

RADIO NEWS

NOVEMBER
1940
25c
In Canada 30c

W9USB

Please do not talk to Operators
They are engaged in Official
Business.

thank You
-W1ADO-

9645
R9

WPA

F.D.R.
JONES

W9USB
SEE PAGE 34

THE NAVY WANTS 4,000 RADIO OPERATORS!

SEE PAGE 8

Beginning: Communication & Electronic Maintenance

SEE PAGE 12

DAVEGA ★ World's Largest Radio Dealer..Established 1879

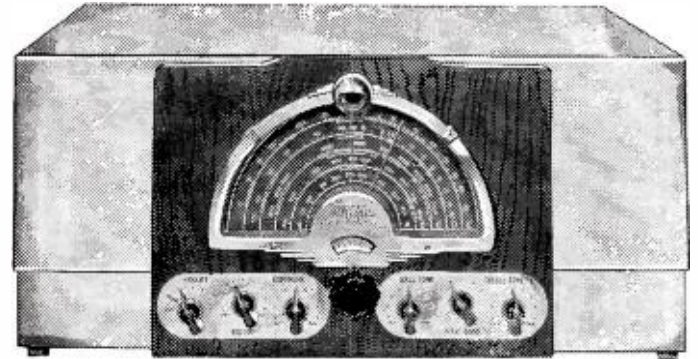
Here's Sensational Value • Finest McMurdo Silver Chassis Ever Built

TWO R.F. STAGES
VARIABLE SELECTIVITY
GIANT JENSEN 18" SPEAKER
FINEST SHIELDING
34 WATTS UNDISTORTED

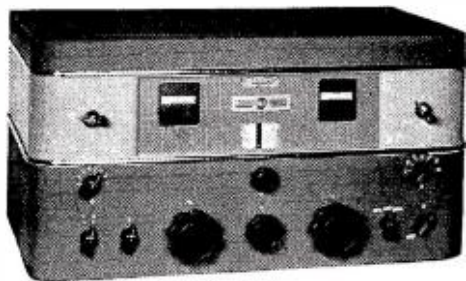
Built to Sell
for \$350.00

189⁵⁰

Complete including 18" Speaker made by Jensen



Made by Radio Headquarters RCA



AR 77 WITH DUAL
R.F. ALIGNMENT

139.50

IMPROVED
IMAGE
REJECTION
ANTENNA
TRIMMER

HALLICRAFTER SUPER SKY RIDER

6 BANDS • 15 TUBES
VARIABLE SELECTIVITY
2 R.F. STAGES
HI-FI-AUDIO SYSTEM
FOR FINE TONE

159.50



Hallicrafter S.20R

R.F. stage, 2 I. F. stages,
9 tubes, noise limiter,
bandspread.

49.50

Hallicrafter SX23

THE SET THAT HAS
EVERYTHING. WRITE
FOR OUR SPECIAL
PRICE.



Federal Recorder Model P 12

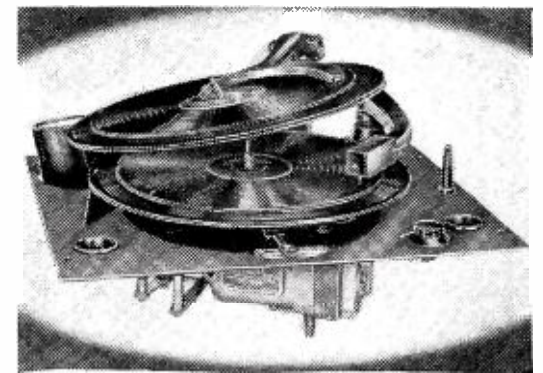
Professional 12" recorder, 15
watt audio public address, 25.00
mike and stand. Perfect record-
ings.

List Price
over
\$200.00 **79.50**

GARRARD RC 50 RECORD CHANGER

MIXES
10" and 12"
RECORDS

List Price
\$90.00 **39.50**



NEW HALLICRAFTER UNIVERSAL S-29 SKY TRAVELER 553-9.85 METERS

AC-DC battery operation, self-
charging unit built in. Self-con-
tained antenna, elec-
trical bandspread.... **59.50**



USED RECEIVERS—ALL FULLY GUARANTEED

NATIONAL NC 100X...\$65	HALLICRAFTER SX23...\$ 60	HOWARD 430\$ 19.95
NATIONAL FB 7..... 10	1939 SUPER PRO..... 100	McMURDO 5C 29.00
HALLICRAFTER S9 24	HAMM HQ 120X..... 99	MEISSNER TELEKIT .. 59.00
HALLICRAFTER S11 ... 39	HOWARD 438X 39	SUPER SPECIAL RME 69 WITH DB20 RACK MODEL SPECIAL ... 125.00

DAVEGA

AMATEUR DIVISION—63 CORTLANDT ST., N. Y., N. Y.

A Reputation Round the World for Value



J. E. Smith, Pres. National Radio Institute Est. 25 Years

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

N.R.I. MEN WORK IN THESE BRANCHES, TOO

I Trained These Men

I Trained These Men

These Men Have SPARE TIME BUSINESSES



I repaired some Radio sets when I was on my tenth lesson. I really don't see how you can give so much for such a small amount of money. I made \$600 in a year and a half, and I have made an average of \$10 to \$20 a week—just spare time.
JOHN JERRY
1529 Arapahoe St., Room 17
Denver, Colorado



I am now making from \$10 to \$25 a week in spare time while still holding my regular job as a machinist. I owe my success to N.R.I.
WM. F. RUPP
611 Green St.
Bridgeport, Penna.

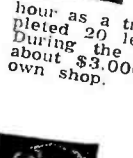


I am doing spare time Radio work, and I am averaging from \$700 to \$850 a year. Those extra dollars mean so much—the difference between just barely getting by and living comfortably.
JOHN WASHKO
97 New Cranberry
Hazleton, Penna.

These Men Have FULL TIME BUSINESSES



For the last two years I have been in business for myself making between \$200 to \$300 a month. Business has steadily increased. I have N.R.I. to thank for my start in this field.
ARLIE J. FROEHNER
300 W. Texas Ave.
Goose Creek, Texas



Before taking your Course I earned about 17 1/2 cents an hour as a truck driver. When I had completed 20 lessons I started service work. During the last two years I have made about \$3,000 in Radio. I now own my own shop.
KARL KELLY
409 W. Calhoun St.
Magnolia, Ark.



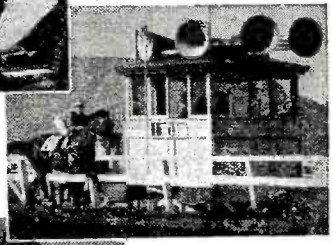
I am making between \$50 and \$60 a week after all expenses are paid, and I am getting all the Radio work I can take care of, thanks to N.R.I.
H. W. SPANGLER
126 1/2 S. Gay St.
Knoxville, Tenn.



(Above) Broadcasting Stations employ operators, installation, maintenance men and Radio Technicians in other capacities and pay well.



(Above) Radio Jobbers and Dealers employ installation and servicemen at good pay.



(Above) Loudspeaker Systems is another field for Radio Technicians. (Left) Police, Aviation and Commercial Radio are newer fields for which we give the required knowledge of Radio.

The world-wide use of Radio has made many opportunities to have a spare time or full time Radio service business of your own. Over 28,000,000 homes have over 40,000,000 Radios. There are more Radios than telephones. Every year millions of these Radios go out of date and are replaced. There's an opportunity to earn good commissions selling new sets. Millions more need new tubes, servicing. I will train you at home in your spare time to sell, install, fix all types of Radios; to start your own Radio service business and build it up on money you make in your spare time while learning. You don't have to give up your present job, or spend a lot of money going away to school to become a Radio Technician.

HOW I GIVE YOU PRACTICAL EXPERIENCE

I send you special Radio equipment; show you how to conduct experiments, build circuits illustrating important principles used in modern Radio receivers, broadcast stations and loudspeaker installations. You work out, with your own hands, many of the principles you study in our lesson texts. YOU ALSO GET A PROFESSIONAL ALL-WAVE, ALL-PURPOSE SET SERVICING INSTRUMENT. See the left-hand column on this page.

YOU LEARN TELEVISION, "F-M," ELECTRONICS

The N.R.I. Course is up-to-date. You are taught how to install, adjust, service Television receivers and antennas. You learn about Frequency Modulation transmitters and receivers; you learn the principles of electronic control equipment, such as photoelectric counters, safety devices, electric eye burglar alarms, etc.

FIND OUT HOW I TRAIN YOU AT HOME

Act Today. Mail the coupon now and I will send my book, "Rich Rewards in Radio," and a Sample Lesson free. Find out what Radio offers; what opportunities are coming in Television. Read the details of my Course in Radio and Television; read more than 100 letters from men I have trained; what they are doing, earning. Read my Money Back Agreement. MAIL COUPON BELOW in an envelope or paste on a postcard—NOW.

MANY MAKE \$5 TO \$10 A WEEK EXTRA IN SPARE TIME WHILE LEARNING

I start sending Extra Money Job Sheets the day a student enrolls—start showing how to do Radio repair jobs. Throughout the Course I send additional plans and directions for doing increasingly complicated, better paying jobs. That's why many students make \$5 to \$10 a week extra in spare time; why many start building their own Radio service businesses while learning.

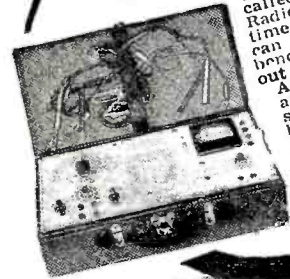
I TRAIN YOU FOR GOOD JOBS TOO MANY PAY \$30, \$40, \$50 A WEEK

Anyone can tune a Radio set, but few can service one. That's why many qualified Radio Technicians make such good money installing, fixing, selling home and auto Radio Sets, operating and maintaining Broadcast, Police, Aviation, Commercial Radio stations; selling, installing, servicing Loudspeaker systems. That's why many open their own Radio sales and repair businesses and make \$30, \$40, \$50 a week. Why others hold their regular jobs and make \$5 to \$10 a week extra fixing Radios in spare time.

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

YOU GET THIS PROFESSIONAL SERVICING INSTRUMENT

This instrument makes practically any test you will be called upon to make in your Radio work on both spare time and full time jobs. It can be used on the bench or carried along when out on calls. It measures A.C. and D.C. Voltages and currents; tests resistances; has a multi-band oscillator for aligning any set, old or new. You get this instrument to keep as part of your N.R.I. Course.



SAMPLE LESSON FREE

I want to prove our Course gives practical, money-making information; that it is easy to understand—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, 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.

Mail Now

GOOD FOR BOTH 64 PAGE BOOK SAMPLE LESSON FREE

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

Without obligating me, mail your Sample Lesson and 64-page book FREE. I am particularly interested in the branch of Radio checked below. (No salesman will call. Write plainly.)
 Radio Service Business of My Own
 Service Technician for Retail Stores
 Spare Time Radio Repair Work
 Broadcasting Station Operator
(If you have not decided which branch you prefer—mail coupon now, for information to help you decide.)
 Loudspeaker Systems. Installations and Service
 Auto Radio Installations and Service
 Television
 All-around Servicing Technician

Name.....
Address.....
City..... State.....



14X1



BY THE EDITOR

SEVERAL of our columnists and authors have expressed the opinion that the radio operator shortage was acute, and that Uncle Sam was doing everything in his power to acquire more radiomen. To that end you must have read the story of the National Defense Net (RADIO NEWS, Sept. 1940), and the opinion of Mr. John F. Rider (RADIO NEWS, August, 1940) as well as the lead article appearing in this issue. In a quiet way we investigated. Here is what we found. Each of the Government services which require operators were so short of operators that it was practically impossible for one department even to "borrow" from another. There were too few radiomen in the Army for the FCC to "borrow" some, and the same condition existed all around. Why? Well, we don't say that the following may be the reason, but it may be a contributing cause.

Under the Union Wage Scale, professional operators receive from \$1,980 to \$1,380 per year. They also receive their board and lodging and in some cases tips and extras. Board and Lodging can be set at a value of \$1,000 per year to the average man. So these radio operators are receiving the equivalent of from \$2,980 to \$2,380 per year. Now what does Uncle Sam offer these same ops? \$1,800 to \$1,620!

In addition to that, the ops must have been employed as a radio operator in the *Government service for at least 1 year within the last 5 years*. This last qualification cannot hope but eliminate all extra-well trained operators. Suppose that you had worked on a Government station for a year and obtained your radio training that way. Then you left the service and went into civilian life. If you were a success, you would by now be receiving about \$2,980 per year. Unless some excellent other reason exists, unless you have been "on the Beach" for a long time, you will not be too attracted by less money than you were receiving in civilian life.

At a time like this our country needs the very best type of radio operator it can get. It is not getting them. The same condition prevails throughout the whole government-radio service. Positions offered to radio inspectors and monitoring officers carry salaries which do not attract our excellent radiomen. Anyone who could meet the requirements of the position as offered by our Government generally is able to earn much more in civilian life. Perhaps were the Government to add housing and board to the salaries it is offering,—if it were to add some insurance feature, not obtainable as cheaply in civilian life, if it were to make the proposition much more attractive in every way,—then more ops would respond.

* * *

THE situation in Washington is tense, but not so tense that some of the appropriations for National Defense have not been turned into actual orders. In some regards, a quietus has descended on the various purchasing agencies who are skillfully going about replenishing the nation's stock of radio equipment.

(Continued on page 43)



Trade-Mark Registered

Including Articles on POPULAR TELEVISION

The Magazine for the radio amateur
experimenter, serviceman & dealer

VOL. 24, NO. 5

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ALLIED RADIO- HEADQUARTERS FOR hallicrafters

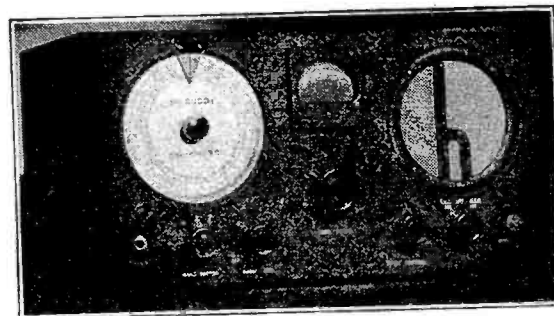
EASY TERMS

Another great ALLIED service to make your purchase of Hallicrafters receivers as easy as possible. You don't have to pay all cash at ALLIED, and there are no large down payments or excessive carrying charges! Your Time Payment purchase is handled quickly with a minimum of delay and red tape. Select the Hallicrafters receiver you want—then send us just 10% of the cash price with your order. You pay only 6% carrying charge, and the balance is spread out over 6, 8 or 12 months. ALLIED'S Time Payment plan saves you money and makes it easy for you to get the equipment you want without delay.

LARGEST STOCK OF AMATEUR EQUIPMENT

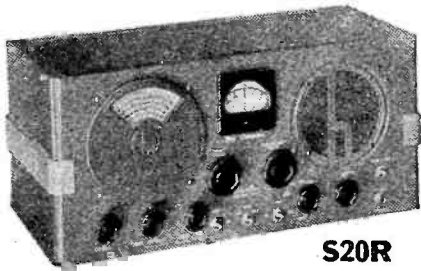
Thousands of Amateurs and Experimenters know that it's no idle boast when we say our stocks are the largest and most complete in the world! We at ALLIED are devoted exclusively to Radio. All the latest Hallicrafters equipment is here ready for prompt shipment, and the big new 212-page ALLIED 1941 Catalog is your buying guide to Everything in Radio.

Whether you are an Amateur, Experimenter, Serviceman, Engineer, or just interested in Radio as a hobby, you need the greatest guide to radio ever published—the 1941 ALLIED Catalog—212 pages—packed from cover to cover with thousands of radio parts, supplies and equipment. And you'll find the latest in communications equipment by Hallicrafters, the world's largest builder of communication receivers. The ALLIED Catalog includes a complete listing of up-to-the-minute equipment, developed and perfected in Hallicrafters' world-famous laboratories—and EVERYTHING IN RADIO—right at your finger tips. Send for your copy now!



HALLICRAFTERS SKY-BUDDY S19R

The latest improved model of the famous 6-tube SKY-BUDDY. Tuning range is 545 KC to 44 MC in four bands with full electrical bandspread. Small and compact, with built-in speaker. Beat oscillator helps you tune in weak signals on SW Broadcast or is ideal for copying "code" signals. Antenna input for doublet or single wire antenna; headphone jack automatically mutes speaker. Also has provision for use with batteries if desired. Complete with tubes.
AMATEUR NET..... **\$29.50**
Time Payments: \$4.43 down, \$4.43 monthly for 6 months.



S20R

POPULAR HALLICRAFTERS SKY CHAMPION

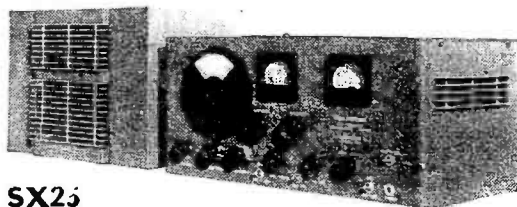
A 9-tube communication receiver that's a "world-beater" for performance! Tunes from 545 KC to 44 MC in 4 bands. Large calibrated main tuning dial with full electrical bandspread and separate bandspread dial. Built-in high quality speaker—no external accessories—complete, compact, and ready for tip-top performance any time and anywhere. Has Automatic Noise Limiter, two IF Stages, Inertia Tuning, Variable Pitch Beat Oscillator, and

\$49.50

provision for operation from batteries or vibrapack.
AMATEUR NET.....
Time Payments: \$4.95 down, \$5.90 monthly for 8 months.

FAMOUS HALLICRAFTERS SUPER-DEFIANT SX-25

Only Hallicrafters could produce a 12-tube communication receiver with so many desirable features at so moderate a price! Outstanding in design and unsurpassed in performance. Features: Two Tuned RF Stages, Drift Compensation, Frequency Meter Tuning, Calibrated Bandspread, Calibrated "S" Meter, Automatic Noise Limiter, 4 Band Tuning Range, 540 KC to 42 MC, Six-step Selectivity with crystal filter, Break-in Control, and 10-in. PM speaker in metal cabinet to match. Complete, nothing else to buy!



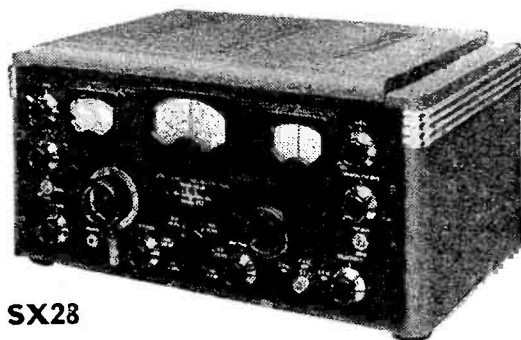
SX25

\$99.50

AMATEUR NET.....
Time Payments: \$9.95 down, \$7.91 monthly for 12 months.

SENSATIONAL NEW HALLICRAFTERS SUPER-SKYRIDER SX-28

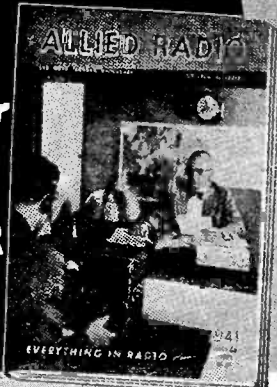
Designed by 600 engineers—and built to conform with U. S. Government specifications! Here is a 15-tube receiver that will set up new records of performance in every type of communication service. Calibrated main and bandspread dials; Tuning Range, 540 KC to 43 MC, Two Tuned RF Stages, Adjustable Automatic Noise Limiter, 6-step selectivity, Temperature compensated, Inertia tuning, High fidelity push-pull audio with bass booster, Calibrated "S" meter. Bass-reflex speaker available to match.
AMATEUR NET, **\$159.50**
LESS SPEAKER.....
Time Payments: \$15.95 down, \$12.68 monthly for 12 months.



SX28

Free ALLIED 1941 RADIO CATALOG!

212 PAGES
SEND FOR IT
BIGGEST EVER
100% RADIO



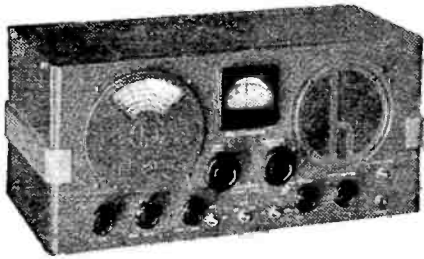
ALLIED RADIO CORPORATION
Dept. 1-FL-1, 833 W. Jackson Blvd.
Chicago, Ill.

Name.....
Address.....
City..... State.....

ALLIED RADIO

HALLICRAFTERS PHILADELPHIA HEADQUARTERS

The Sky Champion (S-20 R)

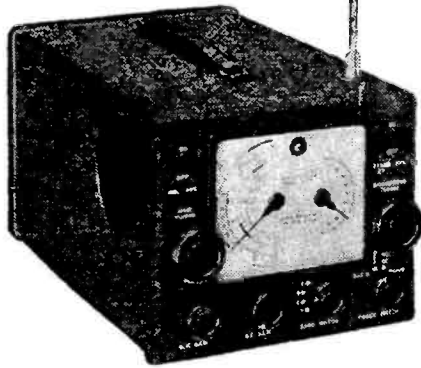


9 tubes—Complete Coverage (545 kc to 44 mc)

All the essential controls for good amateur reception; RF gain, tone control, phone jack,

AVC switch, send receive switch, audio gain, pitch control and 4-position band switch, inertia tuning, separate electrical bandspread, beat frequency oscillator, built-in speaker, battery-vibrapack DC operation socket. Cabinet size 18½" x 8½" x 9¾", \$49.50.

The Portable Receiver



Communications (Model S-29)

The New Sky Traveler

Operates on 110 volt AC or DC or from self-contained batteries. Covers from 542 kc to 30.5 mc (553 to 9.85 meters) on 4 bands. Built-in collapsible antenna extends to 3 feet. Battery life

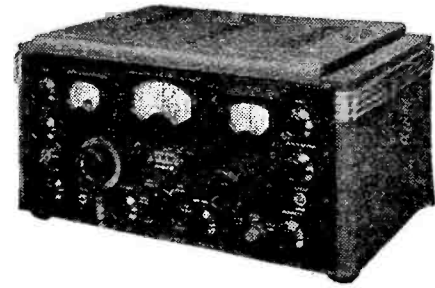
prolonged through self-contained charging circuit. Automatic noise limiter, electrical bandspread, 9 tubes, built-in speaker, \$59.50.

The New 1941 Super Skyrider (SX-28)

Designed to Government Specifications

15 tubes, 6 bands covering 540 kc to 43 mc, 2 stages of pre-selection, high fidelity push-pull audio, band pass audio filter, highly

efficient crystal filter circuit, an additional and completely effective noise limiter. Hallicrafters-Jensen Bass Reflex speakers available, \$159.50.

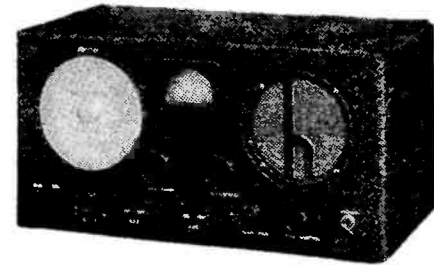


The Sky Buddy (Model S-19 R)

An Excellent Amateur Receiver in every respect

Covers everything on the air from 44 mc to 545 kc, including the 10, 20, 40, 80 and 160 meter amateur bands. Features —

Electrical bandspread, broadcast band, BFO, AVC switch, phone jack, pitch control, built-in speaker, 6 tubes, DC operation socket—battery or vibrapack. Dimensions, 17½ x 8½ x 8½", \$29.50.



The Super Defiant (SX-25)

12 Tubes — 2 stages of pre-selection

An overall range of 540 kc to 42 mc in 4 bands. Amateurs

acclaim this new de luxe receiver the finest ever developed at anywhere near this price. Each part is placed for peak performance. Tuning is effortless and controls are all conveniently located. Dimensions 19½ x 9½ x 11½ — complete with speaker, crystal and tubes, \$99.50.



M & E

SPORTING GOODS CO.

512 MARKET STREET, PHILADELPHIA

ATTENTION, ALL RADIO MEN!

UNCLE SAM WILL NEED 100,000 RADIOMEN
FOR NATIONAL DEFENSE

YOU CAN BE READY BY JOINING THE
RADIO MINUTEMEN OF AMERICA

FOR the past three months there have been repeated statements not only in RADIO NEWS, but in the daily papers, and other periodicals, that there was, and would continue to be, a great shortage of radio operators. To some extent, the *Conscription Bill*, recently signed by the President, will alleviate this condition. But there will always be a necessity for radiomen of all kinds, not only in the Armed Services of our country, but in civilian life as well.

Senator Claude Pepper, of Florida, in an open letter published last month said:

"Briefly, this country needs approximately 100,000 trained radio men. It also needs many thousands of patriotically minded citizens who will spend time at their radio sets listening for any dangerous or subversive material in communication channels. We know that there are a great number of broadcasts in foreign tongues and our patriotic foreign-born citizens could perform a real service by listening to these broadcasts in languages which they understand."

It is response to this letter, that the RADIO MINUTEMEN OF AMERICA are being organized. There will be no dues, nor will it be necessary for any who joins to subscribe to this or any other magazine. The sole qualification will be a desire to help our Government, coupled with a certain amount of radio training and suitably owned equipment.

It is proposed that the RADIO MINUTEMEN OF AMERICA be divided into four groups. These are: (1) the professional (paid) radio operators; (2) the amateur (licensed) radio operators; (3) the short-wave listeners with equipment; and (4) all others including servicemen and engineers who want to serve. It will be possible for a MINUTEMAN to be a member of more than one group at the same time. As the organization grows, suitable membership certificates and pins will be provided.

Now, just what will the MINUTEMEN do? They will follow the government suggestions. Those in *Group 1* will report anything that they may think is non-American which they may hear or see. These reports will be in writing and will be forwarded to the proper authorities. All and any action which may be taken against 5th Columnists or Subversive Elements will be taken solely through the regularly authorized U. S. Government channels. Protection to informants will be the same which is afforded to anybody by our Government.

Group 2 will patrol the amateur air lanes, listening for violations of the *Federal Communications Commission Orders* against communicating outside the United States and its possessions. They will also report any communications of a suspicious nature. These reports will be forwarded to the recognized authorities. From the list of amateurs who compose *Group 2*, will come members who are willing to assist local *FCC Radio Inspectors* in the trapping of "bootleggers of radio amateur calls." These ama-

teurs are very necessary, and will aid the *FCC* in cleaning up the bands. Under *Group 2* will also be listed those members who are willing to spend time listening to code transmissions of foreign stations to make sure that the transmissions are not intended for reception by spies, and subversive elements here.

Group 3 will be one of the most useful of all groups. Here, for the first time, the Short-Wave Listener will be able to be of service to our Government. It is estimated that there are several hundred thousands of these Short-Wave Listeners, and they should be able to render signal service by keeping tabs on all foreign long wave and short wave transmissions. It is known that there are transmissions which are coming over intended for espionage work in these United States. It will be the work of *Group 3* to try to ferret out the transmitters, their location, their times of operation, and wherever possible, to whom the transmissions were intended.

Group 4 will be comprised mostly of radio servicemen, who from their contacts with customers and the trade, hear and see many things. It was a serviceman who uncovered a vast *Bund* organization in the East. He had been called into repair an all-wave set and noticed a complete broadcasting outfit, ready to go. That coupled with the *Nazi* insignia aroused his curiosity; and, on reporting to the *FBI*, an under-cover transmitter was discovered and "neutralized." The work of *Group 4*, therefore will be of greatest value to our Government.

Finally, it is intended to list the members of the RADIO MINUTEMEN OF AMERICA

with our Government as a patriotic group of trained radiomen who are actually serving the *National Defense*. The equipment of the membership will also be listed, and from this latter list the Government will know what type and amount of equipment will be available should a *NATIONAL EMERGENCY* arise.

The RADIO MINUTEMEN OF AMERICA will be a vast voluntary organization of trained radiomen dedicated to "the preservation of our democracy." It will be the duty of the MINUTEMEN each to improve his code speed, if he is an operator, and his technical knowledge if he belongs under *Groups 3* and *4*. From time to time, the MINUTEMEN will be advised of the latest improvements to military radio so that they can study them and can be ready, at a "minute's" notice to assist in the maintenance of such equipment. Remember that a foreign air corps was organized along just these lines and became the most feared and most powerful air armada that the world has ever seen. There is no reason why the United States, which has always fostered invention and innovation, as well as initiative among radiomen, should not be able to produce the greatest, the most perfectly trained, and the most alert group of RADIO MINUTEMEN the World has ever known.

How to join? Just fill out the attached coupon and send it in. You will receive full instructions. There is no cost or obligation to you, beyond that which you assume voluntarily, to be ready to help this great country against those whose philosophies and "isms" are prejudicial to the continuation of the American Way of Life.

Obey that urge to be patriotic! Do it now!

RADIO MINUTEMEN OF AMERICA,
Room 2217, 608 South Dearborn St.,
Chicago, Illinois.

You bet I want to join the RADIO MINUTEMEN OF AMERICA! Count me in under Group(s) _____ Please send me full particulars, but I understand that there are _____
(Insert numbers of groups)

no dues, and I won't be asked to subscribe to any magazine. For a starter I give the following information about myself:

I speak the following foreign languages.....

I read the following foreign languages.....

I write the following foreign languages.....

I was born in the U.S.A. I am a naturalized citizen of the USA I am willing to spend _____ hours per week in work in the RADIO MINUTEMEN OF AMERICA.

Name..... Age.....

Address

Call (If any)

Phone number Licensed radio operator?.....
yes or no



The Navy makes a magnificent sight as it goes into battle line. But unheard of radio ops are the key-men.

by **ALFRED TOOMBS,**
Special Washington Correspondent for RADIO NEWS

Such a shortage of radio operators exists in the Navy, that the Government is planning to school 4,000 young men in radio.

THE United States Navy wants 4,000 young Americans who are interested in radio to join the Naval Reserve and take a four months training course in radio operation and maintenance. The Navy will pay these young men while they are in school—then give them the chance to take a three months cruise, at full pay, aboard Naval vessels.

The details of this plan, which is designed to create a vast reservoir of trained radio men for national defense, have just been announced in Washington. Navy Department officials have been toiling over it for weeks and are prepared to induct the new reservists almost immediately upon application.

Seven schools are being established in different parts of the country to train the radiomen. The reservists will get practically the same course in radio that is given regular Navy radio operators and then will have the opportunity to serve with the regular men on ship and shore stations.

The 4,000 who will be accepted in the service will be classed as V-3 in the Naval Reserve, and when their applications have been approved will be

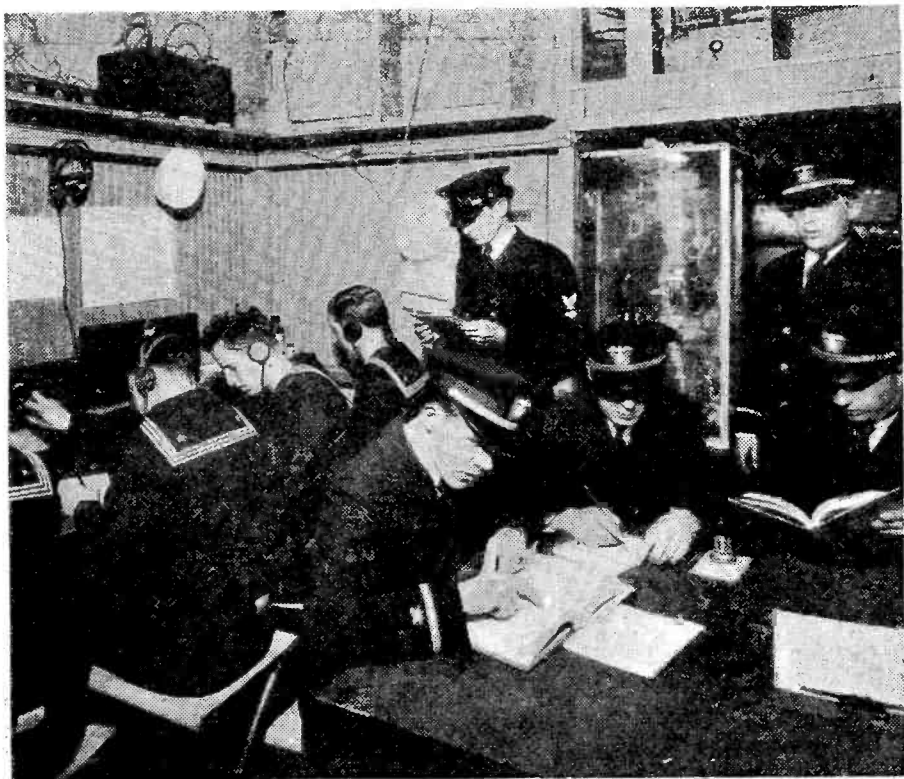
called to active duty. Upon completion of their course, they will be rated as Radiomen and Signalmen—petty officers in the Navy. The Government will pay the cost of transportation from the applicant's home to the school in his Naval District. Those who are taking the course will be considered on active duty status and will be paid at the rate given regular Navy men of their class.

Applications will be received from men between the ages of 17 and 35 years. They must be of good character and be in good health. Those who have had some experience in radio, particularly those who hold commercial or amateur licenses, will be given preference. Those under 21 years of age must send a letter from their parent or guardian, signifying approval of the enlistment. Applicants are

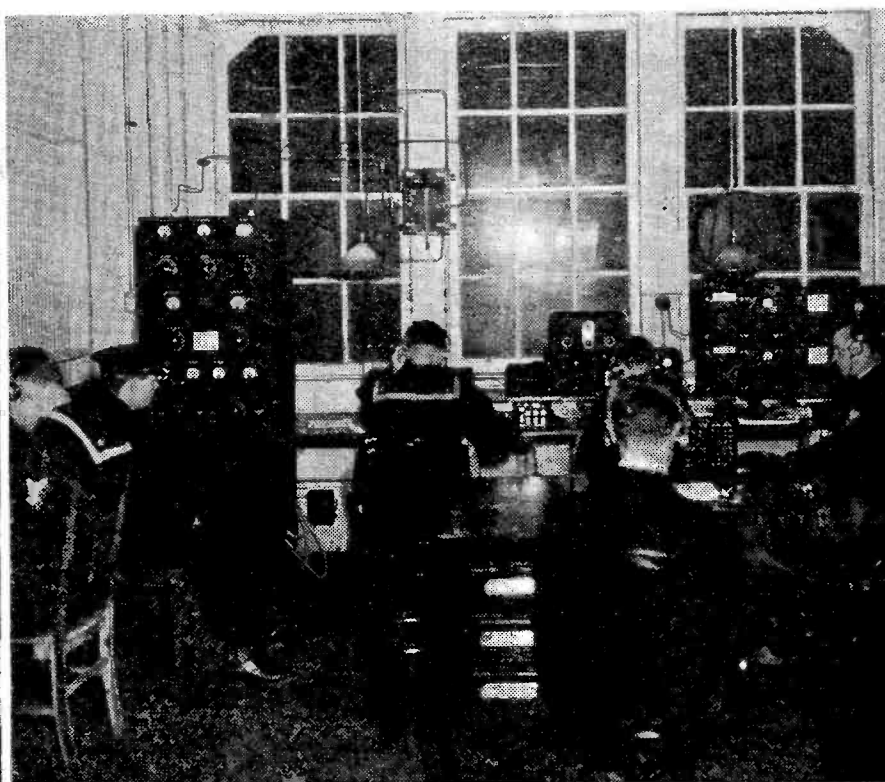
warned that if they make any misstatements in their request for enrollment they will be liable to dismissal.

When the application has been approved, the reservist will be sent to the school where he is to be trained. There he will be given room, board and uniform—along with the items of equipment which are necessary. The pay he receives will depend upon the qualifications he has upon enlistment.

Men who hold first or second class commercial radiotelegraph licenses or a commercial operator's permit will be rated as first class seamen during the training period. They will receive \$54 a month. Amateurs who hold Class A or Class B licenses will likewise be rated as First Class Seamen, and receive the same pay. Amateurs holding Class C licenses will be rated as Second Class Seamen and will be paid



In the foreground, cadet officers are decoding the messages which were received by the ops. Norfolk, Va.



Philadelphia Navy Yard scene with naval reservists at practice drill in the Control Station. Looks fine.

\$36 a month. Those who hold no license will rate as Apprentice Seamen and will get \$21 a month.

Upon completion of the training course, those who pass the examination will be rated as Radiomen or Signalmen Third Class, and will be paid \$60 per month while on active duty. If they go into the regular service after this they will be given a chance to advance to higher rating as Radiomen or Signalmen, with more pay. Those who do not pass the qualifying examination, but who show promise and are recommended for further training, may be transferred to sea duty. They will be given not less than three months to pick up by first-hand experience what they did not master in school. Then they will get another chance to qualify for their ratings, working under actual service conditions.

The school to which an applicant is sent will be determined by the naval district in which he resides. There are twelve naval districts in the continental United States. The First Dis-

trict includes the New England states, with headquarters in Boston and the Third District—(there's no Second District)—includes New York and parts of Connecticut, with headquarters in New York City. These two Districts, along with the Fourth—which includes Pennsylvania, Delaware and New Jersey—will have a school, the location of which has not yet been settled.

Reservists from the Southern states—included in the Fifth, Sixth, Seventh and Eighth Districts—will probably be assigned to the school in Charleston, S. C. These Districts include states as far north as Maryland and as far west as Texas. There will be two schools in the midwest, one in Chicago and one in Indianapolis. Both cities are in the Ninth District and to these schools are likely to go reservists from that District, which includes the midwestern states.

Three of the schools will be located on the West Coast. One will be on the Receiving Ship in San Francisco, for reservists from northern California

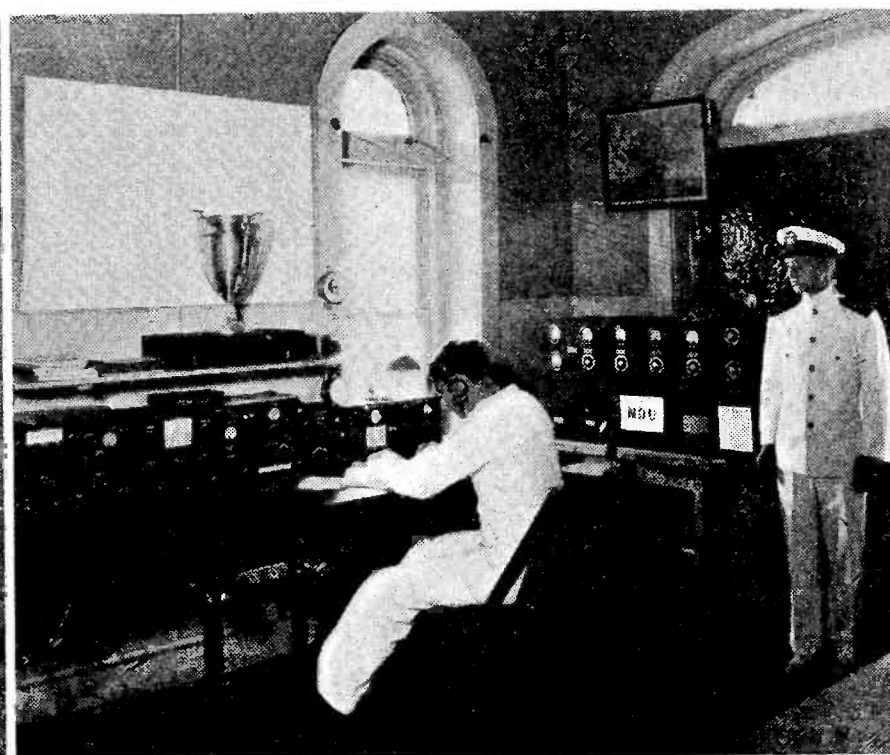
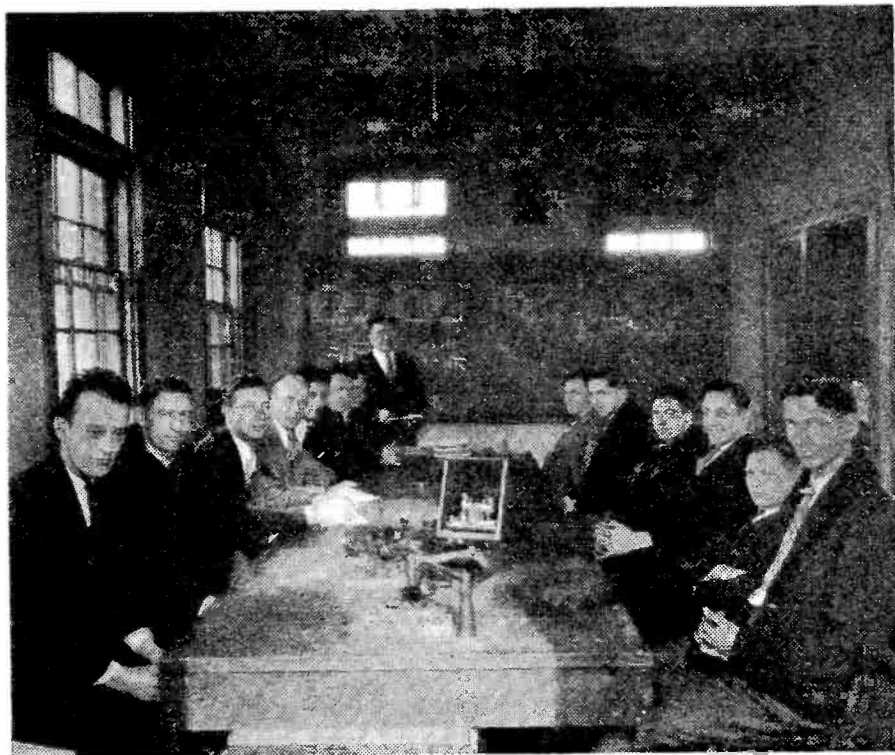
and such western states as Nevada, Utah, and Colorado. Another will be at the Naval Radio Station, Puget Sound, Washington, for students from Washington, Oregon, and the other Northwestern states. The location for the third has not yet been determined, but it has been established for training reservists from the Eleventh Naval District, which has its headquarters in San Diego and includes Southern California and the southwestern states.

To obtain application blanks, prospective reservists should address a letter to the Commandant of the Naval District in which they reside. A letter to the Commandant at one of the cities mentioned above will get results. Or it may be easier to obtain an application from the Naval Reserve activity in your city or one nearby. All Naval Reserve Armories or headquarters will be able to furnish the applications. The questions asked are routine—name, age, were you ever in jail and why, etc.—and the applicants must

(Continued on page 42)

From this "raw" stock will come the future naval radiops. Recruits beginning a 16-weeks radio course.

In tropical "whites", the reservist stands watch in Jacksonville, Fla., while a cadet officer stands by.



HANDY UTILITY AMPLIFIER

By

FREDERIC U. DILLON,
Hollywood, California

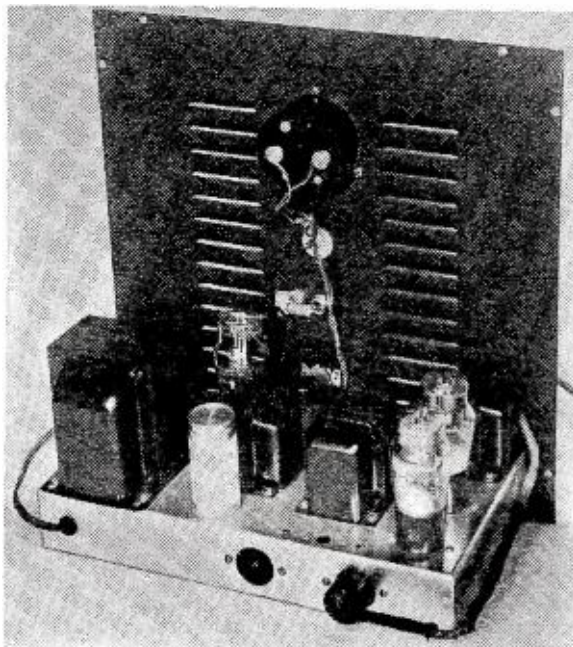
Here is a unit which can be used with RF tuner, with high impedance input, or a 500 ohm input.



While it is not necessary to build the amplifier as high as that (above) of the author, it does make a nice unit.

THE experimenter often has use for a small amplifier. In this article the author explains how to build such a unit. Its features are many. By the use of a three point selector switch (S.W.-1) a choice of any one of three services can be instantly chosen, namely they are: No. 1 input for any r.f. tuner, also power for this tuner may be had from the amplifier by plugging a five wire shielded cable into a socket provided for it on the rear of the chassis. No. 2 input for high impedance velocity microphone. No. 3 input for special five hundred ohm magnetic phonograph pick up, which is also designed to be used as a recording head.

With the selector switch in No. 2 position and switch No. 2 in the playback position this unit will make a fine public address system for small halls, dance bands, etc. The speaker is a *Magnavox* model 112 and has twenty-five feet of shielded cable to allow the speaker to be placed at a distant point from the amplifier.



Rear view of the amplifier.

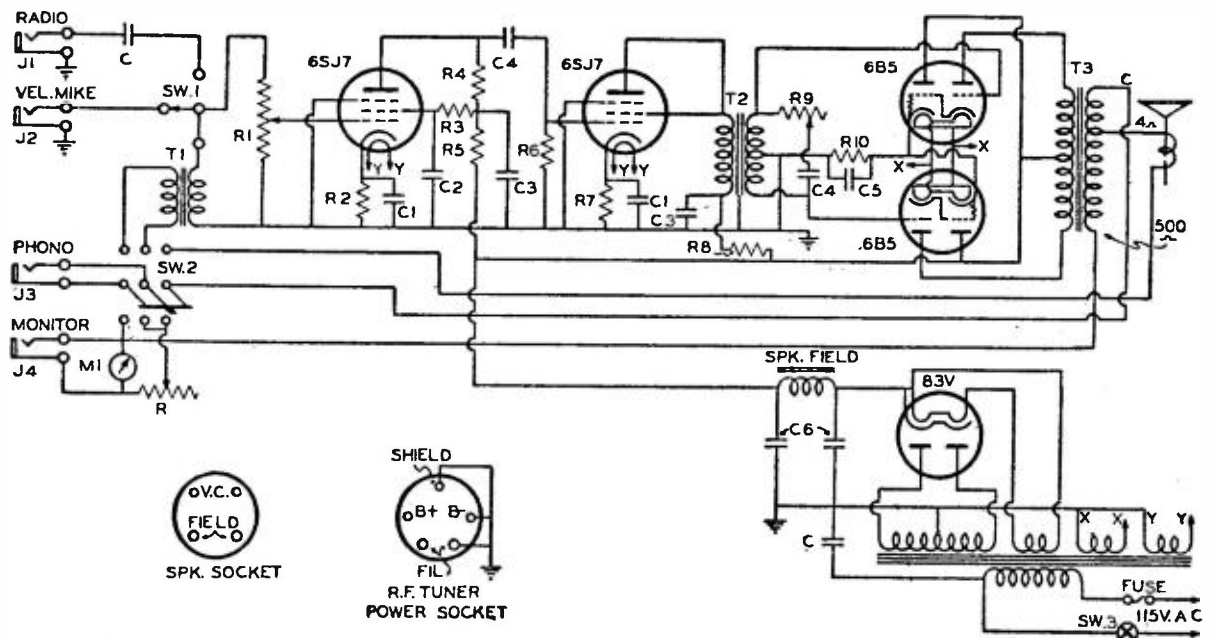
By simply changing switch No. 2 to the "Record" position and taking your choice of a radio selection or an original selection using the mike, you are ready to make a recording. Duplicate records may be made by placing the mike close to an electric record player and playing the first record cut or any one that is to be duplicated. It is understood that two turntables are needed to undertake this type of work.

Just a word about recording discs, it seems that the term "acetate" has been erroneously used as there are no true acetate records. What they really contain is cellulose-nitrate, which

is inflammable, but the discs themselves are not dangerous, it is the threads which are collected when cutting the discs. These should be put in a tin can, an excellent container is a two pound coffee can, painted red and kept handy for disposal of said threads.

Not all discs on the market are inflammable, it is well to know which are and which are not. However, the nitrate discs have less surface noise and are good for hundreds of playings. These are by far the best.

When recording it is best to monitor
(Continued on page 57)



- C—1 mf. 600 v. paper. Sprague
- C₁—10 mf. 25 v. electro. Sprague
- C₂—5 mf. 200 v. electro. Sprague
- C₃—8-8 mf. 450 v. electro. Sprague
- C₄—0.5 mf. 600 v. paper. Sprague
- C₅—50 mf. 25 v. electro. Sprague
- C₆—8-8 mf. 450 v. electro in can. Sprague
- R—2500 ohms potentiometer. Centralab
- R₁—500,000 ohms, pot. Centralab
- R₂—2,000 ohms, 1 w. Centralab
- R₃—2 megohms, 1 w. Centralab
- R₄—250,000 ohms, 1 w. Centralab
- R₅—50,000 ohms, 1 w. Centralab
- R₆—500,000 ohms, 1 w. Centralab
- R₇—1500 ohms, 1 w. Centralab
- R₈—4000 ohms, 5 w. Centralab

- R₉—50,000 ohms, pot. Centralab
- R₁₀—150 ohms, 10 w. Centralab
- T₁—Input Trans. Hadley 5562A
- T₂—Push-Pull Input. Hadley 5546A
- T₃—Plate and Fil. Trans. Hadley P656A
- Speaker—2,500 ohm field, 4.5 ohm voice coil. Magnavox
- Meter—General purpose volume indicator. Simpson 45
- SW₁—Single-pole-3 position switch. Mallory
- SW₂—3 pole-double-throw switch. Mallory
- J₁, J₂, J₃, J₄—Midget jacks. Bud
- Chassis—Bud. 13x7x2"
- Cabinet—15x15x8". Bud 1194
- Nameplates—Bud
- Tubes—2-6SJ7, 1-6B5, 1-83V. Sylvania

AS I SEE IT!

by **JOHN F. RIDER**

Dean of the Servicemen

A vari-colored discussion of timely items compose the author's article for this month.

No Fewer Models

WHAT with the story making the rounds that as a result of the needs of the *National Defense Program*, the automobile manufacturers do not intend bringing out new models in 1941, some people in the radio business have discussed possibilities in the radio manufacturing industry. Will the radio receiver manufacturers bring out many different models for the 1940-41 season? . . . That has been a frequent question. . . . Not knowing the answer, we asked the receiver manufacturers. For the present there does not seem to be any sign of a let-up. The prospects, for at least the same number of different models this year as last year are good and in a few isolated instances, where some of the manufacturing organizations are expanding in certain directions where they were not so active last year, the indications are that the number of models in the line will be increased.

This is not such a bad thing at that. The competitive situation existing in radio receiver sales makes it necessary for engineering organizations to employ every artifice to provide performance, therefore preference in sales. This means progress in receiver engineering and wider knowledge and experience in service practice.

Set Sales by Servicemen

IT has been a general opinion for many years that a certain amount of set sales activity can be expected on the part of the radio serviceman. Not the word of mouth recommendation form of selling, but actual sales of receivers. Due to the financial side of the picture such sales, where consummated, were as a rule on what we call midget sets or at least low-priced sets. With servicemen as natural sales outlets of these small receivers, a few receiver manufacturers thought it advisable to utilize the regular parts jobber, catering to the radio servicemen as a set jobber. This year we note the entry of one of the larger receiver manufacturers into this field and it seems logical to say, although we do not speak officially, that before many months pass, one or more other manufacturers will be selling receivers the same way.

This form of receiver distribution seems perfectly in order and places into the hands of the serviceman a very convenient, basically financial, arrangement for securing his receivers to sell to the public. In the past many servicemen wanted to sell radio receivers but could not make the proper financial arrangements with the regular set jobbers. Since time payments have become quite customary between jobber and serviceman for equipment which the serviceman buys for his own use, there certainly can be no objection on the part of the set

jobber, who is stocking radio receivers, to finance his serviceman customers who wish to sell radio receivers.

There is however one possible hitch in this form of set distribution and it lies in the lap of the parts jobber. Will the parts jobber in his effort to move these receivers attract the public to the store and sell direct? It will not mean very much with respect to loss of service work, that is, getting the customer into the store, for it is a well known fact that the public does very little service of its own, but it is apt to influence tube sales, for Mr. John Public can easily assume the role of Mr. Serviceman, and after all is said and done, a sale is a sale. . . . Maybe it's not entirely orthodox, but it's a sale. And then again, the same applies to the sale of the receiver. Maybe John will not get the same discount as Service Mike, but a sale is a sale!

It seems a bit strange, we admit, to place so much stress upon keeping Public out of a jobber's store, but all of us know that it is the best idea. Fortunately, the majority of the parts jobbers do make an effort to protect their servicemen customers so that fears along the lines mentioned need not be overwhelming. . . . It might, however, be borne in mind for future reference.

Be that as it may, it really would be sinful if the serviceman muffed this opportunity of utilizing the parts jobber as his set supply. Maybe the serviceman is not commercial minded; maybe only one out of every five sales talks materialize—but it pays to try. . . . Wotta ya gotta lose?

Meet Punky

YOU'VE got to meet Punky. He is your pet ant. He came back in Janet's duffle bag. She spent the summer up in camp and Punky was in Janet's nature book. . . . Quite an ant. Oxford accent 'n' everything. He parked himself upon the left ribbon spool of our typewriter and eyed us with a critical stare. "Beg your pardon," said Punky, "what are you supposed to be doing?" . . . "What do you mean, what are we supposed to be doing?" we said. "We are writing a monthly column for RADIO NEWS." . . . "Oh, really!" said P., "about what? And incidentally, you do not seem to be much of an expert at operating this machine." . . .

"We are writing about the radio serviceman and the servicing industry," we replied, "and by the way, why don't you go away. You're annoying!" . . . "Piffle," says Punky, "you can't mean that. Why, I'm very, very familiar with the gentlemen who repair radios. As a matter of fact, I have incontrovertible evidence to corroborate my statement and I refuse to have you doubt the veracity of my ut-



John F. Rider

terances. I positively resent it and you might just as well know it now as later, for I expect to spend some time with you."

Not having been subject to a tongue lashing of that character for quite some time, we felt somewhat abashed and hurriedly apologized. Thereupon Punky with the utmost of dignity accepted our apology and continued, "You might be interested to know that I've traveled a bit among these radio repair establishments and as you can readily understand, could not help but overhear some of the comments. These repair gentlemen seem to be irked, and to me it seems rightfully so," he continued, "at the fact that adequate repair facilities do not exist for test equipment. The purveyors, jobbers to you," he injected hurriedly, "do not seem qualified to make repairs and entirely too much time is lost in transporting such inoperative equipment to and from the factory of manufacture. Do you agree?" he demanded.

"Yes, I'm afraid you're right," we said, "but what do you suggest?" . . . "Suggest! Why it's obvious," exclaimed Punky, "the test equipment manufacturers should provide repair facilities in at least the major centers of shopping, or trading areas, as you call them. . . . What made your motor

(Continued on page 47)



"Say, how can I repair this using Signal-tracing if I ain't got a map?"

Communication & Electronic MAINTENANCE

by **W. H. BOHLKE**

Director of Test Equipment Merchandising, R.C.A. Mfg. Co., Camden, N. J.

The first of a series which will show the serviceman how and where to make use of his test equipment to improve his income, and to reduce his overhead.

Part 1.

GENERAL development in the communication field as well as the gradual growth of the use of electronic equipment in industry, during the past few years, has given rise to much thought concerning the possible expansion of servicing activity, at least enlargement of the zone of operation of the average radio service shop in the United States.

It is not idle chatter to say that the radio serviceman has been operating in somewhat of a small world. In fact, the simplest of investigations shows this to be true. Glance back in the files of radio literature—as far back as you wish to go—and you will find that in the vast majority of instances suggestions concerning service activity on the part of the serviceman were along the lines of home or auto radio receivers. Here and there we find some suggestion along sales lines, servicing of home electric appliances, and

the public address field, but with all of these suggestions, a definite tendency to narrow down radio service activity to a certain sphere seems to exist and there is where we feel that the servicing industry is not growing with the art of radio communication and its allied activities.

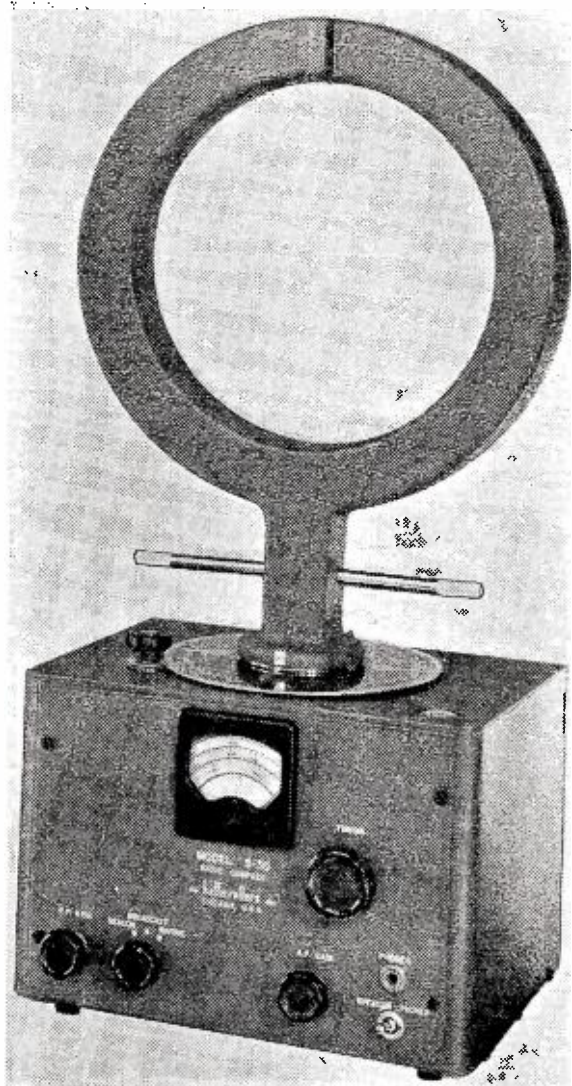
In making this statement we appreciate that some men will be tempted to criticize us on the grounds that the present status of the radio servicing industry may not be sufficiently high to justify such expansion; that sufficient profits are not being generally made; that any concentrated effort to improve conditions in the service industry should be made along existing lines. With that we cannot agree for a number of very sound reasons. First, the personnel of an industry must advance with the industry and such progress is taking place every day. Second—and this is very important—such expansion does not entail unnecessary financial expenditures or any elaborate preparations of any kind. This is so because the well-equipped radio service shop which in the past focused all of its attention upon home and auto radio receivers can with very little additional apparatus embrace virtually all of the other communication fields wherein radio is used. In other words, this shop originally founded and equipped for modern radio receiver servicing is actually a communication system service shop.

Every indication points to the fact that the radio servicing industry does not realize the full significance of communication and electronic maintenance . . . The possible field of activity of a well-equipped service shop is tremendous—if only the individual makes an effort to comprehend what exists and what is in the process of growth. The majority of radio servicemen feel that all the branches of the communication field, except home and auto radio as we understand it today, are beyond their province—that radio communication as employed in other fields is bogged down with so many technicalities and complexities that they cannot hope to derive any income from such fields or even remotely associate themselves with such operations.

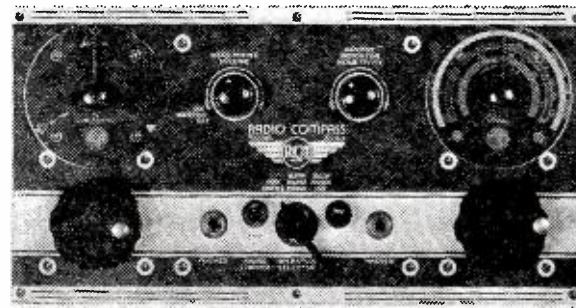
To a certain extent the belief has some foundation, but only a meagre one; for strange as it may seem, service requirements in many branches of radio communication, other than commercial broadcast reception, are very

much like those with which the average radio serviceman is familiar . . . These words, however, are not intended to convey the impression that every radio serviceman is capable of embracing other communication fields—that he is technically equipped—that he has the business-getting ability—that he is of such temperament as to be able to make the desired contacts—that he has the proper equipment in his shop.

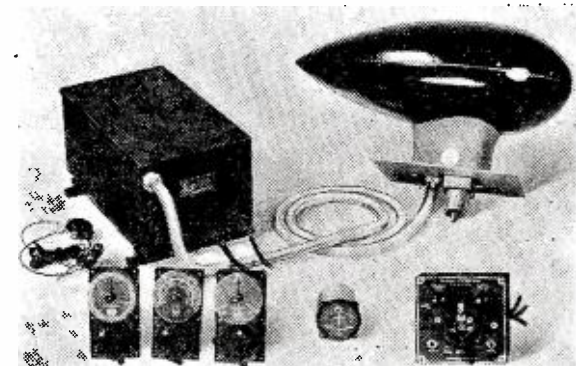
Any one or a number of these limitations might tend to prohibit expansion of the radio service shop into other branches of the communication field, but it is also true that there are many men in this country who are able to fill all of the requisites—if not immediately then by dint of effort in the near future. It is also necessary to realize that the communication field requires men of this calibre because it needs the proper maintenance facilities . . . Perhaps this need is not so tremendous today, but it is growing by leaps and bounds and the wise man is he who looks towards the future and builds the roof over his head before the winds and the rains come. And above all it is important to understand that this idea of expansion does not take the man out of his regular field of duties; it simply makes him spread his operating arms so as to embrace more . . . It does not mean the creation of a service shop which is so spe-



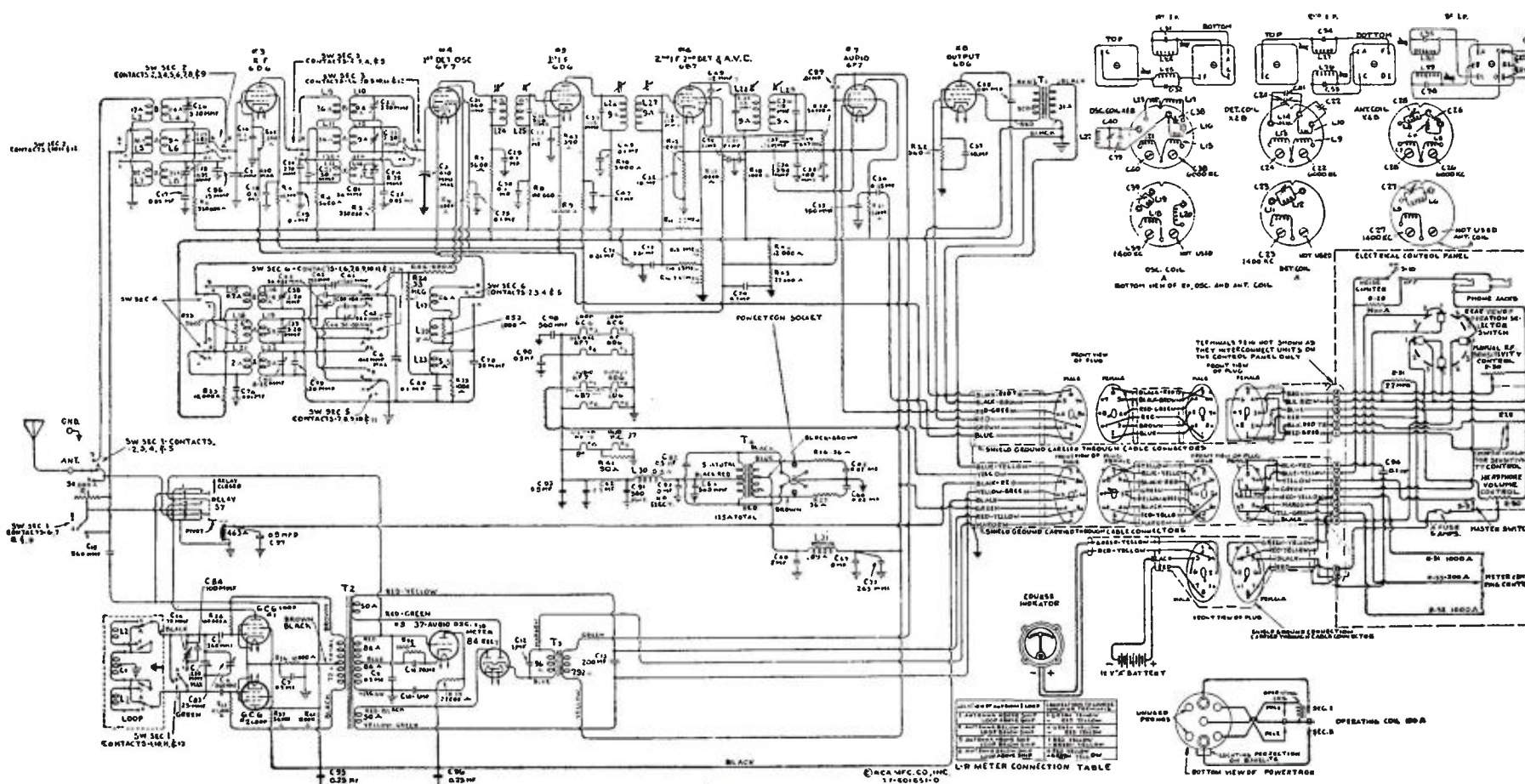
The Hallicrafters S-30 Radiocompass.



Control panel of the RCA AVR-8.



The RCA AVR-8 superhet for airplanes.



Circuit diagram of the RCA AVR-8 superheterodyne receiver. It is used by planes. Figure 1.

cialized in character that unless immediate action is secured outside of the normal radio broadcasting field all work and income ceases. Just the contrary is true; the design of the service shop is such as to embrace as many branches of the electronic art as can be covered by the technical capabilities of the staff. This does not mean that a man becomes a jack of all trades and a master of none, because an analysis of the communication field shows conclusively that many branches are alike in so many respects that there is no reason why one organization should not be able to function in a much broader sense than heretofore with virtually the same equipment as is needed for commercial radio broadcast receiver servicing.

It is our intention in this series of articles to present just such a service shop—a shop founded upon the idea that its technical capabilities are sufficiently broad to encompass all of the branches of the communication field and its allied lines. This means the regular broadcast field, private aircraft radio, private marine radio, police radio in many sections of the country, public address work and electronics in industry.

Many of these fields have been considered taboo by the majority of servicemen. Because of lack of information, it was felt that these fields were so full of complexities and the need for specialization that even the capable, well-equipped serviceman did not have a chance. That is an erroneous thought . . . The well-equipped service shop—the capable serviceman does have a chance and a good chance, for he is the logical individual to do the work. In fact, if a substantial number of radio service shops appear across the face of a nation, broad of experience—capable of rendering service in the fields mentioned—they will be welcomed by the manufacturers of apparatus . . . And once more we cannot help but return to the same fundamental thought—these men are needed

more and more each day because of the increased growth of private flying, marine radio, public-address operation and electronics in industry.

Take, as an example, private aircraft radio. Although the details to be given in this, the first article, are not as complete as the information we have on hand, it will nevertheless suffice to show that this branch of communication is within the province of the capable radio serviceman. So as to avoid confusion we will dismiss commercial air-transport radio with the statement that servicing of these receivers by individual radio servicemen is out of the question, because each airline maintains its own service organization. But in the case of the radio equipment designed for private flying, the good radio serviceman is the logical man for the job.

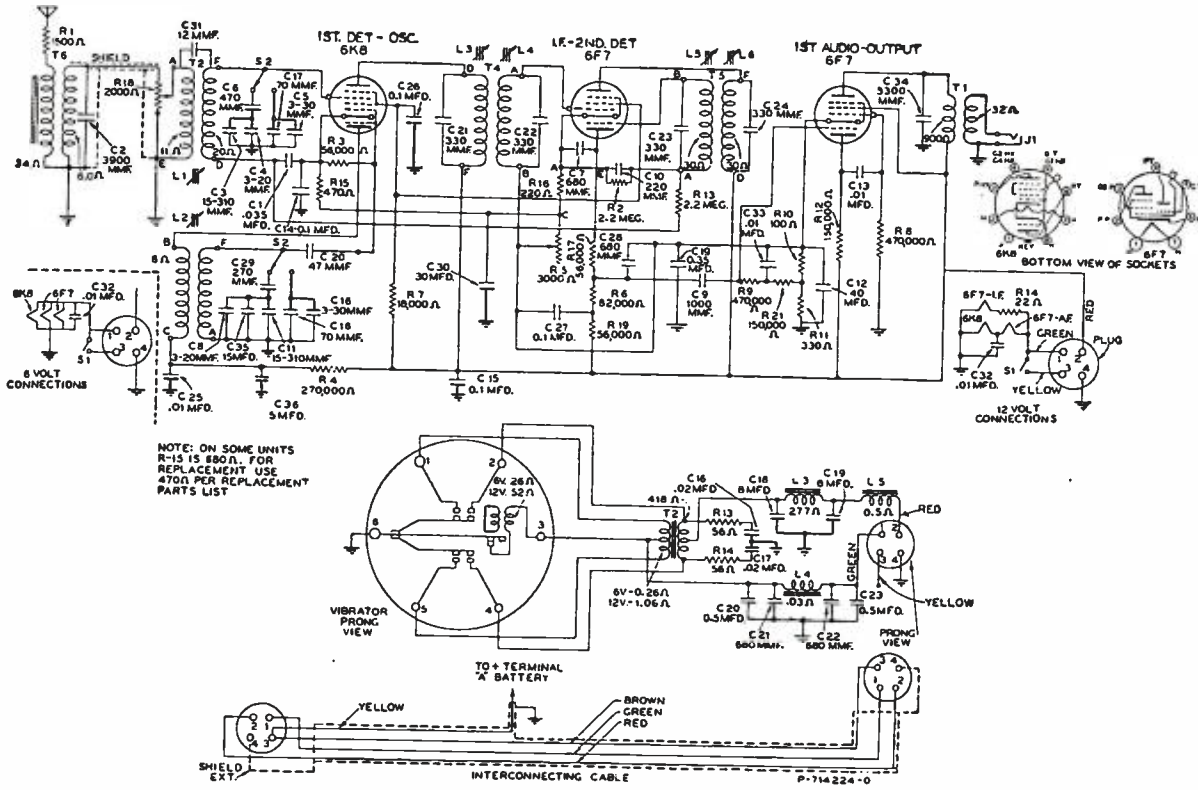
The private flier travels over whatever route he desires—sometimes he flies the beam and in the majority of instances does not. In fact, because of the numerous times when his trips call for flights out of the zone of the beam, radio equipment manufacturers have developed radio apparatus of such character as to permit accurate navigation on such flights. Today the radio repair facilities are pretty meager, usually only found at the larger airports, but how about these private flights which are made between small airports? Never knowing when weather conditions will change unexpectedly, no sensible private flier travels without his radio equipment in good working order . . . Does it seem illogical to say that radio repair facilities should be available in every town where a landing field exists?

Radio equipment is essential to the private flier and while he has a choice of one-way or two-way systems today, there is every likelihood that before much time elapses every private plane will require two-way radio communication. Considering the tremendous strides being made in private flying, the effort to train many tens of thou-

sands of pilots, which no doubt will result in the sale of many thousands of planes, we can say without fear of contradiction that while somewhat limited today, the future will witness many tens of thousands of radio systems in private planes and there is no reason why a competent radio service shop, properly equipped for radio receiver servicing, should not be in a position to service these aircraft radio systems. Such a shop will eventually appear in every town where a private landing field exists, or one such shop might serve a number of towns within a radius of perhaps fifty miles.

Perhaps some of the men who read these lines already have thought about the servicing of private aircraft radio but have discounted the possibility of successful operation on the grounds that the equipment is special in nature, highly intricate and different from that found in the home radio field . . . It is true that the equipment is special in nature, but only from the viewpoint of physical construction. It is also true that a two-way system incorporates a transmitter, a radio system with which the average serviceman is not generally familiar, but the assimilation of knowledge concerning the operation of a comparatively low-powered transmitter is not replete with so many obstacles as to make successful servicing a feat of legerdemain.

As to the receiver, while it may be known by many peculiar names associated with direction finding, weather reports and beam flying, it still remains a receiver. Strange as it may seem these receivers may even be simpler in circuit structure than many of the large commercial home receivers, because of the effort to ensure maximum reliability of operation. Naturally such an aircraft installation is different from a home installation, but even that is not a major problem. We live and learn and if we can learn the details associated with car radio installation, those facts required to do a good aircraft installation also can be



Circuit diagram of the RCA AVR-15 Aircraft Receiver. Figure 2.



Front view of the RCA AVR-15.

learned. Anything associated with the installation and operation of the system can be learned!

These aircraft receivers are invariably of the superheterodyne variety and are classified in accordance with the service they are called upon to render. One group is intended for use on the weather station bands and for receiving beacon signals. For example a typical radio beacon and weather broadcast receiver is shown in Fig. 1. If you examine this receiver schematic you will find that it is not very much different in circuit structure from many of the receivers which come into the average radio shop, so that it is entirely within reason to say that such equipment comes within the capabilities of the good radio serviceman operating in a well-equipped shop. There is nothing in this receiver which represents new theory, and while this is the product of RCA, other receivers of other aircraft radio manufacturers are of the same character.

The second classification of aircraft receivers (generally known as communication receivers) utilized for private planes are of like simple nature, although it is true that some of these

receivers are of the three-band variety so as to embrace the weather, beacon and general communication frequencies and are also equipped for compass flying. Some of these compass receivers are novel in design in that they are arranged to be utilized in conjunction with regular broadcast transmission. The idea is that the pilot sets his compass antenna towards a known broadcast station and simply rides the wave towards the transmitter, thus finding his way home. A general idea of a three-band aircraft receiver can be had from Fig. 2. This will suffice to show that the schematic design of these receivers is very much like that of a good multi-waveband home broadcast receiver. . . . It is our intention later in this series to consider various types of these receivers, operating frequencies, and operation in general, at greater length in conjunction with the formation of our ideal communication system service shop and the application of these service units to these receivers.

As is evident in these illustrations the receivers are battery operated, that is the storage battery on the plane is the primary source of power

supply, but this is nothing unusual in the life of a radio serviceman. Millions of auto radio receivers have been in use and servicemen have secured much experience on vibrator-type power supplies.

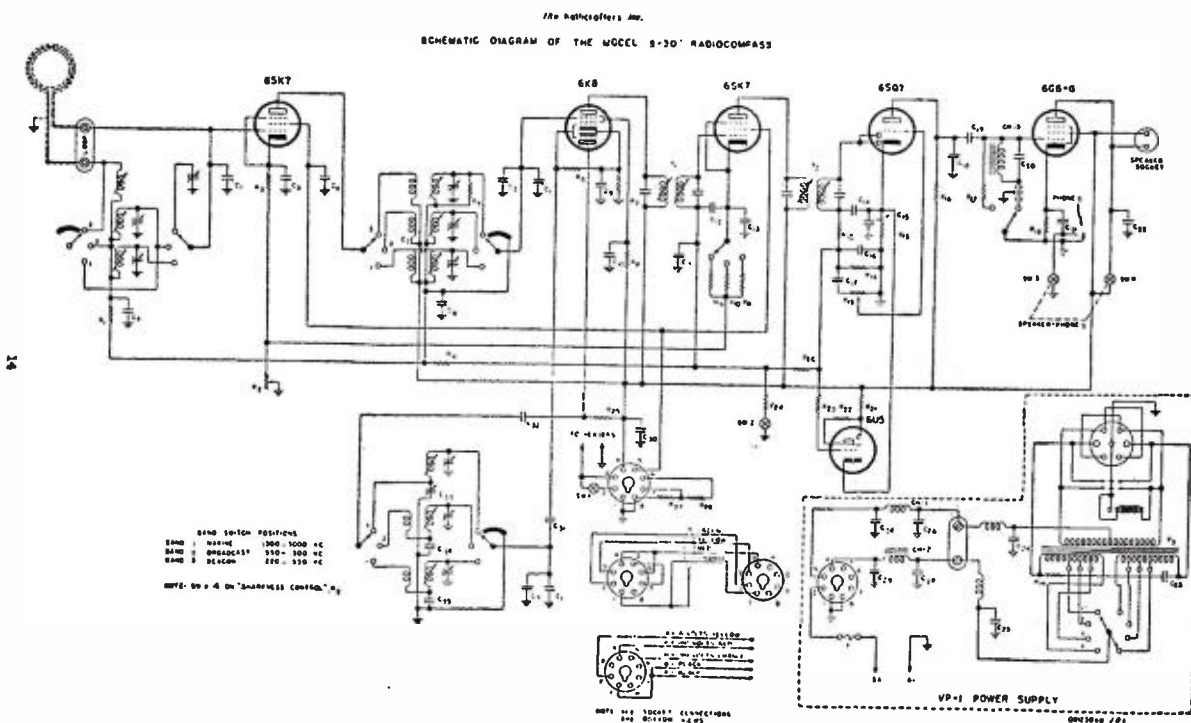
Of course, a great deal of the success in operating upon such receivers depends upon the individual who is doing the maintenance. One cannot just step into a new field by merely walking into an airfield office and soliciting business or advising an aircraft receiver manufacturer that servicing facilities are available in such and such a town. It is imperative to know the requirements of such equipment—what such receivers do—how they operate. . . .

The repair of such private aircraft receivers is not abundant today, as you can well understand. . . . It does however exist—and will grow and all of us must build for the future. . . . We must study—we must make it our business to learn! It might appear as if such expansion calls for the burning of much midnight oil. . . . That's right, it does, but that is nothing unusual in any field. . . . Study is something that can never cease, no matter who the individual, providing that his occupation is such that it is continually in a state of flux and developing. . . . Such is radio!

The shop that handles such aircraft radio receivers in addition to regular home broadcast receivers must be capable of establishing definite standards of reliability, but that is nothing new. Such standards have been the keynote of success in the present service shops and if improved for aircraft receivers by the acquisition of reliable test equipment cannot help but reflect advantageously upon the normal routine home radio operations. The deficiencies in home radio receiver servicing which might be tolerated, for all that it can mean is a return call, cannot be permitted in aircraft receiver servicing. The lives of the passengers in the plane are at stake. As close an approach as possible to faultless operation is imperative.

As to the transmitters used in two-way private aircraft radio equipment, we will discuss them later in this series and for the present we will conclude the subject of aircraft equipment.

Let us now consider the second division in this expansion program, namely private marine radio. This is of interest for as we have stated it is our belief that it represents a source of future income for many radio servicemen. Unlike private aircraft radio, private marine radio is subject to two



Circuit diagram of the Hallicrafter's S-30 Radiocompass Receiver. Figure 3.

AVIATION RADIO

by CHARLES J. SCHAUERS

limiting agencies, namely the seasons and also location. Both of these can easily be understood, for private marine radio flourishes during the late spring, throughout the summer and the early fall months, that is, during the months when boating is popular. As to location, this is important for only those areas embracing boating are generally located upon the sea-coast and upon the Great Lakes. However, despite the limitation of seasons and location, private marine radio is of importance to very many servicemen. The United States has a very long coast line and quite a few large cities are located upon the Eastern, Western and Southern coasts. Further quite a few large cities are located upon the Great Lakes.

The registry of pleasure boats suitable for private radio compass installations is sufficiently high to justify not only investigation but also actual effort to secure such business. There was a time in the past when just a few isolated cases of radio compass installations were heard of, but today many such installations are being effected and if we realize that this radio communication service shop can take these installations and repair in stride, the field certainly deserves marked attention.

Included in these pleasure boat listings are all those small cruisers which are used for deep sea fishing along the Pacific, Atlantic and Gulf coasts. The last two years has witnessed much activity in the installation of ship-to-ship and ship-to-shore radiophone installations upon these boats. Since fishing for tuna, marlin, sword fish and sailfish calls for extensive trips out into the ocean, out of sight of land, weather reports and compass bearings are vital to the safety of those on board. Ship-to-ship communication is important between boats which comprise the fleets from certain cities. It is important when such ships work together for the common good of the fleet operating out of a town that the captains know the location of fish schools. In fact that is a vital function of such ship-to-ship radio. The captains operating from one fishing town plot a certain area of the ocean, or at least their general fishing grounds, and when one captain runs into a school of fish he advises the rest in a special code, thereby keeping the information secret from the captains of other fishing boats operating out of other towns.

It might seem at first thought that both installation and maintenance of such private marine radio equipment inclusive of radio compass apparatus is quite complicated, but once more without in any way belittling the importance of the apparatus, we say with all confidence in the accuracy of our words that any competent service man who puts his mind to the work can learn the requirements of such direction finding equipment and do a really good service job.

In a way, the equipment is very much like that used for radio compass work on private aircraft and since the similarity of such apparatus and regular home broadcast receivers has been discussed earlier in this article, further elaboration is not necessary. Of course the installation of such equipment upon a boat requires that certain special tests be made in order

(Continued on page 56)

CONTACT! Switch on!

This month, RADIO NEWS instigates a new column on aviation radio, thereby adding to the wealth of useful information that has always been found in its pages every month.

This column, with the assured cooperation of aviation radio equipment manufacturers, will supply the latest information to the readers every month on every phase of the aviation radio industry; and will present timely "spot news" gleaned from the most reliable sources. It will also present, from time to time, information pertinent to the installation; maintenance; design; operation; and sales of aviation radio equipment; both aircraft and ground aviation communications equipment.

It is sincerely hoped that the readers will take advantage of the service offered by this new column and they are cordially invited to send in questions concerning any phase of the aviation radio industry.

Those questions which are of general interest will be answered in the column, and those questions coming from readers who desire personal replies should be accompanied with a stamped, self-addressed envelope.

It is readily realized that the 'new,' ever expanding industry, the aviation radio industry, offers many opportunities to the radiomen who have been trained; and now, with defense preparations going into full operation, these opportunities are more apparent than ever before.

THE Douglas Aircraft Corporation of Santa Monica, California, will soon need more trained men.

Due to the expansion necessary for the accommodation of new orders placed by the government and civilian aviation firms, nearly every aircraft concern is taking immediate steps for adding additional space and equipment for the installation of accessory equipment.

Many radiomen who do not find their present positions offering security and advancement should contact personnel managers of the various aviation concerns and place their applications for future consideration.

Aircraft manufacturers are always interested in obtaining trained men, and those possessing the qualifications necessary should have no trouble in obtaining employment after the gigantic expansion is completed.

Our aviation radio manufacturers are also taking measures to insure no leakage of information pertinent to sets that they are manufacturing for government utilization.

We are more concerned in this column with the radio equipment aspects of our aviation industry, but after all is said and done, our manufactured aircraft do have a direct bearing on the consequent design of our radio equipment. One has a direct relation to the other.

With the advent of new types of military as well as civilian aircraft, the aviation radio industry has taken many progressive steps forward, and this progress is also very evident by the many new appearances of better designed equipment.

The Harvey Radio Laboratories, Inc., of Cambridge, Massachusetts, give us information this month on one of their new aircraft radio receiver-transmitter combinations which they call the "IMP."

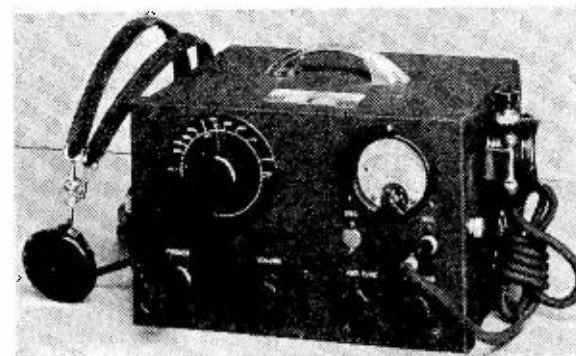
This little unit is highly recommended for small aircraft, and for those who desire

something in the way of fool-proof installation and operation.

The weight of the entire unit is 13 pounds, including batteries and microphone, and is 8 inches wide, 7½ inches deep, and 5¼ inches high.

The unit utilizes nine tubes; four being used in the transmitter and five in the receiver.

The current drain for the entire unit is very low, because it uses 1G4G, 1G6G, 1C5G,



and 1T4 as receiving tubes.

A superheterodyne receiver is used in conjunction with a crystal controlled transmitter which has about a fifteen mile range and more than ½ watt output with a frequency coverage of from 3,000 to 5,00 kilocycles.

LARRY KIEL of the Aviation Sales Department of the American Phenolic Corporation says, "too much emphasis cannot be laid on the insistence of quality component parts, which will withstand the vibration encountered in aircraft." We agree with him, and add, that during the past five years a noticeable trend toward supplying the aviation radio equipment manufacturing concerns with high standard quality parts by component parts manufacturers has been fully realized by those engaged in the maintenance and installation of equipment.

Vibration as encountered in aircraft has a very undesirable effect upon tubes, plug and socket connections, radio receiver frequency adjustments, and the many delicate parts which must be utilized in modern equipment.

Even though shock absorbers are provided with nearly all equipment, there still remains an immense amount of vibration which is inherently detrimental.

"Pre-flight" inspections of the radio equipment installed, and associated electrical equipment, accompanied by a visual inspection of manual parts which are subject to vibration should be made, and too much stress cannot be laid upon the tightness of connections, clamps, bonding connections, and terminals.

Commercial Engineer for RCA's Aviation Radio Sales Department, DeVer K. Warner, tells me that, "the selection and installation of proper antennae for various types of aircraft radio reception is an important topic."

HOW possible is it for radio manufacturers to manufacture aircraft radio equipment on a mass production basis in case war were declared tomorrow? This is, and has been a topic of discussion between aviation radio men for the past few months.

It is well known that the receivers and transmitters as used in aircraft have to be designed from so many "safety" standpoints that the actual design of equipment would take quite sometime—but—a word from one

(Continued on page 62)



The "Beer Mug" which uses an acorn tube in the transmitting position. It did 38 miles dx.



The "High-power Baby" using an HY75 transmitting tube in the receiving position with considerable success. It is AC powered.

"BEER MUG" & POWER TRANSCEIVER: 112 MC

by **OLIVER READ, W9ETI**
Technical Editor, RADIO NEWS

Two and a Half meters makes strange sets. First we used an acorn tube as a transmitter and then we turned to a high powered triode for receiving. Both worked well.

SOME months ago, several entirely different models of 112 mc. transceivers were constructed in an effort to find one most suitable for general communications with a compact unit that would include as many features as possible in an inexpensive rig. The two models chosen from the group are illustrated, together with schematic diagrams for both. One is operated entirely from a 115 volt-60 cycle line, while the other operates from self-contained batteries.

A unique feature of the a.c. operated model is the use of a transmitting tube of considerable power capabilities in both the "transmit" and "receive" positions. With this combination a strong carrier is effected at an increase in general efficiency. Both of the transceivers have undergone the

"acid test" in the field. The "beer mug" unit has performed successfully from a glider in flight at altitudes up to better than 7,000 feet—and its signals were copied clearly 37 miles distant by a casual listener.

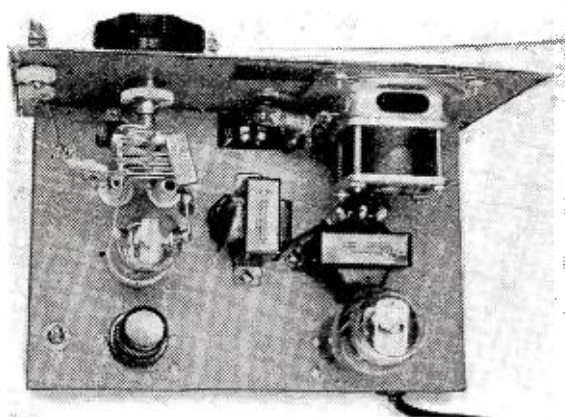
In order not to confuse the reader, we will discuss each transceiver as a separate unit. The circuits are very much the same in fundamental design and in general layout. The principal difference lies in the power rating between units. In each case, tubes were chosen for maximum high-frequency performance in the oscillator section. The modulators were selected for most economical operation at the plate voltage available.

Both units are designed for single-button microphone input as they had been found to be most suitable for this

type of work, besides being inexpensive. Microphones are available that are especially designed for close-talking. These are recommended wherever the transceiver is to be operated in a moving vehicle such as an automobile, airplane, glider or boat. Much background noise can be eliminated and the general results will be more satisfactory.

AC Operated 112 MC Transceiver

The complete transceiver for operation in the 112 mc. band from the a.c. mains uses an HY75 oscillator, a RCA 6J5 audio amplifier, and a 6V6G modulator—or power amplifier. Loudspeaker operation is furnished with a self-contained unit on the chassis. Any small p.m. speaker may be used. The one illustrated is a Utah 3P. More than sufficient volume is fur-



Topside view of the power unit.

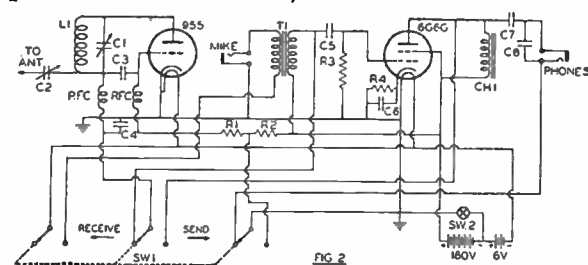
nished by the 6V6G on the weakest signal.

In the "transmit" position the HY75 is a powerful plate-modulated oscillator, capable of putting out a signal that will override the super-regen hiss on a receiver of that type, should one be in use at the receiving end. There is nothing particularly complicated about the switching method used to transfer from "transmit" to "receive." In the former position, the following connections are made: The audio from the 6V6G modulator is transferred to the plate circuit of the HY75 where modulation of the tube can be accomplished at medium-level. Too much audio will cause a wide variation in output frequency and is to be avoided.

The second switch section places the microphone into the circuit and supplies current for its operation. Note that in the "receive" position that all voltage is removed from the microphone. The third switch section is used to change the value of the grid resistor to the correct point for maximum performance and output when the tube is used as an oscillator. Likewise—the opposite is true when the rig is in the "receive" position. The grid resistance is increased to a satisfactory value for reception.

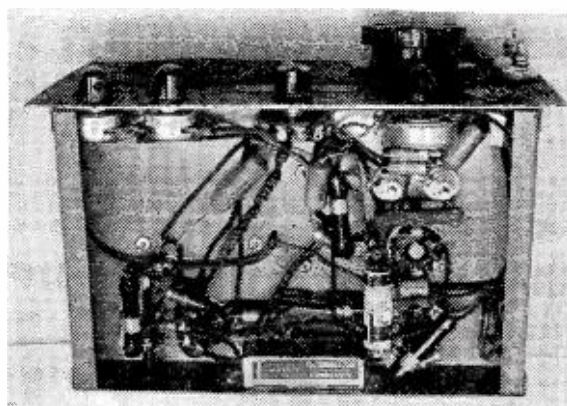
The fourth section on the switch is optional and serves only to limit the amount of audio gain when the set is being operated as a transmitter. In other words—the volume is preset in the "receive" position so that control of the R8 potentiometer need not be changed for each standby.

The input transceiver transformer is a Thordarson T-72A59. Two separate primaries are used; one for the micro-



The "Beer Mug" Transceiver.

- C₁—10 mmfd. midget condenser. Cardwell
- C₂—3-15 mmfd. ceramic padder. Meissner
- C₃—.00025 mf. ultra-midget mica. Sprague
- C₄—.006 mf. mica. Sprague
- C₅—.1 mf. 400 v. paper. Sprague
- C₆—10 mf. 50 v. electro. Sprague
- C₇—.5 mf. 400 v. paper. Aerovox
- C₈—.01 mf. 200 v. paper. Aerovox
- R₁—5,000 ohms, 10 w. Mallory
- R₂—500,000 ohms, 1 w. Aerovox
- R₃—100,000 ohms, 1 w. Aerovox
- R₄—500 ohms, 2 w. Aerovox
- T₁—Ouncer type Mike-to-Grid. UTC A-10
- CH₁—30 hy. 75 MA choke. Thordarson
- SW₁—3 pole-double throw rotary. Mallory
- SW₂—SPST Toggle switch. Arrow
- A Battery—Burgess. F4PIX
- B Batteries—Burgess Z3ON (4 required)
- N—neplates—Crowe. Dial—Crowe
- RFC—Ohmite 5 meter RF choke
- L₁—3-4 turns No. 14 wire, 1/2" Diam.



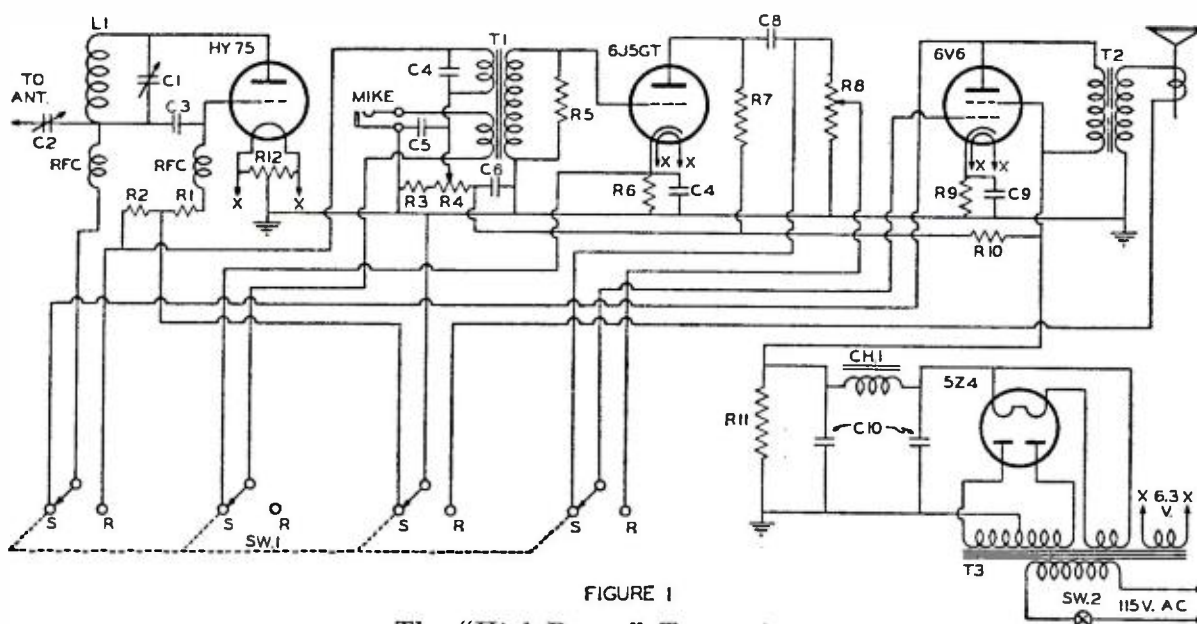
Under chassis view of the power unit.

phone, and another for the plate circuit when the HY75 is operating as a super-regen detector. A resistor is shunted across the secondary of T1 to stabilize the grid circuit and improves the performance. Note that the current for the microphone is taken from the cathode of the 6J5GT in order to eliminate a battery supply. No hum is developed in the primary, nor is any feed-back introduced into the circuit to cause any difficulty.

Regeneration is controlled by the potentiometer R4, placed in the primary plate circuit of the detector. R3 is used to limit the range of the control. Adequate bypassing is used throughout the transceiver and in all cases these condensers are located as close to the socket terminals as possible.

The most important condenser in the entire setup is the C3 grid condenser. This must be small physically and be able to withstand more than the full plate voltage from the power supply. One of the new *silvered-mica* condensers is well suited for this application and is recommended.

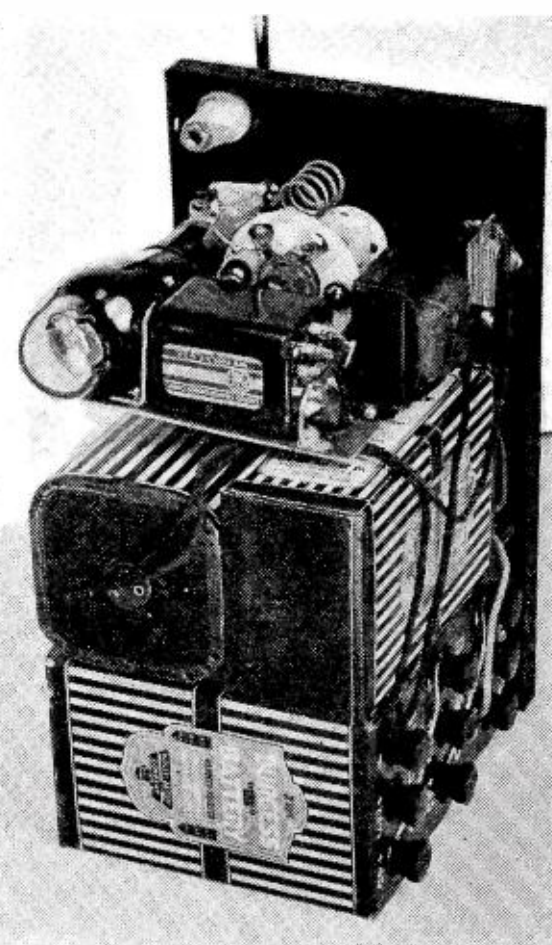
The *Ohmite* high-frequency radio-frequency chokes are designed for 5 meters, but may be used at 112 mc. with equal effectiveness. The tuning condenser is a *Cardwell Trim-Aire*, and may be mounted with the brackets furnished or by any of several ways.



The "High-Power" Transceiver.

- C₁—5 mmfd. midget tuning cond. Cardwell
- C₂—15 mmfd. ceramic padder. Meissner
- C₃—.0001 mf. Silver-mica. Sprague
- C₄—.01 mf. mica. Sprague
- C₅—.25 mf. 200 v. paper. Aerovox
- C₆—8 mf. 250 v. electro. Mallory
- C₇—10 mf. 50 v. electro. Mallory
- C₈—.04 mf. paper. Sprague
- C₉—10 mf. 50 v. electro. Mallory
- C₁₀—8 mfd. 450 v. electro. Mallory
- R₁—7500 ohms, 10 w. Mallory
- R₂—1 megohm, 1 w. IRC
- R₃—150,000 ohms, 1 w. IRC
- R₄—50,000 ohms pot. Mallory
- R₅—100,000 ohms, 1 w. IRC

- R₆—1,000 ohms, 1 w. IRC
- R₇—100,000 ohms, 1 w. IRC
- R₈—100,000 ohms. pot. Mallory
- R₉—500 ohms, 10 w. IRC
- R₁₀—8,000 ohms, 10 w. Mallory
- R₁₁—50,000 ohms, 100 w. Mallory
- R₁₂—100 ohms, center-tap
- T₁—Transceiver Trans. Thordarson—T-72A59
- T₂—Pentode Output-Voice Coil. Thordarson
- T₃—Plate and Fil. Trans. Thordarson T13R14
- SW₁—4 pole—2 position rotary. Mallory
- SW₂—SPST Toggle switch
- Speaker—Utah 3P 3" PM speaker
- RFC—Ohmite 5 meter chokes
- L₁—4 t. No. 14 wire, 1/2" diam.



Rear view of the "Beer Mug." The case fits over the entire works.

The shaft is cut off close to the mounting shank and a flexible coupling attached. This coupling is most important and must be used in order to eliminate any body capacity.

The coil is self-supporting and consists of 4 turns of No. 12 or 14 wire—1/2" in dia. Turns are spaced so that the overall length will be about 1". After the transceiver is operating, these turns are spread apart or pinched together so that the band will be covered completely within the range of the tuning condenser.

An ordinary bakelite socket is used—as the grid and plate connections are both made to the top of the tube en-

velope. The output choke is mounted directly back of the speaker and in front of the modulator. A pilot lamp is included to indicate when the power supply is in operation. An extra control may be seen in the illustration. We intend to add a tone control to offset some of the hiss found in this type of equipment.

The condenser C2 must be adjusted carefully in order to achieve maximum performance. This is set when the transceiver is operating in the "receive" position. Coupling may be varied so that the greatest capacity possible may be used and still have the set super-regenerate over the entire band. The loading in the "transmit" position will be entirely satisfactory when the condenser is set as recommended.

The a.c. power supply is purely conventional and needs no explanation. The rectifier tube is a 5Z4. This was chosen to cut down on the overall physical height of the power supply chassis as that tube is quite a bit smaller than the glass type 80. A center-tap resistor is used in preference to the tap on the filament winding as the two units are in separate compartments.

Unfortunately—this type of transceiver, like the ones commercially available, have a characteristic that is rather annoying when two receivers are operating in close proximity to one another. They transmit "birdies" to form interference when in the "receive" position. This is seldom confronted however and should not be of any great concern. The chassis and cabinet may be any suitable dimensions that will allow plenty of room without crowding of parts. The antenna is a 46" steel rod.

Battery Operated 112MC. Compact Transceiver

This little rig is very simple to construct and will appeal to those who wish an ultra-compact transceiver that may be easily carried about like a "talkie-walkie" as used in the U. S. Army. It is capable of high performance and possesses excellent tone quality for a unit of this type. The one illustrated was recently used at the Third National Soaring Contest held at the Lewis School of Aeronautics at Lockport, Ill. It was placed into a glider and used for two-way communication with the ground station, where it was also heard by the audience over a P.A. system. The quality was considerably better than most of the commercially built transceivers available.

The circuit is a simplified version of the a.c. operated unit described above. An RCA 955 triode is used as a super-regen detector, or (believe it or not), as a *plate-modulated oscillator*. This tube is of the "Acorn" variety having extremely short connections to the elements. A special socket is used to further simplify the layout.

Only two tubes are required, the 955 triode and the 6G6G pentode. These tubes are of the heater type and operate directly from a six volt miniature battery. Microphone current is supplied from the same source when the selector switch is placed in the "transmit" position.

The cabinet measures 6"x6"x10" and an ornamental handle is attached to one end by machine screws. A piece

(Continued on page 56)



Announcements

AS of August 22, 1940 the firm of *Doolittle & Falkner, Inc.*, of Chicago, has been renamed, *Doolittle Radio Inc.* There has been no change in policy, procedure nor personnel.

THE Hollywood Transformer Company, Hollywood, Calif., has just released several catalog sheets describing tapped equalizer inductors, input transformers, and similar items. The sheet is yours for the asking. Address, Norman B. Neely, 5334 Hollywood Blvd., Hollywood, Calif.

NORMAN B. NEELY, West Coast manufacturers' representative specializing in technical equipment announces the addition to his technical staff of Tom Bissett. Mr. Bissett formerly operated his own radio service and sound equipment business as a part time venture while attending college.

Broadcast Radio Equipment

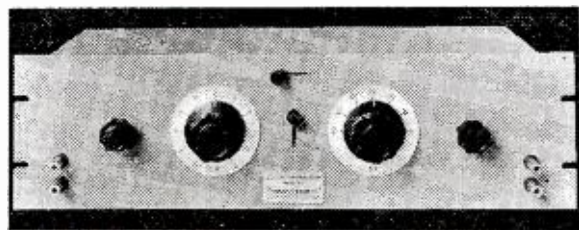
THE Hewlett-Packard Company of Palo Alto, California, has just released their 320A Distortion Measuring Set. This unit was designed to meet the demand for a reasonably priced item to allow radio stations, laboratories, public address operators and maintenance men to make distortion measurements quickly and easily. The 320A may be used with any signal generator and oscilloscope to give distortion readings at two different frequencies.

Frequency Range: The instrument is designed for measurements at 400 or 5000 cps. Filters for other frequencies can be supplied on special order.

Input Impedance: The input impedance is at least 20,000 ohms. A bridging transformer may be used to increase the input impedance.

Distortion Range: The filter circuits will provide more than 60 db of attenuation of the fundamental. Distortion values as low as 0.1% of the fundamental may be measured with a detector of sufficient sensitivity.

Detector Sensitivity: The sensitivity of the instrument is determined by the detector. The



detector should give a readable indication on 0.1% of the fundamental if harmonics of 0.1% are to be measured. The detector need not be calibrated because it is used for comparison only. The usual oscilloscope with a one stage amplifier is sufficiently sensitive to measure 0.3% of a 30 volt fundamental. For proper operation of the instrument the input impedance of the detector must be 100,000 ohms or greater. An amplifier may be used between the instrument and the detector to increase the sensitivity. The only requirements on such an amplifier are that it must pass the highest harmonic which is of interest and that it have a high impedance input. It need not be free from distortion otherwise.

Mounting: The Model 320A is mounted in an attractive oak cabinet with the panel finished in wrinkle grey. The Model 320AR fits the standard 19" relay rack with 3/4" spacing. The panel is finished in wrinkle grey with machine engraved designations.

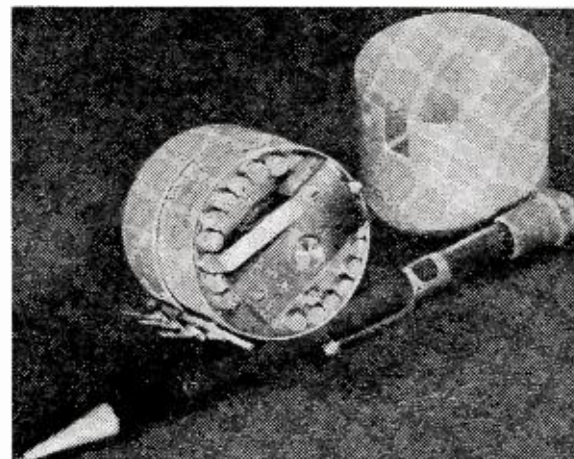
THE Cinema Engineering Company of Burbank, California, has just announced their Model 1658 attenuator. This unit, although in the lower price brackets, has 2% wire wound resistors, reamed sleeve bearing and ground shaft and precision surfaced contact points embodying the same precision and careful workmanship found in the higher-priced C-E controls. The 1658 control is available as a 20 step ladder attenuator to all standard specifications. A similar unit is also available in a potentiometer control.

The brush construction on *Cinema Engineering* attenuators is especially worthy of mention as careful design of the contact springs is an important contributing factor to the superiority and long, trouble-free life of these units. The three laminations are of spring brass with an unusually high degree of resiliency. Springs are individually formed and carefully checked before assembly.

All brushes have square corners rather than the usual rounded corners. This construction, although more expensive and difficult to as-

semble, assures lower contact point resistance and better alignment of the brush contact surface with the points. Properly aligned square brush faces provide extremely smooth action, eliminating the tendency to click between contact points. Brushes are carefully lapped-in before delivery to assure full and even contact pressure. There is actually 1/2 lb. pressure at the contact point of each brush to assure firm contact and good cleaning action.

Contact points are precision ground to flat surfaces after all other assembly operations are complete. Extensive research and long experi-



ence in the design and manufacture of precision attenuators indicates that polished contact points are not conducive to the most satisfactory and dependable operation. Precision design and assembly of the brushes, full sleeve bearing, ground shaft, and precision grinding of the contact points make it unnecessary to polish or round off contact points or the brush contact surfaces to secure reasonably smooth rotation.

A NEW line of speech input equipment, custom-built to meet the individual needs of broadcasting stations or motion picture studios, regardless of size or operating requirements, has been announced by the *Western Electric Company*. According to F. R. Lack, manager of the Company's Specialty Products Division, the new equipment achieves this flexibility of function by employing the principle of unit construction in both its electrical and mechanical aspects.

The new system begins with a simple table that provides housing for pre-amplifiers and supports an inclined control panel on the rear of its top surface. Where space is limited or where the main amplifiers are installed remotely, this



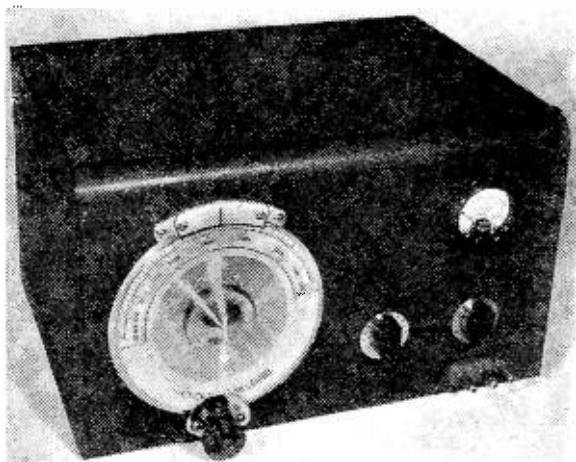
basic unit answers, efficiently, every speech input need. As studio requirements grow in complexity, the table may be flanked on either end by a dust-proof cabinet of the pedestal type. Each of the pedestals, in turn, is designed to act as a support for an electrical transcription turntable. Thus a single centralized unit embracing any combination of standard *Western Electric* apparatus; from a simple channel to an elaborate control system, such as demanded by FM broadcasting plants of the highest quality, may be readily assembled on a "custom built" basis.

Aircraft Radio

A MULTI-CHANNEL radio telephone for aircraft, which provides for dial-switch selection of any one of ten pre-tuned frequencies, has been announced by the *Western Electric Company*. The new apparatus was designed primarily for use by airlines and private planes. To meet the need arising out of the long-range operation of modern airliners, the new transmitter develops more than twice the power of conventional equipment.

(Continued on page 50)

Build Your Own AUDIO OSCILLATOR



by **RUFUS P. TURNER, W1AY**

Cambridge, Massachusetts

In this concluding article the author intimately describes the construction and advises how the unit is calibrated.

Part 2. Conclusion

LAST month the complete Oscillator was described, together with general operating procedure and tuning.

How the foregoing principles are applied to the writer's version of the beat frequency oscillator is best revealed by a detailed description of the instrument and reference to the schematic, the layout drawings, and photographs of the completed instrument.

The fixed oscillator is operated on 350 kc. in the arrangement used here, while the variable one is tuned from 350 kc. down to 335 kc. to provide audio-frequency coverage from 0 to 15,000 cycles.

It may seem odd to tune in this direction, it being customary to think of the variable oscillator as being tuned from the fixed oscillator frequency *up*, rather than down. But that is readily understood when it is learned that our special tuning condenser, C9 in Figure 5, has its slowest capacitance change when the rotors are being turned in from *minimum* (high-frequency setting). And since it is in the lower region of the frequency scale where this very slow change is required, the *minimum* capacitance, rather than maximum, must be used as the starting point.

The two oscillators are inductively coupled to a balanced demodulator employing two 6L7 tubes. Mixing is electronic, the signal from the variable oscillator reaching the No. 1 grids of the 6L7's 180 degrees out of phase through the center-tapped coupling coil, L4, while the fixed oscillator output is applied to the No. 3 grids in phase by the coupling coil L3.

A 1000-ohm potentiometer, R9, permits adjustment of the fixed oscillator output amplitude to establish the proper ratio of fixed and variable oscillator voltages reaching the demodulator. Once set for minimum distortion, this potentiometer will generally require no readjustment unless it has accidentally been disturbed or the r.f. voltage applied to the No. 3 grids becomes reduced as a result of aging in

the fixed oscillator tube or components.

The demodulator is resistance-capacitance-coupled to the push-pull audio output stage. A prototype r.f. filter (C18-RFC-C19 and C20-RFC-C21) is inserted between each 6L7 plate and 6C5 grid to prevent any r.f. voltage which might have passed through the demodulator stage from reaching the a.f. grids and causing distortion. These filters are individually shielded and mounted above chassis. Their round shield cans may be seen near the right-hand end of the chassis in Figure 2.

The output of the instrument is controlled by means of the dual, ganged potentiometer, R15, which allows simultaneous adjustment of the a.f. voltage amplitude at each amplifier grid.

A rectifier-type a.c. voltmeter is permanently connected across the output winding of the special transformer, T1, to indicate zero beat when the dial is being set to zero and to show output voltage amplitude at all other times.

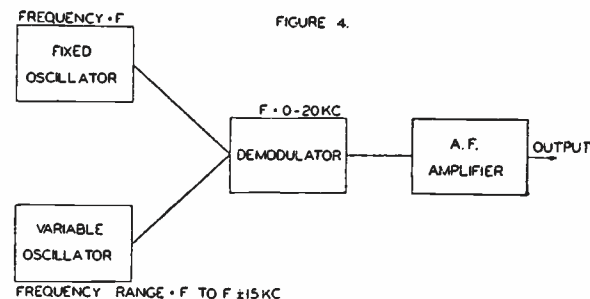
The Special Oscillator Circuits

At first glance, because of the cathode-tapped coil, the circuit employed in the fixed and variable oscillators (see Figure 5) appears to be electron coupled. But on closer inspection, it will be observed that energy is taken from the tank coil by inductive coupling instead. Electron coupling, while very desirable for reasons of stability, is not used here because of its pronounced ability to transmit harmonics. The circuit is made equally as stable as an electron-coupled system by automatically regulating the B-plus voltage, obtaining screen voltage with a voltage divider, use of the 6SK7 tube, and employment of high-grade air-tuned and silvered mica condensers in the tuned circuits. The writer was surprised to find the circuit so stable that while listening to its signal output on a c.w. receiver, the 6SK7 tube could be hammered to the point of breaking the tube without so much as disturbing the frequency!

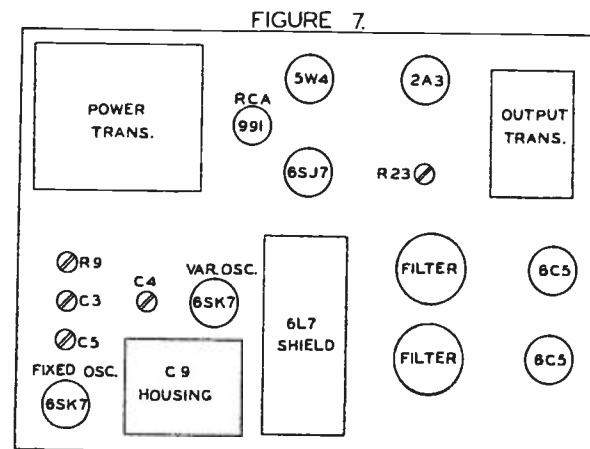
The 1-millihenry tank coils are tapped at approximately one-third for

cathode connection. It is a matter of great convenience that the pi-wound *National* R300U r.f. choke has an inductance of exactly one millihenry and can be used in this circuit position. The choke, which has a very low distributed capacitance (1 $\mu\text{fd.}$), is wound in three pies so that it is simple to make the tap by soldering a lead to the connecting wire between the bottom and middle pies after the insulation has been cautiously scraped from this fine wire. The 6-32 screw which is moulded into the bottom end of the choke can be used conveniently for mounting purposes and for the coil ground connection (the last pi is connected to this screw).

The pickup coils, L3 and L4, are wound on $\frac{3}{4}$ " o.d. Victron forms (*National* type PRF-2) which are slipped over the oscillator coils, L1 and L2. L3 contains 97 turns of no. 36 d. s. c. wire closewound, and L4 50 closewound turns of no. 28 d. s. c. wire tapped at



Block diagram of the oscillator.



Chassis layout details.

the 25th turn. Both coupling coils are thoroughly impregnated with liquid *Victron* immediately after completing the winding.

Copper-foil electrostatic shields are placed between each oscillator coil and its pickup winding, as shown in Figure 6, to reduce capacity coupling and accordingly attenuate harmonics.

Observe that this shield is not a complete cylinder, its sides not quite meeting. This type of construction destroys the "series of shorted rings" effect of a complete cylinder and the attendant eddy-current losses and their effect on the Q of the oscillator coil.

The fixed and variable oscillator coil units are assembled as shown in the exploded view in Figure 6. After connecting the cathode tap, several layers of *Amphenol* polystyrene ribbon are wound around the R300U choke and the copper-foil shield wound on top of the insulating cylinder provided by the ribbon. Enough of the ribbon is then wound on top of the shield to give a tight fit when the coupling coil is slipped on.

After assembly, each entire coil unit is impregnated with liquid *Victron* to render it impervious to moisture. The unit should be given several separate dippings into the solution, allowing ample time for drying between each dipping. The final result will be a coil unit "moulded" in a solid mass of hardened *Victron*.

The fixed tank condensers, C7 and C8, are each 100- μ fd. *Cornell-Dubilier* silvered mica models and are ideally suited to this circuit applica-

tion since their capacitance undergoes only an infinitesimal change with temperature variations.

In addition to this low-drift fixed capacitor, the fixed oscillator tank circuit includes a ceramic-insulated 100- μ fd. variable air-tuned condenser, C3, (*National* UM100) connected across the entire coil, and a similar 35- μ fd. midget (*National* UM35) connected between the cathode tap and ground.

The variable oscillator tank condenser complement includes the two variable condensers listed above and, in addition, the special tuning condenser, C9 which is RCA Stock No. 31333.

All condensers and coils associated with the oscillators are mounted underneath the chassis, away from the heat of tubes, in shield boxes made of 1/16" aluminum.

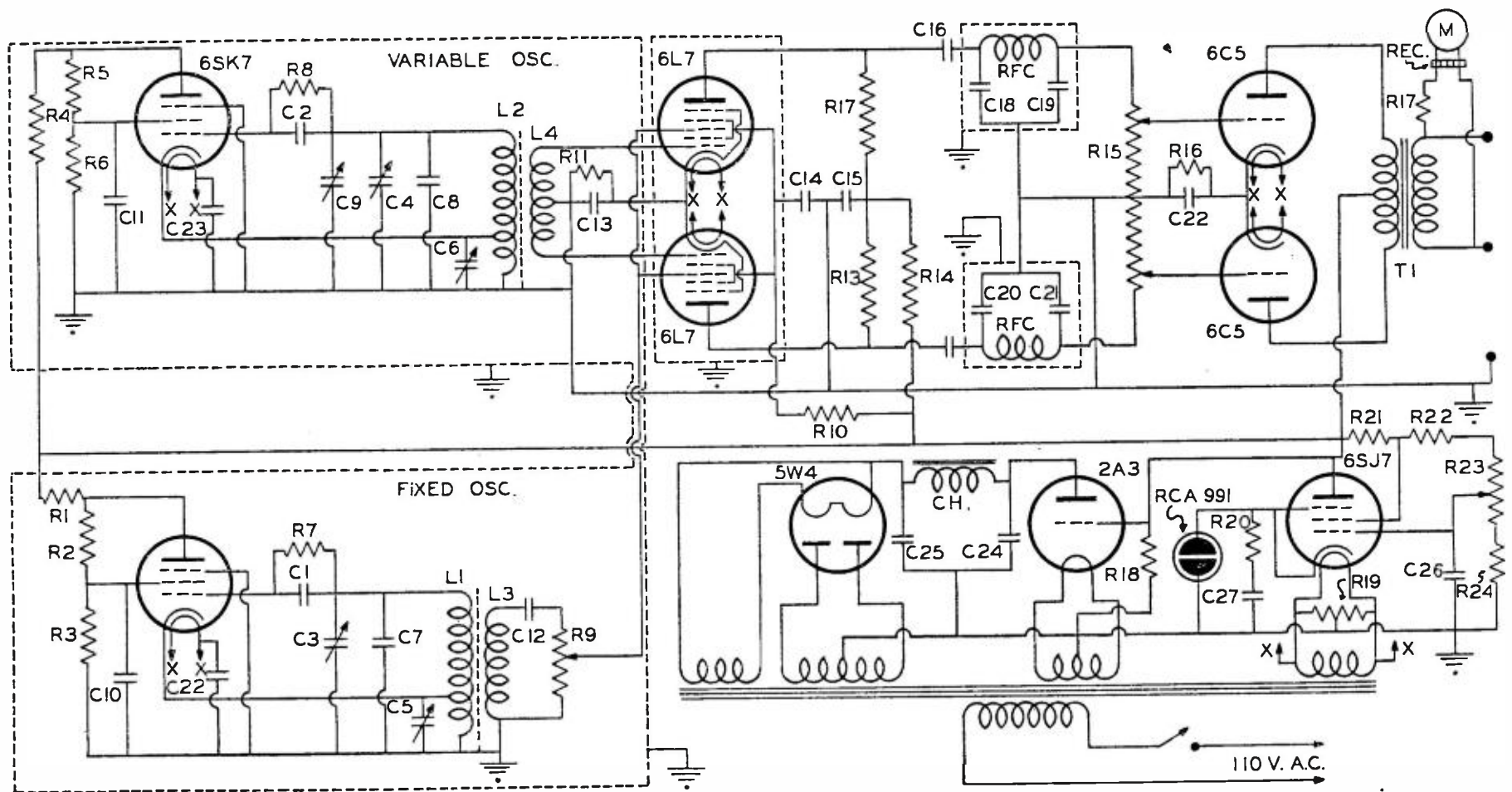
Special Shielding

The fixed oscillator stage shield box is visible prominently in the upper left-hand portion of Figure 3. It is constructed of 1/16" aluminum and measures 3"x5 $\frac{1}{4}$ "x3". The bottom plate, directly visible in the photograph, is removable, being held in place by eight self-tapping screws. This box, which is mounted under the chassis so as to receive the bottom of the oscillator tube socket, houses L1, L3, C1, C3, C5, C7, C10, C12, C22, R1, R2, R3, R7, and R9. The *National* midget trimmers, C3 and C5, are mounted on the under side of the chassis with their adjustment screws extending up through clearance holes (see layout in Figure 7) and the coil

assembly to one side of the shield box by means of the R300U mounting screw. All wiring within the box is done with heavy rigid bus bar (with the exception of the heater leads).

The variable oscillator stage shield is seen directly to the right of the previously-described shield in Figure 3. This box is made of the same thickness aluminum and measures 3 $\frac{3}{4}$ "x4 $\frac{1}{2}$ "x3", and its bottom plate likewise is removable, being also held in place by eight self-tapping screws. The variable oscillator shield houses C2, C4, C6, C11, and C23, L2 and L4, and R4, R5, R6, and R8. The *National* midget trimmer, C6, is used here as the "correction control" for use in setting the dial to zero, is mounted on the inner side of one of the shield-box walls, and is adjusted through a *National* TX-11 flexible shaft terminated at the control end by the correction control dial (left-hand small dial in Figure 1). The flexible shaft assembly and its relation to the stage shield and the front panel is clearly seen in Figure 3.

The leads extending from the variable oscillator coupling coil, L4, do not leave the shielded territory but pass through the chassis through midget rubber grommets into the 6L7 shield box where they attach to the top-cap terminals. This scheme is illustrated in the x-ray layout sketch, Figure 8, and the 6L7 shield box is visible along the center front of the chassis in Figure 2. The left-hand shield box in Figure 2 houses the RCA tuning condenser and is 3 $\frac{1}{4}$ "x2 $\frac{3}{4}$ "x3" in size. It is made of



C₁, C₂—.001 mfd. midget mica. *Aerovox*
 C₃, C₄—100 mmfd. *National* UM100
 C₅, C₆—35 mmfd. *National* UM35
 C₇, C₈—100 mmfd. silvered mica. *Cornell-Dubilier*
 C₉—Special BFO, 5-58 mmfds. RCA 31333
 C₁₀, C₁₁—.01 mfd. 400 v. tubular. *Aerovox*
 C₁₂—.00005 mfd. midget mica. *Aerovox*
 C₁₃—25 mfd. 50 v. electrolytic. *Aerovox*
 C₁₄—.01 mfd. 400 v. tubular. *Aerovox*
 C₁₅—1.0 mfd. 400 v. paper. *Aerovox*
 C₁₆, C₁₇—.1 mfd. 400 v. tubular. *Aerovox*
 C₁₈, C₁₉, C₂₀, C₂₁—.00005 mfd. midget mica.
 C₂₂—25 mfd. 50 v. electrolytic. *Aerovox*
 C₂₃—.1 mfd. 400 v. tubular. *Aerovox*
 C₂₄, C₂₅—16 mfd. 450 v. midget electro. *Aerovox*

C₂₆—.002 mfd. midget mica. *Aerovox*
 C₂₇—.01 mfd. midget mica. *Aerovox*
 R₁, R₂, R₃, R₄, R₅, R₆—.1 meg., 1/2 w. IRC
 R₇, R₈—50,000 ohms, 1/2 w. IRC
 R₉—1,000-ohm tapered potentiometer. *Yaxley*
 R₁₀—50,000 ohms, 1 w. IRC
 R₁₁—1,000 ohms, 1 w. IRC
 R₁₂—Dual 500,000-ohm potentiometer. *Yaxley*
 R₁₃—500 ohms, 1 w. IRC
 R₁₄—10,000-ohm non-inductive precision resistor, type WW4. IRC
 R₁₅—250,000 ohms, 1 w. IRC
 R₁₆—60-ohm wirewound, center-tapped
 R₁₇—50,000 ohms, 1 watt. IRC
 R₁₈—10,000 ohms, 2 watts. IRC
 R₁₉—25,000 ohms, 2 watts. IRC

R₂₀—15,000-ohm heavy-duty wirewound potentiometer. *Mallory*
 R₂₁—5,000 ohms, 1 watt. IRC
 L₁, L₂—1 millihenry tapped at approximately one-third. *National* R300U r. f. choke with tap made between bottom and middle pies
 L₃—Fixed oscillator coupling coil (see text)
 L₄—Variable oscillator coupling coil (see text)
 RFC—250-millihenry r. f. chokes. *National* 1-10
 T₁—U. T. C. LS-51
 T₂—350-0-350 v., 95 ma.; 5 v., 3 a.; 6.3 v., 4.5 a.; 2.5 v., 5 a. U. T. C. Type R3
 CH—15 henries, 100 ma. U. T. C. R19
 M—0-1 d. c. Milliammeter. *Triplet* Model 221
 REC—*Triplet* C-4 copper oxide rectifier

1/16-inch aluminum and is provided with spade bolts for mounting. A large clearance hole in the chassis within the condenser box admits the stator bus which passes down into the variable oscillator shield box under the chassis. The 6L7 shield box measures $2\frac{1}{4}'' \times 4\frac{3}{4}'' \times 3''$, houses only the two tubes, and like the condenser shield is provided with spade bolts for mounting on the chassis.

The upright chokes and condensers of each 6L7 plate-circuit filter are housed in the round shield cans seen adjacent to the 6L7 shield box in Figure 2. These are regular coil shield cans, two inches in diameter and two inches high, each provided with two spade bolts for chassis mounting. Their arrangement on the chassis is also shown in Figures 7 and 8.

Modern Power Supply

It will be observed from the schematic, Figure 5, that a full-sized voltage-regulated power supply is used. This is a decided advantage, as the circuit is entirely foolproof and really delivers the goods. The constancy of operation it imparts to the beat frequency oscillator is worth several times its cost.

From Figures 2 and 7 it will be observed that the power transformer is mounted in the left rear corner and the other power supply components nearby along the rear edge of the chassis. The special above-chassis socket for the RCA 991 neon voltage regulator tube is mounted adjacent to the transformer, and the filter choke below chassis almost directly beneath this socket. The 5W4 rectifier tube and 2A3 voltage regulator are mounted at the very edge of the chassis since they run hotter than any others in the instrument. The potentiometer, R23, is mounted through the chassis between the 6SJ7 and 2A3 sockets and its shaft is cut off and slotted for screwdriver adjustment.

The a.c. line cord is made removable through the expedient of an *Amphenol* flush receptacle seen to the right of the filter choke in Figure 3. Directly to the right of this part is seen one of the 16- μ fd. midget tubular filter condensers.

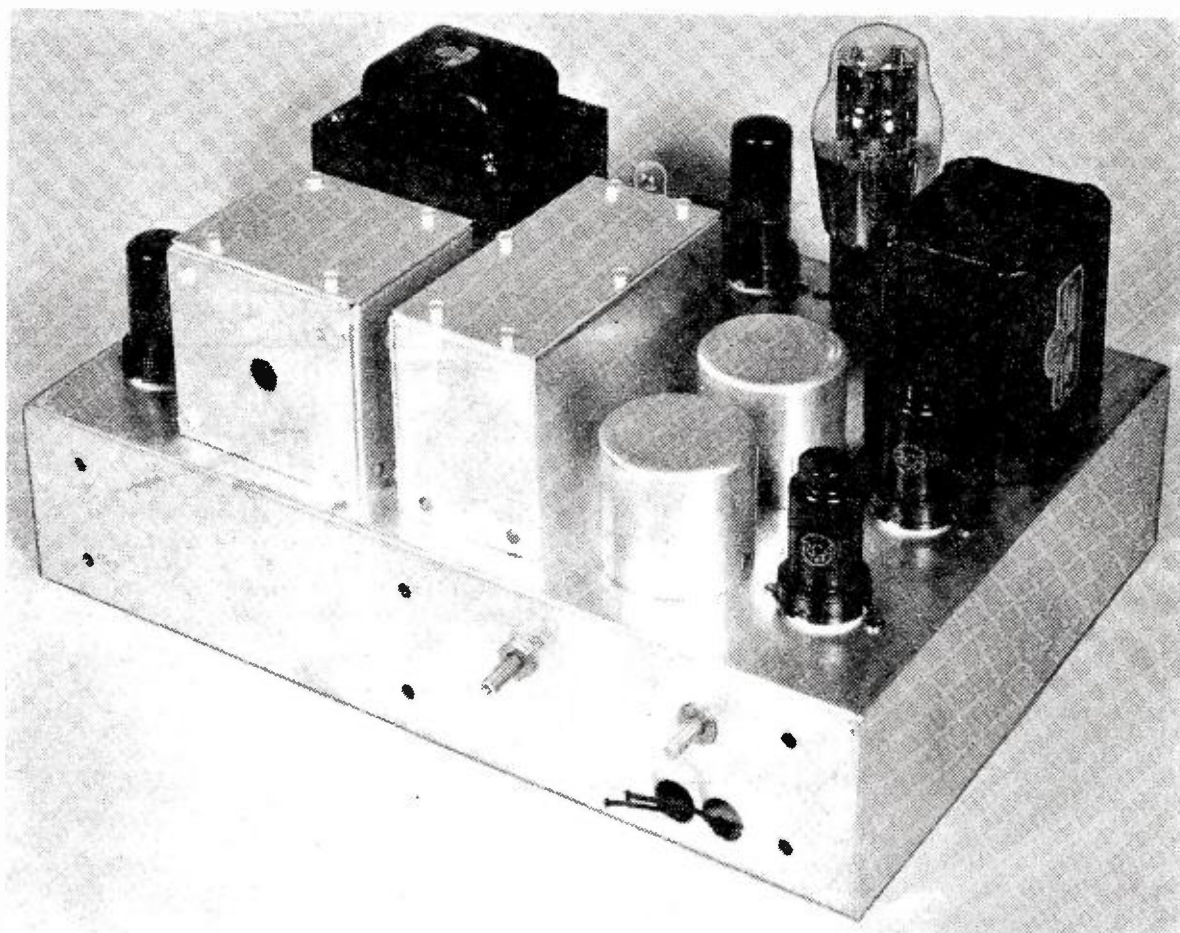
Special Output Transformer

Notwithstanding the inclusion of a gain control in the instrument, the output voltage curve of a beat frequency oscillator should be kept as flat as practicable to insure even output over the entire dial range. Inordinate output variations entail unnecessary work at the gain control to maintain a constant output level.

The output voltage curve can be no better than the frequency response curve of the output transformer, hence there is no alternative but to employ a transformer of superior frequency characteristics. There can be no skimping in this matter; the transformer selected *must* be of broadcast studio quality.

The high-fidelity unit, UTC type LS-51 (T1 in Figure 5) is particularly suitable. Shown here, the 500-ohm output terminals are utilized, although this transformer is a "vari-match" job and will provide output impedances of 50, 125, 200, 250, and 333 ohms as well.

Its response is flat within plus or minus 1 db. from 30 to 20,000 cycles and it is a hum-balanced job with dual alloy shield. (This relative hum-pick-up reduction is -74 db.). Although re-



Notice the extremes to which shielding has been made in the unit.

latively heavy in weight, the transformer is not too large in size for compact assemblies. Its electrostatically-shielded coil structures are novelly arranged to neutralize voltages induced by hum flux.

The unit, housed in its heavy alloy shield may be seen in the right rear corner of the chassis in Figures 2 and 7. A $2\frac{1}{16}''$ hole cut in the chassis with a circle cutter clears the numerous terminals.

Output Meter

The output meter, represented by the combination M-REC-R17 in Figure 5, is a O-10 a.c. voltmeter with a O-1-milliammeter as the basis. This device is most helpful in indicating zero beat when the dial is being set to zero prior to use of the instrument.

While it is of considerable advantage to use the precision non-inductive resistor specified for R17, the meter is adversely affected by the higher audio frequencies, so that if it is used as an output meter as well, it will be necessary to plot a correction chart for the various frequencies and voltage readings.

It is strongly recommended that all who have the opportunity include a vacuum-tube voltmeter as the output indicating device, since this instrument will not be affected by the frequencies within the range of the beat frequency oscillator.

Special Dial

It is highly desirable to have the dial read directly in cycles per second and to have it as large as possible for ease in manipulation and reading. The knob drive should be a smooth acting vernier.

The dial shown in Figure 1 and recommended particularly for this instrument is a *National* Type NW. This is a six-inch German silver job with a variable speed vernier. It can be obtained on special order without figures of any kind and may then be engraved by a local machine shop equipped with dial engraving gear after the builder has marked off his calibration points. We originally used a temporary

paper scale that was executed in India ink and cemented to the dial face while the writer was waiting for the regular engraving job to be done. Attention is particularly called to the pleasing separation of the various frequencies. Note that the 1-kc. point is quite half-way up the dial.

Mechanics

All the rules of good building apply with double emphasis to the beat frequency oscillator. In an instrument of this type, almost imperceptible movements of chassis, parts, or wiring cause noticeable frequency shifts. It therefore becomes imperative to employ good solid construction throughout, to use a chassis of heavy stock, only parts of superior mechanical construction, and to do all of the oscillator wiring with heavy, rigid bus bar. The instrument is built on a $14'' \times 10'' \times 3''$ cadmium-plated steel chassis which is 0.060-inch thick. The edges are folded to receive a steel bottom and the corners are spot welded.

All of the components within the oscillator shield boxes are fastened down firmly to avert movement. The tuning condenser, C9, and the trimmer condensers, C3, C4, C5, and C6, are all equipped to receive four mounting screws and must be so mounted. The trimmers are built on small rectangular Isolantite panels held below the chassis by four 6-32 screws which are

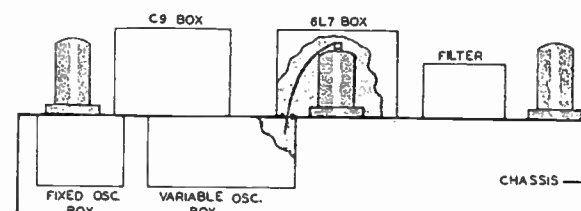


FIGURE 8
Chassis parts placement diagram.

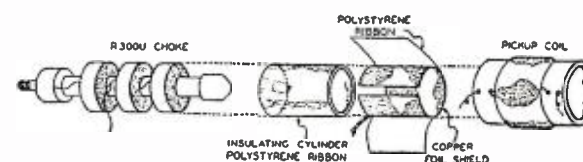


FIGURE 6
Coil construction diagram.

passed through short spacing sleeves. The mounting hardware is supplied with the condensers.

All resistors and condensers in the oscillator and demodulator circuits are mounted at *both* ends with as little pigtail length as necessary. In some cases this mounting can be achieved simply by fastening between the terminals of two other parts. In all other cases, it will be necessary to fasten insulated terminal strips to the chassis for the purpose.

Power transformer leads should be laced together with stout cord and clamped to the chassis, as shown in Figure 3.

The *National* type NW dial, indicated here for tuning, is of excellent mechanical construction and has four-screw mounting to hold it firmly to the front panel. The center hole for clearing the shaft should be drilled large enough to prevent the rotating shaft from rubbing against the panel during any portion of its revolution, and the dial must be mounted *exactly* in front of the tuning condenser to prevent stresses and displacement due to misalignment. The tuning condenser is mounted straight on the chassis for the same reason. It will be noted that the tuning condenser box is mounted quite close to the front panel to make possible the shortening of the shaft coupling to minimize torsion.

Tighten all screws to their limit and use lock washers liberally. Employ no single-hole mountings wherever it is possible to use a number of screws for the purpose. After completing the "screwdriver-and-wrench" work, it should not be possible to work any part of the foundation unit loose. Indeed, complete "battleship" construction should be achieved.

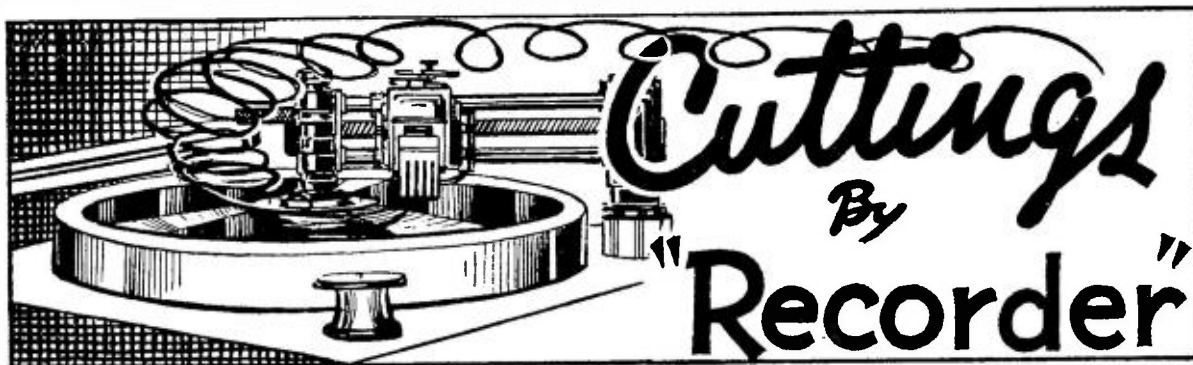
Output leads are brought to a *National* type FWH terminal assembly, seen in the lower right corner of the front panel, Figure 1. This unit is mounted with great mechanical solidarity, since half of the R39-insulated base block is on the front; the other half on the back of the panel. A matching *National* FWA binding post is mounted directly to the right of the FWH board for ground connection. The three binding posts shown here are particularly useful on a test instrument, accommodating as they do either banana plugs, plain wires, standard test tips, phone tips, spade tips, or the companion *National* type FWF dual conductor plug.

Calibration

Several methods of calibrating audio oscillators have been advanced from time to time. By far the best would be to compare the home-made beat frequency instrument directly by the zero-beat method with a freshly-calibrated instrument which might be set at dozens of points throughout the spectrum. This is likewise the most difficult method, insofar as gaining access to the commercial instrument is concerned. However, it is certainly to be recommended in every case where there is a "friend" in a laboratory or broadcast station.

The second best method of calibrating the instrument described in this article consists in checking the frequency of harmonics of the variable oscillator in the following manner:

1. Assuming that all wiring is correct, allow the instrument to heat up
(Continued on page 44)



Manufacturer's Specifications

Make: Radiotone. Radiotone, Inc., Hollywood, Calif.
Model: HR-8T
Motor: Heavy-duty, constant-speed.
Turntable Speeds: Standard 78 rpm and 33 $\frac{1}{3}$ rpm.
Cutting Head: High grade Magnetic.
Pickup: High-Impedance crystal.
Microphone: Crystal.
Amplifier: Self-Contained.
Radio Tuner: Built-in.
Control Panel: Sloping type with controls.
Feed: Undercarriage drive.
Table: Heavy weighted type.
Speaker: Furnished in case cover.
Case: Reinforced-fabric covered and waterproofed.
Remarks: Cuts all types of instantaneous discs of 6", 8", 10", 12", 13 $\frac{1}{2}$ " diameters.

Description

The *Radiotone* HR-ST portable recorder will make a professional record with high quality and fidelity. Even the smallest model will cut and reproduce records having diameters of 6", 8", 10", 12" and 13 $\frac{1}{2}$ " masters. They are easy to operate and so flexible that



any amateur can make professional records with minimum attention.

A weighted turntable is used to insure accurate tone reproduction without any audible waver or "wow." This table is accurately machined to perfect balance. A felt top is provided to cushion the disc and to protect it from scratch.

A radio tuner is offered to those who wish to make records of their favorite radio programs. This is built into the carrying case as shown on the illustration. A tight fitting cover permits the compartment to be closed.

A high grade crystal microphone is furnished as standard equipment on all models. Pleasing response is thus afforded in making "direct pickup" records.

The control panel is laid out in such a manner that all controls are easily identified. Push buttons are used to select the various functions that the recorder is capable of handling. These are clearly marked for proper identification.

Four control knobs are used: Tone-Equalizer—Phono-Radio Volume, and Mike Volume. Each of these perform important functions in making and in playing recordings. Operates either at the standard speed of 78 rpm or at Transcription speed of 33 $\frac{1}{3}$ rpm. Will cut from outside-in, or inside-out.

Discussion

This recorder is not particularly well known in the states west of the Mississippi but is well accepted in and around California. It is a pleasure to present this line to our readers and to acquaint them with some of the features to be found in this merchandise. The manufacturer has taken great pains to turn out a unit that is foolproof in design and workmanship and to pay particular at-

tention to small details usually overlooked in some models we have tested.

First of all; the entire assembly is unusually rugged. This means that records can be turned out that will possess true fidelity and freedom from any turntable rumble or distortion caused by mechanical vibrations. The turntable is of sufficient weight to ride through heavy audio peaks without the slightest waver. These features, together with a heavy-duty motor, insure satisfactory performance under all conditions met in the art of instantaneous recording.

A high-fidelity radio tuner is provided in some models to make records of programs coming into the home. Unlike some tuners we have seen and heard, the one furnished with these particular units are especially designed for wide band width for maximum fidelity. Accurate tuning is simplified by the tuning eye provided on the tuner panel. Stations may be set accurately and maximum fidelity attained.

Mixing of microphone and tuner is possible with the controls provided. Furthermore, tone correction can be made which is essential when recording at the transcription speed of 33 $\frac{1}{3}$ rpm. This type of recording requires treatment of the higher audio frequencies in order that best fidelity be realized. The *Radiotone* provides this equalization in an efficient manner.

An equalizer control is furnished in order that the high frequencies may be boosted when recording at 33 $\frac{1}{3}$ rpm. Due to this slow speed, the higher notes are not of sufficient amplitude to be etched on the record and it is necessary that they be increased in amplitude so that these notes will not be below the normal noise level of the disc. The equalizer is also helpful in making correction to commercial records for certain applications, and in this service, much can be accomplished to enhance their value. Either the high's or the low's may be attenuated in order to compensate for any loss that may occur in cutting or in playing the record.

The playback pickup is of the crystal type and of good grade. Needles may be inserted into the cartridge easily as the head may be lifted so that the underside is in full view. The pickup is matched properly to the equipment and is capable of excellent tone response. The amplifier has sufficient volume to enable the recorder to be used as a public address system in small halls and the like.

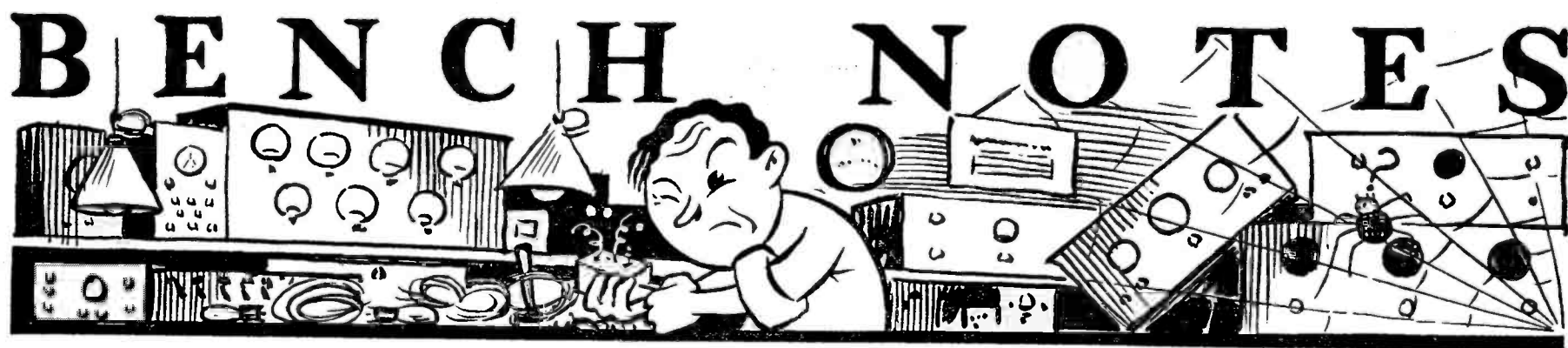
The cutting head is of the magnetic type—noted for its ruggedness and ability to withstand excessive audio peaks without distortion. Adjustments are provided on the head so that various discs may be cut properly, and also to allow for variations in needle "stylus" length. This adjustment is rather important. Some recorders rely too much on the cutting arm assembly to automatically do the adjusting. This is to be avoided when accurate cuttings are to be made.

The *Radiotone* Recorder was put through a series of tests. These included frequency-response measurements and playback response. The net results were very satisfactory from the standpoint of easy cutting and faithful reproduction.

The Reader Asks

Whenever I make records the distortion is high and I hear an echo when the record is played back. What causes this to happen?

ANSWER: This is due entirely to the use of too much volume when cutting the disc. It also indicates that too deep a cut is being made and the walls of one groove are forced toward the walls of the adjacent grooves. The small spacing between grooves actually moves and vibrations are picked up by the pickup and are reproduced.



by **ROBERT KENDALL**

Service Manager, Indianapolis, Indiana

**A short discussion of service responsibility;
plus the Ward's awards of the Riddle No. 7.**

Shop Gymnastics

AN otherwise dull day may be enlivened and a certain amount of exercise obtained, if a finger is clamped down on the plate of a power tube, while turning over a live chassis on the bench.

Service Responsibility

IN a recent issue this magazine published an interesting letter from Harold Davis of Jackson, Miss. Of particular interest to this department was a small paragraph near the end, where Mr. Davis remarked: "But the man in the small town knows that his reputation is his fortune, and even if he replaces only a quarter-watt resistor . . . he has married that set, and if anything happens to it within the next year it is his fault."

This trenchant comment alone is enough to mark Mr. Davis as a man of experience, and what working service man did not murmur to himself as he read it, "Hiyah, pal," or words to that effect? Not only the men in small towns, but in larger towns as well, for the larger towns, outside the main business district, are essentially a number of communities or small towns closely linked together, with one or more radio men operating in each community, and many of their problems are identical. Mr. Davis' slight touch of misanthropy is not entirely unwarranted, as any service man of experience will agree, for he describes a type of customer that is not unusual, but on the contrary is encountered with distressing frequency.

For a number of years the service man has been exhorted on all sides, as to the wisdom and necessity of establishing minimum charges, profitable labor rates, and an adequate mark-up on material used. All this is very admirable, and most service men that are in business any length of time, sooner or later formulate some sort of policy along these lines, that is intended mainly to be profitable to the service man. Under these neat little formulae business rolls along smoothly as long as that ideal customer is served, who pays full rates for labor, and list prices for material, without any excessive yelps of anguish when the bill is presented.

Unfortunately radio customers do not run to one uniform type, and all too soon Mr. Davis's customer appears on the scene, a few weeks after the first repair to his set was made. After some probing around a new defect is found, and the service man announces that "this and that is shot, and it will cost so much to fix it." There is a slight pause while the customer recovers his hat, which he has jumped out from under, and the fight is on! The service man will begin to pour out his explanations, mostly of a technical nature, of his reasons for considering this a new job, and the customer will stick to his main guns "You told me you would fix the set" and "You guaranteed the work." When this point is reached, the service man might as well save his breath and make a decision. There are two courses to pursue, neither one of which is profitable—the service man can either say, "Okay, I'll take care of it," and make the repair at no charge; or follow his natural inclination and say, "This repair does not come under my guarantee, so nuts to you, my fine fellow."

What is responsible for this unsatisfactory state of affairs? It is most unsatisfactory to the service man, as he must either waive a legitimate charge for the second job, or antagonize the customer by attempting to justify a charge for the repair. The service man is usually secure in his feeling that the first job was done correctly, and the second failure has no relation to the first—therefore it seems logical that the root of the trouble lies largely in the customer's ignorance of the large number of potential trouble-makers in a modern receiver, and his pre-conceived notions regarding radio service. These ideas are usually most erroneous, and if the service man expects to make any reduction in complaints of this type it is up to him to attempt to correct these mistaken ideas, and the time to do this is when the first repair job is accepted—it will be too late when the second breakdown occurs.

First, it is obvious that a major difficulty in such cases is the difference in "language." It is an exceedingly difficult job, for instance, to explain to

a non-technical customer the function of a coupling condenser, so that he will get a clear idea of its duty in a receiver, so explanations of this character are usually valueless. It is certain that the average customer has only the vaguest idea, if any, of the large number of parts that go to make up a radio receiver, and it would seem that it is here the service man has a good opportunity to attempt a little "consumer education," and impress the customer with the fact that there are a hundred places (more or less) in a receiver where trouble may develop. This does not call for a long oration and lengthy demonstration, but may be done quite simply by turning over the chassis in the customer's presence, remarking that it may be "condenser trouble." The condensers may then be pointed out one by one, counting them at the same time, and announcing the total with a remark that "any one of them can cause trouble in the set's operation." The resistors can be dealt with in the same fashion, and the same suspicion cast on them. This simple lesson may be given in a few minutes, and may save an hour wasted in futile argument later on. Although most customer's noggins tend to become more solid than ever when anything more complicated than a can-opener is presented for their attention, there is a fair possibility that some results may be obtained from this method. All but the most stubborn can see that if two condensers have been replaced out of a total of twelve previously pointed out to him, that ten old ones have been left, which at least gives the service man a toe-hold to swing from. If nothing else, this demonstration may cause the customer to regard the service man with some respect as a fellow who can find his way around in the jumble of small parts and wiring.

In reviewing a number of these cases, the service man will find that many have one point in common, i.e. the customer's conception of the scope of the service man's guarantee. Their ideas on the subject are quite liberal and optimistic, in that they feel any repair, however trivial, insures perfect operation of the receiver as a whole

(Please turn the page)

for the guarantee period. Why does the customer get this mistaken impression? It can only be because the guaranty is not specific enough to register definitely on the customer's mind the limit of the service man's responsibility.

A number of guarantee forms have been prepared and supplied to the service men from different sources but most fail to impress the trouble making customer on this important point. Many of these forms are typical *salesman's* guarantees, in that they are worded more to impress the customer with the fact they are getting a guarantee, than to clearly define the service man's limited responsibility. There is no need for the service man to be reticent about his policy in this respect, and we feel that a lot of grief may be avoided if the guarantee is worded to leave little room for doubt in the customer's mind.

As an example, a guarantee along the following lines is suggested:

GUARANTEE

The work done, and material used as shown above are guaranteed by (name) for a period of ninety days from the date of this bill, provided the charges shown have been paid in full.

This guarantee DOES NOT cover the possible future failure or breakdown of any parts not listed on this bill.

The guaranty should be printed on each bill, and a bill rendered for each job. The one shown above has been in use for a number of years, with definitely known beneficial results, and at this writing no customer as yet has complained about its terms. As a matter of fact, most customers will agree that the terms are fair enough, if the matter is called to their attention.

The methods outlined in the foregoing are not infallible in effect, but are at least a step in the right direction. It is up to the service man to take action along these lines, as no one else can do it for him. No doubt other men have worked out practical methods of dealing with these cases, and we would be glad to hear from them.

Ward's Awards

RPAIRMAN'S Riddle No. 7, having to do with a radio store owner's fruitless dealings with a crackpot customer, elicited divergent opinions from the various servicemen who answered. Most agreed "The Customer Is Always Right," even though the store owner gets left; but they had different ways of interpreting this policy.

Scoring was done on the following basis:

Kane's Technical Concepts: (points)

1. A spherical antenna does not necessarily "improve tone quality" (1)
2. A soldering iron does not heat up more rapidly on d.c. than on a.c. Iron impedance, for all practical purposes, is negligible; and the suggested use of a d.c. line for the iron alone is, of course, foolish. ... (1)
3. An ordinary water bucket is made of metal. If filled with
(Continued on page 62)

SERVICEMEN'S LEGAL ADVICE



IN the concluding article on Bills and Notes appearing in the September issue, we discussed the liability of a person signing a negotiable instrument as an agent. We commented further on the fact that the authority of an agent should be strictly interpreted and that a third party should not rely upon an agent's mere assumption of authority. Since radio servicemen frequently receive orders from a person who represents another, we feel that a discussion of agency is in order.

Agency is the legal relation which arises when one party, called the "Agent," is authorized to represent and act for another party called the "Principal."¹

An agent should be distinguished from a servant. An agent is vested with some discretion, while a servant usually acts under expressed direction from his master. A servant is primarily employed to do an act for his employer not resulting in a contract between his master and a third person, while the main office of an agent is to make such contract, or to aid in bringing the contract into existence.²

The relationship of agency is created as a result of conduct by the parties manifesting that one of them is willing to have the other act for him, subject to his control and that the other consents so to act. The word "principal" describes a person who has authorized another to act on his account as an "agent" and subject to his control. Therefore, in any transaction involving an agent, the serviceman dealing with the agent should ascertain who the principal is, and learn whether or not the agent claiming to represent the principal has such authority to do so.

Agents are classified under the following two headings: general, and special.

A general agent is one who represents his principal in a particular line of business such as the manager of a store, or one whose business or profession it is to transact for any or all persons as, for example, a lawyer.³ A special agent is one who is authorized to do some particular act or to act upon some particular occasion that is usually in accordance with specific instructions. For practical purposes, however, it is best that these terms be disregarded as the liability of a principal for an act of his agent, as far as third parties are concerned, depends upon the apparent authority conferred upon the agent. It is a general rule of law, that whatever a man may do for himself he may have an agent do for him.⁴ This rule, however, is subject to certain exceptions as there are acts of a personal nature which cannot be delegated, such as the making of a will, or the making of a contract of marriage. If, of course, a person cannot lawfully do an act himself, he cannot confer authority upon another as his agent to do such an act in his behalf.

It is a fundamental principle that the relation of agency can exist only by the will

of the principal and with the consent of the agent. In other words, an agency results and arises out of a contract between the principal and the agent. There must be a contract of employment, which must possess all of the elements of every contract. Frequently, the relation of agency is implied from the words and conduct of the parties existing under circumstances of the particular case. An agency may arise from a single transaction, but may be more readily inferable from a series of transactions.⁵ For instance, where one is put in possession of real property, or put in charge of a business, or given money to invest or to pay over to another, are all instances in which the inference of an agency may be implied. Also, an agency may be implied from prior dealings between the parties, or where the alleged principal has previously employed the alleged agent as such in a transaction similar to the one in question.⁶ Also, where one, with full knowledge, allows another to represent him as his agent and remains silent on an occasion when it is his duty to speak, his silence may give rise to a situation from which an agency may be implied.

As a rule, no particular form of writing is necessary to create the relationship of agency. It may be oral, or partly in writing and partly oral. There are, however, cases where a statute may require an agency to be in writing and, in such case, the requirements of the statute must be fulfilled.

Sometimes, an agent may act beyond the scope of his authority. Where an agent has done so, it has been held that his unauthorized act is voidable and has no effect on the person in whose behalf it was made, unless and until the act is ratified by the principal. In general, any act which is done by one party on behalf of another without prior consent is capable of ratification by him on whose behalf the act was done. For instance, a principal who gives an agent authority to sell land, may ratify a sale, although the sale was made by a sub-agent who was appointed without the knowledge of the principal.⁷ Where the act of an unauthorized agent is ratified by a principal, the act of the said agent becomes the act of the principal as though the act had been previously authorized. Ratification is a substitute for authority.

Ratification may be oral or in writing, or it may be expressed or implied. An implied ratification is usually recognized by the adoption of the act of the agent. Ratification is a question of fact, and in the majority of instances, depends on the conduct of the principal in relation to the alleged contract from which the principal's intention may be reasonably inferred.⁸ Where a principal is informed of the unauthorized act of his agent and does not within a reasonable time repudiate it, but acquiesces in what the agent has done, the principal will be held to have ratified his agent's act. "Acquiescence, although it may not in itself be ratification, is nevertheless evidence of it."⁹ "The silence of the principal, after receiving notice that his agent has assumed to bind him by an authorized act, may be a fact to be weighed on the issue of whether the principal ratified the act, or may raise a presumption that he ratified it, according to circumstances."¹⁰ The rule is elementary that when an agent, in contracting for his principal, exceeds his authority, the principal, upon being fully informed of the facts, must, within a reasonable time, disavow or disaffirm the act of his agent, especially where his silence might operate to the prejudice of innocent parties, or he will be held to have ratified and affirmed such unauthorized act.

The life of the agency may be expressed in

(Continued on page 54)

¹ Keyser vs. Hinkle, 127 Mo. A. 62.

² Wakefield vs. Fargo, 90 N. Y. 213.

³ Jacques vs. Todd, 3 Wend. N. Y. 83.

⁴ Freeland vs. Hogan, 120 166 A. 109.

⁵ Hermann vs. Niagara Falls Ins. Co., 100 N. Y. 411.

⁶ Dickinson vs. Solomon, 36 Misc. 169.

⁷ Lowenstein vs. McIntosh, 37 Barb. 251 (N. Y.).

⁸ Oregon R. Co. vs. Oregon, etc., 28 Fed. 505.

⁹ Allen vs. Corn Exchange Bank, 87 App. Div. 335.

¹⁰ Louis Gunning Adv. Co. vs. Wanamaker, 115 Mo. A. 270.

¹¹ Reid vs. Alaska Packing Co., 47 Or. 215.

¹² McCollough Iron Co. vs. Carpenter, 67 Maryland 554.

¹³ Burke vs. Priest, 50 Mo. A. 310.

Ringling the Bell



In which the customers do the work.

by **SAMUEL C. MILBOURNE**

Expert Serviceman, Greenwood, Miss.

WE are happy to report that several servicemen were interested in the set of books used by the author, which form the basis of a previous series of articles on bookkeeping. We will be glad to advise others regarding a source for these books upon request. This interest shows a *definite need* for a reasonably simple bookkeeping set-up for the average "one-horse" or "two-horse" radio shop like ours. However, when you consider the purchase of one of these systems, be sure that it is applicable to your business, that it is reasonably simple *and that it is complete*. We started out with one which, to our great dismay, didn't have a ghost of a form for Accounts Payable, or Inventory. We'd like to see someone who could use a bookkeeping system like that. Apparently, it was a question of everything coming in and nothing going out.

It's a good trick if you can do it!

WHILE we are on the subject of bookkeeping systems, we received a letter from our good friend Quincy Gibbon, Rolling Fork, Mississippi serviceman which included what we con-

sidered two swell ideas combined in one form.

His invoice blanks are made up in duplicate and bound in pad form with an extended cover which folds back over the top invoice. Fig. 1 shows a picture of this invoice pad. The invoice form (shown in Fig. 2) serves six purposes:

1. Invoice (itemized if desired).
2. Cash Receipt.
3. Monthly statement.
4. Flat rate offer to new dealer accounts.
5. Duplicate record of all transactions.
6. Cost per job on back (more about this later).

On the inside cover of this pad is a form for recording the cash and charged sales (see Fig. 3) and also a form to list the checks received (see Fig. 4). In this manner, an elementary bookkeeping system can be set up, through which this information can be fed.

Note the printed prices for parts as given on the invoice form. There is a certain psychological reaction, Serviceman Gibbon writes, to these printed prices which forestalls any kick by the customer on parts or labor estimates. In other words, the customer believes what he sees in print—and he also feels that if \$0.75 is what the other fellow paid for a resistor, \$0.75 is the correct price.

You will please note that nowhere in this form is any mention of 50-cent repairs, cut-prices, or any other profit-losing offers. The prices asked are substantial, yet reasonable.

The method used by Mr. Gibbon to get across to a customer that radio service men have expenses, is rather clever. On the back of each invoice he has a printed message as shown in Fig. 5. Note that he shows his salary at only 50c per hour and an average of only 3 repairs a day to arrive at the \$4.33 average cost per job. Of course, many service men may feel that this is all wrong, but the purpose of the form must be remembered before taking Serviceman Gibbon apart and feeding him to the lions. This service man wants to impress his customers with the *up-keep* of a shop. Naturally he isn't going to show a salary of \$300.00 because *neither he nor any other service man actually makes that much*. \$150.00 is a fair monthly salary and as the usual work day is 10 hours, 300 hours per month is correct.

All in all, we think Serviceman Gibbon has a good idea which might be well worth copying.

RECENTLY we received a letter from Serviceman Boudreaux of Delcambre, Louisiana, who requests that we write on the subject of *Free Estimates*. Serviceman Boudreaux feels that, although he has operated a radio service shop for 10 years and during that time has never charged for an estimate, the practice is wrong and that a system of a minimum charge should be substituted.

His main objection to the "free estimate" situation is the time lost in estimating repairs which do not materialize, and he feels that as "professional" men, service men should charge a minimum of 75c to \$1.00 for this service.

Let's examine Serviceman Boudreaux' problem (and the problem of all of us). First, he admits that, although he has repaired radios for 10 years, he has never charged for an estimate. Why? Is it because he feels in his own heart that it isn't correct procedure, or is it because he feels reasonably sure that his customers will not stand for it? Probably the correct answer is neither of these. Serviceman Boudreaux is a normal human being and as such, instinctively shrinks from

Clarksdale, Miss. _____ 193__	
Residence _____	Phone _____
Business _____	Phone _____
Radio _____	Model _____
RADIO CITY	
Where Your Music Begins	
258 DELTA ST.	PHONE 1380
QUINCY GIBBON	
Service Call @	\$1.50
Shop Labor @	\$3.50
Trips @	\$.25
Resistors @	\$.75
Bypass Condensers @	\$.85
Filter Condensers @	\$1.45
Audio Transformers @	\$1.75
I. F. Transformers @	\$2.25
Volume Controls @	\$1.25
Pilot Lights @	\$.25
Knobs @	\$.40
Tubes	
Batteries	
Other Material	
Complete Overhaul	TOTAL
On Contract Price	C. O. D. \$
2	By Cash \$
Balance Due - Please Remit	\$
Dealer's Flat Rate: \$2.00 per Job Plus Material at Wholesale Cost.	

Quincy Gibbon's clever invoice blank.

Why It Costs The Average Service Man \$4.33 To Repair The Average Radio		
Monthly Overhead:		
1 Salary (300 hours @ 50c)	\$	150.00
2 Automobile		60.00
3 Rent		20.00
4 Lights		10.00
5 Telephone		10.00
6 Heat and Ice		10.00
7 Stationery and Postage		10.00
8 Advertising		10.00
9 Instruments, Tools & Service Manuals		10.00
10 Interest, Insurance and Taxes		10.00
	Sub Total	\$ 300.00
Tubes, Batteries and Parts		A Plenty
	Grand Total	Too Much
	PROFIT	NONE
SO WHAT?		
Here's What!		
His cost per job, assuming 30 working days per month and material costing \$1.00 per job and an average of 3 jobs per day will be: \$390.00 ÷ 90 = \$4.33 actual cost per job.		
<small>David Lind Press, Chicago</small>		

The other side of the Gibbon invoice.

making any radical changes in his way of life. Otherwise, he would have found out long ago whether the idea would or would not work in his locality. Please don't feel that we are censoring Serviceman Boudreaux for his unwillingness to try out something new, because we most certainly have no such intention. We are in exactly the same boat, because we have never made a charge for an estimate and, as far as we know, we have no intention of doing so in the future.

We can all sympathize with this service man and his unprofitable hours of unpaid estimating time, but can we do anything about it?

In some localities, the answer is *yes*, but in other localities, the answer is a most emphatic *no*. At the present time, varying servicing techniques and the slap-happy methods used by many service men in running their business preclude any hard-and-fast rule from applying universally.

Let us look for a minute upon the statement often made by service men that *because they are professional men like doctors, dentists and lawyers*, they should be paid for their advice whether it is used or not.

We always feel like an old meanie explaining to a little boy or girl that there really is no Santa Claus, every time we insist that radio service men are *not* professional men, but tradesmen—shop-keepers and artisans! We always wondered who started this "professional" idea among service men, because to our way of thinking, it *just doesn't fit*.

Professional men? Shades of every manual worker from Adam on up!

Who's been kidding us into believing we are *professional men*? A professional man may be defined as one who has obtained a liberal education and whose work is more with the mind than the hands.

Now, no one will deny that all radio service men have received a liberal education. This may not have been acquired in a university, but every service man worth his salt has a degree in P. E. (Practical Experience).

But, a professional man? A thousand times *no*! We are *artisans—skilled workers—artists with our hands!*

After wrestling with a recalcitrant dial cable, playing hide and seek with an intermittent and giving the chassis a final alignment, haven't you snapped the switch, tuned the set to a local station, cocked your head on one side and, with a pleased expression, softly said, "Yes sir, that's *got it!*"?

Haven't you ever flicked the last speck of dust from a freshly refinished and polished radio cabinet, stepped back and whispered, "Just like new!"?

After struggling for days selling and installing a P. A. system, haven't you turned up the gain and warbled sweetly into the mike, "One . . . Two . . . Three . . . FOUR . . . sounds pretty good, huh?"?

Yes, you've done it, we've done it—every service man who's really *been through the mill* has done it!

You've used your brains, that's true . . . you've used your "liberal" education—practical or book—that's also true . . . but most of all, *you've used your two hands to create or re-create something!* You feel that you've done

(Continued on page 62)



by ALFRED TOOMBS

Special Washington Correspondent for RADIO NEWS

More Power to U. S.

THE outcome of various phases of this war have been decided in the air—and airplanes have not been the only weapons. Washington is keenly aware of the use of radio, in all its aspects, as a decisive factor in battle.

We are preparing to defend the Western Hemisphere against all comers and in the struggle to come Federal officials are determined that we will not be outstripped in the ether salient. Behind a recent quiet announcement by the Federal Communications Commission lies a significant story illustrative of the preparations we are making.

For a long time, Washington has worried because our broadcasts to South America have been ineffective beside those of Germany, Italy and Spain. The dictators' stations, equipped with the best directional antennae, had been throwing propaganda at our southern neighbors with power that ranged from 10 to 100 kilowatts. We had only two stations whose power even approximated this.

At the State Department's request, the FCC took a look around at the international stations which were carrying our story to the south. They found most of the equipment was in deplorable condition and that the broadcasters, who get nothing much out of the work, were going about it in half-hearted fashion.

An order was drawn up requiring that all stations engaged in international broadcasts use a minimum power of 50 kw's. The out-moded antennae which some stations had been using must be replaced with new directional antennae having a ten-to-one power gain.

Within a few days, nine American stations had been authorized to increase their power or modernize their equipment. Those which have so far complied include National's WRCA and WNBI; Columbia's WCBK; General Electric's WGEA, WGEO and KGEI; Crosley's WLWO; Westinghouse's WPIT and World Wide's WRUL. Three more stations have been given until January 1 to step up power or get off the air.

This means that the United States will be able to lay down nine beams, at least, in any spot to the south with at least 500 kw power, because of the antennae power gain. Secretly being worked on are plans whereby arrangements would be made with South American stations to rebroadcast U. S. programs—which is really the only effective way to do the job.

50 KW and Up Plus Foreign B.C.

AT the same time steps are being taken to strengthen our position on the domestic radio front. The Army and Navy have unostentatiously installed officers who could take command of all commercial broadcasting facilities in case of emergency. Men from the industry have been enrolled as reserve officers and are being trained in Washington for the work in propaganda, civilian protection, etc., which would be the job of the semi-commandeered stations in time of war.

Chairman Fly of the FCC revealed that consideration was being given to the establishment of more clear channel stations for domestic broadcasting. There is the likelihood that the present ceiling of 50 kw's will be raised. He stated that 50 kw was not really enough to establish a clear channel station.

Meanwhile, there is much behind the scenes agitation for a law to bar communists, fascists and other espousers of foreign philosophies from the air. The FCC insists that it has the situation well in hand and privately cites the case of WHIP in Gary, Ind.,

as an example of their method of operating. The station was broadcasting an hour-long Nazi program, which drew hundreds of complaints. Washington let the station operator know that the FCC was interested in hearing transcripts of the program. The Nazi hour was dropped a few days later.

The Commission is similarly resisting demands that foreign language stations be shut down. These stations have a value, because through them you can reach people who don't understand English. All their programs are recorded and heard at the FCC by experts in the language spoken. Washington isn't missing any bets.

Big Orders

GREAT secrecy surrounds the big orders which the armed services have been placing for radio equipment recently. Most of the contracts are being negotiated directly between the Army and Navy and the manufacturers—rather than being cleared through the National Defense Commission. This is to make certain that nothing leaks out on the size or the nature of the orders.

One secret order, at least, has gone to RCA. This is for a large quantity of ultra-high frequency equipment, which will do things that most radio engineers have just been dreaming about. General Electric turned down a similar order.

Graybar Electric Co. has landed the biggest of the few orders that the Defense Commission has negotiated for the Army. This contract is for \$2,004,930 for radio sets of secret design. GE signed an order for \$836,061 for transmitting equipment; the Julian P. Friez & Sons plant in Baltimore will turn out \$67,893 of airplane radio equipment; and the Karp Metal Products Co. of Brooklyn has negotiated two contracts, totalling \$226,471, for radio cabinets.

But the National Defense Commission has not been idle, either. It has just awarded the following contracts: General Electric Company, \$5,750,000 for transmitting equipment; Allen D. Cardwell Mfg. Corp., \$247,970 for frequency meters; same company, \$90,019 for telegraph equipment; Fred Ehrlich Co., \$20,282 for panels and cases for Army Equipment; and Federal Telegraph Co., \$112,161 for radio replacement parts.

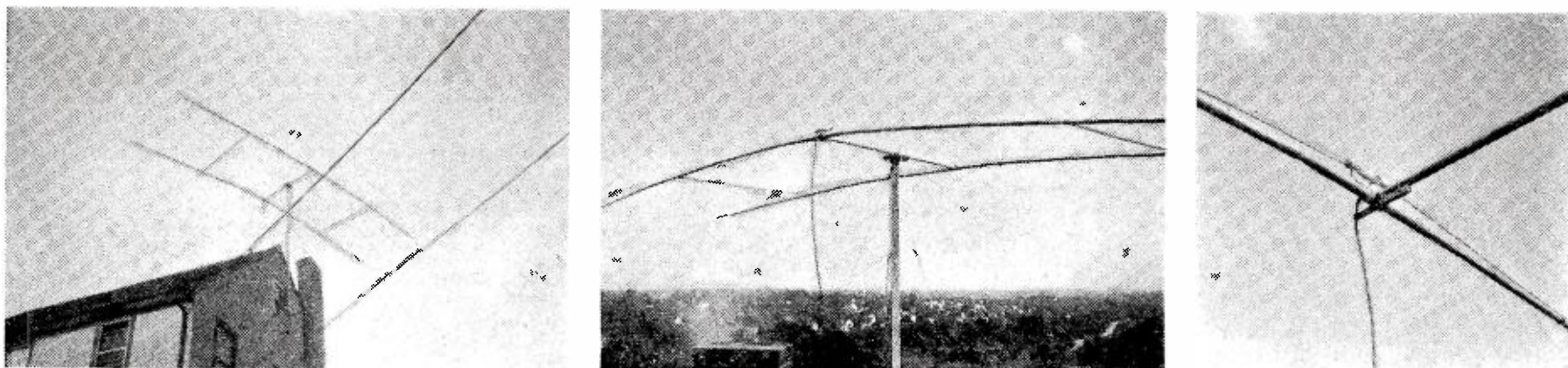
In these two paragraphs we are reporting a total of \$9,355,787 for radio in National Defense. That's a few bucks in any man's language, and reaffirms our contention that the United States cannot be beaten in the matter of production, of money, and of equipment, IF we only get down to cases . . . and it seems that we are!

It does not appear likely that any of the large manufacturers, working on secret contracts, will be hard put to meet the deadlines established. They have plenty of floor space—left over from the pre-depression days of optimism—and can go into production quickly. What does worry Washington is the possibility of bottlenecks in smaller plants which manufacture such parts as condensers, etc., on a sub-contract basis. How much the production of commercial sets is going to be affected by the rearmament program is impossible to say yet. But if any log-jams develop in the industry, hams and servicemen can kiss their dreams of replacements goodbye. For defense comes first.

Checking Army Personnel

THE Army Signal Corps is giving its personnel a very thorough once over. Shocking reports from Army intelligence in Europe revealed how traitorous soldiers had worked into the communication arms of the Dutch, French and Belgian armies and worked for the Nazis. The Signal Corps

(Continued on page 45)



Several views of the completed bamboo rotary antenna. It's quite strong.

A SIMPLE BEAM ANTENNA

by **NICHOLAS S. LEFORS, W2BIQ,**
Yonkers, New York

Bamboo appealed to the author as the right material for a rotary beam. How he solved the problem should guide other hams well.

AFTER much consideration, a two element rotary beam, antenna and director, had been decided upon at this station. In the interest of economy, bamboo for element support was the first idea. After reviewing several articles on the use of bamboo for this purpose, it was found that much could be done to simplify construction.

In reference to the illustration, it will be seen that $\frac{3}{4}$ " galvanized pipe is used to separate and support the bamboo. The vertical three foot piece of $\frac{3}{4}$ " pipe rotates within a four foot piece of 1" pipe, both these pieces being steel conduit. Black or galvanized pipe of this size will not fit together. The bamboo was purchased at a local fish and tackle store, were twenty-four foot lengths and cost \$1.50. The bamboo was fitted into the 1"x10" pieces of pipe and pinned in place with $\frac{1}{4}$ "x20 brass screws. In the middle of each outside 1"x1"x $\frac{3}{4}$ " T, a 2" standoff insulator is mounted and used as center support for elements of No. 10 wire.

The wire is then cut for the approximate element length per A.R.R.L. Antenna Handbook data. Now here is the unusual feature of this beam. As the description progresses, it will be seen that the No. 10 wire is taped directly to the bamboo. This is entirely possible, considering that the bamboo is cut the same length as the No. 10 wire and to a large extent may be compared to a self-supporting element. This feature is accomplished by cutting the bamboo the same length as the wire and doubling back one inch of the wire in the form of a hook. The wire is inserted into the end of

the bamboo similar to stringing a bow. It will be found that the bamboo now has the additional support of the wire element acting as a truss guy and raising the natural drop of the bamboo considerably.

Starting three feet each side of the center insulator, the wire is taped directly to the bamboo each foot and a half to the ends. The bamboo structure is then given a coating of waterproof varnish.

The rotator is a 10" pulley consisting of $\frac{3}{4}$ " waterproof plywood with the pulley edge consisting of 11" diameter tempered masonite. This pulley is slipped on and up the $\frac{3}{4}$ " vertical steel conduit and fastened to the horizontal $\frac{3}{4}$ " pipe with homemade pipe straps of $\frac{1}{8}$ "x1" strap steel. The bearing plate, which bears on the edge of the 1" pipe, within which the vertical $\frac{3}{4}$ " pipe rotates, is $\frac{1}{8}$ "x3"x5" steel with a 1" hole. This is mounted on the bottom of the pulley and bolted in its four corners to the pulley with $\frac{1}{4}$ "x20 brass bolts. The idler pulley arrangement is constructed of $\frac{1}{8}$ "x1" strap steel as illustrated.

The bearing pipe is bolted at the bottom to the 2"x3" mast with a $\frac{3}{8}$ " bolt to prevent slipping of the bearing pipe and clamps used at top and middle.

The feed system which lends itself quite applicably to our purpose is described in detail in "Radio" June 1938. It is a quarter wave matching section of EO1 cable 11' long, into a quarter wave 350 ohm line, constructed of No. 10 wire spaced $1\frac{1}{4}$ "—16.5' long, to the regular 600 ohm transmission line. As a point, it might be interesting to note that the length of the elements is quite critical and has been reviewed in previous articles. It is worth putting the extra time in adjusting the element lengths for proper performance. If it is necessary to prune the elements, which no doubt it will be,

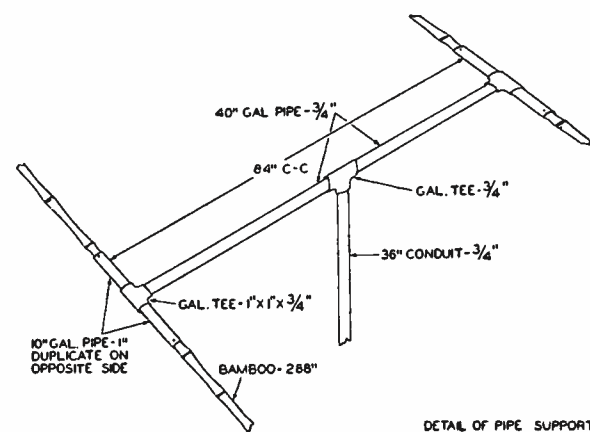
since no two installations have the same physical surroundings, no difficulty will be experienced in cutting the bamboo and wire elements since the taped wire now supports the bamboo. Merely cut the wire an inch longer than the bamboo and hook the wire into the end of the bamboo. For those installations where it is impractical to prune the antenna and director for the greatest front to back ratio, the following lengths for 14,200 kc. will prove highly satisfactory:

Antenna length33'0"
Director length31'8"
Spacing between elements.....7'0"

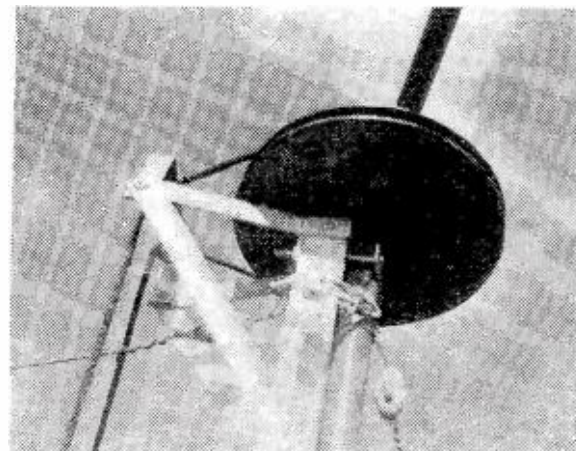
To prevent swaying of the elements a light cross-brace of $\frac{1}{2}$ "x $\frac{3}{4}$ "x7" pine was inserted either side of the pipe T, eight feet out.

Reviewing the construction of this antenna, we find that this bamboo structure is exceptionally light and can be handled by one person. Note may be also made of the fact that a 2"x3" wood mast guyed near the top supports the entire structure. Furthermore—this antenna presents a more finished appearance than some of the usual bamboo structures that may have been constructed by a protege of

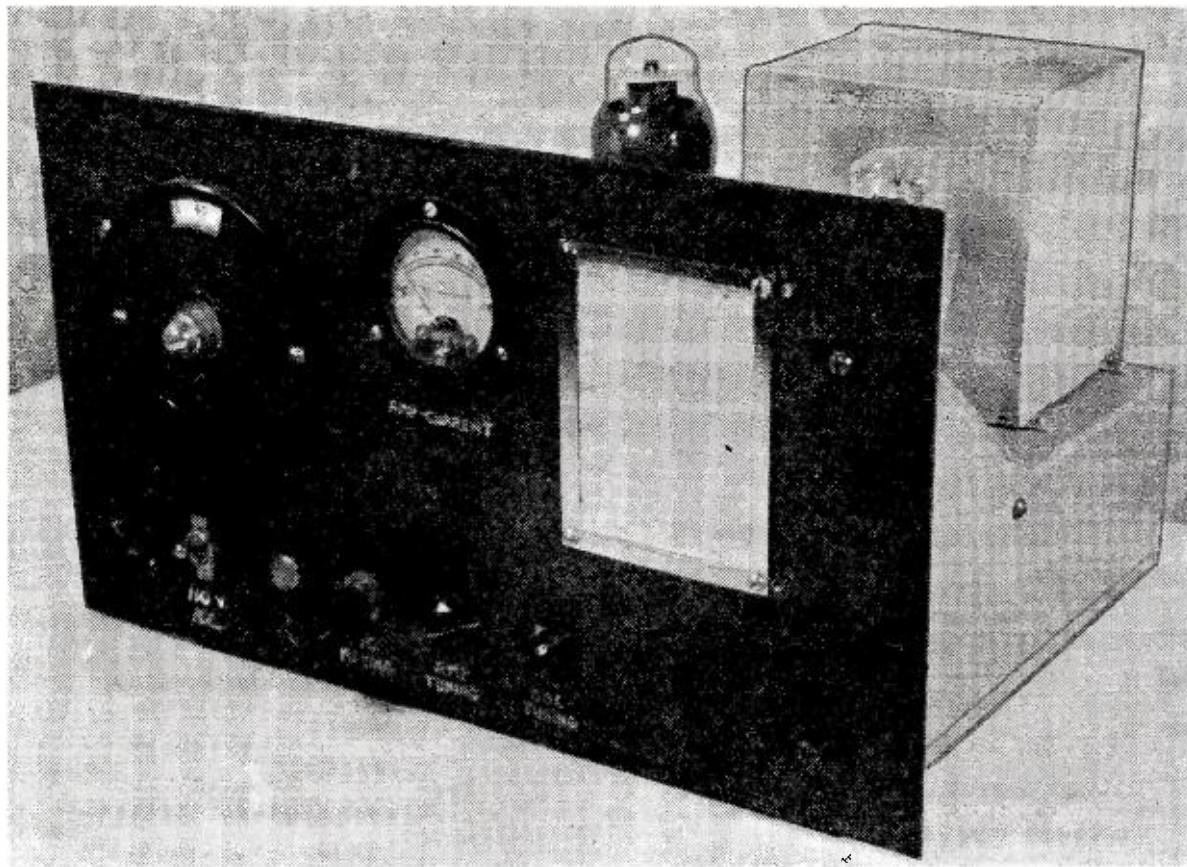
(Continued on page 55)



Beam construction details.



Rotary head construction detail.



The calibrated ECO with chart in front.

CALIBRATED 40 M. ECO

by **HENRY SABORSKY, W8IYQ**

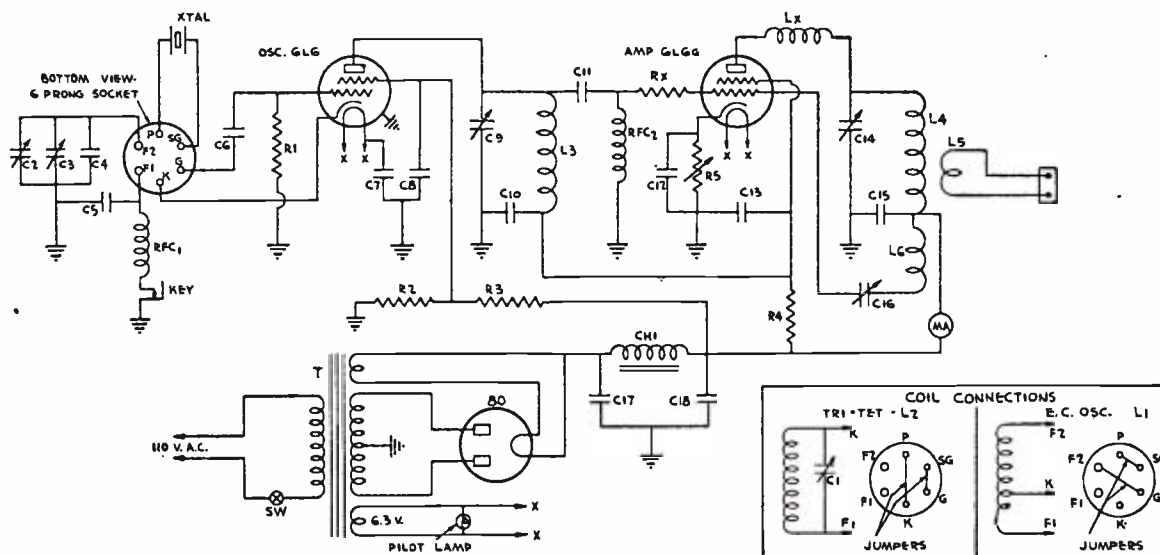
Farrell, Penn.

and

PAUL V. TRICE, W8QHS

Sharon, Penn.

The E.C.O. is fast coming into its own as a simple means of rapid and sure-fire band-QSY.



- C₁—85 mmfd. padding cond. Hammarlund CTS 85
- C₂—140 mmfd. Star midget variable cond.
- C₃—100 mmfd. variable cond. National ST-100
- C₄—350 mmfd. Ceramic capacitor—Zero coefficient Centralab 816Z
- C₅—.002 mica. Solar
- C₆—.00025 mfd. mica. Solar
- C₇—.002 mfd. mica. Solar
- C₈—.002 mfd. mica. Solar
- C₉—100 mfd. midget. Hammarlund
- C₁₀—.006 mfd. mica. Solar
- C₁₁—.0001 mfd. mica. Solar
- C₁₂—.002 mfd. mica. Solar
- C₁₃—.002 mfd. mica. Solar
- C₁₄—100 mfd. midget. Hammarlund

- C₁₅—.006 mfd. mica. Solar
- C₁₆—Neutralizing cond. (NC-600 or equivalent)
- C₁₇—8 mfd. 600 volt filter condenser. Sprague
- C₁₈—8 mfd. 600 volt filter cond. Sprague
- R₁—50,000 ohms, 1/2 w. IRC
- R₂—25,000 ohms, 5 w. IRC
- R₃—25,000 ohms, 5 w.
- R₄—5,000 ohms, 25 w.
- R₅—500 ohms, 10 w. variable. Mallory
- T₁—800 volt c.t., 6.3 volt; 5 volt. Kenyon
- CH₁—30 Henry 200 mil. choke. Kenyon
- RFC₁—2.5 mh. R.F. Choke. National
- RFC₂—2.5 mh. R.F. Choke. National
- SW—110 volt toggle switch
- COIL FORMS—Hammarlund 6-prong XP-53 or equivalent

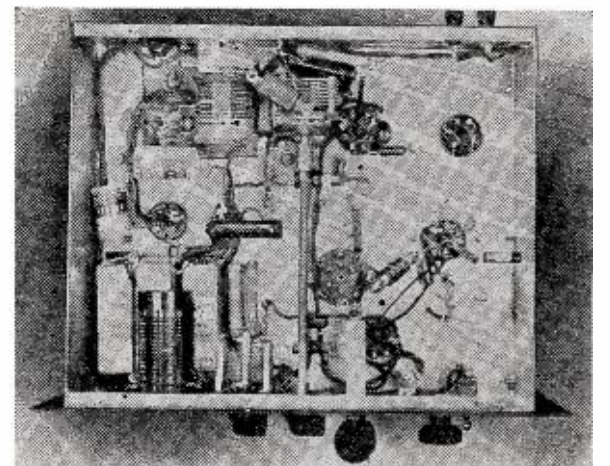
THE need for a variable frequency, stabilized exciter unit for operation in the 40 meter band prompted construction of the unit about to be described. Since cost was an important consideration in the design of the unit, many of the parts were resurrected from the junk box. However, although a few of the constants will have to be duplicated in order to achieve proper results, most of the parts will permit substitution, if necessary.

It can also be stated here that since the rig here described was designed and built, a few possible changes for its improvement have been worked out. Chief among these suggested changes would be to build the rig with the oscillator and amplifier directly behind the panel and the power supply at the rear of the chassis, rather than that shown on the chassis diagram. The reason is that it will permit shorter leads, which in turn will tend to eliminate the possibility of parasites, which were encountered here and had to be cured. Another suggested improvement, not yet incorporated in this rig, would be to mount the oscillator on some sort of live rubber supports, in order to minimize frequency variation due to vibration.

Needless to say the constructor can, and usually does, incorporate his own ideas in laying out and wiring a unit. However, it should be borne in mind that the rig as a whole should be mechanically strong and the grid leads should be as short as possible and as far from the a.c. leads as is permissible, in order to obtain a good, stable note.

The heart of the unit is the oscillator. HI-C is here achieved by the use of large capacity and insures against frequency variation due to change in voltage, vibration, etc.

If the callibration curve which was obtained in the original unit (and which is almost a straight line) is to be secured, it will be necessary to duplicate C₂, C₃ and C₄ as given in the



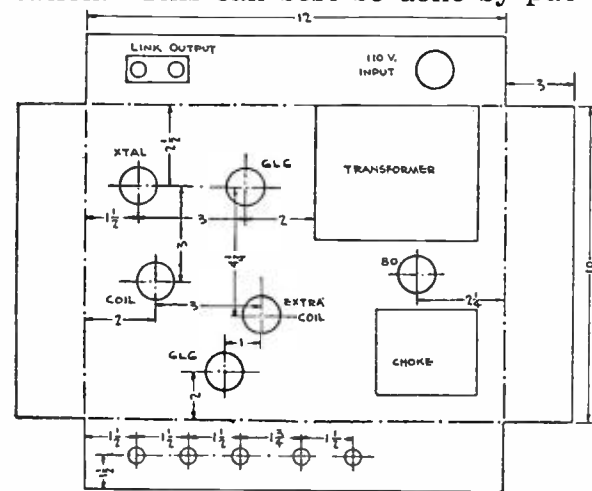
Under chassis view of the unit.



Notice shielding! It's necessary!

parts list. Also, the winding of the coils will have to be closely followed. Due to the HI-C tank circuit, final adjustment of the coils should be made by spacing the top two or three turns of the coil until the band is located and then cementing all turns in place.

The cathode tap on the oscillator coil can best be located by experimentation. This can best be done by put-



Chassis layout.

ting a dropping resistor in the plate lead to the oscillator and if by cutting this resistor in and out of the circuit, the frequency increases with a drop in plate voltage, the cathode tap on L1 is too high and should be changed. The correct point for the tap, however, is not too difficult to find.

The condenser C7 is quite important as it will be noticed that it minimizes frequency drift with increase in temperature. The condenser C5 and the r.f. choke in the keying circuit are necessary for good, clean keying. A metal shield should be used over the oscillator coil and a metal 6L6 is recommended in the oscillator stage due to its shielding.

The Amplifier is straightforward in design except that it is left running at all times and acts as a constant load on the power supply which also helps to keep the plate voltage at a fixed value. The only critical adjustment is the variable resistor R5, which is adjusted so that the plate current remains constant with the key up or down.

Neutralizing is the same as in conventional rigs and will not require explanation here.

In the power supply, the power transformer and choke were taken from an old BC receiver, but any suitable substitute will suffice. If desired, an additional section of filter could be added but is not actually needed as reports indicate it is properly filtered as shown in the diagram. A red pilot light on the front panel is used to indicate when the 110 V. a.c. is turned on.

A shield plate is bolted to the bottom of the chassis and final adjustments on the rig should be made with it in place. It should preferably be of some non-magnetic material such as stainless steel.

Tuning Up

After the unit is finished and checked, a trial operation can be made. The preliminary step is to remove the plate voltage on the amplifier and the 80 meter coil should then be adjusted until the 3.5 mc. band is located with C3, which, if the constants as given are followed, should be about mid-scale on the condenser. L3-C9 should then

(Continued on page 59)

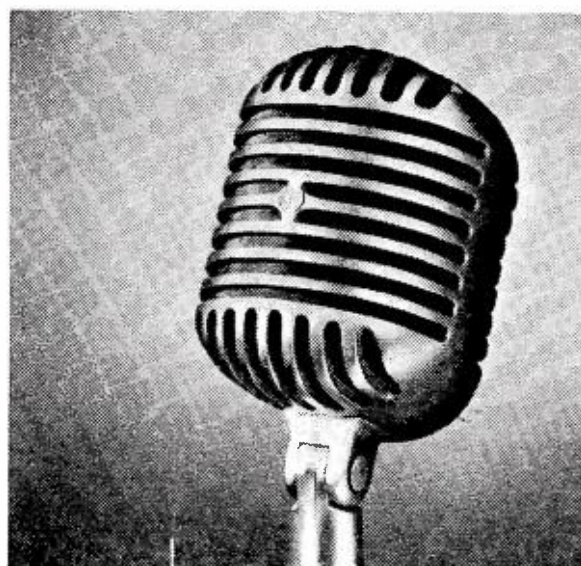
MIKES-HEADS-PICKUPS

Manufacturers Specifications

Make: Shure Brothers, Chicago, Illinois.
Model: 55C.
Type: Dynamic (Cardioid type).
Range: 40-10,000 cycles.
Impedance: High Impedance (100,000 ohms).
Sensitivity: 55 db below 1 volt per bar when loaded with 100,000 ohms or more. This is equivalent to 1.8 millivolts per bar across 100,000 ohms or more.

Remarks

High quality recording requires that the microphone possess characteristics that will insure accurate results from the sound source. This microphone will appeal to those that have high grade equipment and are constantly seeking better microphones as accessory items. The home recorders, as a rule, use one of the most inexpensive types of crystal units. We have seen many cases where great improvement can and has been made by making use of this particular type of microphone as a replacement.



Description.

Models 55A, 55B, and 55C are cardioid type unidirectional moving coil dynamic microphones providing wide-range high quality reproduction of sound. The true unidirectional characteristic of the "Unidyne," obtained by the "uniphase" principle provides highly satisfactory operation under adverse acoustic conditions where a conventional microphone would be practically useless.

The microphone has a specially designed moving system containing a new type moving-coil element, operating in conjunction with a high flux magnet in the magnetic circuit providing high efficiency and smooth peak free response from 40 to 10,000 cycles. The rear response is down approximately 15 db due to the "uniphase" unidirectional acoustic network.

The case is modern in design with attractive streamlining and grille treatment. The head tilts through an angle of 90° to permit aiming at the source of sound for best pickup. A built-in cable connector is provided and a 25 ft. shielded rubber-jacketed cable with microphone plug attached is included.

All are suitable for high quality public address, broadcasting, recording and similar applications. The true unidirectional characteristic of the "Unidyne" provides an easy solution to the feedback problem in reverberant locations, facilities orchestral placement, permits best utilization of space in small broadcast studios, and allows practically complete exclusion of unwanted noises. The swivel allows the head to be tilted through an angle of 90° permitting the microphone to be aimed at the source of sound.

The instrument is unusually rugged and is practically immune to the effects of moisture, temperature and mechanical vibration.

High impedance model 55C (or 55C-7FT) may be used with any crystal microphone

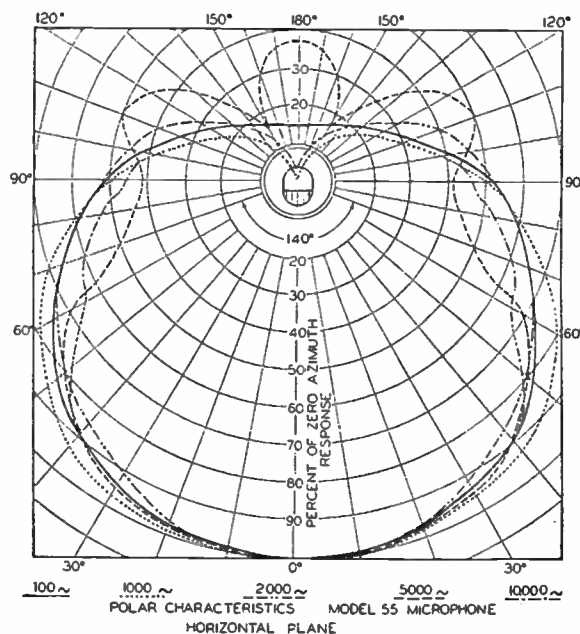
amplifier or other amplifier with an input impedance of 100,000 ohms or more. For best high frequency response, the total cable length should not exceed 25 feet; longer cable lengths may be used with some loss of high frequency response. The additional loss at 5,000 cycles is of the order of 2.5 db for an additional 25 ft. length of cable (50 ft. total) and 6 db for an additional 50 ft. length (75 ft. total).

The microphone should be placed in its operating position before turning up the volume controls of the amplifier. Jarring or excessive moving of the instrument should be avoided while the system is in operation in order to prevent the spring-suspended microphone unit from touching the inside of the case and producing undesirable noises.

No special precautions beyond ordinary care are necessary in the operation of 55 Series Dynamic microphones. They will operate efficiently and dependably under all ordinary conditions in hot and cold climates. To retain the full strength of the highly efficient permanent magnet and to maintain alignment of the structure, dropping or other severe mechanical shocks should be avoided.

The expression "cardioid type" response simply means that the horizontal polar characteristic approximates a cardioid of revolution. There is a wide, useful pickup angle at the front of the microphone while the response at the sides is down 6 db from the front response. The rear response in practical cardioid type microphones is down of the order of 15 db from the front side response. The Unidyne fulfills these requirements over a broad range of frequencies. The true unidirectional characteristic of the "Unidyne" should not be confused with the relatively slight directional effect at high frequencies only which can be produced by baffle effects in the conventional pressure microphone.

The result of this unidirectional characteristic is a complete elimination of acoustic feedback at volume levels which would cause considerable feedback with conventional semidirectional microphones. In practically all cases it is possible to increase loudspeaker levels when a Unidyne is installed. By directing the dead side (rear) of the micro-



Directional characteristics.

phone towards the audience or other source of interfering sound, pickup can be concentrated on the desired source. Reverberation energy pickup is decreased approximately two-thirds. The microphone can be placed close to reflecting surfaces without objectionable effects if the rear side of the microphone is toward the reflecting surface. This is particularly valuable in small broadcast studios.

It is desirable to experiment with microphone placement and orientation in order to secure the greatest benefits from the unidirectional characteristics.

What's NEW in Radio

A new, modern, general-purpose dynamic microphone is announced by *Shure Brothers, Microphone Headquarters*, Chicago. This new Series "508" Dynamic has a smooth wide-range frequency response for voice and music—no annoying peaks or distortion. Recommended for public address, remote broadcasting, recording, call systems, and other general-purpose applications. Moving-conductor type. Very rugged. Not affected by heat or humidity. Built-in high quality transformer. Swivel head for semi-directional or non-directional operation—easily aimed at source of sound for best response. Die cast case richly finished in Satin Chrome. Built-in cable connector. Locking plug attached to cable. Standard $\frac{1}{8}$ "-27 thread for stand mounting. Available in 35-50 ohms, 200-250 ohms, and high impedance models. Permissible cable length practically unlimited with low impedance models. High impedance models may be used with crystal microphone amplifier and other amplifiers with input impedance of 100,000 ohms or more.

The *Shure Series "508" Stratoliner Dynamic Microphones*, complete with 25 foot shielded cable, list at \$27.50.

Shure Brothers, 225 W. Huron St., Chicago, Illinois.

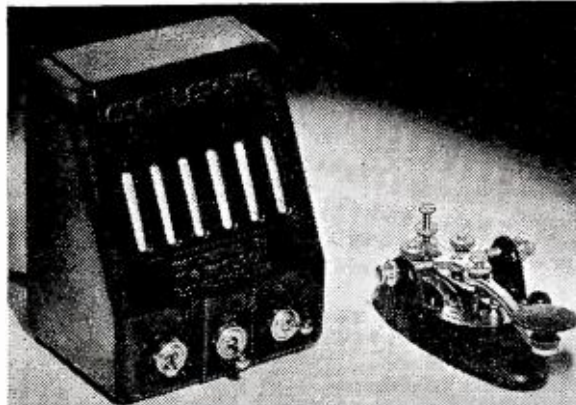
Allied Radio Corporation, Chicago, is currently featuring a new 6-tube, 3-way portable radio, Model B10563. This new set is light in weight, easily portable, and will operate from battery or any 110-volt, 60-cycle a.c.-d.c. light source. The latest 1.4-volt low-drain multi-purpose tubes are used in an R.C.A. and Hazeltine licensed circuit as follows: 1P5G, 1A7GT, 1N5GT, 1H5GT, 3Q5GT, 117Z6GT. Outstanding features include: special r.f. stage for extra sensitivity; built-in "Magna-Beam" loop antenna; slide rule



dial; A.V.C.; heavy-duty, rubber mounted 3-gang condenser; 5-inch p.m. dynamic speaker, etc. The battery pack is good for 200 hours of service. Tuning range is from 535—1730 kc. The case is of grained leatherette and has convenient carrying handle, name tag, and disappearing protective lid. Size: $12\frac{1}{4}$ "x $11\frac{1}{2}$ "x $7\frac{1}{2}$ ".

The *McElroy Oscillatone* is an electronic instrument for reproducing the dots and dashes of radio telegraphy. Housed in lustrous Monsanto plastic, the Oscillatone may be hooked up for practice or plugged into circuit for actual receiving. The staccato flashes, which sound off through slots molded in the front of the housing, are controlled by switches which regulate tone and volume.

The compact case is injection molded of Mon-

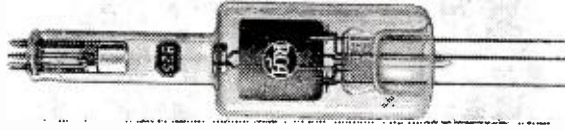


santo cellulose acetate for T. R. McElroy by Gorham Company.

Companion to the *McElroy Oscillatone* is the *Streamkey*, a fast, well-balanced radio sending instrument. The metal parts of the key, finished in gleaming chromium, are mounted directly on the base which is injection molded of Monsanto cellulose acetate. Use of this non-conducting

plastic provides electrical insulation and cuts down on the number of parts needed in assembly. The base is molded by Gorham Company.

RCA Manufacturing Company announces the new *RCA-825*. It is a new type of multi-electrode tube in which the electron stream is inductively coupled to the output circuit. The 825 is designed for use as a power amplifier at frequencies above 300 megacycles and in such service is capable of handling power outputs up to 35



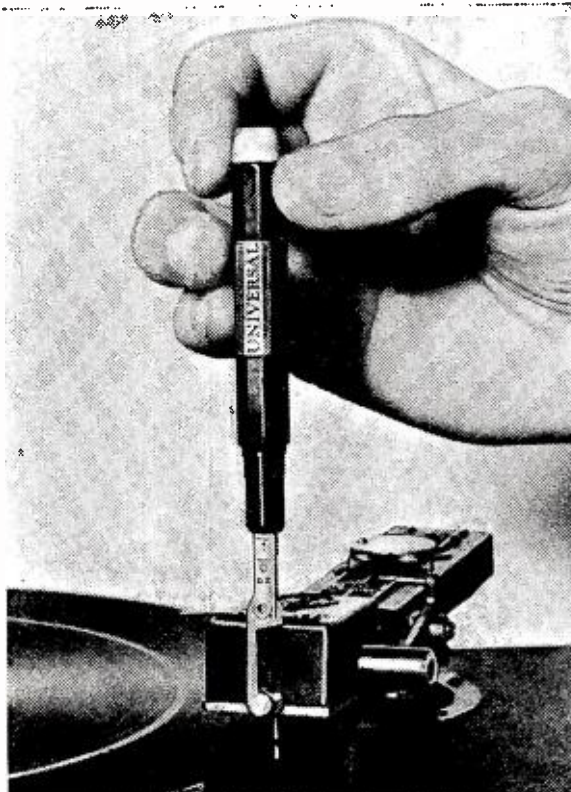
watts depending on bandwidth and type of service. Because of its high transconductance and its adaptability to tank circuits having low effective capacitance, the 825 is especially suited for wide-band services, such as television and frequency modulation. The 825 may also be used as an oscillator and harmonic generator.—*RCA Manufacturing Co., Inc.*

Talk-A-Phone Mfg. Co., 1219 W. Van Buren, Chicago, announces a new, unusually low-priced Complete Home Recorder. It is actually three instruments in one: (1) an easily operated Recorder; (2) an efficient Record Player; (3) a complete Public Address System, including amplifier, Crystal Microphone, and special heavy-duty $6\frac{1}{2}$ " Dynamic Speaker. Plays back the recordings it makes, or plays any standard 10-



inch and 12-inch commercial phonograph records with the cabinet lid closed. When used as a Public Address System, develops full three-watts power output. Employs five tubes, including Rectifier and Electric Eye Volume Indicator. The *Talk-A-Phone Portable Recorder* is housed in a durable, attractive carrying case finished in striped airplane-luggage cloth. Size: 16" long, 16" deep, 14" high. Weighs approximately 45 lbs. It's the last word in an exceptional quality, low-priced Complete Home Recorder.

Universal Microphone Co., Inglewood, Cal., is now distributing its new weight scales for servicemen, recordists, and others who need to quickly determine the weight on pickups or cutting heads. The tiny instrument is small and light-



weight but extraordinarily accurate. It reads in ounces and has a hook for speedy connections which enables the recordist to see the weight on needle or stylus. Besides use with servicemen and recordists, the advent of home recording has made such a device necessary because manufacturers recommend a certain weight limitation. It will be available thru usual dealer and jobber channels.

The problem of energy absorption by radio frequency chokes when used in transmitting circuits has been materially simplified by a new and radically different transmitting r.f. choke, now available. It is known as the Type R-175 and is designed for use on the 1.7, 3.5, 7.0, 14.0 and 28.0 megacycle bands.

It is particularly well suited for parallel as well as series-fed circuits employing a maximum d.c. plate supply of 3,000 volts, and is probably the first wide-band choke to operate successfully in parallel-fed circuits without appreciable energy loss.

It has the following characteristics: Maximum d.c. plate voltage, with modulation, 3,000 volts; maximum d.c. plate voltage, without modulation, 4,000 volts; inductance, 225 microhenries; distributed capacity, 0.6 micro-microfarads; d.c. resistance, 6.0 ohms; direct current, 800 milliamperes. It is manufactured by *National Company, Inc.*, Malden, Mass.

A new series of *Amphenol* microphone switches for crystal, dynamic and velocity microphones is announced by the *American Phenolic Corporation*, of Chicago, Illinois.

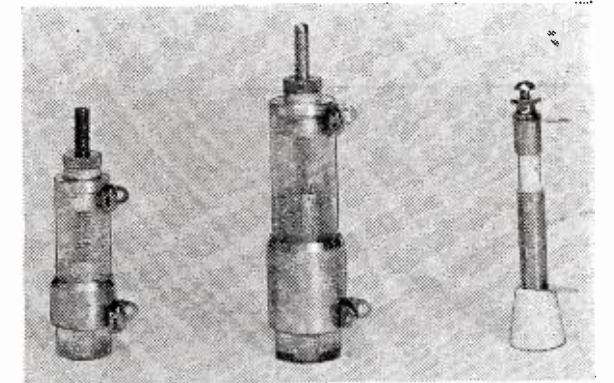
The No. MC1S crystal microphone switch is part of the well-known MC1 group of microphone connectors, and couples directly to the microphone.

Switch is of the "Press-to-Talk" type, a slight downward movement of the thumb locking it in the "On" position. Has a coupling ring at one end, with coupling threads at the other end, machined to fit standard MC1 microphone connectors. Switch spring is silver-plated for low resistance contact and continued noise-free operation.

Two and three contact switches fit the MC2 and MC3 series of microphone connectors which are so widely used on dynamic and velocity microphones.

The increased tendency in the design of r.f. amplifiers toward compactness and the elimination of large and bulky parts has created a need for transmitting components of small size. In keeping with this trend and in order to fill the need for neutralizing condensers of small physical size, *Bud Radio Inc.*, of Cleveland, Ohio, has introduced a new line of Compact Neutralizing Condensers.

Three types are made in this new series. All



are tubular in design and have a single hole for mounting. The capacity is adjusted by means of a small screw driver and may be locked at any desired setting.

No. NC-1928, using ceramic insulation, has a capacity range of .25 mmfd. to 4 mmfd. and is designed for use in stages operating with 1,000 volts or less. It is particularly useful for neutralizing the various popular beam power tubes. No. NC-1929, using Lucite insulation, has a capacity range of .25 mmfd. to 4.75 mmfd. and is designed for use in stages operating at 2,000 volts or less. No. NC-1930, using Lucite insulation, has a capacity range of 1 mmfd. to 9.5 mmfd. and is designed for use in stages operating at 3,000 volts or less.

Further information on these items may be had by writing direct to *Bud Radio Inc.*, Cleveland, Ohio.

The *American Television & Radio Co.*, 300 East Fourth Street, St. Paul, Minnesota, have just announced a "B" Battery Eliminator for Portable Receivers, which operates from flashlight cells or the storage battery in the car.

This new ATR development is so designed and constructed to eliminate two 45 volt "B" batteries, such as Eveready's Mini-Max type or their equivalent, and delivers 90 volts at 10 milliamps, operating from a $7\frac{1}{2}$ volt source of supply, consisting of five No. 2 flashlight cells connected in series.

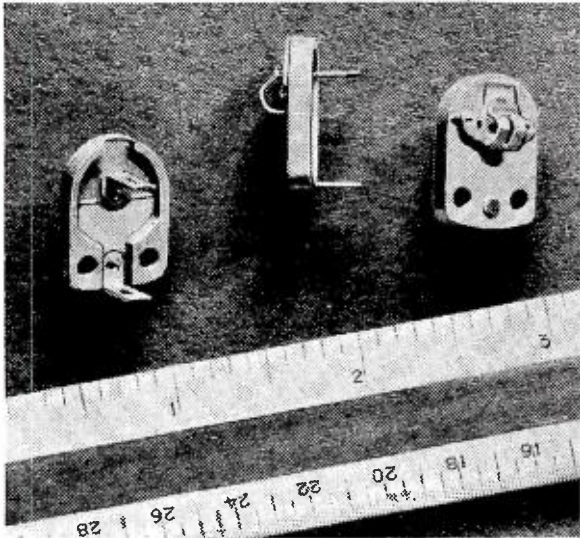
The chief advantages of this arrangement are that flashlight cells are obtainable in the remotest territories from garages, filling stations, hardware stores, etc.; whereas, expensive "B"

batteries, generally considered special, are hard to obtain; and the investment in flashlight cells is approximately one-sixth that for "B" batteries. Also, this ATR "B" Battery Eliminator is designed for operation from the six-volt storage battery in the car, thus permitting further economy in use.

The total weight of the ATR "B" Battery Eliminator, including the flashlight cell container and flashlight cells, is approximately 3 lbs., which is approximately one-third less than equivalent "B" batteries. The list price of the complete unit less cells is \$6.95.

Further complete information may be obtained by writing to the *American Television & Radio Co.*

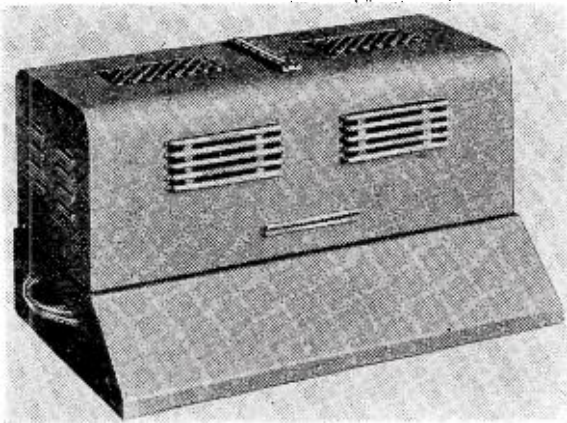
A new ceramic trimmer capacitor has just been announced by *Centralab*. Fixed plate bonded to the ceramic base, eliminating the usual variable air film. Variable plate rotates on a ground ceramic surface. Equally stable at all capacity adjustments. Provides negative temperature



compensation of .0006 mmf./mmf./°C. Power factor less than 0.1%. Capacity change with humidity or temperature cycling less than 0.5%. Available capacity ranges 2 mmf. to 6 mmf., 3 mmf. to 12 mmf., 7 mmf. to 30 mmf., 60 mmf. to 75 mmf.

Manufactured by *Centralab*, Milwaukee, Wis.

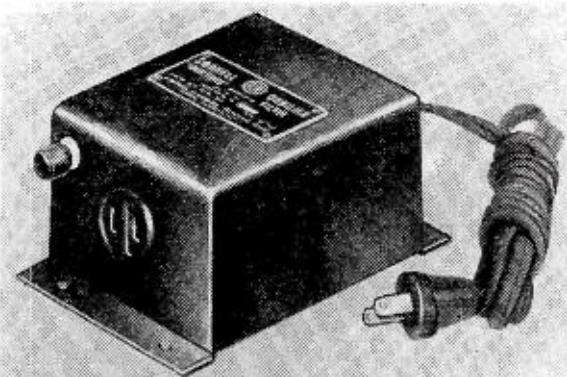
The *Insuline Corp. of America* is introducing a completely new and improved line of metal cabinets, chassis, amplifier chassis, etc. They are all streamlined and are embellished with



chrome moulding and chrome air-gate ventilators. All are finished in marine gray ripple enamel.

Complete catalog No. 207 now ready for distribution.

A radio noise filter which lends itself particularly for use in the home is the *Cornell-Dubilier* universal "Quietone," Type IF-18. Both in-



ductance and capacity are included in its specially developed internal circuit with the result that its filtering action is unusually thorough and it is highly effective even under conditions of severe noise. It is rated to carry 5 amperes and is therefore suitable for use with any radio set or any electrical appliance normally used in the home.

The universal feature is found in the fact that

this unit can be used either in the supply line to the radio set or in the line to a noise-creating electrical appliance.

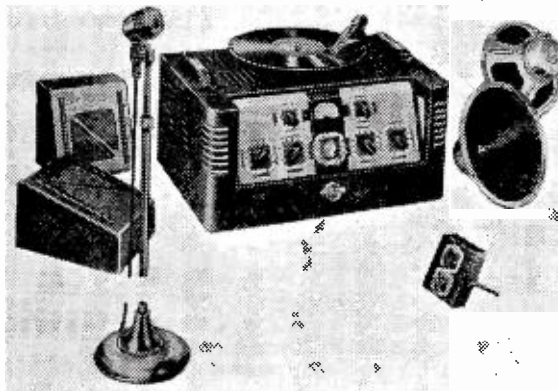
This unit is applied by plugging it into the line and in turn plugging into its receptacle the device which is to be filtered. It may be mounted in or on the radio or appliance, or where more convenient it may be mounted directly on the wall or baseboard. The neat appearance of its Bakelite case (ivory or walnut) makes concealment unnecessary. Mounting flanges at each end provide convenient mounting means.

Dimensions of the Bakelite case are 5x3 3/4 x 2 1/4". The unit comes complete with 6-foot line cord and plug and is for use with any 110-volt line, alternating or direct current. A ground terminal is provided for reduction of radiation.

Cornell-Dubilier Electric Corp., South Plainfield, New Jersey.

Clarion announces the release of a newcomer to its line—the Model CS-45, 31-watt sound system.

This system, complete to the last detail, incorporates an individuality of styling entirely new to the sound industry. Its striking appearance, coupled with the many operating features, such as four inputs, built-in phono mechanism, master gain control, bass and treble



equalizers, V.I. meter, (or optional monitor speaker), dual speaker outlets, 12 inches heavy duty dynamic speakers, indirect lighting, remote control and many others, makes the *Clarion* CS-45 the outstanding contribution to the P.A. field.

The amplifier has a rated output of 31 watts and a peak of 42 watts. Tubes used are 2—12SJ7's; 3—6089's; 2—6L6G's; in push-pull with inverse feedback, and an 83 rectifier. Frequency response is 40-12000 cps. Hum level—20 db below .006 milliwatts. Output transformer is tapped at 2, 4, 8, 16 and 500 ohms. Microphone gain is 118 db.

The CS-45 system complete with two speakers, baffles, heavy-duty floor stand, choice of one of four popular microphones, remote control and V.I. meter, all cables and plugs, ready for immediate operation, lists at \$195.91.

Complete catalog and further information is available by writing *Transformer Corporation of America*, 69 Wooster St., N. Y. C.

A radical improvement in scratch removers has just been perfected by the *Walter L. Schott Company* of Los Angeles, manufacturers of *Walsco* Products.

The new *Walsco* Scratch Remover is shaped like a fountain pen and has a clip on it, so that it can be carried most conveniently. Being made of plastics it is unbreakable.

On one end of this new scratch remover a cap covers the liquid used for light scratches which has been especially prepared for quickly



removing scratches on radio cabinets or other pieces of furniture. The cap on the other end covers the stain filler which has been prepared to match standard radio cabinet finishes. The *Walsco* Scratch Remover is available on an attractive card holding six.

A companion item to the *Walsco* Scratch Remover is now also available. It is the new *Walsco* Refinishing Kit which sells for less than a dollar to the trade and is ideal for use by the smaller radio stores and service shops. This kit contains alcohol-soluble refinishing materials; two shades of ivory enamel, stain, spirit lacquer, French varnish, etc. It is so easy to use that even inexperienced men can do an excellent refinishing job with this kit by following the simple instructions supplied.

A complete line of commercially non-inductive *IRC* Power Wire Wound Resistors, from 10 to 200 watts and with any type of mounting, has been announced by the *International Resistance Co.*, 401 N. Broad St., Philadelphia.

These units utilize the Ayrton-Perry type of winding which assures full wattage ratings as compared to multiple-layer windings which may result in a reduction in the wattage rating of a unit of given size; eliminates large differences in potential as well as high capacitances which may exist between adjacent turns on windings of other types.

The degree to which inductance is reduced is well illustrated in the Type DG 1000-watt unit

of 80 ohms resistances. With standard winding the inductance is 76 microhenries, whereas, with the Ayrton-Perry winding this is reduced to 0.3 microhenries.

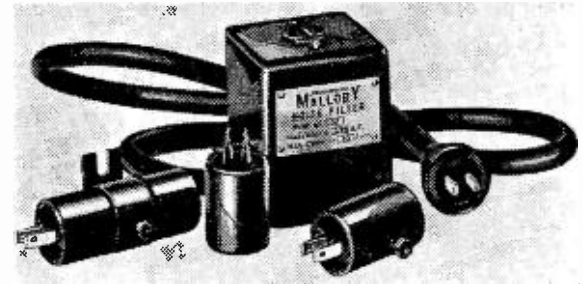
All features of standard *IRC* Power Wire



Wound Resistors including the famous climate-proof *IRC* coatings are included in the new non-inductive units. *IRC* Resistance Data Bulletins IV and IV-A will gladly be sent upon request.

A complete line of *Mallory* Noise Filters, scientifically constructed to combat the particular type of man-made interference for which each is recommended, has just been introduced.

Heavy duty filters in standard cutout boxes.



for use with equipment that is permanently connected to the power line or which draws a minimum of 10 amperes or more, are included.

Type ZA1 is a capacity and inductance combination using house wiring as an antenna. Field-tested recommendations in technical data folder NF 100 tell the correct type and size of Mallory Filter to install in order to overcome a given character and intensity of interference.

The new model CE Capacitor "EX-AM-ETER" just developed by *Solar Mfg. Corp.* of Bayonne, New Jersey, is claimed to be the simplest, quickest and most complete capacitor analyzer on the market. Measures condenser both in and out of circuit. Tests for shorts, opens, high r.f. im-



pedance and intermittents. A capacity and resistance bridge. A megohm meter and a milliammeter. Measures power factor. Both d.c. and a.c. vacuum tube voltmeter. Also performs many other services, thoroughly diagnosing the capacitor and saving much grief for the service man. Moderately priced. . . . Literature may be had from the maker.

Hickok maintains its leadership in improved radio servicing equipment with this wide band



Universal Crystal Controlled Signal Generator specifically designed for Frequency Modulation and Amplitude Modulation servicing. With frequency coverage on fundamentals

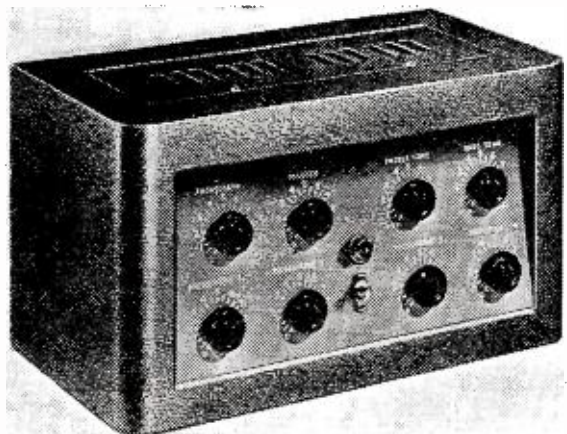
from 100 kc. to 133 Megacycles the 12 output selections include: Electronic controlled wide band frequency modulation output with 750 kc. sweep for alignment of frequency modulation and television receivers. Frequency modulation output, modulated internally, at 400 cycles with F.C.C. standard frequency modulation sweep (150 kc.) for servicing and checking F.M. receivers. Amplitude modulation output as well as narrow band frequency modulation (30 kc. sweep) for servicing amplitude modulation receivers. Audio frequency outputs of 400 cycles fixed and 50 to 10,000 cycles variable are available. Crystal controlled outputs, modulated and unmodulated, with accuracy better than .01 per cent are included with frequency coverage from 100 kc. to 10 megacycles in 100 kc. steps and from 1000 kc. to 150 megacycles in 1 megacycle steps. Also furnishes synchronized sweep voltage for oscillograph use.

The Oscillator includes a complete built-in power supply consisting of transformer, rectifier and filter. It is standard for any 110 volt a.c. line, 40 to 65 cycles.

All necessary cables are furnished. Also complete manual and instruction book. For further details write *The Hickok Electrical Instrument Co.*, 10514 Dupont Ave., Cleveland, Ohio.

A new Preamplifier recently placed on the market by *Montgomery Ward* is, according to all reports, one of outstanding quality and performance. It is known as the *Professional Airline* and designed and built by *Lyon & Healy* under *Montgomery Ward* specifications.

This model is claimed to be the most quiet



and versatile amplifier at anywhere near its price. Its six channels permit the use of four additional microphones at one time, with two extra phonos, though not both at once, and it can be operated up to a mile distant from the amplifier itself.

Its extreme flexibility is made possible by a system of simple, yet most efficient controls. They include two Tone Boosters to emphasize either the low bass or high treble tones, or both; and four microphone input controls for regulating volume in each individual mike. There are also one master phono volume control and one master gain control for overall volume control of both phonos and all mikes.

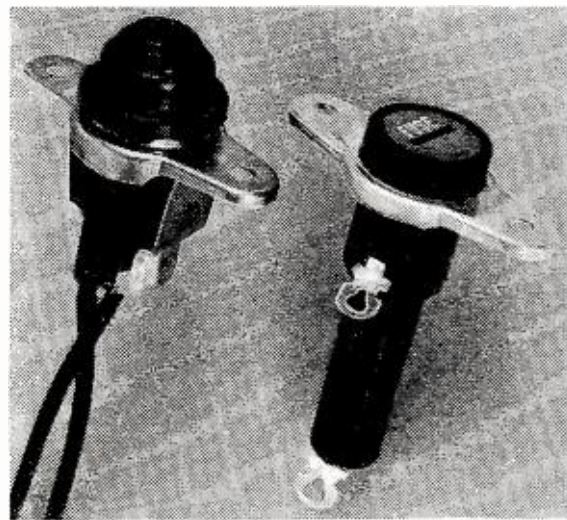
It operates on 105 to 125 volt 50 to 60 cycle a.c., and draws 60 watts.

This Preamplifier is fully described in *Montgomery Ward's* new catalog, "Simplified Sound Systems," and may be had free by writing *Montgomery Ward & Co.*, Dept. RN-39, Chicago, Illinois.

Alden Products Co. have just completed the design of two new items which answer a long-felt need in the radio field.

One is our jewel pilot light assembly, our 440JL and our fuse holder, 440-FZS.

The jewel pilot light assembly was developed after receipt of many complaints on the ordi-



nary type of indicating pilot lamp that upon unscrewing the jewel to replace the bulb, the entire assembly became loose from the panel and it was necessary to gain access to the interior of the instrument to again make it secure.

This assembly (photo of which is attached) fastens to the panel with either eyelets, rivets, or screws through the two holes in the mounting plate thereby making a secure and permanent mounting as well as lending itself well to

(Continued on page 59)

FOR IMMEDIATE RELEASE ...

Hot & Spot News will be found in this column every month. Don't fail to read it!

HOW NBC IS AIDING NATIONAL DEFENSE

Written Specially for RADIO NEWS

by

Niles Trammell, President
National Broadcasting Company

The radio industry today is playing and will play a vital role in national defense. Because of its ability to command the immediate attention of our entire population, the American system of broadcasting provides a means for immediate exchange of information, essential for national preparedness.

Radio has always fulfilled its duties and responsibilities to the American people in times of crises. It rallied the nation's aid to the distressed Ohio River flood and devastated New England hurricane areas. It has brought into millions of American homes the fireside chats of the Chief Executive, stirring developments in our national capital, and the proceedings of the great political conventions. It has followed closely events abroad, bringing daily first-hand descriptions of the Second World War to the listening audience direct from Europe.

Because of their close association with national and international developments and with the millions of Americans who are the "listening public," there is probably no body of men and women in this country more acutely and patriotically aware of the import of the phrase "public service" than workers in the broadcasting field. That is why leaders in the industry are cooperating enthusiastically with economic, social and governmental agencies in the promotion of our national defense program.

The National Broadcasting Company, for example, as well as other networks and individual stations throughout the United States, has been presenting public service programs intended to disseminate information on all phases of nationwide preparedness. The series, *I'M AN AMERICAN*, broadcast over NBC in conjunction with the U. S. Immigration and Naturalization Service, has brought before the microphone distinguished naturalized Americans to demonstrate the privileges, responsibilities and possibilities of the democratic way of life. Again, *THIS, OUR AMERICA*, produced in cooperation with the National Resources Planning Board, in ten successive weekly programs dealt with the resources of the United States and their relationship to National Defense.

Important as this activity is, however, radio has extended its public service into a more far-reaching field. Radio recognized the value of creating good-will with our South American neighbors years ago, and undertook to establish regular shortwave service to European and Latin American countries. Time, money and effort has been expended voluntarily by American broadcasting companies in the production and transmission of international programs.

The success of shortwave service cannot be doubted. NBC's International Division is now engaged in presenting such broadcasts 16 hours per day, seven days a week. Programs in English, Portuguese and Spanish are devoted to subjects of interest to our Latin American neighbors, with particular emphasis on the "good neighbor" policy of our government.

Thousands of letters have been received by NBC from all parts of the world praising our entertainment features, expressing appreciation for a better understanding of American institutions and thanking us for our straightforward and unbiased presentation of the news of the day.

In the face of new problems the American system of broadcasting is measuring up to standards of a true democracy. In America, as opposed to some countries, this cooperation between government and radio on one hand and the people and radio on the other is free and voluntary. Here radio is not told what it must do by any dictator nor on the other hand are citizens ordered to listen. Radio in this country,

by faithfully discharging its obligations, has won the confidence of the public who listen, not from duress, but of their own volition and desire.

Because radio is an integral part of our democracy, we in the industry have swung into action and willingly and wholeheartedly have joined forces with those agencies contributing to national defense. Whatever the future brings to America, radio will stand prepared to do its part.

Recent Changes in Personnel

RALPH P. GLOVER has joined the staff of *Jensen Radio Manufacturing Company*, according to a recent announcement by Thos. A. White, Vice-President and Sales-manager of that concern.

O. E. White of Rockford, Ill., a veteran in the electrical and appliance field, has been appointed as *Stromberg-Carlson's* manufacturer's agent to handle their radio line in nine counties of Illinois, it was announced by H. T. McCaig, Manager of the Chicago Division of *Stromberg-Carlson*.

Stromberg-Carlson Puts FM Production on 24-Hour Basis

ROCHESTER, N. Y.—Production of FM radios that receive the new "staticless" type of broadcasts as well as standard and short wave programs has been stepped up to capacity at the *Stromberg-Carlson* plant, it was learned from E. A. Hanover, vice-president in charge of production. "Three 8-hour shifts daily were put in effect in order to meet the large demand for both consoles and radio-phonographs that employ the new FM band," he said.

Experimental Television for Cincinnati

TELEVISION will make its bow in Cincinnati and vicinity when the *Crosley Corporation*, operator of *WLW*, starts work on a station-authorized by the Federal Communications Commission. The construction permit stipulates that the new station will operate on television channel number one (50,000 to 56,000 kilocycles) with visual and aural power of one kilowatt, and A3 and A5 emission.

The license granted to the *Crosley Corporation* was among the applications tentatively approved in June, subject to proper showing of programs of research and development, including engineering experimentation tending to develop uniform transmission standards of acceptable technical quality.

The new station will work with a transmitting system in which the picture is composed of thirty frames per second interlaced. Tests will be conducted with 441 and 507 lines, as well as an intermediate number of lines. It also contemplates research on wave forms, and experiments on various types of antennae, and the effect of vertical and horizontal polarization.

The initial cost of the station is estimated to exceed \$100,000.

Zenith Reports Its Finances

ZENITH RADIO CORPORATION reports a consolidated operating profit for the first quarter ended July 31, 1940 of its current fiscal year, amounting to \$651,135.99, after depreciation, Excise taxes and liberal reserves, but before provision for Federal income taxes, as per the company's books.

Shipments for the quarter were, with one exception, the largest dollar volume of any first quarter in the company's history.

Substantial shipments were made during August and unfilled orders on hand for September and October delivery give promise of a satisfactory volume of business for the current quarter.

Collections have been unusually satisfactory
(Continued on page 53)

Serviceman's Experiences

by LEE SHELDON

Chicago, Illinois

Remember a customer's home, to keep it in good shape, is an axiom every serviceman should know.

THE whole thing started innocently enough: a Mrs. Larsen 'phoned for repair work on her *Zenith*. I came into her house as I come into all customers' houses; but from then on, things began to be different.

Identifying myself as the repairman from *Salutary Sales & Service*, I strode into the living-room. I noticed some junk on top of the console as I pulled one end of it out from the wall.

"Oh!" said Mrs. Larsen, "do be careful!"

I paused for a moment and turned to question her with my eyes.

"The vase, the vase!" she answered. "Look — watch out — catch it—"

I grabbed, but the thing already had smashed. After she saw it had broken, she took her hands from her ears and put them over her mouth; then sat heavily in a chair and leaned back with her eyes closed.

"Has it ever been broken before?" I asked, while I picked up the pieces. There were quite a few of them, and naturally I was a bit self-conscious.

She raised her head slowly, but said nothing. When her eyes opened, they had a strange look — and it wasn't love. It made me nervous, though, and I began to unload the top of the console very carefully.

"Don't mind the rest of it," she said, "—none of it's worth anything!" Then she jumped up and left the room.

There was a little business with a soldering iron before I removed the chassis. When I finished, I laid the iron firmly across an ash tray, on the floor. Somehow it rolled off, but I didn't notice it was burning until I smelled the carpet.

Mrs. Larsen must have smelled it, too, for she came back into the room. This time she held her throat and pointed.

"Pardon me!" I said lightly, picking up the iron and rubbing the burned place with my foot, "I thought it was something you were cooking!"

She sat down again, breathing heavily, and waved toward the door. I put the speaker, face down, on the chassis, and walked to the hall. Opening the door, I looked back at her.

"Sorry about the vase and carpet," I remarked sympathetically, "but it's a small world, isn't it?"

There was no answer, and the set was getting heavy.

"Well," I said, "let's let bygones be bygones. I'll see you Thursday evening."

I stepped briskly into the hall. That

is, I *thought* it was the hall, but it wasn't; it was a linen closet. I put my foot on a pile of sheets on the bottom shelf, slipped so that my chin hit the third, and dumped the chassis on the second. Then we cascaded to the floor together — pillow-cases, sheets, set, towels. When I found the right door, I was glad to get out of *that* house!

Al sensed something unusual when I entered the shop.

"Have a nice dinner?" he asked, pulling a napkin from under my coat. Then he noticed an 8-mike electrolytic



"Hello, Radio Repair? Why is it that after six trips my radio still doesn't work well?"

had rammed through the speaker cone.

"How many times," he began, "have I told you not to pile—"

"I know, I know," I replied, "but this was an unusual trip. I was in a great hurry."

I knew a confession coming from me would sound better than a complaint from Mrs. Larsen, so I told him everything that had happened.

"I'm ashamed of you," my partner declared. "Be careful in the customer's home! To think that you, after all these years, would neglect to clear the top of a console before moving it! And to put a soldering iron anywhere but back in your toolbag!"

I settled back for a long siege.

"Tell me," he continued, "how long has it been since you bothered to do

all those little things that help keep a customer? The minor duties, aside from merely filling the repair contract, that all set owners see and appreciate. Do you clean the inside of the cabinet before you install the chassis? Tie up slack power cords? Staple lead-in and ground wires? Tack down window strips? Make sure control shafts don't scrape?"

"Sure," I said. "I also walk dogs, and do the week's wash!"

"I'm not kidding," Al replied. "Those things are the ones that hold customers; if you neglect them, you lose good will. I'll bet more repeat calls have come as a result of a little furniture polish on the front of a console than any good work put behind it!"

"Nonsense!" I argued. "When a customer calls a repairman, he wants his set fixed—quickly. Let 'em take care of their own furniture!"

"That's a good attitude to take with you," Al declared, "when you're going out of business. Look here, fellow: I'm going to teach you a lesson. I'm going to deliver the *Zenith*—you come with me and watch. In spite of the bum start you made with Mrs. Larsen, I'll show you how to regain their goodwill—if there ever was any!"

He wasn't fooling. After he'd repaired the set, we drove to Larsen's house together. When he stopped the truck he handed the speaker to me.

"I'll carry the chassis," he announced. "And always remember—the speaker and chassis should be carried separately, even though it means making two trips to or from the truck. C'mon!"

We rang the bell and I followed him upstairs, feeling sort of foolish. Al greeted Mr. and Mrs. Larsen pleasantly.

"I have my junior partner with me," he explained, tilting his head backward as he entered. Mrs. Larsen screamed as soon as she saw me.

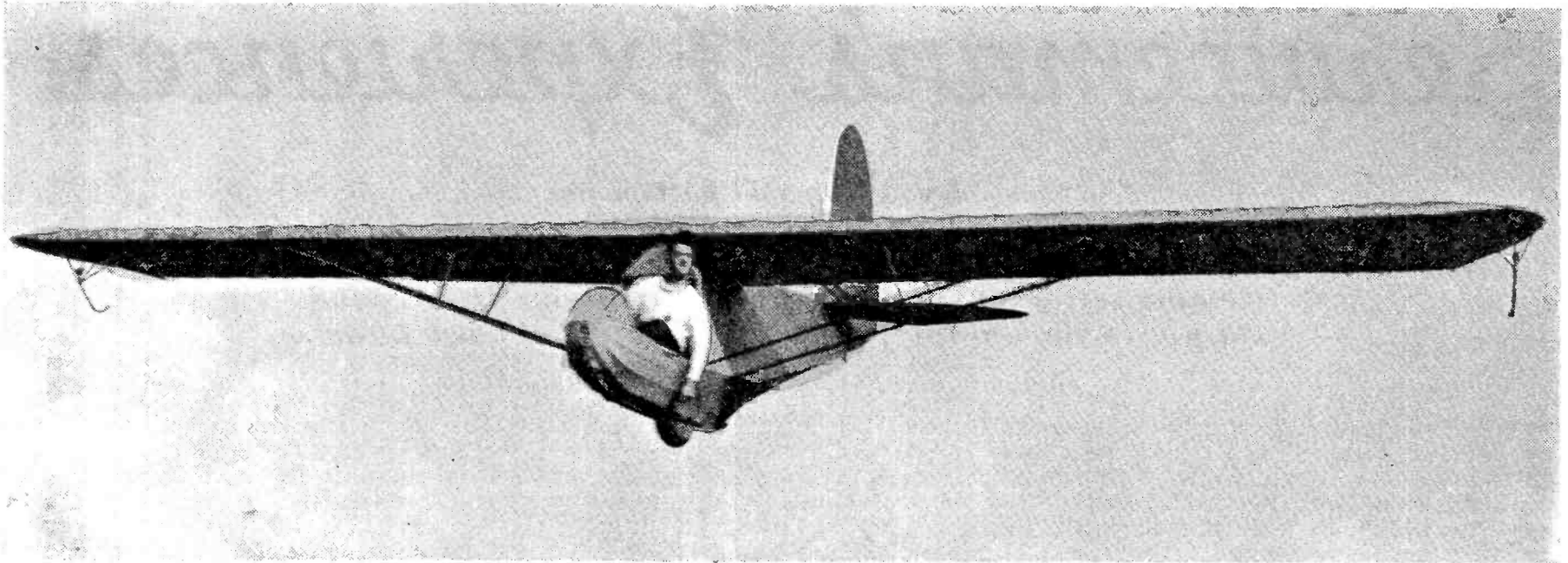
"There he is again!" she shouted to her husband. "The boy blitz! Don't let him in—lean against the door!"

"You'd better stay here on the landing," Larsen said, smiling. "For some reason, my wife seems to be nervous. What say to a little drink while you're waiting?"

That was more like it!

"Sure," I said, tickled to think Al would have to do all the work while I enjoyed a highball. The door closed for a while and then opened about six inches. A glass appeared; I took it, and the door closed again.

(Continued on page 44)



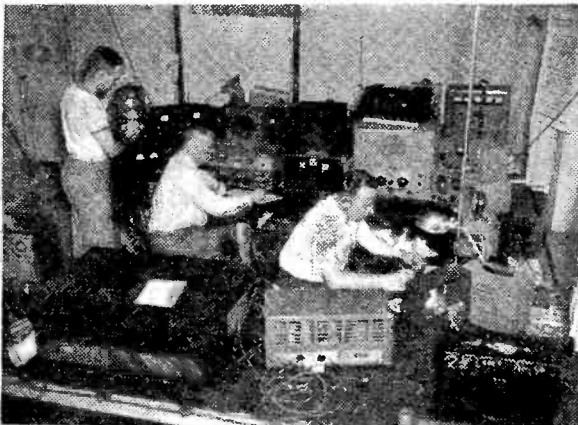
Johnny Novak, the Flying Birdman, (he makes bird sounds) demonstrating glider flight.

★ **W9USB** ★

THIRD OPEN AMERICAN SOARING CONTEST LOCKPORT AIRPORT, LOCKPORT, ILLINOIS

by KARL A. KOPETZKY, W9QEA, ex-W9USB

Managing Editor, RADIO NEWS, and Chief of Communications, 3rd Open American Soaring Contest



W9JU tunes the freq-meter, W9RRC gets out trfc, while W9VSX qso's the field.

ASSEMBLING what has been termed the greatest amount of equipment ever used for so short a time, and certainly the greatest communication network ever to be used in connection with a Glider Meet, W9USB went on the air for the ten days starting August 24 through September 2, at Lewis School of Aeronautics, Lockport Airport, Lockport, Illinois.

The main station, which was given the name of *Radio Central* for easy identification, was located in one of the class rooms fronting on the airport. On a "U" shaped series of tables were placed 5 transmitters, 9 receivers, 2 P.A. units and a interconnecting board. The units were in use for an average of 10 hours per day on all phone frequencies from 160 meters down to 112 megacycles.

In *Radio Central* were 2 Hallicrafter's 100-watt transmitters, one 450-watt Hallicrafter's transmitter, one 56 mc. W9ETI unit, and one 112 mc. Abbott "souped-up" unit. In the receiving department, the RCA AR77 stood watch on 160 meters, Hammarlund HQ120X on 75 meter phone and 3105 kc. itinerant aircraft patrol, an RME 69 on the broadcast band, and special How-

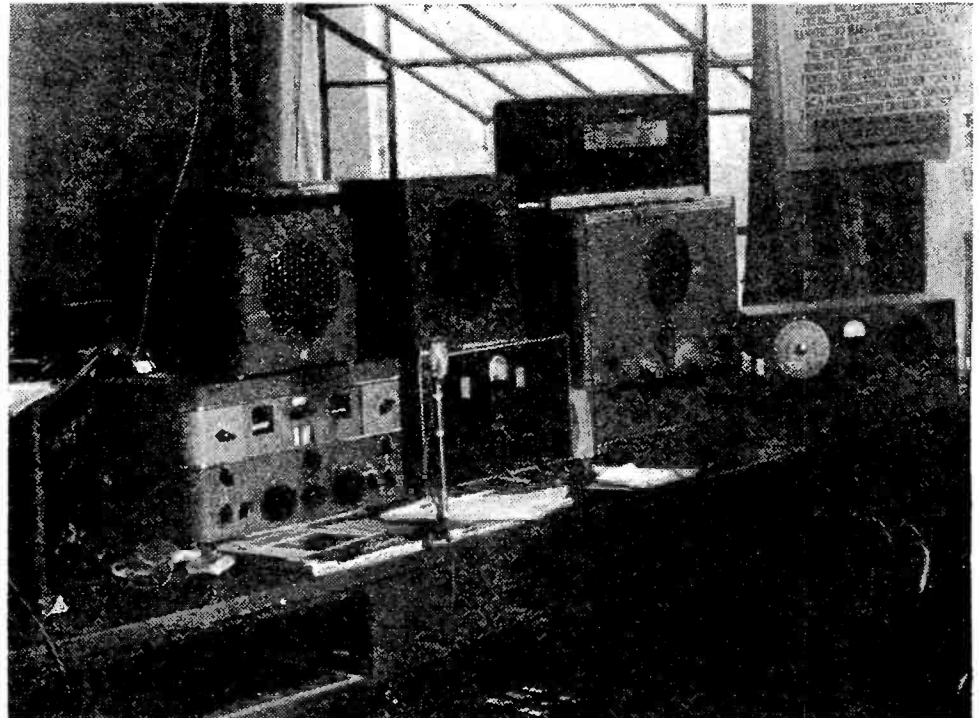
ard 437 on 275 kc. for aircraft weather, a Hallicrafter's 5-10 on 28 mc. phone, the W9ETI unit on 56 mc. phone, the Abbott on 112 mc. phone, the National HRO on 14 mc. phone, and the Hallicrafter's SX25 on reserve, all band duty.

On the field were two and sometimes three "Prairie Dog Specials," home built affairs, on 160 meter phone transmitting and receiving. The "Prairie Dogs" are a subdivision of the "Ham-festers Club" of Chicago, engaged in A.E.C. work. Also there was W9PSP with a 28 mc. portable transmitter and receiver, W9ETI with a 56 mc. transmitter mobile and a 20-160 meter Howard built into his car as a receiver. W9QEA had his car as an Emergency Mobile with a duplication of W9ETI's equipment plus an RCA AVR-15 aircraft receiver for immediate weather and beam reports from Chicago Airport on the Lockport Field. In addition to this, there were never less than four and sometimes as many as six 112 mc. transceivers and one or two 56 mc. transmitters and receivers on the field occupied in one duty or another.

It was the work of W9USB, whose call-letters were specially granted by the Federal Communi-

All 160 meter traffic was handled with the Hallicrafter xmtr, Triplet modulation meter, and the RCA AR 77 rcvr.

Moving along left hand side, the 75-M & 3105kc Hammarlund standby, the BC RME 69, and the WX Howard 437 receivers.





W9JID poses for his pix during a quiet moment at Radio Central. Every op had a chance to work USB.



W9VSX who handed W9ETI his business card just before Ollie was about to go up in a glider. VSX is a mortician.

cations Commission, to coordinate the various phases of the meet. In this capacity all manner of traffic was handled over the station, from a *Disaster Flight*, similar to that one done in the East by W2USA, to finding mothers and fathers for lost children.

Although it rained sufficiently for four days to turn the Airport into a sea of mud in which more than one radio car got stuck, over fifty amateurs turned out over the air and in person to make the radio end of the meet a huge and gratifying success. Most active in participation was the Hamfester's Radio Club of Chicago, whose members were rounded up by Warren H. Keller, W9RRC.

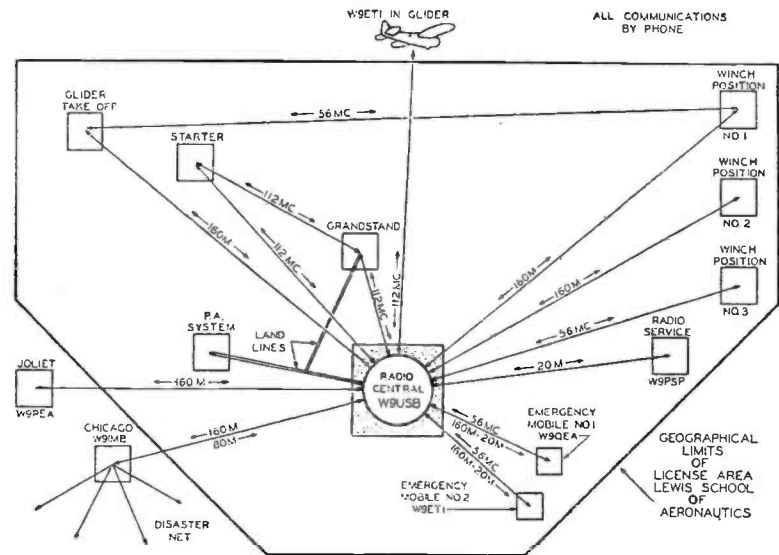
It is Warren's picture that graces our cover this month. Not only is he fond of radio (he's a licensed ham), but he bore such a striking resemblance to President Roosevelt in a characteristic pose, that we thought it too good to pass up. Incidentally, Warren has worked in President Roosevelt's old law office, and is many times mistaken for the Chief Executive whenever he is in Washington where his work as a Certified Public Accountant occasionally takes him. W9RRC is 41, a native of Chicago, and—believe it or not—that's his own cigarette holder (which Warren says he was using long before FDR's became so famous) and his own hat. Warren states that he doesn't mind being the President's double, except that some times it annoys him to have people stare at him . . . and another thing, he's a Republican. At the Glider Meet everybody affectionately called him "Frank."

In the *Disaster Flight*, W9USB was the key station assigned to clearing planes from the "outside" into Lockport which was the scene of the "simulated disaster." Planes came in from as far away as 300 miles, having first cleared through local hams with *Radio Central*. They were then instructed to land at Joliet, Illinois, where through W9REA they were routed, one group at a time, to Lockport with their precious bundles of "Simulated drugs, simulated blankets, and simulated nurses." Enough credit cannot be given to W9IMB in Chicago who spent many hours standing watch on the frequency of W9USB, keeping it clear, and rounding up hams in the outlying districts. These hams obtained the

names of the pilots, and the numbers of their respective ships, and forwarded that information to Mr. Lawrence Lawver, Executive Assistant of the *Airplane Owners & Pilots Ass'n.*, sponsors of the *Disaster Flight*, via W9IMB-W9REA-W9USB.

Special QSL cards were printed for the occasion and they were distributed to all hams who were contacted. An interesting sidelight on the QSL's is that they were "glider flown." We believe that this is the first time that any ham QSL's have so been treated. Each QSL bore the imprint of the Lockport Dedication Stamp, which will make them rare keep-sakes. Special *Certificates of Meritorious Service* were also presented to those radio operators who were instrumental in making W9USB a success. These are personally signed by the Most Reverend Bernard J. Sheil, Senior Auxiliary Bishop of the Archdiocese of Chicago who for the *Catholic Youth Organization* was one of the sponsors of the Meet.

While the work was gruellingly hard at times, and specially at the time of the *Disaster Flight* when five transmitters and seven receivers were going at one time at *Radio Central*, there were pleasant moments for all ops. Almost everybody had a chance to fly, and some made their first "hops" at this Meet. Ollie W9ETI Read distinguished himself by being one of the few hams who has ever had a glider flight. On several occasions Ollie took up a 112 mc. transceiver with him and spoke to W9USB from heights of over 6,000 feet. His conversations were heard in Chicago, over 38 miles away. Through the interconnecting board his conversations with W9QEA at the mike of W9USB were put on the field's P.A. System and the crowd that attended were treated both ends of the QSO. Incidentally,

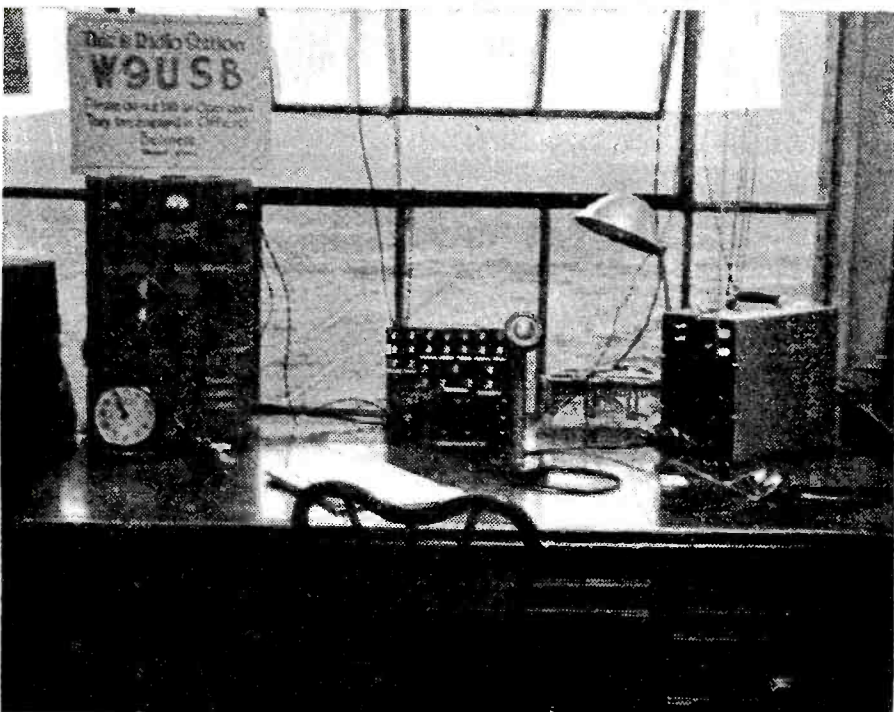


Sketch showing the field positions which were in use at W9USB. It looks—and was—quite complex.

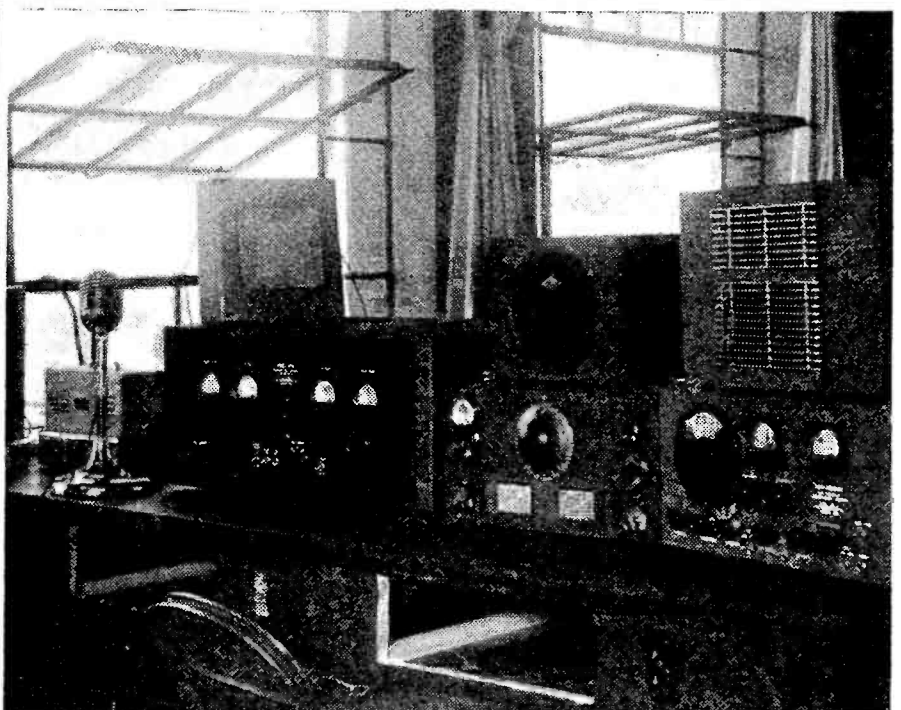
it was possible to put any receiver on the P.A. System and the glider pilots made use of this in getting their weather reports, as well as orders which might have been originating anywhere's out in the mile-square airport. Contacts through the loud-speaker system and the "Prairie Dog Specials" was excellently done, and handy in emergencies. Even 112 mc. was pushed through the P.A. System; and on one occasion W9QEA spoke to W9ETI via a route that went like this: W9QEA (on 112 mc.) to W9USB, W9USB to W9ETI via the P.A. System, W9ETI to W9USB via 56 mc., W9USB to W9JU via the P.A. Sys-

(Please QSY to page 61)

Field end of the Radio Central. At left is the W9ETI unit used on 56 MC. Center is patch-board; right, Abbott.

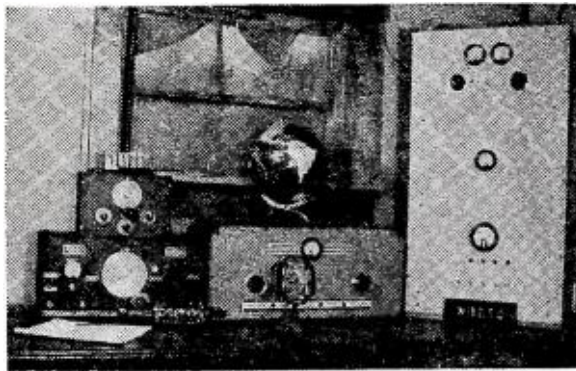


Right hand side of Radio Central. Transmitter is for 14 MC with the HRO as receiver. The SX25 is reserve.

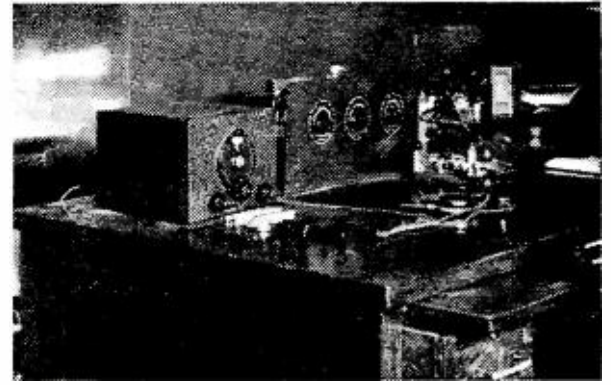




Hamop w8jfc es his fb rigs.



Iowa's hamstation w9ctq.

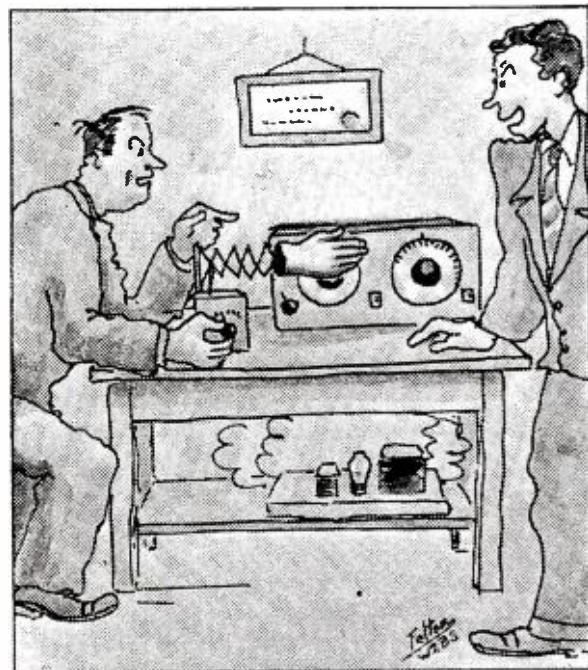


The beautiful layout of w3edc.

H A M ☆ ☆ CH A T T E R



Hamstation of w1gbw.



"This is my new invention to off-set all hand capacity when tuning."

BREATHES there a man who said,
 "I never had a chance,
 To get the CQ's out of my fist,
 And go to a super fb dance!"

Breathes there such,
 Then mark that ham well,
 Grasp his droopy code-cut ear,
 AND YELL

THE CHICAGO AREA RADIO CLUB COUNCIL IS GIVING ITS FALL DANCE, AT THE BAL TABARIN ROOM, Saturday, October 26th, at 8:30 P.M. Music by Cy (W9AA) Read and his 8 men & a girl Band. Sponsored by Bill Halligan's firm, The Hallicrafter's, Inc. Any ham within driving range of the Windy City will miss a swell evening—with vaudeville 'n everything, including prizes worth while, if he does not go! Ask any ham who attended the last CARCC Dance! IT'S TERRIFIC! IT'S STUPENDOUS! IT'S YOUR DANCE! FOR HAMS! BY HAMS! and OF HAMS! Bring your YL, your XYL or come stag . . . BUT BE SURE TO COME!!

SO very many of you hams wrote in to us complaining that in the August issue of Hamchatter we had a pix of W5drz leaning against "a vertical 40" meter antenna, and also a pix of W5ggw leaning against a "vertical 20" meter antenna, and that the two (so it seemed) antennae were one and the same sky-hook. We pondered over the siccheaytion fer a while, and came to the obvious conclusion that the sky-piece is a 1/2 wave vertical on 40 when w5drz uses it, and a full wave on 20 when w5ggw does his stuff. Logical? Yeah, very! Any-hoo, we hereby call on w5drz es w5ggw to explain, if they will, please.

FCC note: The paw-printing of the ops has been pushed off till October 15. Seems that a bunch are having trouble in finding birth certificates. One ham told us that he had always known that there would be some trouble about his birth certificate, and that he welcomed the FCC regs requiring him to file his, because now he had to get it straightened out.

Another ham wrote in from some gosh-for-saken place up in Idaho that he couldn't see the sense in being paw-printed, etc., etc., because he was no crook, and that the paw-printing and birth-snooping was just another way of regimenting the hams, and the beginning of dictatorship in these United States. Well, brother, while France argued as to how long an ammunition factory should stay open, and whether a 48 hour week was legit, the Heinies went right ahead and busted the whole shebang wide open by conquering the place. Now there just ain't no arguments as to how long the work-week is, nor as to what stays open and for how long. They do exactly as they are told.

What we need in America is loads of less argument and talk-talk and oodles of more do-do and let's not worry too much about being regimented. It's better to be a regimented free democracy, than to be a beaten nation any day. The time has certainly come when we should no longer tolerate those among us who would turn our liberties into license. Those who have

far better knowledge of the condx tell us in all sincerity that there is danger. Let's believe them, lest like the dog who had a bone, and seeing what he thought was a better bone, let the one in his mouth drop, and had *nothing*, because he was chasing an image. National security without adequate defense is an image. Let us not drop our good common sense in chasing the will-o-the-wisp.

ON Sunday, September 8, Arthur Cann, operator of W1AJJ, working portable on top of Mt. Washington in the state of New Hampshire, contacted W1COO in Exeter, New Hampshire, a distance of some ninety miles.

While W1COO and W1JK had established communication between these points on July 13, the same was accomplished from two fixed positions, W1COO at the time operating from the Mt. Washington observatory.

As W1COO's 1 1/4 meter transmitter was dismantled, W1COO transmitted in the 5 meter band. The frequency at W1AJJ was 233 megacycles. Duplex operation was possible and employed.

The transmitter operated from the automotive electrical system, employed a Hytron HY75 oscillator with an input of approximately 20 watts. The HY75 was modulated by an HY31Z and a half-wave radiator Zeppelin-fed was employed. The receivers at both ends were National 1-10's.

In the Essex County, Massachusetts area, W1BVL, W1DWL, as well as W1AJJ, are playing around with 1 1/4, 2 1/2 meters, using HY75 tubes in medium power transmitters, and HY615 type in the transceivers on 2 1/2 only.

NEWS items from RXP:

Mac (W6RFS) won the grand prize at the recent hamfest held in Phoenix, Arizona. It was one of the new Thordarson transmitter kits, 100 Watts phone and c.w. cathode modulated. Since he already has 400 Watts he's going to swap the rig for a new receiver.

The U. S. Forest Service Fire Control Net went into full swing with the arrival of summer fire season. W5GPV, Net Control Station, and Max Gardener (W6NRI) of the U.S.F.S. were in charge of the net. W6RXP (Flagstaff, Arizona) is a new addition to the net. Each station in the net sent in a daily report on local fire conditions in their vicinity compiled by local Forest Service officials. These reports were assembled at the regional office of the U.S.F.S. in Albuquerque, New Mex.

W6GUZ of Phoenix, Arizona, was in Flagstaff for two days supervising the installation of the new police station (KQOJ).

W6AM "Keys" the following dope:

Horace Greer, W6TI, and his monthly section meetings, have built up an organization highly satisfactory in all details.

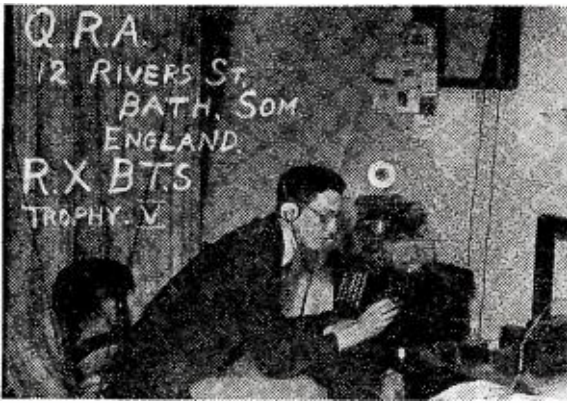
The Bell Club continues to run the largest and most active radio club on the Pacific Coast. Recently, Frank Feay, W6EJZ, had a naval communication reserve meeting with many officials present.

W7KV was expected at the combined Pacific and Southwestern Divisions Convention, Long Beach, over the Labor Day holidays. Mike hadn't told us that he was coming, but somehow or other, he managed to drop in at all the important conventions on the Pacific Coast.

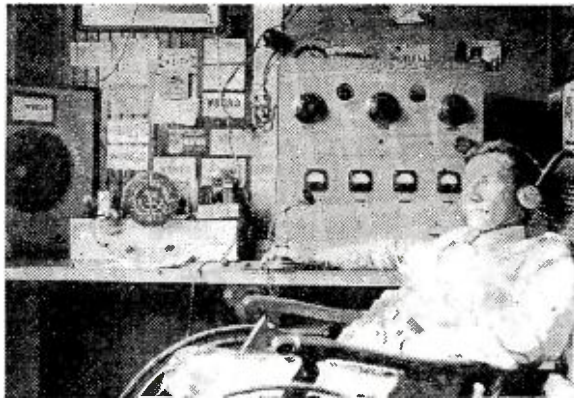
KE6SRA, has put in for a transfer to an Asiatic location. Those of us who have been working him on 14,300 kc. hate to see him leave, but we all will be glad to see him start up again.

Herb Becker, W6QD, thought he would have more time for radio when he became a manufacturer's representative. So far however, has been true, as Herb is so busy getting his new business started.

W6GG, flew to Hartford for the directors' meeting.



Pre-war British SWL station.



Hamop and station of w8uqz.



A YL owns all this nice gear!

W6BKY, now has his pole replaced, so that his big diamond is in working order again. Lew Cartwright, of La Jolla, was one of the very active Hams aiding in the earthquake crisis in Imperial Valley. 75 meter phone seemed to be the most useful band, for all the Valley contacts, for all the hams helping, as the distance was great enough so that the maximum number of contacts could be made on that band. We noted that Director Charlie, visited just about all the stations in the valley immediately after the quake—on the job as usual. The Pacific Division Director, W6EY, in announcing the joint convention with the Southwestern Division, indicates that this is not necessarily an annual procedure. Because of the big Treasure-Island Convention up North last year, it seemed advisable to join forces with the Southern Group this year. Certain indications are that the San Diego group will want the Southwestern Division convention next year, and Phoenix has already spoken for it in 1942.

W6WB certainly gets out fine with his 100 watt phone, and has been making a substantial impression on the group. W6OMC is still going strong on his frequency modulated transmitter.

Hams in this vicinity are still talking about the wonderful hamfest they had in San Diego. Three hundred were present.

The Fresno Hamfest was also a huge success, although quantities of hams which attended came from the North, whereas the San Diego Hamfest drew the Los Angeles crowd in large quantities.

The Associated Radio Amateurs, Long Beach, are meeting twice a month, on Thursday night in the Council Chambers at the City Hall, the first and third Thursdays, at 8 p.m. This twice a month meeting will continue right up to the Labor Day Convention.

When Clark Rodimon, W1SZ, was out here, many of the fellows got a chance to meet him, and see what a dyed-in-the-wool DX Hound he is.

W6GRL, has, if such a title were to be given, the title of "World's Champion Amateur." He consistently stays on top of the DX Century Club listing.

KG6MV furnishes a new country to anyone working him.

KC6 is now well represented on the map, so those that are worrying about the loss of European Countries, have simply to get on the air, and they can get just about as many new countries per month, as any time before.

We are looking forward to the day when K6NYD will jump into his plane, and hop to another island, so that we can all have another country.

If the amateurs will censor themselves, no National Censorship is to be imposed by the FCC. The broadcasting stations work much under the same plan. Present rules provide that no furriner should be worked by anyone under any conditions.

A number of the West Coast Boys will remember, Elmer Lamplugh, W1LWD, who lived in Long Beach for quite a while, and was on the air here, before he went to join the Byrd Expedition, and to operate KC4USB.

Our good old friend W6CIN is operating in Manila, as KA1GC.

The rotary beam at W6GCT, is surely doing its stuff, and Henry is working more DX than ever before.

An interesting combination of calls down in San Diego is W6JMH (the Mrs.), and W6JMI (the husband). Note that the last two letters make "HI!"

W6NAT has some good frequency modulated equipment on 2 1/2 meters. 2 1/2 meters has certainly been doing its stuff out here, with the San Diego gang really going after it in a big way, because they find that they can work Santa Barbara, some 200 miles away.

W6LYY certainly has his full load of visitors at his new location in San Diego. He puts out an interesting reception for those who drive the extra four miles out to his place.

W6JRM seems to do something toward the betterment of his Ham rig every day.

Statistics released by the ARRL indicates that there is almost as many Class A amateurs in the United States as Class B amateurs in the United States.

W6USA was not in operation at the fair this year, although the Forest Service did have a display that will be interesting to the Hams.

W7BAH and his 175 watts certainly comes in fine in this area.

Chuck A. Houge of Cheyenne, Wyoming, and his telephone Second ticket, is just about ready to have his Ham ticket.

W6ILC is traveling and does not get on the air as much as when he was in a permanent location.

W6BIP is still working the Yacht California on schedule daily.

W6MZ is on 20 CW these days.

The ARRL Copying Bee list showed good activity in copying difficult material. W6ZS and W6CIS combined their stations and equipment for the transmission.

Someone heard W7BB on phone—what is going to happen!

W6DGE and W6DEP with their Dual Deluxe Mims Antenna are certainly going to town these days.

W6DX and W6LA are both working out of the FCC office, Los Angeles. They certainly gave themselves some beautiful calls, didn't they?

W6RI is working out of San Francisco at the FCC Office.

These FCC Hams are real old timers.

Let him who has not sinned . . .

IN the October issue of *Hamchatter*, we published a letter from an observer of conditions in the 160 meter band during the S. Carolina hurricane. In it there were some remarks as to what went on by stations jamming the QRR work. It seems that we "struck oil," and the boys are up in arms about it. They are even threatening a boycott of the magazine on account of the letter.

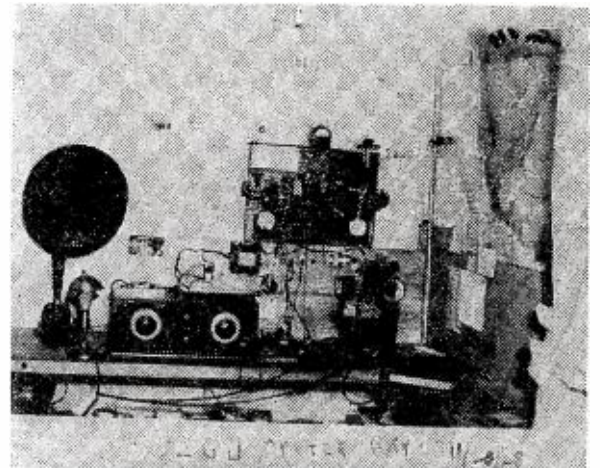
Well, so be it; but if those guys really wanta fight, remember that we have most of the calls which were involved, and while we had withheld them because we felt that the incident alone, unidentified, would serve to show all hams why they must be careful with their QSO's, we can let the guilty ones have it with both barrels.

Some time ago we had occasion to talk with Chairman Fly of the FCC, and the reaction of hams to complaints such as have been published in *HC*, and which have "burned" the amateurs from a prominent mid-Indiana city so much, is just the reason why the venerable chairman told us that he was worried about the situation.

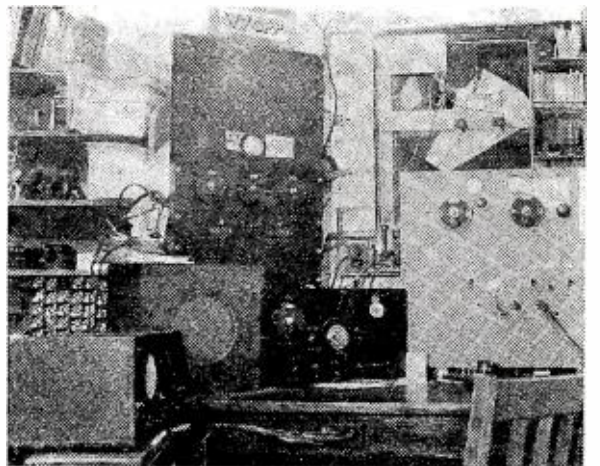
The surest way to get all of us taken off the air, is (1) to jam a real QRR situation so that everyone will know we are not any good even in an emergency, and, (2) belly-ache and get nasty about things when some one calls your attention—in a nice way—to your errors. The man who wrote the letter is NOT a ham, and his word carries more weight with the powers-that-be than a whole lot of hams. He represents the great non-ham public. We ought to be kinder to him, and less vindictive.

Above all let each ham observe his own conduct carefully, to see that it won't be him who gets the rest of us "into the soup."

The Hamchatter Editor.



w2gj, Oyster Bay, N. Y., in 1928!



1939-1940 ORS winner, w7gpp.



"As long as we can't use it fer dx, I thought I'd let the XYL use it!"

K60WR, is now back from the Howland Islands. Quite a few of the boys worked him while over there.

E. E. Sutton, W7AXR, worked 40 states from his mobile car, 10 meters. Included among the DX cards on his car roof, are 3, K 6's. It is certainly an interesting car, having QSL cards plastered all over the inside top of it, just as if it were a full fledged Ham station at home.

W6TT is certainly "knocking them dead" for the time that he is on. He is on CW mostly.

W6KEW, is all well again. He doesn't seem to get on the air as much as he did.

W6FEX used to put over a fine broadcast, over KRKD about amateur activities. Perhaps you will find time for that again, too.

W6DEP, has now worked XU1, XU2, XU5, XU6, XU8.

W7EZZL, is president of the Oregon Amateur Radio Association for next year.

W7HPH sez—(HPH means "Hen pecked husband")

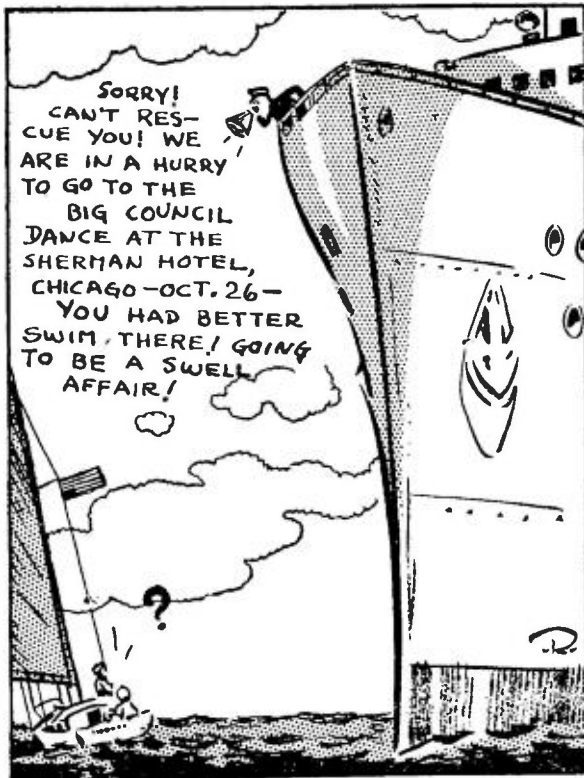
W7ERH is trying cathode modulation and when he gets the bugs out of the speech end and the rig balanced up should go to town. Good luck, Ken!

W7EYR is also playing with cathode modulation.

W6MAV is working portable in seventh district, using a 10 P kit. Sounds fine biz, Jack.

W7GPM and W7HWN are among those using E.C.O. and now, like the soldiers' cooties, you never know where you will find them. Nice going fellows.

W7HPH worked W7HRV recently Q5-R9 at 9:30 to 10:06 P.M., M.S.T., when the band was at its most crowded time. A real QSO, 95% complete. W7HRV is in Oregon City, Oregon, and was using a Karr transmitter at only 13 1/2



watts. Nice going, Carl, and hope to see you again.

W7CJK is also a motor boat fiend and was working on a portable 10 meter receiver and transmitter for both car and boat. We looked forward to working him in the Spring while he sat around the lake here. Came the new regs—and blooze went the rigs and skeds.

W7HOV, while fixing up his shack for the winter, fell while nailing up siding and broke two or three ribs, also hurt his right knee and was tied up for about two months. He had just finished a 260 watt r.f. end so got to do a lot of hamming. Sounds bad, Bill, that's one way to get in a lot of hot licks anyway.

W8PVL, Joe, finding too much interference with 160 fone decided to go down to forty c.w. one evening. Well, he put his 38 watt Collins 32B down there, attached it to his 160 half wave antenna, gave one short CQ and a J5 came back with RST 589X. After that he wrked a K6 for a RST 599X. Well I guess that ought to make the forty meter boys DX conscious.

W8URO is on 160 wid low pwr. The Motor City Radio Club is getting their portable equipment ready for the next A. R. R. L. field day. They have a generator that delivers over five KW.

W8RLT, ten meter man, is building beam No. 3. It seems that two beams is not enough fer him. Hi!

W8SWA of 160 fone is gg on 10 if he can get some parts from his junk box.

W8CXT has his first boy after having five girls.

W8SQQ, Bob, wrks 160, 80, 40, and 20. Rig is a 6L6 osc, running at a cool 80 watts.

W8TNU didn't like 10 condx and is back on 160 fone wid his high pwr.

Lou, W8SZE, is gg back on 160 es 2 1/2 meters after a long absence from ham radio. He tells me he wud like a 16 tube rcvr fer Xmas (Oh hum, nice wx, ain't it). Hi!

Bob, W8RQG, is back on 160 after a long ab-

(Continued on page 63)



WELL, this new gadget called Television seems to really be getting underway after many months of conversation, accusation and prognostication (how'm ah doin'?). First came the FCC partial-commercialization, then repeal. Then came hearings, many inches of publicity, a broadcast by FCC Chairman Fly, some more publicity and finally the RMA convention, at which time the big boys said in effect, "Put on your belt, daddy, we'll be good." So standardization is expected shortly with commercialization naturally following. And when that happens, gentlemen of the glass wrist, look out! A publicized gold strike won't hold a candle to this! Television station applications will pour in, technicians will be at a premium and television servicemen and installation men will do a landoffice business. This will be one time when radio manufacturers will go to town in a large way, knocking sign posts down along the road. Hesitation about future developments won't be considered in the mad rush to sell the television-conscious public a receiver that'll get a picture onto a kinescope. And the public will buy because manufacturers have already cut down the cost of sets so that \$100.00 will purchase a good five-inch scanning aperture. If radiomen don't get in on the ground floor of this new industry, they may just as well remain radiops forever and ever.

BROTHER ROGER J. HOGLUM, head of the Radio Department of the Eugene Public School in Eugene, Oregon, opines . . . quote . . . The emergency training program which the government is actively sponsoring will definitely affect all of us who earn our living, wholly, or in part, by commercial radio operating. Increased employment will perhaps be the most obvious and pleasant result, but other outcomes may not be so satisfying.

For example, there will be quite a few of us who, through no fault of our own, will lose our operators' licenses because our services are needed more urgently elsewhere than in the operating field, as in the design and construction of acutely needed radio equipment, and its subsequent installation. Or in the training of new radio operators to staff the communication services of our army and navy. In other than times of national emergency, the automatic expiration of an operator's license may have indicated that he lacked the initiative and perseverance to get and hold a job. But in times like these, lack of enough operating time on the service record may indicate that the licensee has been performing a more valuable service for his government than had he remained at his operating berth.

My suggestion would be that the government grant a "blanket" extension of all operator licenses for the duration of the emergency. Or, if feasible, permit the licensee to count all time expended by him in emergency governmental service in lieu of actual operating experience . . . unquote.

BUT, say our good friends at CTU-Mardiv, quote . . . Brother L. J. Kleinkaus, GST, had a lengthy talk with Admiral H. A. Wiley, during which a protest was lodged against the present radiop training plan of the Commission. The Commission believes that a serious shortage of radio officers prevails today which will become more acute in the near future. The Civil Aeronautics Authority and the various airways companies have taken a considerable number of experienced marine radiops during the past six months. But the CTU believes that the present apparent shortage is due more to vacations than to anything else and

distinctly recalls a similar shortage last year at this time. It must be realized that practically every radiop now receives an annual vacation with pay, whereas this was not a fact in years gone by.

Admiral Wiley stated emphatically, however, that the Commission would proceed with its present plan to train 300 radiops regardless of protests from any source. It was stated, however, that it was not the purpose of the Commission to use these newly trained men under normal employment conditions, but only in case of emergencies. They are to constitute a reserve force for any national contingency in the future . . . unquote.

CTU-Mardiv sez . . . quote . . . it is difficult for us to restrain our belief that Fifth Column Radiops are doomed for a purge, at which time an "emergency" will arise, and the Commission's student radiops will be made available. But the Commission is silent on this contingency. We are not opposed to the training of such radiops provided we are assured by the Commission that these newly trained men will not be used to defeat the purposes of the union. Whether radiops receive their training in the Army, Navy, Coast Guard, CCC camps or in privately-owned radio schools doesn't matter. But what does matter is whether these men are used as a potential menace to the high wages and good working conditions established by the Union. We refuse to believe like we understand our ACA brothers believe, that the US Maritime Commission is determined to abolish the maritime unions and revert back to the "good old days" of \$75.00 per month. It appears more likely that the Commission is bent on a Fifth Column purge for the safety of the nation. If that is its purpose, CTU offers no objections. On the contrary, we urge the Maritime Commission, and all other governmental agencies to weed out the Fifth Column subverts immediately . . . unquote . . .

BROTHER HAROLD CRAIG was ordered back into Chief Radiop's uniform by the Navy t'other day whilst he was holding down a \$9.70 per day billet on the SS Cabrillo which does ferry work between Catalina, Avalon and 'Pedro. Now some of youse guys and gals might think he was peeved being yanked back into mufti, especially from such a nice soft and lucrative billet. But not HF! A week previous to his recall Ye Ed was discussing just this possibility with him and he was as tickled as a kid about the prospects, even going to the expense of ordering himself a complete outfit of uniforms. We believe that if all ops and American youths felt HF's way, there'd be no need for the Conscription Bill. We don't know where HF is to be based, but wherever he gets berthed we know he'll be a credit to the radiop profession. Good Luck, OM.

INCIDENTALLY, Brother Craig tells us that Brother Bob Herzig just recently returned from a Vladivostok trip and is now holding down a billet on the SS Texas of the Dawnic Lines running between New York and Los Angeles. That should be kinda prosaic after Russian caviar, etc. . . . He also mentioned that Brother John Soldan is on the SS Illinois, a Texaco tanker, working out of Port Arthur to North Atlantic ports. Soldan sez the tankers are great stuff, an opinion which seems to be shared by many others, especially Brothers Chilson of the SS Topila and Stephenson of the SS Kekoskee, both Richfield tankers. They have been doing duty on these boats

(Continued on page 60)

THESE 18



TYPE D ALL-PURPOSE CONTROLS

Handle 60% to 75% of ALL REPLACEMENTS



TAP-IN SHAFTS *Stay Put!*

Type D All-Purpose Controls are exact reproductions of the larger IRC Type CS Controls, with exactly the same design, exactly the same features and with the added convenience of Tap-in Shafts.

Just pick the control you need, select the proper shaft, tap it into position in the cone-shaped control receptacle following simple instructions enclosed with each control, and the job is done. The shaft won't pull or vibrate loose—and you're sure the quality of the control is the highest money can buy.

HERE IS WHAT YOU GET!

The IRC Master Radiotrician's Cabinet is factory-packed with the following 18 Type D All-Purpose Controls, switches and special shafts of the most popular types shown by records to be capable of handling the big majority of all control replacements.

IRC Control Type No.	Resistance	Purpose	IRC Control Type No.	Resistance	Purpose
2-D13-133	500,000	A	1-D13-133 X	500,000	F
1-D11-116	10,000	B	1-DC13-133 X	500,000	G
1-D11-123	50,000	C	1-D13-137	1.0	A
1-D11-128	100,000	C	1-D13-137 X	1.0	F
1-D11-133	500,000	C	1-D13-139	2.0	A
1-D13-123	50,000	D	1-D13-139 X	2.0	F
1-D13-128	100,000	A	1-D14-116	10,000	H
1-D13-130	250,000	A	1-D16-119	20,000	B
1-D13-130 X	250,000	E			

- A—Tone or Audio Circuit Control
- B—Antenna Grid Bias Control
- C—Potentiometer Voltage Divider
- D—Tone Control

- E—Tapped for A. V. C.
- F—Tapped for Tone Compensation
- G—Friction Clutch Auto Radio Type
- H—Antenna Grid Bias of 2 Tubes

Switches: 5—No. 41 S.P.S.T.; 1—No. 42 D.P.S.T.

Shafts: 1—Type B Auto Radio; 2—Type C with slotted, knurled terminals; 2—Type D with slotted, unknurled terminals.

Dealer Net on above controls, 6 switches, 5 shafts . . . **\$14.97**

THE CABINET IS INCLUDED FREE!

...The All-Metal Cabinet is Included - AT NO EXTRA COST!

Now, for the first time, you can purchase a stock of only 18 Controls, 6 switches and 5 special, extra shafts . . . and be prepared for quick, efficient service on more than two-thirds of the radios you are called upon to repair!

You save time, because it is no longer necessary to order a control every time you need one! You simplify installations because IRC Type D All-Purpose Controls with their Tap-in Shafts are easier to install and can be used universally to replace midget size or larger, old-style controls! You save money—and you assure your customer of a first-class job!

Best of all, you pay only the standard price for the controls, switches and shafts. The handy new IRC Master Radiotrician's Control Cabinet, as illustrated, is included with your purchase at not one cent of extra cost.

The Cabinet itself is of all-metal construction. Attractively decorated, it is an asset to the appearance of your shop. It is 14½" x 7½" x 4", weighs approx. 6 lbs. complete. IRC Control numbers are marked underneath each compartment so you can tell at a glance just what values should be reordered to keep your stock complete. Three drawers supply ample space for shafts, switches or other spare parts. Front metal cover snaps securely shut for carrying, or may be removed when Kit is used in your shop. The regular net price of the 18 Controls, 6 switches and 5 special, extra shafts is \$14.97—and the Cabinet is included for not one cent extra!

INTERNATIONAL RESISTANCE CO.

401 N. BROAD ST., PHILADELPHIA, PA.

Attached is \$14.97, check, money order (or send C.O.D.) one IRC Master Radiotrician's Control Cabinet complete with the 18 Type D All-Purpose Controls, 6 switches and 5 Tap-in Extra Shafts as described. It is understood that, if this does not meet my full approval, I can return it in good condition for full credit within 5 days.

NAME _____

STREET _____

CITY _____ STATE _____

Name of your regular jobber _____ City _____

TECHNICAL BOOK & BULLETIN REVIEW

TELEVISION BROADCASTING. By Lenox R. Lohr, former pres. National Broadcasting Company, Inc. 269 pp. Price \$3.00. Published by *McGraw-Hill Book Co.*, New York. A full and understandable discussion of television broadcasting for all interested in it—economically, technically, or generally. Authoritatively discusses all aspects, including the efforts that have gone into and the experience that has come out of television development; operating techniques and equipment; program considerations, with an eye to economic, legal, and technical problems; the precise and detailed coordination required to put a program on the air; and the advertising potentialities of television broadcasting. The book is well illustrated and many actual television setups are shown in complete detail. Chapters include: The Television System; Television Programming; Studio Programs; Motion Picture Film Programs; Outdoor Pickup Broadcasts; The Problem of Network Television Broadcasting; The Sponsor in Television; The Technical Elements of the Television System; Summary of Regular Service Operations, and Rules of the Federal Communications Commission Governing Television Broadcast Stations. Price \$3.00.

THE RADIO AMATEUR'S HANDBOOK, how to make, operate, and repair your own radio. Written by A. Frederick Collins and revised by E. L. Bragdon. 328 pp., plus index. Price \$2.00. Published by *Thomas Y. Crowell Company*, New York City. Illustrated with numerous diagrams and photographs. For more than fifteen years this has been a standard book on practical radio. It has been reprinted many times and constantly revised to keep it abreast with new developments. Now they present the Eighth Edition, which has been wholly reset and brought absolutely up-to-date in every detail. Again the keynote of the book is its practical usefulness. Written by experts, it is decidedly for the Amateur—presented in such a way that he may build, repair, and operate his own set. Price \$3.00.

UNDERSTANDING RADIO. A guide to Practical Operation and Theory—written by Herbert M. Watson, Herbert E. Welch, and George S. Eby. Published by *McGraw-Hill Book Co.*, New York. 586 pp., plus index. Price \$2.80. Radio sets have for years been constructed of a simple assortment of parts by persons handy with screwdriver, soldering iron and drill. These experimenters have proved that the field of radio is not limited to mechanics or persons who are already familiar with electrical and radio principles. This means that the reader can have the fun of receiving distant stations on a set that you have built or that he can have the satisfaction of being able to operate equipment he has purchased. Radio is essentially simple if its fundamental principles are learned in a logical order. Such a learning order is followed in this book by combining set construction, practice in operating basic radio circuits, and a thorough study of radio principles. Price \$2.80.

ANSWER MANUAL, written by Paul H. Nelson. 37 pp. Book 1—Laws. Price upon application to *UHF Publications*, Merchandise Mart, Box 3890, Chicago, Illinois. This book consists largely of direct quotations from the Communications Act of 1934 (as amended), the International General Radio Regulations (Cairo), and the various Rules and Regulations of the F.C.C.

MOTOROLA SERVICE MANUAL, published by *Supreme Publications*, 3727 W. 13th St., Chicago, Ill. 96 pp. Price \$1.00, plus postage. This up-to-the-minute manual will tell you how to repair every *Motorola* auto radio. Includes detail, schematics, service notes, alignment data, parts lists for all of the 72 models.

MANUFACTURERS' LITERATURE

ALLIED CATALOG, published by *Allied Radio Corporation*, Chicago, has just been released. Planned to include Everything in Radio, the new *Allied Catalog* is the largest and most complete in the history of the company. Direct color photography is used with striking effect, especially on the front cover featuring Elmer Davis, popular CBS news announcer, in a full-of-action "On the Air" scene. Eighty pages of rotogravure embody the latest techniques in photography and layout.

Carefully arranged, this new 212-page catalog features each radio field in individual, clearly defined sections. Each section and each piece of Radio Equipment is precisely indexed for speedy reference.

The big special 40-page radio section introduces 83 new radios featuring new style plastic and wood table models, luxurious consoles, "Camera" and 3-way portables, newest 1941 low-cost phonoradios and phono-radio-recorder combinations, auto sets, record players, and a large, complete selection of phono and recording accessories.

In the big 35-page Public Address Section are featured 24 complete new Sound Systems of the latest 1941 design. There are systems ranging from 7 to 75 watts and incorporating many new features such as new illuminated panels and the exclusive "Safused" speaker development. Also listed in this section is a complete line of the latest P.A. accessories.

Of special interest to the Serviceman is the big 128-page section devoted to all the new test equipment and more than 15,000 quality Radio parts. There are sections devoted to photo-cell equipment, to bargains in brand new merchandise, and to the latest books, manuals and literature covering every Radio field.

For Experimenters and Builders, whether beginners or old-timers, there is an unusually complete section featuring the latest in kits, accessories, projects, diagrams, and the new revised 6th edition of *Allied's "Radio Builder's Handbook."*

Amateurs will find a special large section devoted to the latest Communication Receivers and Transmitters and parts of every description for "Ham" use. This section is really a catalog within a catalog.

A copy of this new 212-page Radio Catalog—the largest in *Allied's* history—may be obtained free of charge from *Allied Radio Corporation*, 833 W. Jackson Boulevard, Chicago, Illinois. Free. (RADIO NEWS No. 11-100.)

NEW AMPHENOL CATALOG. An interesting new 40-page Blue Book Catalog No. 62 for the Radio, Electrical and Aircraft industries has just been released by *American Phenolic Corporation*, 1250 Van Buren St., Chicago, Illinois. In addition to a complete listing of this company's many products such as sockets, plugs and connectors, coaxial cable and connectors, insulators and insulating materials, this new catalog also contains a great deal of information on properties of insulating materials, fabricating methods, etc. Free. (RADIO NEWS No. 11-101.)

WORNER PRODUCTS CATALOG, *Worner Products Corporation*, 1019 W. Lake Street, Chicago, have made available an interesting catalog covering their line of Photo-Electric operated relays for the Electric and Radio Jobbers. Write to the above organization for this catalog. Free. (RADIO NEWS No. 11-102.)

AROUND THE WORLD. A new 16-page short-wave station guide which lists several hundred stations throughout the world, together with their frequencies

and call letters, has been prepared by the broadcasting division of the *General Electric Company*, Schenectady, N. Y.

The book is being offered gratis to listeners of the company's international stations and since the first announcement less than one month ago, more than 2,000 requests have been received from Latin and South America.

The guide also includes operating schedules of stations and a world-wide time map comparing times of the world with Eastern Standard Time. It is printed in English, Spanish and French. Free. (RADIO NEWS No. 11-103.)

WALSCO CATALOG No. 41. The *Walter L. Schott Co.* of Los Angeles has just had printed a thoroughly illustrated and completely descriptive catalog of all *Walsco Products*.

This catalog includes information about their famous new time-saving Staple Driver with illustrations of its use on difficult-to-get-at places. It also gives complete information about their Refinishing Kits and Materials, which are most helpful to Radio Dealers and Servicemen. Also described is their new *Walsco Scratch Remover* which looks like a fountain pen, is unbreakable and really takes off scratches. The catalog also describes the *Walsco Radio Cements, Lacquers and Paints* used for radio repairs, and many other *Walsco Products*.

This catalog is now available at jobbers or may be obtained from the *Walter L. Schott Co.* of Los Angeles. Free. (RADIO NEWS No. 11-104.)

RISSI CATALOG. With the opening of a new and larger store at 1112 West Warren, Detroit, Michigan, *Rissi Brothers* announce the publication of a 200 page net price catalog.

Now the entire trade is assured of better service having both our branch store in Grand Rapids as well as the main store in Detroit at the command of every dealer in the Michigan territory.

The new catalog will be sent free to anyone requesting a copy on their letterhead. Write to the store nearest you for a big catalog listing thousands of items, illustrations and net prices. The index in the rear makes it very simple to refer to any item you wish. Keep this book as a handy reference. Free. (RADIO NEWS No. 11-105.)

PRECISION TEST EQUIPMENT CATALOG. Published by the *Precision Apparatus Co.*, 647 Kent Ave., Brooklyn, New York. This catalog describes the complete line of Precision Test Equipment for 1941. Many new items are included for the first time. This company specializes in the manufacture of all types of test equipment for the radio serviceman. Among the items described are: Dynamic Mutual Conductance Tube Testers, Dynamic Electronometers, Tube merchandisers with multi-range testers. Counter-type tube merchandisers with 7" instrument, AC-DC multi-range set tester. High-resistance voltmeters, and portable instruments galore. Free. (RADIO NEWS No. 11-106.)

INSULINE CATALOG 207. Published by the *Insuline Corporation of America*, 30-30 Northern Blvd., Long Island City, New York, is now ready for distribution. This concern specializes in the manufacture of radio parts, chassis, and accessories. Hundreds of items are listed in this new 43-page catalog which may be obtained from the *Insuline Corporation*, or, Free. (RADIO NEWS No. 11-107.)

(Continued on page 55)

THE VIDEO REPORTER

by Samuel Kaufman

ALTHOUGH television has yet to make initial commercial headway, the employment side of the video art already offers promising opportunities to capable men. Even at this early stage of the new industry, the call is for "experienced" men in key television positions. And it is surprising at the substantial number of experienced television men at hand. As a matter of fact there is a small group that may well come under the heading of television veterans.

Two of these television veterans recently figured in important job changes. William C. Eddy, until recently with the New York RCA-NBC set-up and formerly with the old Farnsworth laboratories in Philadelphia, was named to an executive post with the forthcoming Balaban & Katz video station in Chicago. And the second change involved Marshall P. Wilder, the ace television engineer formerly with the National Union Radio Corporation and, more recently, for a brief period, with the American Television Corporation, who is now assigned to the RCA-NBC television staff.

The Video Reporter saw Bill Eddy for the first time on a television receiver in Philadelphia several years ago. Bill, a tall thin lad, was standing on the side of a group in a Farnsworth experimental telecast. It wasn't until I met Bill a few minutes later that I realized that there was no distortion around the picture edge at all, but that his tall frame, by contrast to the shorties forming the rest of the group, was his actual, real-life build.

Bill is a retired navy captain, well-versed in radio, who has the rare knack of being



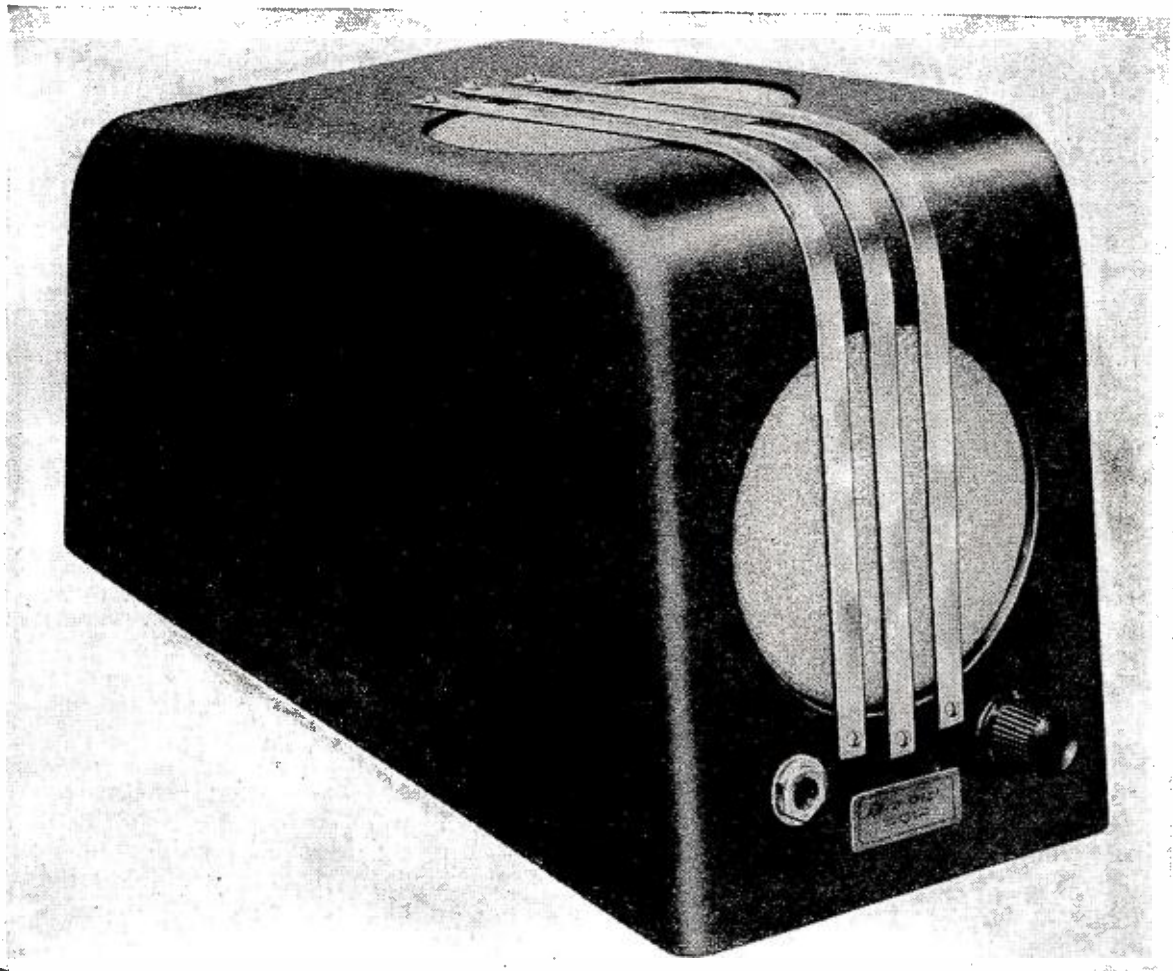
World's Fair Setting of a modern living room with a television set.

able to tackle program problems from an engineering angle and always finding a solution. He pioneered both at Farnsworth and RCA-NBC in television studio lighting and in the use of miniature sets which gave the illusion of mammoth landscapes and seascapes.

Wilder's television career goes back beyond his association with National Union, but it was with that firm that he gained his greatest trade recognition. He helped develop the short "Stubby" cathode-ray tube used in many of the television kits marketed the past two years and developed many other improvements in use today. We're told that one of his first assignments at W2XBS will be to formulate service plans on adjusting the early 441-line RCA receivers to the forthcoming 507-line standard.

THERE are some lively arguments in New York trade circles as to just how much better an image will be obtained when television resumes on higher-definition standards. Actually, the very term of higher-definition means the picture will be an improved one. But the arguments center about whether the average eye can observe any added quality in the increased number of picture lines. These impromptu debates
(Continued on page 48)

Attention C-W Men! SHIP OPERATORS—AMATEURS



This Is the New Meissner "UNI-SIGNAL SELECTOR"

Most Revolutionary Development in
Amateur Radio Since the "Rock-Crusher"
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Navy Operators

(Continued from page 9)

pass a physical examination. Those who hope to qualify as Signalmen—operating blinkers, semaphores, etc., must possess perfect vision, but the radiomen can get by with "satisfactory" vision.

The training begins with a four weeks course, which all successful applicants will take. This includes instruction in Morse Code and visual signals, typing, spelling and composition. During the first week, students will be taught Navy regulations and will learn the Naval communications system—location of shore stations and operation of the Naval nets. Instruction will be given in elementary communication procedure and in the interior communications set-up.

During the second week, the students—continuing in code, typing, etc.—will learn the duties of petty officers (the rating toward which they are working), the general Navy organization, how routine matters, such as correspondence, are handled and will be given a demonstration of the electrical equipment on a ship. During the next two weeks, they will study guns, charts, navigation, ship's logs and range finders in addition to radio work. At this time, they will also begin to study the Navy's secret codes. These four weeks will provide students with about 28 hours in Morse, the same time in typing and with 16 hours in English. The total study period during the four weeks is about 130 hours.

An examination will be given at the

end of this time, and the weeding out and assorting processes will begin. Certain of the students will be selected as Signalmen, but four out of five will continue as radiomen. Intensive training begins at this point, with instruction not only in operating but in maintenance.

With the fifth week of study, the reservists will begin taking down Morse messages on their typewriters and will study machine transmission. Machine transmission, because it is so steady, is used to instruct students in Navy schools. After eight weeks, the reservists will get instruction in advanced communications procedure—such as the methods to be followed in mobilizing a fleet for battle action, etc.

After three months in school, the students begin their practice work under actual operating conditions. They are to handle actual messages and are allowed to work on a circuit, etc. During the last month of instruction, the students will stand watch for six hours every day in the District communications office. They will learn about the forms on which messages are handled and the methods of distribution.

After 16 weeks of instruction, students will take their final examination. During the last 12 weeks, they will have had 70 hours instruction in typing; 146 hours in Morse (machine) and 26 hours in Morse (hand); 30 hours experience in practical operating; 53 hours in procedure, and 120 hours on watch.

During this period they will also have received a thorough course in maintenance. Every man who qualifies as a Radioman must know how to take Navy equipment apart and put

it back together again well enough to do it blindfolded on a foggy night. Those who go to the Signal schools will not receive this instruction, but will learn about flags, lights, etc.

The Navy will make available much of its modern equipment for the students. This will include anything from the Naval transmitters, audio-oscillators, receivers, direction finders, etc. There will be studies in radio theory, carried into practice with advanced work on Navy ultra high frequency and other equipment.

Instructors will include regular Navy officers, plus a number of reserve officers. It is expected that the large schools will be under the direction of about five officers and 25 instructors. Men who are members of the Naval Reserve now and who hold ratings below that of Third Class Radioman are eligible for the schools.

After the class work has been completed, those who pass the examination will be given a chance to make a cruise. They must agree to serve for at least three months and may sign up for longer periods. They will be rated as Radiomen Third Class, at a pay of \$60 per month during this time.

The strength of the Naval Communications Reserve at this time is about 6,000, including officers and men. The training program, it is hoped, will almost double the enlisted strength of the reserve. The time may be coming when we will need a lot of radiomen in a big hurry. And you can't pull them out of a hat. This is the chance the Navy is giving a lot of young fellows to enter the radio profession. And a chance to serve the country.

-30-

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For the Record
(Continued from page 4)

Most of the armed service orders are being negotiated directly between the Army and Navy and the manufacturers, rather than being cleared through the National Defense Commission. This is to avoid much publicity that attends the placing of orders through the National Defense Commission which while doing a splendid job, may still develop into a political foot-ball by the Administration. The worst that can be said against the National Defense Commission, is that it is a "front," designed to throw the unwary off the correct track as to just where and when the real defense measures are being taken. Some at Washington think that the National Defense Commission is one of the slickest measures of counter-espionage that has ever been invented by our Intelligence Department.

* * *

ELSEWHERE in this issue is the statement that "there is a serious shortage of sockets." A letter arrived from a well-known socket manufacturer saying that his firm had millions of sockets available for Government orders. The firm stated that it was already furnishing these sockets to most manufacturers engaged in Government business. From this letter one must come to the conclusion that while there is no bottle-neck in sockets, there is a serious traffic problem. It will not be any good to have the sockets available at the source, if the ultimate destination is not receiving them. We were definitely assured that a large manufacturer of sets was having difficulties in getting sockets, and in face of the socket manufacturer's letter, we cannot understand why this should be so. Unless we have guessed right!

* * *

ALL in all, the optimism we expressed last month about an increase due to the War orders and the National Defense orders seems to be more and more substantiated.

* * *

LOOKING towards the establishment of clearer channels on the domestic front, Chairman Fly of the FCC said that the ceiling of 50 kw. for our own radio broadcasters will shortly be raised. What effect this will have on those stations who are counting on f.m. to give them a clearer channel than is now possible with the low power the a.m. stations are using, is hard to evaluate. One thing is clear. We are on the verge of a terrific fight between the f.m. and the a.m. boys for the mastery of the air. Such a mastery includes the receipt of the advertising revenue which comes to him

who can best serve his locality. That the FCC is not taking sides, cannot be doubted in view of its attitude towards the a.m. boys in raising or proposing to raise their power level, and at the same time giving the f.m. lads all the encouragement possible. Clearly, the FCC is staying out of this particular fight.

* * *

THE story making the rounds among the Automotive manufacturers is that there will be no new 1942 models in the interest of National Defense. Some servicemen have applied the same reasoning to the manufacture of receiving sets. From actual inquiry we find that there is not the slightest sign of any let-up, and new models are expected

to make their appearance on time next year as in any other year.

* * *

THERE has been a summer lull in servicing. This was more than likely due to the fact that the foreign war news has decreased in pace, and that the idea of half the world being at war had lost its novelty. But the requests by the public that the sets they have give excellence in tonal qualities did not diminish. Many a serviceman was being called in to correct the tone of a radio whereas before it was only required that the set receive the station regardless of the tone which came from the loud speaker. The public has
(Please turn the page)

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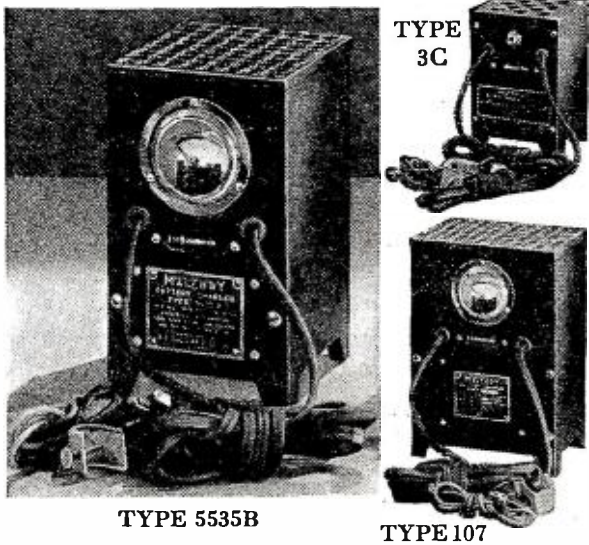


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become keenly music conscious, and this change reflects in the manner in which it is becoming accustomed to hearing its musical programs.

* * *

THERE is less and less tendency to hook the record player to the audio output of the radio as was prevalent years ago, and more and more tendency either to have a separate record player with its own amplifier system, or at least use one of the phono oscillators. Either case is resulting in increased sales for the set and phone serviceman.

* * *

A RECENT squib in RADIO NEWS that the military radio was a fine field to learn the trade elicited over a hundred inquiries. That is but an indication of what we may expect should conscription take place. That there will be many more trained radiomen with conscription than there are now, is a foregone conclusion. But what will be of particular benefit to the industry will be that the conscripts, once they are relieved from Army-Navy assignment, will make a vast pool from which the hard-pressed manufacturers can draw their trained personnel. Since it is supposed that the National Defense Commission is planning a long-range buying program which will take up to seven years to complete. The conscripts will be out of the Army and in the factories in time to take up the duties which those who are subsequently called, will leave open. This means a constant turn-over in labor, and a corresponding even level of employment wage. Wages figure heavily in the matter of profits and taxation. The radio industry should welcome conscription and not fear it.

* * *

WATCH radio for some of the most astounding inventions of all times. The War, the heavy competition, and the increased tempo all are giving radio "the needle." We freely predict that we are on the verge of seeing radio and electronics make as great a change in our lives as did the advent of the automobile. There will be one compensating factor in radio that was not apparent with the auto. . . .

Son Willie won't be able to take his best girl riding in it and dent its fenders.—K.A.K.

Serviceman's Experiences (Continued from page 33)

The first swallow surprised me. *Root beer!* I looked at the glass incredulously, and noticed a drawing of Pinocchio on its side. Junior partner, eh? I swung my foot angrily, and it caught on something. I looked down and saw I had torn the top edge of the stair carpet from its moorings.

My feelings changed suddenly from anger to panic. *This* was no house to do further damage in! Perhaps, I thought, I could tack the carpet back into place before Al came out.

With this in mind, I poured the root beer into the umbrella stand and pulled a few tacks from the floor. Muffled sounds of a successful installation were still coming from the apartment while I worked feverishly on my hands and knees, hammering with the bottom of the empty glass.

Just then the door opened behind me, and something struck me.

"Who's knocking?" I heard Larsen ask as I rolled downstairs. Before I started down, I had grabbed the only thing handy—the top edge of the carpet. As I rolled, it had wrapped around me, and I reached the bottom landing looking like a crepe suzette.

Al and Mrs. Larsen came out and

peered into the cloud of dust that rose about me at the foot of the stairs. When I stopped coughing, I replied:

"It's only me!" Perhaps it was my bad English, but . . .

"Good-bye," said Larsen, deliberately pushing the umbrella stand off the landing. "Take this with you, old man—wherever you go, there's bound to be a storm."

It hit me squarely, but you can't hurt a man who is insulated by twelve turns of stair carpet.

They attended Mrs. Larsen, who had been screaming hysterically, until a doctor came; then they looked after me. They found I was so heavy I couldn't be rolled back upstairs, and they couldn't extract me because I was in too tight. Finally they had to cut the bottom of the carpet and carry me outside the house, where they unwound me by kicking the roll along the sidewalk. They seemed to enjoy it.

Perhaps Al is right when he says I should be very careful with other people's property. I wouldn't be surprised if we'd lost the Larsens as customers.

Build Your Own Oscillator

(Continued from page 22)

for two hours after having set the B voltage to 250 by manipulating R23 and checking with a 1000 ohms per volt meter.

2. Provide a receiver (with c.w. oscillator switched on) which has been carefully calibrated with 100-kc. oscillator—10-kc. multivibrator frequency standard between 1600 and 1800 kc., and allow this set to heat up 2 hours.

3. Set the fixed oscillator exactly to 350 kc. in this manner: Place the variable oscillator out of operation by temporarily grounding its control grid, and provide loose coupling between the fixed oscillator and the receiver by looping a piece of *insulated* hookup wire around the No. 3 grid lead of one 6L7 and the receiver antenna post. Set the receiver exactly to 1750 kc. (fifth harmonic of 350 kc.) and tune the fixed oscillator to 350 kc. by adjusting C7 and C5 in that order until its fifth harmonic is zero beat in the receiver. The fixed oscillator will then be set exactly to 350 kc. and the coupling lead may be transferred to the No. 1 grid of one 6L7 for the variable oscillator adjustment and the ground clip removed from the variable oscillator control grid.

4. With the BFO dial set at zero, advance C6 to half capacitance and set its dial to zero at this position (it is assumed that a dial is obtained with zero in the center of the scale). With the receiver still set to 1750 kc., adjust C4 until the fifth harmonic of the variable oscillator is zero beat. The variable oscillator will then be set to 350 kc. which is "zero" audio cycles per second.

5. By advancing the BFO dial in a counter-clock-wise direction, the frequency of the variable oscillator will be progressive—and continuously lowered, the various frequencies indicated on the receiver dial (which is now rotated to follow) being divided by 5 to obtain the audio settings of the BFO dial. For example: 1750 kc. equals zero cycles. 1745 kc. equals 1000 cycles. 1740 kc. equals 2000 cycles, etc., etc. A large number of points can so be checked to afford a large number of dial mark-

ings or to clarify: when the receiver frequency is divided by 5, the figure obtained will represent a frequency a certain number of cycles removed from 350 kc. (350 kc. corresponding to zero audio frequency, as it has been shown) and it is this frequency separation in terms of which the dial is graduated.

After the various points have been marked on the dial (we suggest, with a sharp scratch awl), the condenser is rotated all the way to *maximum* capacitance, turning it fully home, an index inscribed on the dial to indicate its setting with the condenser in this position, and the dial removed from the condenser shaft. It may then be delivered to a shop set up for dial engraving where the figures and line graduations may be cut in. Or, if the builder is sufficiently adept at lettering, he may Duco cement a ring of white Bristol board to the dial, as shown in Fig. 1, and execute the graduations in black India ink, later covering the cardboard with a protecting face of transparent celluloid.

The dial is reinstalled with the tuning condenser again set fully to maximum capacitance and the dial rotated to the index point determined at the time of removal.

When the instrument is subsequently placed into operation, it will only be necessary to set the tuning dial to zero and adjust the small frequency correction dial (controlling C6) to the point where the output meter stops pulsating and rests at zero, to establish the original calibration. This control permits zero correction within the limits of plus or minus 1000 cycles, ample leeway for the aging of tubes and components and "settling" of the instrument during prolonged standby periods. The pointer of the meter will pulsate between a little under 1 cycle per second to a little better than 30 cycles, and above this top frequency will assure a steady voltage indication. These actual pulses may be counted against standard time to check the extremely low frequencies.

Should it become necessary to provide output impedances other than those supplied by the LS-51 transformer, an external matching transformer with a 500-ohm primary may be used. It is recommended that this auxiliary transformer be of the same good quality, that it be well shielded, and that the leads be kept short.

Performance

As an example of the performance to be expected from a beat frequency oscillator of the type described, the following results obtained by the writer are listed:

Frequency Coverage. 30 to 15,000 cycles. There is some dial space below 30 and above 15,000 cycles which might be marked off, although this is not a particularly facile operation nor is it mechanically tractable to reset to those frequencies.

Voltage Output. 7 volts r.m.s. across 500 ohms, corresponding to 98 milliwatts. Variation is within plus or minus 1 db. from 100 to 10,000 cycles; slightly more than plus or minus 2 db. from 30 to 100 cycles and from 10,000 to 15,000 cycles.

Distortion. At maximum output, slightly under 5% between 100 and 15,000 cycles; slightly in excess of 5% between 30 and 100 cycles. At 1.5 volts output.

Washington Communication
(Continued from page 26)

did a little checking and found some interesting things. One soldier in the Signal Corps, it was discovered, had joined the force at the request of Nazi Bund leaders.

The Signal Corps would be an ideal spot for a Fifth Columnist. Officers admit privately that there unquestionably are a number in the service, but say they know they can trust all the men who handle confidential material. And they say the boring from within would stop in war-time—if a few of them were shot.

Kid-Spy Stuff

THE operator of one of the FCC monitoring stations in the South jerked to attention one day this summer when he heard a voice say:
"Hello, Berlin. Hello Berlin. Agent 75 WX 3 calling."

A conversation followed. Later, on the same frequency, the monitor picked up a voice calling Rome. Agents got busy and traced the station down by triangulation. The voices claimed to be coming from a portable, but the FCC men had no trouble finding it.

They discovered, not a nest of foreign agents, but a pair of fuzzy-faced kids who thought it was very funny. They were just joking, talking back and forth over their ham stations in Tampa, Fla.

The investigators took a serious view of the stunt, rightly enough. The incident was brought to the attention of the full Commission in Washington. The licenses of both operators were suspended for six months. The boys didn't laugh at that.

Hams also got a warning from the FCC that when it had ordered portables put away, it meant it. During the summer, some hamops made a habit of taking their sets off on week ends or vacations with them. The FCC warned that this would not be allowed.

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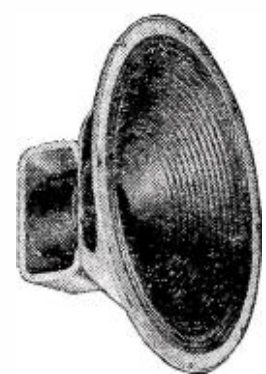
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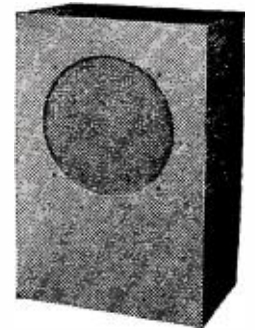


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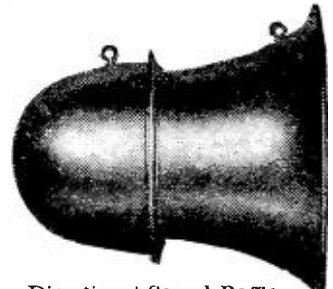
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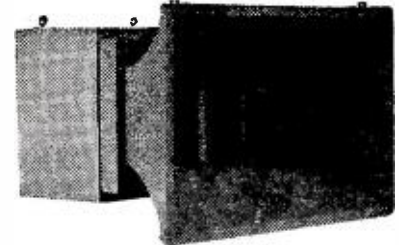
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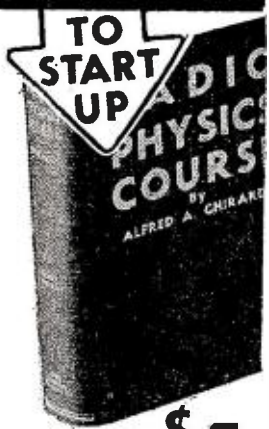
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GENERAL ELECTRIC K-65-P
(Uses same chassis as RCA R-38-P receiver.) See the Case Histories listed for the RCA R-38-P receiver

GENERAL ELECTRIC K-66
(Uses same chassis as RCA-220 receiver.) See the Case Histories listed for the RCA-220 receiver

RADIO PHYSICS COURSE

by Alfred A. Ghirardi

(Continued from October, 1940)

After the tube has been sealed off, it is cemented to the Bakelite base and the lead-in wires are soldered to the tube prongs. These are made of hollow brass tubing, plated to prevent further corrosion. The tube is then tested and aged by operating it at definite filament voltages for certain lengths of time until the filament emission becomes stable and constant. A rough test for gas content is made by bringing a high-frequency spark coil up near to the glass bulb. If the tube contains an excess of gas, it will be ionized by the rapidly alternating field of the coil and the characteristic blue glow due to this ionization will be produced.

The actual measurement in finished vacuum tubes consists in measuring the "inverse" current that flows in the grid circuit under some standard condition of operation of the radio tube. By "inverse" current is meant a current which flows in the grid circuit when the grid is negative with respect to the filament, that is, a current which flows in the sense of grid to filament in the exterior circuit. It can be demonstrated that this current originates from the ionization of the gas tube, and is therefore largely proportional to the gas content of the tube.

In the common types of radio tubes, the magnitude of the grid current is from a few hundredths of a microampere to several microamperes, depending on the excellence of the vacuum in the tube and the test conditions chosen. Currents of this size represent about the lower limit of sensitivity of the very best portable electrical measuring instruments that can conveniently be used in factories and factory laboratories.

Every possible effort is made to not only produce as perfect a vacuum as possible in modern vacuum tubes, but by means of the heating of the metal parts and the flashing of the "getter," to eliminate even the small bubbles of gas and water vapor absorbed in the microscopic pores of the metal and glass parts. The exhausting apparatus consists of mercury vapor pumps in series with ordinary rotary or reciprocating pumps. Gas pressure is usually measured by the height of the column of mercury it will support. A micron of pressure is equal to that exerted by 1/1000 of a millimeter of mercury. The average new vacuum tube has a vacuum of 2 or 3 microns, a micron being one-millionth of the usual atmospheric pressure of 15 pounds per sq. in. An incandescent lamp has a vacuum of 150 microns. Special long-life tubes are being made with a vacuum of less than 1 micron.

A "soft" or low-vacuum tube cannot withstand the high voltages necessary for amplification, although it may be used at low voltages as a detector. The life of a tube is largely dependent upon the degree of vacuum existing in it.

As I See It!
(Continued from page 11)

cars so successful? Indubitably the fact that maintenance is available in virtually every community in the nation. Is that not so?"

"Punky, you're right," we replied, "maybe some of these manufacturers will get wise to themselves and even use that as a sales argument. Who can tell? . . . Say, where are you going? Don't leave so soon, let's talk some more." "No, I'm afraid that will have to be all for today," replied Punky, "I must converse with Janet. She seems to have a problem with her postage stamp collection and I used to be a philatelist. Good day to you, sir."

Vocational School Teachers

A NUMBER of experienced servicemen with high school training and well versed in radio are finding positions as instructors in vocational schools. This National Defense program is embracing more and more of the educational institutions with the hope of producing the required number of skilled people. Much of the instruction is night work, several hours a night, several nights a week. Since the conditions are different in different cities, we cannot state the requirements set forth by the educational bodies in each city. However, it might be a good idea for those well versed service technicians who feel that they are capable of such instruction to look into the matter and not only help the nation, but earn money while doing it. Consult your local Board of Education. Place your name on file; you never can tell when you'll be needed.

Of Possible Interest to Tube Manufacturers

WERE it not for the fact that many servicemen build public-address amplifiers we would not bring this to the fore. However, since they do build such units and need further data, the following is suggested. According to comments heard, tube specification charts published by the tube manufacturers do not contain sufficient data concerning operating conditions of a-f pentodes. That which is given in the tables now available is all right as far as it goes, but does not represent the actual conditions experienced in construction. This is particularly true in the case of the screen operating voltages, which, as can be readily understood, materially influence the performance of the tube and the system wherein it is used.

What seems to be needed is information concerning the application of these tubes with effective values of screen voltage between say 30 to 70 or 80 volts. This reference does not mean that the information given in the tables is wrong. It is correct as far as it goes, but does not go far enough. It would be more helpful to the man who builds p.a. systems and also mean more frequent reference to these charts.

True to Its Name

WE have just received word that tests made to check the efficacy of signal tracing on railroad signaling systems has proved successful. Tests were made on equipment installed in the engine for the purpose of giving the locomotive engineer both visual

and aural indications of the signals ahead.

It has successfully been applied to office intercommunicating systems, carrier telephony and electronic equipment used in various industries. Maybe we have a one track mind, but we still reiterate "The Signal's The Thing."

Photo Cell Pickup

THE photoelectric record pickup system announced by a major receiver manufacturer is casting the shadow of coming events. Heretofore photoelectric cell apparatus has been pretty much foreign to the servicing industry, being used in special apparatus, but now that it appears among equipment which radio servicemen will or may have occasion to service,

another type of tube becomes an item of interest.

Speaking about photoelectric pickups of sound recording, we do not think that the sound on film attachments to home movies are so far distant. Since these units employ equipment of the type utilized in receivers, namely the audio amplifier, it is within the province of the radio serviceman. And as far as sound-on-film reproduction is concerned, there is no doubt about the fact that the future will witness the demise of the familiar disc record and its replacement by sound on film.

So when you see data on photoelectric pickups, don't just pass over them as being of no interest at the moment. At least take a good look and read the



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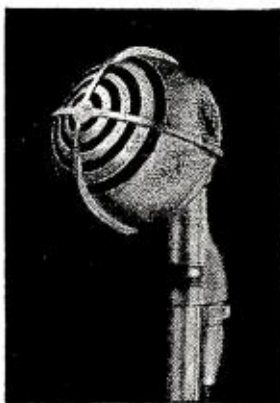
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captions underneath the pictures, if not the paragraph headings.

Note to Magazine Editors

THIS is written in a sincere desire to correct not necessarily an evil, but more of an oversight. Every so often articles appear which provide constructional information covering test equipment. In a number of instances the information given, particularly the schematic and the constants of the parts, shows immediately that the performance cannot be all that is claimed for it. As a matter of fact, in many instances certain definite defects exist. Construction of the devices substantiates these beliefs and the suggestion is made for the benefit of all, that is the readers as well as the magazine, that such constructional articles submitted to magazines should be accompanied by the finished product. More than likely some editors will tell us to mind our own business and perhaps they are right, but it is exasperating to build equipment and then find that it does not perform as stated.

We do not doubt the sincerity of the authors and constructors, but it is true that there is more to the design of a piece of test equipment than just construction and during the construction, the replacement of one constant by another, because the exact required part is not available. Proper presentation of such construction articles should include certain definite tests made to establish the correct operating conditions with proper laboratory equipment.

Another criticism which has been voiced generally and which might be of interest to editors is that sufficient stress is not placed upon those of the constructional features which are critical in nature. Very often the original model is built with complete success during the initial effort without realization that some points in layout are critical. With the layout details missing, the reader builds and because he employs his own layout ideas, strict adherence to the original not having been stressed, trouble is encountered.

Still another point of interest in connection with tube voltmeters in particular is that associated with tube types. In many instances the author in building his original model did not check the full operating limits of the tube types suggested with the result that the constants used work well with the particular tubes used in the model but not with other tubes available upon the open market.

All of this is not intended to reflect either upon magazines or the editors, for both have to depend upon statements made by authors, but it would be a good idea if such equipment were sent in with the article and a routine test were made to see if the equipment as built would operate with the general run of components available upon the open market. If this is not feasible, then it might be a good idea if the authors stated definitely the operating characteristics of those components which, if not exactly duplicated, may be productive of trouble and the type of trouble which might be expected.

-30-

Video Reporter

(Continued from page 41)

parallel the current word duels regarding just how much better the average ear finds frequency-modulation broadcasts than amplitude-modulation programs.

At *NBC*, where the video lads seemed content to stay on the 441-line standard, the opinion seems to be that there won't be much noticeable difference on live pick-ups when the standard is stepped up to 507. However, a substantial improvement will be noticed in film transmissions, according to our *NBC* informant.

THE *British Scophony Company*, pioneers in big-screen home and theatre television on the British Isles may soon realize the launching of an American affiliate. The firm had representatives in New York about two years ago to help start an American corporation to market models similar to those that were a mild sensation during England's brief period of television program activity. There was quite a bit of publicity on the *American Scophony* plans two years ago but the whole thing was soon forgotten. It seems that the war clouds that hung over Europe in 1938 caused the idea to peter out and, when the war actually started in 1939, plans to organize a U.S.A. outlet seemed definitely shelved.

But, now, with the war still raging at the time of this writing, another *Scophony* representative is in New York with plans to introduce the big-screen television receivers on the U.S.A. market through a new firm said to have the backing of some prominent Americans.

Television transmitting is also in the *Scophony* plans and this angle would necessitate that the company be American-controlled inasmuch as licenses cannot be granted to aliens. This latter point was discovered by the British *Baird* firm many years ago when it attempted to set up a video station in New York.

The suggestion has been weighed by some American promoters to import the large quantity of television receivers that were completed in England before the suspension of telecasting and to dump them on the American market after revising the standards to conform with domestic transmissions. However, the plan was shot to pieces by the reduction of American television prices which made it more practical to buy domestic merchandise without the high cost of war-time trans-Atlantic shipments, plus the incidental shipping risks. On top of this, the lull in American telecasts had such an adverse effect on the television equipment market that the same promoters would have been interested in a plan whereby they could find foreign outlets for American merchandise.

With the exception of opportunists' viewpoints, the American trade seems to concur that television will be a closed domestic market in the U.S.A., with barely any imports or exports of video equipment. And, it is believed that this will hold true even when the European war is over. There may be some indirect international trade through the establishment of foreign subsidiaries. But, like the radio receiver business in the past few years, the only way American brand-name receivers can be sold in bulk in England—and many other big markets in normal times—will be to build factories in the respective foreign nations. The difference in standards is a small thing as compared with growing barriers of merchandise quotas, high customs taxes and mounting shipping costs.

SUSPENSION of television programs in the New York area brought surprisingly few squawks to the headquarters of W2XBS, the *RCA-NBC* station. As a matter of fact—taking the word of an *RCA* spokesman—not a single complaint reached his firm's executive offices. And the complaints reaching *NBC*, we were told, were of such a mild nature that they were actually more in the class of inquiries as to when the service will be resumed. But we can't help having our

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doubts about the absence of squawks. Dealers and newspaper offices received stiffer comment on the suspension of telecasts than *NBC*. If the complaints were actually few, the *Video Reporter* believes that trade estimates that about 4,000 video receivers were in use in the *New York* area were excessive.

DETERMINED to show results and prove that its efforts are not merely perfunctory gestures, the *National Television Systems Committee* has plunged into its tasks with vigor and the general trade feeling is that some material results will soon be revealed.

There is a splendid spirit of cooperation in the committee's undertaking. Getting a batch of competitors to sit around a conference table and iron out industrial wrinkles is a real achievement—as we said before. And best of all is the cooperation extended to the *RMA* by the *FCC*.

But even with the best of intentions, plans can go astray. And that's as true of television as anything else. It is evident that, despite an effort for speed, the committee's work will take considerable time to complete. And therein lies the threat to the entire set-up.

The *Video Reporter*, from the outset, was enthusiastic over the committee's formation and work. He still is. And insofar as the committee's endeavors go there is little doubt that the desired results will be obtained. And there is every reason to believe that *FCC* Chairman James Lawrence Fly will cooperate with the committee.

However, it must be remembered that there's a Presidential election coming up and a change in the Administration will most certainly entail a new *FCC* setup. Of course, there is no reason to say that a new commission named by Mr. Willkie, in the event of his election, will retard any constructive television plans laid by the industry. But a new commission—and a new chairman—may have ideas entirely different than those of Mr. Fly and his aides.

Completing its task swiftly may enhance the real value of the committee's aims and labors. But it hardly seems that speed can be made once the vital issues reach the conference table. There are too many clashing viewpoints represented in the individuals on the committee's panels. Just who will give ground on the various problems remains to be seen.

At the time of this writing the *RMA* reports "rapid progress" on the committee's work. But virtually all of the work to date has been on the organizing of nine subcommittees—or panels, as the *NTSC* prefers to call them—and the real tasks lie ahead.

One of the most vital jobs is in the hands of the newly launched panel on coordination of transmitters and receivers. This subcommittee is to delve into essential factors in the design and operation of transmitters and receivers. Ironing out these industrial problems before the mass commercial launching of the video art will be one of the greatest merchandising boosts any industry ever obtained.

I. J. Kaar, of *General Electric*, heads this panel which includes the following members: E. F. W. Alexanderson, *General Electric*; F. J. Bingley, *Philco*; N. P. Case, *Hazeltine*; M. Cawein, *Farnsworth*; J. N. Dyer, *CBS*; T. T. Goldsmith, *Du Mont*; Herman Greenberg, *Fulton*; D. D. Israel, *Emerson*; A. G. Jensen, *Bell Labs*; R. D. Kell, *RCA Victor*; Paul J. Larsen, *Baird*; H. R. Lubcke, *Don Lee* and George Towne, *Stromberg-Carlson*.

ALL the fuss and furore over frequency-modulation has temporarily—at least—stolen the spotlight from television. Many persons who were reluctant to scrap their old broadcast receivers for a new one because they were "waiting for television" are now being told by the high-pressure FM merchandisers that they need wait no longer inasmuch as FM is the big improvement that's already here while television is a thing still in the distant future. And quite a few manufacturers were quick to fall in the FM line. But there is one outstanding holdout—*RCA*. And an *RCA* spokesman told us that not a single FM set will be included in the firm's line next season.

RCA has been known to change its mind before. And it may happen again. But stay-

ing out of FM is probably more than a whim. It is believed that *RCA* is pretty well burned up over the *FCC* boost given FM at about the very same time it shelved commercial television. Television receiver production at Camden is at a standstill pending further *FCC* action on video matters. However, the *Video Reporter* was told that *RCA* is counting on merchandising the high-fidelity sound of its television receivers to compete with FM. The effort will probably be based around the thought that the television set buyer gets high-fidelity sound in his instrument—plus sight reception facilities.

In line with the suggestion to merchandise the sound qualities of video receivers, *W2XBS* has already experimented with the use of the television frequency for sound programs sans pictures—something like being entertained by a talking picture with the screen darkened. The first experiments along this line were conducted in England where it was felt that high-quality musical reproduction—in which watching the musi-

cians might be monotonous—could be obtained by using the audio channel of the television set-up without picking up the picture.

QUITE a few popular and technical books on television were released in recent seasons. And, from what we hear 'round the trade, about a dozen or so authors are busy on forthcoming video books. The one thing most television books seem to lack is the value of long life. Many of them are out of date as soon as they're published. On the other hand, a few technical volumes issued several seasons back, still offer valuable study material for the television enthusiast. Highest mortality is in the non-technical, reportorial classification; these video books in the lighter vein have a habit of popping up on drug store bargain counters shortly after publication.

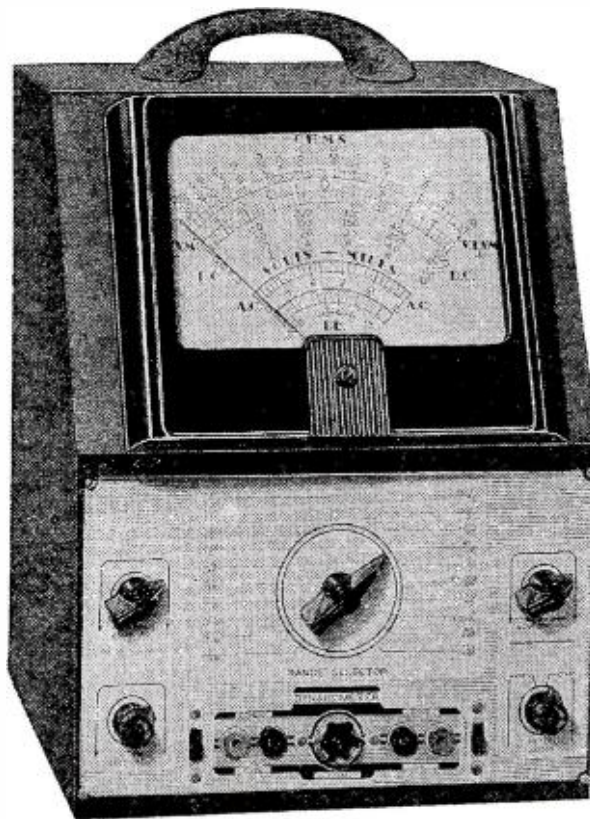
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 - RESISTANCE MEASUREMENTS IN 3 RANGES: 0-1,000 Ohms, 0-10,000 Ohms, 0-30 Megohms.
 - D.C. CURRENT MEASUREMENTS IN 4 RANGES: 0-1, 0-10/100/1 Amp./10 Amp.
 - 4 OUTPUT RANGES: 0-15/150/1500/3000 Volts
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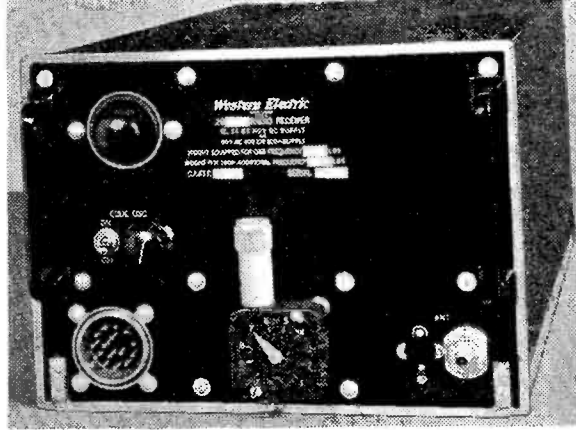
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Utility Radio
(Continued from page 18)

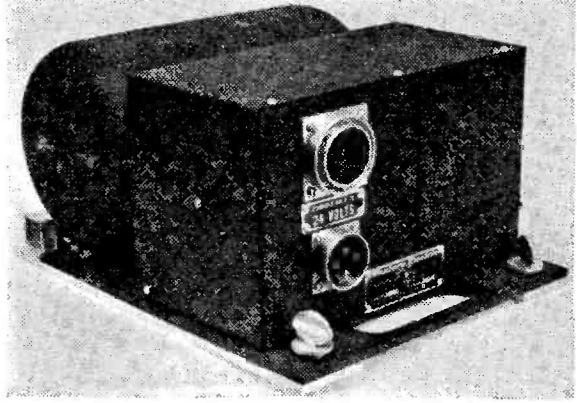
The equipment is extremely simple to operate. Both the transmitter and receiver are simultaneously controlled from a small switching panel located on the plane's instrument panel. The control is accomplished electrically requiring no mechanical cable or rotating shafts. One dial on this unit gives the pilot a choice of any one of ten pre-tuned frequencies. A second dial converts the equipment for telephone, telegraph, modulated telegraph, or facsimile operation. An "on" "off" switch, and a toggle switch for "send" "receive" when employing telegraph, complete the controls. Although the transmitter and receiver are designed to be used as a two-way system, either may be employed alone. When so used, a separate electrically-operated remote control panel may be supplied for each unit or local control can be employed.

Other features of the transmitter include pro-

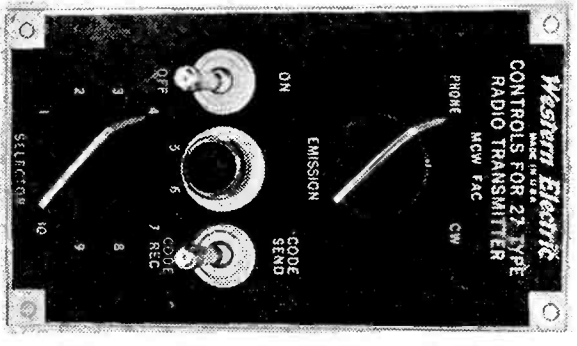
ing final tune-up, can be made without entering the cockpit.
The new equipment meets fully the requirements of the Civil Aeronautics Authority.
Specifications of the transmitter:
Code Designation: 27A.
Frequency Range: 10 spot frequencies; 2000 to 15,000 kc.
Power Output: 125 watts—reduced power: 10,000 to 15,000 kc.
Power Supply: 12-24 volts dc.
Frequency Shift: remote or local.
Emission: phone, CW, MCW, facsimile.



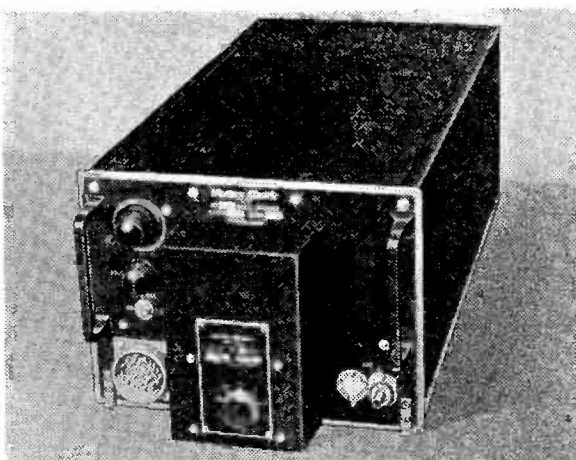
Western Electric 29 Receiver.



Western Electric Power Unit.

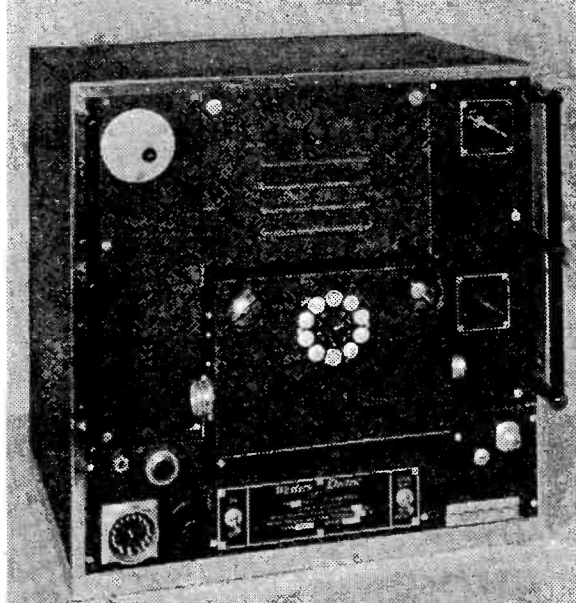


Western Electric 27 Control Unit.



Western Electric 29-A Receiver.

Weight: 60.28 pounds, one frequency; 1.31 pounds each additional frequency.
Dimensions: 17 3/16" wide, 17 3/8" high, 12 3/4" deep.
Specifications of the receiver:
Code Designation: 29A.
Frequency Range: 2000 to 15,000 kc.
Power Output Per Audio Channel: 300 milliwatts.
Power Supply: 12, 24, 110 volts dc.; 400-800 cycles a.c.
Frequency Shift: remote or local.
Weight: 18.31 pounds, one frequency, less power supply; .33 pound each additional frequency.
Dimensions: 10 3/16" wide, 7 1/16" high, 19 1/2" deep.



Western Electric 27-A Transmitter.

APPROXIMATELY 250 filter units, which in conjunction with special radio receivers now in use will enable airline pilots to spot landing field approaches through thick weather, have been ordered from *Western Electric Company by Aeronautical Radio Inc.* The new units will be installed in the 27A marker receivers which are now standard equipment on practically all of the transport airlines in the United States.
The 3000 cycle filters originally installed limit the receivers to a periodic determination of position along the line of flight between airports. With the addition of the new filters, which cover the 400 cycle band, pilots may materially shorten the flight around an airport preparatory to landing since in bad weather the exact edge of the airport may be picked out unerringly by means of a flashing signal light that is actuated by the receiver.

NEW YORK'S bid for the best equipped municipal airport in the world was considerably strengthened recently when it was announced that 15 *Western Electric* radio receivers, interference-free to a degree unprecedented in aviation radio, have been installed to serve the newly opened *LaGuardia Field*. In the control tower of this air terminal for the nation's biggest city, dispatchers are on the alert, day and night, to receive calls from airliners of five great systems, the flying units of Uncle Sam's Army, and private airmen.

The ears of dispatchers are spared the sound of receivers constantly turned on by a device known as an automatically operated "codan." In the absence of a signal the receiver appears "dead." As soon, however, as the carrier wave from the plane's transmitter comes in, the receiver "comes to life."

Day and night channels are assigned to United Air Lines, T.W.A., Eastern Air Lines, and for the regular and southern routes of American Air Lines. A receiver is constantly tuned to 4495 KC, the frequency for Army aircraft. The voices of private fliers come in over a daytime frequency of 3105 KC and a nighttime frequency of 6210 KC. The two additional receivers are maintained as emergency spares with the possibility that additional channels will be allocated to them in the future.

These receivers are similar to those employed at many of the *Bell System's* coastal radiotelephone stations which serve vessels operating off the Atlantic and Pacific seaboard and in the

vision of special condenser combinations to match practically any type of antenna or transmission line; forced draft pressure type ventilation through a spun glass filter; self-contained MCW oscillator; and side tone on CW or MCW which enables the pilot or radio operator to monitor his own transmission. The audio amplifier has sufficient gain to permit the use of either carbon or dynamic type microphones. Careful attention has been given to those design details affecting maintenance. For example, all connections are made through plugs mounted on the front panel, and test meter jacks, also on the front, give ready access to those portions of the circuit requiring measurement. Where the transmitter is installed remotely, all maintenance work, includ-

waters of the Gulf.

The receivers and antennas for the Municipal Airport are installed on Rikers Island in New York's East River, whence the signal is transmitted over wire lines to the control tower at the field. The new receivers (coded types 23-A and 23-AB) were manufactured in the Specialty Products Shop at the Kearny Works of the Western Electric Company.

THE Waller Communicator Line, manufactured by The Spartan Aircraft Co., of Tulsa, Okla., announce three transmitters, the Model B-11-813, the Model AB-39-814 and the transceiver Model AB-39.

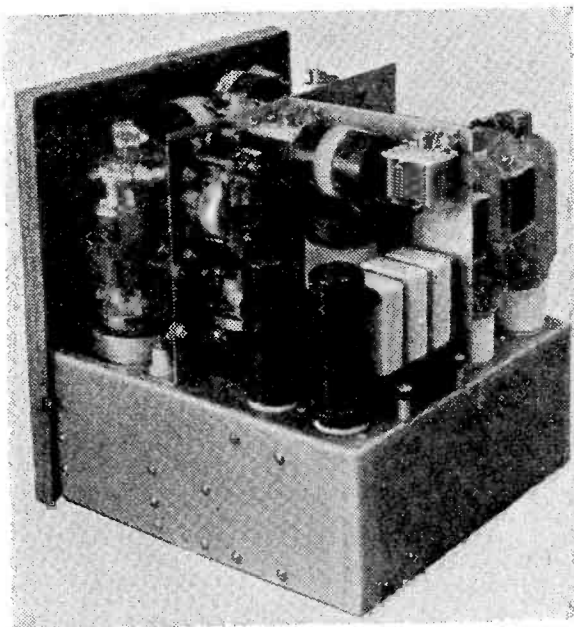
Specifications for the Model B-11-813 are as follows:

Transmitter 10 1/8" long, 9 3/4" wide, 10 3/4" high. Over-all dimensions including shock-mounting and cable plugs 13" long, 9 3/4" wide, 12 1/2" high.

Control Head: 5 3/4" high, 5" wide, depth 2". Dynamotor: 10 1/4" long, 7 1/2" wide, 8 1/4" high. Total weight: 62 lbs.

Tube Complements: 1 RCA 6L6 Crystal Oscillator; 1 RCA 6L6 Speech Amplifier, driver; 2 RCA 811s class "B" Modulators; 1 RCA 813 as Power Amplifier; stand by current—2.5 amperes.

Outstanding Features: Telephonic communication 100% modulation. Interphone system for intercabin communication. Excellent side tone. Full floating approved Lord shock mounts. Transmission and reception on both long and



short antennas. All crystals furnished with transmitter, 3105, 3120, 6210KC. Special Aircraft Anti-noise microphone. Ruggedly constructed, chassis of welded aluminum. Frequency stability within .01% (FCC Tolerance). Complete remote control from a single control panel. All adjustments made at factory and locked in position.

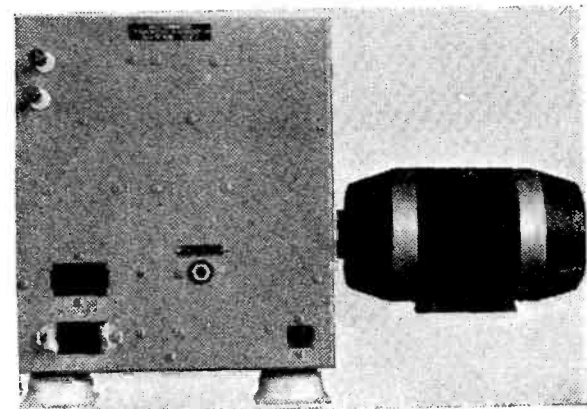
This unit provides transmission and reception on both long and short antennas, providing automatic insertion of the proper loading, when transmitting on short antenna. This feature prevents over modulation, maximum efficiency on short antenna, and insures longer tube life.

The "Waller Communicator" assists you to meet the CAA's requirements relative to aircraft flying "on instruments." It provides you with that dependable, constant air-to-ground communication so desirable on those "cross-countries" where weather or field conditions are doubtful.

From its very inception, Spartan has concentrated on the design and construction of apparatus to meet the rigid specifications necessarily imposed by these services. Through years of service in the Aircraft Radio field, our personnel are fully cognizant of the space and weight limitations, climatic and atmospheric conditions, and other factors influencing the operation of aircraft radio equipment. Our Radio equipment must operate "on" the air and "in" the air. Our transmitters are flight tested under all possible conditions to check and obtain perfection in transmission and reception. Complete and rigid tests are applied to prove the efficiency and strength of all circuits and parts.

Model AB-39-814.

Dimensions: Transmitter 10 1/8" long, 9 3/4" wide, 10 3/4" high. Overall dimensions including



shockmounts and cable plugs: 13" long, 9 3/4" wide, 12 1/2" high. Control Head: 5 3/4" high.

5" wide, depth 2". Dynamotor: 8 1/2" long, 4 1/2" wide, 5" high.

Weights: Transmitter Unit 18 1/2 lbs. Dynamotor 13 1/2 lbs. Microphone 10 oz. Head Control Unit: 1.06 lbs. Cables and Main Fuse Mount: 6 lbs. Remote Antenna Control Unit (optional) 5 lbs.

Tube Complements: 1 RCA 6L6 Crystal Oscillator; 2 Raytheon RK-39s as class "AB" modulators; 1 RCA 814 as Power Amplifier; stand by current 1 1/2 amperes; transmitting current demand 25 Amps., 12 Volts.

Features: Same as given on Model B-11-813. Same head control used on all transmitters. All crystals furnished with transmitters. Remote antenna control unit may be used with both 150 and 50 watt transmitters. If not desired deduct \$50.00 from price listed.

Our equipment contributes substantially to the successful completion of the pilot's mission by increasing his facilities and safety without demanding an undue amount of time and attention to its control. Maximum reliability of performance is achieved with minimum size and weight; flexibility of operation is achieved with simplicity of control, extremes of climatic and atmospheric conditions are anticipated in the selection of materials.

The equipments are small, compact and ruggedly constructed to withstand the rigorous op-

erating conditions to which they will be subjected. Individual items are rigidly inspected both before and after assembly to detect the slightest flaw. Complete units are tested under extremes of temperature, humidity and vibration far more severe than those ever encountered in actual tactical operations.

All tubes are supplied with transmitter, are of the standard type and readily available for replacement in most cities. Our Radio Equipment is built to meet the CAA type certificate requirements.

Model AB-39.

Weights: Transmitter Unit: 5 lbs. Dynamotor 12 lbs. Head Control Unit: 1 1/2 lbs. Microphone: 10 oz. Cables and Main Fuse: 2 lbs.

Dimensions: Transmitter 11 1/2" long, 7 1/2" wide, 8" high. Control Head 5 3/4" high, 5" wide, depth 2". Dynamotor 4 1/2" wide, 5" high, 8 1/2" long. Shown above.

Tube Complements: 1 RCA 6L6 Oscillator; 2 RK-39s class "AB" Modulators; 1 RK-39 as power amplifier; frequencies 3105 and 6210 KC. Current demand: stand-by 4 Amps., sending 16 Amps.

Model B.

The transceiver is the ideal unit for two way communication on light planes and auxiliary equipment on large planes. It is a standard superheterodyne receiver covering the beacon and

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**THE NEW MODEL 1240
TUBE TESTER**

- Instantaneous snap switches reduce actual testing time to absolute minimum.
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- Sockets for all tubes—No adapters.

Superior is proud to offer the newest and most practical tube tester ever designed. Unbelievably low in price—unbelievably high in performance.

★ Tests all tubes, 1.4 to 117 volts, including 4, 5, 6, 7, 7L, octals, loctals, Bantam Jr., Peanut, single ended, floating filament, Mercury Vapor Rectifiers, the new S series, in fact every tube designed to date.

★ Spare socket included on front panel for any future tubes.

★ Tests by the well-established emission method for tube quality, directly read on the GOOD ? BAD scale of the meter.

★ Jewel protected neon.

★ Tests shorts and leakages up to 2 megohms in all tubes.

★ Tests leakages and shorts in all elements AGAINST all elements in all tubes.

★ Tests BOTH plates in rectifiers.

★ Tests individual sections such as diodes, triodes, pentodes, etc., in multi-purpose tubes.

★ Latest type voltage regulator.

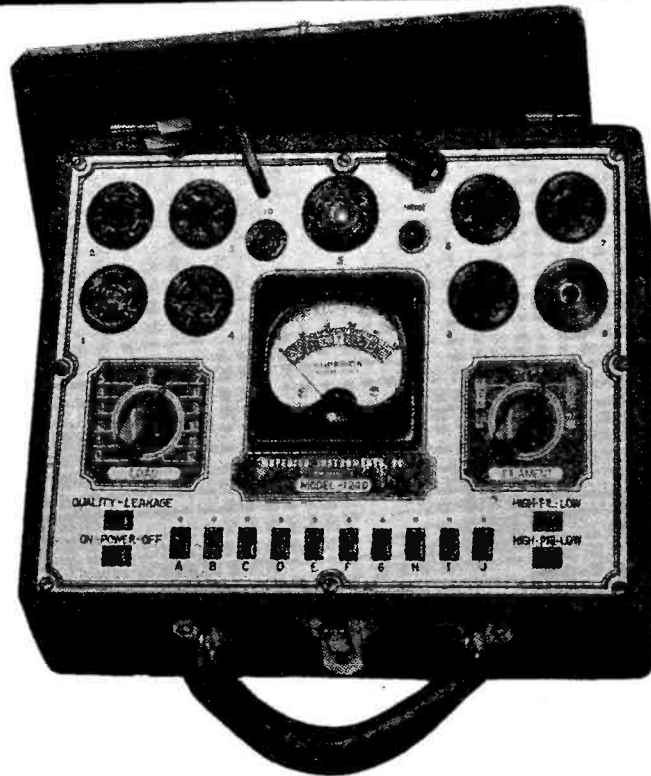
★ Features an attractive etched aluminum panel.

★ Works on 90 to 125 volts 60 cycles A.C.

Model 1240 comes complete with instructions and tabular data for every known type of receiving tube. Shipping weight 12 pounds. Size 6" x 7 1/2" x 10 3/4".

Our Net Price.....

Portable cover \$1.00 additional



\$11⁸⁵

**THE NEW MODEL 1230
SIGNAL
GENERATOR
WITH
FIVE STEPS
OF
SINE-WAVE AUDIO**

SPECIFICATIONS

RADIO FREQUENCIES from 100 K. C. to 90 Megacycles in 7 bands by front panel switch manipulation. All direct reading and accurate to within 1% on I.F. and Broadcast bands, 2% on higher frequencies. The R.F. is obtainable separately or modulated by any one of the five Audio Frequencies.

AUDIO FREQUENCIES: 5 steps of SINE-WAVE audio 200, 400, 1000, 5000 and 7500 cycles WITH OUTPUT OF OVER 1 VOLT. Any one of the above frequencies obtainable separately for servicing P.A., hard-of-hearing aids, etc.

ATTENUATOR: Late design, full-range attenuator used for controlling either the pure R.F. or modulated R.F.

CIRCUIT: The Model 1230 employs an improved electron coupled oscillator circuit for the R.F. affording positive protection against frequency drift and a Hartley oscillator circuit for the A.F. section.

DIAL MANIPULATION: Large 5 1/2" dial etched directly on front panel, using a new mechanically perfected drive for perfect vernier control.

APPEARANCE: The front panel is etched by a recently perfected process which results in a life-long attractive finish and the instrument comes housed in a streamlined shielded cabinet.

CURRENT SOURCE: The Model 1230 operates on 90 to 130 Volts A.C. or D.C. any frequency.

The Model 1230 comes complete with tubes, shielded cables, moused carrying handle and instructions. Size 14" x 6" x 11". Shipping weight 15 pounds. ONLY.....

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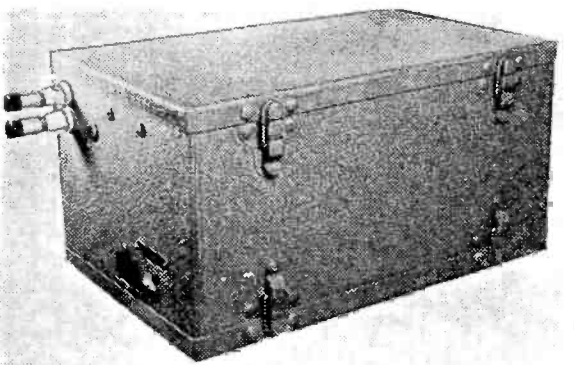
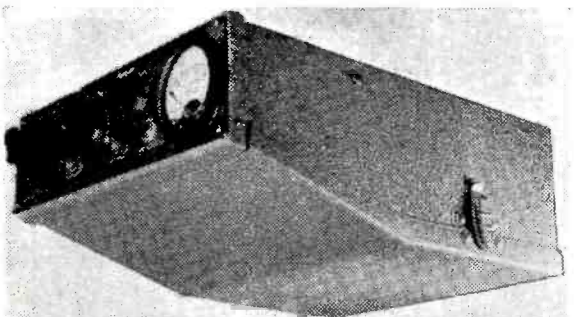
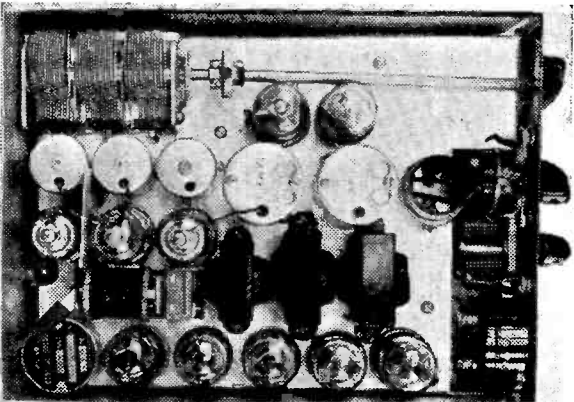
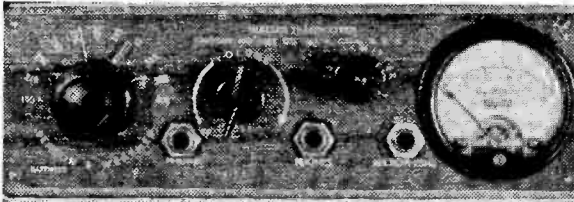
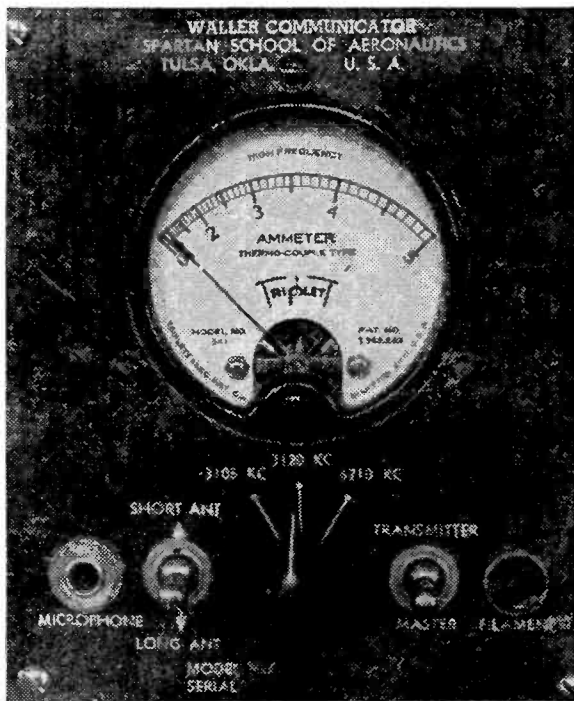
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weather band 200 to 400 KC. Transmitter is of the standard master oscillator power amplifier type, crystal controlled on 3105 KC or any frequency desired. It has a total of ten tubes operating from a single dry battery supply. The case and chassis is of welded aluminum



Various Waller units.

construction, case is finished in a platinum gray baked crackle, head control is grained in natural wood patterns. It may be obtained in any desired color combination. Head panels available for mounting in either position.
Weights: Transceiver, 8 lbs.; Dry Battery, 4 3/4 lbs.; Headphones, 1/2 lb.; Microphone, 1 lb.; Total, 14 1/4 lbs.
Size: Transceiver Case: 11" long, overall 12" long, 8 1/4" wide, rear 4 3/16" high. Head: 8 3/4" long, 2 1/4" wide. Battery: 10"x2 1/4"x5". The battery dimensions given are for the Burgess No. 6TA60. It may be substituted for the

Burgess No. 5DA60. Dimensions 7"x5 1/2"x2 3/4", weight 4 3/4 lbs.

The standard transceiver chassis is also available in a special portable aluminum case housing the transceiver, battery and speaker. Dimensions 11 1/4"x7"x8 1/2", weight 14 lbs. This unit will also accommodate two pairs of headphones.

The portable transceiver is the ideal unit for ferrying purposes and may be placed in any position in the plane. Only necessary to ground to metal structure of plane and connect trailing antenna to antenna post.

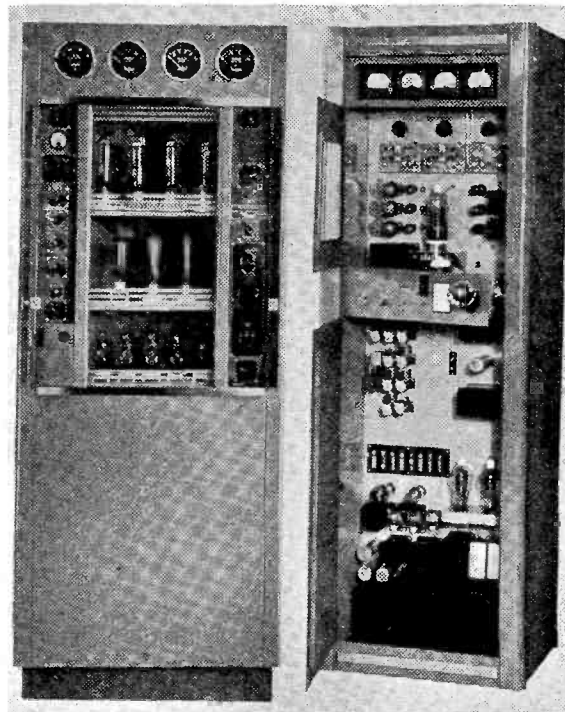
Tube Complements: Receiver: 1 RCA 1N5 as R.F. Amplifier and Pre-selector; 1 RCA 1A7 as Oscillator and translator; 1 RCA 1N5 as Intermediate frequency amplifier; 1 RCA 1H5 as diode detector and 1st A.F. Amp.; 1 RCA 1Q5 as tetrode power output; Output to 500 Ohm Phones may be used with range filter.

Transmitter: 1 RCA 1Q5 as Crystal Oscillator on 3105 KC.; 2 RCA 1Q5s as power amplifier. All tubes GTs; 2 RCA 1Q5s as push-pull modulators.

Police Radio

A NEW radio transmitter of 100-250 watts output, designed expressly for use in stations where limited technical personnel requires the conservation of man-power, as in local broadcasting plants, police work and the emergency communication services, has been announced by the *Western Electric Company*.

Economy of both operating and maintenance time, therefore, keynotes the new design. All electrical components in the new unit, for example, are assembled on a central member which is built of vertically-mounted steel plates. An ingenious arrangement of the vital transmitter



Left, WE 450-A. Right, H-W 50-TC.

elements on this member permits each part to be serviced freely without interference from any other part. The wiring, too, has been assembled on the flat structure. Each wire, therefore, is individually accessible. Much consideration also has been given to the method of fastening the apparatus to the mounting plates for quick interchange.

This guiding principle of extreme utility has also been carried over into electrical design. All tuning and operating controls, together with a test meter and its associated transfer switch, are mounted on narrow side panels which flank the front door of the cabinet. Operating controls are divided into three groups, according to function, and a distinctive type of knob or slot is used for each group in order to eliminate confusion. Controls that are rarely used and require, in addition to their operation, the opening or closing of link switches within the cabinet, have screw-driver slots. In the second group, consisting of the plate and grid circuit tuning controls, round knobs are used. Those designed for routine operation constitute the third group and have rectangular knobs.

The central structure, together with its vital electrical elements, is essentially independent, both electrically and mechanically, from the cabinet. The installation may in fact be completed entirely before the cabinet, which serves merely as a protective device, is placed around it. Forced-draft ventilation cools the unit.

Code Number: 450A-1, 100 watts. 451A-1, 250 watts.

Output Power: As above, except those stations operating 250 watts daytime may desire optional gear for shifting to 100 watts at night.

Frequency Range: 550-2750 kc. depending upon coils and condensers installed.

Dimensions: 30" wide by 28" deep by 76" high.

Weight: Approximately 1000 pounds. Voltage Regulation: Manual. Will accommodate primary voltages from 200 to 240 volts.

Audio Frequency Response: Flat within plus or minus 1.5 db. from 30 to 10,000 cycles per second.

Distortion: R-m-s audio harmonics show less than 3% below 5,000 c.p.s. at all modulation levels to and including 100% and less than 5% from 30 to 7,500 c.p.s.

Modulation Capability: Stabilized feedback and other developments enable modulated amplifier to carry over-modulation without damage to equipment and without sharp increase in distortion.

Noise Level: R-m-s noise level 60 db. or better unweighted, 70 db. or better weighted, below signal level at 100% single frequency modulation.

Harmonic Radiation: Not greater than .03%.
Method of Modulation: Grid bias last radio frequency stage.

Carrier Stability: Quartz plate controlled within 10 cycles.

Power Supply: Input voltage: 200-240. Frequency: 60 cycle (50 cycle can be supplied on order). Consumption: 450A-1—1250 watts. 451A-1—1750 watts.

HARVEY-WELLS COMMUNICATIONS, INC., of Southbridge, Mass., announce the 50-Tc Communications Transmitter, high fidelity communications unit, designed in the modern manner and embodying the latest technical improvements to insure fine performance and economical operation.

The 50-TC Dial-Tune Transmitter is recommended for all high frequency services even where only one frequency is actually employed. The Dial-Tune device adds only a nominal amount to the cost of the equipment.

Only the best component parts have been used in the fabrication of this equipment. The transformers, coils, resistors and condensers, even the smallest parts, have been carefully selected to assure of an adequate safety factor. The 50-TC is rated for Continuous Commercial Service, built to withstand tropical climates and give long, trouble-free life under the most adverse conditions.

Practically all high frequency transmitters are required to operate on more than one frequency. Widely different frequencies must be chosen to effect best transmission at different distances and at different times of day and night. Frequency changes are required for traffic routing and for tactical reasons in military communication. Most modern transmitters have so many tuning controls that rapid manual or automatic frequency changing is a major problem.

The Harvey-Wells Dial-Tune device has proved to be a simple, direct and complete answer to the frequency changing problem.

The 50-TC is furnished with a Local and a Remote control unit. Each control unit is provided with a telephone dial. By means of this dial unlimited combinations of circuits can be selected.

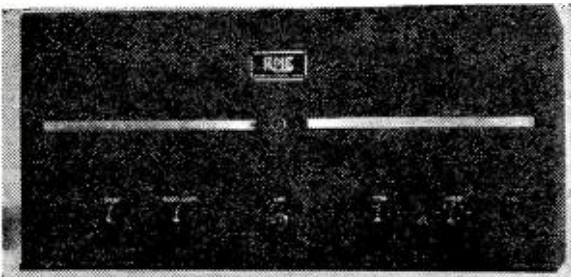
In the case of phone operation, plate voltage is applied by the "Press to talk" bar on the crystal microphone.

The most important feature of the Dial-Tune mechanism is the use of but a single 500 ohm line between the transmitter and remote control unit. Multiple lines and their high cost of rental and maintenance are completely eliminated.

The cabinet and chassis are constructed of heavy gauge steel, well protected against corrosion by means of a zinc chromate rust-resistant finish. The cabinet, measuring 67 1/2"x22"x15" deep is modern in style and pleasing in appearance. It is finished in grey crystalline enamel with a zinc chromate undercoat. The chassis is finished in baked grey enamel.

Marine Radio

RADIO MANUFACTURING ENGINEERS, Peoria, Illinois, have just completed a new spot-fixed tuned receiver, Model SPD-11. The unit is a superheterodyne circuit employing 10 tubes, crystal controlled on any of 5 frequencies selected from 2 to 3 megacycles. Two tuned radio frequency stages precede the first detector, and the unit incorporates a QAVC circuit for quietness during standby periods. Any of the 5 frequencies may be selected by means of a switch. A 6th position has been left blank so that with proper coils and crystal another frequency channel may be added. Although adopted for 2 to 3 megacycles, the unit may be changed to any other ranges up to and including the ultra high frequency police bands. Naturally, the receiver must be used only with fixed-tuned transmitters, since there is not any way the receiver can be tuned outside the incorporated crystal frequencies. The first of these receivers is operating on the Mississippi and adjacent rivers in the hands of a well known Barge Line.



—30—

For Immediate Release
(Continued from page 32)

tory for this period in the year with the result that the company's cash balances in banks are more than ample for its current requirements.

The figures submitted herewith are be-

lieved to fairly set forth the extent of the company's progress for the period. They are, however, subject to verification by our auditors when they make their annual examination at the close of our fiscal year.

Two-way General Electric FM

Communication for Maywood, Illinois
FIRST community in the Chicago area to adopt frequency modulation for emergency communication purposes is the City of Maywood, Ill. Early this fall, a new two-way *General Electric* FM communication system for the police of Maywood will go into operation.

The transmitter, located at police headquarters, will make possible constant contact with patrol cars in the field. It will have a power output of 25 watts, allowing a service area many times that of an equal power amplitude modulation transmitter. To cover a service area equivalent to that provided by the 25-watt FM transmitter, at least 250-watt

amplitude modulated transmitting equipment would be needed.

General Electric equipment was chosen after Maywood officials had made examinations of existing AM installations and had discussed with radio engineers the advantages of frequency modulation transmission. Particular impression was made by FM's ability to practically eliminate natural and man-made interference and increase the service area considerably as well.

With the new equipment, Maywood joins the fast growing roll of progressive communities turning to frequency modulation for emergency communication.

CBS Clarifies on Color Television

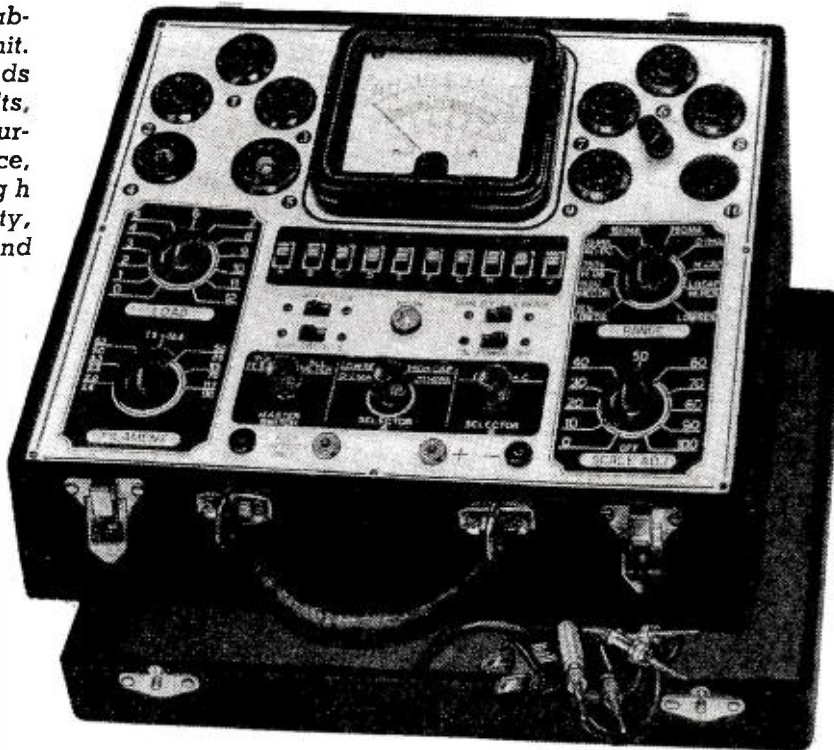
COLUMBIA'S recent announcement of its laboratory success in developing color television has been misinterpreted as a forecast by this company that it planned to broadcast color television programs by January 1 next. This misinterpretation appar-

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THE NEW MODEL 1280 SET-TESTER

A complete testing laboratory all in one unit. Tests all tubes, reads A.C. volts, D.C. volts, A.C. current, D.C. current, High Resistance, Low Resistance, High Capacity, Low Capacity, Decibels, Inductance, and Watts.

- ★ Instantaneous snap switches reduce actual testing time to absolute minimum.
- ★ Spare socket, and filament voltages up to 117 volts make the Model 1280 proof against obsolescence.
- ★ Latest design 4 1/2" D'Arsonval type meter.
- ★ Comes housed in attractive, leatherette covered carrying case.
- ★ Sloping panel for rapid, precise servicing.
- ★ Works on 90-125 volts 60 cycles A.C.



The primary function of an instrument is, of course, to make measurements accurately and when designing test equipment this is our first thought. However, we also appreciate the important part the appearance of an instrument plays in the impression a serviceman makes on his customers, especially on home calls. We have, therefore, paid special attention to the outward design of all of our new instruments. For instance the panel of this Model 1280 is made of aluminum and etched by a radically new process, which results in a beautiful, confidence-inspiring appearance.

SPECIFICATIONS

- ★ Tests all tubes, 1.4 to 117 volts, including 4, 5, 6, 7, 7L, octals, loctals, Bantam Jr., Peanut, single ended, floating filament. Mercury Vapor Rectifiers, the new S series, in fact every tube designed to date.
- ★ Spare socket included on front panel for any future tubes.
- ★ Tests by the well-established emission method for tube quality, directly read on the GOOD ? BAD scale of the meter.
- ★ Jewel protected neon.
- ★ Tests shorts and leakages up to 2 megohms in all tubes.
- ★ Tests leakages and shorts in all elements AGAINST all elements in all tubes.
- ★ Tests BOTH plates in rectifiers.
- ★ Tests individual sections such as diodes, triodes, pentodes, etc., in multi-purpose tubes.
- ★ Latest type voltage regulator.
- ★ Features an attractive etched aluminum panel.

- Complete A.C. and D.C. Voltage and Current Ranges.
- D.C. Voltage: 0-15, 0-150, 0-750 Volts.
- A.C. Voltage: 0-15, 0-150, 0-750 Volts.
- D.C. Current: 0-1, 0-15, 0-150, 0-750 ma.
- A.C. Current: 0-15, 0-150, 0-750 ma.
- 2 Resistance Ranges: 0-500 ohms, 500-5 megohms.
- High and Low Capacity Scales: .0005 to 1 mfd. and .05 to 50 mfd.
- 3 Decibel Ranges.
- 10 to +19,
- 10 to +38, -10 to +53.
- Inductance: 1 to 700 Henries.
- Watts: Based on 6 MW. at 0 D.B. in 500 ohms .006000 MW. to 600 watts.

Model 1280 comes complete with test leads, tabular charts, instructions, and tabular data for every known type of receiving tube and many transmitting tubes. Shipping weight 18 lbs.

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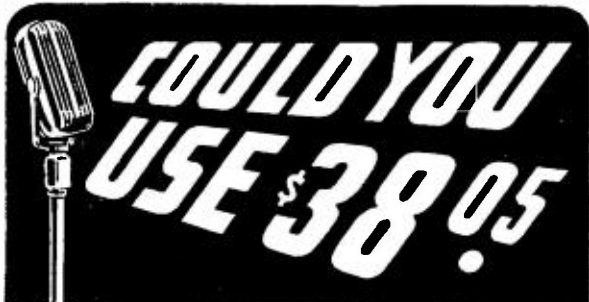


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CITY.....

STATE.....

ently arises from the company's employment of the phrase "commercial use" in apposition to "laboratory development." It was *Columbia's* intention to use the word "commercial" in reference to the manufacture of receiving sets and transmitting equipment by commercial producers in those fields. In that sense, *Columbia* does hope that January 1st will see the beginning of, or at least substantial progress toward, the manufacture of such commercial equipment. Since *Columbia* is not itself a commercial manufacturer of television apparatus, it is not possible for this company to say how long it will take to begin actual marketing of the necessary devices.

It should further be pointed out that while production of commercial equipment would enable numerous television broadcasters to avail themselves of the *Columbia* development, this does not necessarily mean that television broadcasting would be commercial in the sense of carrying sponsored programs, since no date has yet been set for such broadcast service.

Philco Farm Radios Advance

SALES of *Philco* farm radios are more than 50 per cent ahead of the total at this time last year, according to John F. Giligan, manager of specialty division.

The tremendous potentialities of the farm market are the objective of an advertising campaign in more than 22 farm publications reaching an audience of more than 10,000,000 a month.

Two themes are being emphasized in the sales and advertising program—the importance of keeping in touch with European affairs and the extraordinary interest in the 1940 presidential campaign.

As a direct merchandising effort, *Philco* dealers are being enlisted to exploit the possibilities of their state and county fairs. Special broadsides have been made up with outline suggestions for exhibits, stunts and premium offers.

Du Mont Line Now in United Catalog

THE *Du Mont* line of cathode-ray oscillographs, electronic switch and cathode-ray tubes, is now listed in the United Catalog. Catalog sheets covering those cathode-ray items of interest to the general trade are available from the United Catalog Publishers, Inc., New York City, to jobbers handling this line. In addition, the *Du Mont* organization is cooperating with its jobbers in the compilation of their catalogs, by supplying wood-cut electros and concise text for printed catalogs, art proofs for photo-offset reproduction, and bulletins for inclusion in loose-leaf catalog assemblies.

Argentine Competition

THE following report on radio sales in the Argentine Republic, received from the American Consul General at Buenos Aires, was published in the July 25 issue of the *World Market Review* of the U. S. Bureau of Foreign and Domestic Commerce:

"It is reported locally that the Dutch radio manufacturing company, Philips, is considering a further extension of its manufacturing activities in Argentina to compensate for the disruption of its production facilities in the Netherlands. The expanding activities of the Philips company is one of the chief factors in the declining Argentine demand for American radio materials. Practically all receiving sets now sold in the Argentine market are manufactured in this country, United States trade consisting of component parts and tubes. Exports of American radio materials to Argentine during 1939 were valued at \$1,376,264, compared with \$1,859,216 in the preceding year and \$2,621,806 in 1937.

"The position of American-made tubes in the Argentine market has been declining as a result of a number of factors, including increased domestic production, the growing demand for receiving sets requiring European type tubes, and the intensified competition of Philips tubes. In the opinion of authorities in the local trade, the Philips company accounted for approximately half of the 2,000,000 receiving tubes sold in the Argentine market during the last calendar year.

"It is reliably estimated that the number of receiving sets now in use throughout Ar-

gentina is in excess of a million. About 200,000 sets are sold annually, more than half of the sales being in the metropolitan district of Buenos Aires."

Non-commercial Educational FM Broadcasts Proposed by San Francisco Public Schools

FIRST use of FM broadcast in the non-commercial educational field is proposed by the Board of Education of the San Francisco Unified School District as a result of being granted a construction permit by the Federal Communications Commission for a new station at 22nd and Bartlett Streets, that city, to operate on 42,100 kilocycles with 1 kilowatt power, unlimited time.

It intends to use radio for instructional, administrative, supervisory, and other functions in the local schools. Thirteen studios are planned for high schools and colleges in that area. They will be connected with the broadcast station by means of leased wires. In this manner it is expected that a greater number of teachers and pupils will be enabled to participate with less effort and expense of transportation.

The broadcast programs will cover nearly all of San Francisco as well as the East Bay area which includes the cities of Alameda, Oakland, Berkeley, El Cerrito and Richmond. The Board of Education, which is the governing body of the San Francisco Unified School District, has allocated \$9,000 for the station, and an additional amount of \$42,000 has been made available.

Three other institutions were previously licensed to use AM on the channels set aside for non-commercial educational purposes. They are the New York City Board of Education, the Cleveland Board of Education, and, more recently, the University of Kentucky.

—30—

Servicemen's Legal Advice

(Continued from page 24)

the writing creating it. In the absence of any definite period of time, the provisions of the contract or the circumstances may be such as to imply a definite term. Where the hiring of an agent is indefinite, it is the rule that the hiring is at will.¹²

Of course, when an agency contract has expired, it may be extended or renewed by an agreement between the parties, or by circumstances from which it may be inferred that an extension has come into existence. Of course, where the agency is created by the principal for a definite purpose, or for the purpose of doing certain acts, the agency expires upon the completion of the acts for which the agency was created. Generally, the principal has absolute power to revoke an agency at any time, at its mere option, with or without reason. The reason for this rule has been set forth as, "The authority of the agent to represent the principal depends upon the will and license of the principal. It is the act of the principal which creates the authority; it is for his benefit and to subserve his purposes that it is called into being; and, unless the agent is acquired with authority and interest in the subject matter, it is in the principal's interest alone that the authority is to be exercised. The agent has no right to insist upon a further execution of the authority if the principal desires it to terminate."¹³ Where an agent fails faithfully to perform the duties conferred upon him by his principal, the agency may be revoked. Also, an agency may be revoked on the ground that the agent is unsatisfactory to the principal. To constitute a revocation, it is only necessary that it be made clear that the principal has withdrawn his power from the agency. The revocation may be exercised in writing, or it may be oral, and an oral revocation may be effectual although the authority was originally conferred in writing. An agency may also be terminated by operation of law. For instance, war terminates an agency existing between persons of hostile countries to the extent that further discharge of the duties involves communication between the lines of the two countries and is therefore contrary to the policy or interest of either of the belligerent countries.

—30—

Simple Beam Antenna

(Continued from page 27)

Rube Goldberg. The question may arise as to the effect of wet weather upon the operation of this beam. The author's observation has been that no appreciable detuning is noticed whatsoever. As far as results are concerned, the fourth contact after the final erection of this beam was KC4USA, with apologies to the Department of Interior.

In conclusion, may we state that if anyone is not satisfied with the investment of approximately five dollars in this antenna, all is not lost, as this arrangement will make an excellent fishing outrigger for a fishing excursion.

Manufacturers' Literature

(Continued from page 40)

SPRAGUE 1940-1941 CONDENSER CATALOG. This latest printing of the *Sprague Condenser Catalog* is now available to those servicemen and manufacturers interested in all types of radio condensers and testers for condensers. Twenty pages full of new items are illustrated showing the complete line of *Sprague* products. Copies are now available to those who wish them. *Sprague Products Company*, North Adams, Mass. (RADIO NEWS No. 11-108.)

HICKOK RADIO SERVICE EQUIPMENT CATALOG No. 120, is now off the presses. This features a very complete line of radio test equipment of all types. Among the instruments described are: Signal Generators, Vacuum Tube Voltmeters, Oscillographs, Traceometers, Combination Tube and Set Testers, Vibrator and Substitute Speaker Testers, Zero-Current Set Testers, Volt-Ampere-Wattmeter, Appliance Testers, Radio Set Testers, Volt-Ohm-Milliameter. A copy of this new catalog may be had by writing to the *Hickok Electrical Instrument Company*, Cleveland, Ohio. Free. (RADIO NEWS No. 11-109.)

SERVICING BY SIGNAL SUBSTITUTION, by G. N. Goldberger. Published by *Precision Apparatus Company*, 647 Kent Avenue, Brooklyn, New York. 119 pp. Price 35 cents. The purpose of this book has been primarily to acquaint the radio service engineer with the vast possibilities and wide scope of application of purely basic test equipment. In other words, it has been felt that regardless of what extraneous apparatus the service engineer may be fortunate enough to own, he has not, in general, obtained maximum utility from those instruments, which may be classified as purely basic test equipment; that is, the tube tester, the multi-meter and last but most important of all the Signal Generator. These three instruments alone are capable of forming the basis of a complete systematic dynamic approach to receiver adjustment problems, and it is with this thought in mind, and its value to the radio service industry, that this book has been written and is dedicated. Price 35 cents. (RADIO NEWS No. 11-110.)

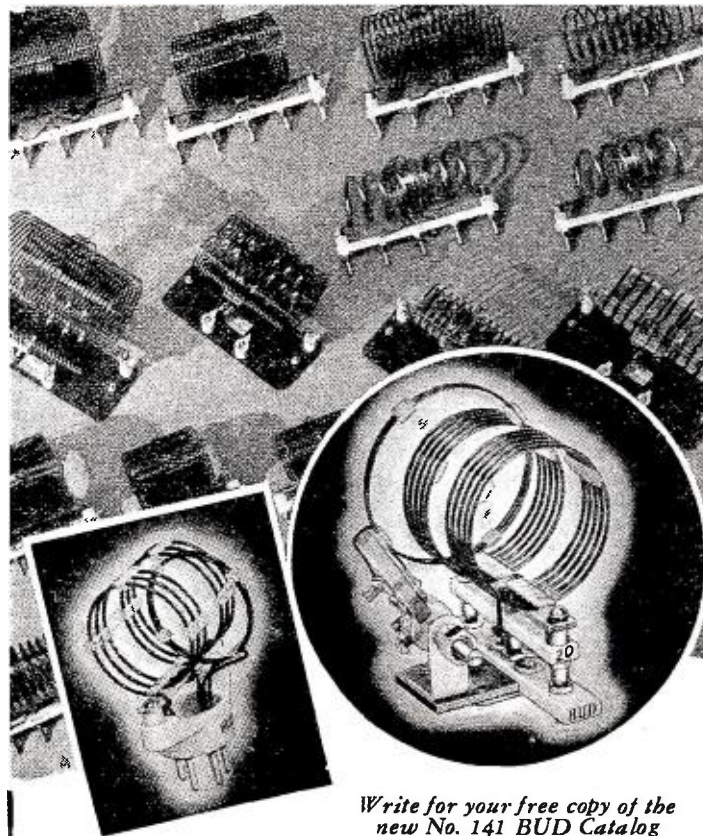
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See Page 59

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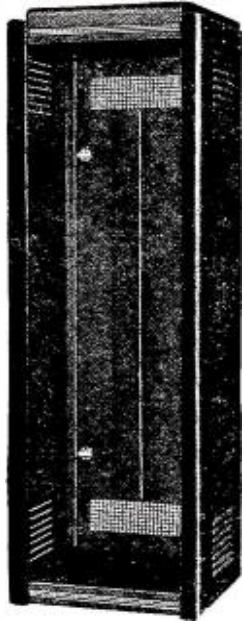
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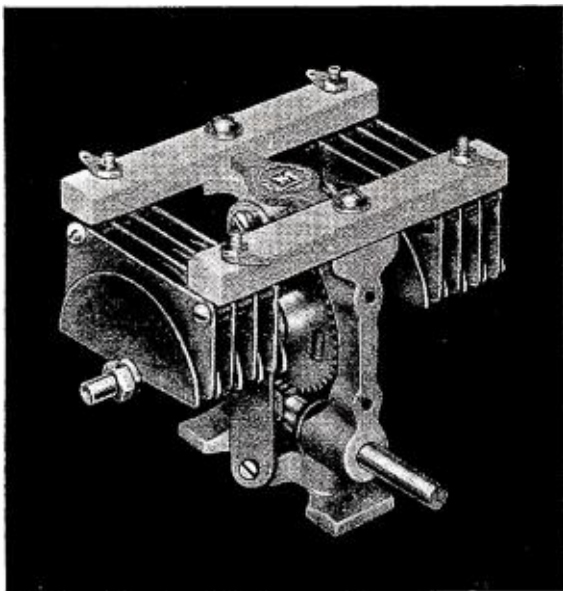
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Catalogue Upon Request

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Electronic Maintenance

(Continued from page 15)

that when the final compass indications are taken, the direction indicated is correct, but even this operation is not replete with tremendous complexities. By no means, is it beyond the capabilities of the serious minded service station operator.

In order to give you some idea of the nature of these private marine radio receivers, the types being manufactured by radio receiver producers, we show in Fig. 3 a typical marine radio compass receiver. This one is made by the Hallicrafters. As you can readily observe this is a three band receiver, battery operated and equipped with a compass calibrated loop pickup. The three bands cover the marine beacon, weather and regular broadcast frequencies. Special comment is not necessary to show the similarity between these receivers and those which have come into the hands of radio servicemen for many years.

All of the receivers intended for marine work are not identical to that shown in Fig. 3, but a number of radio receiver manufacturers are making compass units which are like that one shown. In the event of more elaborate installations, the decision to do maintenance work or to embrace the marine field depends entirely upon the individual. As in the case of aircraft receivers, some of the service work is outside of the zone of the radio servicing industry, but one thing cannot be ignored and this is the fact that the marine radio field is growing; that radio receivers intended for marine operation are being brought out at prices which will permit the purchase by the owners of small powered and sailing craft; that the radio receivers utilized for this work are little different from that used in the home and it behooves the radio serviceman to expand his field.

We have spoken sparingly about the equipment used in the aircraft and marine radio fields. We are reserving much data concerning operation in these fields for future discussions concerning the application of the apparatus in this radio communication service shop. As each piece of test equipment is described, we shall show how its electrical characteristics lend itself to use for the servicing of all radio communication apparatus within the province of the radio serviceman. We hope that by the time this series is finished, not only will this ideal service shop be completed, but those of you who have read this series of articles will have some idea of what is embraced by private aircraft and private marine radio, frequencies used, manner of operation, service procedure, etc. . . .

The same applies to electronics in industry. There are in use today many pieces of apparatus which do special work in industry, yet which when dissected are found to be commonplace radio equipment. We have had more than one conversation with men in industry who expressed themselves to the extent that they wished they could locate a serviceman in a nearby community upon whom they could depend for the maintenance of electronic apparatus used in their

plants, because in too many instances too much time elapsed between the failure of the equipment and the arrival of the factory man to make the repair.

By making this statement we do not mean to imply that every factory where electronic equipment is used is waiting with open arms for the local serviceman. But we do mean to say that many manufacturers of electronic apparatus intended for industry would welcome contacts with local servicemen upon whom they could *depend* to do their maintenance work—and we emphasize the word *depend*.

Electronics in industry is still in its infancy and we repeat that the radio serviceman of today is the logical individual to do that work. We believe that all those who feel that radio servicing can become a lucrative source of income can seek expansion. Most certainly it will be hard work because the finances are not as plentiful as they could be, but very few things have been accomplished without hard work and often times privation.

Perhaps this first article of a series is a strange approach to the problem of creating an ideal communication service shop capable of embracing a reasonable portion of the radio communication field and the electronic field, but we feel that this subject of expansion is vital, particularly today, and justifies the space devoted to it. This ideal service shop is the nucleus of the expansion program and if as we believe it can be arranged to provide the required maintenance facilities for the radio broadcast field, private aircraft and marine radio, public address work and electronics in industry, it might prove to be the key to the manner in which the financial status of the radio servicing industry can be elevated to the level where it belongs.

To be continued.

"Beer Mug" Transmitter

(Continued from page 18)

of aluminum or other non-magnetic material is shaped to fit inside the cabinet for mounting all of the small parts and tubes. One edge is turned down to act as a self-supporting bracket. The controls are mounted directly on the case. A lever type knob is used in preference to a conventional knob for the send-receive switch as it is a bit easier to handle.

The microphone transformer is of high grade and is, in part, responsible for the excellent quality of the unit. It is well shielded and small in size, besides being light in weight. The value of the modulation choke is not critical, but quality will be best if this is kept to around 30 henries. The rating of this choke need not be more than about 30 ma.

The condenser C8 across the mike helps to cut down on the super-regen hiss. The value of the condenser is not critical and may be chosen from trial if more treatment is required. The condenser C7 must be high in capacity and we do not recommend that any substitution be made in this position.

A single "A" battery is used and will give some 25 hours of service before replacement is needed. The plate supply consists of four 45 volt "B" batteries connected in series. Both types

of batteries are very compact and fit nicely into the cabinet. Automatic bias is used on the 6G6G modulator, while the cathode of the 955 is grounded.

The coil is self-supporting and is wound four turns $\frac{1}{2}$ " diameter of No. 14 wire. Turns are spaced to cover the full 112 mc. band. The condenser C2 is a small 15 mmf. ceramic padder condenser and is adjusted so that the set will "hiss" over the entire range when in the "receive" position. This condenser should have the highest capacity that can be used without stopping superregeneration. The loading will then be correct for *transmitting* as well as for *receiving*.

The antenna used is a 46" steel rod mounted by means of two brackets on the feed-through insulators shown. The length may be anything from 43" to 46" and will load equally well at either length. An 8' horizontal wire antenna attached to the underside of one wing with scotch tape was used with excellent results in the glider installation. Reports were somewhat better than with the 46" rod used in earlier attempts.

Considerable care is needed if all of the parts are to be included in a small area. A bit of crowding will save considerable space and the slight effort in compact wiring is really worth while. Like its bigger brother a flexible coupling is used on the tuning condenser to eliminate body capacity. The by-pass condenser below the coil is also of a small size. This transmitter was originally a one tube affair and the 6G6G modulator later added. This was placed in the only room available.

A half-inch hole is drilled in the front of the cabinet—directly in front of the adjusting screw of the C2 condenser. A metal plug is inserted into this hole after the proper operating point has been determined. This keeps out dust and adds to the finished appearance of the set.

A reasonable amount of care in construction will insure the reader in having a transmitter that will give an excellent account of itself.

-30-

Utility Amplifier

(Continued from page 10)

your signal by means of headphones, regulating the volume control by the swing of the d.b. level indicator meter, which is a *Simpson* model 45. The scale reads from minus ten to plus six d.b. It was found that if a variable control potentiometer is used in series with one side of the meter, see schematic diagram, that sufficient volume can be given the signal, and by regulating the control (R) and the main volume control to keep the needle on scale. About three d.b. was ample for most recording work. However, no set rule can be offered as each application is different and is a case of experiment, cut and try. By monitoring all your work and keeping a check on the position of the controls a standard can be worked out to fit your need. This must be done, for if you have too much volume it will cause over-cut grooves and ruin your recording.

The tone control should be kept in the "treble" position for all recording

"MARVELOUS, ME EYE!", SAID PROFESSOR OSWALD SQUEEGEE

PROFESSOR OSWALD Z. SQUEEGEE, Phd., ABC, PDQ., etc., turned an austere eye on the eager, upturned faces of his class in industrial engineering. Then, in the simple dignity becoming to a great man (which everyone, including himself, admitted he was) the Professor spoke:

"Listen, you dimwits," he thundered. "If there's one thing I want to pound through your thick skulls, it's simply this: The easiest way of doing any job is generally the complicated way. The hardest way is to keep plugging along until you've developed the simple way. That takes time. It takes patience and—ahem!—it takes brains."

Here the Professor paused, reached for the glass of water on his desk, got the ink by mistake, and sipped it calmly. Then he cleared his throat and continued: "Some of the world's greatest inventions have been so simple that everyone wondered why Noah hadn't thought of them while he was sitting in the Ark.

"What, for instance, was more logical than putting an eraser on the end of a pencil? What was more logical than the safety razor? What was more logical than, instead of making nuts to fit the wrench, to make the monkey fit the nuts, I mean—ahem—the monkey wrench."

Fishing through the pile of notebooks, overshoes and chewing gum wrappers on his desk, Professor Squeegee found a Sprague Koolohm Resistor and held it up.

"Now here is a practical example of simplified improvement," he bellowed. "One of you clucks brought this resistor in and told

me how marvelous it was."

"Marvelous, me eye! The only thing marvelous is that some resistor manufacturer didn't do it sooner—that it took a condenser manufacturer to figure out how much simpler it would be to insulate the wire itself, instead of trying to insulate the resistor after it is wound without shorting a lot of turns, or without having a coating that will crack, chip or maybe even peel like a banana. Now hand me that crowbar and cold chisel and I'll show you something real."

After 15 minutes' hard work and 3 skinned knuckles, the Professor pried the outer ceramic shell off the Koolohm.

"There it is," he beamed, "a practical example of a little simple simplification that meant a whale of a big im-

provement. Larger wire. No danger of shorted turns. More resistance in less space. So moisture-proof a duck's back would turn green with envy. So well designed it runs cooler than any other resistor of equal size and rating. The only resistor with an automatic overload indicator, and the first . . ."

Just then the 'phone rang. It was the Professor's wife telling him he was already three hours late for lunch. Without even waiting to bid his class goodbye, he laid a handkerchief carefully on his head, crammed his hat into a pocket, shut the door and walked calmly out through the open window.

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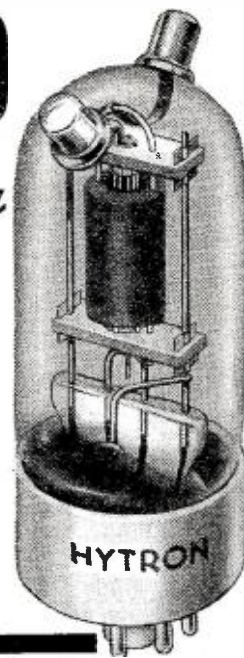
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work except when recording "off-the-air" a slight advance towards the bass will cut out some of the static and back-ground noise. The amplifier should be thoroughly checked for any signs of hum before any recordings are attempted as this hum will be recorded on the record and will override everything and make good records impossible.

For the DX fan who desires to burn the midnight kilowatts searching the air lanes for some illusive signal, this amplifier is a honey. He can listen in on the phones with full power or as much as he needs. Then when he makes the catch it can be recorded with everything right in the same position, no switching being necessary. Thus the signal won't get lost in switching over. All you have to do is to start your turntable with a blank disc on it, place the recording pickup on it and let 'er ride.

A glance at the schematic wiring diagram will show that the amplifier is a three stage resistance coupled unit employing two stages of 6SJ7's in cascade, the second having its screen and plate tied together thus making it a high gain triode suitable to be transformer-coupled into push pull 6B5's. The output transformer has a tapped secondary to match the voice coil and the special pick up. The input transformer is a straight line to push pull grids, the center tap is not used. The primary of course is 500 ohms to match the pickup.

The power transformer specifications must be watched closely and should not vary. The selector switch (SW-1) is a single deck three point rotary. The triple-pole-double-throw switch (SW-2) enables the operator to switch the pickup from the input of the amplifier for play-back, to the output for recording at the same time breaking the circuit of the voice coil. A separate crystal pickup may be used for the play-back and thus overcome the constant changing of needles when recording and playing back. If you have just a record player, this can be fed into the amplifier in place of a radio tuner.

A few details pertaining to the construction of this amplifier. The chassis is a Bud measuring 8x13x2 inches, layed out and drilled as shown in the illustrations. The front panel of this unit is the back of a 15x15x8 inch portable speaker cabinet. The chassis is fastened to it and fits inside of the case when being transported.

Looking at the illustration of the front of the amplifier we have: first the Simpson D.B. meter, monitor phones jack, green pilot light, selector switch. To the left is the power cable going to the radio tuner and on the right is the line cord. The bottom row left to right is the volume control—and line switch, radio jack, mike jack, playback-record switch, phono pick-up jack, tone control.

This little unit is the last word in portability and can give the constructor a large variety of services and is a unit one can hardly be without.

-30-

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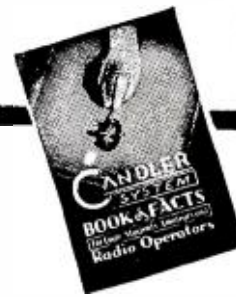
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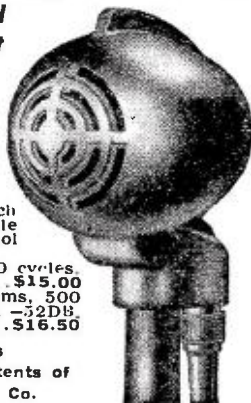
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What's New in Radio

(Continued from page 32)

production methods of assembly. The indicating jewel is made from a translucent thermosetting material which is available in a large variety of colors. Being a thermosetting material, it is unaffected by the heat of the lamp inside. This is also available with a "U" shaped bracket on the back which mounts the lamp detachable from the mounting plate if preferred. On the other models, the two parts are spot-welded permanently together.

A complete new series of console and table model RCA Victorolas embodying many important advances which improve tone quality and performance to a degree never before achieved, has been announced by E. W. Butler, Manager of the RCA Victor Radio, Phonograph and Television Division. A principal feature of the series is advanced cabinet styling in the famed Victrola tradition.

Greatly increased power output (push pull amplification), improved circuits, larger and better loudspeakers, automatic tone compensation, and a "Tone Guard" which cancels out virtually all the extraneous noises of mechanical



operation which is present in all phonographs, are among the more important improvements introduced in the new instruments. Automatic tone compensation and the "Tone Guard" make it possible for the first time to reproduce records faithfully at low volume without hearing objectionable noises or distortion of the tonal range. A home recording mechanism utilizing a special chassis is incorporated in three of the models.

The instruments also use new 12- and 15-inch loudspeakers which utilize a new principle of cone suspension to provide response over a wider audio range than ever before. Not only is bass range improved, but changes in treble response have increased musical brilliance and reduced surface noise. Oversized turntable motors are also important contributors to higher fidelity of reproduction.

Model V-302 is the most luxuriously-housed instrument in the line. The cabinet is a regal 18th Century design in Sheraton style, with front doors concealing Victrola compartment and radio controls. Expensive stripe and feather crotch mahogany (or walnut) veneers are used. Model V-301 is 18th Century design in Chipendale style. A divided lid conceals the Victrola compartment, and a front door closes on the radio controls. A decorative inlay adds to the attractiveness of the front panel.

-30-

Calibrated ECO

(Continued from page 29)

be checked with a wavemeter and adjusted for 40 meter output. The final amplifier should then be neutralized and the plate voltage applied. During these operations the key should be kept closed.

A 25 Watt lamp should then be connected to L5, the output link, and if the amplifier is working properly, it should light up to about three-fourths brilliancy with the full input of 30 watts. (If a 6F6 is substituted for the 6L6 in the amplifier, the input will be only about 20 watts). Adjustment can now be made on the cathode coil for lowest variation in frequency with variations in voltage. Also, at this time, a test can be made for parasitics. With the key open, tune C14 through its range and note the 25 watt lamp connected to L5 for any indication of output during rotation.

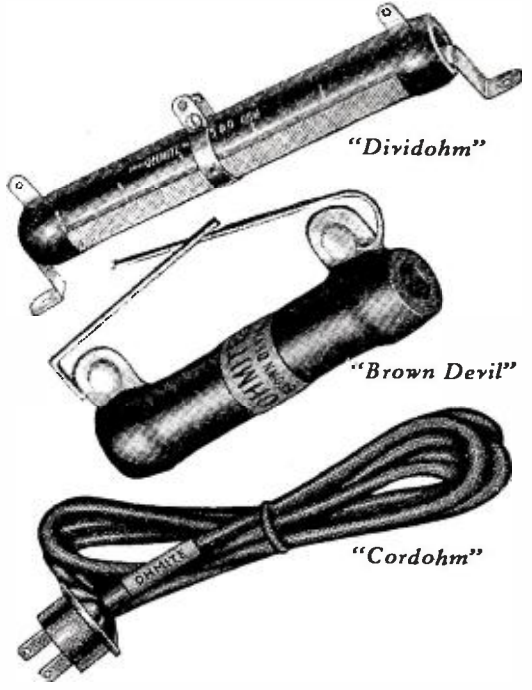
If the bulb does not light, it is rea-

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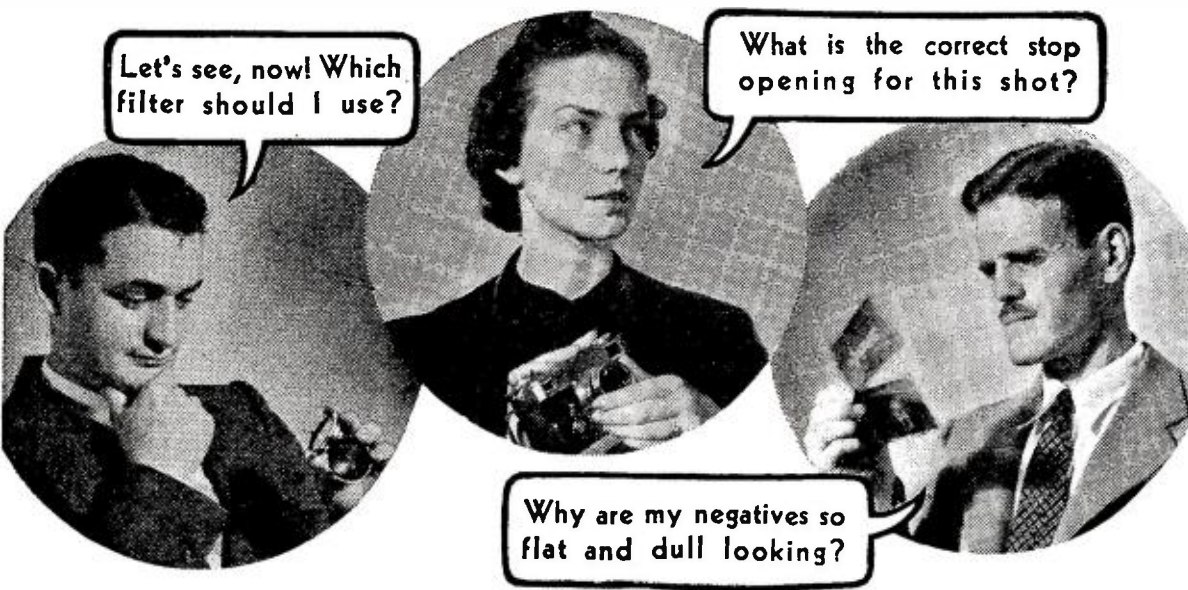
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sonable to assume that parasitics are not present. Another and perhaps much better check would be to listen in on an all wave receiver for a rough note as the condenser is rotated. If parasitics are present, they can be cured by the insertion of Rx and Lx.

Calibration

For the calibration curve, ordinary graph paper with 20 blocks to the inch should be used. The size of the paper used here was 3" x 4" and after the curve was completed, it was mounted on the panel with a transparent celluloid shield to protect it from dirt and a metal collar to hold it in place.

The frequencies are listed on the Ordinates and the dial numbers on the Abscissa. In locating points for the calibration curve several methods are available. One is by checking with various Amateurs worked who use crystal control; another would be by the use of an accurately calibrated receiver. However, a still better way which was used here, is the use of a 100 kc. frequency oscillator which was placed at zero beat with WWV on 5000 kc. and the 100 kc. points located in the 40 meter band. These points were then transferred to the calibration chart and an almost straight line for the operating curve resulted. The accuracy of calibration is plus or minus 5 kc. and with this in mind the operator should never operate at the extreme band edges. Calibration should be made with all shields in place in order to insure accuracy.

Once the adjustments have all been made and the rig is operating properly, the entire band can be covered simply by turning C3 to the desired frequency. However, variations of over 100 kc. from one tuning-up adjustment will require that C14 be peaked again for greatest output.

This unit can also be operated as crystal controlled simply by selecting the proper coil and tuning up as a regular Tri-tet Oscillator. The coil for crystal operation is shown on the chassis layout as EXTRA COIL. It is plugged into a blank socket in order that it may be available at all times. The crystal can be left in its socket at all times as it is only brought into use when the proper coil is placed in the oscillator socket.

Coil	Length of winding	No. turns	Remarks	Wire Size
L1-3.5 mc. ECO	2"	16	Turns evenly spaced. Cathode tap 5T from ground end	#18
L2-7 mc. Tri-tet	1.5"	22	Turns evenly spaced	#24
L3-7 mc. Osc. Plate Coil	2"	18	Turns evenly spaced	#18
L4-Amp. Plate Coil	1.5"	15	Turns spaced evenly	#18
L5-Two turn link around L4				
L6-Neutralizing coil		15	Turns scramble wound at gnd end of L4 & in same direction	#28 DCC

Enameled wire is used for all coils except L6.

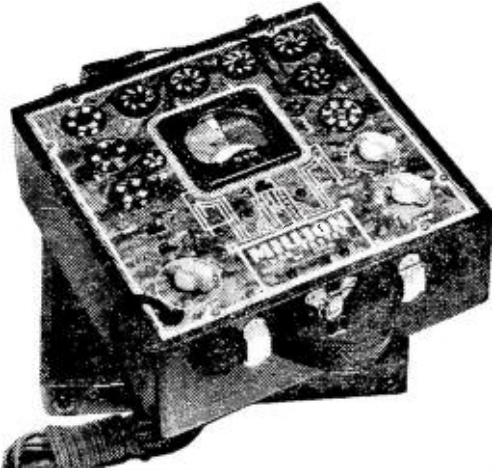
QRD? de Gy

(Continued from page 38)

for more than four years. Which is a recommendation in any country, eh.

WELL, Brother Dr. Lee DeForest is getting the spotlight aplenty these days with transcontinental broadcast hookups, San Francisco World's Fair honoring him with a "Dr. DeForest Day" and Congress-

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sional recognition. A bill is now up before the House which proposes to sponsor a National Radio Day in his honor. During his recent visit to Chicago, WGN gave him a mike reception at which time it was stated . . . quote . . . Since this is National Radio Day, we take pride and pleasure in having with us Dr. Lee DeForest, "The Father of Radio," because today we celebrate in his honor his 67th birthday.

Forty years ago today, in Chicago, he conceived the novel idea which led him to the Radio Tube, which made the whole radio industry possible. If it were not for this invention, the radio in your home and automobile could not exist. His invention is officially credited by the *National Manufacturers' Assn.* as being one of the greatest inventions in American history, ranking with that of the telephone by Bell, the incandescent lamp by Edison and the telegraph by Morse. May we congratulate you on your birthday today, and express the hope that you may be granted many more years of health and activity for invention and research to which you have contributed so immeasurably . . . unquote . . . To which all Ye Ed can add is "Amen."

U. A. Sanabria, President of the *American Television Laboratories*, who has contributed such outstanding inventions in the television field as "interlaced scanning" and "intermittent scanning," the systems which are now being used by practically all telecasting stations in this country, has been working with the U. S. Army on his latest invention, the Television Torpedo Plane. He states that this device would provide the U. S. military forces with an inexpensive means of obtaining information by aerial surveys and also would act as a robot bomber. The flight of the Torpedo Plane is directed by radio from a mother ship 10 or more miles distant. Television cameras, operated by radio, would be placed in the nose of the torpedo plane and a bomb could be carried beneath the fuselage. Right now tests are being conducted at Wright Field to prove its efficiency and practicability, although Mr. Sanabria, who recently celebrated his 32nd birthday, stated that his brain-child has already proven itself in many trials and under trying conditions.

AND so, me hearties, another issue gets put to bed as well as us-all. And another chapter in radio and television history is made. Today, more than at any other time, radiops are sitting pretty with knowledge of a subject that will give to them the greatest future conceivable. But it is not only the knowledge that is necessary. It is also the ability to know what to do with that knowledge. Start thinking, me lads, and begin burning the midnight oil so as to be ready when things start popping. So with cheerio and 73 . . . ge . . . GY.

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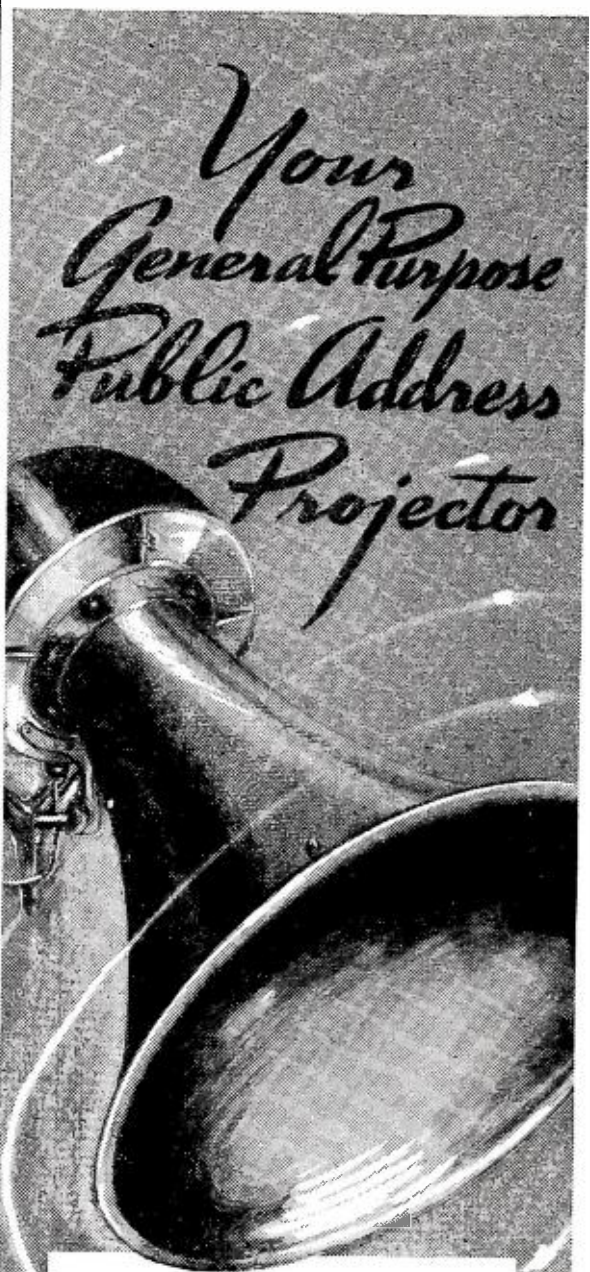
W9USB
(Continued from page 35)

tem, W9JU to W9QEA via 160 Meters. Some of the hookups were complex to the extreme, all as the occasion might dictate.

The hams who participated and who were awarded Certificates of Service were: W9=CNM, JID, ZKQ, VPO, AEG, DAA, DAB, CWP, ENX, ETI, FIB, HOD, HTI, HXO, IMB, IMN, IWZ, IZI, JJP, JU, KBO, KKT, MTW, NIL, ONR, PEQ, PPQ, VRP, RRC, PSP, QEA, QPW, QYJ, RBR, REA, SAQ, SXZ, TAL, TDF, TJD, VEZ, VRS, VSX, WZG, YZV, ZHR, ZYL, AVE, RDD, QGG, MKW, VFW, and WJU.

The following radio firms lent their equipment and helped to make the W9USB end of the Meet a success: Allied Radio Corp., Chicago; Amperite Company, N.Y.C.; Bliley Electric Co., Erie, Pa.; Browning Laboratories, Winchester, Mass.; Bud Radio, Inc., Cleveland; Burgess Battery Company, Freeport, Ill.; The Hallicrafters, Inc., Chicago; Hammarlund Mfg. Co., N.Y.C.; Howard Radio Co., Chicago; The National Company, Malden, Mass.; Newark Electric Co., Chicago; Pioneer Gen-E-Motor Corp., Chicago; Presto Recording Co., N.Y.C.; RCA Mfg. Co., Camden, N.J.; Radio Mfg. Engineers, Peoria, Ill.; Radio News Magazine, Chicago; Shure Brothers, Chicago; and Triplett Electrical Instrument Co., Bluffton, Ohio.

From the reports trickling back to us, the pilots of the gliders as well as those who put on the Meet, were pleased beyond words with the operation of ham radio. We believe that the presentation which was given to the public at the Meet, of what ham radio can do, was excellent publicity, and did much to raise the esteem in which the public holds the ham.



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Dealers' price, Type "S" Peridynamic Projector (No. SPH-81) complete with Permanent Magnet Speaker installed, \$31.20 Net (mounting standard extra). Dimensions: 24 inch bell; 30 inches overall length.

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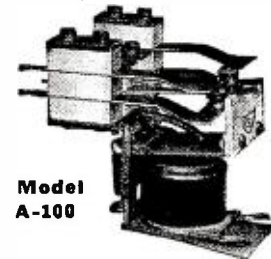


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GUARDIAN ELECTRIC

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Aviation Radio
(Continued from page 15)

of the aviation radio field's largest concerns tells us that the equipment now on the market and on the drawing boards would fill the bill in just a very short time; and that the shortage of equipment for our military aircraft would be non-existent . . . manufacturers are planning.

MANY servicemen are not aware of the fact that they must possess licenses issued by the *Federal Communications Commission* after passing an examination, before they are able to legally tune an aircraft radio transmitter.

Let us say here, that this is another 'must' and those who attempt to do this work without the proper license are liable to a fine imposed by the *Commission*. So, beware of testing without a license!

Most aircraft radio shops have on hand the necessary 'phantom' or dummy antennae for properly testing transmitters, but this doesn't necessarily indicate that servicemen may perform the testing in aircraft with the antennae connected, even though the transmitter has already been bench tested.

-30-

Bench Notes

(Continued from page 24)

salt water, the resistance between two immersed electrodes decreases as the distance between them increases, since more current passes through the sides of the bucket. In practical use,

since there are so many possible current paths, the resistance would probably be infinitely small, varying in inverse proportion to the surface of electrode which was immersed. Briefly, it isn't a good rheostat (1)

4. The correct name is Dr. G. S. Ohm (1)

5. Current does not flow backwards through a meter. Its markings merely indicate to which side of the line each post should be connected to obtain needle deflection in the proper direction (1)

6. An 80 has one, not two, filaments; witness the 5Z3 (1)

7. All radio signals do not take the shortest path between transmitter and receiver . . . (1)

Customer Handling:

Comments, judged for practicability and value in a radio store, and compared with the bad handling of trade in RR No. 7 (7)

Total 14

The Winnahs!

First Prize, choice of either a Trip-lett Model 426 0-1 d.c. milliammeter; a Simpson Model 29 with the same range, or any other meter of the same retail value, goes to O. K. Powell of Ainsworth, Nebraska—amateur W9FMW. Okay, Powell! From now on, you'll be entitled to sign "Fine Meter Winner."

Second prize, a copy of Ghirardi's famous *Radio Trouble-Shooter's Manual*, was won by David Gnessin of 3444 Resier Ave., S.W., Grand Rapids, Mich.

Calvin Brainard of Walker, Arizona, and H. P. Zurn of 736 Madison Ave., York, Pennsylvania, tied for Third Prize. (Third, Fourth and Fifth Prizes are one year's subscriptions to RADIO NEWS, or extensions to present subscriptions.)

Fourth Prize was won by Percy Kuhl, Spruce Grove, Alberta, Canada, and two contestants tied for Fifth Prize—Hugh Linebach, Siloam Springs, Arkansas, and Uriel J. Theriot, 2643 Jasmine Street, New Orleans, Louisiana.

Honorable Mention goes to Harvey Heaverlo of Eddyville, Iowa; Martin C. Rose of East Falls Church, Va.; Vincent M. Poll of 1201 Wood Street, Dubuque, Iowa; E. G. Roundtree of Centralia, Ill.; Leo B. Hill, Box 94, McKinney, Texas; Everett F. Dagle, of 412 W. Madison, Lansing, Mich.; an unsigned entry from Lamont, Alberta; and E. H. Wolfe of Lynden, Wash.

Congratulations!

L. W.

-30-

Ringling the Bell

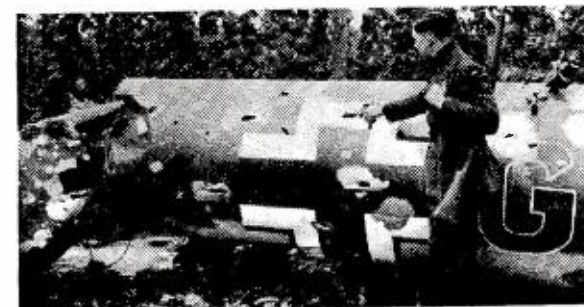
(Continued from page 26)

a good job—you're pleased and satisfied with the results.

Thus, you are an *artisan*, not a *professional* man. Be proud of it! Don't ever let you sell you that you're not a whole lot more than just a professional man—yours is the heritage of generations of creators and builders.

Don't ever let them take away from you that inner satisfaction which comes as a result of skilled manual work well done!

Now that we have that off our



HERE'S an outstanding collection of authentic air war pictures . . . dramatic shots captured right at the scenes of action in England and Germany! Big, powerful British bombers and fighters . . . Swastikaed war-birds . . . Royal Air Force pilots . . . Hitler's men of the air! Don't miss this big, exclusive, 6-page camera coverage of the English-Nazi air war . . . one of the many great features on flying you'll find in the

NOVEMBER ISSUE

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chest, let's see how other *artisans* handle this "estimate" business.

The watch repairer. Does he charge for an estimate? The bicycle repair man. Does he charge for an estimate? The garage repair man. Does he charge for an estimate?

According to our information, the answer is *no*, except in the case of the garage man who must tear apart the car to find the trouble. A charge is made at times when a good deal of work must be done to establish the cause of the repair.

Thus, we can make this general statement. If the estimate of a radio repair will take an appreciable length of time and will entail a good deal of "hunting," then a charge is in order—otherwise, a free estimate is in order.

Coupled with this, it must be strongly suggested that on *free* estimates, the service man should tell the customer the *cost* of the repair *only*, not what is wrong with the set. In other words, limit the *free* service to the estimate of the cost of repair—not a

report on the condition of the set. If the customer wants to know the *why* and the *wherefore*, charge him for the information.

Thus, your conversation with the customer should run along these lines: Customer: "Well, did you find out what was wrong with my radio?"

Service man: "Yes sir, the set can be fixed, the repair charge will be \$4.50, and the set is worth repairing."

Customer: "\$4.50! What was wrong?"

Service man: "If you would like a report on the condition of your set, we make a nominal charge of 75 cents for this service. The *estimate of the cost* which we gave you is, as we advertise, *free*, but this does not include the report. Of course, the parts and labor will be itemized on your bill and if you give us an O.K. on the repair, we'll be glad to give you this report at no extra charge and right now."

If the customer appears not to understand the reason for this action, you may explain as follows:

Service man: "You see, we are always glad to examine your set at no charge and tell you the cost of repairs. However, the information regarding the exact cause of the breakdown, its location and the exact parts necessary to make the repair is a part of the service we sell you. This knowledge is our stock in trade which we do not feel obligated to give without a small charge. In any case, whether the cause is a condenser, transformer or some other part, it is really of little moment to you. What you want to know is whether the set can be fixed, how much it will cost to fix it, and whether it is worth the repair. This information we have given you and all that stands in the way of returning your set to you in first class condition is your O.K. of the estimate."

When you hit a customer who says, "What? \$4.50 to repair that radio? I can get a new one for \$9.00," your reply should be as follows:

"You can? Then the difference between the repair charge and the new set is \$4.50. Will you sell this set for \$4.50?"

You will find that the customer always backs down and many times states that his set is worth more than \$4.50. You should immediately follow up this opening by pointing out to him that, in that case, the present set is then worth a lot more than \$9.00 to him and that this, then, makes the set worth the repair. You should also point out to him that the set failed because of a defective part or parts. You desire to replace these parts with first-grade material designed to withstand wear much better than the original part. Therefore, when the set is repaired, it should be worth as much as *or more* than what it originally cost.

Once more, may we caution you to use only the *best* replacement parts and back them with a 90-day guarantee. It pays!

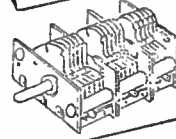
Ham Chatter
(Continued from page 38)

since also. It seems everyone around here gets on when the QRN gets hvy. Bob is using W8SH's rig which has pp HK54 final stage, running at a cool 250 watts. He is also on 2 1/2 wid a low pwr job, and he also wrks 5 meters as a side line—having wrked a W5 wid five watts input.

W80TE expects to be on ten vy soon. He

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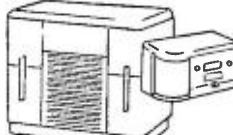
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doesn't have a rig as yet, but he just put up a beam. FB. Mac.

W8SZS. Blackie, is gg on 160 wid a 10 final modulated wid a S.B. mike and 6C5-6L6 modulator.

W8TLG is on 160 wid 200 watts and he has a very strong gnd wave. If you don't believe me just ask his neighbors.

W8MYZ, Frankenmuth, Michigan, is one sixty wid 500 watts and also has a high pwr rig on 5 meters. He has a special home-made "super" coaxial vertical antenna on that bnd. He can wrk 25 miles wid the antenna on the gnd.

W8IIP is really wrking out wid his multi-bnd antenna. It is a forty meter center fed job that wrks btr on 20, still btr on 10, and does a FB job on 75.

W8TQR. Marv. is on 20, 75, and 160 and is wrking out fb. He wrks for the Detroit Board of Education as a teacher.

W8PSV who went to Albion College has just graduated and is on the air agn from his home location. Congratulations OB.

The gang at the *Motor City Radio Club* equipped a trailer with all the necessary gear for portable operation on all bands. They had installed a high power generator supply and they expected to have the outfit working in time for the Field Day.

W8UAS after working on 20 CW has moved up to 160 where he can now be heard chewing the rag with the rest of the gang.

W8AIZ had the misfortune recently of his antenna mast giving away, but to make matters worse it had to take a part of the garage roof with it.

W8MXU is another one of the 20 meter CW fellows who have moved up to 160 fone, also understand that he expects to have a 112 mc portable for his runabout.

W8MYP will be missing on the *Salted Milk Net* (160 fone) for a while, as he and his sweetie decided to say "I do" to each other. Well good luck Jim and congrats.

W8RLT can be heard with a fb signal on 112 mc and he has only 3 watts.

W8SPF has finally settled down on his new QTH and he has the 20 meter rig ready to go just as soon as he can find the suitable antenna.

W8UPZ is another new call heard on 160 fone, he is running 65 watts to a half wave antenna. Expects to increase power soon to several hundred watts.

W8QZZ is building a high power rig for 5 meters, expects to be quite active on that band.

W8HEF has began operations on 10 after installing a 3 element array antenna to his commercially built 125 watt rig and he sure is getting out, working some fb dx.

W8TMS is also building a 112 mc transceiver, that is, if he can find all the odds and ends, hi.

Visited W9EGQ. Herb Brier, a shut-in who gets a big bang out of amateur radio. Herb's rig, with a 812 in the final, gives him 150 to 200 watts on all bands. Preference is given to the 20 meter band (c.w.) where he has made many friends all over the world. He started out to work a country per watt with 5 watts but after 72 confirmations found that he had set too high a goal. Since that time, in addition to the increased power, Herb also has a peachy 3 element rotary but hasn't used it much because one of the elements was loosened during erection and blew off in the first high wind. "Extra Good Quality" earned his slogan with his 5 watt "puddle jumper" on 160 fone. Hi. W9EGQ has been licensed since 1931. Change over to 60 cycle is being made within a block of Herb's QTH. He's snickerin' up his sleeve waiting 'til they have to climb up to change the motor on the beam.

Thanx a lot, W4ARX, fer the tip on how you do it. Always did spend more than I made but it's the time factor that slows me up, now. Can't even find time to cram on the ticket exams. Y'know, I had a mental picture of you as a slender, peppy, efficient ham-op; after that crack about fried chicken, I betcha you're as rotund as Santa Claus. Too few chicken coops & too many shot guns, here. Well, we know you read the whole HC colyum, now.

My brother, Claude, LaPorte, Ind. serviceman-aviator, sez there's a coupla hams in his neighborhood and quite a few RN subscribers in the county seat, b'heck. Sez they give my stuff the double O. Hows about sum dope on the rigs es operations, eh, boys?

Marvin Peterson, W9OCP, has been transferred by his company to Cleveland, O. Congratulations, Marv, but we hate to see you go. Cleveland welcoming committee please note.

Fred Allen, W9ETE, is now located permanently in Michigan City, having moved from Gosport, Ind. He's living near W9OZZ.

Dr. Hotchkiss, W9GTH, just received his new ticket and was assigned the call W9LUA which was first issued him about 8 years ago as a portable call. He intends to work 10-160 fone and 20 es 40 c.w. His former station, QTH being Colfax, Iowa, he would like to hear from his old Iowa gang.

GREETINGS from the King of Happiness, fellows: The 10 meter band is not up to par yet this year, it has been very cool out here and maby that has something to do with conditions. The 160 meter band has been fine though as the cool nights omit the QRN.

We held the first meeting of the *Chair Warmers Club*, on 1850 kc., Monday, May 6. All shutins are welcome to join this new net, and if interested write myself or W8ROA. W8RGV calls the gang together at 11 p.m., C.S.T. every Monday night. At the first meeting the QRN was very bad but I gave and received reports from W8RGV, W8REQ, W8ROA, and W9CGX. So come on all you shutins and let's make this a real roundtable, you can surely stay up late one night a week.

W9IJR is putting a fine sig, in from K.C. Give Alice a call boys she is a FB Op.

Ivan, W9KKR is sure putting a wallop in here with that 10 watts too he is a new addition to the 160 meter QRM.

W9DKQ just got on the air with one of the *Stancor 10P* transmitters. Charles is on the farm with 32 volts current and sure does a swell job.

W9SWT has a HT 4 rig like mine and we had a swell chat on 10 meters recently, nice sig, there A.J.

W9VEJ does not have a lot of power but is one of Chicago's most consistent sigs here. Call us again, Harry.

W9AG is a newcomer to the 160 meter clan. Welcome, Red, hope you like the gang.

W9AIF has increased power to 200 watts and is now one of the outstanding signals in the middle west. There's rumors of a 600 watt rig, but Johnnie is wondering about the light bill. Hi.

W9QUV is spending most of his time on 10 meters, and says he is doing all right. Glad to hear it, Ivan.

W9BMA, W9IJR and other amateurs in Kansas City had a fine display and handled several hundred messages at the Hobby show there last week end.

W9VZQ was home from college. John was working this summer as a printer for *Summers Studio*, of this city, a large mail order Kodak firm. W9APY also works for this Co. [Ed. Note: Is this a plug? No advt. please. Hi!]

W9WHG sure has things fixed up convient. Leo has a separate transmitter and also separate receivers for each band, and is active on most of them.

W9WAK and W9CAF operating close to the same freq. are both doing a fb job on 160 meters.

W9DMR is a new ham down at Maysville, Mo. Give Herschel a call when you hear him, fellows.

W9MTS is the well known Rug Cutter from Kensett, Ia. Irv can really do the Big Apple up in Minn. from what I hear. All I know is he sure has a sig, way down here in Mo.

W8GHV puts in a fb sig, on 160 meters, and last week I had a swell chat with him on 10 meters. Nice going Lee.

W9LMX lays a good sig, during short skip on 10 meters too.

W9IQJ is also a new ham. Does a fine job with 15 watts, and uses a Bretting 6 as in-haler on 160 meters. Welcome Darrell.

W9NIP has a nice rig on the air now at Columbia, Mo. W9RHC of that city will vacation at his home here in Unionville.

W9LVA is the first ham to appear on 160



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meters from Sedalia, Mo. Hope you like the band Orville, your rig sounds great.

W9WEM is back on the air at Kirksville, Mo. Louie likes to chew the rag, boys, so watch for him.

W9DMK traded his small Stancor rig for a rig giving him more power, mighty fine sig. there now Olin.

So long till next month, fellows and if you hear the "King of Happiness" on 10 meters, or 160 give us a call.

AT a recent meeting of the Iowa-Illinois Amateur Radio Club we experimented with a balloon supported antenna. It seemed to support the wire pretty well, but bobbed around a lot due to shifting winds. After the meeting, W9ALC took the inflated balloon home with him for some private experiments and as he tells it, he "laid" it on the ceiling over night. Hi!

W9ALC built a swell 5 meter converter to work into his SX-24 receiver. He has heard several signals on it but hasn't been able to identify them as yet.

W9HIM graduated from High school and was named for membership in the National Honor Society. fb Bob. & Congrats. He has been working 80 CW but the rig won't perk on 40 so he is going to completely rebuild it.

W9QOQ rewound a Dodge generator for 110 a.c. and has it mounted on the motor of his Chevie where it works very fb.

W9WNL is a working man now and doesn't get so much time to spend on the air. He still operates 80 CW and has a very low powered 160 meter fone rig.

W9QGU is enjoying his summer vacation from Junior College and is heard on 160 fone very often.

W9RZV says, "Boy, wouldn't it be tough now if I called CQ on 160 fone in the evening and a half dozen foreign stations came back at me? I wouldn't be able to answer them!" Emil isn't worrying about it very much tho, because he is only running about 20 watts.

W9LAC has his new TW-75 perking on the 20 meter fone band and is getting excellent results. Doc is experimenting now with an ECO.

W9IBH is working only CW lately on 160 and

80 but hopes to get back on fone soon.

W9GWD is busy building a fone rig for portable use. At least that is what Al planned it for, but the new FCC ruling will change that. He will have to call it a 'stand-by' xmtr now.

W9DVP is a member of the Burlington unit of the Naval Reserve and he is busy helping get their new radio equipment set up and ready for operation. Uncle Sam sent them some real fb stuff and they are anxious to get going.

W9BHW is planning on getting a Stancor 10-P xmtr so he can give his big rig a rest in the daytime. He will use it on 160 fone and possibly on 10, too.

W9ETS swapped his Hallicrafter receiver with W9BHW for a home-made super that was originally built and owned by W9TMY.

W9TMY, the old crystal grinder, donated a AT cut blank for a door prize at a recent meeting and the lucky winner was W9HQO. Charles does things up right, even furnishing carborundum and a piece of plate glass.

W9WTD, who was building a 10 meter mobile job is changing it over to 5 for obvious reasons.

W9PBV has made plans to run his generator off of his Ford and intends to work in the ARRL field day.

A number of Burlington hams, including W9-PJR, Iowa's SCM, attended the hamfest at Cedar Rapids, June 16 and report a very fb time.

We were glad to see in July RN that our old friend, Rich, is still among the living out in the wilds of Nebraska, and still helping the boys on theory, etc. He always told us that theory was his favorite subject and it must be, 'cause you can't stump him. I sure hope you get on 40 sometime, Rich, and look for me.

(Note to W9BDO. You wrote about Rich getting one of Grand Islands "Irish Valentines" and boy, if he told you guys what to do about a situation like that you can sure believe him, because you got the dope straight from the voice of experience himself. Hi!)

W9KYR is moving all his stuff to an extra room in the house and will have a regular studio when he is finished.

W9FSH has plans for a 20 meter beam; he is heard now on 75 fone.

I sure was glad to run across my old pal Bill, W5GZN on the air recently and now we are having lots of fb ragchewing QSO's. He told me that he and W5FXP built a 500 watt 20 meter CW rig and during the last year each of them had worked over 50 countries with it.

I wonder what's become of W9UCJ. He and W5GZN and I used to have lots of fun during our three-cornered round-tables, but Bus hasn't been heard from for months. How about it OM?

Arkansas has been well represented in my 40 meter log for the last week, what with W5HTX and W5BVT of Springdale and W5GNF of Fort Smith across the river from Van Buren, where is, of course, Bob Burns home town. John, W5BVT works nights and I sure don't envy him sleeping in the daytime during this hot summer wx.

I also enjoyed another QSO with WSTEL, the old "prof" of Wilberforce, Ohio. School is out now so Frank will have lots of time for ham radio. He has been very active all winter with traffic handling, originating much good stuff from his college and pushing it on FTS and ARRL trunk lines.

FROM ur East Coast DX'er:

DX activity at the end of the month was at an all year high with several African stations and many new stations in the American possessions in the Pacific Ocean making their appearance.

During the month of June, however, DX went into a slump that it will probably not come out of until the end of the present conflict. With the U.S.A. hams banned from contacting all foreign stations excluding our continental possessions, many of the outstanding DX stations in neutral countries have quit the band leaving the DX portions entirely vacant. Many of the Continental stations advocating that allotments be made that will allow them to operate in those vacated frequencies, so as to be able to make better and more reliable contacts with the states.

The 10 meter band opened up at the beginning of the month with the South Americans putting in real strong signals on the coast and several K6 sigs and an occasional signal from Little America.

Here are several of the more active and consistent stations on 10 fone: PY5AQ, PY2AK, PY2AC, CE3CZ, LUSAD, T2RC, K4GPS, PY1BS, CE1AC, XE2AF, K5AP, PY2DS, HCLJB, CE3DG, TG9AA, LUSAB, K4FOW, K4FKC, K6PUL, K6MVB, K6OQM, K6BNR, K4ENT, KA1ME, XE2FL, and YV1AQ.

During the latter part of the month the band closed up completely with hardly a signal from outside the states.

K4FOW planning on coming to Boston in time to take in the Hamfest in October. K6OJI also will pay a visit to the Boston hams shortly while on route to see his family in Newberryport.

If some of u other DX hounds wonder why some time u can get a swell rept out of Little America & sum times u can't, the reason is tt due to the freak wx condx the direction in which u point ur beam vary with the time of day, sun spot activity, and the antenna used by the KC station. Very rarely will 2 contacts be made on different days at a set time with the antenna in the same direction.

Best wishes to The Funny Old Woman of 10 meter fame for a speedy recovery frm her illness, which has limited her activity on the band very greatly.

PY7AI is running 750 wts to a singl Amperax HF300 into a 3 el rotary.

VK4HN, the op of PK6XX is nw in the states

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on the W. Coast & will shortly come East.

CO6OM will come up to the coast next summer for a visit.

CO2HY did not visit the states this summer because of an extended illness from which he is now recovering. Bernard had a pretty close call & tells the story of he went up to those pearly gates & asked the fellow if he was eligible to go in but the caretaker answered back, "No, u big bum, we don't want u arnd this place, so u better go back where u came frm." So now his on 20 fone agn causing a lot of QRM.

CE3DG is a new ham on the air & is operating on 10 fone.

Some of the new stations in the Pacific Ocean Islands that have appeared on 20 fone the past month are:

KH6AHS frm American Samoa, this station can be wrked frm the East Coast in the very early mornings arnd 2 to 4 a.m. Signal strength usually rides abt Q-5 R7to9.

KB6SRA is a nw station in the Virgin Isles. He comes in R-6 plus wid sum fade. The op of the sta is wid the US Navy station. The ham station runs 150 wts to a long wire directive array.

KF6JEG on the Canton Isles, on 14,280. He rides a gd R-9 & is on both fone & c.w. in the early morning. He skeds W1FH of Boston, Mass., almost daily.

KB6CBM is another newcomer in the past few months but has not bn putting in vy gd sigs. This sta always when hrd has a vy bad fde. Best time to get him is arnd 6 to 8 a.m., E.S.T.

KB6ILT also of the Virgin Isles has been rather active of late on the 20 meter band. His freq is 14,168. Sigs are vy strong.

KG6MV from the Jarvis Isles is a new sta. It is generally believed that this is the first KG sta on 20 fone. His freq is 14,160. He is on regularly from 2 to 4 a.m., E.S.T. Sigs are fair, little fde.

Another one from the Virgin Isles is KB6CBN. The rent is R-8 no fde.

KC6OQS of Wake Island is another new ham on the band. His signal when hrd was weak. He is not vy active so not much info on him is available at present.

Frm the Philippines signals are much weaker this month with quite a bit of fade. Not very many of these stations were logged this month because they r no longer hrd with any strength in the late mornings and late afternoons. They peak abt 3 to 4:30 in the a.m., all average abt R-5 to 6. Here are a few of the newcomers & sum of the stronger & consistent KA's coming thru hr: KA1LW, KA1HQ, KA9CH, KA1ME, KA4RP, KA3KK, KA4LH, KA1MM, KA7EF, KA1PI, KA1SH, KA1GC, KA1LZ, KA1EM, KA1JH, KA1ZL, and KA1BB.

The Hawaiian Isles have bn putting the usual strong signals with more and more new stations appearing on the air & the old ones continue to be vy active. Here are a few calls logged the past few days: K6LEJ, K6KOK, K6OCE, K6PUL, K6PAD, K6BNR, K6LTV, K6PTW, K6KGA, K6NYD, and K6PHD.

W1FHW is at present on 20 fone running about 220 wts to HK-54's & 203A's in class B. Steve is planning to gg dwn to 2½ to experiment on beams.

W1CVC usta be in the sound motion pic biz. At present he is wid RCA.

W1AOZ is operating port marine on 2½ frm Boston Harbor.

W1MKW has changed his QTH & is nw residing on Cape Cod.

W1KVQ & W1MON will sn be on 1¼ meters.

Attention local Vigilante Committee. There are 3 sta on 1¼ meter fone tt hve bn on daily fer abt 8 mo. These stations never sign call letters & never discuss radio.

W1GAC pt mobile on 2½ running a 37-41 trans.

W1IGA has a new harmonic.

W1MCB, W1MUB, & several other N. H. r putting in fb sigs dwn into the Boston area on 2½ fone.

W1KNZ formerly of Dorchester is nw W3IIL in Wash., D. C. Lefty is nw in the Army Radio Dept. at Boeing Field. He tells tt he is hving a fb time & frm the pics (abt 150 fotos) he showed to the boys they proved it without doubt. His cw speed has improved slightly since he left. His speed (he sez) is abt 72 to 75 per. (not hr but minute.)

W1CIB is nw showing off his crd frm ZS5BE tt he recently received. George is on 160 fone running abt 200 wts, while ten meters is in its 10 yr slump.

W1HNR is a devoted R.N. reader & wants to know how cum we didn't give him a little credit for pioneering the 2½ meter band.

W1MMG is on 7150 kc & is wrking out swell wid low pwr in all prts of the state. But the irony of it all—he called W1KVQ who is located but a few hundred yards away & KVQ cudnt pick him up.

W1KBN, club station of Northeastern Univ. is nw active on 112 Mc. The members r building several beams to overcome the drawback of being located in downtown Boston.

W1EYR of Sharon, one of the 5 meter pioneer's, is nw dwn on 2½ playing arnd wid rotary beams.

They'll do it every time: Abt 2 yrs ago the "Roxbury Radio Twins," W1GDS & W1BK, quit ham radio. So last week when we hrd their squeaky voice bust thru super hiss on 2½ we were vy much surprised. They're both operating port mobile using Abbot DK-2 trans. Welcome back fellas, & get on a little more often.

W1JLI & sister Norma recently pd a visit to W1LEM in Southie.

W1LEM is all set to go on "one sissie" but lacks a xtal.

W1PI is the most active ham on 2½. He has up to date wrked 190 different stations on

2½ excluding all stations known to be bootlegs.

The flutter tt many hams hve noticed on 10 meters is also prevalent on 2½ meters but not to such a great extent.

Just as a matter of interest to the local 2½ meter band, we hear tt a romance is budding. As yet we are not at liberty to divulge the 2 stations calls, but rest assured tt ye ol' reporter will bring u the news as it happens!

W1IXL is down on 20 fone for a while frm 75. Jim is running 400 wts to a concentric fed doublet. The rig runs 806's in the final & mod wid 276's in class B.

W1AJA has rebilt his rig & nw uses 812's. Wid the help of W1DNL he nw has a vy fb 10 & 20 fixed beam tt really puts out a swell sig.

W1JDE's xyl Ellen, says the om's so lazy tt she cleaned the whole house & even dusted off the om & he was still sitting on front of the rig trying to get a contact on the 10 meter band.

W1MIF of Beverly has wrked 28 stations in the Boston area up to date.

W1MNK also of Beverly is on 2½ running a pr of 45's.

W1AXX has come down from 20 to 2½ fone. Frank is an old cw man, but cum dwn just to see wat the fone boys get a kick out of.

W1LDD is nw active on 20, 40, 80, 160 cw.

W2MQI Union City, New Jersey, is off 160 phone and now on 40 and 20. Thinking of going on 10 phone with 811's.

W2MAJ is not so active. Is he sore. Ex-W3FK is waiting for his license. They both live in the same house—both going on with over 300 watts! Wat a mess.

W2JQV Weehawken, New Jersey, is the proud papa of a baby girl junior op. He's on with 600 watts on 40 and 20.

Larry Quinlan is waiting for his ticket and wants to know why it takes so long. He's going on 160 and 80 with 70 watts, then on all bands with his 242's Class C. He's getting an Sx24 rcvr.

Boys of Union City and vicinity are going on 2½ meters soon. Also organizing a 160 meter net.

W2MWH is on with pp 6L6's and does o.k. Has Sx24.

W2MRJ and W2MTO are always on 160 cw chewing the rag about nothing in particular.

About this time of the year (spring) ham activity decreases about 50%. Why? Remember Tennyson's famous lines—"In the spring a young man's fancy lightly turns to thoughts of love."

THE Philadelphia Wireless Association whose club call is W3GAG, is composed of mostly radio hams. This club enters most of the DX and QSO contests and usually rates high in scores. It is the only radio club in Philadelphia that has been in constant operation for 5 years. The club has a fine station and also expensive portable equipment. If, in the case of emergency, it can readily operate under self-supplied power using a gasoline generator. The one aim of this club is to promote fraternity and friendship between fellow hams. Members who are hams are: W3BYB, W3FYC, W3DVE, W3DVG, W3GUV, W3FXG, W3HLZ, W3HRD, W3IDR, W3EFH, W3ETM, W3IJN, W3DFJ, W3HIO, W3GYK, and W3HGE. The club meets every Friday night at the Germantown YMCA. The Philadelphia Wireless Assoc. prints a monthly newspaper with all the club gossip. Incidentally, several of the members have commercial "tickets" and work at commercial station WIBG, Glenside, Pa.

W4BOL recently gave the natives in Montezuma a few thrills with his airplane.

W4EEZ at Athens, Ga., has recently rebuilt his rig.

W4GHU at Albany says that he has a new apartment and has more room for a shack.

W4RM is the champion guzzler of Ga. hi.

W4GJR of Monroe, recently paid a visit to your scribe and reports that all is well with his 600 watter.

The Valdosta, Georgia, gang have reorganized their club and are planning a hamfest there shortly.

W4EFD at Montgomery, has promised us a personal QSO this summer and in the meantime our hair gets grayer.

W4AUO is planning on a two and a half tele rig.

A postcard from Brunswick, Ga., states that mebbe the reason Brother Irvin isn't on the air (W4FPF) is that the Georgia Peaches on the beaches there are worrying him considerably (Hope the XYL don't see that FPF). Heck boy—run out and find out the fare to the beach. Hi.

W4FFI's xyl has recovered from her recent illness.

W4GHW is visiting W4EDD in Miami, Florida, and postcards back that he is having swell time. Says that W4EDD's rig is really FB.

W4EEE of Athens, Ga., was recently married to Miss Helen Woods of same city and they are honeymooning in Miami at present time, after which they will be at home to fellow hams at Athens. Congrats OM.

The annual hamfest sponsored by the Crisp County Radio Club of Cordele, Georgia, was held July 4th at Flintside, a summer resort near that city. W4FCW was in charge of arrangements assisted by W4FFI and W4GFF and the Xyls. The crowd began to come early in the morning and the fun really started in earnest. At noon a welcome call to dinner was sounded and the hams as per usual did justice to the fish and other items on the menu.

After dinner, Dave Traer called the meeting to order and prizes were awarded.

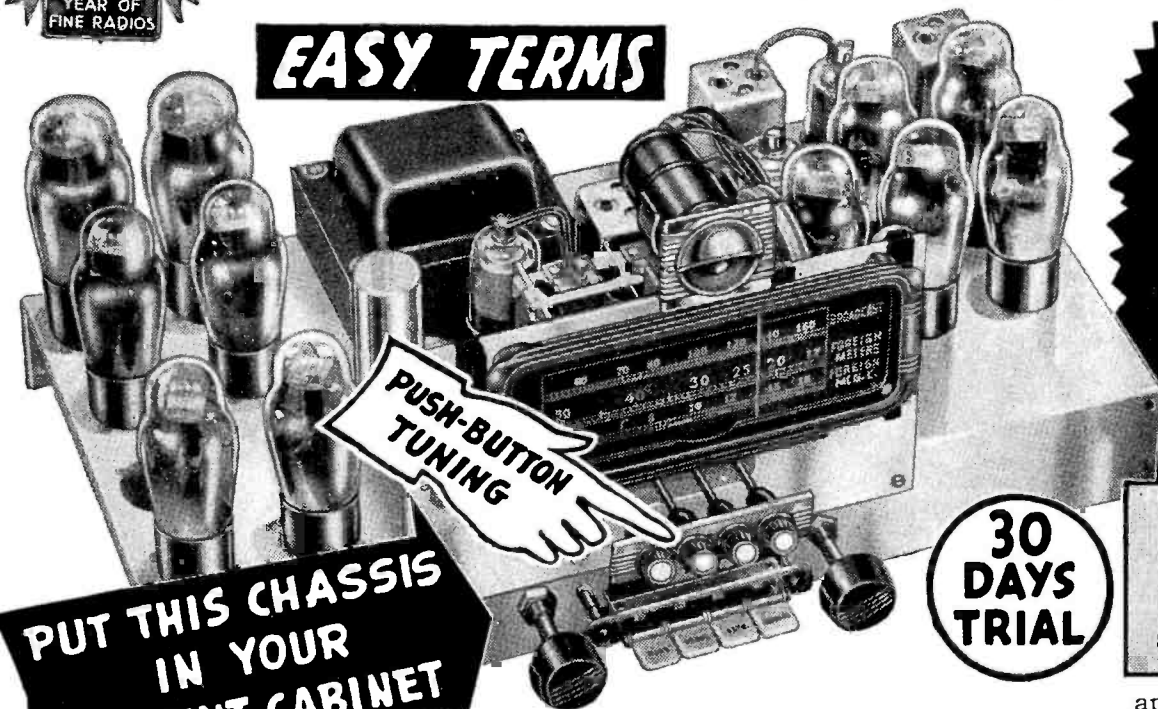
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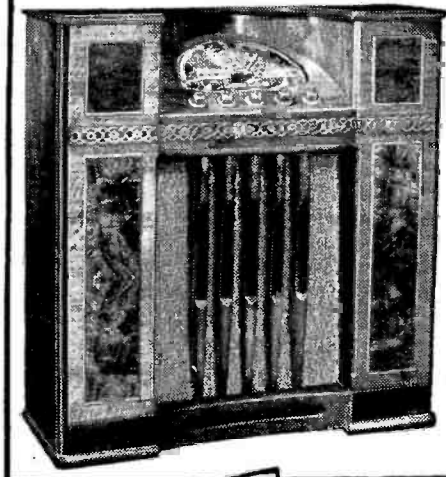
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The band-spread dial of the AR-77 makes the tuning of foreign stations remarkably easy. Once you've tuned a broadcast it "stays put." "Drift" is reduced to a minimum. As for noise, the manually-operated Noise Limiter of the AR-77 is a feature that has brought high praise from all sides. In actual test, peak noise voltages hundreds of times higher than the signal have been pulled down to signal level, so that the signal could be clearly heard and understood.

Frequency coverage is from 540 to 31,000 KC in *six* ranges, with

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Hear this remarkable outfit perform at your nearest RCA Amateur Equipment Distributor's store. You be the judge! Descriptive folder free.

AR-77 Receiver, \$139.50 net, f.o.b. factory. 8" Speaker in matched cabinet (not shown above) \$8.00 net, extra.

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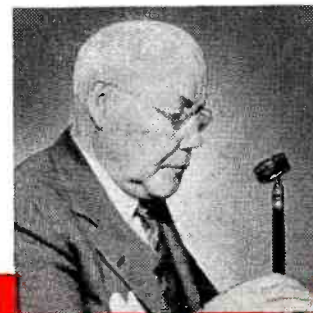
Read these Comments from Radio Men Who Know



● Reliable reception under all conditions is a "must" for operators of the well-known Amateur stations. What these prominent operators say of the AR-77 tells its own story of outstanding dependability.

"It beats receivers costing twice as much!" says Thomas A. Consalvi (above), owner of world-famous W3EOZ at Bryn Mawr, Pa. "In many features, the AR-77 is superior to any other I ever tried at any price. In every way, it matches the performance of my old receiver costing more than twice as much."

● "The AR-77 is even finer than your announcement led me to expect," states Dr. Burton T. Simpson,



W8CPC of Buffalo, an old-time amateur and still one of the best known voices on the air. "The Noise Limiter is particularly valuable because of its manual adjustment which can easily be regulated to meet local conditions in separating signal from noise. I am more than pleased with the outfit and believe it is the last word in receivers."



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