

WIN A COMMUNICATIONS RECEIVER FREE

SEE PAGE 24

AUGUST
25c

RADIO NEWS

COMBINED WITH

All-Wave Radio



TRANSOCEANIC TELEPHONE
PAGE 8

MARINE LOOP RECEIVER
PAGE 28

BROADCASTING 30 YEARS AGO
PAGE 33

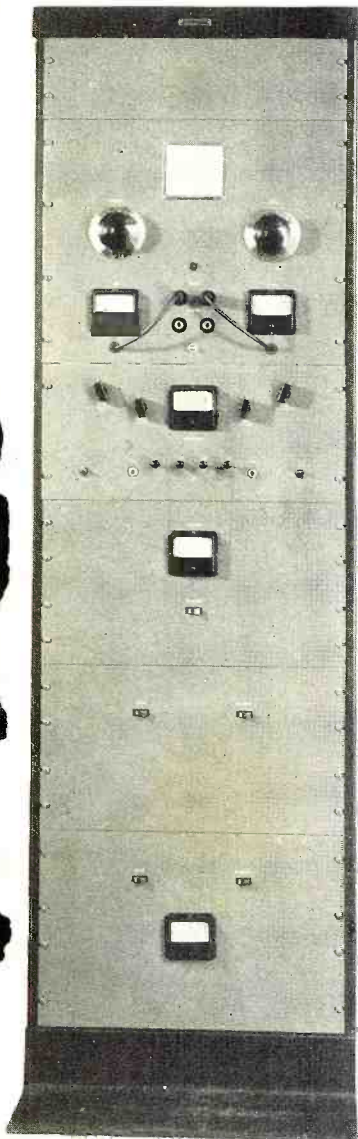
MIKES, MIXERS and MONITORS
PAGE 40

ARM DODGER
PAGE 35

Amateur Station W9YJE
SEE PAGE 12



Only **\$10 DOWN**
 Take YOUR CHOICE of these fine Sets



National's
NEW 600-WATT TRANSMITTER
 Now Yours on NEWARK'S EASY TERMS

Write for Time Payment Details—
 A modern Transmitter available in kit form built around the new National Co. type "NTE" Combination Exciter and Speech Amplifier. Complete descriptive booklet sent upon request.

NATIONALS NEW NC-100XA
 Notice the big, new type, illuminated dial with direct reading scales for each band. Calibrated in Megacycles. Also continuous running vernier dial with band spread readings from 0 to 1000 at all frequencies. Equipped with "S" Meter. Cabinet restyled and enlarged. Yet with all these fine improvements the NC 100XA costs no more! Send only \$10.00 with order, pay \$17.60 C.O.D., balance easy terms. (See List.) **Cash Price \$147.60.**



CHOOSE any one of the dozen fine nationally known sets in this list and **RESOLVE TO HAVE IT NOW!** Regardless of what set you want, just send only \$10 with your order. Make a small additional payment C.O.D. when your set arrives. Balance in six, nine or twelve months as listed below.

Model	Cash Price	C.O.D. Payment	6 Months Payments	9 Months Payments	12 Months Payments
NATIONAL NC-80X-NC-81X complete with tubes, crystal and speaker in cabinet	\$99.00	\$9.60	\$14.36	\$9.66	\$7.30
NATIONAL NC-100XA complete with tubes, crystal and speaker in cabinet	\$147.60	\$17.60	\$21.10	\$14.21	\$10.80
NATIONAL NC-101X complete with tubes, crystal and speaker	\$125.10	\$10.10	\$18.58	\$12.50	\$9.47
NATIONAL HRO with tubes and coils	\$129.00	\$14.00	\$18.58	\$12.50	\$9.47
NATIONAL HRO with tubes, coils and power supply	\$179.70	\$19.70	\$26.14	\$17.67	\$13.45
RME-69 complete with tubes, crystal and speaker in cabinet	\$195.60	\$25.60	\$27.84	\$18.83	\$14.33
HAMMARLUND SUPER PRO complete with tubes and 8 in. dynamic speaker	\$151.20	\$16.20	\$21.94	\$14.77	\$11.25
Model SP-110—15 to 560 meters and Model SP-110S—7.5 to 240 meters	\$243.00	\$23.00	\$36.35	\$24.61	\$18.75
Model SP-110X—15 to 560 meters and Model SP-110SX—7.5 to 240 meters	\$261.00	\$31.00	\$38.08	\$25.78	\$19.64
HALLICRAFTER SKY CHALLENGER II complete with tubes, crystal and speaker	\$99.00	\$9.00	\$14.36	\$9.66	\$7.30
HALLICRAFTER SX-16 SUPER SKY RIDER complete with tubes, crystal and speaker	\$123.00	\$13.00	\$17.74	\$11.93	\$9.02
HALLICRAFTER SX-17 SUPER SKY RIDER complete with tubes, crystal and speaker	\$149.50	\$24.50	\$20.26	\$13.64	\$10.36

NEW LOW PRICE NATIONAL RECEIVER

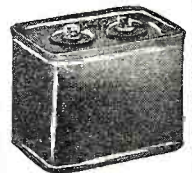
As soon as released by the manufacturers, you can

GET FULL DETAILS FROM US

Be first to have one of these new National sets. Write us today! Ask us to reserve first shipment for you. No obligation.

Oil Filled, Oil Impregnated FILTER CONDENSERS

Only **\$1.00**



- 1500 V. DC. 1 1/2 mfd. **\$1.00**
- 2 in. Diameter Round Can. 2 3/4 in. high. Weight 1/2 lb. Well Known Makes. Bought at a lucky price! Quantities limited. First come, first served. Guaranteed at rated voltages.
- 2 mtd., 2000 V. DC 4 3/4 x 3 1/4 x 1 1/4, 1 1/2 lbs. **\$1.50**
- 3 mfd., 1000 V. DC 5 x 3 1/4 x 1 1/4, 1 1/2 lbs. **\$1.10**
- 3 mfd., 1250 V. DC 3 3/4 x 3 1/4 x 1 1/4, 1 1/2 lbs. **\$1.25**
- 3 mtd., 1500 V. DC 5 x 3 1/4 x 1 1/4, 1 1/2 lbs. **\$1.50**
- 4.4 mtd., 1500 V. DC 5 x 3 1/4 x 1 1/4, 1 1/2 lbs. **\$1.75**
- 8 mfd., 2000 V. DC 5 x 3 1/4 x 3 1/4, 2 1/2 lbs. **\$2.75**
- 10 mtd., 750 V. DC 4 3/4 x 4 3/4 x 1 1/4, 2 lbs. **\$1.75**
- 14 mtd., 750 V. DC 4 3/4 x 4 3/4 x 1 1/4, 2 lbs. **\$2.00**

New Low Price On RCA-ACR-111 Now Only \$129.50
 (Originally \$189.50)

Only \$10.00 with order! Then pay \$14.50 C.O.D. and \$9.47 per month for 12 months; \$12.50 per month for 9 months; or \$18.58 per month for only 6 months! You save \$60 at this new low price!

YOUR CALL LETTERS IN GOLD

Hams Look at this! Your Call letters in impressive three dimensional style. Big shadowed letters nearly TWO INCHES high. Put them on your HAM SHACK door, auto window, etc. Send dime for yours today. Be sure to give your call letters.

FREE! Get This Big New HAM BARGAIN BULLETIN!

Illustrations, prices and full details on nearly 600 separate items, sets, tubes, parts and supplies! MAKE UP A \$60 ORDER and Buy All the supplies you need at present low prices AND PAY ON EASY TERMS. Write for this Special Bulletin Today.

RADIO NEWS CONTEST PRIZES

Now on display in Our Store. See these fine Sets and accessories. Then get in the contest and WIN one!

COME IN and SEE THEM—Ask
 For FREE Literature and information.

NEWARK

Electric Company
 323 W. MADISON ST.
 Dept. 7 CHICAGO, ILL



J. E. SMITH President National Radio Institute Established 1914 The man who has directed the home study training of more men for the Radio Industry than any other man in America.

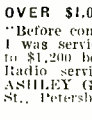
I WILL TRAIN YOU TO START A SPARE TIME OR FULL TIME RADIO SERVICE BUSINESS WITHOUT CAPITAL

HERE ARE A FEW EXAMPLES OF THE KIND OF MONEY I TRAIN MY MEN TO MAKE



\$200 TO \$300 A MONTH IN OWN BUSINESS

"For the last 18 months I have been in business for myself, making between \$200 and \$300 a month. I have N.R.I. to thank for my start in this field."—**ARLIE J. FROHNER**, 224 W. Texas Ave., Goose Creek, Texas.



OVER \$1,000 BEFORE GRADUATING

"Before completing half the N.R.I. Course I was servicing sets, and I made \$1,000 to \$1,200 before graduating. I am doing Radio service work for myself now."—**ASHLEY G. ALDRIDGE**, 1228 Shepherd St., Petersburg, Va.



CHIEF OPERATOR BROADCASTING STATION

"When I completed 20 lessons, I obtained my Radio Broadcast Operator's license and immediately joined Station WMPG, where I am now Chief Operator."—**HOLMES F. HAYES**, 85 Madison St., Lapeer, Mich.



EARNINGS TRIPLED BY N.R.I. TRAINING

"I have been doing nicely, thanks to N.R.I. Training. My present earnings are about three times what they were before I took the Course. I consider N.R.I. Training the finest in the world."—**BELSHARD COSTA**, 201 Kent St., Brooklyn, N. Y.



Get My LESSON on Radio Servicing Tips FREE

I'll prove that my Training gives practical, money-making information, that it is easy to understand—that it is just what you need to master Radio. My sample lesson text, "Radio Receiver Troubles—Their Cause and Remedy" covers a long list of Radio receiver troubles in A. C., D. C., battery, universal, auto, T. R. F., super-heterodyne, all-wave, and other types of sets. And a cross reference system gives you the probable cause and a quick way to locate and remedy these set troubles. A special section is devoted to receiver check-up, alignment, balancing, neutralizing, testing. You can get this lesson Free by mailing the coupon.

Do you want to make more money? The world-wide use of Radio has made many opportunities for you to have a spare time or full time Radio service business of your own. Three out of every four homes in the United States have Radio sets which regularly require repairs, servicing, new tubes, etc. Servicemen can earn good commissions selling new sets to owners of old models. Even if you have no knowledge of Radio or electricity, I will train you at home in your spare time to sell, install, service, all types of Radio sets to start your own Radio business and build it up on money you make in your spare time while learning. Mail coupon for my 64 page book. It's Free—it shows what I have done for others—what I am ready to do for you.

Many Make \$5, \$10, \$15 a Week Extra in Spare Time While Learning

Almost every neighborhood needs a good spare time serviceman. The day you enroll I start sending you Extra Money Job Sheets. They show you how to do Radio repair jobs, how to cash in quickly. Throughout your training I send you plans and ideas that have made good spare time money—from \$200 to \$500 a year—for hundreds of fellows. I send you special Radio equipment and show you how to conduct experiments and build circuits which illustrate important Radio principles. My training gives you PRACTICAL EXPERIENCE while learning.

There's a Real Future in Radio for Well Trained Men

Radio already gives jobs to more than 300,000 people. In 1937 Radio enjoyed one of its most prosperous years. Nearly \$500,000,000 worth of sets, tubes and parts were sold. Over 5,000,000 home Radios were sold—25,000,000 homes (4 out of 5 in the U. S.) now have one or more sets. Over 1,800,000 auto Radios were sold—5,000,000 cars now have Radios. Every year millions of sets go out of date, are replaced with newer models. Every year millions of dollars are spent on transmitting equipment, Television developments, etc. The \$30, \$50, \$75 a week jobs have grown from a few hundred 20 years ago to thousands today. And Radio is still a young industry—developing fast.

Get Ready Now for Your Own Radio Business and for Jobs Like These

Radio broadcasting stations employ engineers, operators, station managers and pay up to \$3,000 a year. Spare time Radio set servicing pays as much as \$200 to \$500 a year—full time jobs with Radio jobbers, manufacturers and dealers as much as \$30, \$50, \$75 a week. Many Radio Experts own and operate their own full time or part time Radio sales and service businesses. Radio manufacturers and jobbers employ testers, inspec-

tors, foremen, engineers, servicemen, paying up to \$6,000 a year. Radio operators on ships get good pay, see the world besides. Automobile, police, aviation, commercial Radio, loud speaker systems are newer fields offering good opportunities. Television promises to open many good jobs soon. Men I trained are holding good jobs in these branches of Radio. Read their statements in my 64-page book. Mail the coupon.

I ALSO GIVE YOU A PROFESSIONAL SERVICING INSTRUMENT



Here is the instrument every Radio expert needs and wants—an All-Wave, All-Purpose, Set Servicing Instrument. It contains everything necessary to measure A.C. and D.C. voltages and currents; to test tubes, resistance, adjust and align any set, old or new. It satisfies your needs for professional servicing after you graduate—can help you make extra money servicing sets while training.

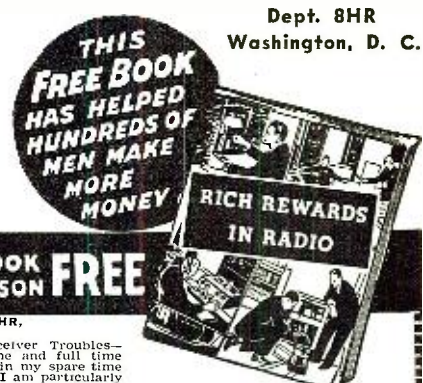
Save Money—Learn at Home Money Back Agreement Protects You

I am sure I can train you at home successfully. I will agree in writing to refund every penny you pay me if you are not satisfied with my Lessons and Instruction Service when you finish my Course. I'll send you a copy of this agreement with my Book.

Find Out What Radio Offers You Get My 64 Page Book Free Now

Act Today. Mail the coupon now for my Free Lesson and my book, "Rich Rewards in Radio." Both are free to anyone over 16 years old. My book points out Radio's spare time and full time opportunities and those coming in Television; tells about my Training in Radio and Television; shows you letters from men I have trained, telling what they are doing and earning. Find out what Radio offers YOU! MAIL THE COUPON in an envelope, or paste it on a penny post card—NOW!

J. E. SMITH, President National Radio Institute Dept. 8HR Washington, D. C.



GOOD FOR BOTH 64 PAGE BOOK FREE SAMPLE LESSON

J. E. SMITH, President, National Radio Institute, Dept. 8HR, Washington, D. C.

Without obligating me, send your Lesson "Radio Receiver Troubles—Their Cause and Remedy" and free book about spare time and full time Radio opportunities and how I can train for them at home in my spare time—about the N.R.I. Set Servicing Instrument you give me. I am particularly interested in the branch of Radio checked below.

- Radio Service Business of My Own
- Spare Time Radio Service Work
- Retail Sales of Radio sets and Equipment
- Service Expert for Retail Stores
- Broadcasting Station Operator
- Aviation Radio Operator
- Ship Radio Operator
- Loud Speaker Systems, Installations and Service
- Auto Radio Installing and Service
- Television Station Operator
- Service Expert with Radio Factory
- Commercial Radio Station Operator
- All-around Servicing Expert

(If you have not decided which branch you prefer—mail coupon now, for information to help you decide.)

NAME..... AGE.....

ADDRESS..... 14X1



MAIL COUPON NOW

The Tested Way to BETTER PAY

CARDWELLS *are in demand...*

"TRIM-AIRS" FOR SUMMER PORTABLES

Flexible, Light, Sturdy and Efficient Units

Typified by a few sample units shown. Note the handy brackets, small couplings, shaft extensions, panel bushings and other handy accessories.

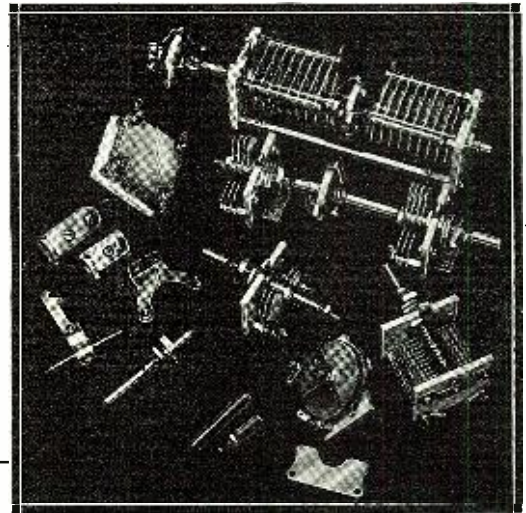
Single "Z" types may be single hole, bracket or stud mounted. Convenient for shielded stages in 5 or ten meter portables, where a variety of gadgets and the simplicity of Cardwell construction, permit the designer to work out an efficient layout with flexible units adapted to his ingenuity and originality.

Single and double spaced "E" type dual "Trim-Airs" for P.P. Finals, with shaft extended at rear for ganging, in line with newest single control, multi-stage rigs, destined to become very popular.

Phos. bronze inductance clips for No. 12 or No. 14 bare wire used for self supporting coils—(Type 804-A shown) are very handy.

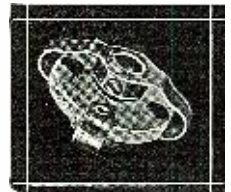
Midget fixed air condensers for loading low freq. tanks on 160 meter portables and emergency gear, available in 15 capacities and airgaps to .100".

Ease of modification has endeared this family of small but sturdy condensers to "hams" and H.F. experimenters the world over.



CARDWELL FLEXIBLE COUPLING

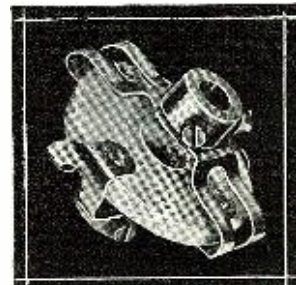
TYPE A—Fits all 1/4" shafts. Has isolantite insulation with new type nickel plated phosphor bronze springs and reversed brass hubs. Minimum space required. Maximum flexibility with no back lash. A real improvement over existing types. Overall diameter 1 1/2". Overall width outside hub-to-hub 5/8". Packed in standard cartons of one dozen. **\$.60**



List price
TYPE B—Same as Type "A" except hubs turned out for **\$.60** H.V. List price

TYPE C Flexible Insulated COUPLING

15,000 V. Peak Flashover



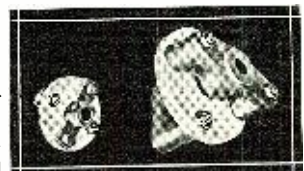
A heavy duty unit for high power variable air condensers or other rotary R.F. units. Insulation—No. 196 Alsmag disc 2 1/4" diameter, 1/4" thick. Maximum overall diameter, 2 5/8"; special steel cup set screws, heavy N.P. brass hubs, permanently staked into thick nickel plated phosphor bronze springs. Removable bushings to fit 1/4" shafts. Hubs fit 3/8" shafts with bushings removed. **\$.280**

List price
TYPE D—Same as Type "C" except hubs turned in. **\$.280**

List price
TYPE E—Like Type "C" but smaller—2 1/8" maximum **\$.150** diameter. Disc diameter 1 1/2". List price

LO-FLEX INSULATED COUPLINGS

Inflexible, heavy duty couplings, permitting insulated extension or coupling of shafts where flexibility of the insulating member is undesirable. TYPE ENF. Medium Power LO-Flex. 10,000 Volts. Insulating disc, 1 1/2" diameter Isolantite, wax impregnated. For **\$1.00** 1/4" shafts. List



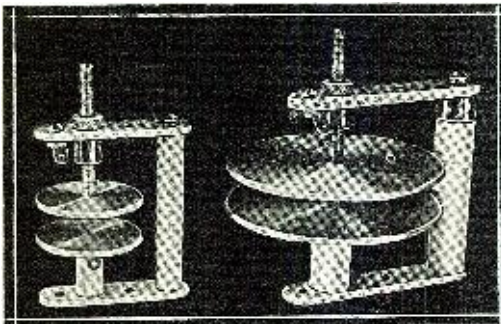
Cardwell Presents G.E. MYCALEX

H.F. insulation in stock bar sizes, you can saw and drill. Make your own special inductance mountings, R.F. terminal blocks, etc. with a real H.F. low loss material. Here are some of the best buys:

Item "ME" 4 1/8" x 1/2" x 1/2" List \$0.35	Item "MJ" 10 7/8" x 3/4" x 1/2" List \$1.65
Item "MI" 6" x 1/2" x 1/4" List55	Item "MK" 12" x 1/2" x 1/4" List 1.35
Item "MH" 6 1/2" x 1/2" x 1/4" List60	Item "ML" 12" x 3/4" x 1/4" List 1.75
Item "MN" 12" x 1" x 1/2" List \$1.95	
Item "MO" 12" x 1" x 3/8" List95	

* Sold below factory cost by G.E., we pass it on with only a handling charge. Supply limited at this price—call your dealer NOW! REMEMBER—G.E. MYCALEX CAN BE SAWED AND DRILLED, and it's a DEPENDABLE, LOW LOSS H.F. INSULATION.

DISC TYPE NEUTRALIZING CONDENSERS



TYPE BDN

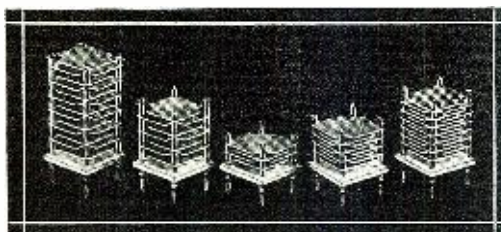
A companion unit to our smaller Disc Type Neutralizer for Low Capacity Tubes. Type BDN is for use with such tubes as 806, 833, 831, RK-38, RK-36, T-125, T-155, T-200, HK-354, F-108-A, HF-200, HF-300, 150-T, 253-TH, 250-TL, 300-T, 450-TL, etc. . . . Height, 4 3/4"; Width, 4"; Length, 5"

Capacity range: 2 to 12 Mmf. 3/4" Alsmag pillars; except for nickel silver extra long bearing, metal parts are of satin finish aluminum with fine screw adjustment to eliminate wobble. Convenient double lugs of husky proportions and knurled thumb nut

for easy locking. Heavier construction throughout. May be sub panel mounted by using 2 small insulated pillars screwed to holes in top supporting plate, and adjusting the condenser through clearance hole in chassis. List **\$.500**

TYPE ADN with 1/2" Alsmag pillars; for such tubes as 808, 834, 852, RK-30, RK-35, RK-37, RK-32, 304-A, 304-B, T-55, 35-T, 50-T, 100-TH, 100-TL etc. . . . Construction similar to type BDN. Height, 4 1/4"; Width, 2"; Length, 2 7/8". Capacity range: .5 to 4 Mmf. List **\$.300**

TYPE "J" FIXED AIR CONDENSERS



Have you ever wanted to make the tank condenser you use on 40, 20, or 10, resonate an inductance designed for 80 or 160 meter operation? With the new fixed capacitors by Cardwell—(plug in type)—such procedure is practical. The correct L to C ratio can be obtained on any frequency, yet you use only one variable capacity. Note that plates are readily removable for fixed capacity adjustment.

Type	Capacity	Airgap	Length	List
JCO-50-OS	50 mfmfd.	.250"	5 3/8"	\$5.50
JCO-25-OS	25 "	.250"	3 3/4"	4.00
JD-80-OS	80 "	.125"	4"	5.50
JD-50-OS	50 "	.125"	3 1/8"	4.00
JD-25-OS	25 "	.125"	2 1/2"	2.80
JR-750-OS	750 "	.1030"	4"	8.50

All "J" types are 2 1/4 inches square
TYPE JB—Jack Base for "J" fixed units. Alsmag 196—2 3/8" x 2 3/8" x 1/4". Complete with mtg. posts, screws and nuts, list. **\$.100**

Every Barker-Williamson coil covered by suitable 50-50 mfmfd. variable, with either a 50 or 25 mfmfd. "J" fixed. Coto Coils for 160 meters use 70-70 mfmfd. variable with 50 mfmfd. "J" fixed.

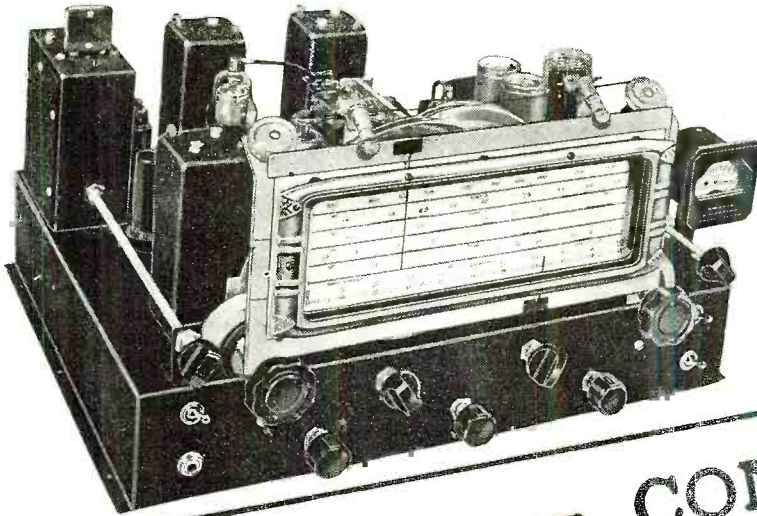
Ask your dealer or write for catalog No. 40 with supplementary bulletins showing most complete QUALITY line of low, medium and high power transmitting and receiving condensers and accessories on the market.

THE ALLEN D. CARDWELL
83 PROSPECT STREET



MANUFACTURING CORPORATION
BROOKLYN, NEW YORK

ENJOY THE THRILL OF BUILDING YOUR OWN RADIO RECEIVER



The Greatest Radio Kits Ever Assembled!
14 TUBES - - - 5 BANDS

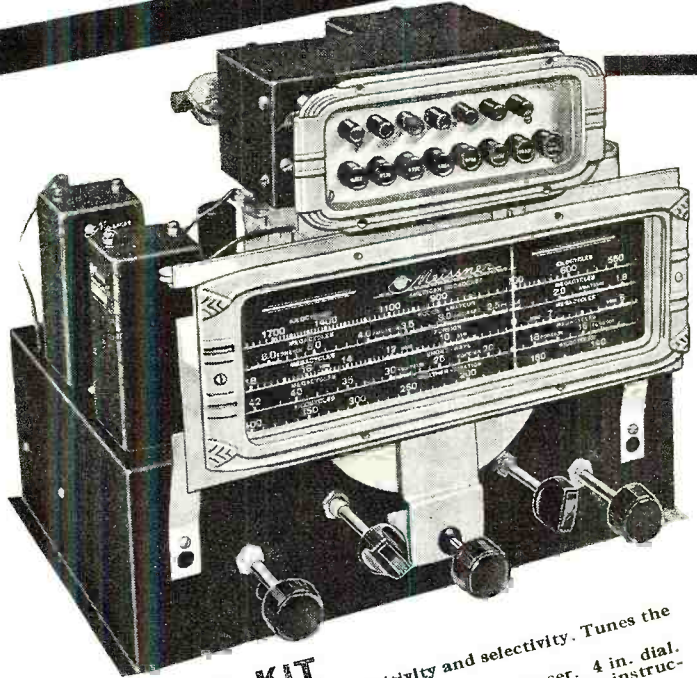
TRAFFIC MASTER Communications Super
What a radio! A 14 tube, 5 band Communications receiver that has every major circuit improvement known to radio engineers. In sensitivity, selectivity and signal-to-noise ratio on the amateur bands, and electrical band spread, it has no peer, even among the finest commercial receivers.

The Traffic Master comes to you in complete kit form—everything included except tubes and speaker—even the solder. You cannot go wrong with a Traffic Master—it has everything! And it is guaranteed to operate to your complete satisfaction!

Meissner COMPLETE KITS

9 TUBE "CUSTOM" SUPER
One of the most sensitive receivers ever designed. Available with cathode-ray tuning indicator (magic-eye) or with automatic permeability-tuned push-button tuner—7 station selectors.

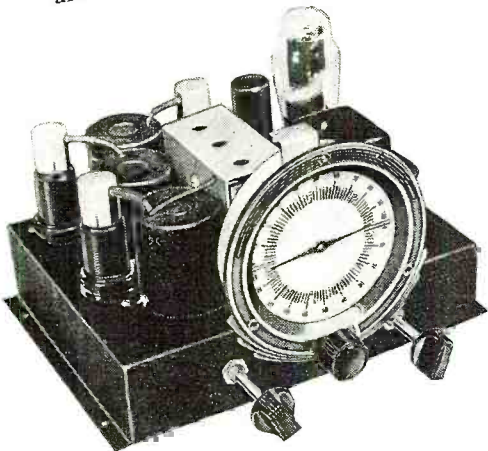
The Complete Kit is Meissner engineered throughout—assuring you of flawless performance. The 9 tube "Custom" Super will fulfill all your expectations—and you will be amazed at the ease of assembly.



5 TUBE AC T.R.F. KIT
Low-cost easy-to-build kit with exceptional sensitivity and selectivity. Tunes the broadcast band 530 to 1600 KC (187-565 meters). Features 2 stages of tuned R.F. (3 tuned circuits) 3-gang condenser. 4 in. dial. Volume and tone controls. Pentode output. Meissner's easy-to-follow instructions included!

FREE!

New 1938 catalog—a big 44 page book showing the latest Meissner line—everything you need. Complete Kits! Push Button Tuners! Complete line of parts! Get this free book now, while the supply lasts. See your Parts Jobber, or write to us—Meissner Manufacturing Co., Mt. Carmel, Illinois.



Meissner

"A FAMOUS NAME FOR TWI DECADES"



WITH this issue we bring out the combined magazines of ALL WAVE RADIO and RADIO NEWS. We are happy that the publishers have acquired the former magazine because it enjoyed a large and varied circulation among the amateurs, servicemen, DX fans and experimenters. Many of the departments of AWR are duplications of those presently carried in RADIO NEWS. The following will assist those readers who want a ready and quick reference:

The "Hamfest" column is carried as "Ham Chatter"; "The Circuit Court" will be found under "Questions and Answers" and throughout the general technical make-up of RADIO NEWS; "Globe Girdling" will be found under our "Short Wave Flashes"; "Channel Echos" are covered by "Studio Briefs," "Not For Rebroadcast" and "Short Wave Flashes"; "Ultra High" and "Short Wave Broadcast List" are covered by our DX department and "Short Wave Time Table"; while "Night Owl Hoots" material can be found in "Special DX Broadcasts" column. In all other respects all of the information heretofore carried in AWR will be furnished in more or less complete form by RADIO NEWS. A column will appear monthly devoted to the activities of the "Radio Signal Survey League" which will be edited by their Director, Mr. Barry. Unfortunately the change of management came at a crucial point of make-up of the magazine and, therefore, RSSL News has been left out of this issue. It will reappear next month.

We believe this marks an important step forward towards the dissemination of information on all phases of radio to our readers who are interested in this hobby and we foretell a brilliant future for the combined magazines. The Editors will welcome any suggestions from our new readers who were the old readers of AWR on any radio subject.

* * *

WE have actively entered the campaign to clean up the ARRL from within. We don't believe there is room in the United States for more than one league unless the present League steps down as the official mouthpiece of 43,000 amateurs. As long as the ARRL is lax, RADIO NEWS will continue to conduct its campaign for the betterment of ham conditions by that body. It can't hope to succeed in this proposition unless the membership itself becomes cognizant of the emasculation of its own league. The machinery is there; the membership lacks only the power of concerted action to put it into operation, and make the League the most powerful body of amateurs in the World.

There is grave danger (and in fact an official of the ARRL has stated publicly), that by 1942 the amateurs will lose their 20 and 40 meter bands unless the fraternity arouses itself from its 18 years' sleep and compels the ARRL Directors to take suitable action at Washington. It must do this so that the United States Representatives to the Convention in Rome, to come, will be instructed just exactly what our Government will do and will not do. If we continue our Rip-Van-Winkle-like attitude, the chances of the amateur becoming wholly extinct are very great.

There is a Federal investigation starting into the activities of the Federal Communications Commission and into its allotment of frequencies to the various services throughout the U. S. This is then the time to strike and to make our voices heard that we, as amateurs, demand recognition of the value to our country in times of stress and emergency, and that such recognition be rewarded not only with the retention of our present frequencies, but with the acquisition of more.

It is an obvious fact that since the amateur has been relegated to the five main bands, which he now occupies, that he has been stagnant in developing anything startlingly new in the field of radio. It must be made clear to our Government that by awarding the amateur new frequencies, new developments will take place which will enable our Government to benefit from such award.

* * *

THERE are many who question whether or not television and broadcast and motion picture industries will eventually



Our Booth at the RMA Show in Chicago, with W9KQH at the portable station, W9ETI reading RN, and Jerry Crosse, THE RADIO NEWS GIRL, talking to a customer.

clash with the induction of public television programs. That this fact has been noticed in a number of quarters is evident by the fact that Columbia Broadcasting System, through one of its officers, is quite heavily interested in Warner Brothers motion picture company. Since Columbia Broadcasting System uses RCA equipment for the most part, it would seem that these three industries are preparing to develop television for public consumption, together.

* * *

YIELDING to the pressure of the millions who enjoy their broadcast radio reception, the F.C.C., on May 28, 1938, submitted a bill to Congress which stated, "no person shall operate or cause to be operated any apparatus which uses r.f. electrical current as an essential to its operation . . . in any manner inconsistent with the rules, regulations, restriction or conditions which the Commission may prescribe under . . . this section." The Commission, in recommending that Congress pass this bill, predicted that "the use of a large part of the radio spectrum for communications purposes will be destroyed," unless some laws and measures can be passed for the suppression of electronic interference. The devices aimed at by the F.C.C. are motor cars, trucks, buses, neon signs, defective power lines and electric therapy equipment. The organization interested, is the National Association for the Prevention of Radio Interference.

In presenting this act to Congress, the F.C.C. follows the lead taken by the Canadian Communications Commission prohibiting radio interference of any kind.

To those amateurs who are seriously minded enough to read the handwriting on the wall, the bill foreshadows a drastic move on the part of the F.C.C. to reduce not only the interference complained of, but also amateur interference. The Editors of RADIO NEWS freely predict that the time is not far distant when amateur interference will be met with more drastic measures than heretofore. It will be up to the amateur fraternity at large to clean its own house and ascertain whether or not it is causing any interference.

* * *

RAISED EYEBROW DEPARTMENT—What certain radio star in New York is one of the few people permitted to park his car in the select circle in front of the NBC studios where big NBC officials have preferred space? He pays off the guard in charge with complimentary tickets to his own broadcast!

* * *

THE Navy Department has announced that the Navy Research Laboratory of (Continued on page 74)

RADIO NEWS

INCLUDING **All-Wave Radio**
 The Magazine for the radio amateur,
 experimenter, serviceman & dealer

AUGUST 1938

VOL. 20 No. 2

The Contents



★
 An unusual rig which is at once a ham transmitter and a commercial job is that of W9HEZ afloat the Nancy Ann III. Watch for a description of this interesting station in the September issue.

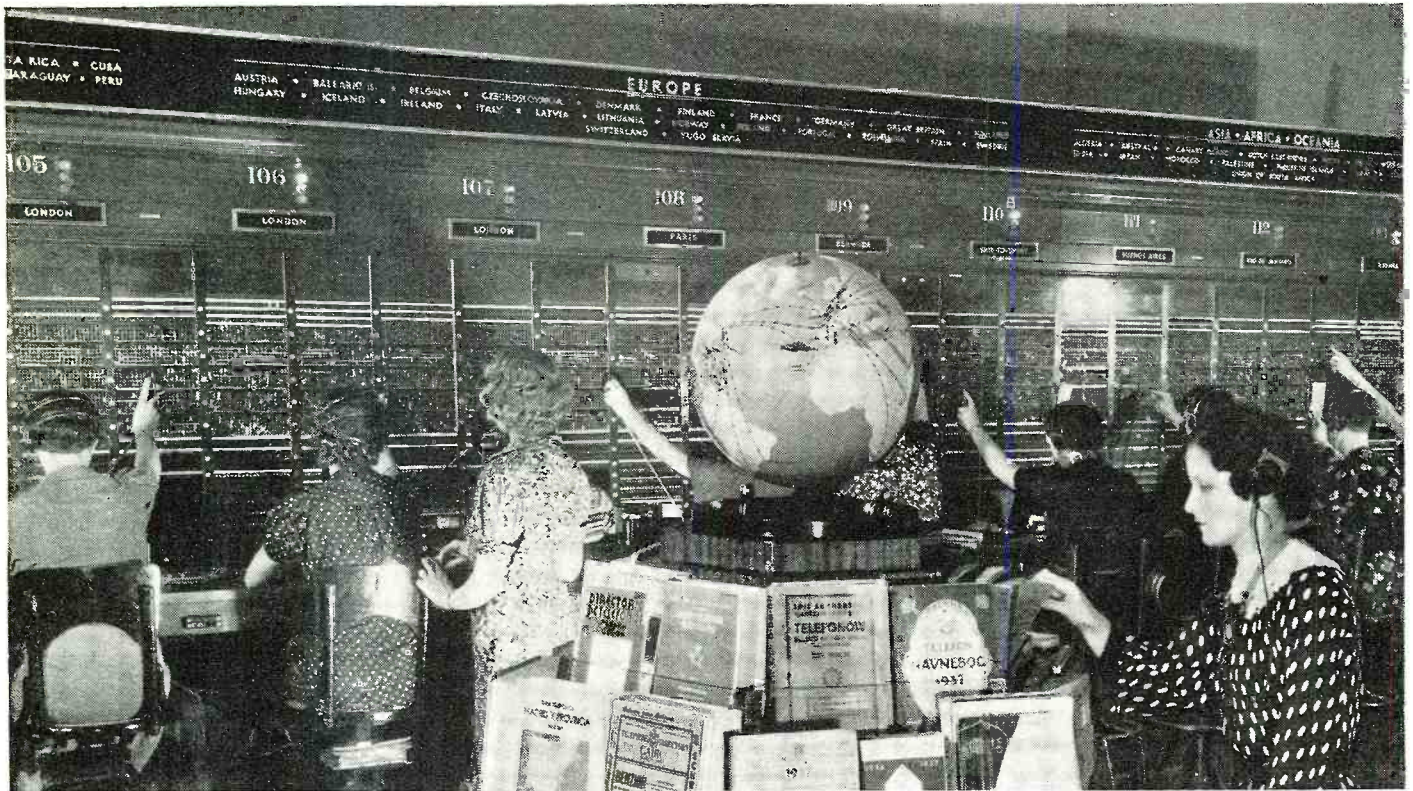
★
 PUBLISHED MONTHLY BY
 ZIFF-DAVIS PUBLISHING COMPANY
 at 608 So. Dearborn St., Chicago, Ill.
 New York Office, 381 Fourth Ave., New York City
 William B. Ziff, Publisher, B. G. Davis, Editor

Karl A. Kopetzky, W9QEA, Managing Editor
 E. Stanton Brown, Associate Editor
 Herman R. Bollin, Art Director
 John H. Reardon, Circulation Director

CONTRIBUTIONS: Contributors are advised to retain a copy of their manuscripts and illustrations and to include return postage. Contributions will be handled with reasonable care, but this magazine assumes no responsibility for their safety. Any copy accepted is subject to revision or changes to meet the requirements of this publication. Payment for manuscript and photographs will be made at our current rates. In making payment illustrations will be considered part of the manuscript unless otherwise specified. All manuscripts must be accompanied by return postage and self-addressed envelope in order for them to be returned if not found suitable for publication. If no return postage accompanies the manuscript, and it is found unsuitable, it will be destroyed. RADIO NEWS accepts no responsibility for lost manuscripts due to improper packaging or addressing.

Within Earshot of the Editor.....	6
Transoceanic Telephone.....	8
Columbia's KNX.....	10
This Month's Cover.....	12
Eddie Cantor Speaks.....	13
Chatham Radio Guards the Sea.....	14
Bing Crosby, Inc.....	16
Studio Briefs.....	18
Propaganda in Latin America.....	19
Machine Gun Mike.....	20
Radiopix.....	21
Radio Lands the Plane.....	22
Radio News Receiver Prize Contest.....	24
Pounding Brass on a Pig Boat.....	25
Radio Weatherman.....	26
Constructing the Marine-Ham Loop Receiver.....	28
Not for Rebroadcast.....	32
Broadcasting 30 Years Ago.....	33
QRM Dodger.....	35
The National QSO Page.....	36
Questions and Answers.....	38
Ham Shack.....	39
Mikes, Mixers, and Monitors.....	40
What's New in Radio.....	42
The Beginner's 160 and 10 Meter Fone Transmitter.....	43
Ham Chatter.....	44
How to Make a Ribbon Mike.....	45
Radio Gadgets.....	46
Photocell at Work.....	47
Short Wave Time Table.....	48
Short Wave Flashes.....	50
Cathode Ray Modulation Indicator.....	51
A Ham's Wife Confesses.....	52
Serviceman's Experiences.....	53
Letters to the Editor.....	54
Special DX Programs.....	56
Radio Physics Course.....	63

Copyright, 1938
 ZIFF-DAVIS PUBLISHING COMPANY
 Member of the Audit Bureau of Circulations



Transoceanic

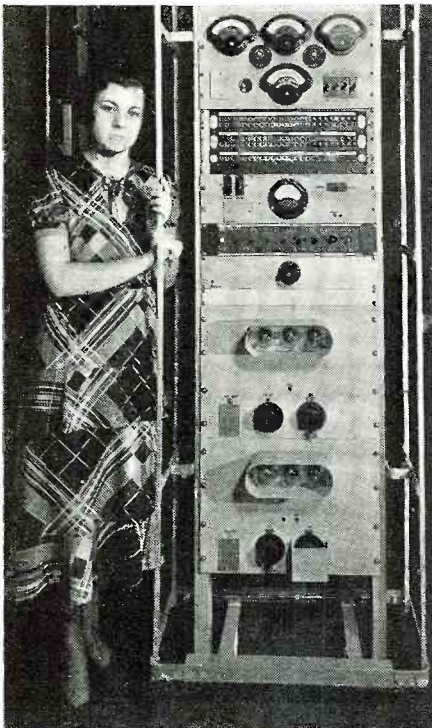
Overseas Dept. of A. T. & T. Co. where a file of foreign directories are kept for reference in handling transatlantic calls.

The "secrecy" machine, or inverter of all speech which makes your transatlantic call unintelligible to the eavesdropper.

by F. LELAND ELAM

Elks Grove, Calif.

Today you can call your friend or relative any place in the world by means of the transatlantic telephone. Most of this traffic is over radio's short waves, and it is as secret as your own home phone because of the inverted speech which the company interposes on the air for you.



THE constant jangling of the telephone jerked Sacramento's mayor from his intense study of a serious situation caused by a storm which had hit his city a few hours earlier. He gripped the phone and lifted the receiver to his ear, wearily giving the usual greeting, "Hello," to hear the answer:

"This is the *London Times*. Is this the Mayor of Sacramento, California? We understand your city was struck by a terrible hurricane and hundreds of people were killed and injured."

Mayor Tom B. Monk almost dropped the phone, but the surprise of having someone calling across a continent and an ocean was no greater than the shock of the disaster which had hit his city the day before, so he recovered quickly to carry on a ten-minute conversation with the London scribe. It was made clear there was only one fatality, although 25 persons were injured, and he described the effects of the

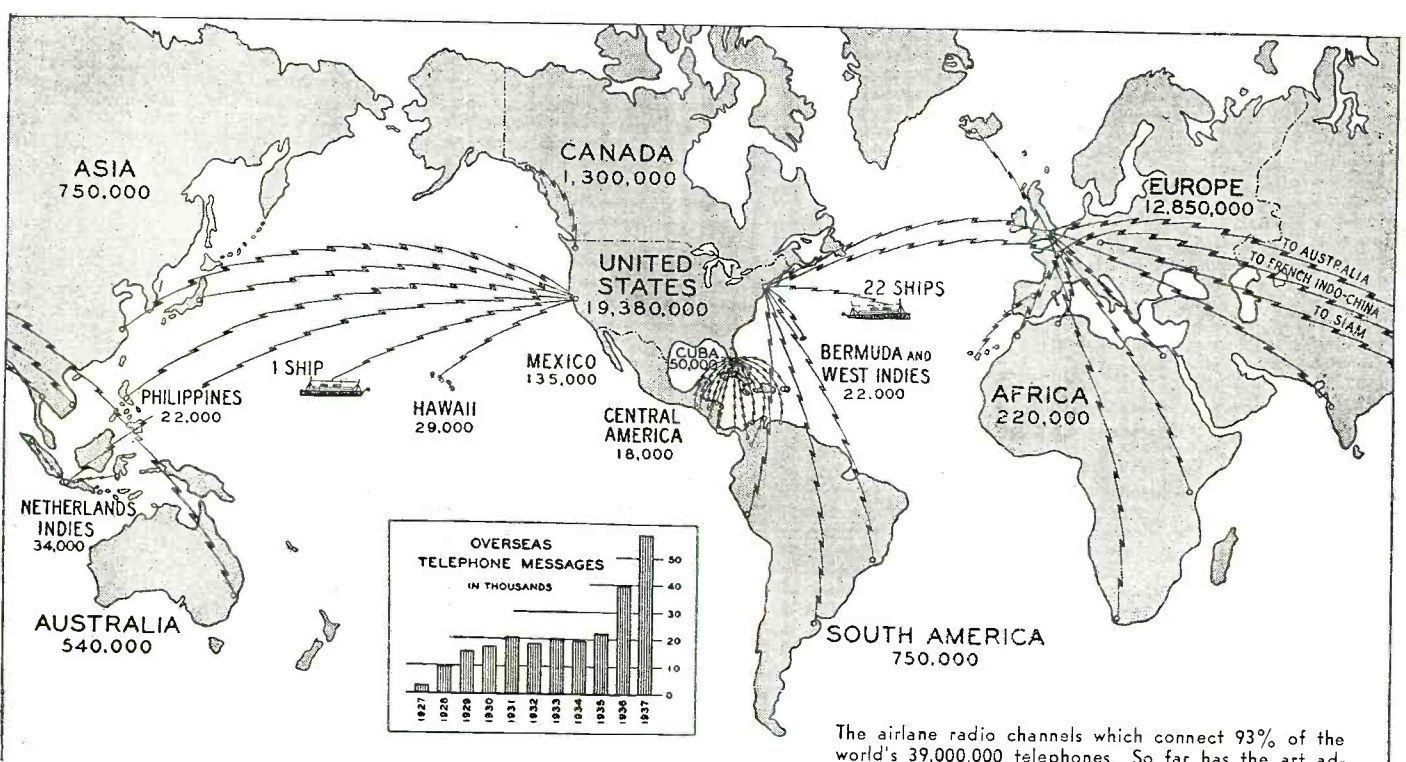
storm that ripped up hundreds of trees in the city.

About the same time Mayor Angelo Rossi of San Francisco received a transatlantic call from the *London Daily Sketch*. This paper also had a distorted idea of the storm damage for the Mayor had to assure the caller there were no ocean liners overturned in San Francisco Bay and that the city was in no need of being saved.

Not many years ago talking with someone in London from the United States was an idea that belonged in one of those imaginative books that dip into the dim future.

The radiotelephone conversations between the reporters and the Mayors were but two of such calls now commonplace in a daily stream of traffic that flows not only to London but to the four corners of the earth, and in these two cases helped correct serious misunderstandings.

Overseas radiotelephone service began on January 7, 1927, just a little over eleven



The airline radio channels which connect 93% of the world's 39,000,000 telephones. So far has the art advanced, that there is no trouble for any connection.

Telephone

years ago, with the opening of service between New York and London by means of long-wave radio communication across the Atlantic.

The scope of this service has been enlarged rapidly—a city or two, a group of islands, or an entire country at a time. You can now send your voice flashing around the globe with the speed of light.

Without leaving the soil of the United States you are within reach of more than 36 million telephones or about 93 per cent of all the instruments in the world.

Radio has made this possible by connecting the airplanes with wire lines to form the voice channels between countries.

American calls to Europe pass through an overseas terminal in New York City then across the ocean over the original long-wave airplane or through one of three short-wave radio channels. The radio circuit connects with land-wire lines in Europe, through which you can reach nearly any city desired.

Other radiotelephone circuits at London and other European points, give service to the Levant, Africa, Australia, India, and the Far East. All of these connecting circuits are in the short-wave band.

New York is also the terminus for short-wave channels to Buenos Aires, Rio de Janeiro, Lima, Bermuda, and ships at sea.

Other short-wave channels terminating in San Francisco provide service with Hawaii, the Philippines, China, Japan, the Dutch East Indies, and ships at sea. From Miami we can reach the West Indies, Central America, and the northern part of South America. These channels are also short-wave.

The conversation between the Mayors and the London reporters were perfectly clear to the men talking, but to anyone trying to eavesdrop on the conversation as it flung its way through the air it would have been undecipherable.

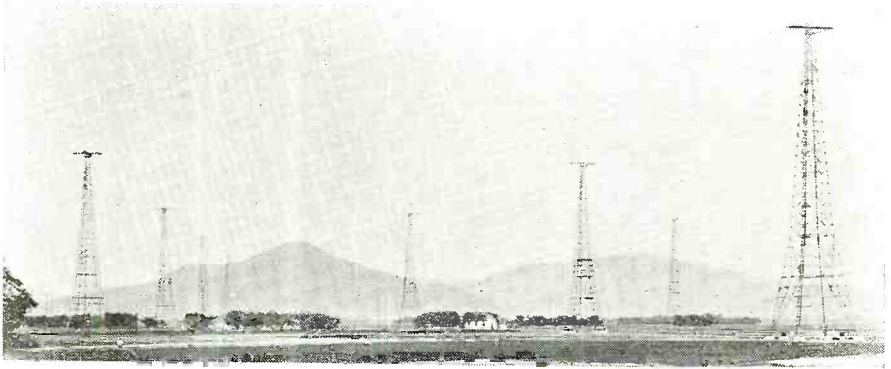
A device in the central control room in the New York long-distance building, or in San Francisco, as the case may be, scrambles the voice so it is undecipherable.

The words spoken by a subscriber go into the scrambling device correctly but when they come out over the directional antennas of the radio transmitting station the words go hurtling through the air upside down. The receiving station has an unscrambling instrument which makes the words intelligible again.

Although perfect transmission of speech may be noticeably marred by the slightest defects in the transmission system, it is remarkable that speech currents may be subjected to severe distortion without complete sacrifice of their intelligibility.

In developing privacy systems for use in trans-oceanic radiotelephony it has been necessary to devise means for converting

(Continued on page 73)



The Bandoeng, Java, receiving antenna which connects with Dixon, Cal., 8700 miles away.



The always interesting panorama of Hollywood in which is located KNX. In the left foreground, on Sunset Blvd., is the main building housing both studios and offices.

by **JERRY GOLDBY**
Los Angeles, Cal.

With the fanfare over, KNX settles down to being just one of Columbia's regular studios. The author tells of the newest equipment installed there which makes it one of the world's finest and first class broadcast stations.

APRIL 30th, 6:00 a.m. Pacific Standard Time, and as "Good Morning from Hollywood" spread its cheerful notes over practically the whole world, it officially notified the listening audience that station KNX's new Hollywood home on *Columbia Square* was on the air. Each fifteen- and thirty-minute program brought stirring features and familiar voices to eagerly receptive listeners 'til the wee small hours of the morning, and Hollywood's thrilling, modernistically designed edifice of radio was ceremoniously opened; "tops" in technical and architectural structure. With a twenty-five hour celebration surpassing anything hitherto undertaken, Columbia Broadcasting System dedicated its new Pacific Coast headquarters.

From coast to coast, over the Canadian networks and by shortwave to Europe and South America, programs originating exclusively in these ultra-modern Hollywood studios were broadcast. And from 6:00 a.m., April 30th, until 12:45 a.m., May 1st, an array of important personages passed before the microphones and made this the most outstanding dedication of all times.

The climax of the day's festivities was the two-hour program presenting such luminaries as Al Jolson, Eddie Cantor, Cecil B. DeMille, Edward G. Robinson, Joe Penner, Jean Hersholt, Frances Langford, Martha Raye, Raymond Paige, Parkyakarkus, and a host of other radio and screen favorites.

Hollywood outdid itself in its acclaim of "stupendous, colossal, gigantic," "How-de-do" to the CBS "nerve-center" of the west. It gave pause for thought, as but another

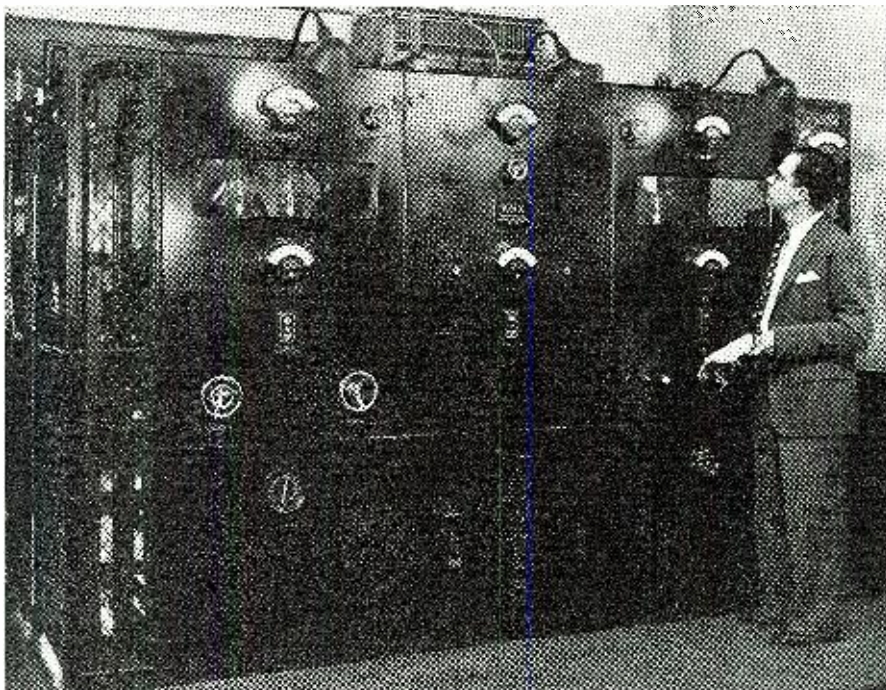
indication of the implied threat of radio-broadcasting's capitol also moving westward. To the Columbia organization it was but another achievement, another step forward in its great stride towards a goal of supremacy in the radio field with adequate coverage into the most hidden corners of the U. S. A. and the western hemisphere.

From a humble beginning of one broadcast originating from the movie capitol, later growing to eight broadcasts, there now emerges upon the air twenty entirely

new and exclusive features of top-flight performers originating from KNX.

The station boasts an imposing history of achievements from its start in 1924 as a small 500 watt located in one corner of the Paramount lot to the 50,000 watt position it now holds. Operated as a subsidiary of a local newspaper during 1924-1931, it secured a power increase to 5,000 watts and continued growing until it reached its present eminence of 50 KW. It is interesting to note that many of the personnel moving into *Columbia Square* have been with the station since its inception. Harry F. Felch, one of the old-time engineers, recalls an amusing incident when power was increased to 5 KW. Harold Isbel was on duty and, as a climax to a terrific buildup heralding the new transmitter, read a glorious blurb that ended with the exhortation, "Listen!" Felch plugged in the switch, but . . . the added extra wattage, coming from a different location and from equipment not completely adjusted, let out a howling, squeaking, raucous disturbance! The old ½ KW was immediately switched back on and weeks later the new power sneaked in. Harry Von Zell, they fondly remember, is also a veteran from this station.

KNX is considered to be the most modern radio station in the world today. Mr. Thornburgh, vice-president in charge of Pacific Coast operations, states, "Many stations have added new transmitters, or new equipment or new studios, but KNX is the only high-powered station in the country that is completely new from the tip of its



Allen Packard, Maintenance Supervisor for West Coast CBS, inspects the 5KW driver for the 50KW transmitter at Sherman Oaks.

KNX

transmitter tower, to the copper mats embedded beneath its new studio and office buildings."

The new KNX transmitter is situated about 18 miles from the broadcasting studios and was selected after exhaustive tests were made. The transmitter site consists of 37 acres in the El Nido section of Los Angeles, close to Redondo Beach. The transmitter, which is not yet completed, but is expected to be functioning perfectly in early August, will use an Ideco tower, 490-foot, guyed-type, vertical radiator, considered to be the most efficient yet devised. Under its base is buried a wheel-shaped net with the spokes made of 130,000 feet of copper wire similar to the ground beneath the studios at *Columbia Square*.

The RCA equipment, Model 50-D, 50,000 watt transmitter, will have a very high efficiency of approximately 65% as against the former 33%, considered usual. This is accomplished by the two tubes in the amplification stage. The new type water-cooled 898 tube having a 3-phase AC filament is coupled with the latest 891R air-cooled tube. This 5 KW air-cooled tube is the largest per KW ever built by RCA and is constructed with fins in order to radiate heat quickly. It looks like the cylinder of a motorcycle engine.

This completed transmitter, together with a few added features to astound the average layman, will be open to the public's gaze through a 40-foot panel of plate glass which fronts the elaborate equipment and will offer a panorama of winking signal lights, fluctuating indicators, and giant tubes. This



Some of the men responsible for KNX's success. Left to right: Engineers Felch, Bruck, Bowman (chief), French, Shephard, and Tashner. These men worked months to open on time.

is the first time in this writer's knowledge that a transmitter will be open for public inspection and study. Mr. Bowman, western engineer in charge, says that the public will be cordially invited to visit this department every day of the week and engineers will be on duty to act as guides.

A less apparent feature of the transmitter buildings construction is its unusual strength as protection against possible earthquakes. Extra thick walls, floors, and ceilings of reinforced concrete will be braced to withstand the most severe lateral shocks without disintegrating. There will also be installed an auxiliary gasoline power

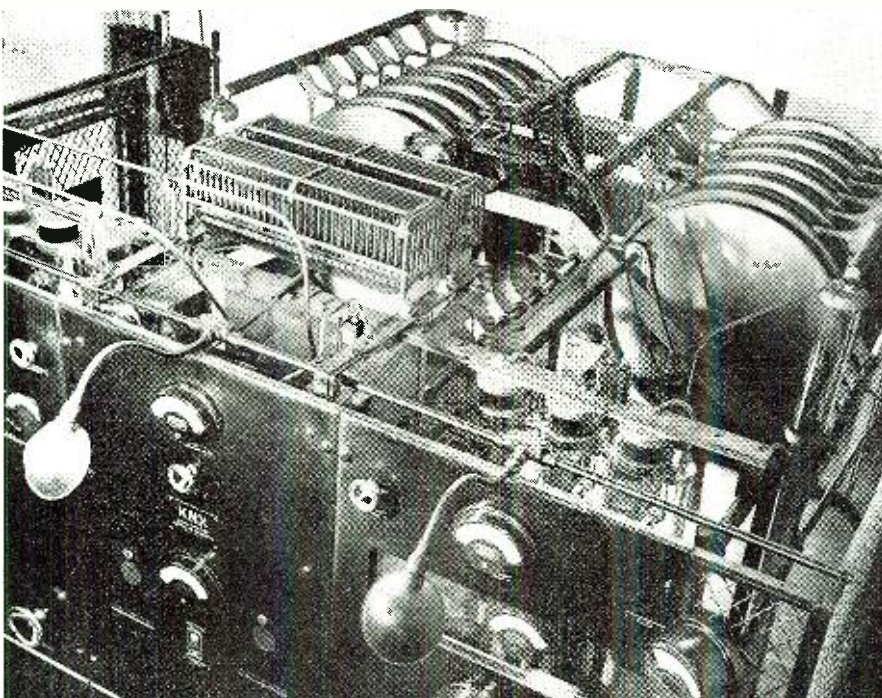
plant to guard against the remote possibility of a power interruption and to maintain service to the community in any critical emergency. Also, they will always be ready to assist the short-wave "Ham" nets working under the Major Disaster Control networks, as experienced during floods.

The same foresight governed the construction of the studios which cover a complete square block at *Columbia Square*. This group of buildings houses seven studios and two audition rooms, plus a theatre with a seating capacity of 1050 persons. There are various quarters for technicians on duty and space has been set aside in these buildings for experimental laboratories, for short-wave broadcasting facilities, and for television equipment, whenever that is needed. No television broadcasting, however, is contemplated right now.

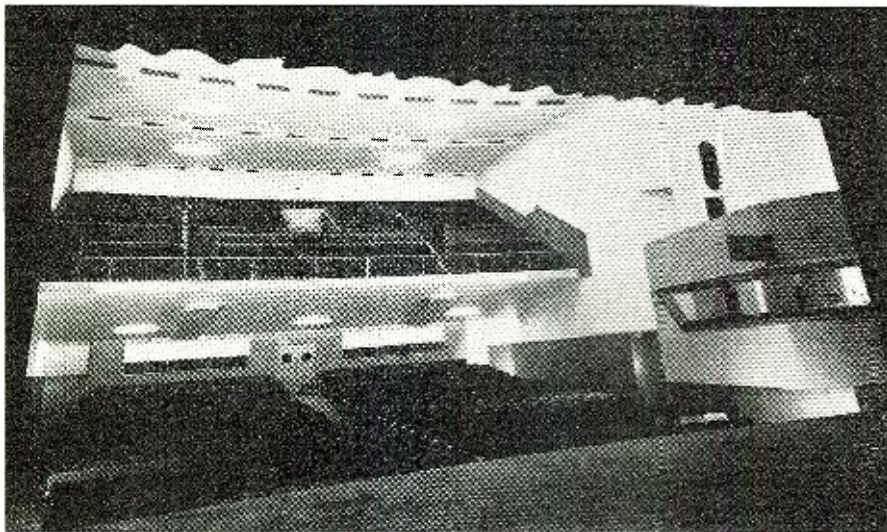
Echoes in these studios are eliminated by the slanting walls. Other noises are eliminated by sound-absorbent materials and insulation against outside noises. The studio floors and walls "float" on steel springs that act as shock absorbers and the entrances to the studios are formed by double doors which are in effect "sound locks."

All joints of the building's foundation are padded with thick felt which absorb any ground jolts. The supports of the balcony of the theatre are not rigidly anchored to the foundation of the building. Between the concrete of the foundation and the concrete of the balcony pillars is an expansion joint of roofing felt which will take ground jolts and will not disturb the superstructure.

Acting under the advice of Dr. Vern O. Knudsen, Professor of Acoustical Engi-



The big disks are air condensers and the glass column extreme right is an insulator. Somewhat different from that ham rig!



A huge stage without footlights is the main studio audience-theatre at CBS-KNX. Note the slant glass-enclosed engineer's control room, and clients' rooms at rear.

neering of the University of California, the architect designed the walls of the studios so that one is not parallel to the other. Even the windows of the monitor room are set at an angle. Sound reflected from any of these surfaces is thereby directed away from the microphone.

The monitor rooms are set out in front of the performers, which is a very novel treatment. It will permit technicians to monitor a program with greater efficiency since it will bring them face-to-face with the performer.

In order to create echo effects an unusual *Echo Cavern* or *Reverberation Chamber* has also been built in. When a radio play calls for a speaker to address a crowd in a large auditorium, his voice will be reproduced in this chamber and picked up from there by a mike. Other novel features have been added and from the level of modern standards for health, eyesight, and acoustical technique, it surpasses anything yet known.

Even the switchboard in the *Columbia Square* Master Control contains new innovations. One of these is the setting up of a channel in advance of a program and operating it off a single push button. Six

complete different channels can be preset in this manner and started simultaneously by simply pressing the push button. The actuating of relays on each channel affords flexibility and also eases the work of the technicians. Each complete chain of stations can be arranged beforehand and when all studios are ready to go, just the one switch controls them all. In this way, all measuring for any of the instruments in the various studios can be done right from the Master Control instead of carting equipment into each studio. Thanks to the open glass panels, the public will be able to observe these wonders of modern radio science, see the lights flashing on and off, huge oscilloscopes on top of each separate panel, mystifying and awe-inspiring.

Little did the farmer think his well-cultivated slopes of orange trees would become the site of this beautiful building fifty years later. Nor did David Horsley, who built the first film studio in Hollywood known as Nestor Film Studios, think that a few years later his spot on Sunset Boulevard and Gower Street would embrace the home of KNX radio station, a modern new miracle of entertainment.

-30-

One of the other studios where the engineer's control room glass slants to prevent glare reflection in performer's eyes. Room slopes inward for better acoustics.



ON THE COVER WE HAVE . . .

HOMER L. COX, of 633 N. Humphrey Ave., Oak Park, Illinois, is the junior op of Al Cox, Jr. One of the most unusual combinations of father-and-son, Al and his boy are both licensed hams. Al started way back "when" and received the call W9UAQ while his boy has the sign W9YJE. Each has his own rig and while Al is active on twenty and five with the mike, the son pounds the brass on forty.

A heavy but good natured competition has arisen between the two as to which can work the best dx, but as long as the youngster sticks to the forty meter band and the cw, our bets are on him.

The young lady with whom Homer kindly consented to pose in the special picture for *RADIO NEWS*, is a professional model, Claire Sargent. The cover is made from a kodachrome transparency of full colors. Over 5000 watts of illumination were used and the camera was a Retina II with an *f* 2 lens. Shutter speed was 1/50 second at aperture *f* 5.6. The cameraman was Henry F. Kroeger, Jr., of Chicago, Ill.

Not much information is available on W9YJE'S rig except that he uses a National receiver and that his input is in the neighborhood of 100 watts, crystal controlled, of course.

Homer attends high school where he excels in athletics and his hobby outside of ham radio is photography. While taking the picture, W9YJE'S hair caught fire from the lights; and the fuses blew out twice when Mrs. Cox turned on a kitchen light; all those other than those in use for the picture having to be turned off so as to keep the line voltage up to snuff.

Attention All-Wave Radio Subscribers

The last copy of ALL-WAVE RADIO you received was the June issue. Due to the difference in release dates this issue of RADIO NEWS INCLUDING ALL-WAVE RADIO is your next following copy.

In order to compensate for this, all subscriptions to ALL-WAVE RADIO, in effect prior to the merger, are being automatically extended by one month on RADIO NEWS' mailing list. You will therefore receive the actual number of magazines for which you contracted.

Eddie Cantor SPEAKS

by NORMAN D. MODEL
Chicago, Ill.

It is rarely that Eddie Cantor gives a personal interview and reveals just what the radio life of a comedian is. Apparently all is not easy with the funsters and no matter how many gag-men he has, he must work.

TAXI! Taxi! "The Sherman Hotel and step on it!"

Eddie Cantor was in town and I had been granted an interview. In less than an hour he would be rolling westward with his Caravan of writers and actors toward his home in the celluloid colony. The sooner I got to the hotel the longer I could buzz with the nation's favorite funster.

He was sitting on a sofa with a gathering of friends around him and his manager, Ben Holzman. In the opposite corner of the spacious reception room was Ida, the famed mother of Cantor's all-girl quintet. Though she was talking to Sophie Tucker, she seemed to be casting a weather eye in Eddie's direction. Eddie wasn't many days out of a sick bed in a New York hospital.

I was introduced. The old saying held true: that the first mark of a really big man in his faculty for putting lesser beings at ease as soon as he meets them. You can't help feeling friendly with Cantor.

"Mighty glad to meet you," I told him as we shook hands and then added, "I've been trying to get your ear for ages."

Clowning, his hands went to his ears in self-defense.

"I sent you a letter," I went on, "but it never got past your secretary. Say, you must have a ring of them around you in Hollywood."

He must have known what was coming next, but he waited for me to continue.

"You see, once I had the idea that I wanted to be a gag writer. Your secretary must be a pretty tough customer."

Cantor's eyes sparkled with humour.

"You must have got Form Letter Number 5," said Ben Holzman.

"No, no," Cantor corrected. "Number 6." He said it with a straight face too. Suddenly he went into action. I mean he talked. Talking for Cantor necessitates a wealth of gesture and movement. He jumped up from the couch. On the stage or in the parlor, he's the same Eddie Cantor, exuding energy like a living dynamo.

"Would you believe," he asked, "I get at least one thousand letters a week, and every one of them is from somebody who wants to come to Hollywood to be a writer or an actor, a singer or a comedian, or maybe another Gershwin? In order to answer

The banjo-eyed comedian at his favorite pastime talking to Mrs. Cantor or to one of his many daughters.



them at all, I have to keep a regular staff of four stenographers continuously typing out form letters."

"That's the trouble with being a goldfish," said Ben Holzman. "If Eddie had a day of peace, he'd think he was slipping. You ought to have seen the letters that came to him while he was in the hospital."

"Was that a hospital?" joked Eddie. "Then that girl in the white cap—she must have been a nurse. And all the while I thought she was a mail clerk. No wonder I had a fever!"

His shiny black pop-eyes rolled woefully as he shook his head from side to side in mock chagrin. Quickly he became serious again. "If it were only possible for me to help everybody that writes me, I'd do it. But how can I? I can only help a few undiscovered stars who happen to shine when I'm looking their way."

"That's a fact," corroborated Ben Holzman. "He would help everybody. And he's helped plenty too, let me tell you."

In my mind, I recalled the story of David Freeman, one of Cantor's former writers, whom he raised to enviable heights from the milling horde of unknown writers.

"Think of Bobby Breen," Holzman went on, "and Deanna Durbin, Parkyakarkus, Vyola Vonn, Hattie Noel, the Mad Russian."

"You were sick so many days," I said, "how did you ever jump right back into your program? You must have got out of bed on a Friday and you were back on the job Monday."

"Monday?" he shot back. "Oh, I see. You think all a comedian has to do is read over his script a few minutes before he's on the air and he's prepared. Oh, no!" His eyes widened dramatically as he shook his head in denial.

"But you have writers to prepare your gags," I protested.

"Sure. I have five of them." He got to his feet to make his statement more emphatic. "The comedians who have de-

pend solely upon their writers for gags—I could name them for you—are soon forgotten. The Bennys and the Allens (and the Cantors) do 75% of their writing themselves.

"There's a whole week's work, both night and day, before our show is ready for the air. That's why I haven't the time to convalesce. When I got out of the hospital, I went to work immediately with Sid Fields and my other scribblers to hatch a show for Sunday evening."

"I thought you went on Monday evening," I put in.

"If we waited till we were on the air on Monday, we'd hatch eggs. We always test our gags on a live audience. Sunday nights we have a regular dress rehearsal. We put on a fifty-minute act before a packed studio. When it's all over, we kill twenty minutes from different parts of the script, the spots the audience forgot to laugh at."

Listening to Eddie Cantor talk, I almost forgot that this was an interview. Everybody was grinning broadly watching the comedian prance up and down the floor as he spoke. The facial expressions he added to his conversation were like the salt and pepper that makes a bowl of soup savory. It's not an act either. When he's funny professionally, he's just being natural, as he is always.

Cantor went on, "That attack of influenza left me with a head dizzier than a spinning yo-yo. But I had to convalesce at a round table conference with my writers, arguing over what was the next best step for Hattie Noel. Even while I had the fever, my mind was playing over her romance with Spongy. You see, I have a problem in Hattie."

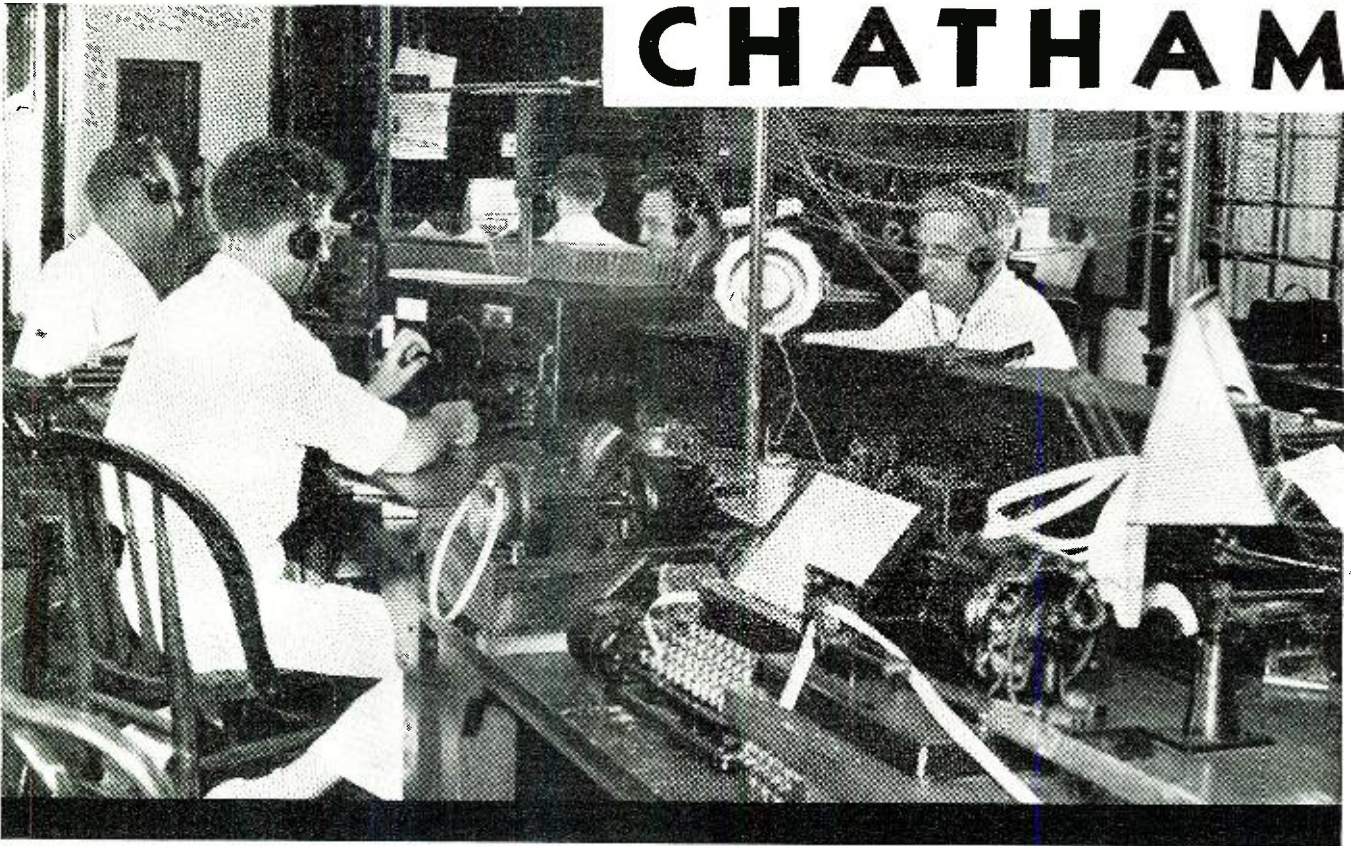
"How's that?" I asked.

"I have to be sure that we're giving Hattie the best material possible."

"Now waitaminit! I thought you were the comedian on the program."

(Continued on page 71)

CHATHAM



Chatham "talking" simultaneously to a dirigible, the "Queen Mary," and the "Kungsholm." The circler of paper in the foreground is a "V"-wheel-signal marking a frequency.

AWAY down on Cape Cod where Massachusetts bends her sandy elbow to the Atlantic, the marine radio station at Chatham stands guard over the sea. Here, on the outskirts of this little summer resort town, men sit with earphones clamped over their heads and listen day and night to the multitude of flying dots and dashes that come to them from all quarters of the globe. Though they be unknown and unrecognized, these men are real conquerors of space who can hurl the mighty voice of Chatham to the farthest corners of the earth.

In spite of the fact that Chatham's radio call-letters (WIM and WCC) may not be found on the dial of your broadcast set at home, they are familiar to ships the world over. WHEX, the *S. S. Monterey*, express liner running between San Francisco and Sydney via Honolulu, Pago Pago, Suva, and Auckland, can contact Chatham at any time of the day or night. The *Normandie* (FNSK) exchanges hundreds of messages with Chatham on every trip, as does her great rival, the *Queen Mary* (GBTT). The speedy *Conti de Savoia* (IBLI) out of Genoa, the *Bremen* (DOAH), the *Europa* (DOAI), and the *Kungsholm* (SMJA) talk to Chatham regularly. In radio language, ships and cities are always known by their official call-letters, never by their rightful names.

Although Chatham's list of marine customers reads like a blue book of international shipping, WIM also does business with thousands of lesser vessels whose names never reach the front pages: tiny trawlers off of the fishing banks, deep-laden tankers in the Gulf, sleek yachts in the

Caribbean, sluggish tramps in the tropics, fast freighters in the Mediterranean, and a host of other craft of all types and descriptions scattered over the seven seas.

The heart and nerve centre of "The Voice of Chatham" lies within the ivy-covered brick building at the foot of the hill under the mast. Here, in a sizable, well-lighted room, approximately nine operators are on duty twenty-four hours of the day, 365 days of the year. Their up-to-the-minute instruments are designed for communication with any radio-equipped vessel afloat, regardless of the type of apparatus it may carry.

Besides the twelve receivers there is a teletype system with simplex, duplex, and Western Union printers. These connect by direct wire to important cities such as New York, Chicago, and Boston. They feed a steady stream of messages into and out of Chatham, to and from all parts of the world. Then, of course, there are the keying circuits that control the nine transmitters (two emergency) which enable the station to communicate with as many as eight ships at one time.

The total staff consists of twenty-one operators, twenty of whom are married and live close at hand in the town, or else in cottages on the ground. Their regular eight-hour watches begin at midnight and alternate from time to time so that the hours of daylight may be equally divided between them. Each watch has its own supervisor, usually an "old-timer" who has many years of radio experience behind him. Every operator possesses a first-class commercial radio operator's license issued to him by the Federal Communications Commission.

Since most SOS, emergency, and ship traffic calls come in on the 600 metre band, this wave length is never left unwatched. One man always has his receiver tuned to it. For ordinary marine work ships usually call WIM on 600 metres and then shift to a higher, less frequented wave band where they actually receive or send their messages. In this way much interference from other stations is avoided. At the same time other Chatham operators work on various bands such as 2100 metres (the long-distance long wave), and 18 and 36 metres (the long-distance short waves). These last go farthest and are most efficient. Curiously, the 18-metre wave penetrates best during daylight while the 36 excels in darkness. However, short waves can be used only for contact with vessels which



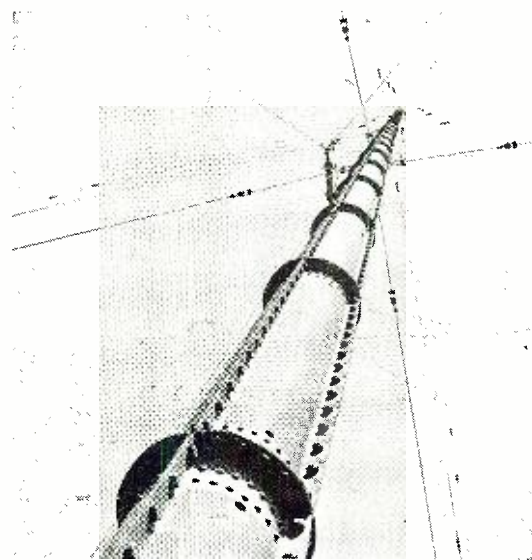
Fred D. Heiser, Manager-in-Charge of WIM.

R A D I O

Guards the Sea

by JOHN N. MEISSNER
Boston, Mass.

When an SOS rips through the air we read how such-and-such a ship went to the rescue. But usually that ship was called by Chatham, the watch-dog of the East Coast. Besides SOS's this station handles millions of words of traffic and clears messages from yachts, coast guard, warships, shore stations, and occasionally even medical information for stricken sailors.



The watch-dog's land mark, Chatham's steel tower which can be seen for miles around.

are equipped with short wave apparatus.

Every incoming signal received by WIM or WCC is picked up on one of the antennas at Chatham, but the outgoing ones are not transmitted from here at all. They emanate from Marion, 54 miles away. By simply throwing a switch, any Chatham operator can exercise the electrical magic of remote control that instantly puts into use any one of the seven powerful 40-kilowatt transmitters at Marion, Massachusetts. The connection is made by means of special control wires strung on telegraph poles across 54 miles of sand, under-brush and scrub-pine.

In summer a million vacationists see the fifteen, great, four-hundred-foot steel towers that stand silhouetted against the sky on Buzzard's Bay, but not one in a hundred thousand dreams that they are even remotely connected with Chatham over on the east side of the Cape. As a matter of fact, the original intention was to make the \$2,500,000 plant at Marion a separate point-to-point station for trans-oceanic communication only. Consequently, the famous Alexanderson alternators, about which there was so much controversy during the war, were moved there from Long Island for that express purpose. However, the plan eventually fell through and the present more practical arrangement was adopted.



Leslie H. Strong, Supervisor of the watch.

Inasmuch as it may be interesting to know how radiograms are transmitted to ships at sea, let us suppose that you want to send one to a friend on the *Queen Mary*. First you file your radiogram like an ordinary telegram at your nearest telegraph office: "HELEN LITTLE SS QUEEN MARY—SEE YOU THURSDAY LOVE—BILL." From the telegraph office your message goes by teletype to the Marine Bureau at 60 Hudson Street in downtown New York City. It is the business of this bureau to know the whereabouts of all ships at all times and to route your radiograms to them accordingly.

For instance, the bureau knows that the *Queen Mary* is a day-and-a-half out of Southampton and is already passing her westbound radio traffic to Chatham. Therefore, your radiogram is relayed by one of those automatic simplex printers to the radio room at Chatham where it arrives a surprisingly few minutes after it was filed in your local telegraph office. Should a Chatham operator happen to be working GBTT (*Queen Mary*) at the time it comes in, he will take it off of the printer, start one of his transmitters at Marion and send it by dots and dashes directly to the big liner where the receiving operator will type it onto a regulation radiogram form. A minute or two later a bellhop will deliver it to Helen Little on the *Queen Mary*. The whole operation from time of filing to time of delivery often consumes less than twenty minutes, in spite of the thousands of miles covered.

The charge for radiograms from shore to ship is high, but it is the same whether the vessel be in Boston Harbor or half way across the Atlantic. It amounts to eighteen cents per word, plus regular telegraph charges and federal tax from point of origin to Chatham. But radio uses the cable-count system which charges for both the address and the signature. Hence, the nine-word radiogram to Helen Little aboard the *Queen Mary* would cost \$1.89 plus the government tax and extra landline charges. But if we left out the unnecessary word "SS" (meaning steam ship) the same message would cost only \$1.78 including tax.

An intricate book-keeping system splits

up the charge in the following manner: three cents per word goes to the telegraph company, ten cents goes to the shore station and the remaining eight cents is credited to the *Queen Mary*. Large vessels sometimes gross as much as \$6,000 a voyage on radio traffic alone.

Thrice daily: at 9:00 a.m., 1:00 p.m., and 5:00 p.m., Eastern Standard Time, the Chatham-controlled transmitters at Marion are synchronized on all waves and the keen, high-pitched signals of WIM and WCC wing their way from sea to sea as Chatham's "CQ" (call to all ships and stations) goes 'round the world. At those hours seagoing wireless operators everywhere drop whatever they may be doing and listen to Chatham's dots and dashes as they spell out long lists of call letters belonging to ships for which there are messages.

Although Chatham does the bulk of her business in straight paid radiograms, she also renders many other services. Among them is that of furnishing Cape Cod Canal and local weather reports to ships requesting them. Another important service offered by Catham Radio is the free transmission of medical advice to doctorless ships. Because the larger passenger and government vessels are the only ones that carry physicians, there is a very real and constant need for expert medical aid.

In the old days the skipper administered simple first aid and let it go at that. Now WIM or WCC at Chatham takes the responsibility. As soon as a detailed description of the case is received, Chatham puts it on the New York land wire and speeds it down to the U. S. Marine Hospital in New York. If the matter seems sufficiently grave several staff doctors go into a conference and diagnose the radio symptoms. When they arrive at a common conclusion they return a clear-cut message of instructions which they send back to Chatham. WIM then quickly flashes this to the captain of the stricken man's ship.

Medical messages are prefixed with the word "MEDICO," which gives them right of way over everything but SOS and other distress calls. They are handled without

(Continued on page 65)

BING CROSBY, INC.

by WICK EVANS

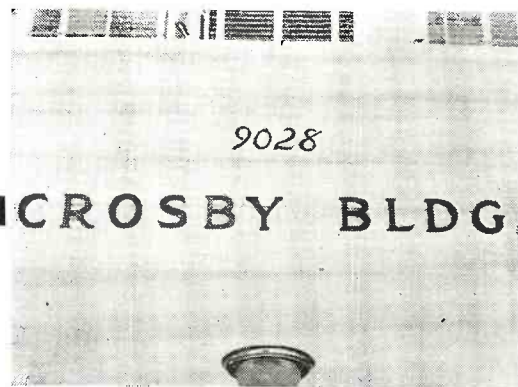
Hollywood, Calif.
Special Feature Writer for RADIO NEWS



The man whose voice founded an amazing business enterprise.



(Left) H. L. Crosby, Sr., Bing's father, treasurer of the Company and associated with the Crosby Investment Co. (Center) Brother Larry Crosby in charge of publicity and radio talent. (Right) Everett, Personal Management.



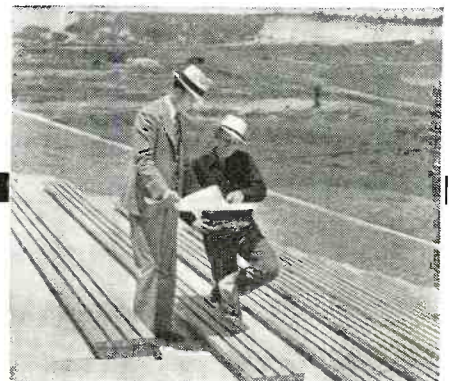
The Crosby Building is the home office of all of Bing's numerous businesses.



John Scott Trotter (Crosby management) and Bing rehearse for "Kraft Music Hall."



A 40-acre farm, "Rancho Santa Fe" near Del Mar, Cal., is used for horse breeding.



The radio-screen star's Del Mar race track is one of his many businesses.

NOT so very many years ago Bing Crosby missed being a complete washout on his first national broadcast by less than a hair's breadth.

Today he can do as he pleases, either on the radio or screen. It's a pretty safe guess that Bing Crosby could completely disappear from the public eye, and still make not only a comfortable living, but one nearly as great as his present income—in other words, one that would keep him in the manner to which he has become accustomed.

To return to the first statement, Bing's first national hookup appearance was nearly a total failure—although not directly his own fault. It happened like this. Bing and his brother Everett, together with their respective wives, had gone to New York. The trip was Everett's idea. He felt that Bing had reached the point in popularity where New York would receive him with open arms.

The arms weren't as wide open as he had thought, but he did succeed in signing a contract with CBS for Bing to appear on a sustaining program to the tune of six hundred bucks each and every week.

There was great rejoicing among the foursome when Everett broke the great

Illustrated here are some of the various enterprises of Bing Crosby, Inc., made possible by an unusual voice.

— The House A Voice Built

Here is the amazing story of a voice that started in a college band, raised itself to the heights of radio popularity, and founded a successful business that is startling in its diversified enterprises. The author shows you Crosby, the corporation, in this exclusive story published for the first time by RADIO NEWS.

news—and everything went grand until 2:30 in the afternoon of the rehearsal.

Bing sang swell for a time, but was dismayed to find some of his notes growing sour. Soon after that he discovered that he could not have sung a note if his life had depended upon it. A voice specialist, to whom Bing was immediately rushed for diagnosis, informed him that his vocal cords were haywire in some way, that he probably wouldn't sing for weeks. They decided that a golf game Bing had played in the rain, plus strenuous vocal efforts had done the "dirty work."

It was announced that night that Bing was ill and that he would appear the following night. But he did not appear for some nights later. Against his better judgment, for he thought his voice was shot completely, he allowed his brother to talk him into going to the studio for a tryout. The result was that he went on the air, with "fear and trembling," and made the grade.

In order to present a clear picture of Bing Crosby, and his business which has grown out of his radio popularity, it is necessary to relate something of Bing's early life by way of contrast. Life has not

always been "beer and skittles" for him. Not by a whole lot.

Bing was born in Tacoma, Washington, May, 1904. He was named Harry L. Crosby. The "L" stands for—of all things—"Lillis."

When Bing was almost too young to remember, the family moved to Spokane, Washington. It was there that he earned the sobriquet of "Bing." The reason? Simply that in playing that good old childhood game of "Cowboy and Indian," he managed to shout "Bing, Bing Bing," louder than any other kid in his block as he mowed down the pesky redskins.

Followed then the usual ups and downs of childhood—during which time Bing became a city swimming champion—and finally he was ready for college. His family thought he would make a pretty good lawyer, so they sent him to Gonzaga College.

Bing was soon making more of a reputation in college as a singer than a student of Blackstone. The enthusiasm with which some of his solo numbers with the college glee club was so great that he got an idea. He and a friend, Al Rinker, organized a seven-piece band. Bing played the traps

and he and Rinker sang. There were a number of engagements, and plenty of times when there were none. Al Rinker and Bing decided to make singing their career, so they came to Los Angeles, Rinker had a sister with "contacts," and Bing's brother Everett had a job selling trucks.

They finally succeeded in getting an engagement at a cafe, which, incidentally, was owned by Mike Lyman, brother of Abe Lyman. After their first engagement—their act was called *Two Boys And A Piano*—they toured the Pacific coast in vaudeville, again winding up in Los Angeles.

During the period that Bing and Rinker were playing at the Metropolitan Theater, Paul Whiteman was playing an engagement at the Million Dollar. The famous band leader caught their act one afternoon, and liked their work with the result that he signed them to appear with his band.

Crosby and Rinker went East with Whiteman, and were joined there by a third vocalist. His name was Harry Barris. This was the beginning of the *Rhythm Boys*, a team that was soon famous from coast to coast.

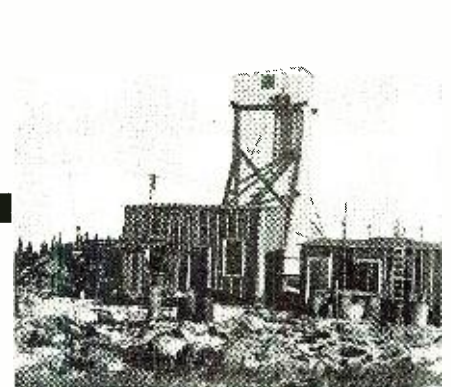
(Continued on page 56)



Bing buys part of every picture he makes. To date not one of them has lost money.



Bob Crosby, another of Bing's brothers has his own orchestra and is in "big time."



Gold, silver and lead mines in British Columbia add their bit to Crosby dividends.



Horses from Bing's stables are well known at Santa Anita track and sometimes win.



Part ownership of Freddie Steele, middleweight champion, is yet another activity.



The Select Music Corp., founded by Bing, publishes songs and makes his records.

"STUDIO BRIEFS"

by SAMUEL KAUFMAN

A PROMINENT New York clubwoman recently told me "off the record"—so I can't use her name—that her group was about to launch a series of sustaining programs on a coast-to-coast network that would be chockful of "good propaganda to offset bad propaganda." Her sincerity and intentions may be of the best, but her plans may prove a boomerang. Her particular intent is to aim thrusts at the dictatorship nations and, by dramatic comparisons, show the advantages of democracies.

She illustrated her technique with the following specimen script lines:

"Why don't you eat your food," a mother would say to her child.

"I don't like it," would be the reply.

"If you were in certain parts of Europe, you'd be glad to have it," the mother would argue.

She boasted that such lines would be deftly inserted so as not to be obviously intentional. This column is certainly not the place to discuss the merits or faults of the clubwoman's logic. But we don't think American broadcasting should be used for hidden propaganda of this type. If a similar script was used elsewhere with a reversed line of reasoning, the same woman would undoubtedly organize mass protest.

The side taken doesn't matter when it comes to eliminating disguised propaganda from the air.

Viewpoints on public questions are okay for the air. A radio speaker makes his program most interesting when he speaks his mind without pulling punches. But he should make no bones about it. When his message is subdued so as to be "slipped over," the listener is being cheated. The listener tunes-in in the best of faith and the broadcaster should conduct his program in the same spirit.

* * *

TELEVISION demonstrations in New York—of which there have been very many recently—are all subject to prefatory remarks on the parts of the demonstrators.

They might explain that, due to traffic interference, location of antennae, atmospheric conditions, etc., the picture might not be up to the desired mark. Such advance rationalizing is to be expected at this stage of television development. But it took O. B. Hanson, vice-president and chief engineer of NBC, to satirize the procedure by giving the strangest reason yet for a bad picture.

Just before a recent NBC-RCA press demonstration, "O.B." was heard kidding a spectacled newspaperman by telling him to wipe his eyeglasses so that he wouldn't blame any of the stains and streaks thereon on the television reproduction.

* * *

NEW YORK hotels featuring "radio in every room" will soon realize revenue from a new source when the plans of an ambitious promoter blossom into reality.

An enterprising fellow, we hear, sold the leading hosteleries of the metropolis on the idea of selling announcements to local advertisers. Under the plan, a mike in the hotel will be cut in on the master radio circuit between broadcast periods. For example after hearing Rudy Valle's Varieties on a Thursday night, the hotel guest will hear about a current sale at a local department store before the room loudspeaker will resume with the Maxwell House "Good News" feature.

This is a procedure that broadcasters undoubtedly won't relish. They like the flow from a loudspeaker to be unadulterated; they like the listener to hear station identification and all. But the guess of experts is that there's little they can do about it.

* * *

WE made a trip out to Farmingdale, Long Island, one recent night when the Army Air Corps conducted its first "blackout" defense maneuvers. All three nation-wide chains—NBC, CBS, and Mutual—had mikemen on the scene to convey to the nation a word report of what was happening—just when it happened.

But we left with the impression that radio will certainly have to alter its war coverage technique if that demonstrated during the blackout was a fair sample.

The important thing of a blackout defense—as the name implies—is to have all lights out in a solid designated area so that attacking bombing planes can not locate their objective. In this instance, the test objective was the Seversky airplane factory.

At the commanding officer's word, all lights in Farmingdale went out. Nary a lamp, headlight, or match was to be seen. But there was one exception to the order. A bright bulb held in a radio announcer's hand, so that he could read from prepared script, made the officer's observation plat-



Televising "The Mysterious Mummy Case" during the NBC demonstrations of experimental television for press members.

form stand out prominently in the dark!

THERE'S talk of some dissension in the radio ranks over the Women's National Radio Committee's annual awards.

This year, the committee decided to make a single award to the year's outstanding series. The distinction went to *America's Town Meeting of the Air*. There was general trade accord over this, although there were a few broadcasting executives who previously believed the honors would go to the NBC Symphony Orchestra.

Although there was but one award, there were many honorable mentions. And some critics claimed that the *Rising Musical Stars* series should not have been on that list because Mme. Yolanda Mero-Irion, chairman of the committee, was identified with that program. We disagree on that point. That fact in itself should not disqualify a program from consideration.

But it is held that the committee's annual awards are losing the kick they once had. They once seemed like the Pulitzer Prizes of radio, but they are now losing weight. Thus far, though, they are the most widely recognized program ratings.

We hear that the New York newspaper radio editors are considering organizing into a unit like the New York Dramatic Critics Circle to award their own prizes to outstanding air performers. A few of the writing lads are interested but nothing has come to the plan as yet.

* * *

FROM Philadelphia, we hear that the dedication of KYW's new \$600,000 building was the occasion of a period of festivity that lasted for several days. Special broadcasts, newspaper supplements, cocktail parties, dansants, etc., studded the celebrations arranged by Westinghouse—the owners—and NBC—the manager and operators. The event was planned far ahead and, while termed successful from every angle, it did lose some of its local importance due to being sandwiched in between two of the biggest events in the Philadelphia news year—the primary elections and the dedication of the Benjamin Franklin memorial. If the opening was scheduled for a period far and apart of the other events, much more fanfare and publicity would have been attached to the new building.

* * *

NBC—Chicago Briefs

FIFTEEN hundred hours on the air, playing a diversity of roles, is the record of Harry Humphrey of the *Death Valley Days* program. And in addition to his work as an actor, Humphrey also boasts a reputation as a playwright, having written *The Skull*, which was successfully produced in New York and London. At present the NBC actor is completing another play which he started to write in collaboration with William Gillette, a short time before Gillette's death.

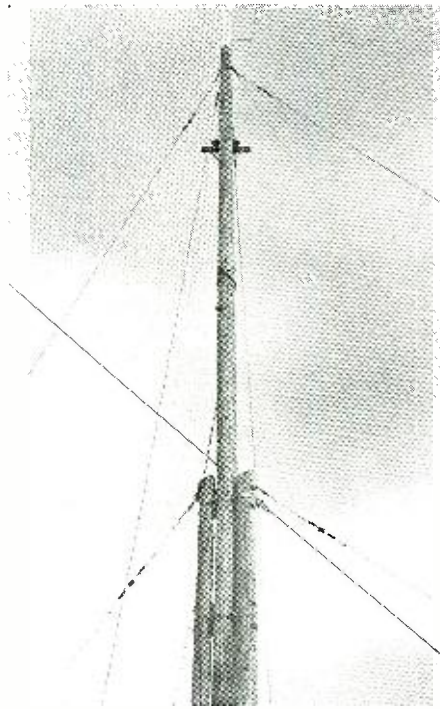
There is a veritable epidemic of attractive gray hats about NBC and all the result of a Texas radio celebration. Lenox R. Lohr, president; Niles Trammell, vice president in charge of the Central Division; Gene Arnold, interlocutor of the NBC *Minstrels of 1938*, and Don McNeill, master of

(Continued on page 59)

PROPAGANDA IN LATIN AMERICA

by CHRIS MATHISEN

"The Evening Star—The Sunday Star," Washington, D. C.



American Short Wave Stations use this type antenna for South American signals.

WILL that tenet of this country's policy with respect to its hemisphere, the Monroe Doctrine, be invoked in taking official cognizance of an insidious invasion of the nations to the south? Will the Department of State hold this venerable document up against the encroachments of other nations upon the prestige of the United States in South America via the radio waves? There can be no positive answer as yet, but it is evident in Washington that more than a little concern exists in the higher circles, occasioned by the directionalized propaganda broadcasts that are sprinkling their indoctrinating verbiage upon the aerials of listeners on the neighbor continent.

And well they might, for England, Italy, France and Germany have concentrated beams which present the danger of "sister republics" becoming an outmoded designation. Although their effect upon the recent change in the form of Brazil's government can be no more than the subject of conjecture, the fact remains that "totalitarian state" no longer is a purely European phrase. Broadcasts which foster that philosophy are, at the least, not an agent for increasing the preeminence of this country and its principles of fair play among the Latin American nations.

What is going to be done about it, if anything? Government bigwigs are only too well acquainted with the principle of "saving face" and that its importance in this vicinity is no less than on other parts of the globe. Possessed of the most extensive propaganda corps in history, the pres-

ent administration is placed in a delicate position with respect to sending it forth to battle on an international front. Propaganda is a particularly noxious word to the average American citizen, and any straight-forward step in the direction of admitted inculcation efforts on the part of the federal government would be fought with grave political peril for its leaders. They realize the possibility of any attempt to impress the public with the counteractive quality of such efforts not "taking."

Last year, Rep. Emanuel Celler of New York introduced a measure in the House of Representatives providing for the establishment of a super-power radio station to be built and operated by the government and used for placing the United States on equal footing with other nations in the matter of facilities for spreading explanations of our brand of democracy. There has been no action on this bill and, while some support has evidenced itself in officials, it has not been the militant sort of support necessary in order that such a piece of legislation might be brought out of a pigeonhole and sped to enactment.

That the Department of State would have no objection to playing a part in the operation of such an instrumentality is certain, but no plea has come or seems destined to come from the dingy building on Pennsylvania Avenue that houses the headquarters of this country's diplomacy. "It is not the American way," is the summing-up statement. The United States will not take a hand in the international propaganda game with blatant outbursts.

The Washington powers-that-be are not content to do nothing, however. Indeed,

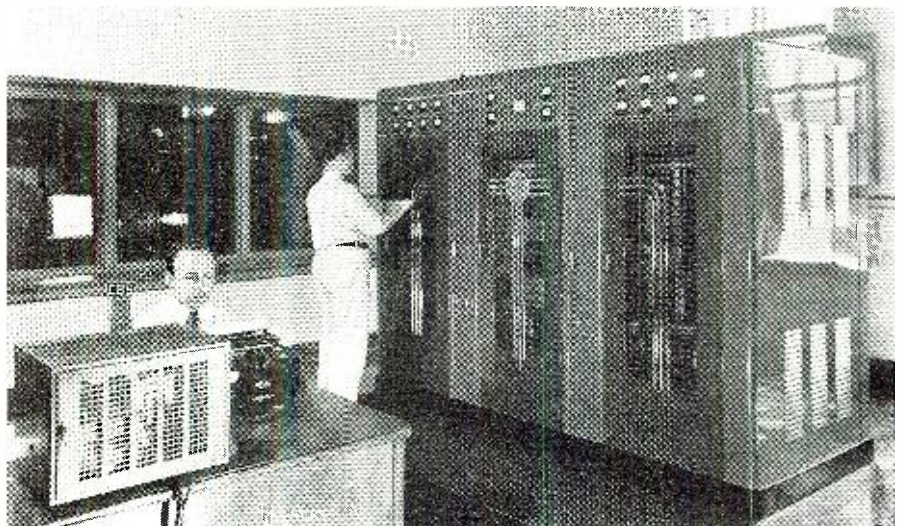
they have been doing something—in the *American way*. That way appears to be an effort to build up good-will indirectly—not through a continual expounding of the virtues of our type of government but by a species of flattery. Such was the psychology of the program series presented during the past fall and winter by the Bureau of Education of the Department of the Interior.

These broadcasts extolled the progress of the Latin American nations, dramatized stirring episodes in their history, eulogized their leaders down through the years. The results were most gratifying and crowned with impressive success, according to those responsible for the series; the United States' first experiment over a period of months in increasing *understanding* with other American countries. That is the course that has been charted, and nothing has appeared on the scene in the Nation's Capital which points to an altering of that course.

In other words, the defense mechanism against the efforts of other nations to weaken the bonds among the Pan-American countries is taking the form not of telling or counselling, but of pointing with pride—of saying "everything is fine" rather than "things would be better if—"

The Kingfish's motto, "We Is All Brud-ders," is the byword of the Department of State with regard to South and Central America. Any efforts to heighten regard for Uncle Sam will continue to take the form of "good neighbor" broadcasts, but broadcasts by an equal neighbor with equal interests—not by a protecting neighbor.

(Please turn to next page)



Will W2XE (right) be the alternative to the invocation of the Monroe Doctrine?

Most important step taken has been the allocation of several of the so-called "Pan-American frequencies," allotted to the United States at the Havana Conference, to private interests, the General Electric Co., and the World-Wide Broadcasting Foundation. Not effort has been made to dictate the program policies of these organizations, for it is evident that the government feels that they can do the most good in building up the good will without direct propaganda. The World Broadcasting Foundation presents only *cultural* programs and champions peace. It is considered the strongest agency at present doing the job *the American way*.

The future will bring little change in method unless the viewpoint of those entrusted with the choosing of methods changes radically. Enactment of the Celler bill or a similar measure would not alter it. Such a super-power station would be treated in the same way that the existing non-commercial stations in this country are treated by their operators. Every effort would be made to provide features of interest to the listeners to the South. No effort would be made to jam any ideology down their throats.

The Department of State believes that it holds the upper hand in this hemisphere with its "good neighbor" policy, if full effectiveness can be gained from that policy. The only danger, it is felt, lies in the possibility of foreign broadcasts building up an antagonism against the United States by implying that its motives are purely selfish and that the smaller nations of this part of the world would do better by ceasing to regard it as Lord High Protector. This is the object of all counter-propaganda efforts.

The United States never will be the possessor of a loud counselling voice in radio propaganda. The only positive propaganda will continue to be rebroadcasts of important addresses of government leaders **WHICH ARE HEARD IN THIS COUNTRY AS WELL.**

-30-

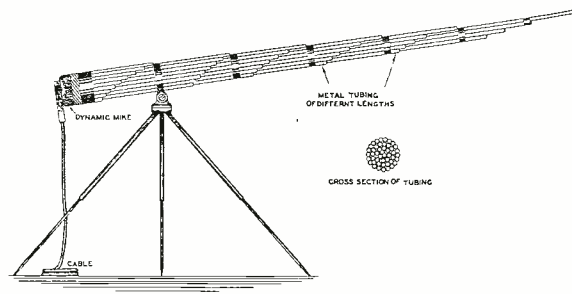
HAMS, SERVICEMEN AND BROADCASTERS, ATTENTION!

Always ready to advance the general radio art, RADIO NEWS conceived the idea of finding a sentence which would at once contain all the vowels and diphthongs of the English language. For this purpose it retained the services of D. Doob, B.A., M.A., teacher at Hunter College, N. Y. C. The sentence to be used to test amplifiers, transmitters or any acoustical device is:

"THE FEATURES OF RADIO NEWS CAN HELP ALL ALERT ANNOUNCERS ENLARGE THE SPHERE OF THEIR KNOWLEDGE ABOUT CHOICE CURRENT IMPROVEMENTS, VITAL TO GOOD BROADCASTING."

To use, speak this sentence slowly and carefully into the microphone. If the output response is clear and legible, the device "passes" all the sounds of the English language without frequency loss.

"Machine Gun" Mike



The "Machine Gun Microphone" is the opposite of the "Ears" used by the U. S. Army to detect enemy airplanes. The reason lies in the fact that the Machine Gun Mike must be aimed at the sound, while the Army's unit will pick up any sound in a wide radius.

THOUSANDS of spectators at Farmingdale, L. I., where a test blackout darkened the town as air "raiders" recently carried out a mimic attack, watched without blanching as cannon boomed and the mythical enemy bombed.

But when the Columbia Broadcasting System's new "machine gun" microphone was pointed in any individual's direction he ran for cover.

What they failed to realize was that the principles of sound established by the nineteenth-century German physicist and physiologist, Baron von Helmholtz, on which the microphone is patterned, do not provide for anything like a projectile. The "machine gun" mike is so called only because it resembles the weapon of warfare in appearance, but not in action.

Mounted on a tripod, the mike consists of almost 100 tubes, varying in length from 1½-inches to more than 3½-feet, all spiralled into a telescopic effect. They taper off from a wide end which contains a dynamic microphone, serving as a hundred "ears" to pick up distant sounds for transmission on the air.

It is aimed at the action desired to be picked up much in the manner of field glasses. As glasses magnify the visibility of distant objects, thus does the "machine gun" mike catch and amplify sounds in its tubes, transferring them to the dynamic microphone.

The mike was given its first trial at Columbia's broadcast of the Kentucky Derby where it was used to pick up the sounds of hoofs on the turf, cheering in the stands, and other noises common to racing.

The Farmingdale maneuvers offered another outstanding opportunity to capture in sound the most minute details of a public event. Frank M. Evans, CBS field engineer, took the device out there in a special case and set it up outside General Headquarters near where Bob Trout was broadcasting his description of the "war."

After spectators recovered from the fright of mistaking Evans for a ruthless machine gunner out to annihilate them, they approached the mike with a good deal of interest. The engineer calls it more properly an "acoustic impedance unit" and explains that it follows the "Helmholtz resonator principle."

Those who pressed Evans to "tell us in English what it is" found it easier to understand when the engineer drew comparisons with an ordinary whistle, a xylophone, the muffler of an automobile, and a gun silencer.

Each tube, he said, vibrates to a particular tone. By blowing across the aperture of an ordinary pipe a whistling sound may be produced. The tone of this sound varies according to the size of the pipe. Each pipe amplifies the sound it receives according to its size, and each tube of the microphone serves this purpose.

The musical instrument, the xylophone, is another illustration. The varying sizes of the tubes suspended below the key board receive and amplify the xylophone tones according to their capacity for resonance.

In the cases of the automobile muffler and gun silencer the principle is effected in reverse. By a system of tube-like curves within a small compartment the vibration of tones, or explosions in these cases, is reduced to a minimum.



The operator "aims" the mike directly at where he thinks the sound comes from.

Thus, each of the tubes in the "machine gun" mike catches such sounds as it may be said to be "tuned" to get. The instrument as a whole is of course trained in a direction which will expose the open end of the tubes to the sounds they are suited to attract and amplify.

In order to establish the precise direction in which to train the instrument the operator wears earphones. The mike is of little use for picking up a single voice or a band close at hand, since it impairs the quality of the sound. However, it is unequalled for directional work and Columbia engineers are well pleased with the early results from these experiments.

-30-

RADIOPIX

A page devoted to pictures of the ham's, dx'ers and experimenter's activities.



George Barnich
W9KQH.

E. P. Kelly, Jr.
W9HPW.

Sam Poncher
"Newark's."

"Dar" Appleton
W9LBJ.

"Bill" Ray
NBC Press.

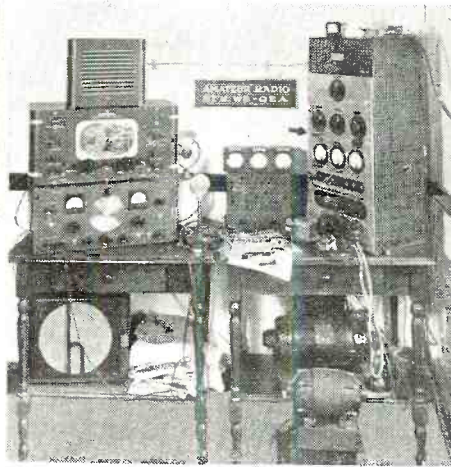
B. E. Philippsen
W9CRG.

Ed. Rogers
W9YUR.

EVERY Friday evening, the Editorial Rooms of RADIO NEWS are thrown open to the hams, dx'ers, experimenters, broadcasters and anyone interested in radio. So far there have been many hams who have taken this opportunity to visit with other amateurs and the discussion is lively on the important issues of the day from the latest ARRL development to what is happening at Washington. Pictures of some of the visitors appear above.



H. Von Jenef
W9NWJ.



The shack of Ye Managing Editor of R.N. The arrow indicates the variable 3.5 mc. crystal.



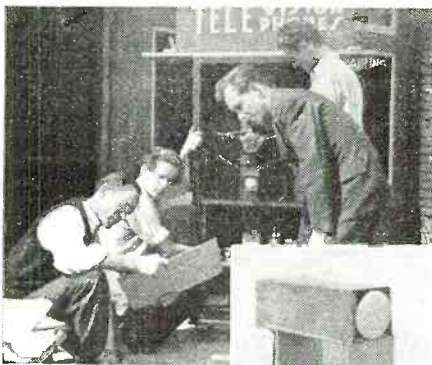
Harry Harrison
W9LLX.

nishing juice for the filaments and Class B modulator plates, and the other of 500 watts capacity which provides the voltage for the final plates.

The plate voltage for the speech, xtal, and buffer stages is supplied by the 300 watt genemotor also.

There are two receivers in operation, permitting double duplex testing with W9XZK, the local police station, and W10XHI, mobile rig of WBBM. One is the Howard 450 receiver and the other a Hallicrafter SX17; a.c. for the receivers is made by a vibrapack.

The antenna is 300 feet above the street, and 18 feet above the roof. It is a half-wave doublet fed by Bassett concentric cable. The input is 170-200 watts and the only band used is twenty meter fone.



Members of the Hollywood Television Soc. exhibit their newest receiver. (See inset).



John Peter Gawel, Buffalo, N. Y. is a DX fan who has heard 29 countries, 20 zones.



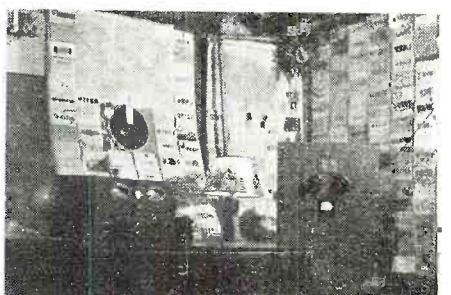
Panhandle, Tex., gives us Sam Graham who has veries from 46 states and 30 countries.



Lyle W. Wood, W9KQA, Ironton, Minn., has this very fine amateur station. Works fb dx.



Here is a picture of a real DX fan who started over 20 years ago; Oliver Amlie.



Ralph Dage, W8PHZ, Highland Pk., Mich., who has worked 45 states with his 160M fone.

Radio Lands the

With the new radio control described here, planes can land without pilots touching the controls.

TRANSPORT airplane operation never could have reached its present status without the aid of radio. Radio beacons guide the planes over land and sea when earth and sky are blotted out by clouds or fog. Unerringly they lead the air clippers over seemingly endless miles of ocean where navigation is difficult even in clear weather because of drift, speed, and motion of the plane which interfere with celestial observations and precise calculations.

Two-way communication between airports and planes in flight bring the pilots frequent weather reports, landing and take-off orders that prevent collisions in the air, and other information pertinent to flight operation.

Pilots of a fully-equipped transport plane have eighty or more instruments and controls to watch and to operate. These impose mental strain and physical fatigue,

particularly in bad weather, that are inimical to safety; hence the pilots have insistently asked for simplification of control. When thick fog or a heavy snowstorm blankets an airport, flights are cancelled because of the hazard involved in manual control under such conditions.

These facts led to the beginning (three years ago) of development work to simplify landing under bad conditions by making it automatic. This has now been accomplished with notable success. Many excellent landings have been made under a variety of conditions without the human pilot touching the controls. The method was made possible by a combination of radio and a robot pilot. Full details of the equipment are unavailable at present, as the apparatus is still undergoing development and has not yet reached the commercial stage and application on regular transport planes, though it probably will be in use in the near future.

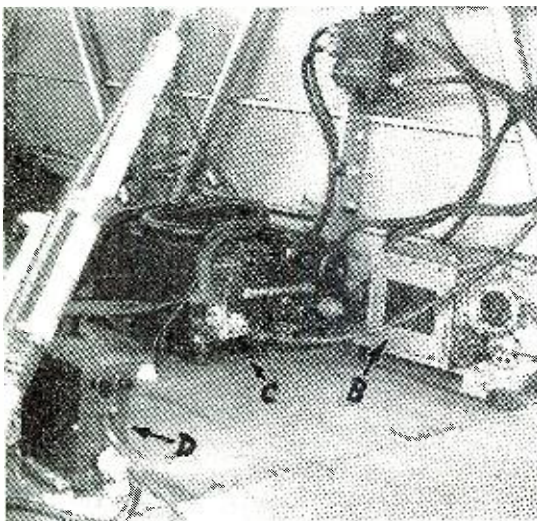
However, already three-quarters of the mileage (in level flight only) flown by airline transports is now done with robots in control of the planes. These mechanical pilots automatically operate rudder, ailerons, and flippers to keep the plane on course at the required altitude, and laterally balanced. They maintain more accurate and smoother flight than human pilots do, particularly in bumpy, gusty air, and relieve the latter of much tiring mental and physical effort. Twenty-two airlines, comprising most of the principal ones in the world, are using these automatic pilots on ap-

proximately 1000 airplanes in service in this country and abroad.

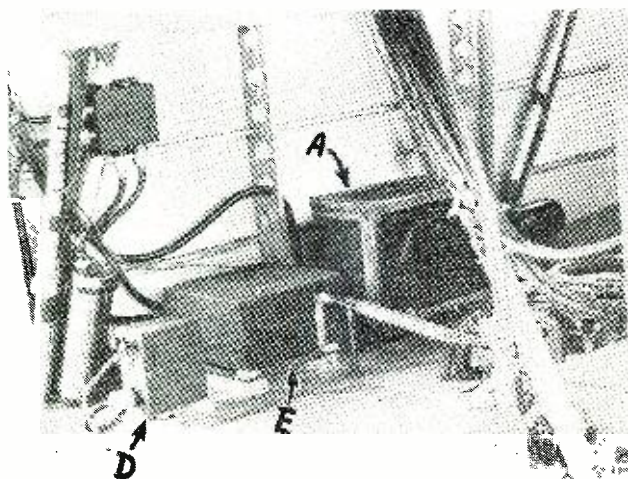
Automatic landing, however, requires much more than maintenance of direction and level flight, and it relies almost wholly upon radio. Two different experimental methods are employed, one by the Army Air Corps at Wright Field, Dayton, Ohio, and the other by United Air Lines Transport Corporation. Both utilize radio transmitting equipment at the airport and receiving equipment in the airplane in combination with the mechanical pilot. The method employed by the Air Corps is entirely automatic, with direct connection between the radio equipment and the automatic pilot, while that used by the airline involves manual adjustment of the robot control knobs to follow radio indications down to a landing.

The Air Corps system employs a series of Z-type radio range beacons located at intervals in line with the axis of the runway and extending for a distance of about five miles from the port, as in Fig. 6. Each range beacon emits waves on a frequency different from the others. In the airplane is a radio compass (C in Fig. 1), which receives the directional signals from the airport and is connected with a relay (B in Fig. 1) that interlocks it with the directional gyro to keep the plane headed directly for the port. A range beacon receptor (D adjacent to relay B, and a frequency selector (E in Fig. 2) working in conjunction, automatically set the frequency of compass (C) as the plane passes successively over each range beacon and operates an altitude-control device (A). Correctness of the automatic settings is indicated on a frequency-selector indicator (F in Fig. 3).

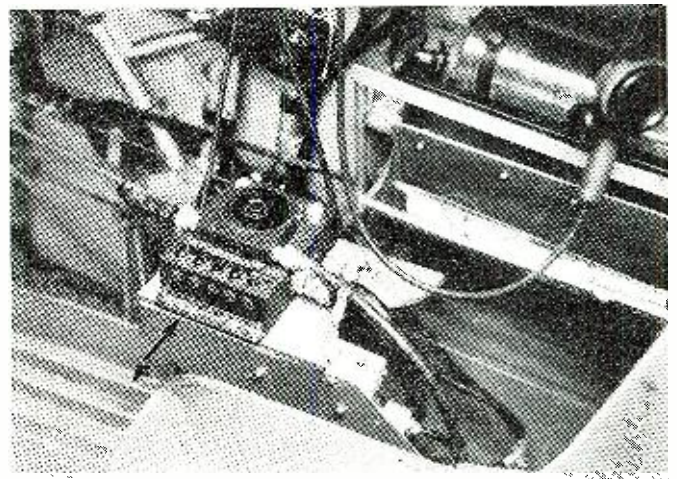
When the airplane arrives within twenty miles, or less, of the airport, the human



1 Radio compass (C) connected with relay (B) and beacon receptor (D) locks directional gyro.



2 Beacon receptor (D) and frequency selector (E) sets the frequency of radio compass; operates altitude control (A).



3 The frequency selector indicator (F) shows the correctness of the automatic settings of the radio compass (C, Fig. 1).

Plane

by HARRY WILKIN PERRY
East Orange, N. J.

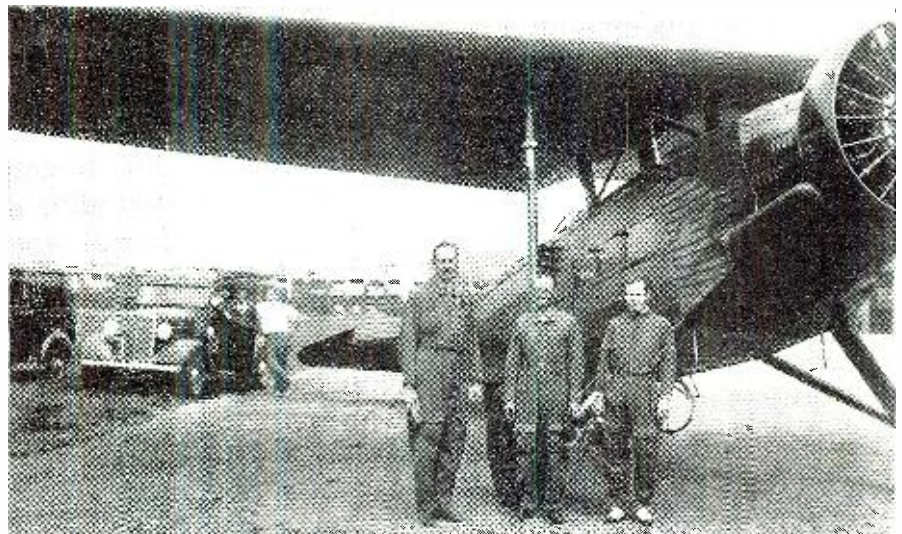
pilot places it at a selected altitude and closes a master landing switch. The altitude is then maintained automatically by the mechanical pilot, and if the plane is not headed directly for the port, the heading is altered automatically so that it flies in the direction of the radio landing beacon. Upon reaching that beacon, the frequency of the compass is automatically changed by the receptor and the selector to the frequency of the next inner beacon, and so on to the final marker landing beacon whereupon the plane comes in to a gentle landing.

These successive frequency changes actuate a throttle control (G in Fig. 4) which responds to partly close the throttle of the airplane engine, thus reducing speed for the landing glide. This throttle control is interconnected with the altitude control so that the minimum height necessary for automatic landing is maintained throughout the glide. Each successive beacon actuates the throttle to control the angle of glide and the rate of descent until ground contact is made.

Finally, switches on the landing gear are connected with the throttle control. When the wheels are set down on the runway, they operate the switches automatically and cause the throttle of the airplane engine to close so the engine will idle and also simultaneously set the wheel brakes to bring the plane to a stop.

It was, of course, necessary to make some addition to the mechanical pilot to provide for these automatic controls by radio. In the cockpit installation (Fig. 5) the mechanical pilot is shown at J, the master landing switch at 1, and the auxiliary reset switches at 2 to 5.

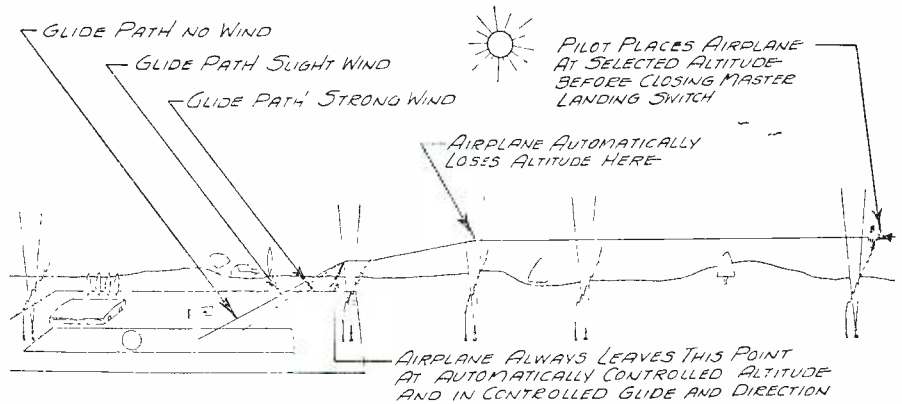
It is not necessary with this system that the airplane be headed directly for the run-



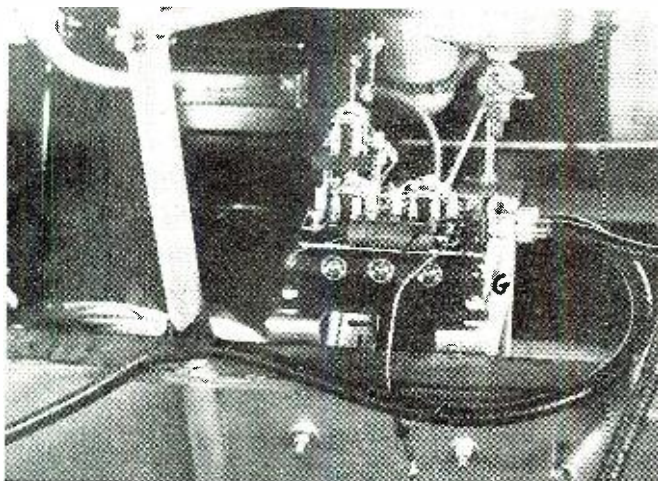
Left to right: Capts. O. J. Cram and G. V. Hallowman, and R. K. Stout, civilian engineer, who developed the Air Corps automatic landing system, before plane used in tests.

way when approaching the airport, since the equipment will bring it into line automatically even if it should be headed directly away from the port. Many landings have been made without trouble in cross winds up to 11 miles per hour and in moderately rough air conditions.

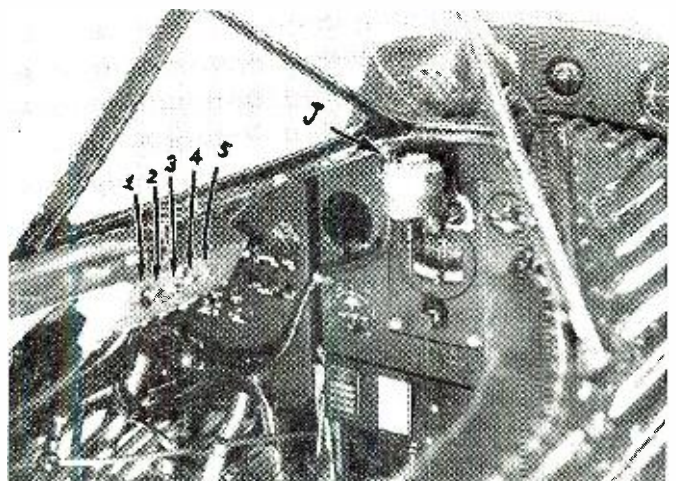
Several hundred smooth, precise landings have been made with the bent-beam system used by United Air Lines, which employs two radio beams emitted from the airport. A special transmitter sends out 93,000 kc. waves along the runway in a directional
(Continued on page 61)



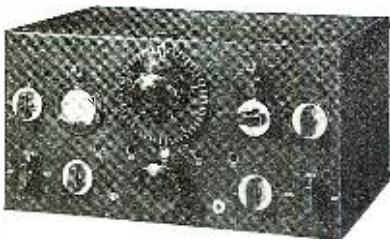
6 Diagram of ground antennae system showing Z-type marker beacons operating on different frequencies which transmit the signals that actuate the automatic landing apparatus.



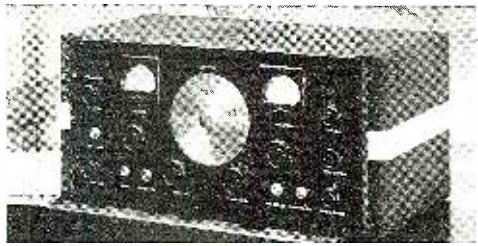
4 The throttle control (G) is operated by the frequency changes, controlling the throttle, and reducing speed.



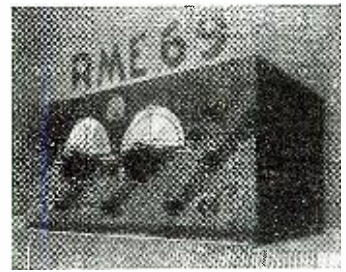
5 Landing switch (1) and auxiliary reset switches (2, 3, 4, 5) provide for hooking radio control into the mechanical pilot.



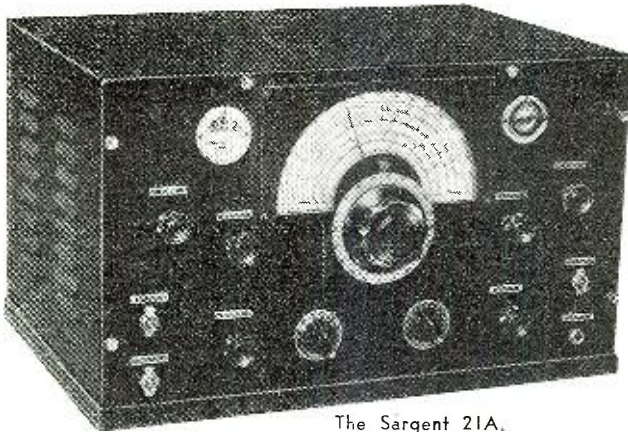
The National 101X.



The Hallicrafter SX17.



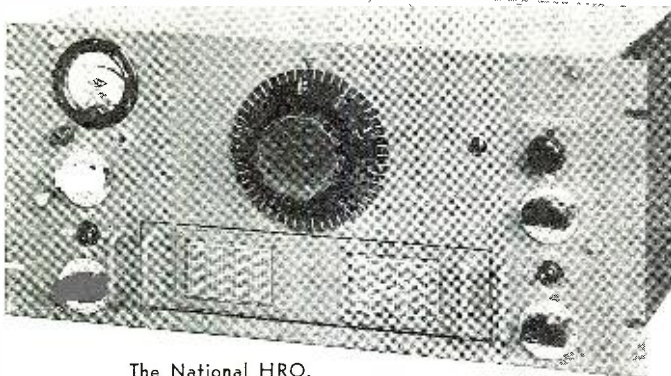
The R.M.E. 67.



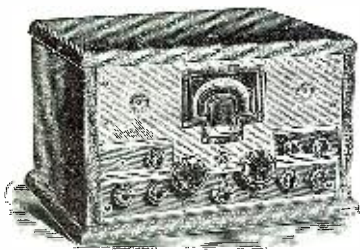
The Sargent 21A.



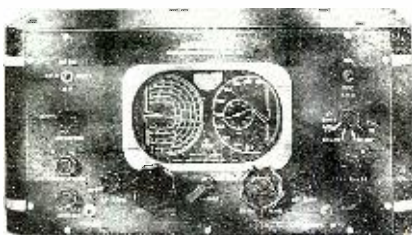
The National NC 100XA.



The National HRO.



The R.C.A. Model 111.



The Howard 450.

Win One of These Receivers

FIRST PRIZE: Any receiver selected from those shown on this page.

SECOND PRIZE: Any Taylor Tube up to and including a T-200 in price.

3rd to 12th Prizes: \$10 in cash for Honorable Mention.

RADIO NEWS PRIZE CONTEST

ATTENTION, HAMS, EXPERIMENTERS, AND ENGINEERS!

Have you wished for that communications receiver and not known how to get one because the old pocket-book just wouldn't stand it? Well, here's your chance to get it. **RADIO NEWS** will give one away absolutely free—you don't have to buy a thing—for the best technical article on any phase of radio.

You may write on any subject which has to do with technical radio. Such an article would be, for example, "How to build a 10M transmitter" or "How to build a rotary beam antenna," or "What to expect from a tube operating at 300MC" or any such type article. The article need not be a constructional one, it may be on research in the field of antennae, ultra-short waves, transmitters, crystals, or even I.F. transformers. In fact, it can be on anything technical in radio from receivers through transmitters, including tubes, antennae, etc.

Write up your favorite circuit, receiver, transmitter, antenna, television rig. Or design a new job of any kind. All types are welcome.

Diagrams need only be neatly drawn in pencil, and pictures need not be professional ones, as long as they are clear.

You need not be a licensed amateur, and there is neither age limit nor any limit to the length of the article. Women as well as men may compete. Only the judges, and employees of Ziff-Davis Publishing Co. and their relatives are barred.

The articles will be judged on their applicability, cleverness, and their publication value. All manuscripts should be typewritten on one side of the page, double spaced and contain the name of the contestant on each page.

Do not delay. Here is the chance you have been waiting for. If the idea is successful, **RADIO NEWS** will run another con-

(Continued on page 56)

Pounding Brass on a Pig Boat



by CHARLES TAMM, U.S.N.

as told to

JACK TIERNEY

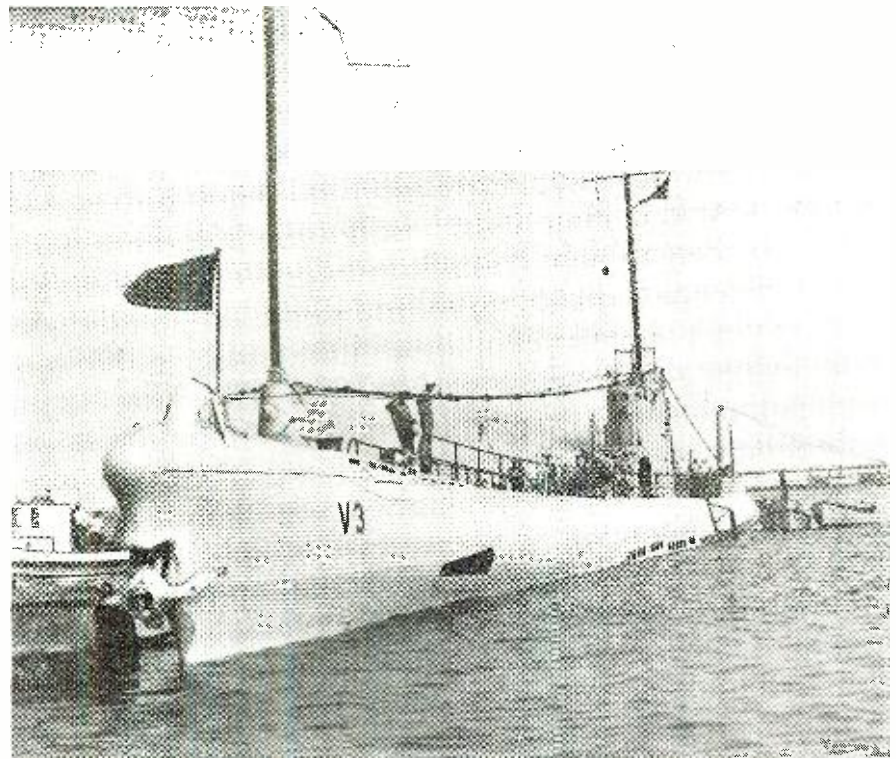
The Burlington Daily News Station WCAX,
Burlington, Vermont.

The life of a submarine radioman is ably described by the author. Mostly it is hard seaman's work, but the excitement makes it as worthwhile and romantic as flying.

WHAT'S all this talk about fishing fleets, fruit steamers, shore stations, freighters and the like being good jobs for radiomen? Have you ever pounded brass on a pigboat? If you haven't, brother, permit me to say that, as far as radio work is concerned, "You ain't seen nothing yet."

Sure, the average radioman has multiple duties to perform on the average job, but when you're a full-fledged submarine operator you know not only the rudiments of the industry to which you are attached, but you're an experienced hand at every wheel, and every control of the craft. No other branch of the short-wave profession can compare with pounding brass on a pigboat for duties, essential knowledge of, and ability to handle, a thousand-and-one chores on a split second's notice.

I know because I have done duty aboard the U.S.S. *S-21* and the *S-47*, with sub-



The U.S.S. *Bonita*, deadly terror of the seas lies quietly at anchor awaiting the call to duty. When she sails, and even though beneath the surface, her radio works.

marine squadron 4, in Honolulu, Hawaii.

Let's list these duties in order, to give you aspiring sub-minded ops a rough idea of what you'll be expected to know and do when you first tackle the job. Don't let it scare you, however, because pigboat work is mighty fascinating and worth any fellow's effort. You'll learn more in a year than you'd pick up in ten in any other short-wave operating job. You'll live a life so different, so packed with adventure and fun that other sea-going jobs will seem tame in comparison.

But first, here's what you'll have to learn:

(1)—A working knowledge of fitting, loading, and making minor repairs on torpedoes.

(2)—A workable knowledge of navigating the entire craft if called upon to do so.

(3)—A complete and detailed understanding of all pumping, draining, and emergency equipment aboard the submarine.

(4)—A practical and working knowledge of starting and running the two,

650-h.p. Diesel engines, as well as the 750-h.p. drive motors and auxiliary equipment for running submerged.

(5)—(And this is probably the most important), ability to find, in total darkness, all valves and controls, instantly!

(6)—A thorough knowledge, of course, of all radio equipment aboard, its operation and maintenance.

(7)—An understanding of, and ability to carry on, all methods of visual communications, including semaphore, blinker, and flag hoist.

(8)—Ability to work chipping hammer in drydock when all hands are called to scrape barnacles off the ship's side.

This last-named duty, is subject, of course, to the amount of radio equipment maintenance or repair work on hand when the ship is in drydock.

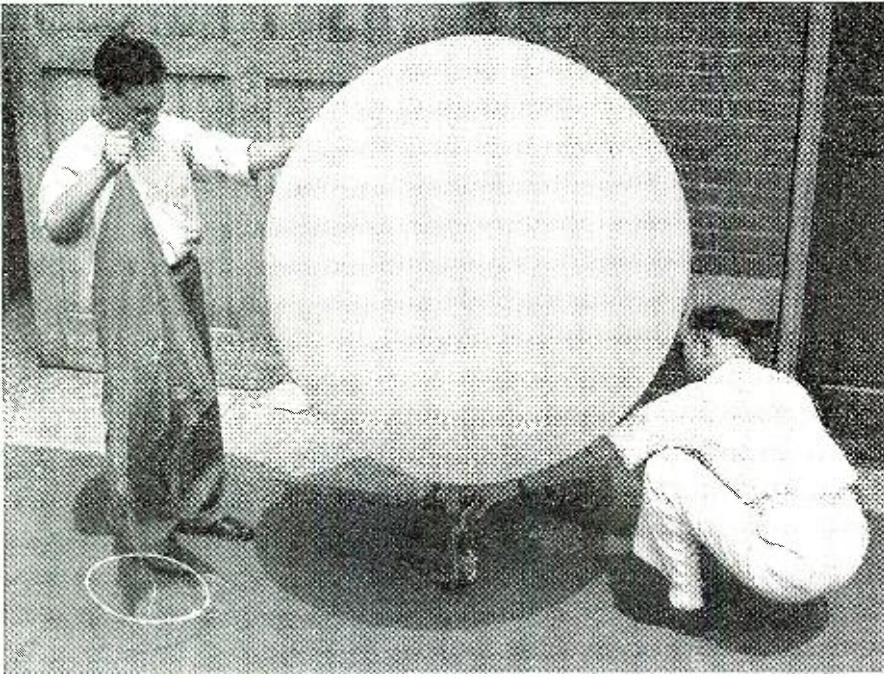
When a submarine is tied up in port the radio operator's duties are few, other than the maintenance and upkeep of his equipment. But from the time the order, "Cast off! All back!", is issued and the sub actually puts out to sea, the radio operator's real work begins.

Briefly, under ordinary conditions, the radioman's routine duties are as follows:

Upon clearing port and making certain that the antennae are clear of the superstructure, the radioman establishes communication with the port of departure, the operation's commander, and makes known

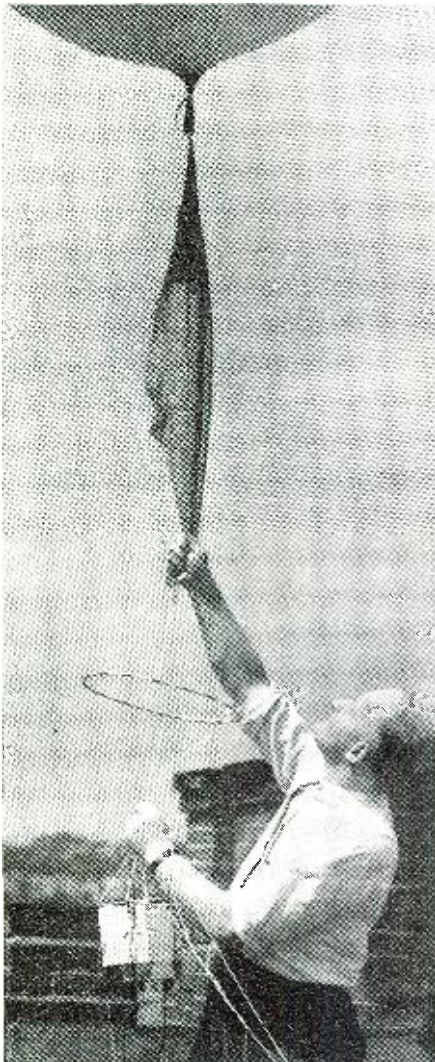
(Continued on page 69)

Aboard the submersible the radioman operates a sonic sounder. Note stored spare periscopes.



Inflating the balloon with hydrogen gas. Before releasing, a parachute is attached.

Releasing the radio weatherman with the radiometerograph suspended ready to go.



IF you sat at your radio and suddenly heard via a short-wave broadcast that a terrific storm was on its way down from Alaska, due to arrive within two days, and if you knew that the sender of that message was a tiny transmitter swinging miles up in the stratosphere below a gas-filled balloon, you might think you had a rush of imagination to the head.

But such miracles can happen, in fact, *are* happening right now, because of an amazing device just created by the scientists of the United States Weather Bureau.

This latest piece of wizardry consists of sending radio transmitters as high as 20 miles into the stratosphere with no human beings to operate them, yet they accurately and constantly signal the wind velocity, temperature, atmospheric pressure, and humidity; predict and localize cold waves, storms, and other information that affects virtually every man, woman, and child in North America.

Due to the work of this most astonishing device, vitally important signals from the upper air are now being received constantly, day and night, at four strategically located stations in the United States and Alaska. This new system, according to officials of the Bureau, is revolutionizing methods of weather forecasting and is bringing a wealth of knowledge on upper air conditions never before obtainable.

What is this machine? How does it work and in what way does it so greatly affect the all-important business of weather forecasting? For our answer let us turn to the laboratories of the Weather Bureau.

The scientists of the Bureau have been endeavoring for years to learn more about what goes on in the stratosphere. Airplanes and balloons have been taking up recording machines for some time with varying results.

There are several obvious drawbacks to such methods, the main one being that the recording machine must be brought back to earth and read before it is of any use. Too

RADIO

by C. S. VAN DRESSER

Washington, D. C.

frequently the recorder attached to balloons was lost and the experiment was valueless. Airplanes present their pet difficulty: often they cannot go up in storms, when weather information is especially desired.

Then, also, planes do not ascend high enough. Altitudes in excess of 30,000 feet are imperative from the Bureau standpoint. At such heights information may be gathered concerning pressure, humidity, temperature, and wind changes that has a most important bearing on weather conditions over the entire Nation.

The new machines, radiometerographs or *robot weather observers* as they are called, are in reality compact, high-frequency radio transmitters operating on a short-wave length, which automatically broadcast changes in temperature, humidity, and atmospheric pressure, regularly as they ascend.

The mechanism is complicated and technical in the extreme, but suffice it to say the machines register four distinct signals. First, the time signal, which is constant, being controlled either by a clock or an electrically driven motor; second, the remaining three signals, those of temperature, humidity, and atmospheric pressure. These signals vary as conditions in the upper air change, and it is their variation which enables the weather expert at the ground station to interpret the changes of the elements aloft.

The receiving set, which is located at the ground station, is tuned to the exact wave length of the robot weather observer. A thin strip of paper tape is fed through a recording device at constant speed.

As the signals are received from the robot observer they are recorded by an automatic pen on the tape. Thus a written record is kept of atmospheric changes. The ground weather expert "evaluates" the signals and immediately puts his findings either on a teletype machine or on the air via a regular Weather Bureau broadcast; thus to be spread over the entire country.

The principal value of the new robot weather observer, according to L. T. Samuels, Assistant Chief of the Aerological Division of the Bureau, is the fact that notice of forthcoming changes in weather conditions can be received instantaneously.

The method of providing the lifting power for the robot is interesting in the extreme. Although there is nothing new about using balloons for the purpose, the ones used by the Weather Bureau are different from any in the world. They are constructed of purest latex rubber, treated with patented chemicals. When first made

WEATHERMAN

The author tells how instantaneous weather reports are transmitted from the sky by robot weather observers.

they are but 10-inches in diameter, and later they are stretched to 40-inches, uninflated. When the bags are filled with hydrogen gas they are further stretched to a diameter of 5-feet.

As the balloon ascends with its load, the heat from the sun and the decreasing air pressure causes the hydrogen to expand. Incredible as it may seem, these rubber bags are capable of stretching to a diameter of 10 $\frac{2}{3}$ -feet before bursting!

One of the early difficulties with this method of ascension was that the heating of the balloon affected the robot weather observer—in other words, caused the delicate device to give inaccurate temperature readings. That obstacle has been conquered by attaching the machines, by means of a stout cord, at least 50 feet below the gas inflated bag. A parachute, cleverly arranged just below the balloon, opens when the bag bursts, conveying its precious cargo safely back to earth.

A stout balsa wood box houses the radiometeorograph, which, with its transmitter and other intricate devices, weighs less than two pounds.

In order to be of much value, the robot weather observer must ascend seven and one-half miles, which is well into the stratosphere. Today the average height is ten miles, while the record in the United States is 20 $\frac{1}{2}$ miles. Germany has the edge as far as altitude goes. One of her balloons carried a recorder to a height of better than 22 miles.

The rate of ascent is approximately



Ground station operator receiving signals from robot observer in the stratosphere.

1,000-feet a minute, and the duration of the signal time is between two and four hours, depending upon how far the balloon drifts horizontally and how high it goes before it bursts.

At present there are three distinct types of robot weather observers being used at four different stations in North America. The "300" graphs being sent up regularly at Burbank, California, were designed and perfected by scientists of the California Institute of Technology.

The "180" machines being used at Fairbanks, Alaska, were designed by Weather Bureau technicians in Washington, D. C. The principal job of the robots being used in Alaska is to forecast severe cold waves that sweep down from the polar regions. A few of this type of robot are being sent up over the Nation's capital.

Another station is at Boston, Mass. The "300" graphs being used there were perfected by the technical staff of Harvard University.

The Weather Bureau is keeping a close

check on the accuracy of the reports of these machines, and so well satisfied are officials with results that within two or three years they possibly will be used in nearly every district in the United States. Bureau scientists long have realized that weather conditions on the ground are affected by the upper strata. Over a period of time devoted to study of data gained through these magicians of the stratosphere it will be possible, through previous records, to determine in advance just what to expect, once the radiometeorograph has "filed" its report with the district Bureau station.

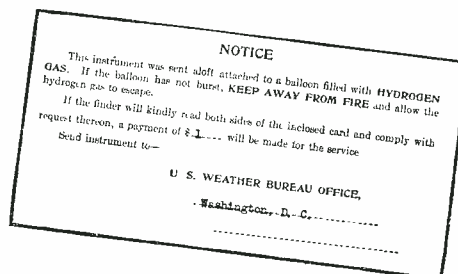
Generally speaking, the construction of the three types of radiometeorographs is very similar. Some use clocks for timing devices, while others employ small, battery driven motors. In other details they are essentially identical.

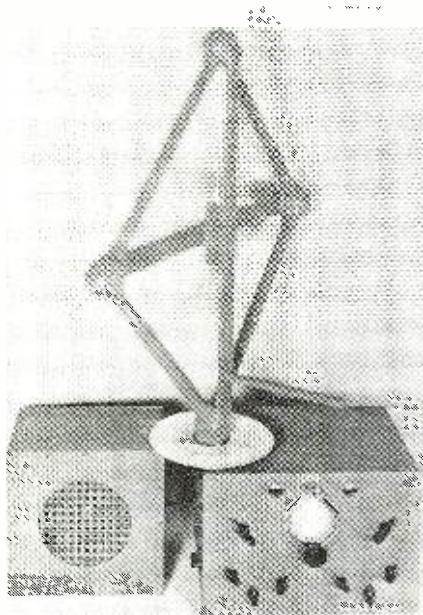
In order to eliminate absolutely any pos-
(Continued on page 63)



Left: Some day you may witness a scene like this in your back yard. Parachute (boy at left) has landed robot observer safely.

Below: One of these cards is attached to every radiometeorograph before it ascends.





The completed units. Businesslike in appearance and dependable in emergencies.

WE have available two types of radio receiving equipment adaptable to or specifically designed for general watercraft service: the common, garden-variety, moderately priced automobile job, which is powered from a 6 to 12-volt storage battery and built into a metal cabinet meets maritime requirements insofar as strictly broadcast reception for purely entertainment service is concerned; and the similarly factory-built but high priced direction-finder which generally tunes over a wide enough range to provide for the pick-up of both standard broadcast and long-wave radiobeacon transmissions but which is primarily designed as a homing and bearing-taking device.

The writer, who has found that the average boat owner wants his music when the mood for it strikes him, likes a weather report now and then, enjoys an occasional "digging into the mud" for elusive short wave "DX"; and, withal, expects to take a bearing or follow a signal into port at least once in a while, has therefore developed an instrument which fills this particular bill and one which may be easily and inexpensively duplicated by RADIO NEWS readers.

General Description.

The particular design whose construction and application this treatment is to outline is basically an all-wave radio, 6 or 12-volt powered, providing for either loudspeaker or headphone reception, tuning from 40 megacycles to 140 kilocycles (from 7.5 to 2140 meters), and having a direction-finding circuit incorporated electrically and physically into the design in such a way that it may be eliminated where finder facilities are not specifically desired.

The battery operated power pack is a built-up Vibrapack. The multi-wave tuning assembly is a built-up, pre-aligned set of very efficient coils. Construction is therefore greatly simplified.

As the receiver is to be used in direc-

Constructing The Marine-Ham Loop Receiver

by RAYMOND P. ADAMS
Canoga Park, California

With water sports in full swing, many a yachtsman will appreciate being able to get his bearings with the loop receiver the author describes. For the ham it represents a short wave rig as well. Broadcast reception is also possible.

tion-finding work, it is completely and effectively shielded. A separate speaker unit is employed—but single unit construction is otherwise featured.

Salt and moisture can and will break down insulation, short coil windings, corrode metal parts and wires, and do considerable general damage in a short time (delicate parts *must* be protected from the extremely humid, salt-laden atmospheres encountered in maritime service); therefore chassis, box, and shield-cans have been coated, inside and out, with a good grade of marine laquer, special hookup wire with washed and treated insulation (particularly in RF circuits) has been employed, transformers have been selected with well impregnated windings, and a permanent-magnet speaker with a treated cone, dipped matching transformer, and protected cone has been worked into the overall assembly.

Featured are: magic eye signal indication; a shielded dial with precision pointer; antenna posts for short wave and general service reception; a jack for the plug-in bearing loop; and knobs for the control of loop tuning, loop range, receiver on-off, volume level, selectivity, band selection, standby-phones-speaker, AVC, beat oscillator, and tone.

The Circuit—Exclusive of Loop Input.

Eight tubes (6K7 RF-6L7 Mixer-6J7 HF Oscillator-6K7 I-F-6Q7 Second Detector-6F6 output pentode-6C5 beat osc.—and 6E5 magic eye) are employed in what a study will show to be a straightforward, fundamental, superheterodyne circuit.

A stage of RF preselection is employed to increase the sensitivity to weak signal inputs, and input and output i-f transformers are of iron-core construction so that the single intermediate stage will afford optimum gain and selectivity for all-wave reception.

The diode second detector produces both audio and AVC voltages—the one for amplification by the high μ triode section of the 6Q7 and by the pentode output tube, the other for application to i-f, r-f, and mixer stages. BFO output is fed into the detector circuit in the usual manner; i.e.,

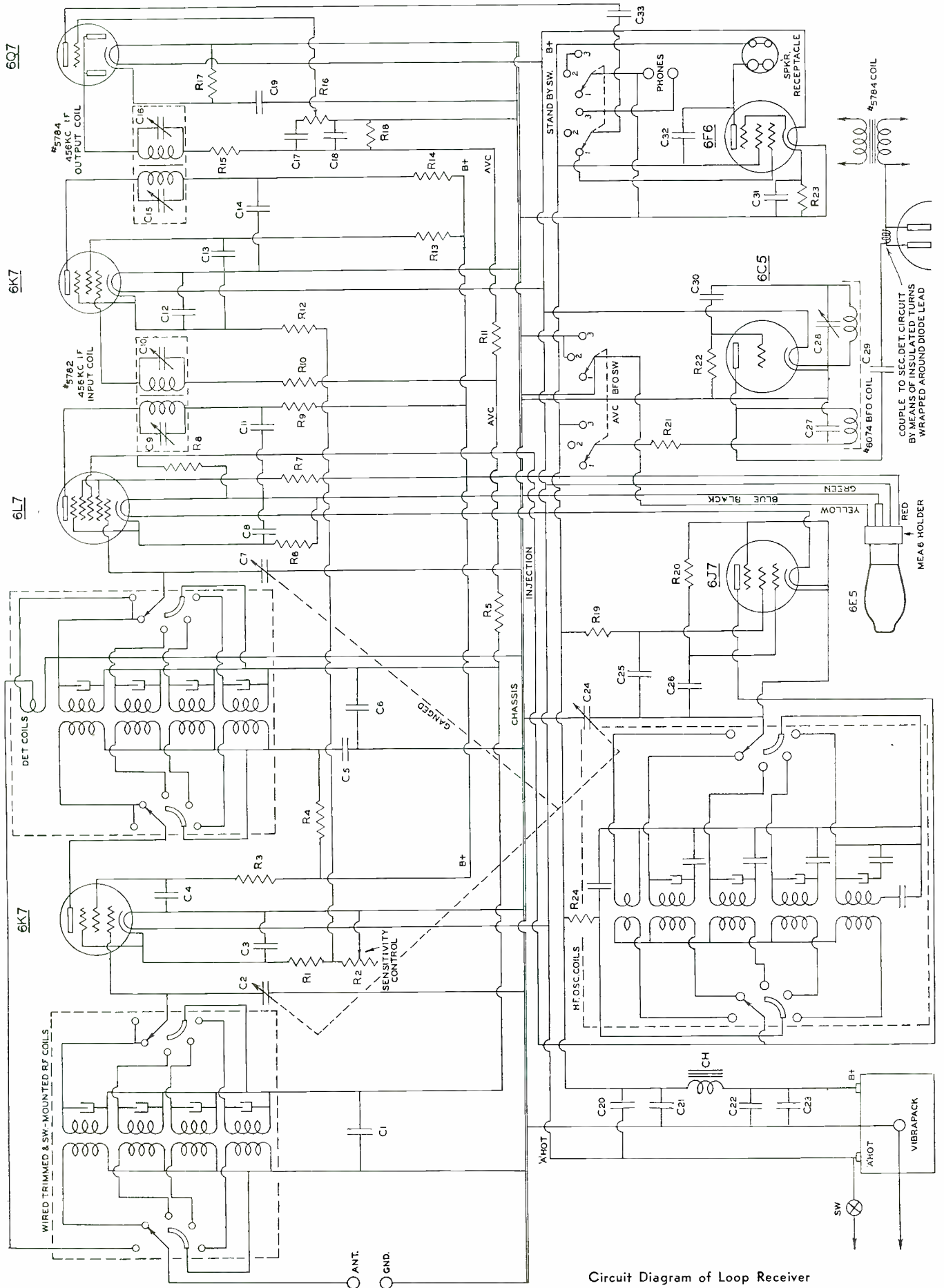
by means of a few insulated turns of wire wound around the common diode lead.

Plate and screen circuits are individually de-coupled and by-passed, and each tube has its individual bias limiting resistor. All No. 2 filament terminals tie directly to chassis at tube sockets as this chassis is itself connected to one side of the 6-volt storage battery. (If the battery potential is 12 volts, the 12-volt filament circuit must be substituted.) A Vibrapack replaces the usual power transformer, but the usual filter choke and electrolytic condensers are retained. The choke, by the way, is and must be a low resistance component, and a speaker field cannot be substituted.

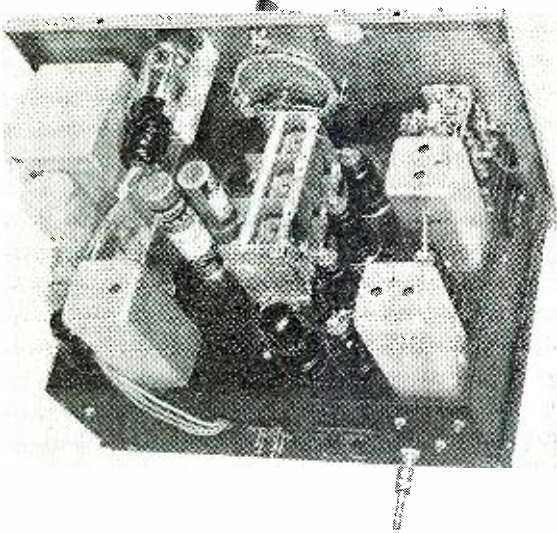
Just in case the switching may seem confusing, we might point out that there are three selector controls. One is physically a part of the RF coil assembly and is a six-circuit affair with follow-up sections for

Component Parts List

R_1, R_{12} —300 ohms, $\frac{1}{2}$ w
 R_2 —25,000 ohms, pot.
 R_3, R_8, R_{10} —100,000 ohms, $\frac{1}{2}$ w
 R_4, R_6, R_7 —1,000 ohms, $\frac{1}{2}$ w
 R_5, R_{11} —100,000 ohms, $\frac{1}{4}$ w
 R_9 —600 ohms, 1 w
 R_{13} —20,000 ohms, $\frac{1}{2}$ w
 R_{14}, R_{15} —50,000 ohms, $\frac{1}{2}$ w
 R_{16} —500,000 ohms, $\frac{1}{4}$ w
 R_{17} —1,000 ohms, $\frac{1}{2}$ w
 R_{18}, R_{20} —50,000 ohms, $\frac{1}{4}$ w
 R_{19} —500,000 ohm pot.
 R_{21} —3,000 ohms, $\frac{1}{2}$ w
 R_{22} —250,000 ohms, $\frac{1}{4}$ w
 R_{23} —30,000 ohms, 1 w
 R_{24} —400 ohms, 2 w
 R_{25} —10,000 ohms, $\frac{1}{2}$ w
 C_1, C_6 —.05 mfd., 200 v. paper
 C_2, C_7, C_{24} —410 mmfd. ganged
 $C_3, C_4, C_5, C_{12}, C_{13}, C_{23}$ —1 mfd., 200 v. paper
 C_8, C_{11}, C_{14} —1 mfd., 400 v. paper
 C_9, C_{10} Meissner Unit 5782
 C_{15}, C_{16} Meissner Unit 5784
 C_{17} —.05 mfd. paper
 C_{18} —.00025 mfd. paper
 C_{19}, C_{21} —10 mfd., 25 v. elec.
 C_{20} —1 mfd., 400 v. elec.
 C_{22} —16 mfd., 450 v. elec.
 C_{25} —8 mfd., 450 v. elec.
 C_{26} —25 mfd., 400 v. paper
 C_{27} —.00005 mfd. mica
 C_{28}, C_{29} —.05 mfd., 400 v. paper
 C_{30} Meissner Unit 6074
 C_{31} —.01 mfd., 400 v. paper
 C_{32} —.0001 mfd. mica
 C_{33} —.006 mfd., 400 v. paper
Mallory Vibrapack VP-552
SW—AVC, BFO Meissner 18254
CH—Kenyon KC-200
MEA 6 holder
RF Coils Meissner Unit 7505
SW—S.P.S.T.



Circuit Diagram of Loop Receiver



In back of the panel, showing the careful arrangement of the component parts which is used for best results.

shorting out unused coils. This is, of course, the range switch. One is the AVC-BFO switch and is a two-gang item designed in three-point adjustment for: 1—AVC on—BFO off; 2—AVC off—BFO off; 3—AVC off—BFO on. The third is another two-gang, three-point, two-circuit component whose adjustment permits: 1—speaker output; 2—standby (magic eye but no aural signal indication); 3—headphone output.

The sensitivity control affects the bias on the 6K7s in the r-f and i-f stages and thus the gain of the receiver, the tone control adjusts the 6Q7 a-f section's plate impedance to high audio frequencies, and the volume control, in the diode load, selects a-f input to the 6Q7 output section's control grid.

One of the diagrams relates to the necessary circuit changes and parts substitution where and if automatic noise suppression is called for to minimize the effect of vibrator "hash" and ignition interference. The system featured is the Dickert one, is very simple and effective, and calls for an extra tube—a 6H6 or 1V, and preferably the "H", as it is small and may conveniently be installed below-chassis.

The second detector here may be the original 6Q7 or a substituted 6R7, whose output section is lower Mu. (The 6R7 will work a little better.) The 500,000 ohm

audio volume level potentiometer is replaced by a 100,000-ohm item and is positioned in circuit in the diode load leg, in series with an 80,000-ohm resistor which itself replaces the 50,000-ohm audio limiting affair shown in the general circuit drawing; and the AVC filter resistor ties at the high side of the load leg, instead of at the point of juncture between the two resistors of which this load is composed. No audio frequency coupling condenser will be required, as the system works most efficiently when the first a-f tube is diode biased. The one megohm resistor and one mid. condenser time the circuit properly, while the switch permits an adjustment for maximum suppression, no suppression, or minimum suppression. (A variable 80,000-ohm potentiometer equipped with a switch to break the variable-arm lead to the 6H6, or a half megohm potentiometer bridged across the fixed 80,000-ohm resistor, would work perhaps as well.)

If twelve-volt battery power is employed, the 6H6 filament circuit must necessarily be wired in series with a dropping resistor (20 ohms, 2 watts) to bring the potential down to proper tube operating value.

Layout.

Reference to our photos of the assembled receiver will identify all major items and indicate their positioning.

The under-chassis photo, however, is not —nor could any such photo be made to identify each and every below-deck item; and perhaps we should at least attempt to clarify the layout here.

(1) The wired RF coil unit is positioned below the threegang tuning condenser, grid leads extending up through the chassis to that condenser's lower stator lugs. To the right of the unit are the V1, V2, and V3 "front end" tube sockets.

(2) The one microfarad condenser in the noise system timing circuit is mounted on the wall of the receiver, near the under-chassis 6H6 noise diode socket and the 500,000-ohm noise adjustment control which

was used in the lab. model in lieu of a three-way switch.

(3) The shielded leads across the depth of the chassis (two leads in one shield braid) run from the 6R7 or 6Q7 second detector and first AF tube to the volume level control. These leads are to be shielded whether or not the noise elimination circuit is featured.

(4) All resistors and by-pass condensers associated with any tube in any stage are grouped together near the socket for that tube.

(5) To the left of the coil assembly, from chassis rear to chassis front, are the choke in the filter circuit, a tie point assembly (for high potential connections from the Vibrapack, the choke, and the electrolytic filter condensers) and the AVC-BFO switch (with a timing condenser in the AVC circuit near this last-mentioned item). The shield braid from tie assembly to point between chassis and coil unit contains the two positive leads from the electrolytic filter condensers.

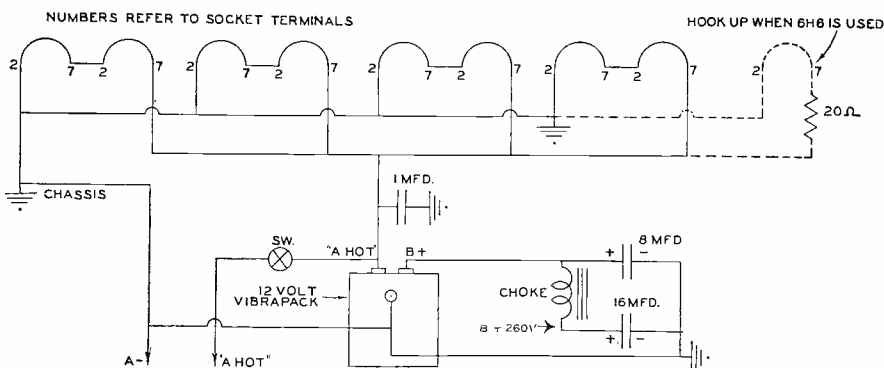
Construction.

The first job is to drill the chassis, the second to mount all parts except the RF coil assembly. (In mounting the Vibrapack, by the way, be sure to use rubber grommets between its own and the receiver's chassis, to prevent contact. Properly sized grommets are supplied with the pack.) With the two electrolytic condensers in position, solder their black leads to the chassis near the securing bushings for these items, then bring their red leads out to the tie assembly, running them through braid-shielding grounded at two or more points. Referring to the photos once more, wire up as many parts as possible, checking with the circuit diagram frequently so that the connections will be correct. Remember these particular construction pointers:

1. Solder all ground connections.
2. Connect the No. 2 terminals of all sockets (if the receiver is to be used with a 6-volt battery) to the No. 1 terminals and the latter directly to the chassis.
3. Shield the lead from Vibrapack B plus terminal down through the chassis to one lug of the tie point assembly to which electrolytic positive and filter choke leads are connected.
4. Ground the Vibrapack at one point only—preferably at the small screw between A HOT and B PLUS terminals, and using a short length of shield-braid.
5. Keep leads as short and direct as possible, group filter condenser and resistor parts around the sockets of tubes with which they are associated, and bring all returns for each stage to one ground point—preferably the No. 1 terminal of the allied socket.

Now install the RF coil assembly, grounding the right hand stranded copper leads (switch shaft forward and looking at the underside of the assembly) to the chassis at points immediately below associated (for each stage) variable condenser rotor wipers, and bringing the left hand or grid leads (stranded) up through grommets in the chassis to the condenser stator terminals.

Mount the high frequency oscillator grid condenser and resistor on the oscillator (rear) section of the tuning condenser.



Circuit diagram of the filament connections and the vibrapack.

Install the dial on the tuning condenser shaft, bending or cutting the control's frame extension until the unit slides tightly over the chassis. Cut off enough of the condenser shaft so that the dial can be slipped back just far enough to bring the dial scale about flush with the front drop of the chassis.

Alignment and Operation

1. Mount a heavy duty, low voltage drop, rotary switch on the front panel, connecting this so that it makes and breaks the A HOT battery lead to the Vibrapack and to tube filaments. Use heavy battery leads and protect the pack with a low voltage drop 15 ampere fuse (an ordinary household job will do nicely). Check the circuit, turn on the power, and then adjust the output switch on the Vibrapack until approximately proper voltages (as indicated in our circuit drawing) are measured.

2. Align the intermediate frequency transformers to exactly 456 KC, as this is the i-f frequency which the "front end" assembly is designed to produce when in proper track. The r-f assembly itself should next be properly trimmed and padded.

3. The layout and circuit are such as to minimize vibrator noise, and if these have been carefully followed there should be little interference from the pack except when the sensitivity is advanced and short wave coils are in connection. If vibrator "hash" is serious, however, it might be wise to use RF chokes in both the A HOT and B PLUS leads, the chokes of such value as to be effective over the frequency range at which the interference is most bothersome, with the choke in the A HOT lead of ample current carrying capacity to handle both tube and Vibrapack drain on the battery. Additional by-passing may help.

4. If neither chokes nor by-passing condensers eliminate the hash effectively, employ the special noise suppressor circuit. As we have indicated before, the Dickert system is very simple, very effective, and reasonably automatic; and once adjusted to meet any specific noise condition it will require no further attention.

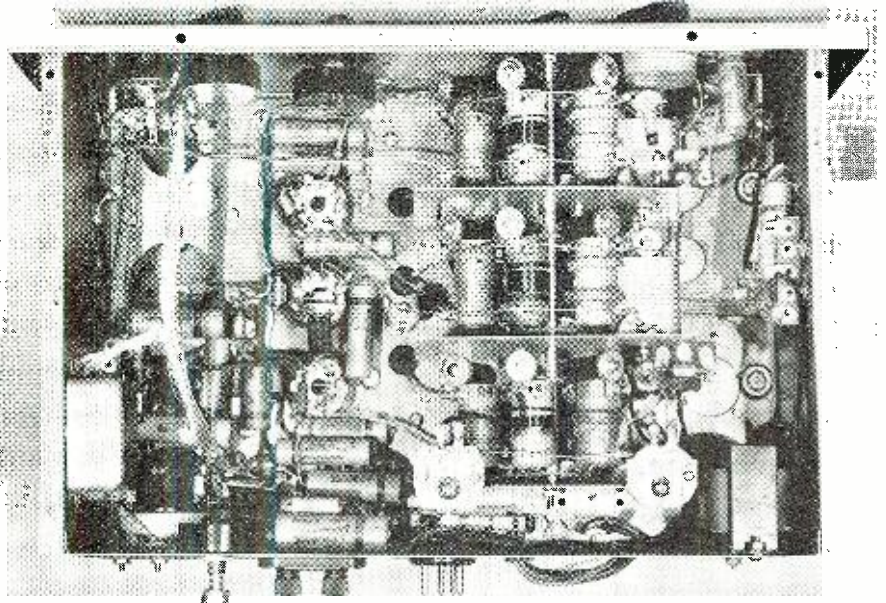
5. Connect antenna posts together (the chassis post and the cabinet post). Connect ground posts similarly.

6. In installing the receiver aboard ship, position it so that VERY SHORT LEADS TO THE ENERGIZING BATTERY will be effected. Use a separate battery if possible. In any event employ a heavy wire, as the efficiency of the Vibrapack depends upon minimum voltage drop in the power input line. Set up as long and as high an antenna as space permits and shield the lead-in if the vessel is engine-powered. In general, follow the familiar and recommended practices which govern the installation of an automobile radio in a car.

The instrument is now—or should be—in proper operating shape and ready to give efficient straight-entertainment service at all input frequencies within its tuning range.

The set should now be thoroughly tested before commencing the construction on the loop, for if it will not work with an ordinary antenna, it will not operate with the loop.

The test is made as with any other receiver. Connecting an antenna of suitable



Underside the chassis shows the tuning coils to the right center and the audio section to the left. Extra pains should be taken to see that each connection is firmly soldered with rosin-core solder, since salt air has a deleterious effect on acid-core connections. It is well to paint asphaltum paint over each connection to offset marine conditions.

length to the antenna post, ground the receiver to a water pipe, or if on board a ship, throw a long length of wire overside. Later connection can be made to a copper plate fastened to the side of the boat, or to some suitable point on the marine motor if there is one.

Set the receiver to some local station and slowly advance the r.f. and a.f. controls. Watch for noises and "hash." This is extremely important, since when using the loop these noises will materially reduce the signal at the very time that it is needed. Make tests with the r.f. gain turned all the way "up" and see that the control works smoothly and without "humps." Then test the a.f. control the same way. If there are "humps" or crashes, there is a chance that a piece of solder has splattered over the control, if an open one, or that it may be defective. The condition should be remedied.

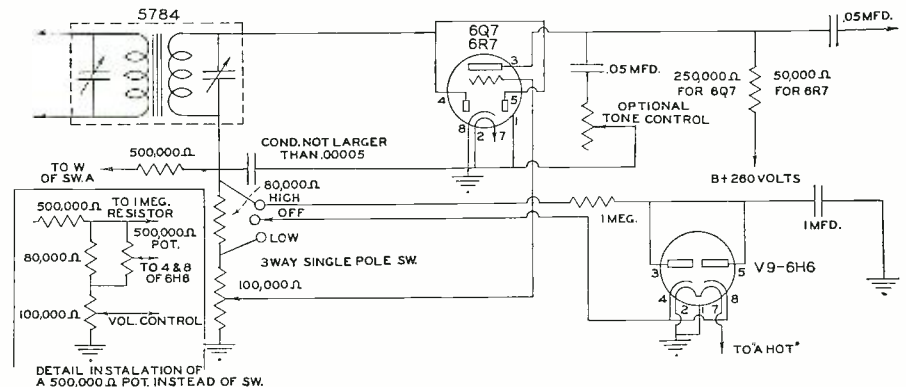
Next, with the receiver running start the marine motor, if there is one, and check further for engine noises in the receiver over its entire tuning range. If there are

noises, and there generally are, the motor will have to be shielded for radio. Best it is to have a local auto serviceman do this. However, you may attempt it yourself.

Place suppressers on each spark plug. Then check with the receiver. The noise should have diminished. Next place a condenser, such as is recommended for auto use, across the generator and the ammeter. This should reduce the noises further. After that a condenser should be placed across, or from one side of every moving part to ground wherever there is any moving electrical unit. Such units are motors, generators (there usually are several on board the larger boats) and pumps. Do not place a condenser across a spark coil or spark plug, as this merely enhances the discharge. The operation of shielding a motor is a long, tedious process, and should be undertaken with patience and thought.

Next month the loop construction as well as the installation and application of the complete assembly as a direction finding device will be described.

-30-



Circuit diagram of the noise silencer installation.

Not For REBROADCAST

by "X-73-88"

The author is one of the best informed men on radio in the country, withholding his identity to maintain complete freedom of comment.

Q UICK, Henry!
Now I know why *Buttercup* ran last in the third at Hialeah.

Of all the silly commercial "spots," I heard what must be tops. . . . Heard it on several stations in various parts of the country, while dialing about.

It goes something like this:

"This is station WXX—

"THEY'RE OFF! . . . Man-O-War is leading. . . . Now *Buttercup* approaches the front horse—he PASSES him—*Buttercup* is leading by a full length and is a sure winner. . . .

"But WHOA! What's this? *Buttercup*'s jockey has stopped his horse . . . and gone over to a trackside stand . . . to get a bar of ——— candy!"

That isn't verbatim report, but you get the idea. . . . The jockey sacrificed the race because of a sweet tooth.

(Stations should charge plenty for tripe like that for after hearing such "flashes." I generally turn the set off for a few days.)

* * *

PRESS VS. RADIO
Unnoticed by listeners-readers, one of the most bitter battles between newspapers and broadcast stations took place in the past month. It is still raging.

Newspapers have long regarded the broadcast industry as No. 1 Public (and press) enemy. This viewpoint arises from the fact that much advertising that formerly was placed in the papers now goes to radio. . . . But the papers have to continue their radio logs and news because the public wants them.

Los Angeles papers got together, decided to drop part of their radio pages (the gossip and news columns plus pictures). . . . San Francisco . . . Boston . . . and some Chicago . . . papers followed suit. One large Chicago morning paper (The Tribune) intimated to the trade it will leave its column out "if readers do not complain too much."

Next step contemplated by publishers: charging for radio program listings.

THOSE LIE DETECTORS!

For some time, this scribe has wondered about the efficacy of various models of "lie detectors" so highly publicized in police trials.

Willing to concede that such devices must have some psychological value in inducing confessions from the lay guilty, I still wondered if they didn't sometimes railroad innocent men to "guilt" and let the Fibber McGees slip through!

Dr. Orlando Scott demonstrated his lie indicator at a Chicago ham club meeting a short while ago. . . . This scribe hap-

pened to be on hand when the Doc was challenged by a local writer. The machine did not stand up to the challenge.

It is Dr. Scott's theory that thought waves ooze continually out of one's pores—all over one's body. . . . These waves vary in intensity, with mental exercise, he avers. So, he intercepts them with a couple of hand electrodes, measures them in terms of "truth" and "untruth" on a calibrated milliammeter.

The machine wasn't working the night I saw it. Sort of an off-night for lie detectors, the Doc explained, due to presence of so many people. . . . Reaction of some radio men was that all the gadget measures is varying resistance (body contact) between the electrodes. In this it does a sensitive job.

One lady, a red-head, complained she was being shocked. . . . The Doc was kind enough not to put her on spot, but by his theory she must have been generating some terrific thought voltage!

* * *

CANADA RAISES LISTENERS' ANTE—

New rates on listeners' licenses in Canada are \$2.50 for EACH set (no double-listing of home and car radios). Fee was formerly \$2. . . . The dough goes toward support of government programs, radio commission, etc.

* * *

THE *First Nighter* shifts from NBC to CBS, come Sept. 2nd. . . . TOM DORSEY orch had to pay \$1,100 fee to musicians' union in Chicago for forgetting to hire a standby orch while broadcasting its NBC tobacco commersh from theater stage. . . .

* * *

COAST TO COAST:

DETROIT: The *Free Press* blasted broadcasting. Charged the industry with airing "cheap, wearisome and demoralizing programs." . . . **HOLLYWOOD:** Actress Gale Page's agents announced when she left for Chicago that she would vacation there ten days. Actually, she'll stay until recalled. . . . **NEW YORK:** Phillips ("Seth Parker") Lord is suing Pathe newsreel for \$50,000, alleging broken contract. It's another of the many legal hang-overs from Lord's ill-fated world cruise.

SAN FRANCISCO: Press-Radio war fomented a laughable situation here. Station KSFO, a CBS airlet, moved studios to Jessie St., on which the *Call-Bulletin* trucks load papers. Station is demanding re-zoning of street so trucks won't jam both sides. It's still unsettled.

WASHINGTON: Before going home for the Summer, Senators took a slap at

super-power. Went on record as opposing grants of permits to utilize more than 50 kw. . . . **NEW YORK:** One of the most entertaining programs on the air is NBC's sustaining *It Might Have Happened* takeoffs on history. At least, this scribe thinks so.

CHICAGO: Sensitive C.I.O. sympathizers complained when WBBM cut short a C.I.O. adherent's spiel on man-on-street bill. Found actual reason was merely program's time ran out. . . .

WASHINGTON: Radio's patriotic rule that the *Star Spangled Banner* shall never be cut short boomeranged on a politico. Demanding that his fifteen-minute spiel open and close with the anthem, he got just that. Time left for his speech—four minutes! (Which is long enough, anyway, for most windbaggers, eh?)

* * *

NEWSCASTS:

Without a doubt, the Fascist nations take the cake—or something—when it comes to diligence of radio propaganda.

The Berlinland-senders probably cram more ballyhoo "flashes" into the air than their co-workers, the Japs and Italians. But the latter two aren't over-looking any bets.

Berlin appears cleverest of the three. Plugs for Nazi-made motors, fabrics, etc., are worked into "news flashes" telling how foreign (to them) products cause disasters or fail otherwise. . . . Berlin's all-night air jam sessions during the Austria *putsch* remains one of the classics of modern ways of influencing people and winning empires. While Britain, France, and Russia charged brutality, we had only to tune in Berlin and hear fairy stories for children, singing by fair (blonde) sopranos and descriptions of woodland trails. Between times, "flashes" from the front of the line of march brought cheers and cheers. At times, I suspected records of one original cheer session might have been occasionally replayed, but the announcer led me to believe, finally, that the Austrians really sat up all day and night cheering the invaders. They had to, as was later revealed.

* * *

TELEVISION will open 22 new kinds of jobs, says Dr. Alfred Goldsmith. . . . Biggest of these will be that of "television cameraman."

* * *

STAR DUST:

Donald Novis is trying a radio comeback on the coast. He retired voluntarily some time ago. . . . Lawrence Tibbett is in Australia, concerting and fishing. . . . Walter Winchell came to near blows with a guard who sought to prevent Walt's entering the trial of Mayor Hague in Jersey City. Upon recognition by a U.S. marshal, the hole-peeper was ushered inside.

Forget rumors that Dorothy Thompson is through in radio. She made lots of enemies among studio attachés with her abrupt manner—but she clicked tremendously at the firesides. She'll be back in Fall, when a Summer vacation is over.

BROADCASTING 30 YEARS AGO

by AUSTIN C. LESCARBOURA
Croton-on-Hudson, N. Y.

In 1908 broadcasting required as much muscle as brains, what with cumbersome, temperamental equipment that would work continuously at least for a few minutes.



The DeForest tower in New York City from which the first opera was broadcast.

"FOR Pete's sake, change the tune!" Thus read our first unexpected "fan" communication scrawled in pencil on a U. S. Signal Corps telegraph blank handed us by the grinning operator in khaki.

"Just picked up from the U. S. S. Pennsylvania," he added verbally. "She's now passing the Hook on her way out to sea. Wireless operator telegraphs he has the wireless room packed with officers and men listening to your music. They've been snatching his earphones one from the other. Says you're getting out in fine shape."

So we had become wireless entertainers. Broadcasting was born. And transcribed programs had made their debut. All because, for the past ten minutes or more, we had been playing the familiar clanging strains of the Anvil Chorus from Verdi's opera "Il Trovatore" on our trusty Edison phonograph, over and over again, thereby giving our tired voices a merited rest from the shouting of test numbers and "How

do you get me now?" queries into the huge horn of the microphone.

The Time: 1908. The Place: Fort Hancock's wireless station at the tip end of that lanky peninsula known as Sandy Hook which sweeps northward from the New Jersey coast, seemingly in a last attempt to prevent shipping from slipping out of Lower New York Bay to the broad Atlantic Ocean beyond. The Players: Two engineers of the Telefunken Wireless Telegraph Company of America, one being your humble author, and a Signal Corps wireless operator. The Plot: A would-be serious attempt to span by wireless telephone conversation some eighteen miles of space as the crow flies between Fort Hancock and Fort Wood on Bedloes Island, in the very shadow of the Statue of Liberty. A contract for \$25,000.00 was to be the reward for a successful 5-minute talk between the two points.

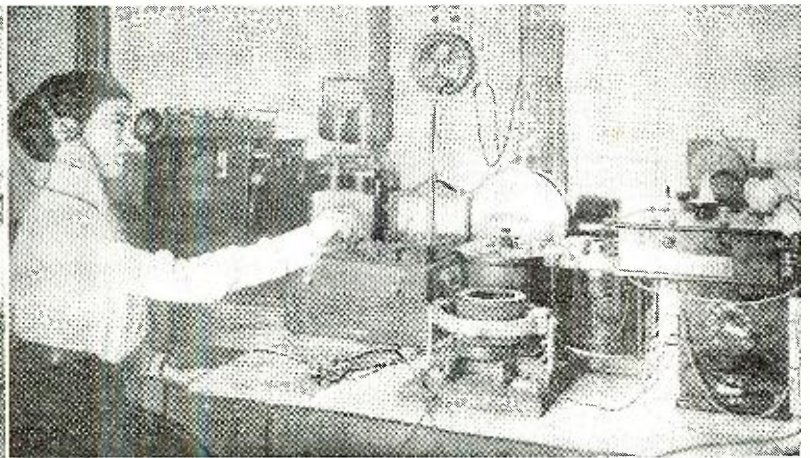
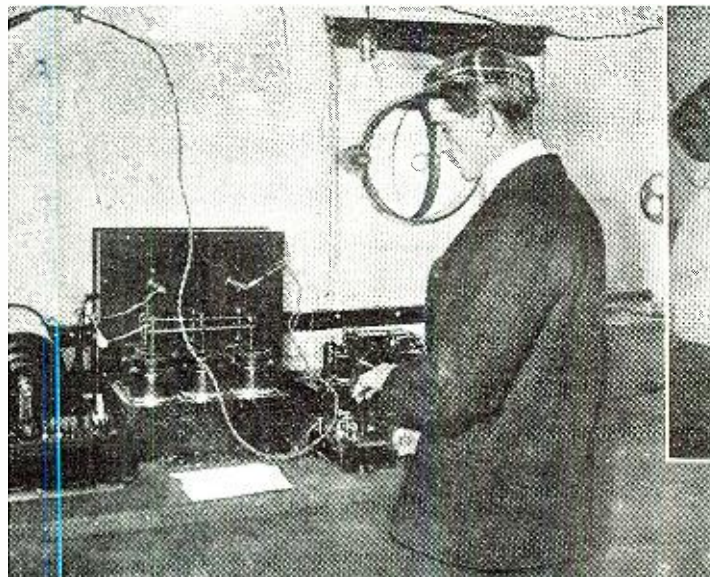
Such is the simple truth of the early struggles of radio broadcasting. My first job after leaving technical school was the taming of a new-fangled wireless telephone transmitter just arrived from Germany. It came in several crates. Also, the instructions in substantial technical German. But the descriptive text proved too formidable for our schoolboy German, and so we simply followed the pictures and diagrams in assembling the latest wireless rig from across The Pond.

In due course we had a mighty imposing

assembly set up. The wireless telephone transmitter was of the electric arc type. In fact, there were ten arcs to generate the oscillations, arranged in two banks of five arcs. Each arc consisted of a tall copper can filled with water, for the top electrode, and a large carbon button held on a metal strip, for the bottom electrode. Pressing down on a handle at the end of each bank, caused all carbon electrodes to be brought in contact with the copper tanks, thereby striking the arc. A thumb nut on each handle could be regulated to set the gaps for all the arcs of the bank, and to feed the carbons towards their cans as the former slowly wore away.

Mounted on a colossal oaken table with a tall back, the ten shiny cans and the ten metal strips carrying the carbon buttons looked more like an organ than anything else. And when the boiling water in the copper cans sent up clouds of steam, we had the makings of a steam calliope, visually speaking. On the rear board were several huge measuring instruments indicating the power supply voltage, the conditions within the closed oscillating circuit, and the output to the antenna circuit. Also a big loose-coupler with a fixed coil and a movable coil whereby to transfer the radio frequency energy from the closed oscillating circuit to the open antenna circuit. Finally, there was a microphone socket with its huge fibre horn coming

(Please turn page)



Typical radio installation (left) aboard a British ship at the time radio was "wireless" and was trying to prove its case. Above is a lady announcer operating one of the early radio telephones between New York City and Newark, N. J., in 1908. The thing she is looking into is—believe it or not—a microphone. It was good for 2 minutes before burning out.

right out to the front edge of the table.

Talk about present-day microphone fright. In those early days a performer or speaker would have been justified in fainting right on the spot when facing that four-foot horn and a vast array of electrical equipment including ten sputtering, smoking and smelling arcs.

Our imported wireless telephone in due course found its way aboard an over-sized tugboat bound for Fort Hancock. Several days later we had it reassembled and perking in the wireless station building on the sand dunes of Sandy Hook, behind a battery of disapproving Coast Defense guns. And for weeks and months thereafter, we commuted several days each week via an Army overgrown tugboat from the foot of Wall Street to Sandy Hook.

It was a cold winter, back in 1908-9. So cold that the grease in the motor-generator bearings became as thick and unyielding as glue. The motor-generator, a huge 7-horsepower Crocker-Wheeler affair intended to convert the Army Post's 110-volt D.C. supply into 600-volt D.C. for our ten arcs in series, had to be started the first thing upon arriving on the job. We threw the switch and swung the starting-box handle. No soap. The motor-generator wouldn't move. What with stiff grease and weak power supply, the armatures wouldn't turn.

Whereupon our sergeant-operator friend-in-need would get busy on the phone, calling up various places about the Post and requesting "Lights Out" not because of an air raid threat, for such threat could not have existed at that early date when the Wright Brothers had yet to spring their flying contraption on a startled world, but in order that we might get our motor-generator turning. Then, with sufficient power supply assured, we would mobilize several husky soldiers for a tug-of-war with that stubborn electrical mule. Several turns of rope were wrapped around the protruding shaft. The soldiers pulled on the rope. And lo, the cussed thing would start up, virtually thawing out its

bearings, and in time providing the necessary electrical diet for the ten hungry arcs.

So far, so good. We had power. The next thing was the taming of the ten arcs. Each sputtered and fumed in its own way. Each had to be critically adjusted to the right arcing distance. As often as not, when all would be behaving fairly well, one would suddenly go off on a bat and had to be pampered and coddled and brought back again into the fold.

The oscillating circuit meter indicated the antics of our arcs. With patience and coaxing, we finally achieved a stabilized meter reading, whereupon the stage was just about set for our wireless conversation. Without loss of precious time a carbon button microphone—in the form of a neat flat cartridge—was slipped into the holder and the four-foot fibre horn swung into position. Then we started talking over the air.

Crooners would have been out of luck in those days. You had to shout to make any impression on that wireless telephone. So you stood in front of the huge horn with your face practically jammed into its wide mouth, shouting your stuff. For want of something better to say, we kept counting numbers from 1 to 10 and back to 1 again, over and over again, with "How do you get me now?" repeated at frequent intervals. Every once in a while we tried "This is Fort Hancock calling Fort Wood via experimental wireless telephone." As with present-day broadcasting, it was a one-way conversation. There was no immediate answer from the party at the other end. Occasionally the sergeant-operator jotted down a brief report he picked up via wireless telegraph from Fort Wood. But since the wireless telegraph didn't do so well either getting through that maze of conflicting signals in the New York area, we generally got our answers by Western Union or Postal Telegraph, and detailed reports many hours later when we returned to the home office in New York that evening.

It all seemed so silly, this business of

calling numbers hour after hour. "1, 2, 3, 4, 5. How do you get me now. 1, 2, 3, 4, 5—5, 4, 3, 2, 1. Fort Hancock calling Fort Wood. How are we coming in?" And so on and on. Little wonder that we included in our equipment an Edison phonograph and a choice collection of cylinder records. Those records were chosen not for their musical or entertainment value, but for their acoustical wallop. That's why the Anvil Chorus record was our favorite, for those clanging sounds wobbled the modulation meter at least two degrees beyond the next best noise maker. In order not to lose too much of this precious noise, the phonograph horn was stuck as far into the huge microphone horn as possible.

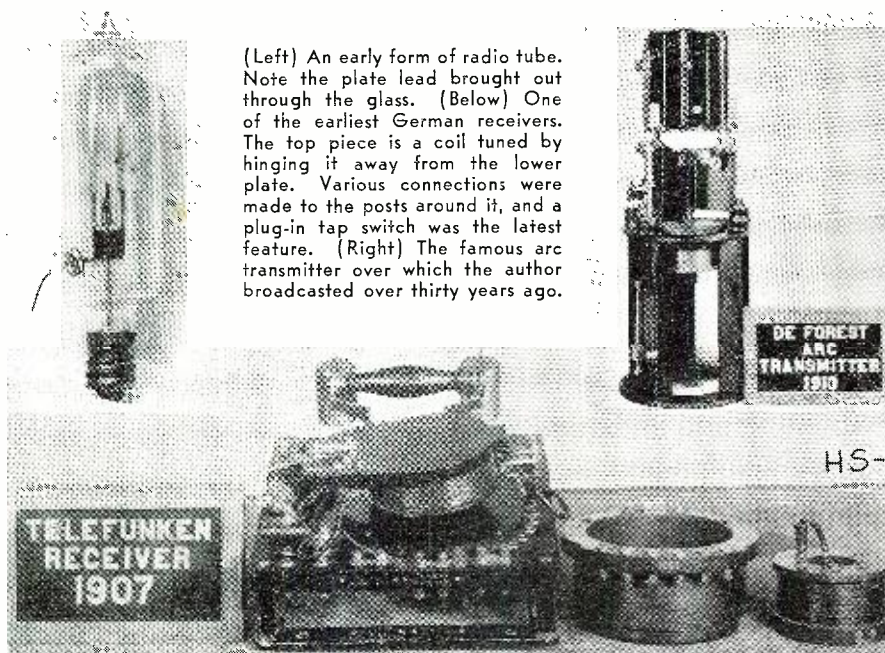
Now the contract we were aspiring to called for a continuous conversation of at least five minutes' duration, before Signal Corps officials. But what a goal that was! At the end of two or three minutes, the modulation meter would no longer flicker in step with our shouting. That meant no further modulation of the outgoing waves. Or in other words, the microphone was "shot." Just as the early motorist had to change tires frequently, so we had to change microphones and we were well trained for those quick changes.

The four-foot horn was taken down. The cover came off the microphone holder. We reached in for the hot microphone cartridge with a pair of pliers, and dropped it in a pail of water where it sizzled itself cool and then to the junk pile. A fresh microphone cartridge was slipped into the holder, the horn restored, and the conversation resumed—provided the arcs were still behaving themselves—all in the space of a minute or two. But since the terms of the contract called for a continuous 5-minute operation, we had to start all over again in establishing our endurance record on the air.

Some days we were fortunate—up to a certain point. Each microphone lasted for several minutes before its demise. The arcs could be adjusted continuously by turning the thumb screws, thereby maintaining an even gap and eliminating frequent striking. But then our tuning condenser would go bad, and that meant shutting down for the rest of the day. This tuning condenser was an elaborate-variable plate job in paraffin oil. It handled several thousand volts. Occasionally a spark would jump from rotor to stator plates, forming a carbon speck that shorted the condenser. Nothing less than taking the condenser apart, cleaning the plates with fine emery cloth at the site of the spark, and filling with fresh paraffin oil, would restore this particular Humpty Dumpty.

Our efforts continued through 1909 until the following winter. We tried, tried, tried. Once we held a steady conversation for six minutes. The contract loomed in sight. But the ranking Signal Corps officer who was to pass on our technical merits didn't happen to be on the job just then, so it didn't count. Finally, we dismantled the transmitter, placed it on the overgrown tugboat, and brought it back to our New York shop, where it finally sold for junk.

Our German confrères across the ocean couldn't understand our failure. With an
(Continued on page 64)



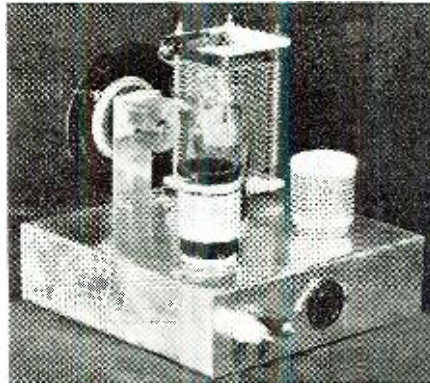
(Left) An early form of radio tube. Note the plate lead brought out through the glass. (Below) One of the earliest German receivers. The top piece is a coil tuned by hinging it away from the lower plate. Various connections were made to the posts around it, and a plug-in tap switch was the latest feature. (Right) The famous arc transmitter over which the author broadcasted over thirty years ago.

QRM Dodger

by IRWIN WOLFE, W2KTC

New York City, N. Y.

Mobility with complete stability is what the ham of today needs to beat the Q R M. The unit the author describes will enable the transmitter to be shifted at will in any of the amateur bands.



Rear and panel views of the QRM dodger. Each part has been so placed to minimize the chance of inter-element reaction. The air condenser has been used to add stability.

BACK in the days when King Spark ruled the kilocycles it mattered little what your frequency happened to be, just so long as it remained conveniently in the neighborhood of other amateur signals. Frequency was something that pretty much happened in a hazy sort of way; you wound up a coil of copper water pipe and there you were!

But the picture today calls for split-hair accuracy—deadly heterodynes scuttle QSO's by only a matter of cycles and the nightly tide of signals which surges and sweeps from hemisphere to hemisphere makes amateur radio a race which goes mainly to the swift.

Today it's the fellow with the mobile frequency who can creep out from underneath the cruel battering ram of some kilowatt that snags the DX: the man who moves about the band, putting his signal where he pleases who gets the most out of his time at the key or microphone. It comes as a pleasant surprise for many to learn that the stabilized type of electron coupled oscillator, such as will be described here, has a stability equal to crystal control, yet possesses the flexibility to cover all the high frequency amateur bands.

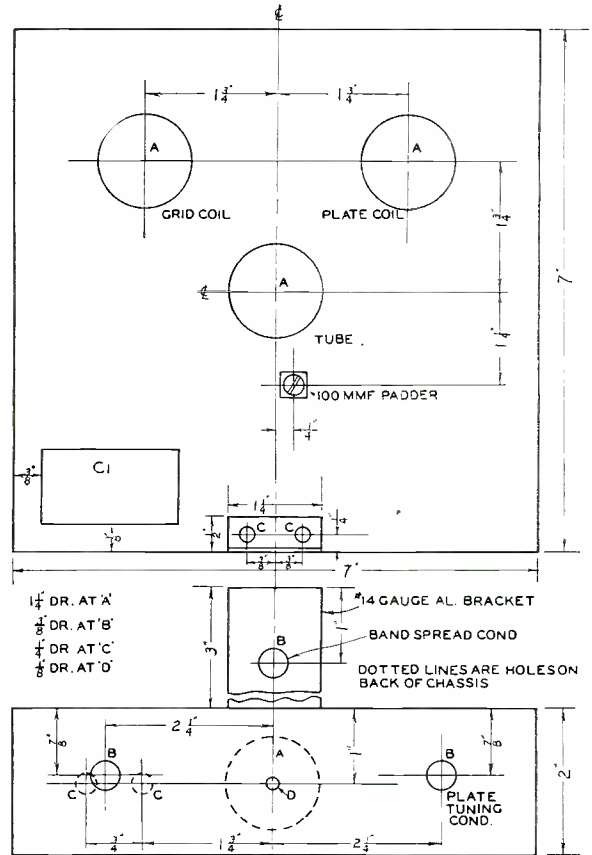
The unit to be outlined here employs a simple 6C6, yet has the dual virtue of being both inexpensive and easy to construct. It may be used to supplement your present crystal oscillator with a minimum of circuit changes, and the cost of the entire unit is only slightly more than that of a good crys-

tal! The outfit may be placed beside your receiver, operating from its own small power pack so that with the transmitter off you may still tune to pick your spot in the band with deadly accuracy.

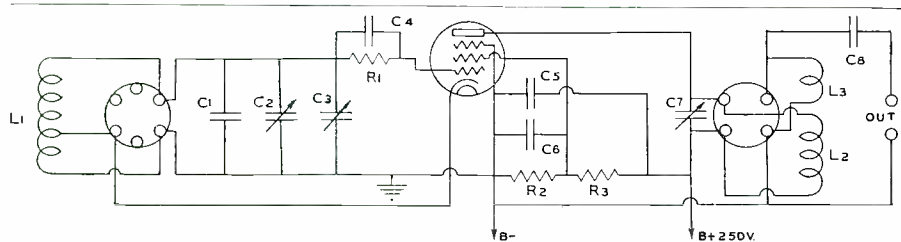
Adaptation of your present rig for this roving oscillator is a matter of but a few minutes work. Remove the crystal and insert a five-prong, plug-in coil, coupling the output of the electron coupled unit to your present oscillator, which is now converted into an r.f. amplifier. If the e.c. oscillator is placed very close to the original crystal stage, direct grid coupling is possible, but if located at a distance, or on the operating table, it will be necessary to link couple, employing a tuned grid circuit in the converted oscillator stage.

The unit fits within a standard 7" x 7" x 7" steel cabinet (Bud) with a calibrated dial of the planetary movement type on its black crackle face. A filament on-off switch and plate tuning control are also needed when this outfit nestles beside your transmitter.

(Continued on page 58)



Construction details.



The circuit diagram of the QRM dodger.

- C₁—750 mmfd fixed air Cardwell Type 1R-750-05
- C₂, C₃—100 mmfd Cardwell Trimair Type ZU-100-AS
- C₄—50 mmfd Cardwell Trimair Type ZR-50-AS
- C₅—0.005 mfd mica
- C₆—0.1 mfd mica
- C₇—0.005 mfd mica
- C₈—0.001 mfd mica
- R₁—50,000 ohms 1/2 w
- R₂—20,000 ohms 2 w
- R₃—30,000 ohms 2 w
- L₁—8 turns No. 16 tinned copper spaced to occupy 1 1/2" on 1 1/2" O.D. coil form (National

- XR20-6). Cathode tapped 3 turns from ground. (This coil with HI-C resonant to 3.5 mc)
- L₂—21 turns No. 18 D.C.C. close wound on 1 3/8" O.D. bakelite coil form
- L₃—(A) 10 turns No. 22 D.C.C. close wound on plate end of coil for direct coupling to grid of present crystal oscillator.
(B) 3 turns No. 22 D.C.C. close wound if remote control operated with link of 3 turns to grid or cathode coil of present xtl oscillator C₈ may be eliminated. (See Fig. 2A) Oscillator output is 7 meg

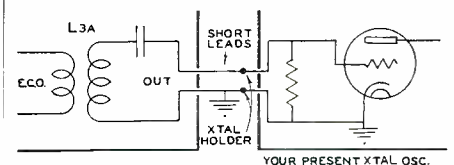


Fig. 2A. Coupling to former xtal mount.

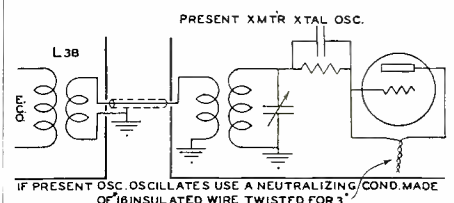


Fig. 2B. Coupling with special circuit.

THE NATIONAL QSO PAGE



ON the fly-leaf of every *QST*, official organ of the *American Radio Relay League*, appears the following statement: "Of, by and for the amateur."

Certainly we do not argue that it has, for the most part, been "of and by," but has it been "for" the ham? That is where the rub comes in. Just what does it mean to be "for" the amateur? That word has been taken for granted these many years, but its meaning not been enunciated to the satisfaction of those of us who have the interest of the ham at heart.

When the ARRL took on that slogan and told the ham it would live up to it, it took on a public trust. This is not of the nature that it can be easily assumed. A public trust is a serious thing and makes that body assuming it a quasi-public body. As such it is responsible to the public; and likewise the ARRL is accountable to *all* hams.

Has the ARRL faithfully discharged that trust? Can they say that they have put aside petty frictions and grievances to further the proposals of the majority of their members and hamdom in general, or have they turned far from that goal to indulge in petty politics, personal aggrandisement and gain? Have they made the supreme effort to retain the bands for us; have they asked and fought for new bands; have they been fair and above-board with those who trade with the ham? These are some of the questions which will be discussed here and on which we invite comments.

There are those of us who always say "Let George do it." and "whatever the ARRL does is OK." Can the pioneer spirit which gave birth to the ARRL be as dead as that? Where are the hams who fought for their rights? Where are the hams who, imbued with the feelings that things should be run in the "American Way," voted down each and every suggestion which had its foundation in dictatorial policies? When Maxim was with us, did any of us, whether members of the League or not, question that the League was thoroughly "American"? What has happened to the "old ham spirit"?

We are heartily in accord with the aims and goal of the ARRL as expressed in its charter and constitution. But how far has the present body strayed from those tenets which endeared the ARRL to every ham.

The time is ripe for action. No longer can there be said that things can "just go along as they are" for another year or so. Powers are seeking our bands, of this there can be no doubt. What are we going to do about it? What will the League do about it? Are we to expect the type of action indicated by the statement of K. B. Warner at the Hartford Convention, when addressing a large gathering of hams he stated, "You boys had better go after your WAC now because in four years there won't be any WAC." or words to that effect. **AND THAT FROM A LEAGUE OFFICIAL!**

As Ripley would say it, "Believe it or not" the League is *your* property, and the main reason that it has fallen off so far

ON this page the Editors of RADIO NEWS inaugurate an open forum for the discussion and dissemination of information relating to the amateur and the more serious side of his activities. Foremost will be an open symposium on the current ARRL situation and the preservation and increase of our ham bands. Serious inroads have been made, and lately at Cairo the European Powers took from the ham a slice of the forty meter band. This is but the forerunner of further steps and if their ingress is to be stopped, action—not words—must be taken at once.

We have not seen anything from the ARRL Board on this subject except that their members have from time to time said, "Leave it to us" or words to that effect. We hams did that and nothing has been accomplished except to induce a divided front and continuous bickerings. What the ham wants now—and for which there is crying need—is ACTION!

A very venerable ham of the old school has said, "It's no use. The ham is not interested anymore, except to take potshots at someone else." We do not believe this to be true, and we hope, sincerely, that the amateur will make use of this page to prove the Oldtimer wrong.

Unless a united action takes place at once, and petty grievances are forgotten in the work for the common good, it is but a few years before the ham will be a vanished race!

Get your shoulder behind the wheel! Make your Director do something about your bands. Back the ARRL to the limit, so long as it gives you ACTION, and if it fails, then change your representatives until one is elected who will give you what you need and want—ACTION!

from the purposes enunciated by its founder is that the ham himself is at fault. Too long has he, Indian-wise, sat back on his haunches and "Let George do it." "George" didn't do it, and the meanwhile those others who could see great financial or political benefit from the use of the ham bands have "done it" and finally the ham is on the way out.

There remains but one avenue of escape from complete oblivion and that is to talk it up, think it up, and get yourself a fist full of ACTION from your Director. Contrary to belief, the Director is supposed to be on the job 100% of the time, not just only at the Board Meetings. Why not have him work *all* the time, rather than just two days out of the year. Sure, he wanted the honor to be a Director and ran for office, but now he **MUST** go to work and produce, or else!

Whether you hams know it or not, your

last chance to remain hams is at hand. Don't muffle it. Federal investigations at Washington will do much to open up a lane for us to apply for greater bands on a share-with-the-commercials basis . . . if you put the pressure where it will do the most good. But you must get busy . . . NOW!

Write your Director now and ask him what he is going to do about the situation. Do not accept an evasive or incomplete answer. *You* elected him, and *you* can force him to give you ACTION. The League belongs to the ham, and the ham can, if he wants to, control it in every way. Let's *make* the League go to town for us!

One last shot. The League cannot and will not act without the hams putting pressure on it. It is up to those in the ARRL to supply that pressure and those outside to join up and do so with the avowed intention of busying themselves in League affairs so that representation at Washington can be as complete as possible, and so that we United States amateurs can get favorable action—regardless what the rest of the countries do.

We will welcome any letters on any subject pertaining to this or any other phase of amateur radio which will have as its goal the betterment of our conditions. Let's go, this is your last chance.

THE EDITORS.

Impressions of the 1938 ARRL Board Meeting
by FRED W. YOUNG, W9MZN,
ARRL Dakota Div. Director

A NUMBER of things impress the newcomer to the ARRL Board Meeting. I may have been a bit self-conscious and conspicuous as the only Director who had not attended at least one previous meeting. In any event, it can be said that my notions as to what constitutes representing a division differed widely from those held by most of the other members of the Board.

Prior to attending the meeting, I had sent a letter to every ARRL member in the Dakota Division advising what important issues faced the League. A brief questionnaire was included covering the major issues likely to come up as well as the proposed changes in the Constitution and By-Laws. It seems now that the meeting is over, that I certainly misunderstood section 14 of the Revised June 1937 Constitution and By-Laws which reads ". . . *They (Directors) shall keep themselves informed on conditions and activities in their respective divisions, and on the needs and desires of the League members therein, that they may faithfully and intelligently represent them in the Board of Directors.*" It is my understanding of this passage that the director is to present and attempt to carry out the wishes of the members when they are known. In each case, I voted as a majority of my constituents wished as shown by the questionnaires returned, and if their wishes did not come up as a motion by another Director, I presented such a motion.

For attempting to carry out such a policy, I was placed at some discomfort a

number of times, and roundly criticized by officials and Board members at others. A number of remarks were made concerning the questionnaire results which I took occasion to mention several times. Such results could not mean anything, some felt, because members were not properly informed on issues. Others dogmatically said that the membership took no interest in amateur affairs except concerning frequency allocations. Still others felt that a Director is not bound to follow the wishes of the majority in his division. Speaking of some of the desires of the majority of the Dakota Division membership reporting, one member of the Board said that they were "half-baked" which he later changed to "ill-advised" when I pressed him to justify his statement.

The Secretary took occasion to say that it was too bad that I was so poorly informed on League affairs (all I know is what I get from him), seeming to take the officious attitude that anyone who would criticize any of the League policies or practices must be uninformed.

As many of you know, I attempted to keep members informed and interested concerning the Board meeting by arranging with W9PZU to broadcast late developments, and during the meeting, brief summaries of its action. A member of the Board took occasion to say to me that such action was ill-advised because it tended to agitate the members concerning the Board meeting.

I was much impressed by the rather arbitrary presumption on the part of most Board members that the membership as a whole was not interested in League policies and affairs. Most of the Directors admitted that they had not made any attempt to canvass their divisions. Many took the attitude that even though the membership is canvassed or seemed interested, results would necessarily be based on misinformation or insufficient information, and therefore, in any case, not worth serious consideration. Thusly do members of the Board excuse themselves from any systematic effort to find out and carry out the wishes of their constituents. The results of my questionnaire canvass showed that members were interested in League affairs. To accuse the membership of being uninformed seems, in my opinion, very unfair because I think that the Director, QST, and the officials should see to it that it is informed.

Further, the Board seemed to take the position that the Director should wait to make up his mind on issues until he had heard the ideas of the other Directors, seeming to place much value in pro and con discussion. However, when I introduced a motion to permit *pro* and *con* correspondence to be published in QST over the Director's signature, the Board voted it down. Then they have the audacity to take the position that the Member is both uninterested and uninformed, and therefore unable to state a wish or opinion that can be counted to be worth anything. I feel that if anyone is at fault in this situation, it is the Board with this attitude.

I still have the conviction that the Directors should keep faith with the majority in their Divisions, that the ARRL is very largely a publishing concern *that as such*

can expect very little government or legislative support [italics, ours. Ed.]; and that the HQ officials are very anxious to keep important issues from members and to keep membership unrest well isolated. To this end they are opposed to conventions on the ground that they are badly managed and often indecent (admittedly some are). I feel that the real reason for this opposition, however, is because conventions permit amateurs to get together, find out what other amateurs are thinking, which might result in criticism becoming too articulate. They are also opposed to opening QST to any critical articles or differences of opinion for the same reason.

It is further my conviction, even after the Board meeting and the majority notwithstanding, that there should be a bigger part for the membership in League affairs, that there should be a budget of expenditures, that the League should be made much more than just a publishing concern, that the HQ station and HQ should be near the center of the US, and that a verbatim report of the Board meeting would be most interesting to the membership, presumably in their behalf.

Previously I felt that the HQ staff was at fault in the conduct of League affairs. Now I am definitely of the opinion that the fault lies with the Board itself. Some Directors demonstrate outright apathy; others a presumptuous tendency to speak for members whom they have never consulted. Most of them seem perfectly willing to take at their fact value the statements and attitudes of the HQ staff. Too many are on the Board without actually having been elected by members of their divisions through indifference to technicalities in qualifications.

I maintain that Directors should try to stir up interest and participation even if it results in competition in elections.

In my way of thinking, the HQ staff feel they have a good thing of it, and therefore, want no change. With things as they are, one can hardly blame them for that position, but I do feel that the Board should be more critical in its action.

If the membership is not taken into confidence, coming events are likely to weaken or destroy the effectiveness of the League. The Secretary mentioned at the meeting that it was his opinion that at the next international conference at Rome four years hence, the amateurs will lose both the forty and twenty meter bands. It is likely that no official QST mention will be made to amateurs at large of this condition. Should this loss happen as is predicted, the League will be severely criticised unless members are prepared for it by being acquainted with European conditions which will foreshadow this loss.

Again I must say that positive action awaits an alert, vigorous, and militant membership which must be solicited from the rank and file of those amateurs presently outside as well as inside the League.

Thank you, Mr. Young, for permission to print your most interesting letter on the ARRL Board meeting. It is good to know that there are one or two Directors who are attentive to the wishes of those who elected them, and who are wide awake to the dangers which face the U. S. Amateur. We hope that more of the Directorate will follow your lead, and that once

again the League will become the militant leader of the ham it was in the days gone by.
The Editors.

WHAT THE AMATEUR FACES

by GEORGE JOHNSON Acting Campaign Mgr.
San Francisco Bay Area
Progressive Radio Amateur Assn.

IT is a matter of record in Washington, D. C., that "the authorized representatives of amateur radio relinquished most of their frequencies for commercial development." This wholesale relinquishment of amateur frequencies caused thousands of good amateurs to discontinue their hobby. At each International Convention the amateurs were again filched of more privileges. The Madrid Convention made it unlawful for the amateurs to handle third-party message traffic. The great Trans-Pacific Traffic Association, which numbered among its membership most of the high power amateur stations of the West, dissolved. Hundreds of messages were transacted weekly between the Orient and the Coast—message to and from our citizens in foreign lands who could ill-afford the high toll of commercial radio traffic. The recently adjourned Cairo Convention did its part to insure the coming doom of amateur radio. At Cairo, it was decreed that foreign short-wave stations (not in the Americas) would be permitted to broadcast within the amateur 7200-7300 Kc. portion of that spectrum. When the Cairo Treaty is ratified the amateurs will be forced to tolerate the strange foreign bedfellows in what was once inviolate amateur territory. High power foreign stations will "smear" the 7200-7300 Kc. spectrum and chaos will prevail.

Within 20 years amateur radio will be as extinct as the proverbial Dodo Bird, unless a group of patriotic citizens takes matters in hand and calls the amateur fraternity together for a caucus. If the present national amateur radio body is utterly helpless and powerless in the defense of amateur privileges, and knowing that the organization is primarily a book and magazine publishing house, it should be evident to Mr. John Amateur that he cannot look to such an organization for help. [That is, unless it changes. Ed.]

For this reason the amateurs on the Pacific Coast have long been the proverbial Bone of Contention—the thorn in the side of the national amateur body. The unrest which came about when the amateur privileges were relinquished long ago at Washington, the bedlam which came about because of the loss of third-party message traffic with the Orient, the encroachment of our 7200-7300 Kc. spectrum as a result of the Cairo debacle, and now the assurance that our 20 and 40 meter bands will be taken from us at Rome—are some of the reasons why the Pacific Coast radio amateurs are taking matters into their own hands.

San Francisco Radio Club, Inc., one of the world's oldest and largest amateur radio groups with more than 170 of the city's best operators, and the newly organized Alameda County Radio Club with a large membership, are but two of the Coast organizations already founded for the purpose of appealing directly to the U. S. Senate for amateur radio aid.

The League is forbidden to partake of

this action because it is tax-exempt. In view of the fact that the laws of radio are made and administered in Washington, and not in Hartford, it seems logical that the amateurs' only recourse must be in the form of an educational campaign among the members of Congress in order to ask our law-makers to protect us before the Rome Convention is called to order. Heretofore nothing was accomplished, because the amateurs failed to appeal to the proper authorities. They were misled and deceived. They did not know that their League was tax-exempt, until recently. No mention of this fact had ever been made in the League's publications.

RADIO NEWS could perform a great public service to the radio amateur fraternity if its columns were thrown open to the frank exposé of amateur radio racketeering. The league could be invited to engage in the controversy, and the following fundamental questions could be advanced:

(1) Why is any person who subscribes to the League magazine made a member of an amateur league?

(2) Why are not only licensed U. S. radio amateurs permitted to be made members of the League?

(3) Why did the League accept tax-exemption under Section 101, subsection (6) of the Revenue Act?

(4) Why does the League choose to remain tax-exempt?

(5) Why did the League spend only ten dollars last year to influence legislation?

(6) If the Revenue Act, under which the League secures tax-exemption, prohibits the League from devoting a substantial portion of its activities to influence legislation, what excuse is there for continued existence of such a League? [Why shouldn't it change? Ed.]

(7) Knowing that the amateur 20 and 40 meter bands are to be taken from us at
(Continued on page 56)

1937 Maxim Award Goes to Oscar L. Short

WORKING 76 foreign countries and experimentation with antenna systems were among the chief reasons why Oscar L. Short, 20-year-old Webb City, Missouri, youth, was chosen by the American Radio Relay League as the most outstanding radio amateur under 21 for 1937. The honors consist of a trophy and \$100, awarded because of the efficiency of Short's station W9RSO and his operating proficiency. With different beam antennas he has recorded signal strengths of R9 from Australia and Russia, with correspondingly high strengths from Asia and South America. This has been done in the Middle-western United States, where DX conditions are not the best.

The Maxim award is also based on citizenship and character. The relay league had its pick of amateurs who did such yeoman service during the emergency flood broadcasting last year, but Short's amateur proficiency and general character brought him the honor. Amateurs generally show their public spirit best during emergencies. Short found many opportunities to show his public spirit by cooperating to eliminate interference between short-wave and broadcast band reception and by teaching interested persons something of short-wave radio operation.

Reared by an aunt and uncle, his father having died when he was six and his mother when he was thirteen, with limited facilities he has created on amateur station of better-than-average performance. With this equipment, used to maximum advan-



Oscar L. Short (W9RSO) 20-year-old ham whose exceptional performance won him the Maxim trophy and a cash prize of \$100.

tage, he has competed successfully in a number of amateur contests, in addition to a large amount of general operating. Despite over a thousand hours' operation annually, he found time to be a leader in high school activity, as president of the student council and in other posts, as well as participating in athletics. At the close of his senior year he graduated as the highest ranking boy in his class.

He is now enrolled in junior college at Joplin, Mo., where he is carrying on his scholastic work with the same spirit which made him an honor student in high school. He has been working short wave for seven years and has been licensed four years.

These qualifications of balanced activity and exceptional performance with limited equipment served to win W9RSO the award.

QUESTIONS and ANSWERS

F. T. K., New York City: I have a super-regenerative 5-meter receiver which employs a 6C5 detector in a self-quenching circuit. The hiss level is high, sensitivity low, and a nearby 5-meter amateur tells me that it radiates badly. Would another type of tube prove better than the 6C5 for this purpose?

Answer: A far better tube for your purpose would be a 6J5G type. In fact the 6C5 is one of the world's worst tubes for use as a super-regenerative detector. The values of grid condenser and leak for use with the 6J5G can be determined by experiment but usually a 50 mmfd. condenser and a leak of around 7 megohms will prove best. An excellent circuit employing this tube was described in the September, 1937, issue of RADIO NEWS, page 152.

J. W. E., New Haven, Conn.: Can I purchase an automobile receiver on the open market that will cover both the broadcast programs and the police calls?

Answer: The set for your requirements would be a special job, capable of tuning as high as 2500 kilocycles, which would cover both municipal and state police radio stations. Consult with your authorities regarding the laws on using a set of this type in a pleasure car.

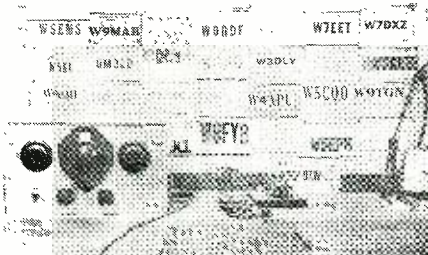
J. P. S., Rutland, Vt.: I have a new receiver which tunes up to 70 megacycles. It works fine except in the highest frequency range, and there my little 3-tube super-regenerative receiver can run rings around it for sensitivity. Why is this and is there anything I can do to improve it in the ultra-high frequency range?

Answer: The main reason for your complaint is that to date we know of no all-wave receiver that is efficient at frequencies higher than about 30 megacycles. This is due to the fact that ordinary tubes are of little use as r.f. amplifiers, oscillators, or mixers at these very high frequencies, and further, that special low-loss circuits are necessary. It is not practical to build such circuits into all-wave sets. The solution to your problem lies in building either a converter or an r.f. pre-selector to use ahead of the receiver for tuning the ultra highs.

K. K., Baltimore, Md.: A friend of mine suggested that I completely enclose the speaker compartment of my console. He said I would obtain deeper tone to make for more enjoyable quality. Is this correct?

Answer: Your friend's suggestion is not a good one. Your speaker would not be operating efficiently and it would cause distortion.

(Continued on page 58)

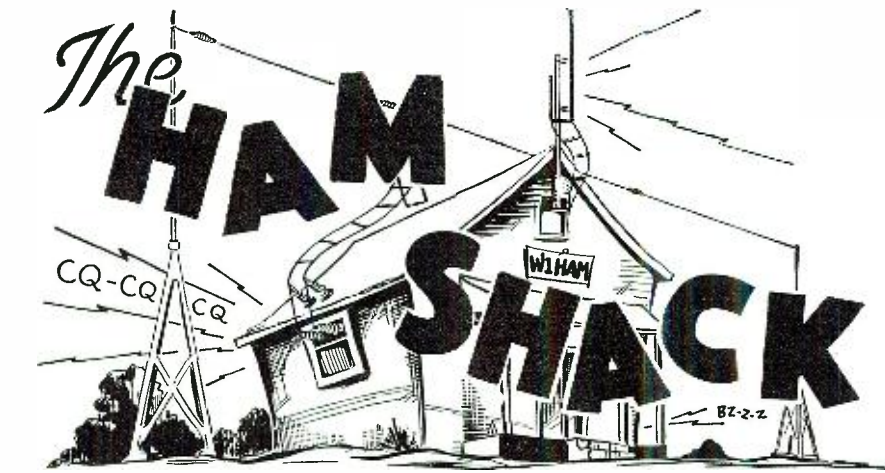


The rig W9RSO used for the QRR work.

THIS MONTH

Just the thing that the ham and serviceman has been looking for—an A.C.-D.C. amplifier. With 4 watts output it makes an excellent modulator driver.

by LOUIS J. GAMACHE, W9RGL
Standard Transformer Corp., Chicago, Ill.



The winners of the RADIO NEWS—STANCOR-R.M.A. Show mystery amplifier contest are announced by the judges as follows: 1st Prize: Mr. Joseph Mendez, 1644 N. Kildare Ave., Chicago, Ill., with the high score of 86 points out of a possible 100. 2nd Prize: Hanen (undecipherable) Cozzens, Chicago, Ill., with a score of 80 points. 3rd Prize: D. Pollachek of Chicago, Ill., with a score of 79 points. Congratulations to these winners. Solution is contained in the article.

RECENTLY, when a d.c. amplifier was needed by a ham in a location with only that type of power available from the mains, none was found to be readily usable which would at once fill the bill with compactness and speech frequency requirements. After the present one was designed it was thought to continue the development and make a first-class a.c.-d.c. job of it as well, so that should the ham change location, the speech amplifier would not be outmoded.

Four watts of undistorted output were provided, together with the usual rugged construction required by the average ham installation. The output was more than sufficient to drive a pair of class B tubes such as the 801 or T20. For that matter the amplifier made an excellent small p.a. system and also a driver for higher powered drivers should they be used.

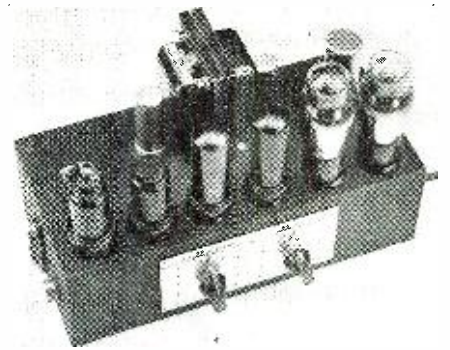
The tube line-up consists of a 6J7 input stage resistance coupled to a 6C5 which was in turn transformer coupled to a power of 25L6's. The rectifiers were two 25Z5's. In adding all of the filament voltages together, a total voltage of 112.6 volts was required to operate the filaments in series. Since the line voltage available was 115 volts, and because tubes today are manufactured to withstand a 10% variation in filament voltage without shortening their life, no line cord resistor was used. The additional 25Z5 tube inserted mainly to eliminate the aforementioned resistor may also be used to supply field exciting current for a speaker. However, in the present circuit this was not done because a magnetic speaker, or the 500 ohm line to the modulators, was used.

Sufficient gain was obtained from the 6J7 to permit operation directly from a crystal microphone, and the overall gain of the entire amplifier was conservatively found to

be 89 db. Provision is also made for a high impedance phonograph unit which works directly into the 6C5. Fixed bias is supplied by a Mallory bias cell and the 6J7, pentode connected, capacity coupled to the gain control of the 6C5 serves the purpose of mixing volume from the phonograph as well as the gain from the crystal microphone input.

A tone control consisting of a one-half megohm rheostat in series with a .01 mfd. condenser serves to control the high frequency output of the amplifier and to produce the effect of a greater low frequency response at lower volume levels. Most important of all is the fact that this tone control acts as an impedance shunted across the output transformer, a condition necessary in pentode as well as beam type tubes.

The 6J7 input is decoupled by use of a resistor and condenser to avoid oscillation and feed-back. Because it is quite customary to ground one side of the a.c. line, and because this amplifier was to be an a.c.-d.c. unit, it was necessary to "float" the chassis. This term is used in the industry to indicate that the "B" negative of the power supply does not return to the chassis itself, which is grounded to the circuit through .1 mfd. condenser.

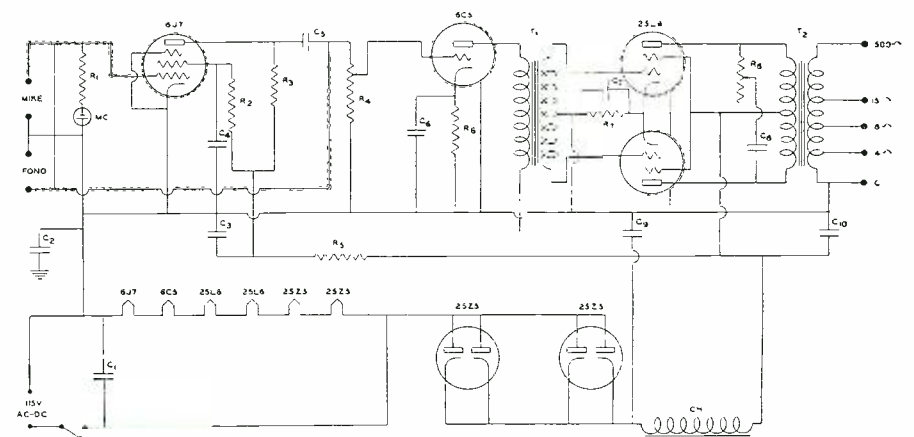


In mounting the parts to the amplifier, the picture should be followed for hum-free results, and for efficient action.

Actually, this last condenser acts as a direct ground in a.c. application. By "floating" the chassis it was possible to insulate the amplifier in such a manner that the possibility of a shock to any person touching a radiator or grounded object, and at the same time touching the chassis, was eliminated.

The chassis is a standard one, measuring 5"x10"x3", finished in black crackle.

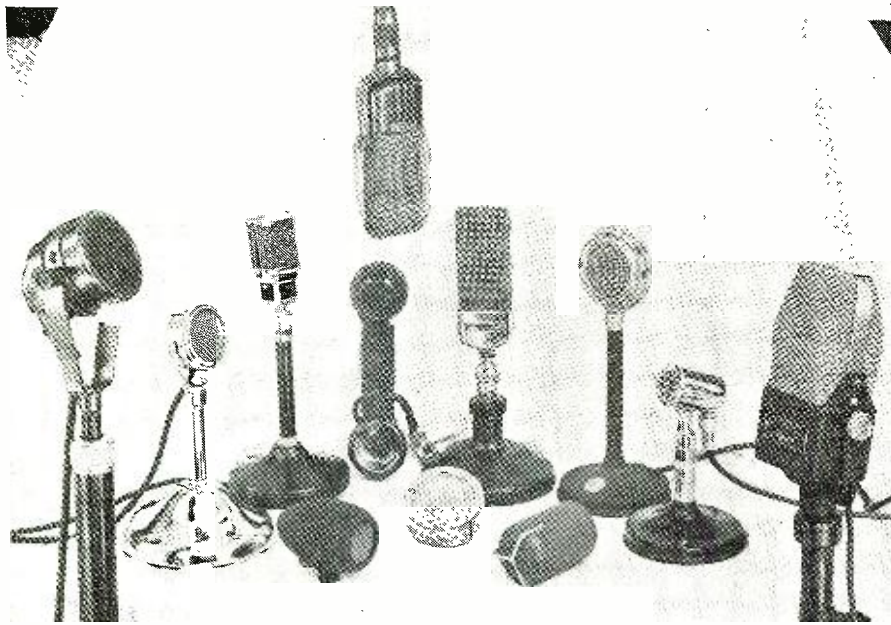
-30-



The circuit diagram of the A.C.-D.C. 4 watt audio amplifier.

Transformer—Stancor A-62-C single plate —pp
grids
C₁, C₂, C₄—.1 mfd. 400 v. paper
C₃—.25 mfd. 400 v. paper
C₅, C₈—.01 mfd. 400 v. paper
C₆, C₇—.10 mfd. 25 v. elect.
C₉, C₁₀—15-15 mfd. 250 v. elect.
R₁, R₂—1 megohm, 1/2 w.

R₃—1/4 megohm, 1/2 w.
R₄—50,000 ohms, 1/2 w.
R₅—3,000 ohms, 1/2 w.
R₆—200 ohms, 2 w.
R₇—1/2 megohm vol. control
R₈—1/2 megohm tone control with switch
MC—Mallory cell
CH—30 hy. Fil. choke (Stancor C-1002)



An even dozen different microphones. Some are high impedance, some low. The trick is to mix these different types and control the gain so that the output level from the speakers is always even, no matter what the input level.

IT is the purpose of this article to consolidate in a general discussion the various methods used in Broadcast, Amateur and Public Address systems for the mixing of microphone circuits, the choice of mikes for a given application, and various methods of monitoring the speech output using both visual and audible indicators. Tremendous improvements in many types of microphones during recent years has placed a wide selection of high-fidelity units within easy reach of the layman.

Choosing the Microphone

The best manner of mixing of two or more input circuits depends largely upon the output level of the microphone to be used. It follows that amplifiers of low gain—"85 db. overall gain or lower"—intended only for phonograph pickup, etc., will require pre-amplification ahead of the first stage in order that the low output of the microphone be brought up to the equivalent of the pickup for which the amplifier was designed. A comparison of the most popular types of microphones shows the outputs in decibels "down" from zero level to be as follows: These are "average" levels.

Phonograph Pickups	—15 db.
Carbon Microphones	—44 db.
Crystal Microphones	—78 db.
Dynamic Microphones	—85 db.
Condenser Microphones	—95 db.
Velocity Microphones	—100 db.

To one unfamiliar with various types, it might be understood that a microphone of say —40 db. would be superior to one of far less output or perhaps —90 db. Such is decidedly not the case since fidelity is the governing factor, not high output; and the —90 db. level mike would naturally contain the requisites of good quality response and a far better over-all sensitivity to a weak sound. On the other hand, certain applications require high outputs for portable equipment, etc., which may or may not

be used as quality devices. For example—an amateur portable transmitter designed for compactness would use a microphone of high output, such as a single button carbon type. A remote amplifier such as used by the broadcast stations would use a microphone of small physical size and yet one of medium or low output in order to provide a high degree of fidelity together with the necessary sensitivity for greater coverage.

Another very important factor in the choice of microphone is the ability of the mike to discriminate in its directional properties to best advantage. In the early days of broadcasting, this feature was little appreciated and only in the past few years has much attention been given to directional characteristics in obtaining special sound pickup effects, and also in the elimination of unwanted sounds from reaching the amplifiers through these directional units.

As a comparison, let us see which mike will fulfill individual requirements. First, a single or double button carbon mike can well be used for amateur phone transmitters of both portable and fixed variety. The advantages are high output and ruggedness and low purchase cost, against the disadvantages of carbon hiss which is caused by current flowing through the granules, and the fact that a source of current must be provided from a battery or specially filtered low voltage supply. The carbon microphone is fast losing popularity and rapidly being replaced by the crystal types for amateur purposes, although the latter require more amplification. The features of crystal mikes are reasonably high output, small size, no polarizing voltage, and special types for obtaining maximum effectiveness at speech or voice frequencies. The single or dual diaphragm types are most commonly used by the amateur fraternity, as these types provide sufficient sensitivity for medium or close talking and cover a good portion of P.A. requirements. The multiple cell types are used where a greater range of response is needed, together with in-

Mikes,

creased sensitivity, although their cost is greater than the diaphragm types. Attachments for increasing the directional response are also obtainable for use where feed-back or other unwanted pickup is present.

The dynamic types are widely used in movie and sound recording as well as being highly suited for broadcast studio and remote pickups. These units are generally of low impedance and consist of a permanent magnet of high grade and a voice coil with approximately 25 to 50 ohms impedance. The merits of this type are many, some of which are—extreme ruggedness, high fidelity response, semi-directional pickup and the ability to be used in a windy location where other types might be very ineffective. This type is probably less subject to changes due to dampness than any other type and is, therefore, the ideal unit to use for outdoor applications. The cost is based upon the alloy used for the magnet. In order to obtain the compactness of other microphones, it is necessary to use a special alloy to make possible a large density of magnetic flux in a small space. The voice coil must be both light and durable, and great care is required in its assembly. Midget types are available for public address work which do not require as wide a range as would a unit in a broadcast studio.

Condenser microphones are now practically obsolete and were largely used in broadcast and motion picture studios. Their main advantages were sensitivity and fidelity, but these features were offset by their bulk, low output, and the fact that they usually contained a battery operated pre-amplifier in the mike shell itself. They were sound pressure operated and great care was always required to prevent blasting of the mike from loud passages and wind.

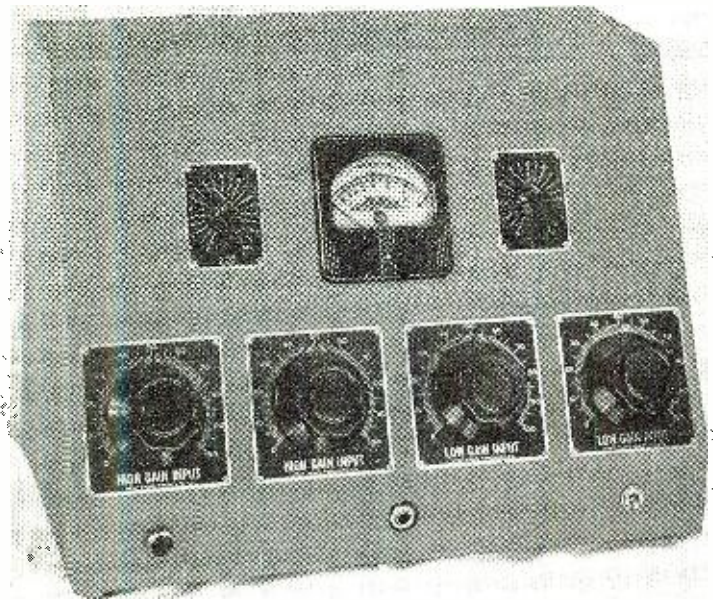
The velocity or ribbon type microphones are widely used for broadcast studio pickups where the position of the soloist may be more or less stationary. The sensitivity is very high as compared to other types and their fidelity is excellent, providing all of the audio range used in modern transmitter capabilities. The velocity is a directional type "mike" and is highly recommended for the better P.A. units which are capable of using them to best advantage. The great disadvantage of this type is a tendency to be very noisy when used in a windy position. This is readily understood, as the ribbons are free to move "back and forth" with very slight sound or other pressure and, therefore, cannot discriminate. Many low cost velocity mikes are now available to the radioman, and their use has been almost universally adopted for a good all-around mike.

Other types of microphones include the now popular electro-static velocities which combine the sensitivity of the ribbon types and the ruggedness of a carbon or dynamic. Although not adapted to high broadcast requirements, they offer, at low cost, an excellent unit for the P.A. man. The earlier

Mixers, and Monitors

by OLIVER T. READ, W9ETI
Engineer, Utah Radio Products Co.
Chicago, Illinois

A detailed description on how to choose the right mike, use the proper mixer circuit, and employ the correct monitor.



The four input channel amplifier which the author used in making the experiments described in the article. Note the VI meter in the front.

units required a polarizing voltage which recently has been eliminated, making them more convenient to use.

The above discussion shows the principal advantages and disadvantages of types universally used, and the selection will, of course, depend almost entirely upon the applications most used and their cost.

All of the various types are shown in the photo and comparisons made with the amplifier shown.

Mixer Circuits

The type of mixer best suited to an amplifier will depend almost entirely upon the number and types of microphones used. It will also depend, to some extent, upon the overall gain of the amplifier, the amount of room available, the cost and whether it is desired to "ride gain" as in "Broadcast," or if the gain may be pre-set to a given level. In Fig. 1A, we find a simple one channel input, which is nothing more than a potentiometer used as a voltage divider which controls the amount of audio volts to the following stage. When this control is used at the microphone source, it is termed "low level mixing" and when it is placed in a high-impedance circuit such as that of Fig. 1B is termed "high level mixing."

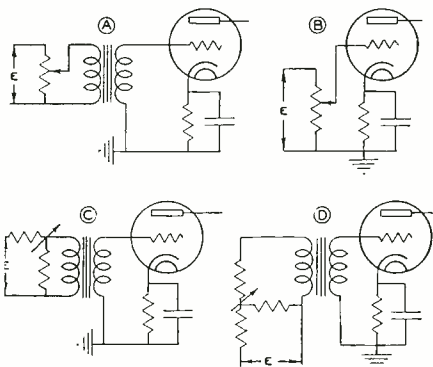


Fig. 1. Several mixer circuits.

Various methods of control are possible and each has certain advantages over others. Consider the mixing of two inputs,—a crystal mike and a dynamic mike. The crystal mike has high impedance and is generally controlled at a point of high level in the amplifier, such as after the first stage where a simple control, as in Fig. 1B, will permit a high resistance potentiometer to be used. However, if the dynamic microphone is of low-impedance, we must provide a mike-to-grid transformer at the amplifier to bring the impedance to a value high enough to be of use. On the other hand, we can control the gain of the dynamic "50 ohms" or so before any amplification is applied by using a 50 ohm pad between the mike and its associated input transformer, as shown in Fig. 1C. We cannot use a potentiometer in this position, or a direct short would result at the low volume setting of the control. To compensate for this condition, a series resistance is used with a shunt resistance, which is varied with the rotation to maintain a uniform "not actual" load to the transformer input. The "T" pad shown in Fig. 1D would be far more satisfactory from a standpoint of maintaining a fixed resistive load both to the input and output of the control. This method permits maximum to minimum settings of the control without greatly disturbing the primary impedance of the input transformer. Space will not permit any complete discussion on various types of "L," "T," or "ladder" type controls as this subject is better suited for the Broadcast operators' own requirements.

The output of the low impedance microphone transformer connects to a high-impedance grid.

In an amplifier using both a high and low impedance mike, it is usually necessary to use two independent pre-amplifier stages. The outputs may be mixed electronically by using one of the twin triodes such as a 53, 6A6, or 6N7. The two grids receive individual inputs and by connecting the two plates in parallel, the combination

of the two signals may be fed to the additional stages. Such a circuit arrangement is shown in Fig. 2. Here we find both a "high" and "low" gain microphone connected to the amplifier.

It is far easier and more flexible to use the same types of microphones, but there are many cases where this is not desirable.

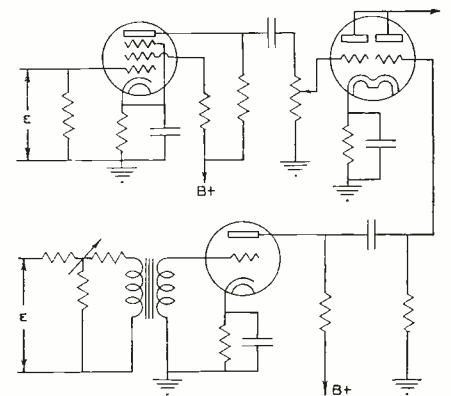


Fig. 2. Mixing different levels.

For most P.A. applications, the use of up to four mikes may be used to good advantage, and for an example, let us assume that we have four high impedance types which may be crystals, velocities, or one of the dynamics with self-contained mike to grid transformers.

Perhaps the one best suited would be of the kind used in the amplifier described in the July issue of this magazine.

The essential circuit is shown in Fig. 3. Mixing is accomplished by R1, 2, 3, and 4 which are ordinary potentiometers. While the use of regular carbon types of controls will suffice in this position for general public address work, they are not used for high-fidelity sound work or broadcast due to the fact that the sliders will cause even the slightest contact noise to be greatly amplified by the following stages.

(Continued on page 62)

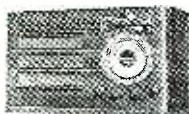
What's **NEW** in Radio

TECHNICAL BOOK & BULLETIN REVIEW

Hammarlund Mfg. Co., New York City, is presenting a new industrial socket. This is a heavy-duty, wafer socket designed especially for use in sound equipment and similar apparatus where a great many tube changes cause socket failure. Featuring two-piece construction, this socket is built of low loss natural color bakelized canvas. Contacts are heavy, non-corrosive metal reinforced with sturdy steel clamps to insure perfect electrical contact and long life.

RCA Manufacturing Co. has announced three additional receivers and two Victrola models for AC-DC mains including a 7-tube console, an 8-tube Console Grand, an 8-tube End Table model, a 7-tube RCA Victrola End Table, and a 7-tube RCA Victrola Console.

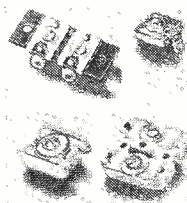
Crosley Radio Corporation, Cincinnati, Ohio, announces a Super 8 table model with push button tuning. Either knob or push button tuning may be used interchangeably without throwing a switch. The tuning range is continuous from 525 to 22,000 kc.



Hygrade Sylvania Corp. announces their type 1231 triple grid amplifier tube primarily for use in television video amplifiers and other similar applications. It may be used as a pentode, tetrode, or triode.

A low-priced, hinge-mounting auto antenna especially designed for use with small auto radios has been announced by the Parts Division of the RCA Mfg. Co. Extending to 47 inches, it has high signal pickup qualities and is easily installed on any type car.

P. R. Mallory and Co., Indianapolis, announce a new line of trimmer and padding condensers. All types are made with India ruby mica and are designed to prevent drift, or change with temperature or moisture.



National Union Radio engineers have developed a novel cathode ray tuning indicator tube. The National Union 6AD6G is comprised of a circular target, two ray control electrodes, and a cathode, indirectly heated by a 6.3 volt, 150 milliamperere filament.

The "Beamascope," a new type antenna built into the receiver, has been introduced by the General Electric Co. When the receiver is first installed in the home, the "Beamascope" is rotated and left in the position of minimum noise pick-up.

The American Microphone Co., Los Angeles, has introduced a new unidirectional dynamic microphone. The energy response pattern is a cardioid, which gives a wide pick-up angle from the front, with an apparent dead rear field.

A new line of midget glass tubes is being produced by the Arcurus Radio Tube Co., Newark, N. J. The new tubes range from a height of 2 3/4" to 3" depending upon the type. They are designed for use with standard octal sockets.

Technical Appliance Corp., New York City, is presenting a noise-suppressing all-wave antenna system. It handles both standard and short wave signals.

Two new catalog sheets covering microphone stands and accessories have been issued by the Eastern Mike-Stands Co., Brooklyn, N. Y.

The Micamold Radio Corp., Brooklyn, N. Y., announce their "Ballast-trois," a novel type of ballast tube (or plug-in resistor) designed for replacement purposes.



Allied Radio Corp., Chicago, has issued a chart for the use of experimentors in winding plug-in coils. Information concerning wire size, number of turns, and spacing is thus made readily available.

A representative stock of high nickel content alloys in various shapes and sizes, particularly Nichrome and Nichrome V, is now available for

immediate delivery to the Pacific Coast trade, according to Driver-Harris Co., Harrison, N. J. Stocks are maintained in Los Angeles, San Francisco, and Seattle.

Special vents in the new Cornell-Dubilier type BR "Blue Weaver" electrolytics permit normal dissipation of the harmless, odorless electrolytic vapor, and afford a great safety factor under all operating conditions. Tubular, compact construction provides ease of wiring into circuit and a new varnished sleeve is spun-over at both ends to prevent possible short-circuits of leads to the aluminum container.



Raytheon Production Corporation, Newton, Mass., announces four new receiving type tubes: OA4G, a gas filled cold cathode triode; 4A6G, a twin-triode power amplifier; 6P5G, an octal based triode; and 6S7, a low drain R.F. pentode in a metal bulb.

Ward Leonard Electric Co., Mt. Vernon, N. Y., is now marketing a new Heavy Duty Midget relay. The relay is equipped with extra large silver-to-silver contacts to provide a maximum contact rating of 10 amperes up to 125 volts, A.C., 10 amperes up to 22 volts D.C., or 2 amperes from 23 to 125 volts D.C. They are available only with single pole, double break, normally open contacts.

Metal-clad, bakelite-insulated, fixed resistors are now offered by Clarostat Mfg. Co., Brooklyn, N. Y. The resistance wire, wound on a special heat resistant bakelite core, is permanently imbedded in moisture-proof bakelite which in turn is encased in a metal jacket. They are available in resistance values from 10 to 10,000 ohms.

General Radio Company, New York City, is now making available the Variac Transformer, an adaptation of the Variac principle to give voltage adjustment over narrow ranges. It may be had in five stock models.

Emerson Radio and Phonograph Corp., New York City, have announced a new series of small radios known as the "Little Miracle" line. They are superhet receivers with five working-tube circuit and two double purpose tubes giving the equivalent of seven tube performance. They operate on AC or DC and cover the Standard American Broadcast band and Police calls.



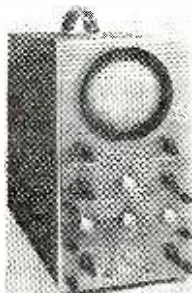
A new "Lafayette" all-metal console amplifier which affords complete monitoring facilities has been announced by the Wholesale Radio Service Company, New York City.

Distinguishing between heavy-duty and normal-service applications, Hyvol transmitting condensers in both oil-filled and wax-filled types are announced by Aerovox Corp., Brooklyn, N. Y.

Wind-impeller Electrical Works, Ellsworth, Ia., is now producing a new 1000 watt, 32 volt wind-driven, direct drive generator.

Several pickup units for transmitting sound, vibration, impact, heart-beat, and other phenomena into suitable electrical terms that can be observed as pattern on the cathode-ray oscillograph screen, are now available through Allen B. Dumont Labs., Passaic, N. J.

A new high power Generator of unusually small size has been developed by the Carter Motor Co., Chicago, Ill. It will deliver up to 500 volts at 200 mills and weighs less than ten pounds.



A new free amplifier catalog, No. 600-C has just been released by Thordarson Electric Mfg. Six models with outputs ranging from 8 to 60 watts are shown.

ENGINEERING ELECTRONICS, by Donald G. Fink, 348 pages. Price \$3.50. Size 6 1/4 x 9 1/2 inches. Published by McGraw-Hill Book Company, 330 West 42nd Street, New York City.

Here is a practical book for the engineer who has a good foundation in electricity but doesn't have specific training in electronic concepts and methods. It covers the fundamentals of electron physics, tube structures, and applications. The practical side of the subject has been developed in a series of type problems and solutions. The book is adaptable to an introductory course for junior and senior college students.

RADIO MASTER ENCYCLOPEDIA, over 500 pages. Price \$3.50. Size 7 1/2 x 11 inches. Published by United Catalog Publishers, Inc., 258 Broadway, New York City.

This is a classified directory of 1,000 manufacturers of various radio parts and allied equipment. It is issued as of April, 1938. The directory is clearly indexed and cross-indexed as to classification, the manufacturer's name and address, etc. Trade marks, trade names, and also registered names are listed. There are numerous illustrations. The publisher has a six months' revision service to keep the book up-to-date.

FOUNDATIONS OF WIRELESS, by A. L. M. Sowerby, 266 pages. Second Edition. Size 5 1/4 x 7 1/2 inches. Published by The Wireless World, Iliffe and Sons, Ltd., Dorset House, London, England.

The book's 266 pages divided into 18 chapters starts with the simplest elementary principles of radio. It explains in detail the separate parts of a receiver and later combines them to form simple circuits. Vacuum tubes are given considerable attention and the usual methods of performance-analysis are discussed. This second edition has been brought up-to-date by the addition of new material on negative feedback, automatic tuning, and automatic selectivity control.

HAMMARLUND'S 1938 SHORT WAVE MANUAL, 32 pages. Price 10 cents. Size 6 x 9 inches. Published by Hammarlund Mfg. Company, 424 West 33rd Street, New York City.

This new short-wave manual presents considerable interesting material for the short-wave experimenter, amateur, and the short-wave listener. Included in its pages are descriptions of one, two, and three tube, a.c. and battery type receivers, a s.w. converter, a two-stage preselector, and an ultra-high frequency super. For the Ham there is a modern crystal controlled transmitter, and other equipment. The manufacturer points out the fact that all apparatus described in the manual was built and tested in the Hammarlund laboratories.

A Beginner's 160 and 10 meter Phone Transmitter

by A. HENRY RIESMEYER, exW8CHT
Research Engineer, New Kensington, Pa.

The author describes a simple rig which has a few new wrinkles which will interest even the old timer.

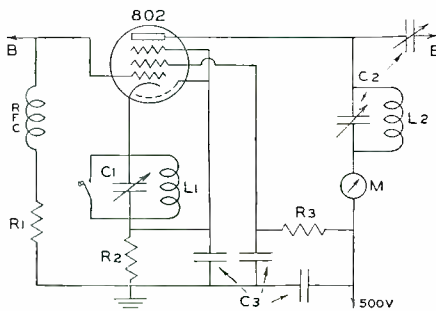
THE heart of any transmitter, whether a 10 watt or a "California Kilowatt," is the oscillator and buffer stage. The features of this unit should be low cost, simplicity, efficiency, and the power capability to control and excite a higher power amplifier with sufficient gain. Any number of oscillators, exciters, and low power transmitters have been described in numerous radio articles. Some of these could be used or combined to give the desired results. However, the results for best operation would be questionable unless designed by one who has had wide experience.

A low power transmitter constructed by the author led to many ideas and plans which have finally come to a head. In itself it can be considered a self-contained, all-around transmitter. This ought to be ideally suited to the beginner since it covers the 160 and 10 meter phone bands. (Of course it could be used for any of the other bands.) It also could be used later to excite a higher power amplifier employing an 80S, T55, 11K54, or 100TH.

The R. F. Section

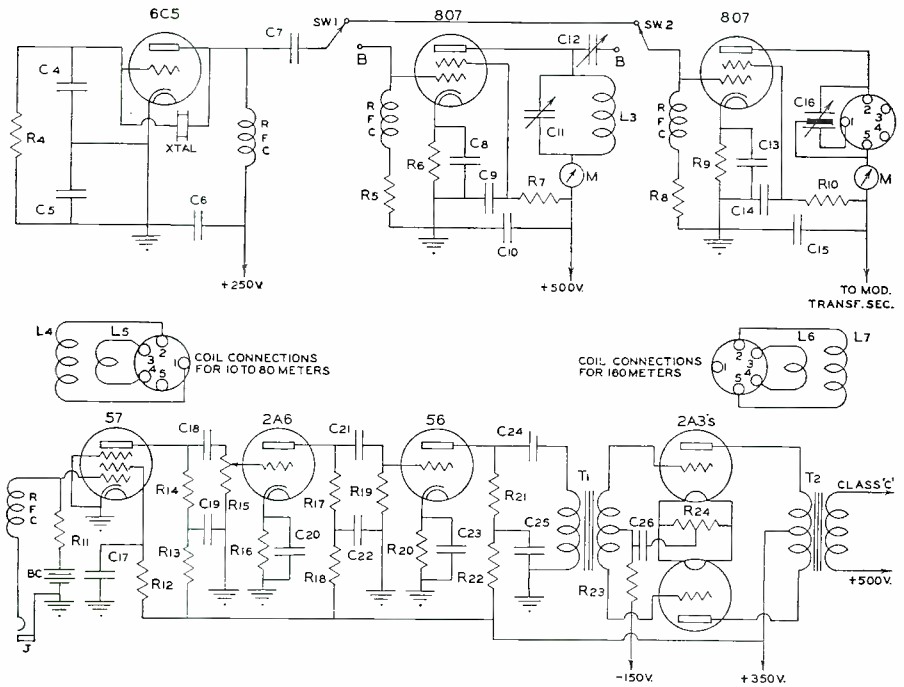
The oscillator is a simple Pierce circuit employing a 6C5 tube. The simplicity of this circuit is one of its advantages, but the real reason for using it is that almost any crystal will oscillate in this circuit. Another advantage is that it does not require any tuning device. This tube delivers sufficient excitation for the tube used in the following stage. This is very important and is one of the things that every beginner should keep in mind. This also applies to the tube used preceding any stage.

The output of the 6C5 is coupled through a 100 mmfd. mica condenser and switch to



Circuit of alternate buffer.

- R₁—8,000 ohm, 1 watt
- R₂—800 ohm, 10 watt
- R₃—1400 ohm, 20 watt
- C₁—50 mmfd. variable
- C₂—50 mmfd. variable
- C₃—1005 mfd. mica
- M—Zero to 100 ma.
- L1, L2—See coil data



The circuit of the 160-10 meter transmitter.

- R₁, R₂—25,000 ohm, 1 watt
- R₃, R₄—250 ohm, 5 watt
- R₅, R₆—25,000 ohm, 10 watt
- R₇—10,000 ohm, 5 watt
- R₈—5 meg., 1/2 watt
- R₉—1 meg., 1/2 watt
- R₁₀, R₁₁, R₁₂—20,000 ohm, 1/2 watt
- R₁₃, R₁₄, R₁₅, R₁₆—50,000 ohm, 1/2 watt
- R₁₇—5 meg., vol. control
- R₁₈, R₁₉—2,500 ohm, 1/2 watt
- R₂₀—5 meg., 1/2 watt
- R₂₁—10 ohm ct.
- C₁—75 mmfd. mica
- C₂, C₃—0.1 mfd. mica
- C₄—100 mmfd. mica
- C₅, C₆—0.005 mfd. mica
- C₇, C₈—50 mmfd. variable
- C₉, C₁₀—100 mmfd. mica
- C₁₁, C₁₂—50 mmfd. variable
- C₁₃, C₁₄—0.005 mfd. mica
- C₁₅—100 mmfd. split stator
- C₁₆—5 mfd. 400 volt paper
- C₁₇, C₁₈—25 mfd. 400 volt paper
- C₁₉, C₂₀—8 mfd. 450 volt electrolytic
- C₂₁, C₂₂—25 mfd. 25 volt electrolytic
- C₂₃—Zero to 150 ma.
- T₁—Single plate to p.p. grids
- T₂—Class AB 2A3 plates to 5,000 ohm
- RFC—2.5 mh. r.f. choke
- BC—Bias cell

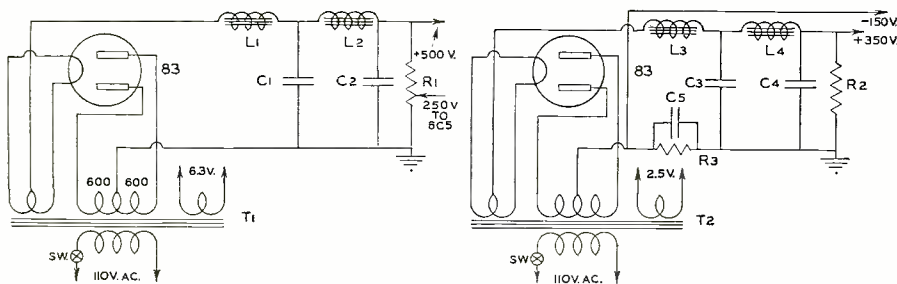
(Note: Diode plates of 2A6 are not connected.)

excite either the doubler or the final amplifier. This switch is really two small toggle switches. SW₁ may be any well insulated switch and SW₂ is one having insulation suited for high frequencies. (Not hard rubber or such, but alsimag, isolantite, or micalex, etc.) When the switches are in "A" position they couple the oscillator directly to the output stage and when in "B" position they couple in the doubler stage between the oscillator and out-put stage.

The doubler stage used only for 10 meter operation may consist either as shown in Figure 1, or as shown in an alternate circuit, Figure 2. The circuit shown in Figure 1 is the simplest and should be used when a 40 meter crystal is available and when the fewest controls are desired. This stage (Figure 1) employs an 807 type tube and is hooked up as a doubler using both cathode and grid leak bias so that if the voltage is accidentally applied when no excitation is present the plate current does not exceed its rated amount. The plate circuit of this tube is tuned to twice the frequency of the oscillator out-put. The reason that

this tube is used instead of another of the beam-power type tubes is because it requires no neutralization when used as doubler or as a straight-through amplifier and has very good out-put with very little excitation. The alternate circuit (Figure 2) employs an 802 type tube in a double-quadrupler circuit. This allows the use of an 80 meter crystal in the oscillator, which is cheaper than a 40 meter crystal, but necessitates the use of another tuned circuit. The most interesting feature of this circuit is the possibility of operation on 5 meters with crystal control starting with a 40 meter crystal. That is something!

The final amplifier is another 807 tube whose plate and screen grid are both modulated for phone operation. This stage is coupled to the doubler (when used) through a 50 mmfd. variable condenser to control the excitation. Grid leak and cathode bias is employed for the same reason as mentioned above. The plate tank condenser circuit is the only novel portion. This condenser is a 100 mmfd. variable (with good insulation) of the split stator type. This



Component parts for the power supplies.

- R₁—30,000 ohm, 100 watt
- R₂—25,000 ohm, 100 watt tapped
- R₃—1000 ohm, 25 watt
- C₁, C₃—2 mfd. filter cond.

- C₂, C₄—4 mfd. filter cond.
- Sw.—Single pole single throw switch
- L1 & L3—Swinging choke 5 H
- L2 & L4—Filter choke 12 H

allows the use of either the total, or half, effective capacity to be employed by simply connecting the sections in parallel or series. This method gives just about enough capacity for the proper L-to-C ratio on either 160 or 10 meters. The out-put of the final is about 30 watts on any band.

The Audio Section

The audio amplifier and modulator delivers 15 watts with only 2.5 per cent distortion and has an overall gain of about 125 db. The frequency response is flat from about 30 to 10,000 cycles.

The feature of this amplifier and modulator is that besides having enough power to modulate the small transmitter just described it is also capable of handling Class B modulators having an out-put of over 500 watts. This surely is sufficient to handle that "California Kilowatt" which you are thinking about building some day.

The input from a crystal mike is fed to a 57 tube, into a 2A6 (the diode plates are not connected) which is resistance coupled to a 56 which is capable of driving the 2A3's in pushpull in Class AB. A bias cell is used in the grid return circuit of the 57 to reduce hum. This amplifier is very stable and free from hum and motorboating because of the individually filtered low-level stages.

Power Supply

The power supply for the transmitter and audio amplifier is made up of two transformers with individual rectifiers and filters. The high voltage power supply delivers 600 volts through the 83 rectifier and filter and has a capacity of 200 milliamperes. This power supply is used only on the R.F. section of the transmitter. The second power supply is used for the audio amplifier and has an out-put of 350 volts at 200 mills. An 83 rectifier is also used in this system. Both circuits are adequately filtered and are humless under full load.

Coils for Transmitter

All the coils are plug-in and wound on isolantite coil forms 1.5 inches in diameter with enamel wire.

Table No. 1

Frequency	Turns	No. Wire	Coil Length Inches	Link Turns
160	65	22	1.5	3
80	40	20	1.5	3
40	22	18	1.5	2
20	10	14	1.5	2
10	5	14	1.5	2

These coils are all designed so that they will tune with a capacity of approximately 1.2 mufd. per meter except on 160 meters. The coils from 80 to 10 meters may be used

in the buffer stage without changing the winding of the coils.

Tuning Procedure

In order to put the transmitter into operation the proper crystal is put in the oscillator circuit and the coil for that frequency is placed in the plate circuit of the 807 final (if the doubler stage is not used). The switch is thrown in the "A" position and the plate voltage applied. The plate condenser of the final is tuned to minimum dip as indicated on the plate milliammeter. After checking the frequency the antenna is connected to the link which may need slight adjustment so that the final draws normal plate current.

When the doubler circuit is used as in Figure 1, the switches are thrown in the "B" position. When the plate voltage is applied the double plate coil is tuned to twice the frequency of the crystal and the plate coil of the final tuned to either the same frequency as the doubler or twice that frequency, depending on what out-put is desired. Since both stages are cathode biased excessive plate current does not occur.

If the doubler-quadrupler is used as shown in Figure 2, the cathode circuit is adjusted to double the frequency of the crystal and the plate circuit of the same stage is then tuned to twice the frequency of the cathode. If quadrupling is not needed and doubling is only desired the cathode circuit may be short-circuited and the frequency doubled in the plate circuit.

-30-

SERVICEMAN'S DOLLAR

Many a service man has wondered just what happens to those hard earned dollars that he puts into his business. Donald B. Stover of Freeport, Illinois, submits this

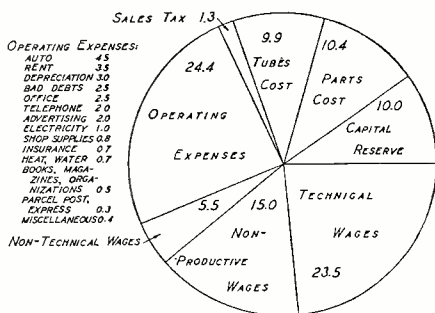


chart as an average breakdown of the devious paths taken by the elusive greenbacks. Briefly, this breakdown is also representative of a well balanced proportionate expenditure.

HAM CHATTER

Attention Hams and Ham Clubs! This is your column. We will be pleased to receive any items for inclusion in it that you may care to send in. Club announcements and club doing are always welcome. Ham gossip of every sort will be printed as well as anything that might be of a "back-fence" type of chatter. Please cooperate with us to make this the finest column in hamdom. Thanks and 73.—The Editors.

W⁹KQH operated portable at the RMA show and cleared over 25 messages. . . . W⁹LIP went out on Field Day and QSO'd a swell cold-in-the-head. Too bad, and him with a kilowatt, too. . . . W⁹DKM has a super fb variable xtal with a spread of 40 kc. on 20. . . . W³FAY is connected with the Phila. police dept. and reports lots of P.D. sigs, coast-to-coast on 33,100 kc. . . . W⁹NLP is erecting a new rotary beam with an old Buick (no ad.) differential. . . . W⁹TLO has rebuilt and is now R9 all over. . . . W⁹IMR put too much power into his neighbor's mirror. Hi! . . . W⁹TKD has a new rig on 20, and vy fb too. . . . W⁹LX in his car on 30 mc. has been heard from the streets of Chi in Mass. . . . W⁹HEZ has new QTH on board of *Nancy Ann III*. . . .

W⁹HPW is asst. design engineer at Stancor where W⁹RGL is chief. . . . W¹⁰XHI on 39.1 mc. is portable rig of WBBM. . . . W⁹FDR is engineer with CBS. . . . W⁵EHM is getting up to Chicago on 5 meters these days. . . . W⁹YSV has more QSL cards from 5M contacts than he knows what to do with. All real dx, too. . . . W⁹QEA won a noise silencer at the Milwaukee Hamfest. Tsk, Tsk, and him an editor, too. . . . W⁹CLH is R9 too much in Chi. He's getting to be a real problem. Hi! . . . W⁹SG has changed his job. . . .

W⁵BEN is bk9 Glenview. . . . W⁹TIZ has new QTH opposite W⁹NLP. . . . Chicago Area Radio Club Council now has an even dz of club members. . . . W⁹SQE wanted a land-line qso the other day. No receiver on 5. . . . W⁹FPP is with Montgomery-Ward (almost didn't write that one right, hi!). . . . W⁹CIT is with Taylor Tubes. . . . So is W⁹LIP. (As if you didn't know). . . . W⁸HAR visited Austin and got himself lost. . . . W⁹MRQ is with W.E. . . . W⁹JU is with Stancor. . . . W⁶AM was visitor to RMA show. . . .

W⁹UAQ makes records of qso's and shoots them back at you and are you surprised. . . . W⁹TAU is amateur sailor these days when not building up that super rig. . . . W⁹VSX has recovered from a severe cold. . . . W³EMX is with a b.c. rig in Lynchburg, Va. . . . W⁹RPE has new QTH which he is building himself and will feature the latest in "studio A." . . . W⁹XZK is R9 both in Wyo. and Pa. with 100 watts on 33.1 mc. . . . W⁶KMC is with LA, Cal. waterworks and can call into LA without charge. . . . W⁹LBJ is former baseball star, but now a school teacher. . . . Many thanks to *Harmonics* for many items.

-30-

How to Make a Ribbon Mike

by ROBERT W. CARSON
Buffalo, N. Y.

Mostly it has been the high cost that has prevented the ham from owning a ribbon mike. The author explains how to overcome that difficulty by constructing one from the ground up.

THE characteristics of the ribbon microphone make it a criterion among microphones. It is safe to say that this microphone will not be replaced for some time. Most of the better instruments of this type, that have been placed on the market the past few years, are too costly for the average amateur and experimenter. The microphone illustrated here has characteristics comparable with any of the better types, yet can be constructed very easily and inexpensively by the average builder.

The case is constructed from 3/16" aluminum; all other parts, including brackets, screen, plates and all screws, are made of brass. After the pieces have been cut, drilled, and countersunk (Figure 2), they are sanded to insure a smooth finish. The two side pieces can be shaped by placing them singly in a vice, and then bending them to corresponding angle of the adjacent side. It is well to remember, when working with aluminum, to use very little pressure on the drill and still less when tapping. A little kerosene placed on the drills and taps makes for easier and smoother work. To avoid breaking taps, it will pay to back tap out after each half turn to break the burr.

The case is now ready to assemble. Using 1/4" 2/56 brass machine screws, draw sides of the case together. Heads of all screws should be smooth to meet the rest

of the case. The screen can now be shaped over the top. It should lap the lower edges about 1/2". After screwing the proper angles over the top frame, it can be removed and the flat sections can be smoothed to present a more pleasing appearance. The brass plate, holding this screen, can be cut from 1/8" stock (Figure 3). The 8/32 screws, for supporting the bracket, can be placed and tightened. After sanding the whole assembly, it is ready for a finish. Black or grey crackle seems to be the most common, however, various metallic finishes can be applied to aluminum by dipping in various chemical solutions.

Next, we come to the magnet and ribbon assembly. The output level of the microphone, of course, will be dependent upon the strength of the magnets used, hence, the better the magnets, the higher the output. The pole pieces are made from 1/4" cold rolled steel. A block is cut on the diagonal and the two triangular pieces are then fashioned (Figure 3).

The U and T shaped pieces, made from bakelite and brass respectively, are the clamps for the ribbon. Two pieces of 1/4" bakelite are cut 3/4" x 1/2" and clamped together in a vise so they can be filed. A 1/4" square file is the exact tool for this operation; the slot is made 3/8" deep, leaving only 1/8" on the bottom side of this U. The holes are then drilled (No. 48) and tapped 2/56. The T clamps are made of 3/16" brass or aluminum; two pieces 3/4" x 1/2" again are clamped together in a vise and filed down to size. The holes are then drilled to pass 2/56 machine screws. The bakelite pieces can then be fastened to either end of the poles and tightened.

We are now ready for the ribbon. You can buy replacement ribbons for standard microphones to use if you do not care to make them. They seem very hard to handle at first, but the technique soon acquired and you will become quite adept at not only replacing them but also making them.

Secure two gears about 1 1/2" diameter, one can be smaller as long as the mesh is correct. These should be mounted on a piece of board, nothing elaborate is necessary, merely two pieces to rotate the gears together. Now take a piece of foil from a gum wrapper. Leave the inside wax paper on. It will protect the foil when rolled through the gears. Flatten it out, and you can cut three ribbons from the smooth surface between the creases. They should be 1/4" wide and the length of the wrapper.

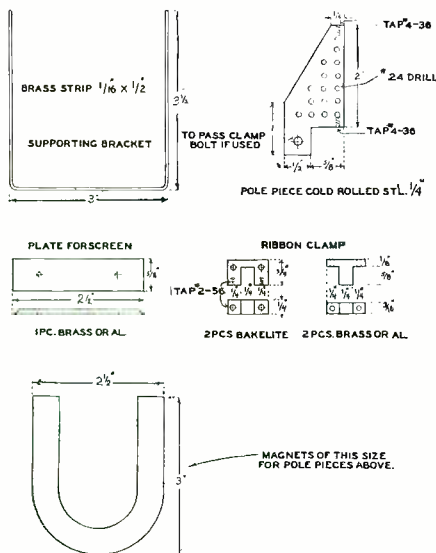


Fig. 3.
Details of the construction of the pole pieces and interior mike parts.

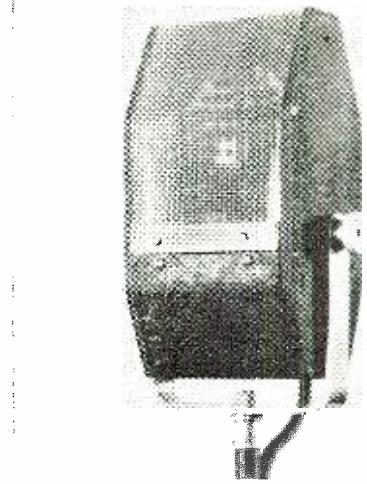


Fig. 1. The homebuilt mike compares favorably with the factory built article.

Now take one piece at a time, laying it edgewise, and start one end through the gears. The ribbon will come through slightly curved, but with corrugations perfectly spaced if the procedure has been done correctly. The pole pieces should be freed of any dirt or filings because cleaning will be difficult when the ribbon is put in place.

Now to put the ribbon in place. Remove the wax wrapper, if still on the ribbon, and lay one end of the ribbon in the bottom clamp, being sure to center it, and then put T clamp in place. The screws holding this should be tightened carefully, because the thread in the bakelite is not very full and will strip easily. The other end can now be placed in the top clamp, and the ribbon gently pulled tight until the corrugations begin to straighten out. The T clamp can then be placed and drawn tight after the ribbon has been properly centered. The pole pieces can now be inserted between the magnets (Figure 4). Place the like poles of the magnets together, so the field will be across the gap between the pole pieces in which the ribbon vibrates. The assembly can be put together by bolts through the magnets and the pole pieces, or clamped together by a bolt drawing the brass bars in on either side of the pole assembly (Figure 4).

The transformer used is a Kenyon type K.L.G.M from ribbon to 200-500 ohms. This
(Continued on page 61)

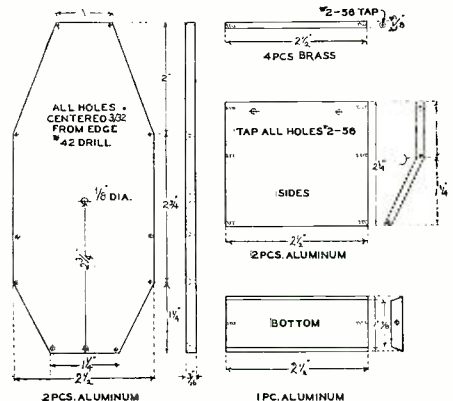


Fig. 2.
Details of the construction of the exterior pieces of the ribbon mike.

"RADIO Gadgets"

Increasing Efficiency of Detector Tube

A five-prong cathode type triode will oscillate more readily if the grid prong is isolated from the composition base, especially so when used in a super-regenerative circuit as a self-quenching detector.

This isolation may be easily accomplished



Type 76 tube, with grid prong isolated, used as a detector in a 5 and 10 meter super-regenerative receiver.

with a highspeed hand grinder, using preferably a small saw in the chuck rather than an abrasive wheel.

Hold the tube with the base upward and cut away a section around the prong, similar to cutting a piece of pie. Cut away enough of the composition base to leave room for a small screwdriver or matchstick to be used to push the prong in place when the tube is inserted in the socket. Care should be exercised not to cut the wire connecting the grid to the prong.

Handy File System

The experimenter, serviceman, amateur, and DX listener will find a small card file system unbelievably helpful in pursuit of their hobby. Using a file in an amateur station, for instance, you can tell in a few seconds whether you have ever worked a station. On each card you can record information on the station, equipment used, signal strength, reports on previous contacts, the "ham's" name and location, type of antenna he uses, etc. On subsequent hook-ups with stations worked before, you will have all pertinent data at your finger tips.

In DX work, another such file could contain cards for each station heard, together with notations of information concerning these stations. When requesting a verification from a station, you can make up a report based on this information, covering a period of a week, month or a year, as the case may be.

A file of this kind will be found very handy in experimental work, for making notes of each experiment for future reference. It is surprising how often you will refer to these records. On these same cards note any articles or books that you may

have read covering the same subject and this file will therefore represent not only a record of experimental findings but a fairly comprehensive bibliography of technical information.

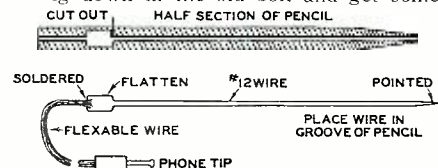
For most purposes a small metal file box with hinged cover capable of holding several hundred cards can be purchased complete with an alphabetical index and cards for a total of about 35 cents. These are standard 3 x 5 inch file cards. As the cards accumulate and outgrow the small file they can be transferred to a drawer type file which will accommodate something over a thousand cards, and which can be obtained for around a dollar.

A little work is involved in jotting the data down on the cards, but this is as nothing, compared with the value of always having the desired information available when you need it.

Test Leads for the Experimenter

Split two 6-inch penny pencils in half, the long way, and remove the lead. Cut out the groove a little as shown in the drawing. This groove prevents the wire from pulling loose.

Dig down in the old box and get some



number 12, hard copper wire. Cut two 5/4-inch lengths, sharpen points on one end, flatten the other ends. Then solder four feet of flexible wire to the flattened ends. Place into the pencil as shown, and cement it together. Fix carter phone tips or spade tips to the end of the flexible wire and you have a good pair of test leads.

For Better Reception

There are many sections of the country where the soil contains very little moisture with the result that the ground circuit for a radio set is not very good. It can be greatly improved by making up a salt and water solution and using this solution to saturate the earth around the ground pipe. One part salt to three parts of water will do the trick. The amount and frequency of application can best be determined by experiment. It is suggested to try one or two gallons for the first application.

Hams—Experimenters—Servicemen

Have you some gadget you have devised to simplify your radio work? Have you an original way of doing a certain thing different from usual procedure?

If you have, write it up and send it, together with sketch or photograph (if necessary), to RADIO NEWS. Standard rates will be paid for those accepted.

Fix It Now

The experimenter and the DX listener should check over his equipment every so often, so as to eliminate the small troubles, which if neglected, may become serious problems. In many cases the DX listener can improve both the sensitivity and selectivity of his set, simply by replacing a single defective tube, by lining up the tuning coils, etc. It is a puzzling fact, how often a fan will tolerate distorted reception, due perhaps to an open resistor or some other part which could be found easily by a simple continuity check or the use of an ohmmeter. The doctor and the dentist find it good business and good psychology to sell their patient the idea of a periodic examination. Many radio servicemen are applying this same idea with equal success. The Radio Gadgeteer who makes his own equipment can use a little of this psychology, and the advantage will be, that his apparatus will operate as originally designed and constructed.

After a piece of radio apparatus has been in use for a period of time an inspection will often disclose that the screws used for fastening the condenser or other parts to the chassis and completing the ground circuit are loose and the cause of considerable radio interference. Look for corroded connections responsible for high-resistance contacts. Check the line cord—the handling that this part has to undergo is considerable and quite often it is hanging by a single strand of wire. Replace the line cord plug with the new tight-grip plug. Inspect the volume control, this part can be replaced very often with a big improvement in results. Clean the contacts on the tube sockets; also check these contacts for proper grip on the tube prongs. Brush or blow out the dust particles on the variable condensers, etc. There are numerous other inspections and jobs that can be made on any piece of radio equipment that will pay dividends in better all around results.

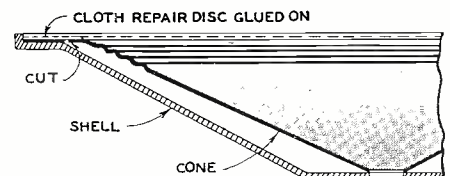
A Practical Speaker Repair

Dynamic Speakers with rusty, nonremovable field pole pieces that the cone's voice-coil fits over, may be easily repaired.

First cut out the cone carefully with a sharp knife so that an empire-cloth disc may be cemented between steel shell and cone.

After cone is removed the No. 243 pole piece may be cleaned with a piece of emery paper. Turn the speaker upside down and tap it lightly to remove small particles of rust and other debris.

Place cone back on speaker by applying



rubber cement to its outer top edge and strip it on the steel shell. Before the cement is dry, put the empire-cloth disc in place and press it firmly in position with a pencil eraser end.

When the cement is dry the cone is centered, finishing the repair.

The Photocell at Work

by ELMORE B. LYFORD

New York City, N. Y.

Photocells are becoming more common day by day in industry and are now used for safety appliances and as automatic inspectors. The author describes the various types of circuits.

IN the article which preceded this one [Radio News, May 1938], all photocells were shown to be divisible into two general types—the *resistance* type and the *battery* type—with three subdivisions under the first group and two under the second. Assuming now that we are somewhat familiar with photocells in general, the next question is—how may they be put to practical use?

In the same manner that we divided all photocells into groups, so may we divide the uses to which they may be put—into three groups. These three groups are shown in the accompanying table (Figure 1), and in each group are shown the most important uses of that type, though by no means all of them, and new applications are being added to these lists almost daily.

The headings of each column of this table indicate the common type of all the uses listed, and they progress in complexity from simple circuits to the more complicated. In the *go-or-no-go* circuits, all that the photocell is required to do is to determine whether or not light is falling on it.

"Go-or-No-Go" Circuits	"Quantity" Circuits	"Quality" Circuits
Burglar alarms	Illumination measure and control	Spectro-photometric analysis
Fire & smoke alarms	Smoke density control	Color measurement
Counters	Color matching	Elaborate sorting circuits
Automatic doors	Simple sorting circuits	
Rough, automatic inspection	Exposure meters for photography	
	Daylight recorders	
	Sound reproduction	

Fig. 1. Some Uses of the Photocell.

Either it is or is not—these are the only two conditions—and the circuits for these uses are, as a result, extremely simple. In the second group of *quantitative* circuits, the photocell is required not only to determine whether or not light is falling on it, but also *how much*. In other words, photocells in this type of circuit *must measure total quantity of light*—in addition to determining merely its presence or absence. In the third or *qualitative* type of circuit, the photocell is required to distinguish not only total quantity, but also *relative quality*—i.e., *color*. We shall see that this is often a function of the associated apparatus more than of the photocell itself, but of this more later.

Going back now to the simple *go-or-no-*

go circuits, when *battery* type photocells are used, and selenium cells as well, the cell is attached directly to a fairly sensitive relay. When light impinges on the cell, the relay is held open or closed, as the case may be. When the cell is not illuminated, the reverse is true. This sensitive relay may be made to control a power relay, a counter, a signal lamp or whatever is desired.

Using vacuum or gas-filled photoelectric cells for such detection circuits, however, is not quite so simple. The power output of these cells is not great enough to operate a relay directly, and it must be amplified before it can be so used. Any standard radio tube may be utilized for this purpose, and the $-12A$, the $-71A$ and the -27 are commonly used.

Figure 2 illustrates one of the most used circuits—a simple resistance coupling between the photocell and amplifier tube. The circuit shown is universal, i.e., it will operate on either a.c. or d.c. lighting lines directly, no batteries being needed, though of course they may be substituted for the voltage-dividing resistance if desired. Polarity is important on d.c. circuits, and must be correct. This of course makes no difference on alternating current.

The value of the coupling resistance determines the sensitivity of the circuit and also, to some extent, its stability. Values from 1.0 to 2.5 megohms are generally employed, though for extreme sensitivity 5.0 or even 10.0 megohms are sometimes used. The potentiometer setting controls the grid bias of the amplifier tube, and by this means controls the point at which the relay will operate. This is not the sensitivity, which remains practically constant, but the level of illumination near which the relay will

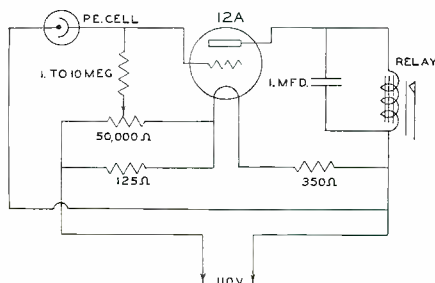


Fig. 2. Resistance coupled P.C. amplifier.



This type unit is common for counters and alarms.

open and close,—with only small changes either way.

The circuit in Figure 3 illustrates a capacity coupling between the photocell and amplifier tube, and is sometimes called a *reversed* circuit, since with this arrangement an *increase* of light on the photocell causes a *decrease* of plate current in the tube. With this circuit, as with the previous one, the sensitivity depends upon the value of the coupling agent. The smaller the condenser is, the more sensitive the circuit will be. For extreme sensitivity, the

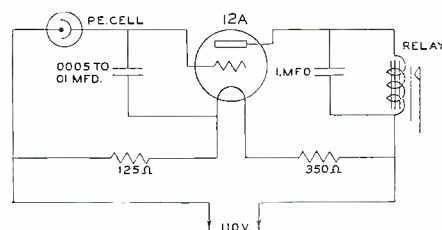


Fig. 3. Capacity coupled P.C. amplifier.

condenser may even be eliminated entirely, leaving practically a *free grid* when the photocell is dark. But this imposes a heavy plate current on the tube and relay, and is not generally to be recommended.

These are only two of many similar circuits which may be used for the basis of a photocell relay, and are, as a matter of fact, used with small variations in all of the commercial photocell relays on the market today. These relays are manufactured in different forms by at least four different concerns, and range in price from \$25.00 to \$125.00 complete.

When photocells are used in detection and alarm circuits, such as burglar and smoke alarms, or to detect whether or not anyone may be approaching, it is often desirable to use several photocells, arranged so that any one may operate the common alarm, regardless of what may be happening to any of the others. Photocells of the battery type or of the selenium type may

(Continued on page 61)



WORLD SHORT WAVE TIME-TABLE



Compiled by the Editors of RADIO NEWS
Hours of transmission for the World's Short Wave Broadcast Stations

HOURS OF TRANSMISSION								EASTERN STANDARD TIME								HOURS OF TRANSMISSION																			
8	9	10	11	M	1	2	3	4	5	6	7	8	9	10	11	N	1	2	3	4	5	6	7												
								Wave-length Meters									Call Letters									Frequency Kc.									City Country
								44.14									IIH									6796									San Pedro, D. R.
								44.71									TIEP									6710									San Jose, Costa Rica
								45.22									HC2RL									6635									Guayaquil, Ecuador
								45.25									HT									6630									Trujillo, D. R.
								45.34									PRADO									6618									Riobamba, Ecuador
								45.80									H14D									6550									Trujillo, D. R.
								46.01									YV4RB									6520									Valencia, Venezuela
								46.08									H1L									6510									Trujillo, D. R.
								46.66									H11S									6430									Puerto Plata, D. R.
								46.85									YV5RH									6400									Caracas, Venezuela
								46.91									H18Q									6395									Trujillo, D. R.
								47.10									YV5RF									6375									Caracas, Venezuela
								47.12									YV1RH									6360									Maracaibo, Venezuela
								47.24									HRPI									6350									San Pedro Sula, Hond.
								47.77									H1G									6280									Trujillo, D. R.
								47.77									COHB									6280									Cancti Spiritus, Cuba
								48.05									H1N									6243									Trujillo, D. R.
								48.15									OAX4G									6230									Lima, Peru
								48.19									HJ1ABH									6225									Cienaga, Colombia
								48.50									H1A									6185									Santiago, D. R.
								48.62									OAX1A									6170									Chiclayo, Peru
								48.70									XEXA									6160									Mexico, D. F. Mexico
								48.70									VFB									6160									Colombo, Ceylon
								48.72									YV5RD									6158									Caracas, Venezuela
								48.70									CJRO									6150									Winnipeg, Canada
								48.78									VE9CL									6150									Winnipeg, Canada
								48.78									HJ2ABA									6150									Tunja, Colombia
								48.78									HJ5ABC									6150									Cali, Colombia
								48.86									W8XK									6140									Pittsburgh, Pa.
								48.88									CR7AA									6137									Lourenzo Marques, A.
								48.94									LKJI									6130									Jeloy, Norway
								48.94									VE9HX									6130									Halifax, N. S.
								48.94									COCD									6130									Havana, Cuba
								48.96									HJ3ABX									6122									Bogota, Colombia
								49.00									HJ1ABB									6120									Barranquilla, Colom.
								49.00									W2XE									6120									New York, N. Y.
								49.18									YTC									6100									Belgrade, Yugoslavia
								49.18									W3XAL									6100									Bound Brook, N. J.
								49.18									W9XF									6100									Chicago, Ill.
								49.20									ZRJ									6098									Johannesburg, Africa
								49.20									HJ4ABE									6097									Medellin, Colombia
								49.26									CRCX									6090									Toronto, Canada
								49.30									HJ5ABD									6085									Cali, Colombia
								49.31									HJ3ABF									6084									Bogota, Colombia
								49.32									VO7LO									6083									Nairobi, Kenya, Afr.
								49.34									HP5F									6080									Colon, Panama
								49.34									W9XAA									6080									Chicago, Ill.
								49.34									ZIH									6080									Penang, S. S.
								49.42									YV1RE									6070									Maracaibo, Venez.
								49.46									SBO									6065									Motala, Sweden
								49.50									W8XAL									6060									Cincinnati, Ohio
								49.50									W3XAU									6060									Philadelphia, Pa.
								49.59									HJ3ABD									6050									Bogota, Colombia
								49.59									HJ9B									6050									Trujillo, D. R.
								49.65									HJ1ABG									6042									Barranquilla, Colom.
								49.67									W1XAL									6040									Boston, Mass.
								49.67									YDA									6040									Tanjong Priok, Java
								49.75									OLR2B									6030									Podebrady, Czech.
								49.75									HP5B									6030									Panama City, Panama
								49.79									HJ1ABJ									6025									Santa Maria, Colombia
								49.83									DJC									6020									Zeesen, Germany
								49.83									XEUW									6020									Veracruz, Mexico
								49.88									NEWI									6015									Mexico, D. F., Mexico
								49.90									HJ3ABH									6012									Bogota, Colombia
								49.92									COCO									6010									Havana, Cuba
								49.96									CPCX									6005									Montreal, Canada
								49.96									HP5K									6005									Colon, Panama
								50.00									NEBT									6000									Mexico, D. F., Mexico
								50.17									HTX									5980									Trujillo, D. R.
								50.25									HJN									5970									Bogota, Colombia
								50.26									HVJ									5969									Vatican City
								50.50									TG2X									5940									Guatemala City, Gua.
								50.72									HH2S									5915									Port-au-Prince, Haiti
								50.76									HRN									5910									Tegucigalpa, Honduras
								50.85									YV3RA									5900									Barquisimeto, Venez.
								51.15									H1J									5865									San Pedro, D. R.
								51.46									TIGPH									5830									Alma Tica, Costa Rica
								51.72									YV5RC									5800									Caracas, Venezuela
								51.90									OAX4D									5780									Lima, Peru

LIST OF SYMBOLS

- | | | |
|-------------|---------------------|--------------------------------|
| S—Sunday | Th—Thursday | —Daily |
| M—Monday | F—Friday | —Irregular |
| T—Tuesday | SA—Saturday | —Daily Except Sunday |
| W—Wednesday | SS—Saturday, Sunday | —Daily Except Saturday, Sunday |

SHORT WAVE FLASHES

BY CHARLES A. MORRISON
and JOHN D. CLARK

EACH month this department features flashes from the world of short wave, setting forth the very latest news concerning new stations, changes in frequency, schedule, and outstanding DX broadcasts. This is information that has been received after the issue has gone to press.

In order to give complete and useful information, two authorities on short wave conduct this column. Charles A. Morrison supplies information of interest to readers everywhere in his section entitled *Short Wave Flashes—General*. All frequencies in Mr. Morrison's column are in *mcgacycles* and all time is *Eastern Standard Time*.

John D. Clark conducts his column specifically for short wave listeners residing on the Pacific Coast, where reception differs considerably from the rest of the United States east of the Rockies. Mr. Clark's data is based on reports from listeners in all parts of the Pacific Coast area. In this section of *Short Wave Flashes* entitled *Short Waves for West Coast DX'ers*, all frequencies are also given in *mcgacycles* but all time is *Pacific Standard Time*, for the West Coast short wave listeners.

SHORT WAVE FLASHES—GENERAL

by CHARLES A. MORRISON

(All Times Are EASTERN STANDARD)

Revision of Wave-Bands at Cairo Conference

At the Cairo International Telecommunications Conference recently concluded, several important revisions were made in the short and intermediate wave-bands available for broadcasting.

New intermediate wave-bands for use in tropical, or semi-tropical countries have been allotted as follows: (a) 2.3 to 2.5 mc/s (130.4 to 120 meters); (b) 3.3 to 3.5 mc/s (90.9 to 85.7 meters); (c) 4.835 to 4.965 mc/s (62.1 to 60.4 meters).

The short-wave broadcasting bands now becomes: 6 to 6.2 mc/s (49 meter band), an increase of 50 kc/s; 7.2 to 7.3 mc/s (41 meter band), a new band of 100 kc/s open to broadcasting, except in America, but shared with amateurs; 9.5 to 9.7 mc/s (31 meter band), an increase of 100 kc/s; 11.7 to 11.9 mc/s (25 meter band), unchanged; 15.1 to 15.35 mc/s (19 meter band), unchanged; 17.75 to 17.85 mc/s (16 meter band), an increase of 50 kc/s, and 21.45 to 21.75 mc/s (13 meter band), an increase of 200 kc/s. The new provisions will become effective not later than September 1, 1939.

New Short-Wave Stations

(On the Air)

CHILE—CR1180 (11.78), *Santiago*, heard evenings from approximately 6:00 to 10:00 p.m., is buried under HP5G, *Panama*, when that station is on the air.

CHINA—A short-wave relay for XGOW, *Hankow*, is being heard daily from 5:15 to 10:30, or 11:00 a.m., on a frequency ranging from 8.93 to 9.18. Programs usually consist of semi-classic selections, interspersed with frequent announcements in Chinese; news in English at 8:45 a.m. . . There is also a powerful station on 9.29, believed to be in *Shanghai*—signal strength much stronger than XGOW, which broadcasts daily from 8:00 to 9:05 a.m. Broadcasts open and close with American recordings, and the interval signal is eight chimes.

COSTA RICA—TI2XD (11.928), "Radio Pilot," first heard on April 23rd, now relays TIXD, "La Voz de la Republica." *San Jose*, nightly from approximately 6:00 to 11:00 p.m. . . TIEM, "Radio El Mundo," P. O. Box 1049, *San Jose*, has been testing on 10.04 and 10.2. . . TIRA, owned by Compania Radiografica Internacional, *Cartago*, has been licensed to operate on 6.08, and 9.59, according to the U. S. Commerce Bulletin.

DOMINICAN REPUBLIC—HISG (6.655), *La Vega*, is being heard weekdays to 6:10 p.m.

ETHIOPIA—"Radio Addis Ababa." *Addis Ababa*, power 1 kw, inaugurated on May 9th, is now broadcasting daily on 9.553, and 4.75, and a third optional frequency of 12 mc/s is to be added soon.

FINLAND—A 1 kw station at *Lahti*, is on the air. Heard daily from 2:00 to 5:00 p.m. on 9.5. It is also licensed to operate on 11.78, and 15.19. Announcements on the hour in several languages, including English, request that reports be sent to the Finnish Broadcasting Company, Helsinki. The QSL card has station data on the right hand side and a picture of the transmitter on the left.

HAWAII—Commercial station KHE (approximately 17.95), *Honolulu*, is being heard on Sundays 6:00 to 6:30 p.m. and on Saturdays 11:00 to 11:30 p.m. irregularly.

INDIA—A new *Delhi* transmitter, first heard on June 3rd, by James Pratt of London, Ontario, Canada, on a frequency of 15.16, comes on the air nightly at 8:15 p.m., with tinkling chimes: clock strikes 7 times (morning in *Delhi*) at 8:30 p.m.

LITHUANIA—According to the Universal DX Club, LYR (9.32), *Kaunas*, is now broadcasting daily from 7:00 to 9:00 a.m., primarily for European listeners.

PANAMA—HP5G (11.78), "Radio Gonzalez," P. O. Box 1121, *Panama City*, first heard on May 15th, and officially inaugurated on May 25th, now broadcasts nightly from approximately 9:00 to 11:30 p.m.; announcements in English.

VENEZUELA—YV5RR (5.835), P. O. Box 185, *Caracas*, relays YV5RS, nightly to 10:00 p.m. Announcements in Spanish, are preceded by a sliding whistle signal; program in English on Tuesdays 8:30 to 9:00 p.m.

(Under Construction)

ALBANIA—A 3,500 watt government station is under construction at *Tirana*.

Notes of Interest

ARGENTINA—LRX (9.66), *Buenos Aires*, uses one note from a bugle, or auto-horn, as an identification signal.

BECHUANALAND—Reports to ZNB (5.9), *Mafeking*, do not require international reply coupons, and should be sent to the Director of Public Works, Mafeking.

BRITISH GUIANA—VP3MR (6.075), *Georgetown*, is issuing a new QSL card to those sending in reports accompanied by an international reply coupon.

BULGARIA—LZA, "Radio Sofia," *Sofia*, is now being heard on dual frequencies of 14.96, and 15.18, from 9:00 to 10:00 a.m. and from 11:00 p.m. to 1:00 a.m., irregularly.

CANARY ISLANDS—EA8AB, "Radio Club de Tenerife," *Tenerife*, not heard for many months, returned to the air on May 12th, on 7.3 mc/s.

COSTA RICA—The station on 7.45, has been definitely identified as TI2RS, "Radio Athenea" of *San Jose*.

CUBA—COCX (11.74), *Havana*, may leave the air while the power of its transmitter is being boosted to 20 kw.

GERMANY—The mystery station on 10.03, believed by many to be the new anti-Stalin Soviet transmitter, is actually the anti-Nazi broadcaster "Der Deutsche Freiheits Sender."

INDIA—Plans are under way for world-broadcasts to acquaint peoples in all parts of

the world with the culture, languages, and ideals of this country. . . VUD2 (9.59), *Delhi*, is being heard in California, at the unusual hour of 9:00 to 10:00 a.m.

MADAGASCAR—"Radio Tananarivo" (10.95), *Tananarivo*, is being heard on the West Coast as late as 11:30 a.m. Modulation is poor. Station verifies promptly.

MEXICO—XEWI (11.9), *Mexico D.F.*, may often be heard testing and requesting reports before regular programs start.

PANAMA—The power of HP5B (6.033), *Panama City*, has been increased to 1 kw; that of HP5J (9.604), to 2.6 kw.

PERU—Temporarily out of QSL cards, OAXIA (6.334), *Chiclayo*, will verify all reports that have been received, as soon as the new cards are off the press.

UNITED STATES—The main programs of CBS radiated by W2XE of *New York City*, are now being picked up by the *Queen Mary* for rebroadcast to the passengers over the ship's loud-speaker system. . . The F.C.C. has granted to W3XAU of *Philadelphia, Penna.*, an additional frequency of 25.725, and to W8XAL of *Cincinnati, Ohio*, two additional frequencies of 11.87 and 15.27, respectively. . . WMI (11.37) of *Lorain, Ohio*, gives weather reports for ships on the Great Lakes, daily at 11:00 a.m., and 10:00 p.m.

URUGUAY—For an identification signal, CXAS (9.64) of *Colonia*, employs station chimes almost identical to those used by NBC.

VENEZUELA—YV1RL (5.935), Box 247, *Maracaibo*, issues a striking QSL card having magna colored call and slogan, on a speckled blue background.

In addition to those given last month, the following stations make English announcements: SPW (13.635) and SPD (11.535); HP5J (9.604); EA9AH (13.99); COCD (6.13); HRD (6.235) and "Radio Martinique" (9.7).

Transmissions of Interest

Daily—2:00 to 2:30 p.m., news in English, over RKI (15.08) of Moscow, U.S.S.R.: 7:30 to 9:00 p.m., *The American Hour from Rome*, over 2R04 (11.81) of *ROME, ITALY*; 9:30 to 11:00 p.m., Program for North America, and Greenland, over OZF (9.52) of *SKAMLEBAK, DENMARK*.

Sundays—12:45 to 1:00 p.m., news in Italian; 2:00 to 2:15 p.m., news in German, and 3:00 to 3:15 p.m., news in French, all over W3XAL (17.78) of *BOUND BROOK, NEW JERSEY*.

Wednesdays—At 7:30 p.m., North American program from ST. KITTS, over VP2LO (6.384).

Fridays—6:15 to 6:30 p.m., CBS' Broadway column for Latin listeners, over W2XE of *NEW YORK CITY*.

Saturdays—3:00 to 3:30 p.m., broadcast for France, over PSE (14.939) of *RIO DE JANEIRO, BRAZIL*.

Fourteenth and last day of each month, 7:00 to 8:15 p.m., special programs for North America, over YUA (6.1), *BELGRADE, YUGOSLAVIA*; also relayed by DZC (10.29) and DJL (15.11).

Revised Schedules

AGENTINA—LRA (9.69), *Buenos Aires*, weekdays 10:30 a.m. to 1:00 p.m.; Sundays 10:30 a.m. to noon; Mondays through Thursdays 6:00 to 9:00 p.m.; Fridays 4:00 to 9:00 p.m., and on Saturdays and Sundays 7:00 to 9:00 p.m.

CANADA—CFCX (6.005), *Montreal*, weekdays 6:45 a.m. to midnight, and Sundays 8:00 a.m. to 10:15 p.m. . . CFRX (6.07), *Toronto*, weekdays 6:30 a.m. to 11:00 p.m. and on Sundays 10:00 a.m. to 11:00 p.m.

FRANCE—*Paris Mondial*: 1:00 to 4:00 a.m., TPA2 (15.243) and TPB11 (9.57); 5:00 to 10:00 a.m., TPA2; 8:30 to 10:00 a.m., TPB3 (17.765); 10:15 a.m. to 5:00 p.m., TPB11 and TPA3 (11.885); 6:00 to 8:15 p.m., TPB6 (15.13) and TPA3, and 8:30 to 11:00 p.m. to North America, TPB7 (11.885) and TPA4 (11.718).

JAPAN—Overseas broadcasts: 12:30 to 1:30 a.m. for Pacific Coast of North America, over JZK (15.16); 7:00 to 7:30 a.m. for Eastern U. S. A., over JZJ (11.8) and JZK; 8:00 to 9:30 a.m. for Australasia, over JZJ; 2:30 to 4:00 p.m. for Europe, over JZJ and JZK; 4:30 to 5:30 p.m. for South America, over JZJ and JZK; 6:00 to 6:30 p.m. for Eastern Coast of North America, over JZJ and JZK.

U. S. A.—W2XE, *New York City*, on 21.52, Sundays, 7:00 a.m. to noon; on 17.76, Mondays through Fridays, 6:30 to 9:00 a.m. and Saturdays, 7:00 a.m. to noon; on 15.27, Mondays through Fridays, noon to 5:00 p.m. and on

(Continued on page 66)

Cathode Ray Modulation Indicator

The author describes an inexpensive amateur phone transmitter monitor which meets FCC requirements. The unit can also be used to indicate carrier shift.

by HOWARD BURGESS, W9TGU

Elliott, Iowa

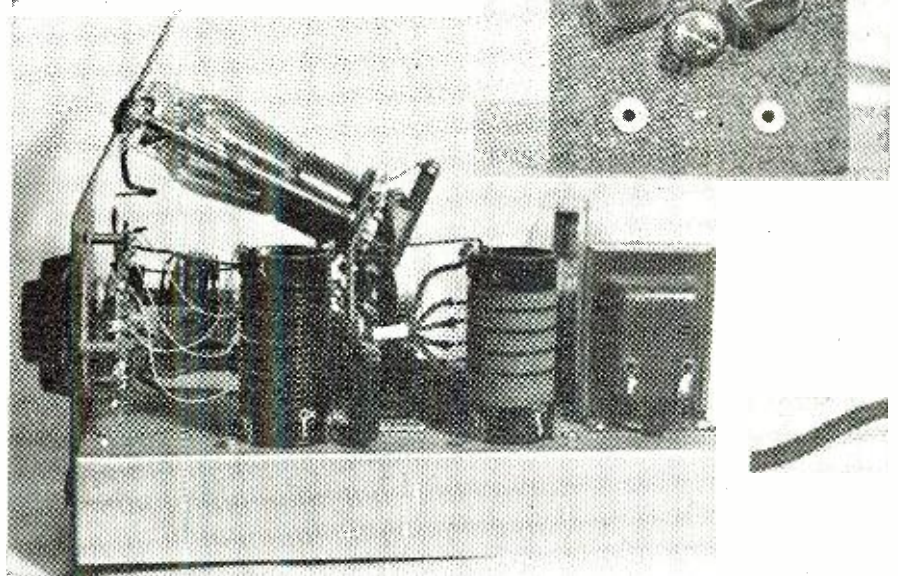
IN the so called "good old days" little was known about the percentage of modulation and less was cared about it. The only factor limiting the percentage of modulation was the condition of the individual's pocketbook and percentages ranged from minute figures to the point where the signal ceased to bring in a report of "much louder" and finally degenerated into splashes of "buckshot."

Within the past few years the whole situation has changed and the Federal Communications Commission requires that every phone station "shall not be modulated in excess of its modulation capabilities" and "in no case shall the emitted carrier be amplitude modulated in excess of 100 percent." Also "means shall be employed to insure that the transmitter is not modulated in excess of its modulation capabilities." All of which means, all phone stations must keep some sort of an instrument to show when the transmitter is being over modulated.

Many such devices have been designed ranging from simple rectifiers to expensive cathode ray oscilloscopes. All such indicators fall into two classes. Those in which the readings are taken from mechanical moving parts such as meters and those in which the readings are given by a moving electronic beam. The first of these two, while giving readings of fair accuracy, has disadvantages of sluggishness due to the mechanical inertia of the moving parts and this is especially true of the less expensive meters which are in reach of the average amateur. In the second class the electronic beam has no inertia and its speed is limited only by the ability of the eye to follow it. Talk of cathode ray tubes brings visions of large expensive tubes but the common 6E5 so-called "magic eye" is just as much a cathode ray tube as any of its larger brothers and in its own field, just as sensitive. A very successful indicator can be built around one of these little tubes.

When a linear rectifier is coupled to the output of a transmitter and the final stage modulated, there will be no change in the rectified current unless the modulated stage is non-linear and its modulation capabilities are being exceeded. Such a change is known as carrier shift and means that there is a change in the average envelope amplitude during modulation. A positive shift indicates that the average time of the positive half cycle is greater than that of the negative half cycle and conversely so.

Any gadget which can show this is all

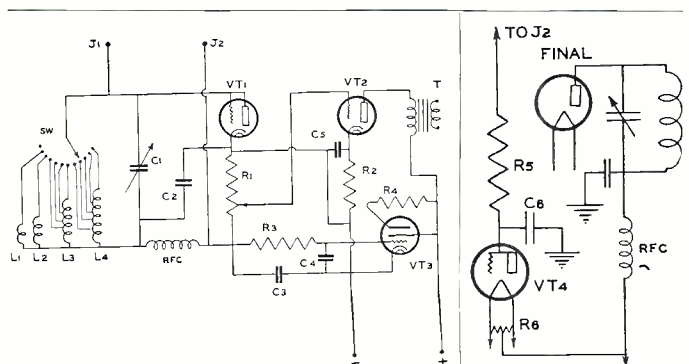


Front and side views of the cathode ray ("magic eye") modulation indicator. The instrument can also be used to indicate a shift in the transmitter carrier.

that is necessary for the amateur station. A meter can be used to read the rectified current; but because of its greater speed and sensitivity the indicator was built around a 6E5. To add to the instrument's usefulness a means is provided for audio monitoring. Carrier shift indicators can show nothing when used on a modulated self-excited oscillator so it was decided to bring out one more connection and so make it possible to use it as an inverse peak indicator for use on self excited ultra high frequency gear. This would give no accurate indication on self-excited transmitters, but would limit the negative modulation peaks to the point where they did not exceed the positive plate voltage of the modulated tube.

The unit is assembled on a chassis measuring 5" x 9½" x 1½" and contrary to usual practice the panel is mounted on one end of the chassis, allowing it to take up less room on the operating table. A

similar unit was built with a plain vertical panel, but when it was placed on the table, the indicator tube was below eye level. To watch the tube the operator was forced to sit with his chin out like a pugilist waiting for the knockout blow and if the QSO was very lengthy he was generally knocked out before it was over. Putting the unit on a shelf did not help matters as the head was still not at a comfortable angle. In the
(Continued on page 59)



The circuit design of the modulation indicator.

J₂ connection

- C₁—150 mmf. midget variable
 C₂—.00025 mica
 C₃—.0001 mica
 C₄—.01 paper
 C₅—1 mfd. paper
 C₆—.005 mica
 R₁—500,000 ohms pot.
 R₂—3,000 ohms, 1 w.
 R₃—100,000 ohms, 1 w.
 R₄—1 megohm, 1 w.
 R₅—25,000 ohms, 2 w.
 R₆—50 ohms center-tapped.
 VT₁, VT₂—Type 37 tubes
 VT₃—6E5 tube
 T—2:1 audio trans.
 SW—11 point tap switch
 VT₄—A rectifier with inverse rating to stand voltage used. For low voltage five meter use a 1V is suitable. In cathode type tubes, cathode to heater insulation must bear full oscillator plate voltage.

A "Ham's" Wife CONFESSES

by DOROTHY HAGERTY, W6JMH

San Diego, California

Can a wife share her husband's hobby of ham radio?
The author goes into this important domestic problem.

THIS article is directed to the wives of *hams*, present or prospective—with all due respect—and represents the views and opinions of this XYL.

I ask your indulgence while I express my concept of this all important subject of amateur radio in the home. You see, I am in a position to do this inasmuch as I am first and foremost a woman and a wife and, secondly—a *ham*. I modestly admit my success in both accomplishments.

I became interested in radio several years ago when I was preparing for a career in aviation. I spent most of my time at the airport—not in a plane—but in the radio control room where the equipment and operator were located that established contact with the mail planes at frequent intervals. Of course, that was not amateur radio, but the operator usually had in his possession a *ham* ticket—and it was *radio*.

However, those were the early days of transport flying and rules were not so strict in the radio room as to visitors. So quite undisturbed, I became acquainted with mercury vapor rectifiers and vacuum tubes.

Yet it was not until I met my husband that I considered becoming an operator myself. Very soon I learned that my husband-to-be was one of the amateur species. All I had to do was to express my interest in radio—and we were married!

It took me a few weeks to recover from such a speedy courtship and consider my new position. But it wasn't until he began talking to me with one ear cocked at the receiver, listening for DX, that I resolved to investigate the ether myself. As a result, I began a earnest study of condensers and coils, transformers and tubes.

When Hubby became aware of my efforts, he positively beamed! Needless to say, his encouragement urged me on. He took great pride in my attempt to master the code. Every evening when he returned home, I had a long list of questions to ask him—all about the Kennely-Heavside Layer, and why crystal control was advisable—and though the list was often quite long, he never became impatient. He positively glowed with satisfaction as he explained these things to me, and though I regard him as a perfect husband, I am certain other husbands would be just as eager to help if their wives would only manifest some interest in their radio activities.

I studied fundamentals and practiced code and drew diagrams in my spare time for two months. And I didn't find much spare time with all the entertaining that is part of a bride's regime. When the day

arrived for me to take my examination, I must admit that I was excited and had rather vague ideas as to the outcome. But the test was completed without difficulty. Later, when I received word stating that I had passed the examination and that I had been assigned the "call" of W6JMH, I was thrilled beyond words.

Now I cannot claim a brilliant mind, neither am I considered exactly dumb. For it requires more intelligence to become a *ham* and remain one than most wives give their husbands credit for. Nor did I receive any consideration because I was a woman. There were many women before me and there have been many since. But I worked to achieve my license and "call" and I don't consider it beneath my dignity to accept a word of praise now and then.

Most of you have not given this much thought. You have not considered how much genuine pleasure you yourself would receive—nor how great would be your husband's satisfaction.

I know there are some women who think their husbands are just a little bit queer with their radio activities, but have these women wondered what this fatal fascination is—that it maintains such a hold on its enthusiasts? Or perhaps they are not inspired to take the trouble to find out.

On the other hand, there are many wives who are indeed clever—who do not complain when dinner is kept waiting—or when they must spend their evening listening to *ham conversation*, for they know that their men are home and not spending money foolishly or getting into mischief. They realize that if they indulge their husbands in regard to this radio business they will gain favor and benefit more by doing so.

YL's & XYL's are aired from these calls.

W6OJC	W1FT	W9VAQ	W1DAL
W8KYR	W6MBD	W9RDJ	W2AU
W6JMH	W6MWO	W9PYS	W2HXQ
W5DEW	W9UHI	W9TAK	W3AKX
HCIFG	W9LLX	W9BBV	W8GSC
G2YL	W9LYX	W5DUK	W8NZV
W9SLG	W9RVK	W5AHK	W8GJK
W2TV	W9TIZ	W5DWP	W8BPF
W3COQ	W9NLP	W4DGS	W8NJP
W9ZTY	W9OJC	W4DID	W9BHM
W9FSV	W4BPD	W7WFK	W2FHJ



This picture of the author proves that a wife can be pretty, brainy, and a good op.

Amateur radio has been a definite bond between my husband and myself. We have experienced a great many contacts which have resulted in hours of keen enjoyment. Enjoyment that you cannot realize until you call a CQ and hear a chap in New Zealand coming back, or an old friend from your home town.

We can always count on one topic of conversation that interests both of us and, as I can carry on an intelligent conversation on this subject, hubby can tell me what's the matter with the transmitter when it won't oscillate, and I can understand! And when the confounded meter jumps nearly off its scale during a QSO, I have a very good idea what's the matter and how to fix it. Later, when hubby comes home, I can explain it to him so *he* will understand!

Distant cities and countries take on new meaning when you contact amateurs living in these places. It is the next best thing to traveling there in person. It is an aerial adventure, to be sure, for your signal has spanned land and sea and been picked up by another amateur in some far-away land.

One makes many new friends. Amateur radio is a very democratic hobby, for it lures professional men, actors, flyers, farmers and bankers; the poor and rich alike. Among the better known are: Frank Hawks, Herbert Hoover, Jr., Freeman Gosden, Carter Glass, Paul H. Davis, Andy Santella, and Hal Kemp, as well as many others, not to mention the ladies.

How many of you wives have received QSL cards? It makes you feel so important. Collecting verification cards can become a hobby in itself, also the stamps thereon. How much nicer it is to have your own personal QSL. It gives you a nice warm feeling when you go to some other *ham's* home and view your particular card on the wall. Especially when you are a YL operator—it more likely will be framed!

We enjoy most of all a radio week-end excursion, when we pack one of the trans-
(Continued on page 60)

Serviceman's Experiences

by LEE SHELDON
Chicago, Illinois

"Don't argue with your customers; give them what they want!" is the maxim which the author discovers and applies. The results are most encouraging.

"THE 'phone is ringing," said Al, turning from the workbench. "Don't you care?"

That's one of the things I don't like about my partner. He is too sarcastic, and never appreciates my methods. When we started in business together, he agreed to work inside the store, and I agreed to work outside. From then on—

"Stop acting coy with the customers," he said, with that annoying tone, "and find out who is calling. We used to get repair jobs before you took to sitting at the desk with your eyes out of focus. Answer the call!"

From then on he called me the *Leg Department*. All he has to do is sit in our nice quiet store, waiting for me to bring—

"Grab that 'phone!"

I know a storm warning when I hear one. I picked up the receiver.

"Good afternoon," I Crosby'd. "Salutary Sales & Service. Mr. Sheldon speaking. May I serve you?"

"Pool-tables," muttered Al, from the background.

"So sorry," said someone on the 'phone. "I was dialing a radio store." He hung up.

I knew without looking that Al was gathering acid for one of his common remarks. The 'phone rang again. I answered the call very quickly, as I always do.

"Radio store."

"I had trouble getting you," said the same voice. "This is Mr. Field, 4445 Webster Avenue."

"Yes, Mr. Field. What model set have you?"

"Never mind. Come up at three. Bring some gold radio wire."

"Gold wire?"

"Well—haven't you any?"

"Certainly, Mr. Field. We have the most complete stock of—"

"Then bring it with you. Three o'clock." He hung up again.

"What," asked Al, who is very mercenary, "did you get out of those two calls?"

"Fellow wants some gold wire at three o'clock."

"Fortunately, we're still in business. That's lucky, considering you've been in the shop for more than an hour."

"Maybe the fellow is nuts. I don't think the call is worth answering. Why does he want gold wire?"

"To put silver threads among. Now, be on time and sell him anything he wants."

"But, what am I going to take along for—"

"But nothing! Don't be fussy in times like these, or Brown will throw us out on our 'butts.'" Brown is our financial back-ground.

"Mr. Brown doesn't expect me to answer the calls of lunatics," I said, firmly. "There is no use wasting gas, and I refuse to go."

Mr. Field led me through his apartment to a large room, arranged as a studio. When I saw a cello leaning in the corner, I recognized him as the eccentric soloist who was paid more than he was worth for a weekly 15-minute broadcast of classical music. His rate, at an allegro beat, came

dered, could a man who had spent his life studying music tolerate such distortion? What a difference two new audio tubes and an a.c. dynamic would make!

When I had finished, he paid me and waved the receipt aside.

"Thank you," I said, warming up to the repair job. "No doubt you keep your radio for sentimental reasons, but do you know it also can be made into a source of pleasing music? It needs attention very badly, and I can make it really sing."

"You know nothing of your business, young man!" He crouched and walked slowly toward me. "Do you mean to stand there and tell me you ever heard a set with quality as good as mine?"

I was not standing there, but backing away toward the door.

"Nothing comes through below 600 cycles," I insisted, "and the highs are badly distorted. I'm sure you would appreciate the difference new parts would make—it would give the set a chance to operate like its designers intended."

"The upper register is beautiful. Do not argue. The bass is perfect. I can forgive ignorance, but not insolence!"

His collar was getting smaller, and I thought it best to leave.

I got no sympathy from Al when I came back to the shop. He just sighed, and sat down at the desk in the manner of a person resigning himself to old age.

"Some day," he sermoned, "you will go out of here trying to get repair work intelligently, instead of saying silly things under the impression you are heaven's gift to the tone-deaf customer."

"Look, Al," I pleaded, "do you have any idea what a 12-year-old output tube sounds like when it tries to jam a program through a stone-age speaker? Can't you see I was trying to help him, and get a repair job?"

It is easy to tell when Al gets narrow-minded, because he disagrees with me. "No," he said, "I can't. I will say, though, that if your effort was cash receipts, none of our store history would be written in red ink."

"You don't seem to realize that tone quality is entirely a matter of emotional appeal. Like love and religion, quality appeals to the heart, not the head. When emotion comes in the door, logic scrams."

"Three factors influence the choice of a set. Two of them, shape of furniture and price, are based on logic, and are derived from tangibles such as the size of the purchaser's living-room and pocketbook. The third, and most important, is timbre, and is base on emotion. One person buys a high-

(Continued on page 70)



"They can't understand how that big orchestra fits into that small cabinet!"

to about four dollars per catgut cycle, which was more than he got for sawing wood in the old country.

"Did you bring it?" he asked abruptly.

"Of course. I have a reel of it down in the truck, but I didn't want to cut any off before I knew how much you needed. Very valuable, you know, since we went off the gold standard. What's it for?"

"Put the floor lamp by the piano, and the table lamps over here. The radio goes against the south wall. Rewire the music stand. Nothing but gold matches the new decoration. How long will it take?"

Shades of Hertz! He wanted *bronze-colored lampecord!*

"About an hour. It will cost—" I estimated quickly: wire, \$2; staples, 10 cents; labor, \$3. Plus \$2.75 because I think I can get it. Total—\$7.85.

Our wholesaler was only a few blocks away; the wind was with us, and Theodora—our delivery truck—went wild and made it in fifteen minutes.

While I was working, I turned on the radio. The heavy console contained an Atwater-Kent 41, two pounds of dust, and a coiled pipe magnetic speaker. I pulled the —71A output tube from the socket, and saw it had *brass* prongs, which dated it about the same as a brass radiator on a Ford.

Its quality was difficult to describe. Perhaps a man reciting poetry and hanging himself while a load of pea coal was being delivered would come close. How, I won-

SPECIAL BROADCAST PROGRAMS FOR THE DX FAN

HERE are the latest special DX broadcast programs dedicated to RADIO NEWS. Tune in on these broadcasts and send in your reports direct to the station. Give them complete information, reporting the station's signal strength, quality, fading, etc. State in your report if verification is desired, practically all of the stations listed will be pleased to verify reports. The schedule is shown in *Eastern Standard Time* and all hours are *A.M.* unless otherwise indicated.

RADIO NEWS invites all DX clubs and all those having to do with special programs, DX tips and frequency checks to send in the information and help make these schedules as complete as possible. Anyone submitting such data, please bear in mind that RADIO NEWS goes to press thirty days before it makes its appearance on the newsstands, which means that notice of programs for a given month should be in our hands by the first of the preceding month.

JULY					
Day	Hour	Call	State	Kc.	Kw.
9	3:50-4:05	WGAR	Ohio	1450	.5
9	4:05-4:20	WJBO	La.	1120	.5
12	5:35-5:50	WGMB	T.H.	1320	1.
14	4:30-4:45	WFOR	Miss.	1370	.1
AUGUST					
9	5:35-5:50	KGMB	T.H.	1320	1.
11	4:30-4:45	WFOR	Miss.	1370	.1
12	4:20-4:35	WRAC	Pa.	1370	.1
12	5:30-5:45	KWYO	Wyo.	1370	.1
13	4:05-4:20	WJBO	La.	1120	.5
13	3:50-4:05	WGAR	Ohio	1450	.5

PERIODIC PROGRAMS

Frequency Checks and Dedications to DX Clubs and RADIO NEWS

Mondays—

9:15-9:30 p.m., 690 kc., CJCJ, Calgary, Alta., Canada, 1 kw. (tips).

Wednesdays—

12:30 a.m., 1390 kc., KOY, Phoenix, Ariz., 1 kw. (tips).

1:45-2:00 p.m., 780 kc., WTAR, Norfolk, Va., 1 kw. (URDXC) (tips).

4:35-4:50 a.m., 1500 kc., KDAL, Duluth, Minn., 1 kw. (IDA).

Saturdays—

10:30 a.m., 830 kc., WEEU, Reading, Pa., 1 kw. (tips).

2:45-4:00 a.m., 780 kc., CHWK, Chilwack, B. C., .1 kw. (URDXC).

Sundays—

12:45-1:00 a.m., 1280 kc., KLS, Oakland, Calif., .25 kw. (URDXC) (tips).

2:45-3:00 a.m., 1010 kc., CKWX, Vancouver, B. C., Canada, .1 kw.

3:00-3:30 a.m., 1410 kc., CKMO, Vancouver, B. C., Canada, .1 kw.

3:30-3:45 a.m., 570 kc., KMTR, Los Angeles, Calif., 1 kw. (tips).

Monthly—

1st day of each month, 3:00-4:00 a.m., 1260 kc., WTOG, Savannah, Ga., 1 kw.

1st Sunday of each month, 4:00-4:30 a.m., 1340 kc., KGDY, Huron, S. Dak., 25 kw.

2nd Monday of each month, 5:20-5:40 a.m., 1250 kc., WAIR, Winston-Salem, N. C., .1 kw.

2nd Tuesday of each month, 5:00-5:30 a.m., 1370 kc., KRMC, Jamestown, N. Dak., 1 kw. 5:00-5:20 a.m., 1210 kc., WSAY, Rochester, N. Y., .1 kw. (NNRC).

2nd Wednesday of each month, 3:40-4:00 a.m., 1310 kc., KAND, Corsicana, Texas, 1 kw. (NNRC).

2nd Thursday of each month, 4:00-4:20 a.m., 1330 kc., KRIS, Corpus Christi, Texas, .5 kw. (NNRC).

2nd Friday of each month, 4:00-4:20 a.m., 1370 kc., WBTM, Danville, Va., .1 kw.

2nd Saturday of each month, 4:35-4:50 a.m., 1310 kc., KTSM, El Paso, Texas, .1 kw. (FC).

Notes from Readers and DX Clubs

The International Dx'ers Alliance reports the following interesting and helpful station news—Aberdeen, Scotland's new station on 1285 kc., will be completed in 1938—the new Milano III station, Italy, 1429 kc., is now in operation with 1 kw. power.—Miquelon, FQN on 609 kc., a commercial wireless station that works France, broadcasts programs sponsored by the St. Pierre Radio Club, every Saturday night, from 7:30 to 9:00 p.m. EST.

Observer Eric W. Watson of Christchurch, New Zealand, writes that station IZM has shifted from Manurewa, N. Z., 1250 kc., to Auckland and is now using 1 kw. He reports that there are very few private broadcasting stations left, nearly all of them now under the government.

DX Listening Posts

If owners of DX Listening Posts will forward good, sharp photographs of their receivers and the surrounding "veris" to the Editor of RADIO NEWS, they will be published in an early issue.

While RADIO NEWS will be unable to reproduce all of the photographs received, as many as possible will be published. If possible, the owner of the LP should also appear in the picture.

-50-

"O.K., America"

WHEN Walter Winchell begins his radio broadcasts with "O.K., America," he is directing newsy remarks to radio listeners everywhere but radio audiences of two towns in the United States believe that it is especially directed at them, and they have plausible reasons for feeling that way. "O.K., America" is a combination of the names of two towns in the United States.

"O.K." is the name of a community located in Tunica county, which is in the central part of the state of Mississippi. The 65 men, women, and children who make up the population of the town take great pride in the bizarre name of their community.

"America" is the name of a village in McCurtain county, Oklahoma. The 112 people who make up this town claim that they are the only Americans in the United States, punning on their town name.

So, when Winchell salutes with his "O.K., America," residents of O.K. and America reply, "That's us, let's go," and then listen to Walter's gossip of the news of the day.

-50-



I'm a member of the ARRL, but must confess that my interests have been more or less casual, just not getting very "het up" over anything until I read the last two issues of "Within Earshot of the Editor." Frankly I would really like to know what it's all about. What is rotten Denmark, etc. Perhaps it is high time we were waking up and looking around. I feel we hams need an ARRL, but if things are not right, I want the other side of the picture. . . . I am also an ORS and if I get worked up over the thing I may cut loose and do some red hot broadcasting on my own hook.

Amos Utterback, W9FB,
Whiting, Ind.

Thank you, W9FB, for your letter. If all the other hams in the ARRL will wake up as you have, then we hams will be able to get going. The future issues of R.N. will contain all the dope available and we hope that from within the League will arise a new type of ham, similar to the real oldtimers, who will get on their white horses and make the League go somewhere with ham radio.

—Ed.

Congratulations on your work toward cleaning up the ARRL. For many years I have disliked the management of the League for obvious reasons. You are certainly on the right track. Please keep it up.

James H. Chapman, W7AXW,
Seattle, Wash.

Thank you for your confidence in R.N., W7AXW, we intend to clean up the League from within with the help of its membership—if they want to have any bands after 1942.—Ed.

The Western World Wave Club congratulates this outstanding national radio publication (RADIO NEWS) on being the first to realize the peculiar reception conditions which confront the western listener. Now for the first time a national radio monthly brings Pacific Coast short wave fans a special section. . . . *Reprinted from Western World-Wave Broadcast Log, June, 1938.*

Thank you for the bouquets. R.N. will always be the first in radio publications.—Ed.

The other day I came across an old radio program dated March 18, 1931. It listed the following old stations, now deleted: WYCH—810 kc. WQAO—1010 kc. WLWL—1100 kc. WGNB—1180 kc. WHAP—1300 kc. WLBN—1500 kc. and WRNY—1610 kc. I thought that this might be of some interest to your readers.

Robert Trubee,
Brentwood, N. Y.

Thus fleeting is fame. There certainly have been changes since the old days.—Ed.

The ARRL is a 1b organization and am proud to say I've been a member since 1952. Have always got a prompt reply to technical questions within a week's time. . . .

J. P. Adrosko, N2ICJ,
Elizabeth, N. J.

That is where the trouble lies, N2ICJ, the League is not only a publishing house, but an organization representing the U. S. Amateur. We are in favor of the League, but believe that it should be forced by the membership and Directors to do something for the ham, before it will be too late. See "The National QSO Page," this issue.—Ed.

I think the amateur readers are a little self-h. I think commercial and social radio news is more important than amateur news. . . .

Clethus Van Vrede,
Chicago, Ill.

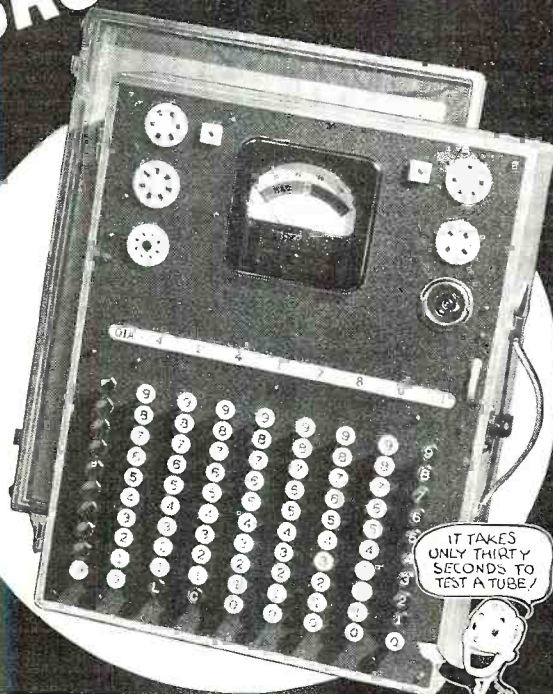
NOW!
A TUBE TESTER THAT OPERATES LIKE A CASH REGISTER!

SUPREME

PORTABLE

Zephyr

TUBE TESTER



IT TAKES ONLY THIRTY SECONDS TO TEST A TUBE!

ONLY \$6⁵⁰ DOWN
\$5.94 for 10 months
CASH PRICE \$59.50

HERE is the greatest tube selling device ever designed for the radio serviceman! A new Supreme tube tester that operates without complicated, tricky, or time-wasting switching circuits!

Just spin the numerical chart roll until the type number of the tube comes up. Then punch the buttons according to the numbers shown (just like a cash register), and the big illuminated meter reads "Good"—"?"—"Bad." *That is all there is to it!* Even your customer can operate it!

You owe it to yourself to see this new Supreme Zephyr Portable Tube Tester at your parts jobber now! It's a quicker, easier way to make *extra* tube profits!

Write For Literature!

SUPREME INSTRUMENTS CORP.

Greenwood, Mississippi, U. S. A.

Export Dept., Associated Exporters Co. · 145 East 45th Street · New York City
Cable Address, LOPREH, New York

The National QSO Page

(Continued from page 38)

Rome, and knowing that the League is to be powerless to influence legislation in an attempt to halt this disaster, why does not the League immediately reorganize itself into a tax-paying body, so that it can devote all of its efforts to influence legislation?

No radio magazine, amateur or otherwise, can do anything for the protection of amateur radio other than the willingness of the magazine publisher to aid, by publicity, the dissemination of constructive information for the protection of our hobby. No Congressman will lend a helping hand to anyone who has books or magazines to sell, because commercialism would immediately enter the picture.

On the other hand, the unbiased publisher of a radio magazine can be of inestimable service to the amateur. He can throw open a column or two in his magazines to the discussion of this grave problem, and by this means he could help the amateurs band themselves into a political body which would be free to lobby in Washington, and to do the things which a tax-exempt organization is forbidden to do.

Eight states have already joined this new campaign. New clubs are being formed. And, for the first time in 25 years, the radio amateurs have come to the realization that they have been racketeered.

A lot of what Mr. Johnson says is too true. However, we think that the solution lies in a careful studied approach to the problem,

rather than by rapid slashing strides which might overlook a dangerous situation and leave the ham open to a flank attack on his bands by some European power. The Editors.

THE AMERICAN RADIO RELAY LEAGUE
RADIOGRAM

Via Amateur Radio
No. 33 Fm W9VOD Ck45 Wall So Dak.
10:10P June 13.

JULY ISSUE RADIO NEWS JUST HANDED ME BY A FRIEND STOP THAT ARRL ATTACK NO MORE POPULAR HERE THAN IN CHICAGO AND BOUND TO LOSE CIRCULATION AMONG SANE HAMS STOP FIRST LAW OF PUBLISHING IS TO CHECK FACTS STOP See You in the Insane Asylum SGD W9VOD SCM SO DAK. [Italics ours.—Ed.]

The gentleman from S. Dakota has missed the boat. There has not ever been any attack on the ARRL in this magazine. RADIO NEWS is for the ham first to last and does not advocate either the abolition of the League nor that it is not the proper voice of the U. S. amateur. What we do say is that there are many things in the League which should be investigated and rectified both by the ham fraternity and the League itself. One of those very things is the mis-use of the ham bands to transmit such utter drivel as this. When exhibited at Washington as a representative "ARRL Radiogram" what do you think the serious minded FCC members would think? No wonder they class us as "kids," and give us scant consideration! Let us use our bands with dignity.
The Editors.

—50—

Bing Crosby, Inc.

(Continued from page 17)

When Whiteman again went on tour, the *Rhythm Boys* decided that they liked the coast better, so they elected to stay in Los Angeles. It was during this period that Bing really began to make a name for himself as a soloist.

Their engagement at the Coconut Grove came to an abrupt end. A couple of times the boys went down to Caliente, Old Mexico, for a week end, and didn't get back until Tuesday of the following week. Their pay was "docked" and they received no promised bonus, so they walked out. As a result of their "walk out" they were black-listed by the Musicians Union. Luckily, however, Mack Sennett had "caught" their act, and offered Bing an opportunity to make a short subject, for \$750.00 with a possible opportunity to make more if the first was a success.

Everett was thoroughly sold on radio by this time, and he kept enjoining Bing to have a crack at New York. He even had a couple of records made of Bing singing *I Surrender, Dear*, and sent them to New York. As mentioned earlier, Bing's first opportunity over a national hook-up, which resulted from his records, was nearly a floperoo.

At the time of this first big radio job, Bing thought that the peak of his career had been reached. So did Everett, for he quit his job selling trucks, and (for 10%) took over the job as Bing's manager.

Bing proved to be a sensation, almost overnight. He sang only a short time for the sustaining program for Columbia, and was then sold to a cigar manufacturer. He sang for them during 1931 and 1932.

About this time Bing received his first motion picture offer and went to work for Paramount in a picture called *The Big Broadcast*. By the time that picture was ready for release, Bing was again in New York, working for Chesterfield cigarettes. He also sang in theaters and night clubs.

By the time he concluded the Chesterfield program, the studio had another picture readied for his appearance. It was called *College Humor*. And it was when he came to Paramount for this picture, that he became Bing Crosby, Inc.

All his checks went into the corporation. From this corporation he drew a salary as president. Everett was treasurer, and John O'Melveny, a lawyer, the secretary. The "office" was Bing's dressing-room on the Paramount lot. The incorporation process was necessary because Bing was drawing checks from screen, radio, records, personal appearances, and advertising products.

In 1934 *She Loves Me Not* was released, and proved to be one of the biggest box office attractions of all. Shortly after the release of this picture, Bing's business became so extensive that enlarged quarters had to be found.

Today the "Sunset Strip," is an ultra-swanky Beverly Hills business district. It is there that the Crosby Building was built. Also during this period Bing's father and mother had come to Hollywood to live. Their first living quarters was rented, but

Receiver Prize Contest

(Continued from page 24)

test giving away over a thousand dollars' (\$1,000) worth of transmitting equipment.

Through the courtesy of Mr. Samuel Poncher, of Newark Electric Co., 323 West Madison Street, Chicago, Illinois, the winner of the receiver may, at his option, exchange it for an equal value of general radio merchandise subject to whatever arrangements are made personally between Mr. Poncher and the winner. The same will apply to the winner of the second prize. The winners will be announced in the November issue of RADIO NEWS and they will receive an order on Sam Poncher for the delivery of the receiver they choose. In sending in your manuscript, you need not indicate your choice but may wait until you have been notified that you are a winner. Directly after the winners choose their sets or the equivalent in merchandise, same will be shipped from Newark Electric Co. In case of a tie, duplicate prizes will be awarded.

In submitting a manuscript, the contestant agrees that the decision of the judges will be final and that the contestant agrees to abide by that decision.

You may submit as many manuscripts as you wish, as long as each one is accompanied by a cover from the August Issue of RADIO NEWS or you may make a reasonably accurate facsimile thereof, one for each manuscript. Any news dealer will permit you to trace the cover.

Well, what say, gang! Let's see those articles!

RULES

1. Anyone may enter the contest except the judges and Ziff-Davis Publishing Co. employees and their relatives.
2. Manuscripts must be of a technical nature and may deal with any phase of radio.
3. Manuscripts should be accompanied by photographs of subject and circuit diagrams (if any). Diagrams may be sketched but should be neat.
4. Manuscripts should be neatly typed (double spaced) on one side of paper only.
5. All winning manuscripts become the property of the Ziff-Davis Publishing Co. and will be published in RADIO NEWS.
6. Each manuscript should be accompanied by a stamped, self-addressed return envelope to ensure return in the event it does not place in the contest. Non-winning manuscripts which are not accompanied by return postage will be destroyed.
7. Author's name, address, call (if any), number of words, and name of article should appear on the first page of the manuscript.
8. Every manuscript must be accompanied by a cover from the August or September, 1938, issue of RADIO NEWS, or a reasonable facsimile of either of said covers.
9. Address all contributions to Receiver Contest Editor, RADIO NEWS, 608 South Dearborn St., Chicago, Illinois.
10. Contestants may enter as many manuscripts as they wish, but each one must be submitted in accordance with Rule 8.
11. Manuscripts must be postmarked prior to midnight, September 8, 1938.
12. Judges:
B. G. Davis—Editor, RADIO NEWS.
Ulmer Turner, W9UG—Radio Editor,
Chicago Herald and Examiner.
G. L. Dosland, W9TSN—Chairman,
Chicago Area Radio Council.

—50—

Bing built them a house soon afterwards. At about the same time, Larry Crosby, another brother, left his job in Seattle, and was set up in business by Bing.

Today Everett is what might be termed General Manager. He is in control of the agency business, which handles screen and radio talent of the "higher bracket" type.

H. L. Crosby senior now officiates as treasurer of the corporation, as well as being in charge of the investment end of the concern.

Larry Crosby heads publicity and fan mail departments. This side of the corporation is so great that there was not room in the Crosby Building proper, so an annex was added. It is here that Larry has his office.

Thus it is that the statement, "Bing Crosby is not an individual—he's a corporation," is singularly apropos. As a matter of fact he's more than a corporation, he's a meal-ticket for better than sixty people. Probably the most important aside to that fact is that Bing's wealth—and he is very wealthy—came about directly from his radio work.

Without radio, Bing Crosby would never have become a movie star. Never, by any stretch of the imagination, could Bing be termed a matinee idol. The thing that gets him across is the fact that his Thursday night program for Kraft Cheese is still tops. Tops because people, particularly the youth of the country, go for his crooning.

For instance, during the Woodbury program Bing became a ranch owner. About

twenty miles from San Diego, California, he owns a forty-acre tract of land known as *Rancho Santa Fe*. He made over two old adobe houses, which had weathered the years since the time of the Spanish Dons, into guest houses. He also built a tennis court, swimming pool, and home for himself and family there; in addition to his imposing estate near Toluca Lake, in North Hollywood, another Los Angeles suburb.

Bing is also the owner of a horse-racing stable. His horses, which he runs at Santa Anita, are not always winners. His idea was to breed winners rather than to purchase them. As yet, his stable is the occasion for as many jokes as are Eddie Cantor's daughters.

Bing is also the promoter of the race track at Del Mar, California, which is becoming increasingly popular.

The crooner's interests are many and varied. Aside from the aforementioned holdings, he has a number of store and apartment buildings in Hollywood and Los Angeles. He has extensive interests in gold, silver, and lead mines in British Columbia. His extra-curricular activities also include ownership, or part ownership, of Freddie Steele, middleweight prizefighter.

The Select Music Corporation was founded by Bing, but, when other songwriters and publishers accused him of plugging his own songs over the air, he turned over the business to his brothers.

From every record that Bing makes he receives a good percentage. And, what is more important, he buys a slice of each pic-

ture that he makes. His popularity is such that no picture he has ever made has lost him money.

It is possible to continue for paragraphs in a recitation of the Crosby affairs. Many deals in which he is interested are never known to the public. His theory is that the public has no right to know anything about his private business operations. About his career as a singer, yes, and about his radio programs or pictures, he has to expect a certain amount of publicity. But he never talks about his business affairs.

Why, then, does the business of Bing Crosby, Inc., click as it does. Those reasons, like his innumerable business dealings, are too numerous to mention in their entirety.

Success, however, particularly in the entertainment world, is sure to "draw a crowd." For that reason entertainers, both screen and radio, are anxious to appear as represented by Crosby. It means something to be represented by a performer with his fame. Another thing, Bing is too good a showman not to pick associates who know their stuff. He's had too many ups and downs himself to have dealings with people who are not tops in their fields.

Again, it has been said of the singer that he has a "magic touch." Everything with which he is connected seems to "sprout" money.

Possibly the best definition of all is the fact that Bing Crosby is at the height of his fame as a radio performer, and through radio, the screen. He is smart enough to



BUD

Builds the Best!



Always a step ahead,
always the "best for less"
—that's what the BUD
trademark symbolizes.

Get your copy of BUD'S
60-page Amateur Station
Log and Data Book
at your jobber's for only
10c—or use the attached
coupon.



SEND FOR
LOG BOOK
OR FREE
CATALOG
NOW!

BUD
RADIO, INC.
5205 Cedar Ave.
Cleveland, Ohio

Enclosed find 10¢ for your big
60 page Station Log Book.

Please send FREE catalog.

Name

Address

BUD RADIO, INC.
CLEVELAND, OHIO

SETTING THE PACE



CORNELL-DUBILIER TYPE "BR"

Ultra-compact, unexcelled for all types of service and experimental work. Far ahead in advanced design—outstanding electrical characteristics—and inherent dependability. Equipped with special vent. Easy to wire-in.

These tiny "Blue Beaver" electrolytics are typical of Cornell-Dubilier's complete line of capacitors for every radio application. C-D sets the pace for capacitor performance and dependability.

COPIED - IMITATED

But Never Duplicated

Demand the original Type BR etched foil electrolytic. Product of the world's oldest and largest manufacturer of capacitors.

FREE

A real house organ for the radio technician! Get your copy of the "C-D Condenser" regularly by mailing the coupon below.



MAIL NOW

CORNELL-DUBILIER ELECTRIC CORP.
1018 Hamilton Blvd., So. Plainfield, N. J.

Rush copy of the last issue of the "C-D Condenser". Also place me on your mailing list.

Name

Address

City State

AMPERITE offers

"ADJUSTABLE RESPONSE"*

... made possible by

THE ACOUSTIC COMPENSATOR

(pat. pend.)



*Higher or lower pitch with the same microphone.

PUSH UP TO INCREASE HIGHS
PUSH DOWN TO INCREASE LOWS

With the flip of a finger you can now (1) lower or raise the response of the microphone. . . (2) adjust the microphone for most desirable response for close talking or distant pickup. . . (3) adjust the system to any "taste", room condition, or equipment.

MODELS RBHk, RBMk, with Acoustic Compensator, frequency range 40 to 11000 cps, output, -65 db., complete with switch, cable connector and 25' of cable. \$42.00 LIST

NEW LOW-PRICED CONTACT "MIKE"
Model SKH (hi-imp); SKL (200 ohms) \$12.00 LIST

MODELS RAH-RAL, excellent for speech and music. Reduce feedback. \$22.00 LIST

Write for Complete Illustrated Bulletins and Valuable Sales Helps.

AMPERITE

561 BROADWAY, N. Y.
Cable Address: Alkem, New York

AMPERITE Velocity MICROPHONE

know that the performer who reaches the top of the ladder had better put a nest egg aside against the day some one kicks that ladder away.

When the time comes that Bing Crosby is not the shining star of radio and screen he is today, he has "feathered his nest" to the extent that the future holds no terrors—either for him or for his family.

Bing has another brother, Ted, and two sisters, Catherine and Mary Rose, who are still in Washington. Both Larry and Everett are working for him in Hollywood, and his mother and dad are well-fixed for life. He also has a famous brother who is out on his own: namely, Bob Crosby, whose orchestra is well known on the air.

It is not generally known whether Bing's other relations are here in Hollywood under his beneficence or not. In either case, as someone else has remarked, "one of the nicest things about Bing Crosby is that he takes care of his own."

-30-

QRM Dodger

(Continued from page 35)

All components are mounted upon a standard metal chassis and for best results should be placed as shown in the accompanying illustrations. Although the power supply was not incorporated within the unit illustrated here, there is no reason why it could not be included, but proper care must be exercised to see that no vibration hum is present which might jar the oscillator and cause the setting of the variable condensers to alter. The use of rubber mounting washers and well-made power supply parts should make it easy to avoid any such difficulty.

Referring to C₁ in Figure 1, we find a fixed condenser of the air dielectric variety manufactured by the Cardwell Company. The grid circuit is tuned with a pair of 100 mmf. Cardwell trim-airs, one of which is operated by the main dial to give bandspread, with the other used to trim the entire grid circuit for proper alignment of the bandspread condenser. This grid trimmer arrangement will permit complete coverage in the 40 and 20 meter bands, and from 28.5 to 30 mc. on ten meters. Coils for the lower frequency bands, of course, are easily made. The plate condenser is not critical and adjusted for maximum output.

In wiring grid and cathode circuits throughout, use heavy No. 12 busbar, supplying a single common ground for all r.f. negative returns. In high frequency work it is courting trouble to attempt grounding only to the chassis, due to the varying potentials which may be set up. This common ground bus should then be connected to the steel cabinet. A voltage divider may be mounted toward the rear of the under-chassis if you wish to take high voltage from the same supply now used to operate your present crystal or other low powered stages.

By-pass condensers for plate and screen may be wired in directly over tube socket terminals. Ordinarily the e.c. oscillator is operated alongside the transmitter and output leads can be made short enough to permit direct grid coupling, but if more remote

operation is desired, follow the circuit in Figure 2B.

There is a possibility your present oscillator, when transformed into an r.f. amplifier, may have a tendency to follow its old occupation and oscillate. Should this occur, a neutralizing condenser of about 25 mmf. or a pair of twisted No. 16 pushback about three inches long will suffice to make it behave.

A potential of 250 volts on the plate of the 6C6 is more than adequate to secure an output comparable to that of a crystal stage. Shielding in this unit, incidentally, is not needed inasmuch as the oscillator is designed to double in the plate circuit for all outputs.

In making final adjustments, turn the 100 mmf. padding condenser in the grid with a screwdriver to approximately half-way closed. Rotate the bandspread condenser and listen for the output on a calibrated receiver (don't forget the b.f.o. switch) and thus locate the frequency of the oscillator output. Readjust the padder until the bandspread condenser covers the band, and after selecting your desired spot set the plate condenser for maximum output.

If you wish to insert a milliammeter permanently into the circuit, or occasionally check the plate current, you will find that with 250 volts you should have a reading of 9 or 10 mills. Touching the grid of the 6C6 brings this to 13 mills, with the oscillator non-oscillating.

The entire device can be constructed and installed in a small but handsome cabinet, excluding power supply, for under ten dollars. It will prove a surprise how many new contacts you can make when not rooted like Plymouth Rock on one or two crowded frequencies and you can really go out after DX. It means increased efficiency of operation, less fruitless calls and QRM plagued contacts. In fact you'll wonder how you ever got along without this little gypsy oscillator all these years.

-30-

Questions and Answers

(Continued from page 38)

N. J. A., White Plains, N. Y.: I recently acquired a power transformer rated to deliver 500 volts direct current output, at 150 milliamperes. I would like to build a power supply for a small transmitter. I have the necessary chokes and a number of electrolytic condensers but all of the latter are rated at 450 working volts. Is there any way that I can use them?

Answer: Yes. If you connect two 450-volt electrolytic condensers in series their working voltage is doubled. As a further safety measure, each individual condenser should be shunted by a 1/2-megohm resistor. If these resistors are not used, differences in the leakage characteristics of the two condensers may result in uneven voltage distribution across them, in extreme cases applying practically all the voltage across one and very little across the other. Keep in mind, of course, that when two 8-mfd. condensers are connected in series their total becomes 4 mfd.

-30-

Modulation Indicator

(Continued from page 51)

second model, the panel which measures 5½"x8" was bent at a 65° angle five inches from the bottom. This leaves a vertical panel for the controls and the ray tube sets at an angle which may be watched with ease while talking. The angle of the bend may vary in other setups depending on the distance of the tube from the eyes and the height of the operator.

The location of parts can be seen in the illustration. The indicator was constructed without a built-in power supply for several reasons. Its small power demands are easy to meet and can be supplied by the receiver or crystal supply, to be used as portable it must be able to operate on batteries. The ray tube works very nice with only 90 volts on the target.

A diode rectifier must be used to obtain control voltage for the ray tube and an audio amplifier should be used to isolate the headsets from the indicator circuit and at the same time bring the audio signal up to a usable level. A single tube such as a 75 or 85 can be used, but the cathode being common to both diode and triode brings up biasing difficulties which can be overcome by using two tubes.

The original model used plugin coils, but to make the second one more flexible, coil switching was decided on. Due to the broad tuning of the single tuned circuit, an eleven tap switch gave complete coverage from 5 to 160 meters with no coil pruning. L₁ consists of 5 turns ¼" in diameter wound with No. 18 wire spaced the thickness of the wire. L₂ is ⅝" in diameter wound with No. 16 wire spaced. Both coils are self supporting. L₃ is wound of No. 16 wire on a 1¼" form with 17 space wound turns tapped at 4, 8, 12 and 17 turns. L₄ is on a similar form wound with 60 turns of No. 28 dec wire tapped at 10, 20, 30, 40 and 60 turns.

The coils are tuned by a 150mmf. condenser and the rectified voltage developed across R₁ is fed through the audio filter C₂, R₂, C₃ to the grid of the ray tube. Part of the voltage developed across R₁ is fed to the grid of the audio tube to be amplified. T is a 2:1 audio transformer used to keep the d.c. from the phones and also to better match the plate impedance of the audio tube to the load.

When used as a carrier shift indicator the instrument is coupled to the transmitter enough to nearly close the eye with the condenser tuned to resonance. When modulation is applied, any nervous twitching of the eye indicates over modulation. If the dark area becomes wider, over modulation of the carrier cutoff variety is present. If the area becomes narrower, lopsided modulation is occurring. To use as an inverse peak indicator, connection is made as shown to J₂.

When the negative peaks of the modulating voltage exceed the d.c. plate voltage of the modulated stage, current will flow through R₁ and R₂ causing the eye to flicker. On self excited high frequency gear modulation should be kept below the point where flicker occurs.

-30-

Studio Briefs

(Continued from page 18)

ceremonies on the NBC *Breakfast Club*, all gathered in Fort Worth, Tex., to help celebrate the addition of Station KGKO to the NBC networks. Amon G. Carter, publisher of the *Ft. Worth Star Telegram* and owner of the station, welcomed them to Texas and played host to them while they were in Fort Worth. When they got back home each received a gray Stetson from Carter, a memento of their visit. Inside the hats, which are "planter's style," is printed "Shady Oak Special, From Shady Oak Farm, Fort Worth, Texas; where the West begins." Near the band, in gold letters is the legend, "The Latch Always Hangs Outside." The hats are manufactured by the hundreds, especially for Carter.

Earl George, NBC actor who plays the rôle of Thad Gillin in *Attorney-at-Law*, comes by his histrionic ability naturally. He is a descendant of W. L. George, English novelist who died during the World War.

WGN—Mutual Bricks

JIM FLEMING, WGN-Mutual announcer, donned cap and gown this month to accept a degree from University of Chicago.

Blair Walliser, WGN's production director, is grooming his 50-foot racing sloop *Revenge* for the racing season on Lake Michigan. A complete new suite of racing sails and a new paint job and reconditioning of the hull are included in the "grooming." The first major race for *Revenge* will be the Chicago-Michigan City event. *Revenge* won the Chicago-Mackinac Island race last season.

Bob Crosby and his orchestra inaugurate a new series of audience participation programs over WGN-Mutual. The programs will be presented direct from the Blackhawk Restaurant in Chicago where the Crosby band is the current attraction under the title of *Radio Candid Cameras*. Idea behind the program is a question bee asking the candidates selected from the audience "what's wrong with this picture?" picture to be framed in music by the orchestra.

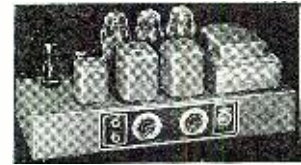
George Jessel and his talented troupe from his *Thirty Minutes in Hollywood* program on WGN-Mutual, played the *Chicago Theater* for a week before returning to Hollywood. Chicago was last theater stop on ten weeks of touring in the East. Plans to make a picture out of the radio show this summer.

CBS—Chicago Briefs

JANE FARRAR, lovely menace in the *Stepmother* cast, wants it known she is nicknamed "Rusty" as a hang-over from kid days when her hair was bright red—and *not* because her voice is squeaky . . . Lee Leyton, girl singer who forms the fourth of the *Four Notes*, is one of three Lees in that group, the other two being Lee Gotch and Lee Gillette . . . Contenders for "brightest-coat-of-the-month" honors in CBS' Chicago studios are Brett Morrison, Francis X. Bushman, Frank Behrens, and Vincent Pelletier, all of whom are turning up in some vivid summer outfits . . . Patricia Dunlap and Marjorie Hannan have at last found

**Popular Priced
TRANSMITTER and
AMPLIFIER KITS**

This new series of kits represents the acme in kit value. The circuits are efficient, stable and easy to wire. Large etched plates and modern panel layouts lend beauty to the slate gray crinkle finish of the chassis, transformers, and cabinets.



S-15A AUDIO AMPLIFIER

The S-15A audio amplifier is an ideal kit for PA and modulator service. The power output is 15 watts and the gain sufficient for crystal mike service. Dual input—high or low gain, and tone control are incorporated. Tubes required are one 6J7, one 6C5, two 6V6's and one 85. The kit is supplied completely mounted, ready to wire, including accessories, less dust cover and tubes.

Amateur Net Price..... \$24.00

Kit as above but with universal modulation transformer in place of voice coil output, use kit No. S-15M..... \$24.00

Amateur Net Price..... \$24.00

Dust cover for above amplifiers, type S-15D..... \$1.50

Amateur Net Price..... \$1.50

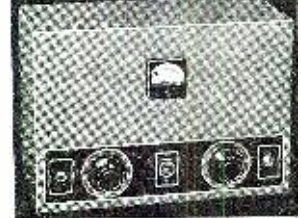
S-25A AUDIO AMPLIFIER

The S-25A audio amplifier has been designed for high power PA and medium power modulator work. 25 watt output is provided with gain sufficient for crystal mike. Dual high impedance input—high or low gain, and tone control are provided. Tubes required are one 6J7, one 6C5, two 6L6's and one 85. The kit is supplied completely mounted and ready to wire, including all accessories and dust cover, less tubes.

Amateur Net Price..... \$30.00

Kit as above but with universal modulation transformer in place of voice coil output, use kit No. S-25M..... \$30.00

Amateur Net Price..... \$30.00



SX-25 TRANSMITTER KIT

The UTC SX-25 kit represents unprecedented value in a low power transmitter. It employs a crystal controlled oscillator of high power output and stability and will operate on all bands from 160 to 10 meters. Tubes required are one 6L6 and one 85. The unit is supplied completely mounted with self-contained power supply and antenna tuning condenser, ready to wire, including cabinet and all accessories, less meter, tubes and crystal. \$18.00

Amateur Net Price..... \$18.00

SX-80 TRANSMITTER KIT

The UTC SX-80 kit is a complete 80 watt CW unit. Operation on all bands is obtainable with plugin coils. A rugged power supply is provided. The kit may be used as a complete 80 watt CW unit or as an exciter for a high power final. Tubes required are three 6L6's and one 85. This unit is supplied completely mounted, ready to wire, including cabinet and accessories, less meters, crystal and tubes. \$37.50

Amateur Net Price..... \$37.50



WRITE FOR BULLETIN NO. S-10
Listing complete line of Transformers, Amplifier and Transmitter Kits, specifically designed for amateur applications. Maximum Value at Lowest Cost.

UNITED TRANSFORMER CORP.
72 SPRING ST., NEW YORK, N. Y.

**SOON YOU MAY SEE
AN AD LIKE THIS**

**TELEVISION
OPERATORS
WANTED**
\$105⁰⁰ A WEEK

Must be experienced workers on actual equipment.

**WILL YOU QUALIFY?
Or Will You Be A
"WISH-I-HAD-er"?**

Already there are 18 Telecasting Stations in America. Programs are being broadcast. Television Receivers are on sale. Tremendous progress has been made. The above facts are definite indications that TELEVISION HAS ARRIVED! Now is the time to get in on the ground floor! Train for your future in Television in which you may earn \$1500 to \$7500 a year. . . A.T.I. is now training more men for Television than any other organization of its kind. There are many reasons why. Just send the coupon . . . it will bring you details on what may be the greatest opportunity of your life.

AMERICAN TELEVISION INSTITUTE

433 E. Erie St., Chicago, Illinois, RN 838

Gentlemen: Please send me your Television book, literature, and complete details. It is understood that all this is free. No obligation. Nothing to pay.

Name Age
Street
City State



**THE
EXTRA MONEY**
you make each week on the
NATIONAL UNION
PLAN is like
**MONEY
FOUND!**

NEW!
National Union
"CERAMITE"
Condensers

No Explosions! No Shorts! The new N.U. "Ceramide" ceramic shell condensers are the "mighty" midget electrolytics of the industry . . . small in size but mighty in quality, performance and safety. Buy Them—Try Them! They apply on FREE EQUIPMENT contract.

. . . do as thousands of Service Engineers are doing . . . get FREE EQUIPMENT . . . earn more money!

You can benefit by the experience of thousands of your fellow Service Engineers who are cashing in on the National Union free equipment plan. These men have proved the plan is right. They are taking advantage of N.U. quality in tubes and condensers. They don't have to fear cut price "dumping" of N.U. products. Ask your jobber or send the coupon.

NATIONAL UNION TUBES & CONDENSERS

NATIONAL UNION RADIO CORPORATION,
Dept. RN-838, 57 State St., Newark, N. J.

Who is the nearest N.U. Jobber?

Send me data on "Ceramide"

Name

Address

City State

justification for the early hours they must keep to play the twins in *Bachelors' Children*. Now they can get in several sets of tennis before other engagements claim their time.

Jack Fulton, romantic tenor of the *Just Entertainment* program, had a bad hour the other morning when his two sons persuaded him to umpire a sandlot ball game. One of the kids was on either team so Jack couldn't win . . . Chanteuse Shirley Sadler is having big worries about a small trouble—trying to find a bathing suit to match her auburn hair .

—30—

Ham's Wife

(Continued from page 52)

mitters in the car along with a good lunch and plenty of hot coffee, to drive into the country—combining radio and pleasure.

We never have any disagreements about spending money on radio, for I understand what he needs to complete the power supply or when he has to replace a filter condenser, as the case may be. Also, there is my own transmitter which occasionally needs some replacement. This is merely one advantage I have over you other ladies. Another is that my OM can't fool me when buying any radio material. I know the value of most all equipment and know what is necessary and what isn't. A well known feminine trait is that of getting a good bargain. I am no exception in that respect. I like to shop around and get a better bargain than my husband did.

And because I do indulge my husband his whims in regard to radio, he is more than generous when it comes to my capricious notions.

The pride of possession cannot be denied whether man or woman. I am certainly proud of my FB station. My OM painstakingly designed a fine sensitive receiver for my especial use, and together we constructed my transmitter. I say together—for you can be certain that I was right on hand when it came to building the frame, and we worked side by side throughout the entire period.

I don't claim to be able to build an entire transmitter and I won't vouch for my wiring—but, by heaven! I can solder a connection and use a drill, and I'm an expert coil winder-upper! Did you ever take a soldering iron in your hands, XYL, and try to apply it to a patch of solder? Believe me, it's an art—make no mistake about that. I discovered that I could make the most amusing things with solder—and I keep my costume jewelry in constant repair. Much to the disgust of the OM here, I have a great time measuring the resistance of fruit and vegetables with the ohm meter. Did you ever measure the resistance of a potato? Try it some time.

Of course, it has been rather difficult to get a meal together at times—what with climbing over tools and getting tangled up in hook-up wire. But for the most part, we have lived in apartments and the kitchen table has to serve as the tool bench. There are at least two shelves in my kitchen devoted to jars and boxes of condensers and resistors as well as nuts and bolts—to say nothing of a couple of drawers and even a

suitcase under the stove! I don't mind in the least, for I know that when we do have more room my husband will allow me to arrange things as I like. My greatest ambition is to have a large room for our radio shack with a fine glass top desk and huge maps and globes and perhaps a fireplace for genuine comfort—yes, I'm sure of that—a real fireplace with a big log blazing—I couldn't think of putting my OM out in a corner of the garage. I want my husband with me. I want to share his ideas and help create new ones. I know when he is "chewing the rag" on the air it may not be exactly "big talk," but at any rate he is not cavorting around town with questionable company—nor gambling nor drinking. Of course, if you have a man you don't care to take the trouble of locking up at night—that is something else.

Perhaps you will ask why it is that a woman has to do all the adjusting. My answer to that is—for that she was created. After all, it is the wife who supplies most of the glamour and illusion in marriage. It is part of her job to create an atmosphere where her man can escape from reality into a world apart—a world where he can masquerade and forget that he may be just an inadequate breadwinner.

I have had occasion to observe several couples who are both amateurs and they appear to get so much out of life. In every case, they are intelligent, interesting individuals with a sense of humor and a great capacity for having a good time.

Speaking of a sense of humor—your husband certainly has to have one when he comes home and there is no dinner ready and you are carrying on a QSO with some fellow. A YL or an XYL receives many proposals and that alone is certain to keep your husband interested in you. You cannot realize how it pleases me when another husband tells me what a fine wife I am, and how he wishes his wife could see things as I do.

My husband has given up trying to work DX because I am able to contact so many more countries than he, due to having more time to "angle" for the elusive DX.

I have been active in amateur radio for five years and I intend to continue. I only hope that I will have the pleasure of a QSO with some of you radio wives in the future.

If you can forget for a minute that I am an amateur and remember that I am a woman, let me tell you as one wife to another, there is nothing that keeps a woman so young and attractive as some live interest. I have tried several and find that amateur radio fully answers my demands for a spare time activity. There is no hobby or recreation that is as worth while and inexpensive.

A well known novelist recently advised all women to create some hobby which would be a sort of insurance against misfortune and unhappiness, and maintain it in the face of ridicule even, but hold fast to it and keep it alive. It cannot help but add charm and interest to any woman. An active mind is a young mind and an alert mind is a happy one.

Remember, too, what Grover Cleveland said: "It is a condition that confronts us—not a theory!"

—30—

Ribbon Mike

(Continued from page 45)

is placed below the pole assembly. The transformer is so light little or no support is required to hold it in place. The wiring to the ribbon is in the order of No. 16, so when soldered to brass ribbon clamps, a fairly substantial assembly results. The cable can now be connected to the transformer secondary, and assembly placed in the case. The supporting bracket can be put in place and tightened with a knurled or wing nut. Before putting the screen on, a piece of silk should be cut to the size of the screen and pasted on the inside.

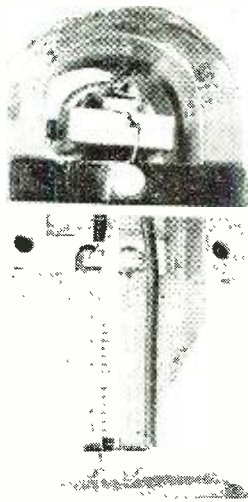


Fig. 4. The completely assembled ribbon mike.

If magnets of the size used on this particular assembly cannot be had, it will be a simple matter to scale pole pieces and other assembly parts to meet the requirements of any size magnets. It must be remembered that a high gain pre-amplifier has to be used with a velocity microphone.

The microphone if properly constructed, will give results comparable in level and frequency range to the better types now on the market.

-30-

Photocell

(Continued from page 47)

be operated in series, if light normally falls upon them, or in parallel if it normally does not. A change of light intensity at any one of them will then serve to set off the common alarm to which they may all be connected.

Photocells of the vacuum or gas filled types are less often used in series of parallel except over very short distances. The long leads which are necessary upset the amplifying circuits, and the expected results do not occur. Over distances of a few feet, however, these cells may also be used in this manner. In such instances they are connected, for circuits like that of either Figure 2 or Figure 3, in same manner as are the battery types of cells—in series if light normally falls upon them, and

in parallel if it normally does not. When several photocells of this type are connected in series, however, one change in the circuit must be made—the common voltage which is across them all must be raised proportionately, in order to keep the sensitivity of each of them up to the point where it would be if operating independently.

So far we have covered only the uses of photocells included in the first section of the table of Figure I, but in the two articles which are to follow we shall discuss the use of photocells in *quantity* and *quality* circuits—those more advanced uses by which the photocell is made useful in the laboratory and in the factory, and where this new tool of science is rapidly making itself useful in a hundred different ways.

Its applications are seemingly endless and the jobs done appear tinged with Black Magic.

-30-

Radio Lands the Plane

(Continued from page 23)

beam theoretically 5-feet wide at the landing point and 100-feet wide at the field boundary. Another transmitter operating on the same wave length emits a bent beam directed along the runway and gradually rising from the landing point to a height of 60 feet at the edge of the field, thus following the normal glide angle of the plane. [See *Landing Blind*, RADIO NEWS, July, 1938.—Ed.]

The airplane carries a special antenna to receive the directional and the landing impulses, which are led to a special instrument on the panel to operate a horizontal and a vertical needle. The vertical needle indicates position of the plane with respect to direction of the runway, while the horizontal needle shows its angle of glide in the landing beam.

Both beams are intercepted five miles or more from the airport at an altitude of 2000 feet, and when the two needles indicate that the plane is headed directly for the runway and is at the correct height in the landing beam, the pilot throttles down the engine for a speed of about 80 m.p.h. and turns control over to the mechanical pilot. The plane then follows the landing beam on a glide that starts on a considerable angle and gradually flattens out to bring the plane to an easy, level landing near the approach end of the runway. When the tail wheel settles to the surface, the brakes are applied manually by the pilot. During the glide, the pilot watches the two needles and if either shows a deviation from course or angle, he adjusts regulating knobs on the mechanical pilot to correct the direction and angle of flight. Except for these adjustments, the landing is done entirely by radio and the robot pilot, the latter operating the controls of the airplane.

An almost irresistible impulse inclines the human pilot to take a hand in the operation when making automatic landings, but experience has shown that more accurate and easier landings are made by the combination of radio and robot without any human interference.

-30-

HANDED TO YOU
by the
POSTMAN
the secret
of how to
SAVE MONEY
IN PHOTOGRAPHY

JUST A SAMPLE. Famous Voigtlander Brilliant V6, *dollars off the regular price. See it in the FREE camera catalog.*



Voigtlander Brilliant V6 Takes 12 (2) x 2 1/2 prints on 120 film
SPECIAL \$9.95

IT'S yours absolutely FREE. Mail the coupon today. There's page after page of sensational camera values in this new catalog. Latest types, famous makes, complete equipment and supplies—at bargain prices. Get this catalog now. It's FREE.

CALLING ALL "HAMS"

Meet Pee-Wee—the new midget transmitter that's gaited to do big things. 25 watt, crystal controlled, and all on a single chassis. Use Pee-Wee for an emergency rig, take it along on vacation. It's portable as your wallet.

\$19.95

Complete Kit Ready for Assembly



LAFAYETTE 6 TUBE \$6.95 AC-DC COMPLETE WITH TUBES



SENSATIONAL RADIO VALUE

This "buy" is typical of the low prices in the LAFAYETTE line Sets for den and camp; phono-combinations for the parlor; sets for the car. Smartly designed, brilliant in performance.

AND HERE IT IS:

new radio catalog—absolutely FREE! Receivers, P.A., "ham" and test equipment, parts, tubes. You'll like the prices. Mail the coupon today. Get both catalogs. They'll save you money, and they're FREE.

WHOLESALE RADIO SERVICE CO., INC.

NEW YORK, N.Y. • CHICAGO, ILL. • ATLANTA, GA.
100 SIXTH AVENUE, NEW YORK, N.Y.

Rush **FREE** Catalog No. 71-2H3

Rush **FREE** Camera Catalog No. 72-2H8

Name.....

Address.....

City.....State.....

PASTE COUPON ON PENNY POSTCARD

www.americanradiohistory.com



E. H. RIETZKE PRES. OF CREI

Are YOU Prepared For the Problems of Tomorrow . . . ?

Stop wasting time—It's your job today to train for a better job tomorrow!

The "lab" problems of yesterday are the commonplace equipment you use today. CREI training is planned for radiomen who want to be equipped to handle any problem of the future. After you read our story you will never again look at your job in the same light. You will realize how important technical training is right now!

You can insure your future by increasing your ability

If you are like many other alert, ambitious men who have planned their futures with CREI and now hold responsible radio engineering jobs . . . you, too, will want to do something about it. You can—by writing today for our interesting story—

WRITE TODAY FOR FREE 48-PAGE CATALOG

"A Tested Plan for a Future in Radio"

Send for this FREE booklet. If you are not satisfied with your present job—be sure and read this interesting illustrated booklet.

CAPITOL RADIO ENGINEERING INSTITUTE

Dept. RN-8
Now located in our own new building—
3224—16th Street, N. W.
Washington, D. C.

Follow the Latest DEVELOPMENTS in the Field of Radio

RADIO NEWS

- » Will the Hams be awarded increased frequencies?
- » Will another Amateur League be formed?
- » When will television be available to the public?

These and all other latest issues are discussed in Radio News, together with the newest circuits and apparatus.

Read RADIO NEWS
25c on all newsstands

(\$2.50 by annual subscription in U. S.)

Mikes, Mixers, and Monitors

(Continued from page 41)

The broadcast controls, when used in high-level mixing, consist of a series of fixed noise tested carbon or wire-wound resistors in conjunction with a series of wiping copper or phosphor bronze brushes which maintain an excellent low resistance and direct contact to the various taps. This type of control should always be used where continuous mixing is done as in "riding gain."

This use of low level mixing is becoming increasingly popular, as the additional tubes required for high-level mixing are eliminated, as well as permitting a more compact unit to be constructed. Two, three or four low impedance mikes such as 25 or 50 ohm dynamics may be mixed with the circuit shown in Fig 3A. If the mikes have an impedance of 50 ohms, likewise the "T" pad controls should have a similar impedance. The input to grid transformer may be a 25, 30 or 50 ohm primary to grid as the difference in adding two more mikes in parallel cannot be discriminated by the average persons' ear. For quality installations, of course, the impedances must be accurately matched. This method of mixing does away with not only additional parts, but controls the volume at a low level where contact noises appear at an extremely low level.

This instrument is a d.c.-movement meter with a copper-oxide rectifier. Several versions of meters are to be had, including both fast and slow speeds. The "standard" type fulfills the applications such as p.a. work or for use in an amateur station as a means of showing the audio level passing from the speech equipment to the modulators. For

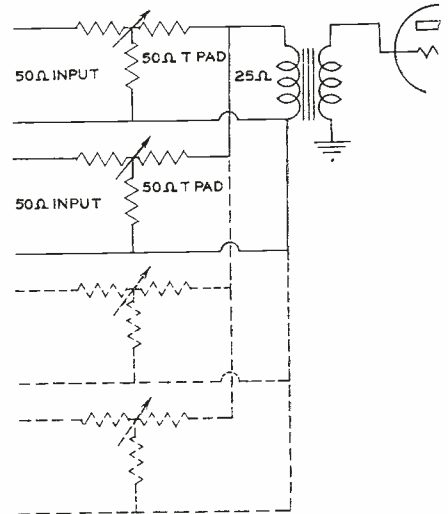


Fig. 3A. "T" pad mixer circuit.

Monitors

A monitor may be either of a visual or aural type and the choice will depend upon the requirements of the individual installation. Let us take up the "visual" methods first. The one most used today for all around volume indications make use of a calibrated a.c. voltmeter which is termed a "Decibel" meter.

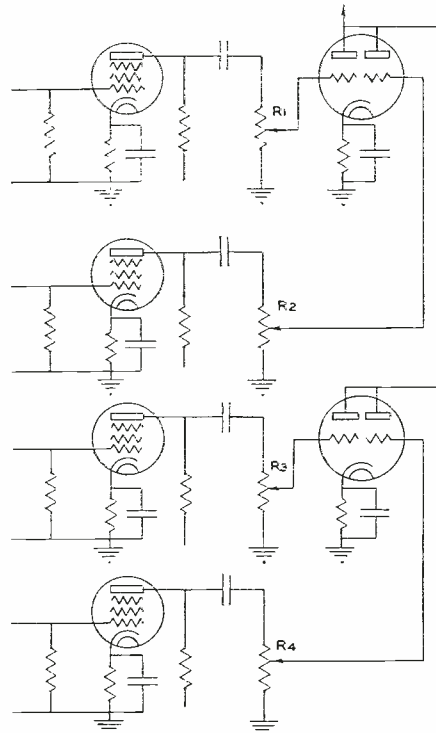


Fig. 3. High level mixer circuit.

the latter use, the meter need not be furnished with a calibrated multiplier, but may consist of a standard decibel meter, which reads minus 10 to plus 6 db., together with an ordinary carbon type rheostat of about 200,000 ohms resistance which is used as a multiplier, see Fig. 4. This variable control will permit the meter to be used across a 500 ohm line without greatly disturbing line characteristics and may be adjusted to increase the range up to a plus 40 db. level if need be, or a power of 60 watts audio across a 500 ohm load.

Another type of visual volume indicator could be a simple vacuum tube voltmeter which would also indicate volume levels directly on a special scale. Such a device is shown in Fig. 4A. Here a vacuum tube is used in a simple rectifier circuit which is biased to cut-off so that with no signal being present, no plate current will flow. When a voltage "audio signal" is present across the gain control and a signal is applied to the tube grid, current will flow causing the meter to indicate this current. The VT voltmeter draws no current and is very fast in indicating changes in signal intensity. This type may be used on other than lines of 500 ohms as no calibration to a.c. is required, if actual readings are not required.

A few installations require the use of an aural monitor and one or the other brings out the quality of the voice or music which, of course, the db. meter fails to do. The two types of monitors for this purpose are a head-set and a loud speaker.

The amplifier shown in the photograph consists of two high level mixer channels and two of the low level, and will accommodate two 50 ohm dynamics, and two high impedance units, such as crystal or high

imp. velocity mikes. The mixer circuits are the same as used in our previous discussion of mixers. A master gain "shown in upper left corner is that of Fig. 2 and provides over-all levels to be set. The upper right hand knob is the db. meter multiplier shown in Fig. 4 with a standard $-10 + 6$ db. meter across a 500 ohm line."

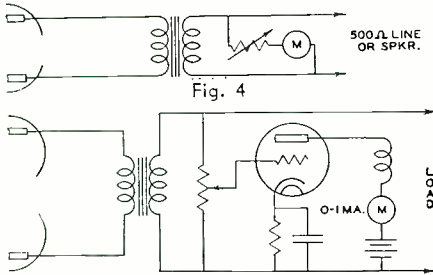


Fig. 4A. Visual Monitoring Circuits.

The amplifier ends with a pair of 6A3 triodes self-biased, furnishing excellent fidelity up to its maximum of 10 watts.

The console style of construction will appeal to the layman who "rides the gain" as the controls and meter are always on a line of correct vision to the operator. Finally, the meter is rear or directly illuminated and is a feature well worth the slight additional cost of the instrument.

With this general discussion sufficient information has been offered to enable the P.A. man, layman and the amateur to make an intelligent choice of the combination of microphone, mixer, and monitor which will exactly fill his requirements.

-30-

Radio Weatherman
(Continued from page 27)

sibility of inaccuracy, the signals of the robots are checked by recording devices sent aloft on airplanes, timing the two ascensions as nearly simultaneously as possible. To date, these comparisons are proving constantly favorable to the robot.

Naturally the question arises as to how many of the machines are recovered. At the Omaha (Neb.) Weather Bureau station a few months ago, 38 recording devices were sent aloft by balloons. In three weeks, 23 of them were recovered.

The Bureau expects a certain loss, but as Mr. Samuels says: "Some radiometeorographs will be damaged—possibly beyond repair—before they are recovered, and yet others may never be found. In view of the tremendous importance of the work of these machines, the loss of a few is not serious, however."

Don't be surprised, some day, if you find a deflated balloon, a parachute, and a queer-looking instrument, all attached to a stout line. On the instrument will be an envelope reading: "Notice—This instrument was sent aloft attached to a balloon filled with hydrogen gas. If the balloon has not burst, keep away from fire and allow the hydrogen to escape."

The envelope contains more directions. It might be a good idea to follow them. The Weather Bureau will send you a dollar if you do.

-30-

RADIO PHYSICS COURSE

by Alfred A. Ghirardi

(Continued from last month)

Some of the missing elements were found to exist in the atmosphere around the sun, etc. The search for and final separation of the missing element radium by Madame Curie, is a thrilling chapter in the history of science. Elements 85 and 87 have recently been discovered and named tentatively. Those listed beyond bismuth, exhibit radioactive properties similar to those of radium. Hydrogen with only one planetary electron is the simplest of all atoms, and uranium with 92 planetary electrons is the heaviest and most complex. It is one of the unstable radioactive substances, since changes are constantly taking place in its atoms with accompanying releases of tremendous energy per unit mass and change of chemical nature.

How radiations are produced: Normally, the planetary electrons are rotating around the nucleus of each atom in their proper imaginary orbits or shells and no external manifestations of energy are present. Each electron possesses a certain amount of potential energy depending on its distance from the nucleus. It requires the application of a force to move one of the electrons away from the atom, which would then contain an unbalanced positive charge. The actual potential energy becomes less as we pass from an outer shell to the one nearer the central positive nucleus. If, however, some external applied agency causes one of these electrons to be knocked or jarred out of its normal orbit or shell so that it is forced into one of the other shells an emission or absorption of energy takes place. If it is knocked from an outer to an inner orbit, the difference in energy corresponding to the two positions within the atom, must be given up in some other form. This entire energy is radiated in the form of electromagnetic radiations and for each electron moved, a certain definite amount of energy known as one quantum is radiated into space and propagated at the uniform speed of 186,000 miles or 300,000,000 meters, per second. If an electron were to be removed from one shell to another farther away from the nucleus the potential energy of that electron would be increased and therefore work would have to be expended by the outside source to effect the transfer. Of course some applied agent may cause this to happen to countless numbers of atoms simultaneously in a body. Thus when electric current is sent through a gas such as neon, helium, etc., the gas becomes ionized due to a disturbance of the electron orbits of its atoms and when the atoms and electrons re-combine, electromagnetic energy is radiated at a frequency which produces the sensations of light on our optic nerve, so we say light is produced. This principle is used in the neon sign lights which are so popular today.

(Continued next month)

Train for In 12 Weeks RADIO

of Coyne

Quick, Easy Way by Practical Work on Modern RADIO, SOUND and TELEVISION Equipment



I'LL FINANCE YOUR TRAINING

Send the coupon in today and I'll send you details of my "Pay After Graduation Plan" whereby you can start paying your tuition 60 days after your 12 weeks' training period ends and then have over a year to pay the balance in small monthly payments. Get into this growing field of opportunities by the quick, easy Coyne way in 12 weeks. "Learn By Doing" on a great outlay of radio broadcasting, television, talking picture and code equipment. Coyne methods make it easy to learn. First you are told how to do a thing—then you are shown—then you do the work yourself under expert instruction. You don't need previous experience or a lot of education.

JOB HELP AFTER GRADUATION

My Employment Department helps you get a part time job to help pay living expenses while you are training. They also give you lifetime employment service after you graduate. To help increase your earning capacity after graduation—ELECTRIC REFRIGERATION Training is NOW included AT NO EXTRA COST.

MAIL THIS COUPON TODAY

H. C. LEWIS, Pres., RADIO DIV., Coyne Electrical School
500 S. Paulina Street Dept. C-31, Chicago, Illinois
Send me your Big Free Book and details of your "Pay Tuition After Graduation Plan."

NAME.....
ADDRESS.....
CITY..... STATE.....

SUBSCRIBE TO
RADIO NEWS
AND
BE UP TO THE MINUTE
ON
RADIO NEWS
12 big issues—\$2.50

EASIER THAN EVER

RADIO PHYSICS COURSE
A. A. Ghirardi
972 PAGES
508 ILLUS

THIS 1 BOOK TEACHES YOU EVERYTHING

Without any previous training you can now master the whole science of Radio, Electricity and Television quickly and easily by reading Ghirardi's famous home study **RADIO PHYSICS COURSE**. Its many exclusive features and plain easy-to-understand language present for its use by more radio schools and students than any other book in the world.

only \$4

Here's What You Get!
Sound-Electrical Theory and Principles—Electrical Circuits—Electromagnetism—Transformers—Inductance—Condensers—Measuring Instruments—Radioactivity—Broadcasting—Receiving—Vacuum Tubes—Amplification—Superhets—A.C.—Speakers—Receivers of all types—Short-Wave—Auto-Radio—Aires et Radi—Public Address—Photoelectric Cells—Cathode-Ray Tubes—Television—Testing and Servicing—Sound Motion Pictures—Reference Tables—435 Review Questions for Self-Study—and DOZENS of other subjects!

TRY IT!
Ghirardi's 1 Big Book will get you started in Radio quickly, simply, easily! Grab this marvelous bargain now—order your copy this easy way! Write your name and address on this ad—send it in with \$4 today (\$4.50 foreign). Every penny of your money back if not satisfied. Free Circular—no obligation. Write at once!

RADIO & TECHNICAL PUBLISHING CO.
45 Astor Place, New York, Dept. RN-88

SPEED UP

Your Service Work with **GHIRARDI'S GADGETS**

In a flash these amazing Pocket Trouble Shooters spot over 800 different set troubles—give you exact TESTS and REMEDIES. One each for HOME and AUTO radios—3 day Trial. FREE Circular.

RADIO & TECH. PUBL. CO.
45 Astor Pl., Dept. RN-88, N.Y.C.

Become an expert Photographer

for pleasure or career

Would you like to be an expert in Commercial, News, Portrait, Advertising, Candid or Motion Picture Photography? We offer you a thorough, practical training in these and other branches of photography. Learn for pleasure. Or prepare for a fascinating career making photos for newspapers, magazines, advertisers and hundreds of other uses. Wonderful money-making opportunities!

Personal Attendance and Home Study Courses

Learn at home, or in our modern completely equipped studios. Individual, personalized instruction by noted experts.



Send for Free Booklet

that tells about today's opportunities in photography, and describes the famous N.Y.I. method of training.

NEW YORK INSTITUTE OF PHOTOGRAPHY

10 West 33 St. (Dept. 122) New York

Broadcasting 30 Years Ago

(Continued from page 34)

exact mate to our transmitter, they had demonstrated wireless telephony to the German army over a distance of some one hundred miles. Perfect results. And we —bah! Couldn't even cover 18 miles!

The sequel to that story is simply this: Our intelligent German friends stretched their transmitting aerial parallel with a telegraph line running between the two points. Likewise with the receiving antenna. Of course they covered almost six times as much distance as we did. But we couldn't have found telegraph lines stretching over the Lower and Upper Bays of New York, even if we had thought of such aid.

For that matter, a stock promotion venture gave a marvelous demonstration of wireless telephony between New York and Philadelphia shortly after our tests. Clear, reliable two-way conversation took place. We were floored. Especially in view of the simplicity of the arc transmitters used, and the modest power. We would have been puzzled to this day save for the folding up of the stock promotion some time later. *Among the details coming to light was an unpaid bill presented by a telegraph company for the leasing of a direct line between New York and Philadelphia on the very day and hour of that marvelous wireless telephone demonstration.*

The oscillating vacuum tube or DeForest oscillion was yet to make its appearance, back in those pioneering days of 1908-9. But one Prof. Reginald Fessenden, somewhere in the wilds of Massachusetts at a place called Brant Rock, was experimenting with a high-frequency alternator, and Dr. A. F. Alexander was already at work in the General Electric shops on his high-frequency alternator. Dr. Lee DeForest, the Father of Radio, was experi-

menting in New York City with the oscillating audion.

For our part, we had little choice. The arc transmitter was the only thing available to us. And since the microphone had to control the output more or less directly, we couldn't expect it to stand up for more than a few minutes at a time. That is why our German confreres made the microphone in the form of a cartridge for quick-change acts. The microphone simply shunted several turns of the oscillation transformer secondary, thereby handling a current of several amperes at high voltage, soon baking the carbon granules into a solid cake.

All was not rosy at the receiving end either. The best we could provide was a crystal detector. Our German designers were trying hard to achieve fool-proof equipment. So the detector took the form of a hard-rubber tubular-case cartridge containing a sharp-pointed pencil lead pressing against a piece of galena crystal mounted on a spring. Provided with bayonet contacts, the detector cartridge could be instantly removed and replaced with another cartridge as seen fit.

Without amplification yet made available, the intercepted signals had to possess considerable strength to make a desirable impression. In our experimental transmissions from Sandy Hook we were picked up at such remote (!) points as Brooklyn Navy Yard, some 25 miles away.

Our German confreres, appreciating the need for amplification, came through after a bit with a microphonic or acoustic amplifier. This consisted of a telephone receiver mounted in a soft-rubber chamber, with plenty of sponge-rubber cushioning, facing a carbon microphone a couple of inches away. The idea was that the weak sounds of the sensitive receiver could be impressed on a microphone carrying a relatively strong current, thereby playing an electrical relay race, so to speak. It worked, after a fashion. Ultimately, the junk dealer got it for scrap rubber and metal.

Late in 1909, after nearly two years of wireless telephone work, my dad asked me just what I thought of the possibilities of wireless. My answer was promptly forthcoming: "Well, Pop, there's nothing in it. Wireless is simply an experiment, nothing more or less. Just so long as we have crazy arcs, hot-house microphones, temperamental crystal detectors and a bunch of engineers who simply don't know when they're licked, I can't see any future for wireless telephony."

"Wireless telegraphy may be all right. At least, with plenty of transmitting power, you can jam a signal through the air over a fairly decent distance. And you can get through often enough not to run up too big a cable or telegraph bill; or in the case of marine wireless, you can clear the accumulating wireless messages some time before the ship docks, so as to collect the tolls.

"No, I can't see wireless. I'm going in for something more substantial." And so early wireless lost one of its young engineers who wandered forth to the electric trolley car repair shop and the power house of a more substantial career. . . .

4 NEW RELAYS



The new edition of Circular 507B is just off the press. It describes and gives prices on 4 new Relays as well as other Ward Leonard automatic contacts built especially for the amateur. Send for a copy today.

WARD LEONARD
RADIO SPECIALTIES

WARD LEONARD ELECTRIC CO.
47 South Street, Mount Vernon, N. Y.

Please send me the new circular 507B.

Name
Address
City State
Call Signal

Chatham Radio Guards the Sea

(Continued from page 15)

charge. Chatham has given medical advice to ships as far away as the South Pacific.

Almost everyone who reads the newspapers remembers the Robinson appendix case in 1934. Nevertheless, not many know that Chatham played an important part in it. The following facts will surprise you: A small vessel in the Galapagos Islands noticed Robinson's distress flag. Since this craft was equipped only with short-wave radio she was unable to reach near-by ships. But due to the freakish manner in which short waves travel, WCC, away up on Cape Cod, picked up the call and learned of Robinson's illness and need of immediate assistance. By means of her powerful transmitters Chatham quickly passed the news along to NAX, the naval station at Balboa in the Canal Zone. From there a government seaplane was speedily dispatched to Robinson's aid. Perhaps this seems like the long way around Robin Hood's barn, but 10,000 miles is nothing to radio waves traveling with the speed of light.

Chatham's radio station has a habit of saving lives at sea. It's part of the job and the operators accept it as such. For instance, take Phil Lord, the radio broadcast star, who set out to cruise around the world with a load of refrigerators in his sailing ship, *Seth Parker*. After several false alarms the windjammer met with real disaster in mid-Pacific in April, 1934. Her frantic short-wave SOS calls were picked up on the other side of the world by far-away Chatham. After a great deal of work and much inconvenience, one of WCC's operators contacted the *H.M.S. Australia*, through the U. S. Government station on the island of Guam. If you recall, the Duke of Gloucester was on board at the time. But, to make a long story short, the British cruiser went to the *Seth Parker's* rescue and Phil Lord was saved for the broadcast fans.

Landsmen seem to think that distress calls are local affairs, but this is seldom the case. Once an SOS is launched into the air, it involves hundreds of people in all parts of the world. It is fortunate for many that Chatham's radio fingers are long and strong.

But marine radio is not all romance and smooth sailing. It, like everything else, has its own troubles. For example, there was the time when the Prince of Wales (now the Duke of Windsor) was en route to America on the *S.S. Berengaria* in the late summer of 1922. Correspondents from both British and American newspapers were on board to cover the story and Chatham was taking most of their press dispatches. Traffic was heavy and the station plucked thousands of words from the air every hour and fed them by landline to newspapers all over the country.

At this critical time a hurricane was moving up the coast from the Caribbean. Radio stations all along the seaboard put out storm-warnings to ships at sea. But no one ever thought the storm would actually reach Massachusetts. In consequence Chatham was totally unprepared when, with a blast and a roar, it swept across Cape

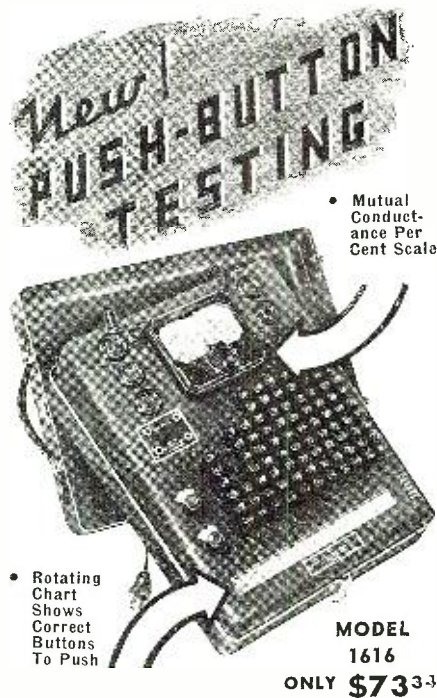
Cod and tore down the control wires to Marion, like so many straws. Was Chatham put out of commission? It was not! Every available man on the staff was called out on duty. The emergency motor-driven transmitters located on the grounds were put into immediate operation and an experienced operator was sent to Marion with a receiver to use the transmitters there. By working for thirty-six hours without relief the cross-Cape lines were repaired and communication was reestablished on the old basis. Meanwhile business went on as usual and those aboard the *Berengaria* never even knew that the service had been interrupted.

SOS calls are more fascinating to the average person than any other form of radio entertainment. Before the allotment of separate radio channels for broadcast and commercial use, all broadcasting stations had to shut down when an SOS call came in. Those were the days when every listener who knew the International Code and was within range strained his ears to pick up the exciting dots and dashes from the sinking ship. Now things are different, for it is only the commercial operators who hear the dread signals. The ever-alert ears of the dial-twisters at WIM are constantly listening on the 600-metre ship wave for distress calls on every ocean.

The most pathetic SOS message ever handled by Chatham came from the Japanese grain ship, *Raifuku Maru*, whose operator wirelessly: "PLEASE MISTER HURRY. IT IS VERY DANGEROUS." No time was wasted. Chatham swiftly shifted up to 2100 metres where she knew the *S.S. Homeric* was working. In another instant she broke in on the passenger ship's conversation and told of the *Raifuku's* desperate plight.

A few moments later, a thousand miles out on the wild grey Atlantic, the *Homeric's* captain stepped to that great ship's motor-controls in the pilot house. Far below in the engine room bells jangled. The vessel trembled from stem to stern, slowed, and came about. More bells. Full speed ahead—on to the rescue! But the monstrous seas and high gales proved too much. They delayed her just enough so that she arrived at the scene too late. The grain had shifted in the holds of the *Raifuku Maru* and she went to the bottom with all hands.

In spite of recent great advances, radio will always have to contend with "Acts of God," atmospheric disturbances, and the human factor. Nor can these handicaps ever be entirely eliminated. But men, women, and children on board ships in all the seas of the world can sail more safely and sleep more soundly in the knowledge that away down on the sandy elbow of Cape Cod, trained ears and skilled fingers are guarding them through all the hours of the day and night; that they are always ready at any instant to send aid with the mighty voice of Radio that reaches around the world to ships, shore, even doctors.



DYNAMIC MUTUAL CONDUCTANCE

Tube Tester and Volt-Ohm-Milliammeter

This new Triplett Model incorporates two revolutionary advancements in tube tester design. First, Push-Button control gives a new order of simplification. The buttons are clearly marked on chart at base. Just rotate the Chart to the tube to be tested—then the button to push is indicated in line under each row of push buttons. What could be simpler?

The second revolutionary improvement is the arrangement of the measuring circuit of the dynamic mutual conductance test for amplifiers and power tubes. The tube tested not only shows GOOD or BAD but the percentage of mu to the 100% Good Condition is also indicated. In critical sets this permits the service dealer to pick his tubes with confidence. . . . Diodes and rectifiers are tested for emission according to the latest approved engineering standards. Gas and Ballast tube tests included.

Rotate chart to Volt-Ohm-Milliammeter settings—push button for D.C. scale; 0-10-50-250-500-1000 Volts at 1000 Ohms per Volt; 0-10-50-250 M.A.; .2 Ohms—500 Ohms—500,000 Ohms—1½ Megohms—3 Megohms; 0-10-50-250-500-1000 A.C. Volts at 400 Ohms per Volt; decibel chart furnished to 42 db. (Ohmmeter is line powered and provision is made for using batteries if desired.) Use two interchangeable plug-in type rectifiers, simplifying replacement in case of unintentional damage. One is in the tube tester circuit, the other for the Volt-Ohm-Milliammeter.

Installed in attractive, all-metal case with lustrous finish. Removable cover for portable or counter use . . . sloping panel.

SEE IT AT YOUR JOBBERS

- Model 1615—Dynamic Mutual Conductance Tube Tester only with Push-Button testing. Dealer Price . . . \$63.34
- Model 1610—Emission Type Tube Tester with Push-Button Testing. Dealer Price . . . \$39.00
- Model 1611—Emission Type Tube Tester with Push-Button Testing and Volt-Ohm-Milliammeter. Dealer Price . . . \$49.50



The Triplett Electrical Instrument Co.,
158 Harmon Dr., Bluffton, Ohio.

Please send me more information on

- Model 1616
- Model 1615
- Model 1610
- Model 1611

Name

Address

City..... State.....



Dealers! Service Men! Sound Men! Amateurs! Set Builders! ALLIED's big new Spring-and-Summer Catalog brings you everything in Radio—at sensationally low prices! Over 12,000 parts; revolutionary new P.A. Systems for every purpose—10 to 70 watts—portable, mobile, permanent; all types of latest test equipment; new Amateur Gear; Kits; books, tools, etc.—and 56 new, super value KNIGHT Radios with Push-Button Tuning, etc., at amazing low prices. Radio men everywhere say: "ALLIED's Catalog saves you time and money!"

Send coupon now for Spring-and-Summer Issue—it's FREE! **FREE BUILDERS PARTS LIST** We supply Free Part Lists of matched kits for building any circuit described in this or any other magazine. Just specify where seen.

FREE CATALOG

ALLIED RADIO CORPORATION
833 Jackson Blvd.
Chicago, Ill. Dept. 1-H-38

Send me your new Spring-and-Summer catalog—FREE.

Name

Address

"OUR FLIGHT TO SOUTH AMERICA"

By Lieut.-Col. ROBERT OLDS

... the commanding officer who led the recent spectacular flight of Army Boeing *Flying Fortress* bombers to Buenos Aires and return. Of particular interest to radio men is the outstanding work by Army radio men on the flight. It's an exclusive POPULAR AVIATION scoop, one of many highlights in the issue now on sale.

August Issue

POPULAR AVIATION
NOW ON SALE

Short Wave Flashes

(Continued from page 50)

Saturdays and Sundays, 1:30 to 5 p.m.; on 11.83, daily 5:30 to 10:00 p.m., and on 6.12, daily 10:30 to 11:30 p.m. . . W2XAD, *Schenectady, New York*, on 21.5, daily 7:00 to 11:00 a.m.; on 15.33, daily 11:15 a.m. to 6:00 p.m., and on 9.55, daily 6:15 to 10:00 p.m.; W2XAF, *Schenectady, New York*, on 9.53, daily 5:00 to 11:00 p.m. . . W3XAU, *Philadelphia, Penna.*, on 9.59, Mondays, Thursdays and Saturdays, noon to midnight; Tuesdays, Fridays and Sundays, 11:00 p.m. to midnight, and Wednesdays, 9:00 p.m. to midnight; on 0.66, Tuesdays, Fridays and Sundays, noon to midnight; and Wednesdays, noon to 9:00 p.m.

Frequency Changes

CEYLON—VPB, *Colombo*, to approximately 6.15.
COSTA RICA—TIGPH2, *San Jose*, to 5.855, where it is badly QRM'd by H1J; TIWS, *Puntarenas*, to 6.375.
CUBA—COBC, noon varying between 5.94 and 9.98; COCM, *Havana*, to 9.82, to escape QRM from EAQ.
ECUADOR—HCJB, *Quito*, now testing on 6.225; HC2CW, *Guayaquil*, to 9.19.
FEDERATED MALAY STATES—ZGE, *Kuala Lumpur*, to 6.21.
GUATEMALA—TGQA, *Quetzaltenango*, to 6.505; TG2, *Guatemala City*, now variable between 6.217 and 6.222.
U. S. S. R.—RAN, *Moscow*, back to 9.6.

Data

CURACAO—PJC2, "Radio Curon," now broadcasting daily from 6:30 to 8:50 p.m. on a frequency of 9.095.
DENMARK—OZF (9.52), *Skamtebak*, is now broadcasting daily from 8:00 to 9:30 p.m. for South America, and from 9:30 to 11:00 p.m. for North America, and Greenland; OZH (15.165), a new frequency, is being used experimentally on Sundays from 8:00 a.m. to 1:30 p.m.
DOMINICAN REPUBLIC—HI5P (6.565), *Puerto Plata*, operates daily from 5:40 to 7:40, and from 9:40 to 11:40 p.m.
FRENCH INDO-CHINA—Allan Preen of Dunedin, furnishes the following information concerning the stations in this country: "Radio Hanoi I" (9.51), operated by the Radio Club d'Indochine, 82 Rue Jules Periy, *Hanoi*, broadcasts Sundays to Fridays 11:00 p.m. to 2:30 a.m.; Mondays to Saturdays, 6:00 to 9:30 a.m., and on Saturdays 8:30 to 10:30 p.m., and from 11:00 p.m. to 9:30 a.m. Sunday. "Radio Hanoi II" (11.9), operated by the Radio Club d'Indochine, 20 Rue de la Pepiniere, *Hanoi*, broadcasts Mondays to Saturdays midnight to 2:50 a.m., and 6:00 to 9:30 a.m.; Saturdays 8:30 to 10:30 a.m., and on Sundays midnight to 9:50 a.m. "Radio Haiphong," operated by the Radio Club d'Indochine, 41 Boulevard Bonnal, *Haiphong* "Radio Boy Landry" (11.09—9.76—6.21), Etablissements Boy-Landry, *Saigon*, operates daily from 11:00 p.m. to 1:00 a.m.; Mondays, Wednesdays, Fridays and Saturdays 5:30 to 9:00 a.m.; Tuesdays, 6:00 to 9:00 a.m.; Thursdays, 5:30 to 9:30 a.m., and on Sundays 4:30 to 9:30 a.m. "Radio Michel-Robert" (9.4), *Saigon*, power 10 watts, operates weekdays from 7:00 to 8:30 a.m., and on Saturdays from 10:00 p.m. to 1:00 a.m.

INDIA—"All-India Radio Stations" operate as follows: VUD2 (9.585), *Delhi*, daily 9:30 p.m. to midnight and from 2:00 to 4:00 a.m.; on 3.49 or 5.995 (depending upon season), from 6:30 a.m. to 12:30 p.m. . . VUB2, *Bombay*, on 6.085, or 9.365 (depending upon season), 9:00 to 10:30 p.m., and from 1:00 to 3:30 a.m., and on 3.305, from 7:00 to 8:50 a.m.

ITALY—HVJ, Stazione Radio Citta del Vaticano, *Rome*, operates daily on 15.12, from 10:30 to 10:45 a.m., and on 5.97, from 2:00 to 2:15 p.m. Transmissions are in Italian on Mondays; English on Tuesdays; Spanish on Wednesdays; French on Thursdays; German on Fridays, and Dutch on Saturdays. The following identification signals are used: a clock ticking for 5 minutes before start of broadcast; chimes of St. Peter's sounding the hour, and at the start and close of each transmission the announcement, "Laudetur Jesus Christus."

MADAGASCAR—"Radio Tananarivo" (10.95—9.51—6.072), *Tananarivo*, broadcasts Sundays from 2:30 to 4 a.m.; on Mondays,

12:30 to 12:45 and 10:00 to 11:00 a.m., and on other days, 12:30 to 12:45, 3:50 to 4:30, and from 10:00 to 11:00 a.m.

PHILIPPINES—KZRM (9.57), owned by Erlanger and Galingier Inc. of *Manila*, power of 1000 watts, relays KZRM (618 kc), weekdays 4:00 to 10:00 a.m. and 4:00 to 9:00 p.m.; Saturdays 11:15 p.m. to 12:15 a.m., and on Sundays 5:00 to 10:00 a.m.

ST. KITTS—VP2LO (6.384), power of 500 watts, studios in the Ryan Building, *Basseterre*, broadcasts daily from 4:00 to 4:45 p.m.; Wednesdays from 7:30 to 8:00 p.m., and irregularly on Saturday evenings. Present power is to be increased to 2,500 watts in 1939, and to 10,000 watts in 1940. Firms interested in a full broadcast coverage of the West Indies, should contact the Caribbean Broadcasting Service, P. O. Box 88, *Basseterre, St. Kitts*. Broadcasts open with *Rule Britannica* and close with *God Save the King*.

SPAIN—"Radio Malaga," *Malaga, Spain*, power of 700 watts, broadcasts Spanish insurgent news in English, on 7.22, daily from 9:00 to 10:00 a.m. and from 4:00 to 5:30 p.m., and on 14.4, daily from 5:40 to 8:45 p.m.

UNITED STATES—W4XB, 6.04, *Miami, Florida*, power of 5,000 watts, operates daily from 1:00 to 3:00 p.m. and from 9:00 p.m. to midnight. Frequent announcements are made in Spanish, as well as English; verifies promptly.

Amateur Notes

GREENLAND—The MacGregor Arctic Expedition has broken camp and Gerry Sayres, operator of WIOXAE (OX2QY), is now on his way home.

GUATEMALA—The second amateur phone, namely TG9AB, has just been licensed to operate in this country.

JAPAN—Japanese amateurs are only allowed to operate 6 periods each day—a period being two hours long. Limit of power allowed is about 20 watts to the final. Used Callbooks are very much appreciated by the J's as they are hard to get and very expensive there.

NETHERLANDS NEW GUINEA—PK6XX (14.2), first heard by John DeMyer of Lansing, Mich., gave his power as 300 watts. The station is believed to be at the base-camp of the American Museum of Natural History's Expedition to New Guinea, and as such should provide some very thrilling moments of reception from this unexplored hinterland.

NEW ZEALAND—ZL2QL (14.194), was heard to state that 90% of the hams in New Zealand are on 80 meters, 7% on 10 meters, while at present only six stations are permitted on 20 meters. ZL2QL has only worked three W stations and is glad to get reports from SWL's.

U. S. A.—The highly coveted annual Paley Award for outstanding amateur achievement has been awarded this year to W9MWC, Robert T. Anderson, of Harrisburg, Illinois, for his heroic performance during January, 1937, flood emergency when he worked for four days getting only ten hours sleep, to secure relief for the beleaguered town of Shawneetown, threatened with inundation by the raging Ohio River. . . Max Fisher of San Francisco, states that VK6YZ (14.169), was heard there recently with the loudest phone signal ever noted outside of the local "California Kilowatts."

Last Minute Notes

Clive Peterson of *Saint Marten, N. W. I.*, writes that J. P. Curiel is in charge of the verification department of PJC2 (9.095), *Curacao*, and that all correct reports, enclosing an international reply coupon, and addressed to him at Mondo Nobo 143, Willemstad, *Curacao, N. W. I.*, will be answered promptly. . . A letter from *Daventry, England*, states that GSG (17.79), will be introduced in transmission VI, heard from 9:20 to 11:20 p.m., on about July 15.

Short Waves for West Coast DX'ers

by JOHN D. CLARK

(All Times Are PACIFIC STANDARD)

Siberia

RV15 of *KHABAROVSK, U.S.S.R.*, is one of the world's oldest short wave broadcasters, and old-timers still remember it as RA97 in the days when short waves were in their infancy.

Today RV15 is still one of the most reliable Asiatic transmitters for Pacific Coast listeners. From midnight to 7:00 a.m. daily programs are

RADIO ENGINEERING DEGREE IN 2 YEARS

Complete Radio Engineering course in 96 weeks. Bachelor of Science Degree. Radio (television, talking pictures and the vast electronic field) offers unusual opportunities for trained radio engineers. Courses also in Civil, Electrical, Mechanical, Chemical, Aeronautical Engineering; Business Administration and Accounting. Also short diploma courses in Surveying (36 weeks), Drafting (36 weeks). Low tuition, low living costs. World famous for technical two-year courses. Those who lack high school may make up work. Students from all parts of the world. 55th year. Enter June, September, January, March. Write for catalog.

1688 College Ave. Angola, Ind.

TRI-STATE COLLEGE

Don't Overlook the RECEIVER CONTEST that appears on page 24 of this issue.



TRANSOIL

for transmitting

HIGHEST QUALITY OIL CAPACITORS

Ask for new complete Transmitting Catalog describing

TRANSOIL—SOLAR—TRANSMICA

SOLAR MFG. CORP. 599 BROADWAY NEW YORK CITY

ELECTRICITY

"LEARN BY DOING" 12 weeks training

TRAIN NOW FOR A BETTER JOB!

My Big Free Book tells you how we train you in 12 weeks—to start in the growing field of Electricity by actual shopwork on real electrical machinery in the Big Chicago-Coyne Shops—not by books or correspondence. Expert instructors guide you every step of the way. Experience or advanced education not needed. Many Earn While Learning. Free lifetime employment service. Diesel Engine, Electrical Refrigeration and Air Conditioning instructions included. Mail Coupon for FREE BOOK and all facts.



H. C. LEWIS, Pres., COYNE ELECTRICAL SCHOOL
500 S. Paulina St., Dept. C-8-81, Chicago, Illinois
Send Big Free Book with facts on Coyne training and tell me about your "Plans" to help me.

NAME _____ AGE _____
ADDRESS _____
CITY _____ STATE _____

broadcast in Russian and Chinese on 4.27 meg. and a strong harmonic on 8.54 meg. is often responsible for a clearer signal than the original wave itself.

Pacific Islands

"This is VPD2, SUVA." These words identify the *Fiji ISLANDS*' only short wave broadcaster, station VPD2 which is now audible on 9.54 meg. from 2:30 to 4:00 a.m. daily except Sunday with surprisingly good volume.

FO8AA, located in *Papeete, Tahiti*, has failed to make its appearance in the low wave spectrum for several weeks. The station is scheduled to operate on 7.1 meg. every Tuesday and Friday from 8:30 to 9:30 p.m.

"Radio Noumea," of *NEW CALEDONIA*, is still weak but audible on 6.12 meg. from 11:30 p.m. to 1:00 a.m. Tues., Sat. and Irreg. Programs begin and conclude with the French *Marschallaise*.

VPB, *COLOMBO, CEYLON*, has been reported on 6.16 meg. near 4:00 a.m. with weak signals.

KZRM of *MANILA, PHILIPPINES*, has increased its power, and is now received with excellent volume on 9.57 meg. from 2:00 to 6:00 a.m. daily, and to 7:00 a.m. Saturday. Unfortunately WINK of Boston often causes a serious heterodyne until after daylight.

An unidentified Philippine transmitter, possibly an amateur, relays programs from the Hotel Pines on 7.1 meg. irregularly near 4:00 a.m.

Japan

As predicted in this column last month, the Japanese *Overseas Program* is now released over the 50,000 watt JZK (15.16 meg.), in place of JZJ (11.8 meg.), from 9:30 to 10:30 p.m., daily. The higher frequency brings *TOKYO* programs to the Pacific Coast with tremendous volume, and will continue in use until sometime in November.

No station change has been made in the 4:00 to 4:30 and 5:00 to 6:30 a.m. transmissions, and JZJ is responsible for excellent signals at that time.

JVN (10.66 meg.) is again broadcasting baseball games near 11:30 p.m. irregularly. Although the Japanese language is used exclusively, the terms *ball, strike, out*, etc., are easily recognized, and the cheers of the crowd lend atmosphere behind the voice of an excited announcer. JVN still relays programs from the JBC network from 10:40 to 11:20 p.m., and from 1:00 (sometimes 2:00) to 4:40 a.m. daily.

JDY of *DARIEN, KIWANGTUNG* (9.92 meg.), directs a program to the United States from 4:00 to 5:00 a.m., daily, the last fifteen minutes consisting of news bulletins in English.

JFAK, *TAIHOKU, FORMOSA*, seems to have altered its schedule slightly. Although transmissions still commence at 2:00 a.m., the English news period has been shifted to 6:05 a.m. and the station now signs off on its 9.62 meg. frequency at approximately 6:30 a.m. JIB (10.53 meg.), which previously worked simultaneously with JFAK at intervals seems to be used now only for the news release at 6:05 a.m.

India

VUD2 (9.59 meg.) is now heard with fair volume on a previously unreported schedule between 5:00 and 7:00 a.m. Evidently this transmission is heard only on the Pacific Coast in this country. The evening broadcast from *DELHI*, although still audible as early as 5:30 p.m., is badly blocked by W3XAU, and is extremely difficult to identify.

A communication from *BOMBAY* advises that VUD also uses 7.26 meg. irregularly near 4:00 a.m. Reception on this frequency has not as yet been reported in this country. The same communication states that a sister station VUC, located in *CALCUTTA*, works on 6.1 meg. from 6:00 to 8:00 a.m. daily.

China

A Chinese station, XRV, location unknown, calls KVV of Dixon, Calif., irregularly at 6:30 a.m. on 9.545 meg. The use of a strong beam directed on Northern California is responsible for the tremendous volume with which this station is received in that region.

NGOX of *SHANGHAI* was heard for a short period on a new frequency of 9.1 meg., but seems to have shifted temporarily to 9.32 meg. as we go to press. The schedule is 3:00 to 6:30 a.m. with news in English at 5:45 a.m.

HONGKONG'S BRITISH-OPERATED ZBW3 (9.53 meg.) is still the most reliable

PRESENTING

The Winner!



Robert Rossi, 733 Watkins St., Philadelphia, Pa. with his McMurdo Silver "15-17" receiving World's Championship Cup from Oliver Amlie (right)

WORLD'S DX CHAMPIONSHIP TROPHY TO "15-17" USER

ROSSI, with 230 verifications of short wave reception from that many stations over 5,000 miles away, is a champion himself. But during the contest of the International 6,000 to 12,500 Mile Broadcast-Short Wave Amateur Club, he was dependent upon his radio receiver—a McMurdo Silver "15-17." Produced by a pioneer in radio engineering, the "15-17" is the peak performer on both the broadcast band where tone quality and selectivity are the criterions, and on SW where it has won supreme DX honors.

It may be hard to believe, but it is easy to prove that you, as well, can get similar DX and broadcast results. Write for complete details. Hear it at the leading music store in your locality.

FLASH!
1938 Bowdoin-Kents Isle Expedition will again depend exclusively upon same two Masterpiece receivers which so perfectly served the expedition last year.

McMURDO SILVER CORPORATION

2900-A So. Michigan Blvd., Chicago, Ill., U. S. A.

McMurdo Silver Corporation,
2900-A So. Michigan, Chicago, Ill.

Please send me details on the "15-17"

Name _____

Address _____

MAKE MORE MONEY in RADIO

SPRAYBERRY'S PERSONAL HOME TRAINING PLAN

Actually Sets You Up For a PROFITABLE BUSINESS

Be your own Boss! Get into the fast moving Radio industry. If you are an ambitious fellow, I can train you for a good paying full time or part time job... with a big future ahead. My training is distinctly new and different.

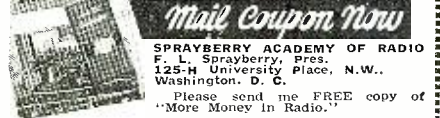


Television Covered . . . Earn While You Learn
Sprayberry Training not only covers thoroughly all phases and branches of Radio . . . it equips you for an actual start in business. I show you how to get profitable spare time Radio service work. Moreover, I show you how to do these jobs. You gain practical experience . . . add easy cash to your bank account while learning.

BIG PROFESSIONAL OUTFIT GIVEN!
Consists of All-Wave, All-Purpose Analyzer, Rider Manuals (7.076 pages), Tool Kit, Electric Eye Outfit, Experimental Apparatus. THE SPRAYBERRY COURSE IS SOLD UNDER AN IRON-CLAD MONEY-BACK AGREEMENT.

A. H. Lanoie, Northbridge, Mass., writes: "Since enrolling I have cleared a net profit of more than \$150. in spare time alone . . . and I am not half through the Course yet. Honestly, I cannot understand how you give so much dope for so little money."

SPECIAL SERVICEMAN'S COURSE
Advanced Training for those already in Radio—teaches the easiest way to do the hardest jobs. Complete details of this advanced course and fundamental course, features, etc., fully described in my 48 page FREE book. Send for your copy today.



Mail Coupon Now

SPRAYBERRY ACADEMY OF RADIO
F. L. Sprayberry, Pres.
125-N University Place, N.W.,
Washington, D. C.

Please send me FREE copy of "More Money in Radio."

Name Age
Address
City State
Mail in envelope or paste coupon on postcard.

Utah 25 Watt Junior Transmitter Kit Only \$15.95
Write Dept. AW for details
UTAH RADIO PRODUCTS CO.
Chicago, U. S. A.
Buenos Aires—UCOA Radio Products Co.
"16 Years of Leadership"

BE SURE TO READ /
"FREQUENCY CONTROL with QUARTZ CRYSTALS"
A new booklet covering the theory and use of quartz crystals. Only 10c. (Canada 15c.) Buy Your Copy Now!
At all Biley Dealers 10c

Notice! Don't miss the September issue of RADIO NEWS. On sale at newsstands and leading radio stores on August 10th

Listen Comfortably with BRUSH "Hushatone" (pillow speaker)
Put this radio accessory under your pillow and listen to your favorite programs.
Write for details
THE BRUSH DEVELOPMENT CO.
3311 PERKINS AVE., CLEVELAND, OHIO

Chinese broadcaster for western listeners. This station broadcasts both Chinese and English programs, and is received with fair volume before 3:00 a.m., and with good volume after that hour. Following is the somewhat complicated new schedule which has now been put into operation: *Tuesday, Wednesday, and Friday*, from midnight to 7:00 a.m.; *Monday and Thursday* from 3:00 to 7:00 a.m.; *Saturday* from midnight to 8:00 a.m.; *Sunday* from 1:00 to 6:00 a.m. The station also relays programs from London irregularly (usually Saturdays) and on such occasions has remained on the air until almost 9:00 a.m. News is released daily at 3:00 a.m., and a relay of news from London is effected at 5:30 a.m.

Australia

VLR of MELBOURNE is another old-timer still among the "best bets" for western listeners. A slight change in schedule now places this station in the spectrum from 12:30 to 5:30 a.m. (from midnight Sunday), and from 6:35 to 11:00 p.m. daily (never audible before 10:00 or 10:30, however). On irregular days, VLR makes phone contact with Geneva near midnight. All regular programs of VLR are relays from 3AR, 3LO, and the Australian National Network. A late news bulletin is always released just before closing down at 5:30 a.m.

VK3ME of MELBOURNE, another old standby, has followed the same schedule now for over five years—from 1:00 to 4:00 a.m. daily, except Sunday, on 9.51 meg.

VIS, a new SYDNEY phone station, is reported on both 12.67 and 6.19 meg. phoning ships at sea. The former wave was in use near 11:30 p.m., and the latter near 4:00 a.m.

Straits Settlements

A SINGAPORE correspondent sends the following information on Malay stations: ZHO (6.01 meg.) on the air from 2:40 to 6:40 a.m. daily, except Sunday; ZHP (9.53 meg.) on 9:40 to 10:40 p.m. schedule (this one reported in America near 2:00 a.m. on days when ZBW3 is off the air); ZHJ (6.08 meg.) from 3:40 to 5:40 a.m.

European Best Bets for Western Listeners

(Times indicated are PACIFIC STANDARD)

Because of the general interest in European broadcasts, and as another service to its western readers, RADIO NEWS presents below a summarized log of the best European stations for listeners in the western United States. Only the more reliable stations are included, the weaker and irregular ones being omitted.

Midnight to 6:00 a.m.			
No Europeans Available			
21.47 meg.	GSH	London	(Fair)
17.79 meg.	GSG	London	(Fair)
15.20 meg.	DJB	Berlin	(Fair)
15.14 meg.	GSF	London	(Fair)
7:00 to 8:00 a.m.			
21.47 meg.	GSH	London	(Fair)
17.79 meg.	GSG	London	(Fair)
15.14 meg.	GSF	London	(Fair)
15.20 meg.	DJB	Berlin	(Fair)
15.11 meg.	DJL	Berlin	(Fair)
8:00 to 9:00 a.m.			
17.79 meg.	GSG	London	(Fair)
9:00 a.m. to 1:00 p.m.			
17.79 meg.	GSG	London	(Fair)
1:00 to 3:00 p.m.			
15.31 meg.	GSP	London	(Good)
15.18 meg.	GSO	London	(Fair)
3:00 to 5:00 p.m.			
15.34 meg.	DJR	Berlin	(Fair)
15.31 meg.	GSP	London	(Good)
15.28 meg.	DJQ	Berlin	(Fair)
15.20 meg.	DJB	Berlin	(Good)
11.77 meg.	DJD	Berlin	(Fair)
11.75 meg.	GSD	London	(Fair)
5:00 to 6:00 p.m.			
15.34 meg.	DJR	Berlin	(Fair)
15.31 meg.	GSP	London	(Good)
15.28 meg.	DJQ	Berlin	(Fair)
15.20 meg.	DJB	Berlin	(Good)
11.89 meg.	TPB7	Paris	(Fair)
11.77 meg.	DJD	Berlin	(Fair)
11.75 meg.	GSD	London	(Good)
6:00 to 8:00 p.m.			
15.26 meg.	GSI	London	(Strong)
15.28 meg.	DJQ	Paris	(Fair)
15.20 meg.	DJB	Berlin	(Good)
11.89 meg.	TPB7	Berlin	(Fair)

11.77 meg.	DJD	Berlin	(Good)
11.75 meg.	GSD	London	(Strong)
9.58 meg.	GSC	London	(Strong)
9.51 meg.	GSB	London	(Fair)
8:00 to 9:00 p.m.			
9.58 meg.	GSC	London	(Good)
11.75 meg.	GSD	London	(Strong)
15.26 meg.	GSI	London	(Strong)
9.51 meg.	GSB	London	(Weak)

All stations off at 8:20
No Europeans audible 8:20-9 p.m.

9:00 to 10:00 p.m.			
15.18 meg.	GSO	London	(Fair)
15.14 meg.	GSF	London	(Good)
15.28 meg.	DJQ	Berlin	(Fair)
15.20 meg.	DJB	Berlin	(Good)
11.75 meg.	GSD	London	(Strong)

10:00 p.m. to Midnight			
11.88 meg.	TPA3	Paris	(Good-Fair)
11.75 meg.	GSD	London	(Strong-Fair)
15.14 meg.	GSF	London	(Good-Weak)
15.20 meg.	DJB	Berlin	(Good-Weak)

Miscellaneous

Our listeners tell us . . . that SOUTH AFRICA'S ZRK (9.61 meg.) is still heard with good volume near 7:00 a.m. while western reception of the 8:45 to 9:45 p.m. transmission has weakened considerably . . . that the INDO-CHINESE broadcaster heard on 6.21 and 11.69 meg. from 3:00 to 6:30 a.m. has abandoned its higher frequency, but is still audible on its 49 meter wave.

-30-

SEE FOTOSHOP FIRST for CAMERAS
PROJECTORS • EQUIPMENT
We feature one of the country's largest stocks of new, used and reconditioned still and motion picture cameras and equipment at lowest prices. Liberal trade-in allowance given for your used equipment.
SEND FOR BARGAIN BULLETIN, 52
Almost 100 Pages of Real Values
Fotoshop Inc.
18 E 42nd St. #136 W 32nd St.
N.Y.C.

JOHNSON TYPE "N"

Designed especially for neutralizing low C tubes, the Johnson Type "N" is the only neutralizing condenser that has all these important features:
1. Extremely small mounting space.
2. Constant voltage over full capacity range.
3. 4 to 1 capacity ratio accommodating an extremely wide assortment of tube types.
4. Vertical or HORIZONTAL mounting permitting panel adjustment if desired.
Ask your jobber or write for Catalog 984L which lists these condensers and other Johnson products.

E. F. JOHNSON COMPANY
WASECA, MINNESOTA, U. S. A.

FOR ALL HAM TRANSMITTERS
"More Watts Per Dollar"
Taylor HEAVY CUSTOM BUILT TUBES
Your parts dealer's choice.

FREE PARTS CATALOG
Lists over 3000 quality parts . . . many of them specified by engineers when designing rigs as described in leading magazine articles. Such popularity must be deserved. Lists insulators, jacks, plugs, hardware, sockets, antennae, wire and many others. Be sure to get your Free copy.
BIRNBACH RADIO MFG. CO., Inc.
145 Hudson St., Dept. RN-7,
New York, N. Y.

ANYONE can LEARN CODE the CANDLER WAY

SHORT CUT THOSE TEDIOUS HOURS OF UNDIRECTED PRACTICE

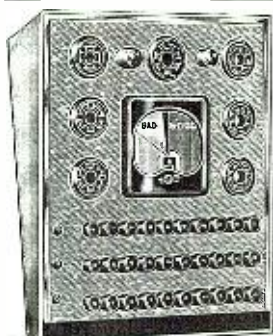
Like thousands upon thousands of others, after a few weeks of Candler Training, you'll find you've made more progress than you did with months of undirected practice. With Candler Training, you start with the correct fundamentals. You learn Sound Consciousness, and, before you know it, you'll be able to read words, even sentences, as easily as you read print—without strain or conscious effort. And you'll be able to send with that easily read, rhythmic speed you hear when a Candler Trained operator gets on the air. Ask any skilled operator about Candler Training. Send for FREE "Book of Facts" today, and read what Candler Training did for former Candler students. You'll enjoy reading the Book of Facts, with all its interesting code tips. Send for it today!



Send for FREE Book of Facts

CANDLER SYSTEM CO.

DEPT. N8, ASHEVILLE, NORTH CAROLINA, U.S.A.



and only **\$18.95**
Buys this new Universal Push Button Tube Checker

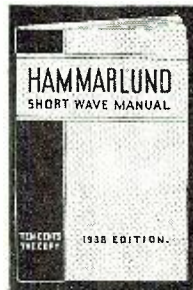
SEE IT AT YOUR JOBBER

MILLION

• Direct Push Button Test • A New Easy Reading Scale • Tests all Standard Tubes • New Precision Design • Looks Like a Million

Outstanding in performance, precision and design. Universal for all tubes. Direct "push button" readings. WRITE FOR LIST

MILLION RADIO AND TELEVISION LABS.
577 N. Union St Chicago, Ill.



Hams-Fans!

The 1938 edition of the famous Hammarlund SHORT WAVE MANUAL is chock full of high and ultra-high frequency receivers and transmitters. No ham or experimenter can afford to be without a copy.

Send 10c for your copy now!
HAMMARLUND MFG. CO., INC.
424 W. 33 St., N.Y.C. Dept. RN-8.

SUBSCRIBE TO RADIO NEWS

6 Big Issues
\$1.00



PHOTO ENLARGER \$5.94

Money back guarantee
A REAL Photo Enlarger that does fine work. Focuses automatically. Also COPIES and has a Contact Printer and Retouching Table. Interesting circular free. Only \$5.94 complete. Lens included.

IDEAL-H, 122 East 25th St., New York

Pigboat Op

(Continued from page 25)

the sub's departure, mission, and destination.

He then receives any instructions from either of these sources. A continuous watch is maintained until arrival at destination, the maneuvers or fleet problem is completed, or the watch is ordered secured by the senior vessel in company.

During the continuous watch the operator is kept busy sending and receiving maneuvering signals, squadron movements, and coded dispatches. As a general rule these communications must be received with the highest degree of accuracy, because, in many instances the ship's maneuvering in squadron relies entirely upon radio instructions. Any error on the part of the radio operator in receiving such instructions could possibly cause serious collision or some other similar disaster.

Most of these maneuvering instructions by radio are snapped out at a good speed. The operator must receive them absolutely accurate, receipt for them, and give them to the commanding officer at the controls, all in less time than it takes you to read this. So you see, a submarine operator must be able to "take it and put it out."

From a technical standpoint, the submarine radioman's headaches are many. His chief worry is condensation of moisture on resistors and condensers whenever the craft makes a quick pressure change, up or down.

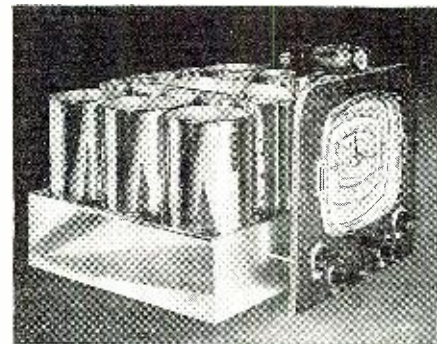
Although most equipment today is shielded completely in tight-fitting cans, the sudden change of air pressure within the hull, whenever the sub dives or surfaces, creates a dense fog within the boat, which settles on the radio equipment, bridging the gaps at the base of tube sockets, among other annoying things.

Runner-up for second-place headache is the task of trying to get at the motor generator, usually tucked away either in the bilges (beneath the floor plates), or behind the huge electric ice box; you can bet it's the hardest-to-get-to spot on a submarine. It has long been my opinion that the man who installs motor generators in submarines is the same fellow who puts the pins in new shirts!

As for the radio shack itself, its usual dimensions are five-feet square. Picture, if you will, a room of this size, filled with radio equipment! Filled, to be exact, with such items as a 250-watt multi-frequency transmitter; an automatic starter box for the motor generator; two complete receiver-battery installations, including a six-volt storage battery and three 90-volt wet B batteries per set; a locker containing spare parts, tubes, and library of technical, navy, code, and communications manuals; two receivers; a typewriter; wastepaper basket; supply of message blanks; log sheets, and a three-legged milk stool.

It has been said that when a radioman faints in a submarine shack he has to walk out to the deck before he can fall down!

Still, it's home, and every pigboat operator is mighty proud of that hole-in-the-wall where he is ruler of all he surveys.



THE SCOTT—For Those WHO WANT THE BEST

- Sensitivity better than 0.6 microvolt • Selectivity meeting every present day requirement on either broadcast band or short waves • Three Noise Suppression Systems for quieter distant reception • Precision Built and Guaranteed for Five Years • Laboratory Type Non-Directional Sound Projection System • 50% Higher Fidelity than average radio • Undistorted Power Output 300% greater than that of most receivers • Separate Bass and Treble Controls, both Continuously Variable • Two Separate Automatic Gain Control Systems • 16 Latest Type Tubes • Two Chromium 16 Gauge Steel Chassis • Precision Calibrated • Economical operating costs • Tone Balanced Volume Control • No elaborate aerial necessary • Sensitivity Control • Local Installation and Service Facilities in over 500 major cities • Costs less than many ordinary 10 and 12 tube receivers • Liberal Time Payments • 30 Day Home Trial anywhere in U. S. A. • Over 80 other amazing features.

CLIP COUPON BELOW AND MAIL TODAY!

E. H. SCOTT RADIO LABORATORIES, INC.

4440 Ravenswood Avenue, Dept. 5N8, Chicago

Please rush FREE data, prices, and special offer on new Scott Sixteen. (No obligation.)

Name _____

Address _____

City & State _____

READ AND SEND CODE

Learn Easily at Home This Quicker Way

No experience needed. Beginners read code quickly, copy accurately. If already an op, speed up your wpm with this approved amazing All Electric Master Telex Code Teacher. Only instrument ever produced which records your sending in visible dots and dashes on specially prepared paper tape—then sends back your own key work at any speed you wish.

Fascinating, fool-proof—gets results because you learn by HEARING as well as SEEING. That is why thousands agree this method is surest and quickest. While not designated standard equipment, Telex is used at many U. S. Army Posts, Naval Training Stations. We furnish Complete Course, lend you the New All Electric Master Telex, and personal instruction with a MONEY-BACK GUARANTEE. Low cost, easy terms. Write today for folder R.N.-8, no obligation.

TELEPLEX CO. 72-76 Cortlandt St. New York, N. Y.

MANHEIM POCKET SLIDE RULE

Polished stainless steel back frame, flexible scale slide, glass hairline runner, A B C D scales. Length closed 3". No celluloid—no wood. Non-shrinking. Accuracy guaranteed. In leather case with instruction booklet.

Only \$1.00

Postage Paid
Sevan Co.
Dept. 18
7 E. 42 St.
New York City



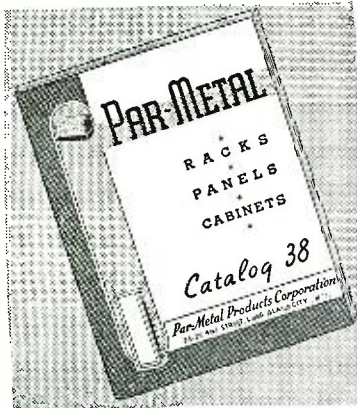
HEADSETS

AMATEURS! Choose the ultra-sensitive, ruggedly constructed, lightweight COMMERCIAL PHONE. Write Dept. R-28 for catalogue

TRIMM RADIO MFG. CO.,
1770 W. Berneau Ave.
Chicago, Ill.

Par-Metal

**YOU NEED THIS
NEW 1938 CATALOG**



The most complete line of racks, panels, cabinets, etc. You can build up almost anything from a short-wave receiver to a professional transmitter. Standardization of the units facilitates easy assembly of a real job of modern design and commercial appearance.

WRITE FOR YOUR FREE COPY
OR ASK YOUR NEAREST JOBBER

PAR-METAL PRODUCTS CORP.

3521-41 ST. LONG ISLAND CITY, N. Y.

ELECTRIC PRODUCTS for the

H O M E

that mean big savings to you

Equip your home with all the latest electrical appliances, such as refrigerators, laundry equipment, vacuum cleaners, food mixers, toasters, irons, clocks, lamps, razors and hundreds of other electric items, made by the most prominent nationally advertised manufacturers. These items save you energy, time and money.

Are you interested in the latest 1938 RADIOS—the Nationally advertised brands, not the unknown kind disguised under pretty names. We have all of them—RCA—Philco—Zenith—Emerson and the others.

**Discounts on All
Standard Products
Range Up to**

50%

Our new 88 page catalog lists all our products. There are over 400 new 1938 Radios to choose from, priced from \$1 to \$1050. Over 700 illustrations in this big catalog. It's yours FREE. Send coupon below for your copy. Do it TODAY.

Mail coupon to address nearest you



Modells

Since 1889
Dept. G-16

58 Cortlandt St.,
New York, N. Y.

56 W. Washington St.
Chicago, Ill.

57 Forsyth St.
Atlanta, Ga.

**MODELL'S, Dept. G-16
58 Cortlandt St., New York City, N. Y.**

RUSH me your new Spring & Summer Edition combined Radio & Electric catalog No. 410 with discount plan.

NAME

ADDRESS

CITY..... STATE.....

Paste coupon on penny postcard

Serviceman's Experiences

(Continued from page 53)

pitched set, the other, a low; each thinks the other is crazy, but both have chosen the sets which give them the best emotional reactions."

"My biggest emotional reaction comes from hearing the wail of a distant locomotive whistle late at night," I pried in. "According to you, then, I should feed my aesthetic being engine toots. Imagine sitting down after supper to listen to the C. B. & Q. *Nocturne*, by the Boys of Section Eight!"

"Why not? If we didn't have different responses to music and quality, there would be only one set in the world, and everybody would own one. There wouldn't be any manual means of voluntary distortion, such as tone control, either.

"In your case, where musical education stopped at the coin slot of a gin-mill player piano, the higher forms of the musical art do not cause the response they would in someone else.

"Do you remember Raymond Knight's *Cuckoo Hour*? One Saturday, as a gag, he rendered Mendelssohn's *Spring Song* with steamboat whistles. Naturally, it was ludicrous, because it sounded like East River on a foggy night. I happened to listen to it with a group of sea-going men, and it had them dreamy-eyed before it ended. Those funny noises meant something entirely different to them because of their emotional conditioning."

"I see now why you won't initiate four Hawaiians," I said, "but what's all this got to do with my losing a repair job?"

"Plenty. Don't try to foist your preferences on a customer in order to get work. Your standards of quality come from a technical knowledge of the set; his from his emotional conditioning, of which you know nothing.

"Instead, appeal to the customer's partiality for his set. Agree with him that the quality is wonderful, and tell him what he needs to keep it that way. He will recognize you as a person of refined tastes, and you will have paved the way to his pocket-book.

"In any event, don't be arbitrary, because his judgment of his own set is the only appraisal that means anything."

"By the way, Al, what's the thing that gives you the greatest emotional wallop?"

"The bell on the till," he answered, changing to his usual coarse manner, "and I hope to hear it oftener, when I nurse you into business maturity. Let's deopt up."

I thought of Al that night when I turned my set on. If he knew so much about tone quality, what made him pick out the high-pitched model he has in his home? My radio has perfect quality; being a radio man, I was able to pick the one with the best tone with no trouble. My ears might be big, but they're musical, and I chose the one set with full-bodied, low pitch.

Now and then a picture drops off the wall while I'm playing it, but that's only because the plastering is cheap.

NATIONAL NC-100A AND NC-100XA

These new models are the time-proven NC-100 receivers, with mechanical improvements. The latest features include a new direct reading dial, calibrated in Megacycles, with band pointer; An "S" meter instead of a "Magic eye" and a larger cabinet of new design. These features can be added to older models at \$25.00 net.

CAMERADIO

963 LIBERTY AVE. PITTSBURGH, PA. 30 TWELFTH ST. WHEELING, W. VA.
Established 1919

6-VOLT UNIVERSAL POWER PACK

At Less Than Price of 6-Prong Synchronous Vibrator
LISTS \$15.00
Operates 2 volt set from 6 volt storage battery, also operates 6 Volt house sets, auto sets, S.W. transmitters and receivers. Output, 180 Volts at 50 M.A. On 4 Volt cell supplies 120 Volts at 30 M.A. Housed in case 3"x4"x6 3/4". Shipping Wt. 6 lbs. **ONLY \$3.95 NET**

ARROW SALES COMPANY
27 S. Jefferson St. Chicago, Ill.



CLEAR SOUND REPRODUCTION

Quality materials and the highest order of manufacturing skill produce Amer-Tran Transformers. Their reliability is known throughout the world. Write for free bulletin 1002.

**AMERICAN
TRANSFORMER CO.**
178 Emmet St., Newark, N. J.

FOR ALL HAM TRANSMITTERS

More Watts Per Dollar
Taylor HEAVY CUSTOM BUILT DUTY **Tubes**
Your parts dealer's choice.

There must be a reason why so many circuits specify

AEROVOX

And that's the best reason why you should use these condensers.

RADIO IN IT'S ENTIRETY!

"B-A" serves the trade with every need in radio—complete 160-page catalog of nationally known radio receivers, public address, parts, supplies and equipment. Orders shipped same day received.

COMPLETE CATALOG AVAILABLE

BURSTEIN-APPLEBEE CO. 1812-14 McGEE ST. KANSAS CITY, MO.

LEARN CODE RIGHT

INSTRUCTOGRAPH tapes send you typical messages, Radio or Morse, any speed. Easy, practical way to improve. Senior Model \$20.25 (also rented). Junior Model \$12.00 (not rented). Complete oscillator equipment less battery \$6.50. Write for details today.

INSTRUCTOGRAPH CO.

Dept. NR-8
912 Lakeside Place, Chicago, Ill.



FREE TRANSMITTER CATALOG

By the manufacturers of America's most popular line of quality X'mtrs. Completely describes and illustrates the TEMCO 50, 100, 350, 600 and 1000 as well as the 10A portable mobile models, etc. If you're thinking of a new transmitter, this catalog is a "must."

TRANSMITTER EQUIPMENT MFG. CO.
130 Cedar St. Dept. RN-7 New York, N. Y.

Eddie Cantor Speaks

(Continued from page 13)

"Ah yes! But—" Cantor's eyes widened into big round O's as he illuminated my foggy understanding. "I'm not the only comedian. There's Hattie. There's the Mad Russian. There's perhaps a guest performer. By having a variety of comedians we achieve a funnier effect through contrasting different kinds of humor. Get it?"

"Sure. But why are you so interested in Hattie Noel?"

"Why? Because Hattie's one of the biggest finds I've ever made. It's positively amazing to watch her do her lines. She has the most perfect sense of timing I've seen in years. And you know, it's timing that counts in a comedy show. Brilliant comebacks can be ruined if the actor's response is as little as one second late. You watch Hattie!"

"What are you going to have her do next?"

"I'm not saying. I want it to be a surprise when she starts singing."

"Hattie a singer!" This was amazing!

"A regular Harlem hillbilly. Now do you see why I want to give her a build-up?" Eddie paused expectantly, his index finger elevated expressively in my direction. But no, I didn't see. "It's an important technique in comedy," he explained. "Hattie is built-up as a gag-cracker. Then suddenly she vocalizes. No matter whether she sings like Grace Moore or a Hottentot with a toothache, it'll be funny. It's the unexpected."

I asked him to describe what happens before the dress rehearsal.

"More rehearsals," he returned. "First, the script is written and rewritten several times. Each of the players is given a copy. We get together wherever we happen to be, in a studio, in a living room, even on the train, and go over the lines. It's here that we come upon little twists and polishes that turn a dull gag into a belly laugh. A writer never knows exactly how a comedian will read a line. The comedian gets a hold of it, and it may sound as limp as a wet string. He changes it a little to suit his personality, or sees a new angle, and suddenly the joke becomes a joke. The script is corrected. You ought to see the pencil marks on a script after it goes through a rehearsal."

"When something funny is pulled, do you and the others ever laugh over it?"

"If we couldn't laugh at our own jokes, how could we expect the public to laugh at them? Sure, we have a great time at our rehearsals. We enjoy our work. But it's work just the same. We can't take a lot of time out to giggle at each other. Making jokes is a mighty serious business. A little too much emphasis here or not enough build-up there and the gag is lost. We have to work up a real sweat to make sure we have something when we're up before the mike."

"Don't you relax during a rehearsal?"

"Of course. I'll tell you how we do it. I call a few minutes rest period. The cast spreads out over the entire stage to take advantage of those precious seconds. Some

3 Winners tell you how to make better pictures



ATTENTION: All camera fans! If you are interested in making BETTER pictures . . . pictures that stand out . . . pictures you'll be proud to show . . . let these 3 "WINNERS" tell you how to do it!

1. NOWELL WARD . . . Chicago, Illinois
GRAND PRIZE WINNER OF THE 1936 NEWS-PAPER NATIONAL SNAPSHOT AWARDS says:

"Proper lighting and careful planning of your 'shot' is very important in making BETTER pictures. The wealth of valuable information in each issue of POPULAR PHOTOGRAPHY has indeed been helpful to me in my work in photography. I read it regularly."

2. EDGAR T. CLEWELL . . . Allentown, Penna.
GRAND PRIZE WINNER OF THE 1937 NEWS-PAPER NATIONAL SNAPSHOT AWARDS says:

"Reading POPULAR PHOTOGRAPHY is a regular habit with me. In all my years of amateur photography, I have found it to be most helpful and informative. Each issue is, in my estimation, a 'junior encyclopedia' on photography. I wouldn't be without it!"

3. Popular Photography

THE WINNER OF CONSTANT PRAISE.

If you, too, want to make BETTER pictures, let POPULAR PHOTOGRAPHY be your "camera guide." It's interesting! It's helpful! It's informative! Written in everyday, understandable words and thoroughly illustrated, POPULAR PHOTOGRAPHY is the "daily" reference book of camera enthusiasts everywhere. It tells all about photography.

IN THE CURRENT ISSUE [NOW ON SALE]

For Summer and Vacation Time: Three instructive articles on how to improve your outdoor pictures. . . . Mortensen reveals his method of Abrasion-Tone printing . . . Famous photographers give advice to the amateur . . . A directory of popular movie cameras. . . . Many hints on how to build equipment and improve your technique. Don't miss this issue!

POPULAR PHOTOGRAPHY
608 South Dearborn Street, Chicago, Ill.

Please enter my subscription for the special introductory offer of 5 issues of Popular Photography for \$1. Start subscription with . . . issue. Enclosed is \$1.

NAME CITY
ADDRESS STATE

I prefer a one year subscription at \$2.50 two years at \$4. \$1.00 extra foreign postage per year.

Save Money
SEND THIS COUPON
Now!

Classified

Rate 16c per word. Minimum, 10 words.

CORRESPONDENCE COURSES

USED Correspondence Courses and Educational Books sold or rented. Inexpensive. Money-back guarantee. Write for Free Catalog listing 4000 bargains. (Courses Bought.) Lee Mountain, Pisgah, Alabama.

USED R.T.I. course, complete, \$2.95. Wacker, 3727 West 13th, Chicago.

INSTRUCTION

AMATEUR Radio Licenses, Home Study Course in Code and Theory. Reasonable, efficient and thorough. Results guaranteed. American Radio Institute, 1430 North Dearborn Parkway, Chicago, Ill.

PATENT ATTORNEYS

INVENTORS . . . Protect your rights before disclosing your invention to anyone. Form "Evidence of Conception"; "Schedule of Government and Attorneys' fees" and instructions sent free.
Lancaster, Allwine & Rommel
414 Bowen Building Washington, D. C.

PATENTS—Advice and booklet free. Highest references. Best results. Promptness assured. Watson E. Coleman. Patent Lawyer, 724 9th Street, Washington, D. C.

PATENTS AND INVENTIONS WANTED

INVENTIONS Commercialized. Patented or unpatented. Write Adam Fisher Company. 278 Enright, St. Louis, Missouri.

RADIO

RADIO Engineering, broadcasting, aviation and police radio, servicing, marine and Morse telegraphy taught thoroughly. All expenses low. Catalog free. Dodge's Institute, Elm St., Valparaiso, Ind.

MISCELLANEOUS

ELECTRIC Eye. Build your own burglar kidnapper alarm. Plans 25c. Unlimited possibilities. Photo-Cell Specialties Co., Lockbox, Swissvale, Pa.

QSL Cards, 300 for \$1.00. Quality printing. Free samples. Miller Printing Co., 399 Thirteenth Ave., Columbus, Ohio.

PRINTING CUTS made overnight \$1 up; electros 50c; mats 10c; free price list. Riteway, 1465 HG Broadway, New York.

SUGAR DIABETICS send for free Booklet. Otto Cisky, Leesburg, Fla.

SPECIAL RATES FOR READERS

A special classified rate is now offered for readers (non-commercial) who wish to buy, sell, or exchange radio sets, transmitters or parts; 10 words for 50c. Extra words 16c. Payable in advance.

take a smoke. Some do a little gabbing. Others just sit down and breathe.

"A couple of months ago we had a little surprise. Our tension was relieved like magic when suddenly we heard nimble fingers wandering over the keys of the piano. Beethoven, no less, and then the music drifted gently into an operatic aria. Not a person moved. From where I stood I couldn't see who was playing, but I learned later that he was entirely unconscious of the fact that he had an audience.

"But it had to stop. We had a show to rehearse. 'We'll take the scene with the Mad Russian,' I called out. 'Russian, where's the Mad Russian?' The music stopped. 'Here I come, Eddie,' answered Bert Gordon as he stepped away from the piano."

Eddie attended the opening baseball game of the Season to watch the Giants and Boston play. Jesse Block of Block and Sully was with him. For two solid hours Cantor's comments about the game kept the people seated around in gales of laughter. For every pitch, it seemed, Cantor had a quip, and a good one too.

Just before the game ended, a person in a nearby box walked over to him and said, "Eddie, will you take this, please?"

"What is it?" asked Cantor, as he held out his hand.

"Fifty cents," was the reply. "That's what I had to pay to see you in *Ali Baba Goes To Town*. But I enjoyed this performance much better."

I forgot to ask him whether he kept the fifty cents. Time was growing short. Eddie would have been generous enough to keep talking for hours. But train schedules don't wait even for Cantor.

As we walked to the door, I asked him what he generally did on the long trip to California. I couldn't picture him looking out a Pullman window.

"I don't even know I'm on a train," he answered. "Sid Fields, the boys, and I have to work all the way from New York to Los Angeles to get out next week's show. We've done it so often now, we time our scripts by the train stops. I've figured, from experience, that a rough draft of the show's first fifteen minutes should be completed at Buffalo. By the time we arrive in Cleveland, the entire show is fairly well mapped out. After leaving Chicago today, we'll discuss the script for a while, and when Emporia, Kansas comes into view we'll be ready to begin on the dialogue. By the time the train steams into Albuquerque the dialogue will be nearly completed."

Abruptly, as we entered the elevator, he changed the theme. "I'd like to see that story you're going to write about me. Here, take down my home address, and send me a copy of the magazine." I took it down. That was typically Cantor, always interested genuinely in other people's work. "The next time you write me, send the letter here," he continued. "But don't publish it. I like my home. If my address got in the papers, I'd have to move Ida and the girls to the office and let my secretaries take over the house."

Then he turned to the elevator boy and gave him something to laugh about during his monotonous ups and downs.

-30-

DO YOU LIKE
RADIO
&
TELEVISION

If you want to know employment opportunities and requirements in radio and related industries, get National's book of facts. **Send for YOUR FREE COPY TODAY**
Dept. RN-3 4000 S. Figueroa

NATIONAL SCHOOLS
Los Angeles

RADIO ENGINEERING
DEGREE IN 2 YEARS

Intensive, specialized course, including strong basis in mathematics and electrical engineering, and advanced Radio Theory and Design. Modern laboratory, thorough instruction. Low tuition. Self-help opportunities. Also 2-year courses in Aeronautical, Chemical, Civil, Electrical and Mechanical Engineering. Terms open September, December, March, June. Catalog.

INDIANA TECHNICAL COLLEGE
247 East Washington Blvd., Fort Wayne, Indiana

RADIO COURSES

RADIO OPERATING: Prepare for Gov't License Exam • **RADIO SERVICING**
Including Short Wave • **AMATEUR CODE**
• **ELECTRONICS** • **TELEVISION**

Day and Evening Classes Booklet Upon Request

NEW YORK Y. M. C. A. SCHOOLS
7 W. 63rd Street, New York City

Correspondence Courses in
RADIO and ELECTRICAL ENGINEERING

ELECTRICAL ENGINEERING Get good grasp of wild electrical field. Prepare yourself, at Low Cost, for secure future. Modern course. So simplified anyone can understand quickly.

RADIO ENGINEERING Extra fine course in radio, public address, photo-electric work.

Trains you to be super-service man, real vacuum-tube technician. Experimental kits furnished. Diploma on completion. Tuition ONLY \$25. Deferred payment plan available. Write for free copies of school catalogues, student magazines, full details **SEND NOW!**

LOW AS \$25

LINCOLN ENGINEERING SCHOOL, Box 931-94, Lincoln, Nebr.

"HAM SPECIAL"

Standard Teleplex

A highly efficient code teacher, using heavy specially prepared waxed paper tape, having two rows of perforations. Write for Free folder AW. DEALERS—Correspondence invited with dealers for protected territories. Instrument with tapes prepared by expert and complete course of lessons: all for \$11.95.

We are the originators of this type instrument

TELEPLEX CO., 72 Cortlandt St., N. Y. C.

RADIO ENGINEERING

RCA Institutes offer an intensive course of high standard embracing all phases of Radio and Television. Practical training with modern equipment at New York and Chicago schools. Also specialized courses and Home Study Courses under "No obligation" plan. Catalog Dept. RN-38.

RCA INSTITUTES, Inc.
A Radio Corporation of America Service
75 Varick St., New York 1154 Merchandise Mart, Chicago

LEARN RADIO CODE

Now it is easy to learn the radio (continental) code. A newly designed, copyrighted, easy method—the fastest you have ever seen. Many report that they can copy at a speed of 5 to 10 words per minute after only a few minutes' study. Also used for blinker, heliograph, wig-wag, and submarine signaling. Mailed postpaid on receipt of only one dollar. Address Telechart, Dept. 9, Post Office Box 25, Knoxville, Tenn.

The easiest and fastest way to learn Code is to SEE and HEAR the actual dots and dashes as they are sent or received with the **AMERICAN CODE READER and OSCILLATOR**. You can not only see and hear your own fist, but can also connect to your radio receiver and it will copy 100 words per minute directly from Code received on your Radio (the only machine of its kind).

AMERICAN CODE READER, list price \$20 less tube. Net to Amateurs and Experimenters \$15 less tube.

AMERICAN AUDIO OSCILLATOR, list price \$6 less tube. Net to Amateurs and Experimenters \$4 less tube.

AMERICAN COMMUNICATIONS CORPORATION
1650 Broadway, NYC

RADIO ENGINEERING

broadcasting, aviation and police radio, servicing, marine radio telegraphy and telephony. Morse telegraphy and railway accounting taught thoroughly. Engineering course of nine months' duration equivalent to three years of college radio work. School established 1874. All expenses low. Catalog free.

Dodge's Institute, Oak St., Valparaiso, Indiana

Transoceanic Telephone

(Continued from page 9)

speech into meaningless sounds, but in such a way that they may, by proper apparatus be converted back into their original form at the receiving end.

One of the simplest forms, by suitable modulation and filtering processes, inverts the entire speech frequency band, turning the bass into treble and the treble into bass.

The result is to make English sound like some outlandish foreign tongue. A second inversion at the receiving end puts it back into its original form.

Other more complicated systems divide the speech frequency band into several parts by means of electrical filters and then transpose these parts with reference to each other. Here again retransposition at the receiving end brings back the original speech.

The voice inverter is built on the fact that every word you speak sets up air vibrations numbering hundreds per second. A low spoken word might create 250 vibrations or cycles a second. A high pitched word makes 1,000 cycles or vibrations a second. Middle C on the piano causes 256 vibrations.

The "inverter" simply "inverts" these vibrations by speeding them up or slowing them down. The rich low voice becomes a squeak, with an occasional low grunt due to overtones. The high voice becomes low. A school girl's giggle turns into a stevedore's roar, and a deep-chested roar turns falesetto.

In the case of music the shrill fife sounds like thunder, while the kettle drums sound like squeaky machinery.

The whole process resembles the inverting lens which stands a person on his head.

People upside down are no funnier than words in the same fix. If you eaves-dropped on the transoceanic radiotelephone when some one said: "Pacific Telephone Co.," it would sound in this outlandish fashion: "Ta-thth-uk play-a-feen crink-a-nope." "Mountain" would be "jay-out."

All this queer jargon if it was sent out from San Francisco over the Pacific voice lanes would flash miles high into the air and bounce against the heaviside layer of ionized gases, then down to Hawaii. Privacy devices at each end of the circuits re-invert the jumble into plain English.

Another machine boxes up your voice a fraction of a second to allow time for companion relays to switch automatically or direct the voice currents to their proper destination and thereby prevent the west-bound and eastbound voices from interfering with each other.

This device causes a short circuit of the radio channel in one direction while the oppositely directed channel is in use, and vice versa.

The delay network boxes up the voice by compelling it to wind its tortuous way through the equivalent of a circuit about 4,000 miles long. The machine resembles a pile of twenty-six shoe boxes. These boxes each contain many coils of wire tightly wound on iron cores which resist the electric flow.

In 1927 there were approximately 2,000

overseas radiophone calls. Service has increased the volume by leaps until in 1937 there were nearly 60,000 calls, almost one-third increase over the approximately 40,000 calls of 1936.

Business is transacted by radiotelephone on a world-wide scale, being employed for a wide variety of business matters. An American automobile manufacturer, with branches in South America, Asia, Africa and Australia, often calls his representatives by radiotelephone.

Such conversations through the air have become so vital to business that many firms are investing annually thousands of dollars in toll.

A New York business man while touring Europe some years ago listened to the stock market pulse. On one occasion he established an all-time record of one hour and thirty-seven minutes of continuous connection. Another call lasted one hour and a quarter. Both calls cost him more than \$1,000 at the rates then prevailing.

An auto horn manufacturer in Jackson, Michigan, devised a novel way of outwitting his foreign competitors. He called a London dealer by transatlantic radiotelephone and demonstrated a new chime horn which he had just produced. The call resulted in a large order.

It is now customary for American representatives at the Paris fashion shows to watch a parade of fashions and then radiophone a description of the dress creations to their home offices.

There is one department store buyer who shops around Europe without leaving his office in New York. He visits a half dozen shopping centers in one day.

The Press is also a large user. Not only do London reporters find it good policy to call American sources of news but the American reporter does likewise. You no doubt recall dispatches radiophoned from some distant country or the printing of an interview over the radiotelephone with some eminent statesman or financier.

The Government also has employed the overseas air channels to keep in touch with the stirring events that have marked history in recent years. When political strife breaks out abroad, the department of state calls our embassies and legations by radiotelephone. The volume of telephone traffic varies with political and financial developments. When France went off the gold standard in September, 1936, in one day 124 calls were made over transatlantic channels.

In addition to these uses, the voiceways to other continents have been employed for all manner of personal matters—births, deaths, marriages, all the infinite variety of happenings that engross mankind's attention and that are no less interesting because they may have happened on the other side of the world.

The short-wave air channels have also been used by the great broadcasting companies to bring programs from abroad to their American listeners. In this way Americans have heard famous orchestras of Europe, statesmen addressing international

EXTRA! EXTRA!
PRECISION A.C. and D.C.
POCKET-TESTER
ONLY \$12.00



MODEL 736 VOLT-OHM-MILLIAMMETER

Uses TRIPLETT Precision Instrument

- Molded Case
- Jacks for All Ranges
- All Accessories Included
- For A.C.-D.C. Voltage, D.C. Current and Resistance Analyses

READRITE METER WORKS,
815 College Ave., Bluffton, Ohio.

Please send me more information on Model 736.

Name

Address

City..... State.....

"LET ME TRAIN YOU at home FOR A GOOD RADIO JOB"

Get in Line for Big Money!

Radio is growing fast. Modern receivers require thoroughly trained experts for service and maintenance. You can become such an expert . . . right at home . . . through R.T.A. methods and begin earning money almost from the start of your course. In a very short time you will

Be the ONE Man in 1,000

INCLUDED WITH OUR TRAINING

who understand everything there is to know in order to give quick "sure-fire" service to all kinds of receivers. You can be the one man who can take the service business away from the old-time radio "tinker."

No Experience Needed

Even though you know nothing about Radio now, you can quickly qualify the R.T.A. way to step right into a well paying position—or start your own profitable business. Use your spare time and



LEARN AT HOME

Most R.T.A. members start making money right from the beginning. The special servicing equipment which is supplied without extra cost makes this possible. Don't wait—get started now. Write today for our Interesting Radio Book FREE.

This efficient time-saving, trouble-finding Circuit Analyzer and Resistance Tester helps you to make money without delay.

Don't Put It Off—Send Coupon Now

RADIO TRAINING ASSOCIATION OF AMERICA
4525 Ravenswood Ave., Dept. RN-88, Chicago, Ill.

RADIO TRAINING ASSN. of AMERICA
Dept. RN-88, 4525 Ravenswood Ave., Chicago, Ill.
Gentlemen: Send me details of your Enrollment Plan and information on how to learn to make real money in radio quick.

Name

Address

City..... State.....



When Temperatures are Up and Collars Wilt Down

MALLORY Condensers are Unaffected

Steamy summer days may play havoc with ordinary condensers. But they do not affect Mallory Replacement Condensers because humidity doesn't get to them!

Mallory provides a heavy metal seal around the actual condenser unit inside the carton. This protection—plus a final sealing of the carton itself—so completely safeguards the condenser that its characteristics remain unchanged despite increasing or decreasing humidity.

The humidity proof feature of Mallory Replacement Condensers is one big point of superiority. There are many others. If you are not using them, you are missing a real bet. Ask your distributor about Mallory Replacement Condensers—now!

P. R. MALLORY & CO., Inc.
INDIANAPOLIS INDIANA
Cable Address—PELMALLO



gatherings and descriptions of important events taking place in other nations.

Where a switchboard becomes the portal of speech to seventy-two foreign countries, the question naturally arises as to what complications these many languages create. The solution is quite simple.

The language of all the direct radio circuits operated by the Bell System in English. Bermuda and certain of the West Indies are English-speaking, while in Central and South America, the operators who work with New York or Miami speak English as well as their native tongue.

On the circuits to London the operators in New York talk only with the London Trunk Exchange, the English operators dealing with the Continental operators in whatever foreign language the case may require. The circuits to Japan and other points in the Pacific are likewise operated in English.

Suppose you were to call a telephone subscriber in Bucharest. While your dealings with the operator are in English, a call to Bucharest would pass through several languages before reaching their destination. The call is passed from New York to London in English, next to Budapest, and then to Bucharest in German. The Bucharest operator deals with her subscriber in Roumanian. Often the call involves four or five languages.

Knowledge of foreign languages is a useful asset to all operators and many of the overseas staffs speak at least one other tongue. In New York some ten foreign languages are represented. A knowledge of the language, geography, and customs of a foreign country often enables an operator to handle a call more intelligently.

The secrecy machines, and the machines that box up voices and direct them to their destination so that they will not intermingle with each other, are not the only outstanding engineering feats that make transoceanic radiotelephony one of the great radio accomplishments.

Over the Atlantic ocean, as an example, there are no convenient islands on which to locate repeater stations such as are used in telephone service on land to amplify speech.

Thus, the entire amplification must be applied at two points—the transmitting and receiving stations. This has necessitated the design of equipment capable of producing enormous amplification. Thirty water-cooled vacuum tubes, each with a power capacity of ten kilowatts, are employed in the final stage of the long-wave transmitter at Rocky Point, Long Island.

The power behind your voice, whether you shout or murmur, is just a few milliwatts. When the transmitters get your voice they convert it into waves of energy which if suddenly converted into sound waves, would shatter windows for miles around.

Despite the enormous amplification which hurls the voice across thousands of miles with the force of a gigantic pile driver, the wear and tear of such a trip reduces it to microscopic proportions, until it is a mere whisper of energy when it reaches a receiving station 3,000 miles away.

In actual figures the amplification at the transmitting station reaches a millionfold and more. It is nothing to the operation which must be performed at the receiving

station, where the amplification reaches, at times, the prodigious figure of a billion times, after being received by diamond-shaped antennas. The same type antenna is used for transmitting. This simple arrangement of wires gives the same results as antenna arrays much larger and more complex.

Radiotelephony to the other side of the world is often an almost startling reminder of the fact that sunrise, high noon, or tea time—and, in fact, the phenomenon of daylight itself—varies in different parts of the world.

Thus is it possible for you to hold the world in your hand and command it to listen. The farthest corners of the earth are as readily accessible as your corner drugstore because of radio.

—50—

Within Earshot

(Continued from page 6)

Bellview, D. C., will make test radio transmission on 94.6 mc., 150 mc. and 275 mc. on the first and third 15 minutes of each hour from 8 A.M. to 4:30 P.M. Mondays through Fridays during the period July 23 to August 6. Any reports on the reception of these signals will be appreciated by the laboratory. The laboratory specifically requests reports of the failure to hear these transmissions as well as reports of hearing them. In writing to the laboratory, please mention the type of equipment you are using.

* * *

WITH regard to the Dorsey family, we don't know whether to apologize to Tommy or Jimmy for running a picture of Tommy and labeling it with his brother's name. To whomsoever we must apologize,—we do; and trust that the Dorsey family will not hold it against us.

* * *

QRM DEPARTMENT—What broadcast station repeatedly uses the amateur 20 meter band for their "cue" work? The last frequency used was 14.2 mc.

* * *

WE were very much impressed at the recent Radio Parts Manufacturers' Show, held in Chicago, by the extreme optimism and general betterment of business conditions which was evidenced by those exhibiting. The exhibits took up the entire hall with not a single inch of space vacant, and the attendance exceeded the most sanguine expectations. Judging from what we heard from all quarters, one may expect boom and banner radio year between now and the next Show in June, 1939.

* * *

THE Summer season is upon us and the static is rolling in heavily every evening. We certainly wish that someone would invent a static eliminator which would really work. But, then, perhaps it is just as well that we are unable to spend as much time at our radio as we would like to, because sometimes during the twelve months of the year it seems best to spend most of our time outdoors. Following our own suggestion, we will cut it short here and see you next month—W9QEA.

FACTORY-TO-YOU SAVES YOU 50%

Also... **\$30⁰⁰** **AND UP** **FOR YOUR OLD RADIO**
AS A SPECIAL TRADE-IN ALLOWANCE!

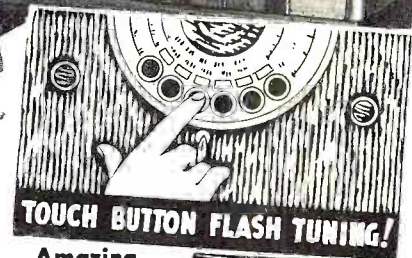
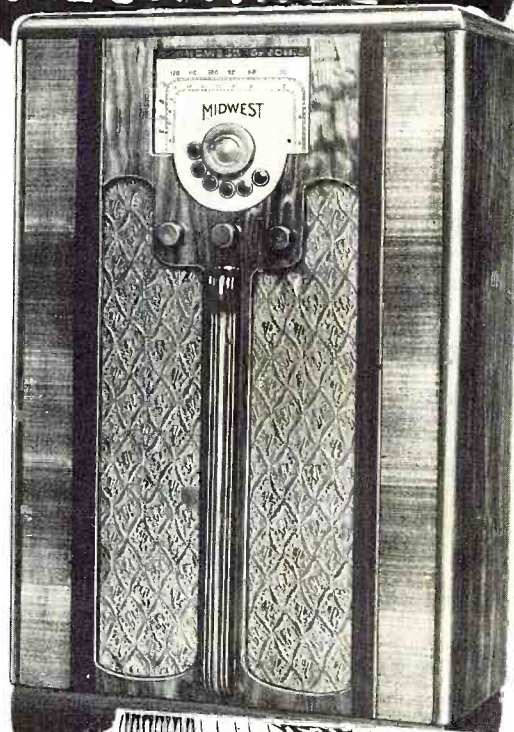
17-TUBE WORLD-WIDE

MIDWEST

MIDWEST FACTORY-TO-YOU PRICE... **\$69⁹⁵**
 TRADE-IN ALLOWANCE... **\$30⁰⁰**

YOU PAY ONLY
\$39⁹⁵ **ABSOLUTELY COMPLETE**

30 DAYS FREE HOME TRIAL



Amazing New Easy Pay Plan



Here it is—the radio headliner of the year—the sensational new 17-Vital-Tube 1939 world-wide Midwest that just sparkles with new features. Regarded as today's greatest radio value, this Midwest gives you high-priced performance for what you would expect to pay for an ordinary 8 or 10-tube set. Use it for 30 days, in your own home, FREE, before you make up your mind. If you decide to keep it, you secure \$30.00 credit and up on your old set.

This 1939 Midwest will delight you with its tremendous range (550 KC to 18,000 KC), glorious new tone and brilliant world-wide reception. Stations 10,000 miles away come in like "locals." Just imagine a radio so big, so fine, so powerful, so luxurious . . . in a big, beautiful, richly-finished Walnut console . . . at such an amazingly low factory-to-you price.

Let us tell you about our complete 1939 line with many features like Dial-A-Band Tuning, Electric Touch-Button Split-Second Tuning, Acousti-Filter, Fidel-A-Trol, Tun-A-Lite Indicator, and scores of other features.



MASSACHUSETTS
 —"Your radio has a marvelous tone quality that can make other radios on the market take a back seat." Thomas F. Walsh.



TEXAS — "Midwest's wonderful tone, splendid foreign reception and marvelous selectivity are second to no other radio on the market today. Many of my friends say that in beauty and performance it is far superior to radios costing twice as much. I am proud to be another Midwest enthusiast and heartily recommend these fine radios to anyone planning to purchase a new one." C. Huddleston.

SEND FOR FREE 1939 FACTORY CATALOG

Factory-To-You Wholesale Price Saves You 50%

The famous Midwest factory-to-you plan, proven by 19 years of success, is just as exciting! You buy at wholesale prices, just like a dealer. You save up to 50%, and make your radio dollar go twice as far. Now, pay as little as 50c a week on the famous Midwest Easy Pay Plan. Remember, you get 30 days FREE Home Trial. Midwest guarantees your absolute satisfaction.

PASTE COUPON ON 1¢ POSTCARD... OR

MIDWEST RADIO CORPORATION
 Dept. 11-AA, Cincinnati, Ohio
 Send me your new FREE catalog, complete details of your liberal 30-day FREE trial offer, and factory-to-you wholesale prices.

Write Today!

Name

Address

Town..... State.....

User-Agents Make Easy Extra Money. Check here for details.

MIDWEST *Factory-to-You* **RADIOS**
 DEPT. 11-AA MIDWEST RADIO CORPORATION...CINCINNATI, OHIO, U.S.A.
Manufacturers of Quality Radios Since 1920

Communications performance

... at a price!

the SKY BUDDY

the SKY CHAMPION

the sky champion

A complete a.c. Superheterodyne communications receiver in every respect. Provides full coverage from 6.7 meters to the top of the broadcast band (including the 10 meter band) with sensitivity and selectivity usually found only on receivers selling at double its low price. This range permits reception of high frequency Facsimile broadcast and the 7½-meter 2 Way Police Band. Includes every essential control for communications reception.

FEATURES

- ★ 8 Tubes
 - ★ Complete Coverage from 44 mc. to 545 kc. (Includes 10 meter band)
 - ★ 4 Band Direct Calibrated Dial
 - ★ Separate Band Spread Dial
 - ★ Individual Coils for each band.
 - ★ Inertia Tuning Mechanism
 - ★ Beat Frequency Oscillator
 - ★ A V C Switch
 - ★ Excellent Sensitivity and Selectivity
 - ★ Band Switch
- THE SKY CHAMPION (Model S20) including speaker and tubes....\$49.50



HERE'S Performance,—real communications receiver performance,—available at prices any amateur or short wave listener can afford to pay. There's more genuine value packed in each of these receivers than you've ever been offered before for so little money.

The 1938 SKY BUDDY has been entirely redesigned—its bigger, finer in performance, with new precision and convenience in operation—a real communications receiver in every respect,—and still available at the same low price.

The SKY CHAMPION is all new—with every essential control for short wave reception—covering everything on the air from the 10 meter band to the top of the B. C. band—sensitivity and selectivity of real communications receiver quality—at a price so modest it is beyond comparison with existing standards.

See these new receivers at your Hallicrafters' dealers—all Hallicrafters receivers are available on liberal time payment terms.

the sky buddy

An amateur receiver in every respect, with complete coverage from 18.4 mc. to 545 kc., including the 20, 40, 80 and 160 meter amateur bands. The SKY BUDDY is an a.c. Superheterodyne with conventional power pack construction and built-in speaker—nothing else to buy

FEATURES

- ★ Complete Coverage 18.4 mc. to 545 kc.
- ★ Built-in Speaker
- ★ Direct Calibrated 3 Band Dial
- ★ Separate Band Spread Dial
- ★ 5 Tubes
- ★ Beat Frequency Oscillator
- ★ Phone Jack
- ★ Pitch Control
- ★ A V C
- ★ Send-Receive Switch
- ★ Audio-Gain Control

THE SKY BUDDY (Model S19) including Speaker and Tubes\$29.50

the hallicrafters inc.

2603 INDIANA AVENUE, CHICAGO, U. S. A.