunteered as a Warden, but there are plenty of other jobs available, particularly for photographers.

It might be wise to insert a word about cameras and the National Emergency and some of the restrictions that have

been set up for photographers. Don't, and I stress this very strongly from personal experience, don't try to take pictures of bridges, from bridges or even from under bridges. Particularly at night. One night, before we were engaged in this Japanese clam bake, a friend of mine and myself went out to get some pictures of lower Manhattan, where the pictorial possibilities abound. We had set up and made one shot, and had then moved down the street to set up for another.

The point we had chosen was not quite good enough, so we moved back about twenty feet. Ah! This was it. Perspective, angles . . . everything. Just as we were ready to start making the shot, a car with two cops, rather on the large side, inquired of us, very politely, what we were doing. When we said that we were making pictures, they said, "Yes, we can see that, BUT WHY? And at night!" Bang!

Well, there was some natural embarrassment on our part and for lack of something better to say we told them that it was a nice looking spot and that we wanted a picture of it.

To make a long story short, we were taken to the precinct house, and asked to explain to the desk Sergeant our activities as we were technically under suspicion as something or other. I did not have too much in the way of identification on me, but the aforementioned friend had his R.C.A. identification card in his wallet and I really think that was what saved us. Let that be a lesson to you, junior.

However, should you want to make pictures in places where you think there may be some question as to the propriety of your activities, go to the nearest police station, explain your problem, and they will inform you as to whether or not it will be permissible. I think on the whole, you will find the police most co-operative, if your reasons are legitimate.

Your better judgment will steer you away from army cantonments, navy bases, air fields, etc. It just isn't being done today. There is one more place that you should not bring your camera. It may seem strange to you and me, and for the life of me I can't figure out why the restriction has been placed on them, but no cameras are allowed in post offices.

To get back to photo supplies. At this time, there is no shortage of paper or film. However, certain fancy surfaces and odd sizes will be discontinued when the present stocks are exhausted. First of all there never has been a great need for them, and secondly, there is today some photography that is so important that it is making great demands on the manufacturers for the regular standard stuff. So if you can't get your double super semimatte rough surface in 9 7/8" by 11 4/16" don't crab about it. Use 8x10 in rough or semimatte and be thankful we can still get it without a priority order, or better still that we are allowed to go out and buy what we want without some gestapo dope asking us why.

I'm sorry that I had to write this month on this rather unhappy note, but I had to get it off my chest. I've been asked so many questions so often about shortages, and supplies and restrictions that I felt I'd like to write it out once and for all. If, on the other hand, I come into any news as to the questions discussed I'll advise you on it so that we can all be prepared. Next month, surely, darkrooms. In the meanwhile . . . Cap your lens.

Behind the Mike

By Con Conrad

SCOTT HELT, Chief Engineer of WIS, Columbia, S. C., is using his spare time to good advantage these days. He is conducting a course in Radio Engineering at the University of South Carolina, for the War Department.

WM. TAYLOR, WLS, Chicago, Studio Engineer, beat the Draft to the punch and signed up with the Army. He is now stationed at Randolph Field, Texas, as a Communications Officer.

WM. KELLER, WLS, Chicago, now takes over the duties of Bill Taylor of the WLS Staff. Keller has been the Relief Man at WLS for the past three years.

CARL E. SMITH, WHK-WCLE, Cleveland, Ohio, is the new Chief Engineer, taking over the duties of E. L. GROVE who resigned.

PAUL QUAY, WHK-WCLE, Cleveland, is the most recent addition to the Staff. He is new to the Broadcasting Business.

JAMES BOGAN, WHK-WCLE, Cleveland, Ohio, also a new addition to the Cleveland Staff, hails from WBOE, Cleveland.

REX HOUSER, Transmitter Engineer, WIS, Columbia, S. C., has left for Camp Bowie, Texas, where he will be a Civilian Radio Technician in the Signal Repair Shop.

FRED FRYE, Soundman at WXYZ, Detroit, has become another of those loyal Americans to leave Radio for the Armed Services. He is now with the Army Air Force as a flying cadet.

CLAYTON DONALDSON, formerly of KYW, Philadelphia, is now Radio Operator on American built planes being ferried to the battle fronts. This information according to the gang at KYW.

BEN TESSLER, formerly of WPID, Petersburg, Va., has joined the Technical Staff of RCA at Camden, N. J.

CHARLES WILEY, veteran Transmitter Engineer, has been transferred to the WTIC, Hartford, Conn., Studio force. He replaces ED. STEVENS, who left to join the staff of General Radio at Cambridge, Mass. Wiley, who has been at the Avon Mountain Plant of WTIC for six years, has been replaced by GEORGE ANDREWS, new to the staff of WTIC.

HARVEY SENNETT, Control Engineer of WOCB, West Yarmouth, Mass., has resigned to join the Army. He will be stationed at the Signal School at Ft. Monmouth, N. J.

TOM McCLELLAND, formerly Chief Engineer, KLZ, Denver, Colorado, and more recently Radio Man on the U.S.S. Arizona, was killed in action when the Japs made their infamous stab. Many of the boys in the Midwest will miss Tom as he was very well liked in these parts.

JACK WAGNER, formerly Assistant Station Manager of KHUB, Watsonville, California, and more recently with the Staff of KSRO, Santa Rosa, California, has joined the Engineering Staff of KQW, San Jose, California.

CLIFF BIXBEE, Engineer of WCAE, Pittsburgh, Pa., has joined the Army. We are lacking in details as to where he is stationed, but we say, Good Luck, Cliff.

P. H. CLARK, Control Room Supervisor, NBC, Chicago, had his car stolen recently. Paul feared the worst, since the tire shortage and rationing could have left him with a car and no tires. However, Lady Luck is smiling on him. Car has been found, tires and all.

(Continued on Page Fourteen)



1941 has been one of the best year in Hallcrafters existence. We are grateful for the host of new friends such receivers as the SX-28 has made for us.

As the year came to a close, we were a little proud that we had been able to fulfill the demand such equipment had enjoyed.

1942 will see us keeping up with our ever-increasing National Defense commitments and still supply radio communications equipment to our old friends.

*Used by 33 Governments
Sold in 89 Countries*



Various Applications of Crystal Detectors in Broadcast Operation

By Jesse R. Sexton, Chief Engineer KALB, Alexandria, La.

THE various uses of fixed crystal detectors as described in this article, while laying claim to no new principle, may be of interest to broadcast engineers in the actual operation of their equipment, as well as supplying food for thought toward possible new developments and the advancement of the art.

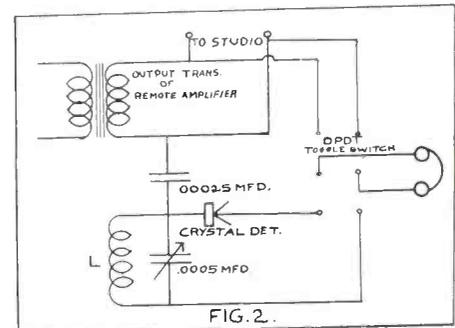
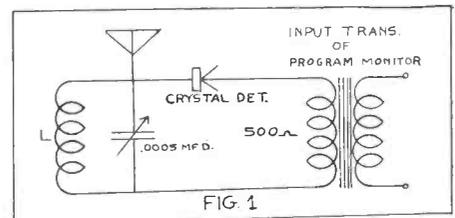
Fixed crystal detectors are cheap, give almost perfect rectification of radio frequency currents, are exceedingly simple, practically foolproof, and require no power. With these advantages in mind, one was first installed in the program monitor at the transmitter building (remotely located) of this station. Previously, as is the case in a large number of broadcasting stations, the program monitoring amplifier was fed by rectified current from the modulation monitor. This, of course, is a satisfactory method of monitoring the output of the transmitter,

except at such times as it becomes necessary to remove the modulation monitor from the circuit for servicing, and under one other condition which will be indicated later.

The fixed crystal detector was connected in a simple receiving circuit, as shown in Fig. 1, and fed directly into the 500 ohm input transformer of the monitoring amplifier. As the transmitter building was more or less fairly well shielded, it was found necessary to use a small antenna to pick up enough radio frequency to drive the amplifier. About ten feet of lampcord was found to be ample. The circuit was tuned to the transmitter frequency by means of the variable condenser, and no other adjustment has been necessary during approximately eight months service. This method seems to offer more positive monitoring of the transmitted signal, the modu-

lation monitor may be serviced without affecting the program monitor, and the quality of reproduction seems to be improved.

To cite an example of more positive monitoring by this method: some time before the fixed crystal circuit was installed, a short circuit developed at the remote end of the transmission line from the transmitter to the vertical radiator. As it happened, the short circuit was of almost exactly the same impedance as the tower and the associated tuning equipment; therefore, there was no appreciable change in the meter readings at the transmitter, and the program moni-



tor, being fed from the modulation monitor, indicated that all was well. This could not have happened had the program monitor been fed directly from the radiated wave. In a city where there are other broadcast stations it may be necessary to loosely couple the antenna to the crystal circuit to prevent interference.

The program monitoring system at the studios, located about two miles from the transmitter, was next changed over to this system. Previously, an audio frequency amplifier was bridged across the output of the control room console to drive four speakers located in the control room and various studios. This system had the disadvantage of working independently of the signal actually transmitted; that is, if the transmitter should

(Continued on Page Twenty)

Bliley CRYSTAL UNITS



Engineered Reliability
Guaranteed Accuracy...

BLILEY precision-made Crystal Units are supplied for all frequencies from 20Kc. to 30Mc. Catalog G-12 contains complete information.

BLILEY ELECTRIC COMPANY
UNION STATION BUILDING ERIE, PA.

Who's Who in Chicago (The Ninth in a Series)

By Tom Gootee

RAYMOND A. LIMBERG—better known as “Lindy,” dean of Chicago’s Field Department—has a long and enviable record of service in the middle west, predicated on some amazing records he has run up in the normal pursuance of his field work. He has traveled well over 175,000 miles during his eleven years with NBC—and is still going strong. All because he likes to travel.

That urge to travel has always dominated his work—and Lindy claims he isn’t really happy unless he’s moving around. This goes back a long way into history.

Ray was born in 1908, on a farm in Wisconsin—and received his education at Plymouth, Wisconsin. He first became interested in amateur radio while in grade school, and built his first crystal receiver in 1920—so excellent was it that during an entire year of listening he heard just



Raymond A. Limberg

exactly one station (and that in code). But undismayed, he persevered—and finally built his first tube receiver with slightly better results. From that time on, he rebuilt the receiver regularly—every time he saw a new circuit diagram.

In December of 1924 he became a member of the A.R.R.L., and in August of the following year he received his first station license under the call: 9-AZY. In December of 1925 he was on the

air with his first equipment.

By that time radio had become very much a part of his life, and he decided to look further into the operating profession. Upon graduation from high school he attended Dodge’s Institute at Valparaiso and got his first commercial operating license in April of 1927.

The summer cruise season was just beginning on Lake Michigan, and Ray signed aboard the *S.S. Indiana*—as junior operator—on a regular run between Chicago and Mackinac Island. It was his first experience with rotary spark ship transmitter, but he fared well during the summer, under the call: WFC.

Then, at the close of the season, he spent the fall and winter studying electrical engineering—until spring arrived again, and the call to Travel.

He spent two months on the Lake freighter *L. E. Geer*—and then took a senior operator’s job on the *S.S. Carolina* running passenger cruises between Chicago and Mackinac Island. When the summer season ended, Ray found himself out of a job again.

But the urge to travel still nipped at his heels in the Windy City, and he finally headed for Galveston, Texas—there to sign aboard the first ship offered him: the *S.S. West Cressey*. The ship was a freighter carrying sulphur and cotton bound for Mediterranean ports, and equipped with

a two kilowatt spark set under the call: WGOU. The trip over was very fine, and Lindy got quite a kick out of the sea voyage. But on the way back the freighter ran into a bad storm. The ship was returning empty, and due to the lack of either cargo or ballast it bobbed around on the rough seas like a cork. Ray caught a bad case of influenza from the cold and dampness, and when the ship finally put in at Galveston, Ray quit the freighter. He had more than his allotted share of salt-water travel, and decided then and there to confine his future traveling to within the Continental United States.

In March of 1929, a few weeks after landing, he was offered a job at broadcast station KTNT in Muscatine, Iowa, and Ray accepted. The station was owned by “Doctor” Norman Baker, who enjoyed much of the (in)famous reputation of “Doctor” Brinkley at that time. Baker sold a particularly good patent medicine over KTNT— from dawn to dawn — which was absolutely positively guaranteed to cure anything from cancer to frostbite or astigmatism. After two months of that, Lindy left the “Doctor” to become the chief (and only) engineer at WOMT in Manitowoc, Wisconsin.

At WOMT Ray Limberg was announcer, engineer, telephone operator, news commentator, director, and janitor. The station was only on the air a few hours daily, and Ray was the No. 1 Man at the 100 watt station. Yet despite the

(Continued on Page Fourteen)

A NEW STORE for BETTER SERVICE

Yes, for better service to our patrons we have opened a new store at 85 Cortlandt Street. Here we have consolidated our great stock of essential radio parts and equipment. Now you are assured the best possible service and most speedy delivery of your orders under present conditions.

TERMINAL RADIO CORP.
85 CORTLANDT ST., N. Y. C.

Telephone: WOrth 2-4416

Who's Who in Chicago

(Continued from Page Thirteen)

rigors of the job, he stayed there for almost a year—until the urge to travel caught up with him again.

He journeyed south to Chicago, and there applied for a job with the newly formed National Broadcasting Company—obtaining a position in the Field Department, which he has since held. He started work in May of 1930.

Back in those days the Chicago Field Dept. consisted of three men: Marshall Rife, Marvin Eichorst and Ray Limberg. There were never more than three or four nemos a week, mostly dance band pick-ups—covered by either Eichorst or Limberg. In those days the boys carried at least six pieces of equipment to each pick-up, generally weighing well over two hundred pounds. Carbon mikes, huge battery cases, type OP-1 amplifiers, and cast iron mike stands were necessary for every pick-up.

Special events pick-ups were generally few and far between back in those days, but there were enough to keep Ray well occupied. His first big assignment was covering the Hunter Brothers famous endurance flight at Sky Harbor Airport in their plane "The City of Chicago." It was a rush assignment, and after a hectic night of packing, driving north, and setting up all the equipment—expecting the flight to end at any minute—the "event" lasted six days. When the plane finally did come down, the announcer, Wally Butterworth, happened to be taking a shower at the time, and he was rushed to a mike quite wet and clad only in a pair of misfit trousers.

During the summer of 1931 Ray handled the Amos and Andy broadcasts from their summer cottage at Lake Geneva, Wsconsin

By 1932 the vogue for big out-of-town pickups began, and Ray was on the road almost continually for several years with one big show after another. He handled all of the Lucky Strike programs of that era, the Fleischman shows, and Wayne King's Lady Esther programs. Nineteen thirty-two was also the year of the Democratic and Republican political conventions in Chicago, and Lindy did more than his share in making these broadcasts a success. Upon their termination he celebrated by getting married.

After the World's Fair, there followed a long routine of field pick-ups—keeping Ray busy week after week. Beginning in October of 1934 he began a fifty-two week schedule of De Wolfe Hopper programs—commuting weekly between Kansas City and Chicago. In January and February of 1937 Ray covered the big Ohio River flood from Evansville, Indiana. A few of the other programs he has since handled on-the-road are the Yearly National Cornhusking Contests, and the Indianapolis Auto Races; the old RCA Magoc Key shows, the GE Hour of Charm programs, and countless others. A complete list of his out-of-town pick-ups would probably fill several good-sized books.

And Ray Limberg's activities have not been confined to the operating end of engineering. He built much of the early short-wave equipment used in Chicago prior to national standardization of field equipment by NBC. He designed and built most of the equipment on Chicago's Mobile Unit, and is continually designing and constructing various gadgets for use in the field.

Ray still prefers to travel, however, rather than spend too much time around the Chicago Field Room. And his record of the past eleven years indicate he has done just that. On routine pick-ups only he has covered some 21 states, over a hundred different cities, with a total train mileage of over 175,000 miles—all without venturing out of the middle-western United States.

CAPPS*

SAPPHIRE is, and has always been, the only material for making cutting styli for high class recordings.

CAPPS* Patented Sapphire Styli are the original and accepted standard for high class professional acetate recordings.

Imitated but not equalled

FRANK L. CAPPS

244 W. 49th STREET NEW YORK CITY

Telephone Circle 6-5285

*Reg. U. S. Pat. Off.

Behind the Mike

(Continued from Page Eleven)

Among those who passed out the cigars:

BOB COE, WTIC, Hartford, Conn. The new arrival is a baby girl. He said, "'Twas a fine feeling."

J. B. BLOOM, Chief Engineer, WWL, New Orleans, La. Proud Pappy of a baby girl.

CARL NOYES, WTIC, Hartford, Conn. Proud Pappy of a new girl arrival.

DAN BARLOW, Engineer of WIP, Philadelphia, Pa. Boasts of the arrival of a new daughter.

"STUB" NEWPORT, Supervisor, A.T.&T., Long Lines Office, Chicago (CQ) has recently moved into his new bungalow in Skokie, Ill. With the cold wave that hit Chicago Stub is comparing gas bills with boys all along the Line.

DAN HYNES, formerly of WWL, New Orleans, and now Lieutenant Dan with the 122nd Observation Squadron, was recently married to Marie Adele Read of the WWL Accounting Department.

LOU HOUSE, formerly Chief Control Room Engineer of WDRC, Hartford, Conn., has been named Assistant Chief Engineer. Good Luck to Lou on his way up.

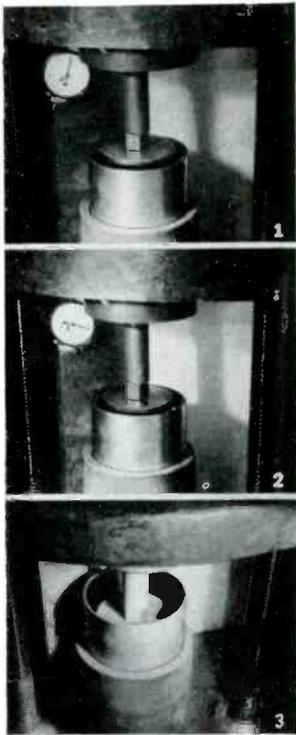
E. C. HORSTMAN, NBC, Chicago Engineering and NABET President, to WOW Omaha to talk things over with the boys there re: NABET.

GEORGE HEUTHER, Transmitter Engineer of WWRL, New York City, has resigned and is now with the

(Continued on Page Seventeen)

Bonded Rubber in Industry

The ability of bonded rubber to withstand heavy loads when stressed in shear, now enables engineers to isolate vibration caused by equipment weighing many tons. The three photographs of a standard test procedure for determining the strength of the bond between the rubber and



metal of Lord Mountings shows the high safety factor of these units. Illustrated under test is a Lord Tube Form Bonded Rubber Mounting which measures 5½" O.D. x 4½" and has a ¾" rubber wall between the inner and outer metal members. In the middle picture, the mounting is deflected 1/16" under 2,200 pound load. In the installation on which this mounting was used, this deflection at 2200 pounds was sufficient to provide efficient vibration isolation. For any other set of conditions, the characteristics of the mounting could be changed to support greater or smaller loads with greater or smaller deflection. At 50,000 pounds, which is the capacity of the testing machine, the mounting, as shown in Photograph 3, had deflected 1 13/16" without

failure at the bond or in the rubber wall.

These photographs illustrate a standard test procedure which Lord Bonded Rubber Mountings of all sizes from small instrument mountings up to the large tube form

WE'RE PREPARED, TOO

with the

**GREATEST STOCK of RADIO PARTS
EVER IN OUR HISTORY!**



**IMMEDIATE DELIVERY
ON ALL STANDARD BROADCAST REPLACEMENT
PARTS and ELECTRONIC RESEARCH EQUIPMENT**

BROADCAST ENGINEERS!

In these trying times, when it is imperative for all broadcast stations to be prepared for any and all emergencies, it is quite possible that you may be handicapped by some delay from your regular suppliers. Here, at SUN, we maintain a smooth-functioning organization geared to provide prompt, immediate service on even your most urgent requirements. Let SUN help you with your priority problems! Our present stock of supplies is the greatest ever in our history and avoids unnecessary delays.

Radio's Most Complete Source of Supply

**CONDENSERS • RESISTORS • TRANSFORMERS
TUBES • METERS • SWITCHES • RELAYS, etc.**

Address Dept. BJ on Station Letterhead for Free Copy of 416
Page General Catalog. Write Today as Quantity is Limited!

Est.
1922



Our
20th
Year

Telephone BRadclay 7-1840

mountings shown, are subjected. A fixed percentage of every production run in the Lord Manufacturing Company plant, located at Erie, Pa., is given this normal and overload test. When samples do not meet the specifications for the particular size and style, the entire production run from which they were selected is rejected.

How to Play Bridge and Win — (In One Easy Lesson)

By Tom Gootee

NOWADAYS so many persons are playing Bridge, you are really a social outcast if you don't know the essential rudiments of this great American parlor game: Bridge. Also known as "Kick Me Under the Table."

Realizing that many readers may not understand the finer points of Bridge, a number of helpful suggestions are presented in order to make the game more understandable—and to enable you to always win! After reading this you will not only be able to befuddle your opponents, but your partner and yourself as well.

To begin with, there are two kinds of Bridge: Auction, and Contract. The cards are dealt and played the same in both cases, but the bidding is slightly different. In Auction Bridge you bid much more than your hand is possibly worth; in Contract Bridge you bid much more than your hand is possibly worth!

A deck of unmarked cards is dealt around among three other people and yourself; the one directly across the table

from you is your partner. In order to win there should be some co-operation between he, or she, and yourself. Most wives differ on this point, however, and claim their husbands make all the mistakes. It is customary, in any case, to openly and publicly blame your partner for any mistakes you might make.

After you have 13 cards you pick them up, and look them over with unconcealed disgust. You will be surprised by the absence of all face, or high value, cards of all suits. This, of course, is correct, since your opponents have most of these.

When you have a particularly poor hand, signal immediately by saying, "Who in h— dealt this mess?"

Now the bidding commences, and the fun begins. Because at this point in the game you are anxious to play all the cards your way—in the suit you personally prefer.

Looking over your hand, if you find you have as many

(Continued on Page Eighteen)

RIDING GAIN



ON THE AIRIALTO WITH TON GOOTÉE

RALPH EDWARDS' *Truth or Consequences* program started the New Year by skidding past Information Please—to become the top favorite of the nation among all quiz participation programs. These two programs have been jockeying for leadership in the official radio surveys for the past year—and the hilarious *Truth and Consequences* finally won out. Almost anything is liable to happen on the Saturday night show—and usually does! The laughs are the most *unscheduled* on radio.

But Ralph Edwards' mail turns up some of the most surprising things of all—most of which never get a coast-to-coast airing. For some time now he has been receiving weird and strange objects—from people desirous of supplying a slapstick consequence, using the unusual objects for props. Although he offers prices for questions and consequences, Edwards has never asked for props and is wholly mystified how the idea got around.

"It all started a few months ago," says Edwards, "when we received a watering trough—and thought it was a gag. Then other screwy gadgets began to pop into the office, for no reason at all. So we cleared out a store-room—and turned

it into a museum." And a visitor to that museum finds it more fun than a visit to a Coney Island nut house—since each item suggests its own looney consequence. There is, for example, the adult-size baby's rubber pants—with water-bottle to match. And just as subtle is the hand-operated fan which sprays ink in all directions. Other items in the weird collection of props include: a doorknob with spikes, a red wig, three right-handed gloves, a two-foot razor, a handle-bar mustache, an oversize nightgown, a fake schnozzola, large pink bloomers, several old floral wreaths, a safety belt for window-washers, and a dried monkey's head. Several devices are ingeniously constructed, like the treadmill on the belt of which were fastened, alternately, rubber spikes, banana peels, and clay painted to resemble glass. Or the small flag pole mounted in a large porcelain bathtub. An appropriate title for this museum would be: The Whacks Works.

* * *

Ennio Bolognini — a Chicago cellist of some international fame — conceived the idea of letting street-car tracks guide his collegiate-type flivver, while he bowed majestically to acquaintances from the rear seat. "Radio control!" he yelled to spectators. But the police couldn't see it that way — and he was fined \$25 and costs for being a back-seat driver.

* * *

Hal Peary, star of the *Great Gildersleeve* program, conducted the first daily Hollywood column broadcast on the air. It was back in 1929 and Peary aired his column from San Francisco. Old-time movie favorite, Juanita Hanson, was his first guest star.

* * *

One of the smallest transformers made for commercial use is the diminutive unit manufactured by the United Transformer Corp. of New York. It is just $\frac{1}{2}$ " square and $\frac{3}{4}$ " long—weighing only *three-tenths of an ounce*. Almost 10,000 turns are employed in the coil structure to effect an inductance of about 70 henrys. Such midget transformers are in use for special hearing-aid and defense aircraft applications.

* * *

Ex-radio actor Alfred Dixon of New York has a unique profession: teaching persons to speak *without* an accent or dialect. During his radio days he often imitated as many as eight or ten American dialects, and as many foreign accents. Which gave him the idea of "breaking" speakers of objectionable or unwanted accents, gutturals, and certain American dialects. So the school was founded. Now, a man who can't gain employment because of a heavy Southern drawl is easily cured, and may emerge speaking Bostonian English. And Dixon can change a middle-western twang into Park Avenue, or eliminate foreign — particularly European — accents from the speech entirely.

* * *

The latest 1942 home radio-phonograph-recorder sets combine all the features of a minute broadcasting station, and supply the owners with a lot of fun—if they happen to have a sense of humor. The trend or "bug" for making records

Courmettes & Gaul OPTICIANS

55 West 49th Street
R. C. A. Building, New York
Main Floor

EYE EXAMINATIONS

Prescriptions Filled . . . Prompt Repair Work

If you require information
on insurance of any kind
call



HERB RICE

10th Floor
RCA
Building
Suite
1017

Telephone
NBC
Extension
140

at home has reached surprising proportions, and in time the recorder will become a fixed part of *all* home receivers. Besides furnishing an excellent medium for amateur dramatics (of a questionable nature)—owners have concealed micro-phones in various parts of their homes, and recorded unknown conversationalists—with some surprising results!

Adding to the national importance of Television — at least among the tired business men — was the recently televised contest to determine the "Ideal Legs of 1941" during the closing weeks of December. Such sponsored programs as this — opine staid publicity executives of WNBTV — will go a long way toward popularizing Television (but positively!). Shown in the photograph is one of the contestants, Miss Luise Holman, a "Miss Kentucky" beauty-contest winner. Sponsor of the contest was a hosiery company.



Sammy Kaye, who recently contributed a stack of recordings to a New Jersey prison, received a thank-you note from one of the inmates. "I would have enjoyed the *Daddy* tune much more," he wrote, "if it hadn't been for the lyrics. The gal who asks for bracelets, diamonds and cars reminds me of a girl I once knew. That's why I'm here now."

For a change of pace from the machine-gun humor of so many of the comedians these days, we nominate Frank Fay. He and Fred Allen are without doubt the *slowest* funny-men on the airialto, with Frank taking a slight edge because of his glib, suave humor.

Jay Jostyn, the Mr. District Attorney, escorted a friend on a tour around New York's Radio City. The final stop was the NBC drugstore. Jostyn explained solemnly: "This is the place where more ham meets the eye than the tongue!"

Walter Hoffman of WWJ, in Detroit, takes exception to our remark (in the November *Journal*) concerning the status of WBL back in 1921. Actually, this call became obsolete as we so recorded, but the station itself was relicensed to WWJ—and has since continued under that call. WBL was, in turn, a child of 8MK—Detroit's first experimental broadcast station—which was on the air in the fall of 1920. All of this recalls the time-honored feud between KDKA and WWJ, as to which was the first broadcast station in the United States. If we consider the forerunners of these two stations, 8XK and 8MK, neither were the first broadcast stations—since many other amateur stations of that era (1919-1920) were broadcasting music and entertainment.

Twenty Years Ago in Radio: How many of these old-time broadcast stations can you identify? All were of comparatively high power, within the broadcast "band", and were in operation during the year: 1922. You name the locations! In the east: WBS, WDT, WGL, WJX, WOO, and WBAY. In the middle-west: WBU, WCE, WCK,

WCX, WEB, WEH, WGAS, WKAG, and WOH. In the west and far west: KDN, KFC, KGG, KJJ, KNN, and KYY. In their time these stations were quite famous. You'll find the location answers on another page.

AIRIALTO COLUMN ANSWERS

Here are the locations of the long defunct broadcast stations: WBS was in Newark, N. J.; WDT, WJX and WBAY in New York City; WGL and WOO in Philadelphia. WBU and WGAS were in Chicago; WCE in Minneapolis; WCK and WEB in St. Louis; WCX in Detroit; WEH in Tulsa; WKAG in Louisville; and WOH in Indianapolis. KDN and KYY were in San Francisco; KFC in Seattle; KGG in Portland; KJJ in Sunnyvale; and KNN in Los Angeles. Better luck next time!

Behind the Mike

(Continued from Page Fourteen)

Short Wave Staff in the Engineering Department of CBS. PAUL GREEN, NBC, Hollywood, to New York on the Engineering Staff. R. J. RIED of New York, to Hollywood in his place. Each hopes the other will like their new jobs. (And weather).

STATE POLICE COMMISSIONER HICKEY of Connecticut, announces the formation of a 14-Station Amateur Radio Network to cooperate with the authorities in times of emergency. The Main Control Station for the Net has been set up in Naugatuck, Conn.

TOM EATON, WTIC, Hartford, Conn. (THANKS TOM FOR ALL THE NEWS ON THE BOYS OUT EAST).

PATERSON:
79 Bridge Street

NEW BRUNSWICK:
54 Albany Street

AARON LIPPMAN & CO.

246 Central Avenue

Newark, N. J.

Leading Radio Equipment Distributor of New Jersey
Prompt Service at No Extra Cost

PREPARE TO JUMP INTO A BETTER JOB

Nilson's Master Course in RADIO COMMUNICATION

especially prepared for Home Study, can help you get the increased knowledge you need. Many broadcast men already enrolled. Every Nilson graduate to date has secured operator's license. Many got better jobs.

TRAINING TAKES TIME — DON'T WAIT

Use your spare time to increase your technical knowledge. SEND FOR CIRCULAR 3-J NOW! Make this step toward advancement today!

NILSON RADIO SCHOOL
51 EAST 42nd STREET, NEW YORK, N. Y.



Success Depends
On Training

How to Play Bridge

(Continued from Page Fifteen)

as three cards in any one suit, like, say spades, you immediately bid "three spades." In like manner, if you have five spades, bid "five spades." This will serve further to confuse your opponents, who probably have eight spades between them.

A good rule to remember, is to always bid high—it doesn't pay to be conservative in Bridge. You may lose, but that doesn't pay well, either. And under no condition let your opponents top your bid. The highest bid you can make is seven no-trumps; and to save time you can just bid this in the beginning—thus saving much time. "No-trumps" means that anything is liable to happen when you start playing—and usually does.

In the best of Bridge circles, thirteen cards of any one suit is considered an excellent bidding hand—which is a good thing to remember.

With the bidding over, you are now ready to play. And during the course of the actual playing, a number of important points should be kept in mind. Always ask what the trump is, two or three times—this refreshes everyone's memory. Always trump your partner's ace—thereby cinching the trick. Lead from either your hand or the dummy—whichever happens to be convenient. And always ask your partner why he, or she, didn't return your lead—reminding them to lead it the next time.

After playing several rounds of one suit, you find that you no longer have cards of that suit. Then noisily rearrange the cards in your hand—thus indicating that you no longer have any cards of the last suit played. And if you have but one card of a suit, save it—under any cost—to play on your opponents' ace, so you will not have to waste a trump.

After the third round lay your hand down on the table and claim all the rest of the tricks. You probably won't get them, but it's so much easier to play with all the cards on the table.

Having considered all the important generalities of playing Bridge, let us now consider the *really important* factors governing the playing of good Bridge.

First, the art of: Kicking Under the Table.

Among the more advanced players it is considered bad practice to tell your partner how to bid, what cards you have in your hand, etc.—since your opponent will thus benefit by the information. This condition gave rise to the famous IBSker-Duskey-Flynn system of underground communication for Bridge players, by means of leg or shin kicking under the table—where it will not be noticed.

One good, healthy kick from your opponent means "Watch your step, brother!" or "No!!!!!" Two light kicks mean "Yes!" or "Maybe!" or "No!" Two very heavy kicks always mean, "What's the matter, are you crazy?" which is generally followed by an audible cracking of the leg bone. And three kicks may mean almost anything—depending on your prearranged signal. Care should always be taken in kicking your partner, being careful not to interfere with any similar signalling between your two opponents—who, after all, have a similar right to this manner of communication.

Next we consider the art of conversation at the Bridge table. Here the ladies excel quite nicely, and you can do well to listen—occasionally—noticing their technique. After years of practice some women can speak extemporaneously on over five hundred assorted subjects—at the same time playing a mediocre game of Bridge.

The subjects of conversation, of course, vary greatly. According to a survey made early in 1939 by McSteady, Throckmorton, and Woof, women Bridge players, in general, discuss (1) where Mazie got that awful hat, (2) the weather, (3) where Mazie got that awful hat, (4) all the latest jokes, (5) where Mazie got that awful hat, (6) what's wrong with all the girls who aren't present at the Bridge Party, (7) where Mazie got that awful hat, and (8) how high the taxes are this year.

Men, as a rule, have little to say during the average Bridge Game. There is on record, however, of one man—a Mr. Caldwell Goon—who, in 1908 during a Bridge game, opened his mouth and said: "Huh?"

Finally, after several hours of tedious playing, you will find that you are beginning to yawn quite frequently. This is a signal, and your partner should immediately remark

(Continued on Page Nineteen)

WHAT IT MEANS TO CONSOLIDATE

It means simply this: By concentrating our complete stocks of everything you need in radio at one address, you receive the benefit of a centralized source of supply and a resulting efficiency in delivery and service. Our 12,000 square feet of space at 85 Cortlandt Street houses the most diversified and up-to-date stock of radio equipment in the East.

TERMINAL RADIO CORP.
85 CORTLANDT ST., N.Y.C.

Telephone: WOrth 2-4116

Television

(Continued from Page Nine)

that they were sold on the idea through the television programs.

The following are excerpts from a letter from Mr. S. F. Newmark of the Gold Mark Hosiery Company:

"I would like to take this opportunity of letting you know how thoroughly pleased we are with the way your television staff has cooperated with our advertising agency.

"Although we have had much experience in newspaper and magazine advertising in behalf of our product, nothing that we have ever done has stimulated as much enthusiasm as these television programs.

"Dealers everywhere in the metropolitan area have commented upon this unique promotion idea and the results in the actual sales of Gold Mark Kant-run stockings have exceeded our fondest expectations and are directly traceable, in many cases, to the television programs.

"My visit to the studio while the program was on the air was a most enjoyable experience and it was almost unbelievable to see the tremendous preparation necessary for the program and the sincere efforts of your television staff,

who do their utmost to make each program a success."

Some list of the type of sales agruments used in selling television service belongs in this six month round-up of commercial activity. Other than the specific analysis applicable to individual advertisers, the following are some of the general points used:

1. Cost per thousand circulation of television compares very well with other media rates.

2. What television has to offer as compared with other advertising media?

3. Television is the most effective substitute for actual sales calls.

4. Television demands active attention and delivers new kind of selling impact.

5. Advertisers themselves believe that television's selling effectiveness is in the order of ten times that of sound radio.

6. Television makes news and offers many effective merchandising tie-ins.

7. Value of being among the first.

There are certain industries that sound radio has had particular difficulty in selling in a big way because of the visual appeals necessary to sell certain commodities and services. Some of these are: travel, men's and women's fashions, real estate, and the automotive industry.

The list of advertisers above show seven out of the total of thirteen from the clothing and fashions industry, which is a good beginning towards getting these "hard to sell" industries into the radio field. Other big industries, such as insurance and banking, have indicated that, through television, their financial services could be shown with charts and graphs as well as actual dramatizations of everyday situations involving their services.

As for the commercial outlook for 1942, there is a strong possibility of more than doubling this first six months record period. Further tests and activity are well along toward the realization of commercial network service, originating from New York, to at least one other city, and possibly two.

Behind this commercial progress were many hours of work in the way of establishing rates for time and facilities for advertisers, and the formation of a program policy and a code of operating ethics. The story of the derivation of these philosophies is very interesting, however time prohibits their discussion here at this writing. They deserve a mention in this commercial summary in that they form much of the background for the entire operation.

Play Bridge

(Continued from Page Eighteen)

"Perhaps we had better be getting home." Everyone immediately throws down their cards, and the score is added. If you have been keeping score yourself, everything will probably turn out all right. But if one of your unscrupulous opponents has been keeping score, it is quite correct for you to carefully add his figures and totals—pointing out their errors in addition with fiendish glee, and sneers of disgust.

And when you lose by forty-five hundred points be very nonchalant, and write out a check—they can always be cancelled before the bank opens next morning.

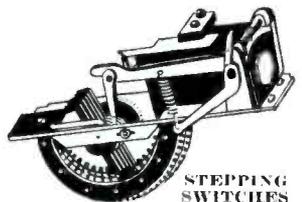
But a much more clever and adroit method of breaking up a long bridge game is known as the Biddle-Biddle-Quagmire Method. This is a convenient means of making a graceful exit, and it can be used at any time during the game—when you would rather be elsewhere, and when you aren't winning anyway. Put all the cards in an old hat or a bucket, and then have each player choose a card. Following which you announce that you will go out to the nearest drug-store and telephone back the names and denominations of every card elected by the other guests. Upon leaving the house you can go to a movie, or even go home—and then forget the whole business.

And if you should run into any of the other guests later, blame it on the telephone.

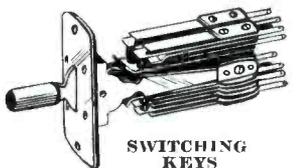
CONTROL APPARATUS by AUTOMATIC ELECTRIC



RELAYS



STEPPING SWITCHES



SWITCHING KEYS

IN AMERICA'S leading radio broadcast studios, Automatic Electric remote control devices are used for the dependable operation of such important equipment as master control boards and announcers' cabinets, for program monitoring and switching, and for other electrical control uses.

These devices have a built-in quality that is the direct result of over 50 years experience in the design and manufacture of communication, signaling, and control systems, utilizing the same engineering skill that revolutionized telephony with the automatic dial telephone.

A complete engineering and consultation service is available to broadcasting studios on any electrical control problem. Avail yourself of this service today by writing—

American Automatic Electric
Sales Company
1033 West Van Buren Street
Chicago, Ill.

AUTOMATIC ELECTRIC

TELEPHONE, COMMUNICATION, AND SIGNALLING EQUIPMENT

Yachtsmen, Ahoy!

FOR THOSE of us who are located along the middle east coast, thoughts of boats and boating are a bit remote at the moment. Not so, however, with the brethren located in the more salubrious climes of the southeast, gulf and southwest. But when boats are a hobby they are interesting at any time and the "Revere," a 45-foot cruiser recently launched at New Bedford certainly, has enough on the ball to be of more than passing interest. In fact it is the sort of stuff of which the boating enthusiast's dreams are made.

From the board of marine architect, Ben Dobson, of New Bedford, Mass., the "Revere" is a boat that, while too rich for the blood of most of us, suggests some highly interesting possibilities in lines, materials and equipment. Her lines

body of the modern car. Because the metal used in the "Revere" is cupro-nickel, the same metal from which condenser tubes for merchant and naval vessels are made, it is almost completely resistant to the pitting and corrosive action of salt water. So much so that paint is employed only for the sake of appearance.

This strong but light construction results in complete freedom from the logginess inherent in past all-metal designs. The "Revere" is highly maneuverable, is capable of top speed just under 35 m.p.h. and of prolonged cruising speed of 28 m.p.h.

It is a demonstration and exhibit boat and is now in Florida waters, having completed a run down the coast from New Bedford during which many yacht clubs were visited to enable members to come aboard to examine its features of design, construction and equipment, all of which represent the last word in modern boating facilities.



The "Revere" during a stopover in New York on her way South. Ultra modern in detail this 45-foot cruiser is made entirely of cupro-nickel welded to form a one-piece, seamless construction. Typical of her appointments is the Hallicrafters HT-12 Radiophone, bulkhead mounted in the main cabin. By this means boat-to-boat and boat-to-shore communication is provided over ranges up to several hundred miles

as shown in the accompanying photo (no, no! The upper one!) speak for themselves. Even more striking, from a technical standpoint is the fact that she is constructed, from the keel to the base of the canted mast, entirely of pre-shaped metal sheets only 0.08" in thickness. These sheets are flanged and welded, forming a one-piece structure as seamless and watertight as the one piece

Applications of Crystals

(Continued from Page Twelve)

go off the air for any reason, or if trouble should develop in the telephone line from the studios to the transmitter, the monitor at the studios was not affected. After installing the same crystal circuit as shown in Fig. 1, with a slightly longer antenna due to the greater distance from the transmitter, the signal on the studio speakers was then coming directly "by air" from the transmitter, and any deviation of transmission from normal was instantly discernible.

The third application of the fixed crystal detector was in the direct monitoring of remote pickups by the remote engineer. A small inductance and a midget variable condenser along with the crystal were installed in the remote pickup amplifier. One side of the telephone line to the studio was used as an antenna, connected to the inductance through a small fixed condenser as shown in Fig. 2. A double pole double throw toggle switch was used to switch the phones either to the crystal circuit for monitoring directly from the transmitter, or to connect the phones in the normal manner across the output of the remote amplifier. After the remote engineer has received his cue and placed his program on the air, he may then switch to the crystal circuit and be sure that his pro-

gram is actually being broadcast. He should be able to pick up the transmitter signal within a radius of ten or fifteen miles of the transmitter, depending, of course, on the transmitter power. High impedance phones should be used; so that the removal of the phones from the output of the amplifier will cause no change in volume level to the studio.

By no means least important is the radiophone installed to insure constant contact not only with her owners but with scheduled ports of call. This unit is a standard type which incorporates such operating features as automatic voice-controlled changeover, crystal-controlled channels for both receive and transmit—10 of each, automatic noise suppression when awaiting incoming calls, and others too numerous to mention. Its compact size is indicated in the lower photo. This unit pumps 50 watts into the antenna system and although in this case the antenna is necessarily short and low, an operating range of several hundred miles has been established.

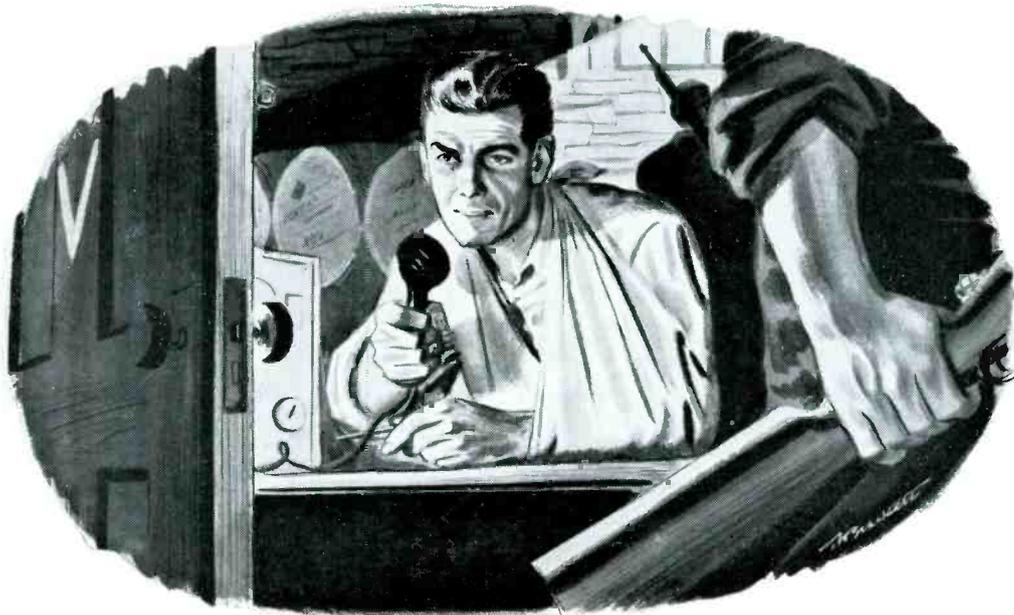
The announced itinerary calls for spending the winter in southern waters, then moving up the east coast and into the great lakes. Information as to the planned schedule may be obtained by anyone interested in a personal inspection by communicating with the owners, Revere Copper and Brass, Inc., 230 Park Avenue, N. Y. City, or with Texaco. It is expected that it will be on hand at major shows and regattas.

Terminal Radio Corp. Merges Its Two Stores Into Larger Quarters

The Terminal Radio Corporation announces that its two stores will be consolidated at new and larger quarters at 85 Cortlandt Street. The new Terminal radio supply house is scheduled to open about January 15th at 85 Cortlandt Street.

The Terminal store at 80 Cortlandt Street will operate as usual up to the time the new store opens, assuring Terminal's customers of uninterrupted service.

At 70 West 45th Street, Terminal's radio and record department will function in beautifully enlarged quarters as one of the leading radio shops in midtown New York. Radio parts and equipment sales will be discontinued at this address on January 2nd, to permit the transfer of thousands of items to the new Terminal radio supply house at 85 Cortlandt Street.



"...This is the Voice of Freedom!"

Out of the night's dark secrecy, "somewhere in Europe" an illegal radio speaks. Those who listen risk the concentration camp. Those who broadcast face torture and the headman's axe... A FREE RADIO, the birthright of Americans, is *high treason* under European dictatorship.

For dictators know well that they cannot long withstand the power of *uncensored* news, freely transmitted and freely received!

The National Broadcasting Company is proud to have played its part in keeping *American radio free*... proud to have abided since the beginning of broadcasting by the spirit and the letter of that "Freedom of Speech" which is written into the American Bill of Rights.

Exponents of opposing views in every field

of thought and action have had equal access to the facilities of NBC. They have been free to present those views to Americans... and Americans have remained free to listen to what they chose. No American political party, no religious denomination, no economic group has ever found the gates of the American system of broadcasting barred against them. For 15 years, NBC has operated "in the public interest, convenience and necessity..."

Freedom of Radio—like Freedom of the Press—is *today* more vital than ever. The National Broadcasting Company, like all Americans everywhere, will continue to guard that freedom jealously—will continue to serve America as *only* a Free Radio can serve it!

NATIONAL BROADCASTING COMPANY

A Radio Corporation of America Service



Radio...all out for Victory

Research and invention have placed radio in the first line of battle

COMMUNICATION—rapid communication—is a vital necessity, on land, at sea and in the air. RCA research and engineering developments in both radio and electronics are strengthening—and will further fortify—the bulwarks of our communications system. At Princeton, New Jersey, the new RCA Laboratories—the foremost center of radio research in the world—are under construction.

★ ★ ★

International circuits, operating on short and long waves, have made the United States the communication center of the world. Today, R.C.A. Communications, Inc., conducts direct radiotelegraph service with 49 countries.

★ ★ ★

Production of radio equipment is essential for news and timely information, for military and naval communications, for dissemination of news among foreign countries. The "arsenal of democracy" has a radio voice unsurpassed in range and efficiency. In the RCA Manufacturing Company's plants, workers have pledged themselves to "beat the promise," in production and delivery dates of radio equipment needed for war and civilian defense.

★ ★ ★

American life and property at sea are being safeguarded by ship-and-shore stations.

The Radiomarine Corporation of America has equipped more than 1500 American vessels with radio apparatus and is completely engaged in an all-out war effort.

★ ★ ★

Radio broadcasting is keeping the American people informed accurately and up-to-the-minute. It is a life-line of communication reaching 55,000,000 radio sets in homes and automobiles. It stands as the very symbol of democracy and is one of the essential freedoms for which America fights. The National Broadcasting Company—a service of RCA—and its associated stations, are fully organized for the coordination of wartime broadcasting.

★ ★ ★

New radio operators and technicians must be trained for wartime posts. RCA Institutes, the pioneer radio school of its kind in the United States, has more than 1,200 students enrolled and studying in its New York and Chicago classrooms.

★ ★ ★

When war came and America took its place on the widespread fighting front, radio was At the Ready . . . with radio men and radio facilities prepared to answer the call to duty "in the most tremendous undertaking of our national history."

David Sarnoff

PRESIDENT



Radio Corporation of America

RADIO CITY, NEW YORK

The Services of RCA: RCA Manufacturing Co., Inc. • RCA Laboratories • R.C.A. Communications, Inc. National Broadcasting Company, Inc. • Radiomarine Corporation of America • RCA Institutes, Inc.