WANT TO BE AN AIRLINE RADIOMAN?

RADIO NEWS

39

SEPTEMBER
1939

25c

DX HOUND

The "DIALOMATIC" MOBILE RIG • TINIEST RECEIVER

CONQUER THE CODE R. N. SHOW

FREE PO NT ANALYZER RHET

SMASHING LOW PRICE!

McMURDO SILVER 15-17

New r.f. amplifier equalizes gain at all wave lengths and provides in single stage, selectivity and gain heretofore available only in best two stage r.f. amplifiers. Four bands. Special Jensen-Silver 15" Giant electro-dynamic speaker. 30 to 8000 cycles. Heavy welded one piece chassis, 20" by 12¾".

Regular Price $205.00
SALE PRICE $109.50
You Save $95.50

MCMURDO SILVER MASTERPIECE VI—Reg. Price $355. Sale Price $199.50

DAVEGA—63 CORTLANDT ST. (N.Y.C.)

DAVEGA is America's Pioneer dealer in HALLICRAFTER

The NEW Skyrider DEFIANT—with FREQUENCY METER TUNING—Covers the radio spectrum from 43.5 to .54 MC with Electrical Band Spread on the 10, 20, 40 and 80 Meter Bands. 9 Tubes, Frequency Meter Tuning brings in signal as indicated on the frequency calibrated dial. $69.50 including tubes and crystal but less speaker.

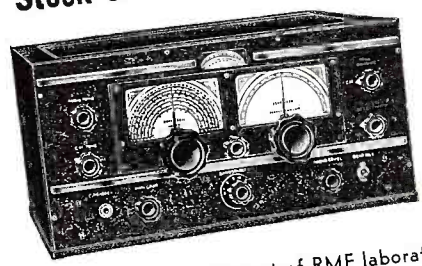
NEW HALLICRAFTERS SKYRIDER SX 23: A new 11 Tube Receiver with 8 Band Positions, with full coverage from 34 to .54 MC (8.8 to 556 meters), Band Spread Positions for 10, 20, 40 and 80 meter bands.

Davega has the largest stock of Hallicrafter Receivers and Transmitters in America

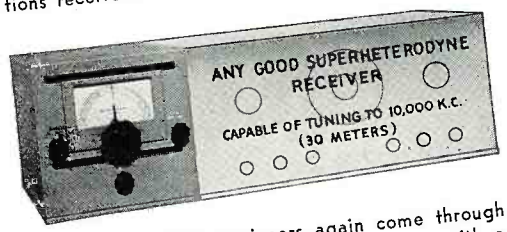
EASY TERMS

ACR-111 COMMUNICATION RECEIVER
Made to Sell for $189.50
Single signal 16-tube Superheterodyne circuit. Two tuned r.f. stages, electrical band speed, crystal filter, Dual Noise Silencers, and an integral power supply.
$99.50 Limited Quantity

DAVEGA has the most complete Stock of RME in America



RME-70. The late development of RME laboratories is proving itself to be one of the finest communications receivers.



The DM-36. RME engineers again come through with a fine unit. This unit, in conjunction with a good medium frequency superheterodyne receiver provides the equivalent of low-frequency reception on 5 and 10 meters. The DM-36 is ready for your inspection at Davega.

DB-20 by RME. Signal amplifier, image rejector, guaranteed to improve any set enormously.

RME-69. A receiver which has proven itself to be dependable and faithful under any and all adverse circumstances.

RME Rack panel models. All types in stock.

EASY TERMS

2 Sensational values in USED receivers (fully guaranteed)

Hallicrafter Sky Chief, 7 tubes, formerly $44.50. Special **$22.25**

Famous Hallicrafter SII Super Skyriders. Complete with Speaker **$44.50**

H. Q. 120
HOWARD
TEMCO
TRANSMITTERS
SARGENT MARINE
PATTERSON
GARRARD

DAVEGA

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

"World's Largest Retail Radio Dealer"

J. E. SMITH, President
NATIONAL RADIO INSTITUTE
Established 25 Years

He has directed the training of more men for the Radio industry than anyone else.

I will send you a Lesson Free

to show how I train you at home in spare time for *Good Jobs* in *Radio*

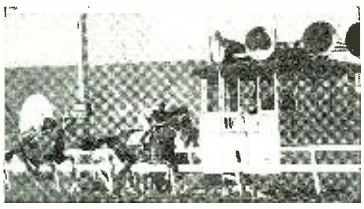
Clip the coupon and mail it. I will prove I can train you at home in your spare time to be a RADIO EXPERT. I will send you my first lesson FREE. Examine it, read it, see how easy it is to understand—how practical I make learning Radio at home. Men without Radio or electrical knowledge become Radio Experts, earn more money than ever as a result of my Training.

Broadcasting Stations

Employ managers, engineers, operators, installation and maintenance men for fascinating jobs and pay up to $5,000 a year.

Repairing Radio Sets

Spare time set repair work pays many $5, $10, $15 a week extra while learning. Full time servicing pays as much as $30, $50, $75 a week.



Loud Speaker Systems

Building, installing, servicing and operating public address systems is another growing field for men well trained in Radio.

Lesson on Radio Servicing Tips FREE

I'll prove my Training gives practical, money-making information, is easy to understand—just what you need to master Radio. My sample lesson text, "Radio Receiver Troubles—Their Cause and Remedy" covers a long list of Radio receiver troubles in A.C., D.C., battery, universal, auto, T.R.F., superheterodyne, all-wave, and other types of sets. A cross reference 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 and testing. You can get this lesson Free. No obligation.

MAIL COUPON NOW

Get Ready Now for Jobs Like These

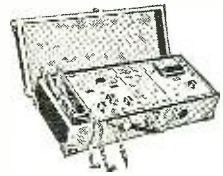
Radio broadcasting stations employ engineers, operators, station managers and pay well for trained men. Fixing Radio sets in spare time pays many $200 to $500 a year—full time jobs with Radio jobbers, manufacturers and dealers as much as $30, $50, $75 a week. Many Radio Experts open full or part time Radio sales and repair businesses. Radio manufacturers and jobbers employ testers, inspectors, foremen, engineers, servicemen, in good-pay jobs with opportunities for advancement. Automobile, police, aviation, commercial Radio, loud speaker systems are newer fields offering good opportunities now and for the future. Television promises to open many good jobs soon. Men I trained have good jobs in these branches of Radio. Read how they got their jobs. Mail coupon.

Why Many Radio Experts Make $30, $50, $75 a Week

Radio is young—yet it's one of our large industries. More than 28,000,000 homes have one or more Radios. There are more Radios than telephones. Every year millions of Radios get out of date and are replaced. Millions more need new tubes, repairs. Over $50,000,000 are spent every year for Radio repairs alone. Over 5,000,000 auto Radios are in use; more are being sold every day, offering more profit-making opportunities for Radio experts. And RADIO IS STILL YOUNG, GROWING, expanding into new fields. The few hundred $30, $50, $75 a week jobs of 20 years ago have grown to thousands. Yes, Radio offers opportunities—now and for the future!

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

The day you enroll, in addition to our regular Course, I start sending Extra Money Job Sheets, show you how to do Radio repair jobs. Throughout your training I send plans and directions that made good spare time money—$200 to $500—for hundreds, while learning. I send you special Radio equipment—to conduct experiments, build circuits. This 50-50 method of training makes learning at home easy, fascinating, practical.



I Also Give You This Professional Servicing Instrument

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

You Are Trained for Television Also

With N. R. I. you take up Television principles right along with Radio principles—the correct method—since Television receivers combine both sight and sound. You also get more than ten text books devoted entirely to Television.

Get Sample Lesson and 64 Page Book FREE—Mail Coupon

Act Today. Mail the coupon now for sample lesson and 64-page book. They point out Radio's spare time and full time opportunities and those coming in Television; tell about my training in Radio and Television; show you letters from men I trained, telling what they are doing and earning. Find out what Radio offers YOU! MAIL COUPON in an envelope, or paste on a postcard—NOW!

J. E. SMITH, President
Dept. 9JR
NATIONAL RADIO INSTITUTE
WASHINGTON, D. C.

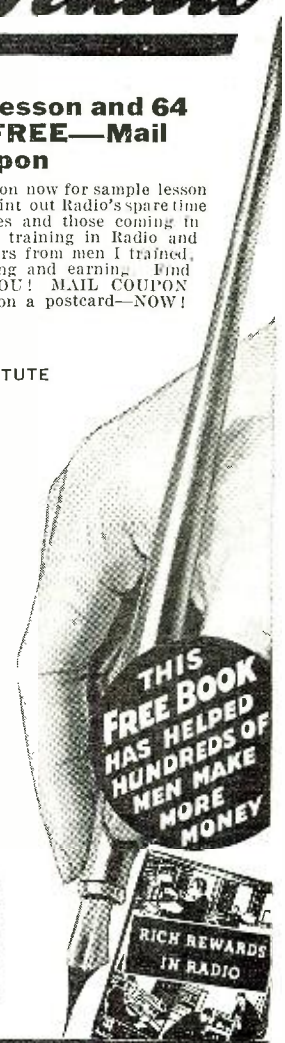
HERE'S PROOF

$10 a Week in Spare Time

"My work has consisted of Radio set servicing, with some Public Address Systems work—all in my spare time. My earnings in Radio amount to about $10 a week."—WILLIAM MEYER, 705 Ridge Road, Hobart, Ind.

Earnings Tripled by N. R. I. Training

"I have been doing nicely, thanks to N.R.I. Training. My present earnings are about three times what they were before I took the Course. I consider N.R.I. Training the finest in the world."—BERNARD COSTA, 952 Manhattan Ave., Brooklyn, N. Y.



Good for FREE SAMPLE LESSON and BOOK on RADIO'S OPPORTUNITIES

J. E. SMITH, President
National Radio Institute, Dept. 9JR
Washington, D. C.

Dear Mr. Smith: Without obligation send me free the Sample Lesson and your 64-Page Book "Rich Rewards in Radio," telling about spare time and full time Radio opportunities, and how I can train for them at home in spare time. (Please write plainly.)

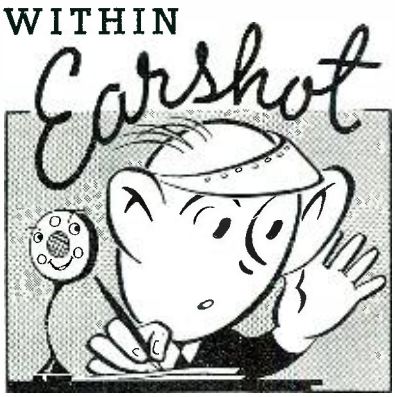
Name..... Age.....

Address .....

City..... State.....

14X-1

The Tested Way to BETTER PAY



OF THE EDITOR

WE HAVE just finished a swing through the Eastern States, and are ready to report, among other things, that a temperature of 128° in the sun (which we encountered in a stretch in Ohio) is not conducive to comfort. Which brings us to this observation. It would be a real service to the many who have radios in their cars, were the local announcers to give the weather conditions that you might expect on the various main highways. Thus, if you are traveling with infants, or with sickly people, you could put up in a spot and wait until the weather made it better for you to travel. Such a service alone might help to increase the sale of auto radios, and overcome the objections that they are not worth toting cross-country.

This and other tourist information could be arranged. When we arrived in Boston to stay at one of their largest and finest hotels, we found a convention in full swing. As a result we had to go elsewhere. This would not have been an exceptional hardship, were it not for the fact that we had already put our car in a garage, and we had to get it out, load it up and move—with the resultant loss of the price paid for parking. Information that a convention was in progress would have saved us considerably.

* * *

IT WAS while we were in Cleveland, that we came across a pamphlet put out by the *Statler Hotel* management. In spite of the fact that it has little or nothing to do with radio servicemen or dealers, we found much in it which could be applied to that business. The booklet is placed in every room, and expresses the ideals and policies of the vast chain of hotels run under the *Statler* banner. It is paraphrased here for the serviceman to read and to follow. It should bring results!

1. Your service shop is operated primarily for the convenience and service to your customers. Without customers there would not be any service shop!

2. So then it behooves every man and woman employed by you to remember this always, and to treat all customers with courtesy and consideration.

(*More Earshot on page* 62)

RADIO NEWS

Including Articles on POPULAR TELEVISION

The Magazine for the radio amateur experimenter, serviceman & dealer

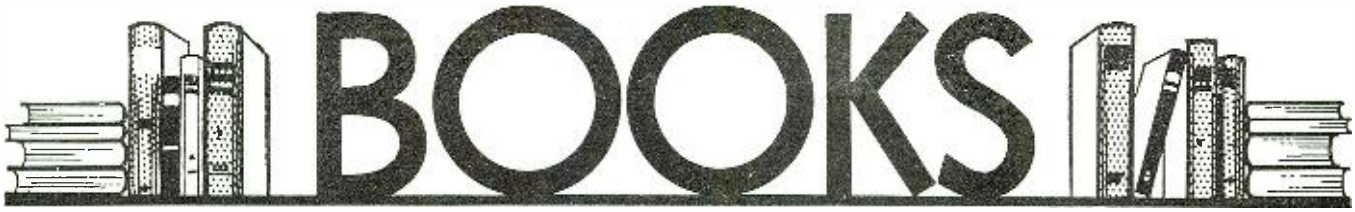
VOL. 22, NO. 3

Contents for September, 1939

FEATURES

DEPARTMENTS

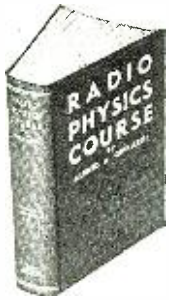
RADIO NEWS is published monthly by the Ziff-Davis Publishing Company at 608 S. Dearborn St., Chicago, Ill. William B. Ziff, Publisher; B. G. Davis, Editor; Karl A. Kopetzky, Managing Editor; Oliver Read, Technical Editor; Herman R. Bollin, Art Director; John H. Reardon, Circulation Director; S. L. Cahn, Advertising Manager. New York Office, 381 Fourth Ave. Subscription $1.50 per year; single copies, 25 cents; foreign postage $1.00 per year additional except Canada. Entered as second class matter, March 9, 1938, at the Post Office, Chicago, Illinois, under the Act of March 3, 1879. Contributors should retain a copy of contributions. All submitted material must contain return postage. Contributions will be handled with reasonable care, but this magazine assumes no responsibility for their safety. Accepted material is subject to whatever adaptations and revisions necessary to meet requirements. Payment will be made at our current rates upon acceptance and, unless otherwise specified by the contributor, all photographs and drawings will be considered as constituting a part of the manuscript in making payment.



ON RADIO

ZIFF-DAVIS PUBLISHING COMPANY (Publishers of RADIO NEWS)
offers these authoritative books on Radio

Every one written by an authority. Giving you in concentrated, easily assimilated form, the tested experience of practical Radio men, each an expert in his field. Why not add their experience to your own, and so increase your knowledge and earning power in this fascinating profession.



RADIO PHYSICS COURSE (104)

By Alfred A. Ghirardi $4.00

A book that leading radio schools throughout the world have chosen as the most thorough, instructive, and interesting radio book ever written—they use it as their basic text in their own radio courses. Explains in easy-to-understand language all of the essential facts about both electricity and radio from simple fundamentals to the most intricate applications. Invaluable to the radio Beginner, Student, Serviceman. 972 pp., 508 illustrations, 856 self-review questions.

TELEVISION (117)

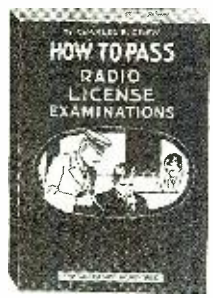
By M. G. Scroggie $1.50

Television, told in straightforward manner, for the professional or the amateur. A complete story of television, its methods, its mechanics, and its physics. Simple, easy-to-understand descriptions of the fundamentals of visual communication.

FUNDAMENTALS OF RADIO (113)

By F. E. Terman $3.75

The basic principles of radio communication. A complete treatment of the subject of vacuum tubes and radio, covering the fundamentals of all important topics and the problems encountered in their practical application. Suitable for use in an introductory radio course. 458 pages. 6x9. 278 illustrations.



HOW TO PASS RADIO LICENSE EXAMINATIONS (107)

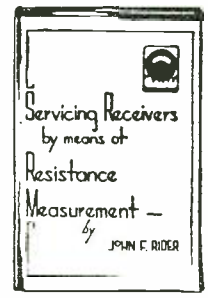
By C. E. Drew $2.00

(Third Edition in preparation.) A book directed to the professional operator. Explains fully all the questions that are met in taking the Federal Communications Commission's examinations for all classes of radio operator. Deals with the Radio Act and the Federal Communications Commission Rules and Regulations. The explanation of ship's radiotelephone and telegraphy and the method of handling traffic is one of the highlights.

RADIO TROUBLE SHOOTER'S HANDBOOK (111)

By Alfred A. Ghirardi $3.00

A new kind of servicing handbook. Essential data for your service jobs. A four-drawer filing cabinet could hardly hold all the mass of complex, technical servicing data that was assembled, tabulated, charted and indexed to make this the greatest contribution to Radio Servicing Literature ever published! 52 sections, 134 illustrations, 518 big 8½" by 11" pages.



SERVICING RECEIVERS By Means of Resistance Measurements (112)

By John F. Rider $1.00

Takes the guesswork out of servicing. How to use an ohmmeter in trouble shooting, and correctly interpret point to point resistance measurements. Vastly simplifies servicing problems. You will need this book to speed up your servicing accuracy. Let Rider show you how to use a modern servicing procedure on complicated receivers. Theory applied to practice. 203 pages.

RADIO OPERATING QUESTIONS & ANSWERS (114)

By Arthur R. Nilson & J. L. Hornung $2.50

Over 600 questions and answers covering all radio operator license examinations. Questions are typical of those used on examinations; answers are full and well-illustrated. Includes information on broadcasting, marine, aeronautical, police and amateur radio operating. 427 pages. 5½x8. 106 illustrations.

PRINCIPLES OF ELECTRICAL ENGINEERING (115)

By Timbie & Bush $4.50

The Electrical Engineer. Electrical units and electric currents. Electric power and energy. The computation of resistance. Electrolytic conduction. The magnetic current. The magnetic field. Induced electromotive forces. Thermionic conduction and conduction through gases. Dielectrics. Many others. 595 pages. 270 figures.

ELEMENTS OF RADIO COMMUNICATION (116)

By John H. Morecroft $3.00

Simple laws of electric circuits. Laws particularly useful in radio communications. General idea of radio communication. The vacuum tube and its uses. Radio telegraphy. Radio telephony. Receiving sets. Problems. A simplified treatment of principles of radio communication not depending on mathematical knowledge. 286 pages 6x9.

Our book lists also present a wide variety on Photography, Aviation, Science

IMPORTANT!

Enclose remittance with order and we will prepay postage.

Check and mail this coupon TODAY. Add to your library the books you need, or secure information and prices on any book on Radio you may be interested in but which is not here listed. DO IT NOW before it slips your mind.

CHECK YOUR CHOICE ON THIS COUPON

Ziff-Davis Publishing Company, Book Department R.N.9
608 S. Dearborn St., Chicago, Illinois

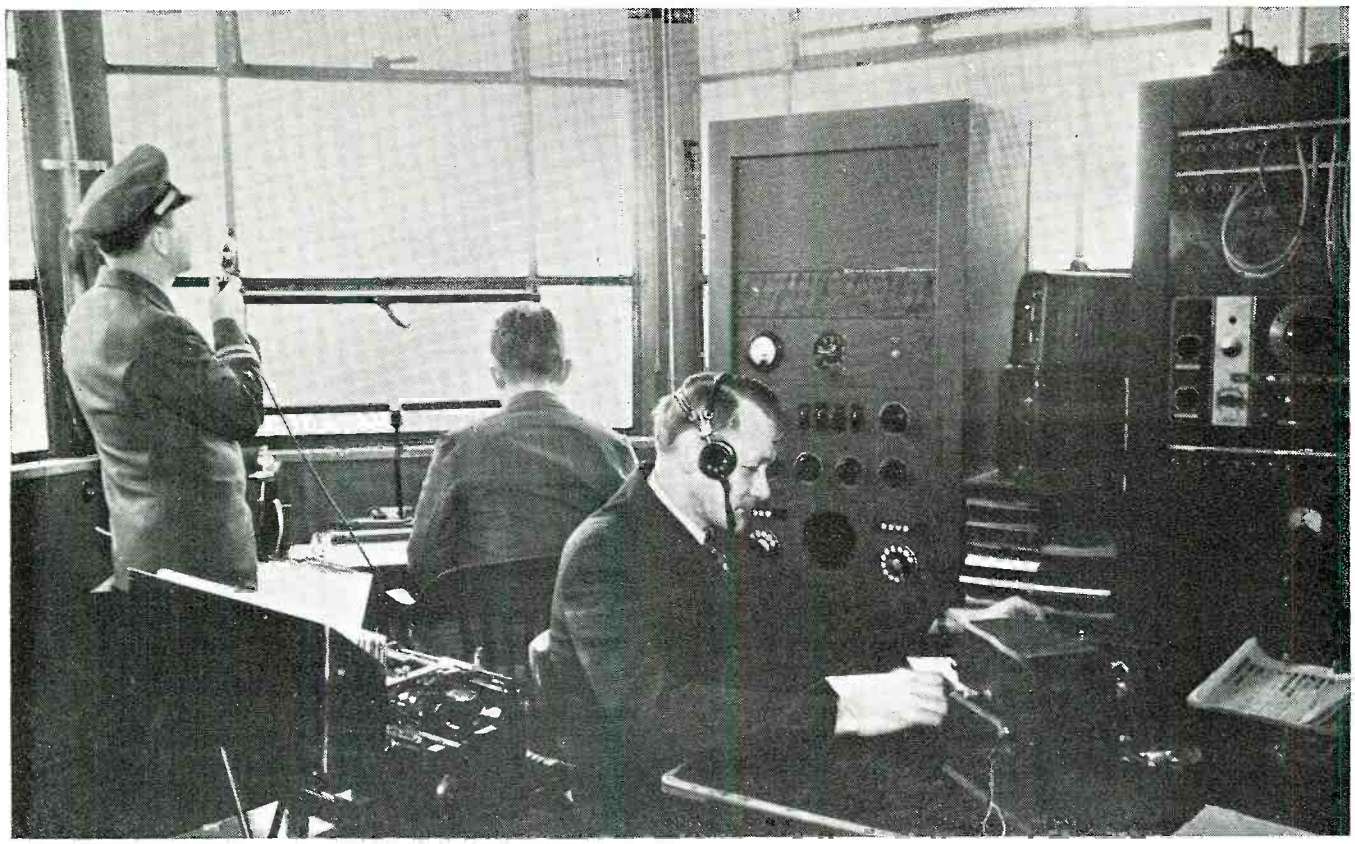
Gentlemen: Please send me the books whose numbers I have encircled below.
Book No. 104, 107, 111, 112, 113, 114, 115, 116, 117.

☐ Price Enclosed $..... ☐ C. O. D. (Plus Postage)

Name .....

Address .....

City..... State.....



In the T.W.A. dispatcher and Radio Room there is constant hustle and bustle.

Want to be an AIRLINE RADIOMAN?

By EUGENE A. CONKLIN

Syracuse, New York

Once in the air, the radio reports at regular intervals on the weather.

Re: Aviation Radio

DEAR SON:

I just received your welcome letter in today's mail informing me that you were thinking of carving out a career for yourself in *Aviation Radio*. In my answer to you I have tried to point out a few of the requirements which the man sitting across the desk in the Employment office (if you are fortunate enough to get that far) will fire at you. I've also included some pretty pertinent dope on the duties and opportunities which will face you in this promising field.

Let's get off to a flying start by taking a quick look-see at the qualifications and duties as outlined by the number-one candidate for your prospective employer, the airlines. But first of all you had better decide for yourself for just which capacity you are best fitted—radioman, electrical engineer, or radio technician, to give each of the three classes of aviation radio employees their proper name.

As a Radioman you will be responsible for trouble shooting, servicing and maintenance of aircraft radio.

As an Electrical Engineer you will

MANY students would like, eventually, to get into the fascinating field of airline radio. The author gives these tyros some valuable pointers.

be: responsible for communications research, communications standards, radio announcing, radio design, radio research, durability of equipment,

And as a Radio Technician you will be responsible for Radio construction, delicate and exacting tests and calibrations, technical research work and development in conjunction, with engineers responsible for service standards used by radiomen.

You may generally act as radioman due to superior ability.

You will be responsible for precision operation of equipment to include Radio Operator's duties when necessary.

Having picked out a promising *niche* for yourself let's peer into the crystal ball which mirrors the qualifications for the three divisions of aircraft radio outlined above.

Radiomen—Must have second class telephone and telegraph or better—must have a thorough knowledge of mechanics—must be exceptionally efficient as service and maintenance men. These men are generally accepted from leading radio schools.

Electrical Engineers — Must have second class telephone and telegraph license or better, with college electrical engineering training preferred—Must have experience on design and construction of receivers and transmitters; also experience in experimental research. A knowledge of communications is also desirable.

Radio Technicians—Generally require a second class license although not entirely compulsory, but must be a good practical technician with considerable design and radio construction to his credit. The latter two requirements include considerable experience as evidenced by proper references.

Now that that's over let's take another look into the type of radio equipment carried as standard equipment by the major airlines. The equipment described below is a typical standard installation which with minor variations will be found throughout the country.

Basically the radio engineering division of all airlines is divided into two parts, Ground Station engineering, and Aircraft radio engineering. Ground stations operate a twenty-four hour watch requiring from four to eight men at each station for maximum service. About two hundred and fifty of these transmitters are scattered over the airways, both aeronautical stations for radio communication with aircraft and point to point stations for transmission of messages concerning flight operations between stations on the ground. These stations have a standard 400 watt output and have a maximum range of two hundred miles. However point to point stations may have as high power as a thousand watts depending upon the service the station is designed for. Each airline has its own individual radio communications network which is in turn a part of the nationwide chain system designed by Aeronautical Radio, an organization whose sole function is to organize the radio system for all domestic airlines into networks or chains and assign each an individual frequency. Each network has a distinctive identifying color, blue, red, brown, purple or green. But so much for the ground setup, now let's turn our attention to the standard plane equipment.

Briefly there are usually three separate radio receivers on each plane and one or more dual transmitters. The standard two way radiophone sets are capable of five frequency reception. Receiving all government weather reports on either of the receivers, at least one receiver can be operated by two separate sources of power. A minimum of four antennae and an auxiliary antenna for emergency are also standard equipment.

The two way radiophone is used for communication with company ground stations and to maintain contact with the Civil Aeronautic Authority stations. Three frequencies are used for daylight work while two others are available for night reception. The ship's power supply provides the power for both receiving and transmitting units. All frequencies are crystal controlled in both transmitter and receiver so the pilot has only to turn a knob for selection of the particular frequency to be used.

The second receiver is used to pick up CAA beam signals and weather reports sent from the same transmitting stations operated by federal airway technicians. The localizer beam used at certain terminals for conditions of limited ceiling is also heard on this receiving unit.

The Clipper Plane's Direction Finder is used to take necessary bearings.

Not only must you be a good operator, but you must be prepared to be able to repair, adjust and maintain the equipment under your control.

The third or auxiliary stand-by unit has in fact a wide range of usefulness. It receives on two wave-bands and is used in conjunction with a loop design antenna. On one band the beam signals and CAA reports are available, on the other band the entire range of night frequencies on which all airlines broadcast come in. It is equipped with a specially built dry cell battery in case of power failure.

In addition to the transmitting and receiving equipment the radio direction finders including a radio compass receiver are carried. Transmitters aboard aircraft operate in the three to six megacycle band with a fifty watt output level.

On the point to point radio senders radiotelegraph is used for the transmission of dispatches, loaf messages, control information and clearances between stations in the system. Radiotelephone is used exclusively for transmission in most cases to aircraft from the ground station terminal.

So much for the equipment which you will be expected to design, construct or service according to the division you have picked out for yourself. Now let's analyze the requirements for each branch of the service a little more thoroughly and see what makes the little wheels go round and round.

As a radio engineer or technician in addition to the 2nd class license which is a "must" requirement, you will be expected to receive and transmit code at a speed of thirty-five words per minute, must be able to type at a speed of fifty words per minute and must be able to enunciate clearly with good English in using radiotelephone. As either an engineer or technician you must be thoroughly familiar with both radiotelegraph and radiotelephone and must understand the theory and practice of radio reception and transmission as applied to aircraft communication.

As an electrical engineer particularly the college education at a recognized electrical engineering school is an essential of the first water. That doesn't mean that if you can set the world on fire with radically new design in the interest of portability, durability or increased range and freedom or increased range and freedom from electrical or man made static, that you must be kicked out the front door of college training with a diploma in one hand and field kit in the other, but it does indicate that lack of adequate college training in this specialized field puts you strongly behind the well known eight ball. You will note the particular stress on experience. How is this experience to be gained? At present the only available route seems to be working your way upwards from the humble radioman to technician and thence to engineer. Experience in individual airport units while attending college is the greatest teacher but more of that anon.

Radio sets are installed by service men who know the airline's problems.

As a radioman a certificate from any of the leading radio schools of which there are dozens will be found satisfactory if backed up by a record of servicing airport and aircraft installations over a period of years. If you are sincerely impatient to "get in on the ground floor" of aviation radio, perhaps the wisest thing to do is to qualify as a radioman and work upwards, particularly if your finances indicate a severe lack of funds to send you through the higher institutions. On the other hand, if your goal is electrical engineering, don't let anything or anybody keep you from college, but at the same time let nothing interfere with your taking a part-time job in some capacity where practical training is available.

Summing it up, you must have either experience and a second class license, college training and experience and the license or best of all, all three to qualify in any of the twenty-two leading domestic airlines. If you are a graduate of a recognized radio school and have confidence in yourself by all means try for a position as radioman. Lack of college training where a good practical technical background is substituted is not a serious drawback to success. Ability to learn much from daily observation, the patience to continue when progress seems hopeless and a certain strange type of initiative and creative ability are important in any branch of radio but particularly in aircraft where your skill and consistent plugging may save a pilot or passenger load from death or severe injury.

Now let's take the second of your employers to be, the CAA (*Civil Aeronautic Authority* or Bureau of Air Commerce to you).

Radio navigation aids maintained by the Bureau are of three types, communication stations broadcasting weather reports and available for radiotelephone communication with aircraft in flight, radio range stations marking the airway routes, and radio marker transmitters indicating the location of strategic points on airway route centers. Point-to-point service is a part of the Bureau's work and each airway has a reporting service consisting of Bureau of Air Commerce observation stations, together with a teletypewriter circuit for sending out these reports. The average range of the communication system and radio range stations are one hundred miles and are of the conventional airway transmitter variety. The directional marker or miniature radio range station covers only fifteen miles and serves as a hom-

(*Study further on page* 65)

AS I SEE IT.

By JOHN F. RIDER
Dean of the Servicemen

In this article the author takes up a few of the variegated problems confronting the serviceman.

John F. Rider

(The opinions expressed herein are solely those of the author, and do not necessarily represent those of the Publisher nor Editors of RADIO NEWS.)

THREE lines in italics head this department. These three lines - - absolve the editors and publishers of RADIO NEWS from any responsibility associated with comments made by us. However, we have never been inclined to take advantage of a situation unless it was associated with competition, but even then we refrained from commenting on test equipment during the period when we were a member in the ranks of test equipment manufacturers. We now are out of that business and you can expect to see comments concerning test equipment and procedure. In fact, such comments will be found elsewhere in this issue. It feels good to have the shackles removed.

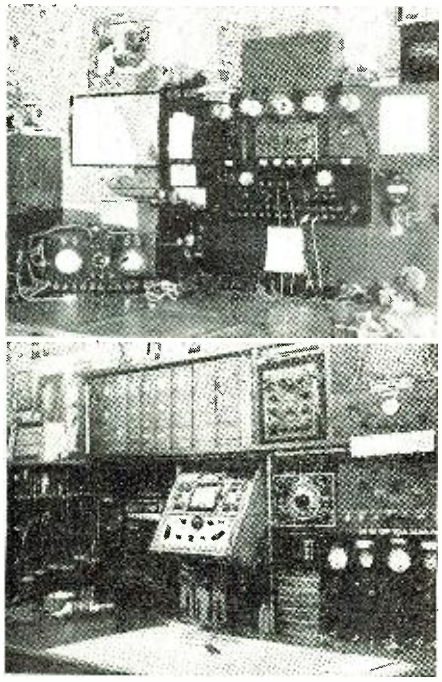
The RSA

THE *RSA*—otherwise known as the *Radio Servicemen of America*—is putting on a drive for members. We had the opportunity during the recent *National Parts Show* in Chicago to attend one of their executive meetings and one of the subjects discussed at that meeting impressed us very greatly. Associations are funny things. When functioning properly they serve an admirable purpose, yet seldom if ever are they an absolute necessity. In other words, the servicemen can get along without a national association, yet, there is every reason why servicemen should join such an association. The dues involved, even if they were twice what they are, would be a secondary consideration.

We said before that we were impressed. That is true because the subject which received the greatest amount of attention was ways and means of fostering public confidence in the serviceman and thereby increasing the business of the average radio service shop. In connection with this discussion much time was spent in clarification of the ideals of this national association. From the general babble of voices came the clear thought to select as the final objective of the association a fundamental idea: creating public confidence in the American radio serviceman. In line with this thought, came the conclusion to build this national association upon the strength of the local chapters and the means of accomplishing the solid foundation for each chapter was to develop the friendly relationship between the members to the highest degree, and to build such confidence among the members in each chapter, that in time to come the chapter would be in a financial position to guarantee the work of its members.

There is a tremendous amount of merit in this idea. It answers every question which the average doubting public asks when it desires radio service. Public confidence is built upon two words—"satisfaction guaranteed." Of course these two words have been abused to the limit, but the guarantee of a group is very much stronger than the guarantee of an individual. To be a member of such a group is of vital importance to every man associated with the industry the group represents. This is true even of the service station operator who now is successful on his own account and sees no justification for joining such a group of servicemen. Even he can benefit by representation, for such representation does not deprive him of whatever honest individual effort he may wish to make. His rugged individualism is not taken from him. He retains all of it and augments it by whatever good the group effort can accomplish.

We hope that the activities of the *RSA* will continue to progress so that this excellent idea will come to complete realization.



D. H. THOMPSON, of Pecatonica, Illinois, shows how much he has progressed between 1930 (top) and 1939 (bottom). Looks like a very fine service bench.

Signal Tracing

IF YOU attended the *Parts Show* in Chicago during the past June or have watched magazine advertising during the past few months you undoubtedly noticed that some of the test equipment manufacturers were discussing equipment intended for signal tracing as a means of locating troubles in radio receivers. Some of this equipment was displayed at the show.

Our interest lies in the utility of signal tracing as a system. The past year witnessed very critical investigation of the performance of the system under the most adverse conditions. By adverse conditions we mean that the system was introduced cold to men who for years thought and worked with methods diametrically opposite to what was being suggested. Further, it was thought that the application of such a system required a tremendous wealth of supplementary technical data. Instead of an abundance of such data, only a meagre amount was available, yet the idea of locating a defect by tracing the signal proved overwhelmingly successful. In fact, the comments of those who applied the system as a system, without regard to any one particular piece of equipment, were such that we hazard the statement that signal tracing will eventually supplant all other methods wherever domestic and foreign servicemen operate. We believe this to be true in the entire communication field irrespective of the nature of the service, be it commercial or military or for the safety of mankind, as in the case of services associated with marine activity.

Neglecting for the moment the advantages gained in daily service activity, signal tracing as a means of locating defects in communication systems will have a far-reaching effect upon the technical advancement of service personnel. And this applies equally well to instruction in schools where communication is taught. It has been

(More servicedope on page 57)

Clint Bowman, of *Specialty Advertising* Co. Peoria, Ill.; Margaret Jones & L. Gamache.

N. Cook (in chair) of *Mallory*, K. Plunkett, R. Voyles, Marvin Huff and Eugene Pulliam.

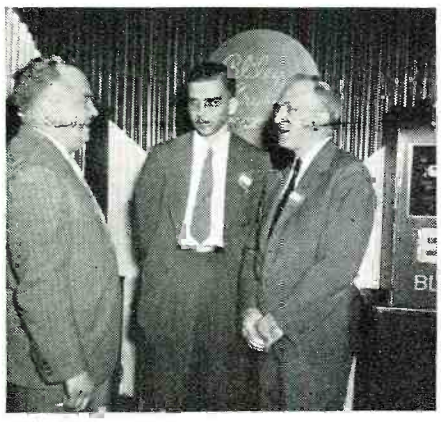
A. H. Brunning of *Premax*, and a customer talk with the *Premax* manager, Geo. Bensen.

RADIO NEWS BIG R.M.A.

George Bock & Phil Gotthold of *Solar* discuss prospects of the new testing unit.

Howard H. Smith & Bob Karet of *Utah Radio Products Corp.* tackle a behatted customer.

Every year the members of the Radio Parts Industry get together in giving a monstrous Show. The purpose of this is to acquaint the public as well as the dealers with the strides which the trade has made during the past year. The exhibit represents the advancement, and this is only overshadowed by the persons responsible for the progress. Believing our readers interested in seeing who the men "behind the scenes" might be, and what they looked like, we had our



G. Wright & F. A. Lennberg of *Bliley Electric Co.*, with J. T. Watts, Pres. of *Meissner*.

United Transformer Corp.'s H. E. Watson, I. A. Mitchell & Sam L. Baraf, take it easy.

Ed Braun, John Olsen & A. B. Stewart (*Capitol Radio Wholesalers*) with W. A. Marsh.

Victor Mucher of *Clarostat Mfg. Co.* and W. L. Davis of *K. D. Sales Co.*, Freeport, La.

L. G. Cushing discusses the *Hammarlund* line with Sales Manager George Shuart.

R. B. Ritter, Mrs. Mary Becker, and Leon L. Adelman, of *Cornell-Dubilier Electrical.*

ATTENDS THE PARTS SHOW

photographer, Seymour Rudolph, mingle with the crowds and snap these very informal pictures of what may be called a true cross-section of the industry.

Most of the men are young, but that is understandable, since the industry itself is not old. Many of them have been in radio since its inception. Of one thing we can be sure; they are a courageous bunch, more than willing to gamble all on new and untried fields. To them we owe much, if not everything.

J.C.Hill, Export Mgr. & W. A. O'Brien, Vice Pres. of *Simpson Electric Co.*, reminiscing.

E. S. Dietrich of *Raytheon Products Co.* & Sandy Cahn, of Radio News, in conference.

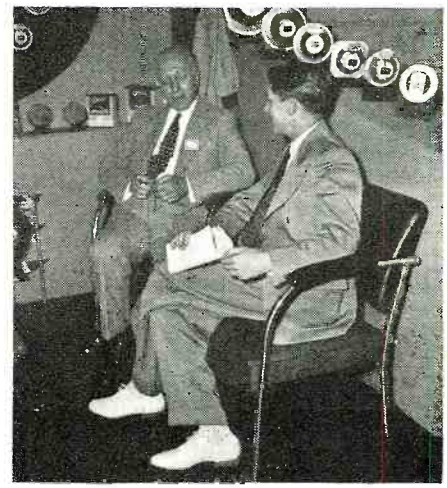
Some of the men in the *RCA* Booth being interviewed by Sandy Cahn of Radio News.

HarryKalker, Sales Mgr., E.L.Hollingsworth, and L. P. Still, of *Sprague Products Co.*

W. M. Robinson, (*Cornell-Dubilier*), W. C. Braun, (*Radolek Co.*) & G. W. Strange.

Sam Ruttenberg of "*Amperite*" explains things to Mr. Lippman of Pittsburgh.

Yep! It's he again! Same Sandy Cahn of our own magazine trying hard to sell a customer



Pres. James P. Quam of *Quam-Nichols* and B. V. K. French of *P. R. Mallory Co.*, Indiana.

Henry Johnson of *Hy-Grade Sylvania* explains things to the young Master Moss.

W. S. Wilson, (*Delaware Radio Sales*), Bill Halligan, (*Hallicrafters*) & Marvin Roye.

Robert Williams, Sales Mgr. & A. A. Barricks both of *Hickok Electrical* with customers.

E. I. Guthman, of E. I. Guthman Co., seems very amused at his engineer, McM. Silver.

In shirt-sleeves, Jack Simberkoff of the *Aerovox Corp.* displays the latest unit.

Sam Poncher, of *Newark Electric Supply Co.*, talks it all over with Mr. Murray Mentzer.

M. J. Stessin, *Amer. Radio Hdwe. Co.*, shows J. M. Landfear (*Hickok Electrical Inst. Co.*)

Samuel Milbourne of *Supreme Instruments,* describes his company's latest units.

Dick Laycock, in shirtsleeves, shows his *Howard Radio* Co. line to F. D. Terwilliger.

The *I.R.C.* boys; Jim Hermans, rep. from S.F., and Daniel Fairbanks of the home corp.

Vern Routh of L. A. reading Pres. Jerry Kahn's (*Standard Transformer* Co.) catalog.

The *Arcturus Radio Tube* Co. crowd: Englerth, Gaertner, Stobbe and Frank Langstroth.

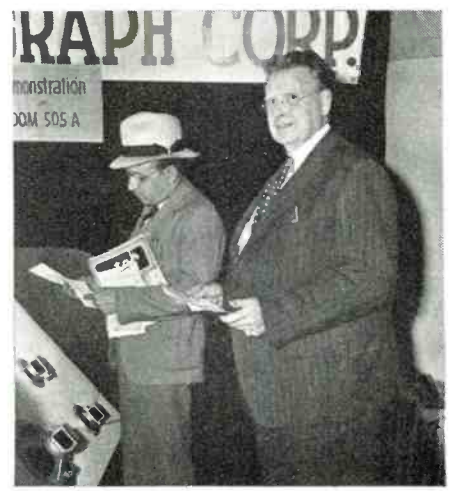
Ralph Hill, *Ohmite* Co. Sales Mgr. (light suit) shows H. A. Marsh the power switches.

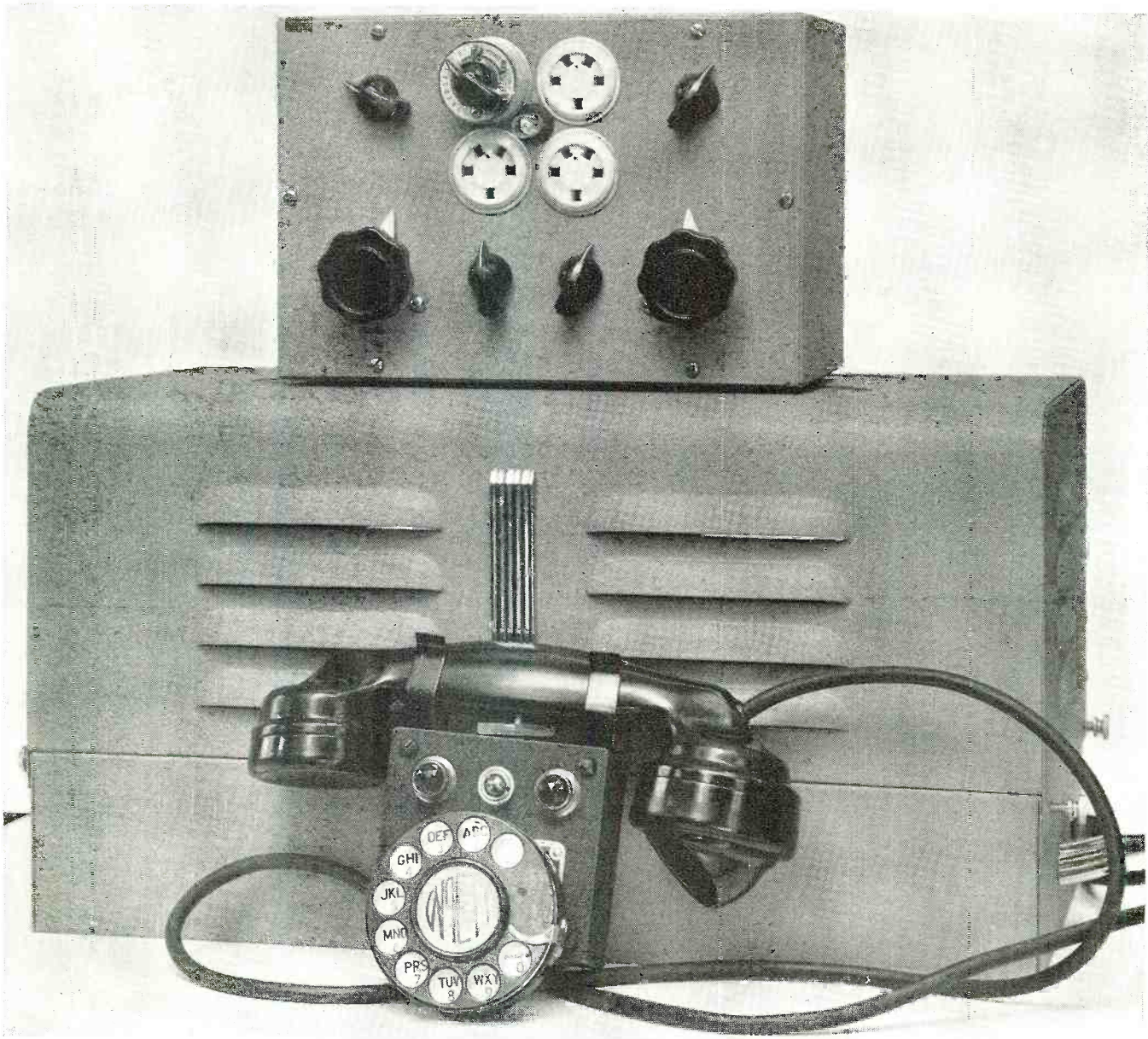
Mrs. Zschau, W. W. Boyd, Jr. (rear), S. L. Spector, Pres. of *Iasccihe Corp.* and Mr. Zschau.

Pres. A. R. Kahn of *Electro-Voice Mfg. Co.,* found the RMA Parts Show to his liking.

Engineer R. B. Shimer and Pres. F. P. L. Kenyon of *Kenyon Transformer Corp.,* relaxing.

A customer examines D. P. O'Brien's *Cinaudagraph Corp.* line of speech equipment.





These three units comprise the entire transmitter installation.

The DELUXE "DIALOMATIC" MOBILE RIG

by OLIVER READ, W9ETI & KARL A. KOPETZKY, W9QEA
Technical Editor, RADIO NEWS. Managing Editor, RADIO NEWS.

Three bands at the tip of a dial-finger, any frequency within a band! These are but a few features of this newest and most unique unit.

MANY remote control systems have been designed that utilize standard telephone circuits to operate over two or three wires to a set of relays at a distant point. This system has limited advantages as far as radio frequency circuits are concerned. A new *mechanical* system for converting relay driving power to a standard low-loss selector switch to overcome these faults will, and does have, unlimited applications for the changing of frequency, the selection of antennae, controlling of additional circuits, and many other uses.

It is an established fact that modern bandswitching requires layouts that permit the use of extremely short leads in order to attain a high degree of efficiency. If the switch assembly can be controlled at a remote position by means of dial pulses — we will have something that can be used to switch our r.f. circuits and yet keep a com-

pact and reasonably priced assembly with a minimum of relays and associated equipment.

The transmitter described in the following paragraphs operates on any three amateur bands or may be used for any three widely separated frequencies for Ham, police, aviation, or other services. Furthermore, complete choice of any frequency within any one band can be made by means of the universal exciter that is located at the dash position. The advantages of the above procedure will at once be appreciated by those operators that have engaged in emergency or field day work.

One of the most fascinating applications for remote control is in the mobile rig. The usual mobile transmitter consists of a ten or twelve watt transmitter operating at a fixed frequency on one band—mainly five or ten meters. Much *dx* has been worked on the latter from an automobile but *consistent* communication has not been possible, due largely to the lack of sufficient power or the inability to *QSY* within the band to avoid *QRM* conditions.

Added to the actual power available for communication, is the fact that the antenna system is limited to a vertical quarter-wave rod. We can overcome the above by increasing the power output of the transmitter to the vicinity of 40 to 50 watts.

Amateur mobile transmitters are permitted to operate on the 5 and 10 meter bands while in motion and on the lower frequency bands in a *fixed* position as a portable station. This means that the equipment be actually portable from one location to another, and not a kilowatt phone rig in the possession of a person who takes up residence in another district from time to time. The unit illustrated may be removed from the car in a few moments time when an emergency rig is needed and where the car may not be required.

The complete system is built as two individual units—the exciter and control panel, and the remotely-controlled amplifier-modulator in the trunk compartment. The first requirement then, is to have a unit within easy reach of the driver for operating the transmitter with maximum speed and minimum effort. An electron-coupled oscillator could be used without resorting to any crystals but this was not wanted as there are times and applications in certain services where this will not be satisfactory—such as the assignment of a definite police frequency.

Both methods are incorporated in this unit so that the operator may instantly choose one or the other. The amount of test equipment may be reduced by using the crystal-plate-tank resonance points as reference points when tuning the e.c. plate circuit to the same settings as indicated for the known crystal frequencies. This is done by tuning the crystal oscillator to resonance and then switching over to the e.c. side of the switch and tuning the grid tank to the point where resonance will be indicated on the plate dial at the same point.

This method gives the operator a knowledge of the position of the e.c. tank setting that is safely within the band. Of course, the dial may be calibrated but this means little if the set is used in darkness and no illumination is provided.

Complete control of the trunk unit is made by means of a standard telephone dial that has pulsing contacts which are normally open. These dials speed through 10 pulses in 1 second; and hence a bandshift takes just that amount of time.

The heart of the complete mobile unit is the automatic stepping relay assembly used in conjunction with a isolantite selector switch. This unit has been designed for this particular application and differs from the usual stepper in that the stepping mechanism actually is used to provide the needed power to rotate the switch. The stepper finally adopted is made by the *Guardian Electric Co. of Chicago* and is known as their Radio stepper type "R."

Unlike the usual stepper, this unit has an extended shaft for coupling to the switch shaft and the stepping relay is designed for a maximum torque on each stroke. This relay draws 5 amps at 12 volts, but this current is only drawn for a 1/10 second at a time and will not drain the battery to any degree.

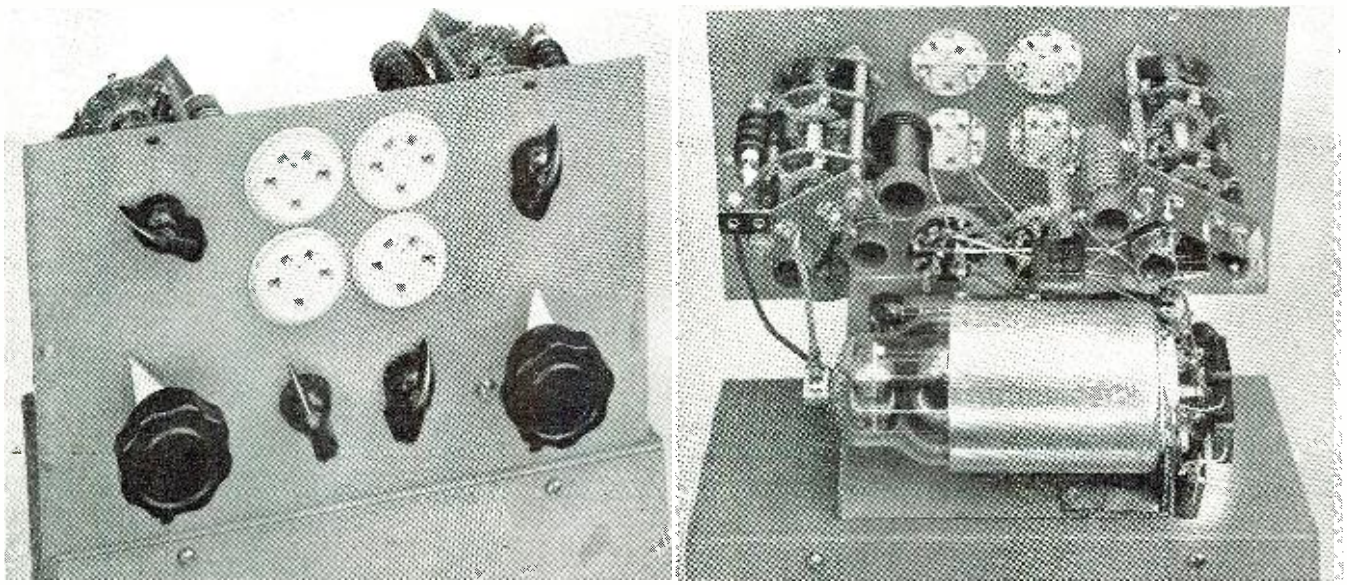
Most stepper assemblies are used to operate a simple arm and set of contacts which connect to a series of relays. These are so placed that the incoming circuits connect in parallel, with the output contacts going to the various sections of each circuit for purposes of changing bands. This method requires longer leads, is far more costly, and the capacity between the relay contacts detract from the efficiency of the unit.

Added to the above disadvantages is the fact that this system is limited to two-band operation unless special types are developed. Therefore, the use of the stepper and selector switch eliminates many relays (up to 12 in this unit), and we may use as many circuits as the switch will handle. There are forty steps on the relay arm. Each set of contacts on the switch are 90° apart and require that 10 pulses be applied to rotate the switch from one position to the following set of contacts.

We might add one more band to this transmitter with the switch used, but this was not desired in our own particular installation and is mentioned only for those wanting four-band operation. This type of switch is available with many more positions and could be used in multi-band transmitters.

It was further our intention to make the system as simple as possible for a

The compactly built exciter unit mounts in front at the driver's seat.



mobile installation by using a multi-wire cable from the dash control, rather than a system using special transformers and parts over a two-wire line that would also include the audio from a pre-amplifier. This method is preferred where the equipment is located at some great distance from the control point, but if only a short distance between points exists, it is far less expensive to use a multi-wire cable between units.

We will describe the construction of the units which locate at the control point first. The initial requirement is to have an exciter which will be stable, both from the electrical as well as the mechanical standpoint. Inasmuch as the transmitter is operated on ten meters while in motion—these requirements become more important than if the unit were to be used in a fixed position. This is particularly true when operating with the e.c. oscillator.

The Exciter Unit

Complete frequency control from the dash of the car is had from the simple unit to be described. The entire oscillator section is built into a standard Bud steel box which measures 9"x6"x5". Winding coils accurately for an electron-coupled oscillator to be used in a multi-band unit is something the average ham dislikes. By using stock parts, this effort can be spared and at the same time a higher degree of accuracy is maintained that is important.

The Browning 5P and 5G tuners are well suited for this unit. Inasmuch as only three bands are used for mobile or portable service, the extra coils were removed and laid aside for future use or when a change in band selection might be made. Further space was saved by removing the self-contained variable condenser and cutting the metal strap used to mount the combination.

The net result of the above change was a compact assembly, designed for high efficiency, and with but a few moments time required for the complete conversion. A type 802 pentode was selected for its ideal e.c. characteristics and large r.f. output. An abundance of power was needed as will be explained in later chapters.

The 802 must be shielded and all connecting leads made as short as possible to prevent vibration from causing a frequency change. By mounting the tube as shown, both grid and plate circuits may be kept well apart. By-pass condensers must be located as close to the tube as possible to be most effective.

All parts with the exception of the *Mallory Vibrapack* and the two voltage regulator tubes are included within the box. Four *Amphenol* steatite sockets are mounted on the front of the panel so that the crystals may be plugged in as well as varied from the front. *Bliley* variable crystals are used so that a fundamental frequency range of 6 kc. on 80 m. 12 kc. on 40 m., or 24 kc. on 20 m., and 48 kc. on 10 m. was available.

When the e.c. oscillator is being used, these plate circuit resonance points may serve as a guide for freqency checks. The plate circuit will tune in the same manner for both types of operation, and by using the crystal frequencies, which are known, the danger of out-of-band operation will be reduced.

The grid circuit is always tuned to the next lower-frequency band than that of the plate and the *Browning* coils are designed for this condition. The grid coils must be designed for high tuning capacities while the plate coils are wound for low tuning capacities for best efficiency. The plate voltage supplied from the *Vibrapack* is 300 volts and is kept at this value by the voltage regulator tubes. The car battery is used for the exciter unit and is therefore subject to varying loads. If the plate voltage were permitted to vary, the e.c. would not be able to maintain a steady frequency.

A pilot lamp (60 ma.) is used to protect the crystals against damage from incorrect adjustments or surges and will indicate whether or not the crystals are passing excessive currents. Change-over from crystal to e.c. control is made by means of a three-pole-two-position switch and is located under the crystal sockets. The other control is the single-pole-five position selector switch for the choice of the crystals or the use of the e.c. connection.

The problem of coupling the r.f. output to the final amplifier was met by winding a series of links consisting of two turns of push-back wire around the cold end of each plate coil, and then connecting them in series with each other as shown on the diagram. There is some loss in r.f. from the above method, but inasmuch as the following tube, type 807, requires but a fraction of the oscillator power for drive, we can sacrifice this power for added convenience and simplicity.

It is important that an efficient means of transferring this output to the trunk compartment be made. The selection of *Amphenol* concentric cable was the answer. This cable is made with an overall waterproof compound and passes underneath the car chassis to the trunk. The outer shield is grounded at several points to the chassis and tied down securely with small metal bands to prevent breakage from vibration.

Mounting of the unit may be made in any convenient manner, but should be done so that it will be within reach of the operator.

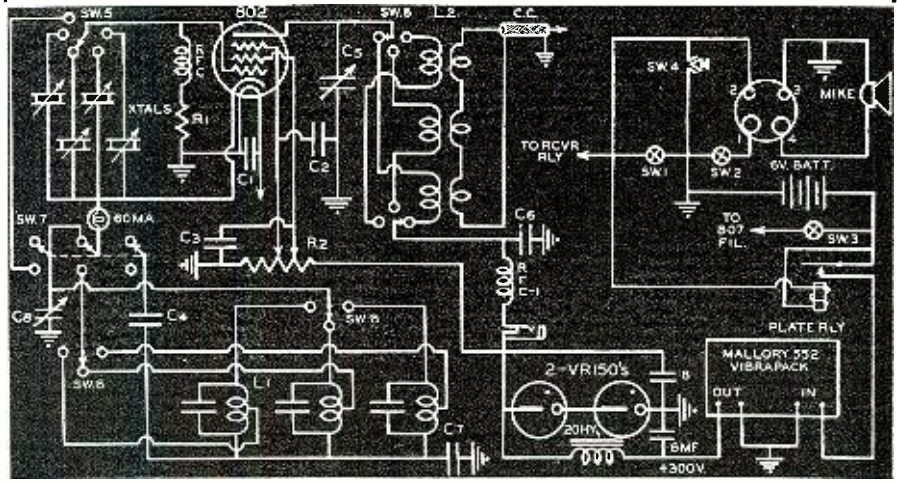
The telephone handset is mounted on two flat spring clamps which hold the unit firmly in place. The one used in this installation is a Temco 10A, normally used on a police rig. The characteristics of the modern telephone transmitter for voice frequencies are ideally suited for close talking and this feature will be appreciated where there is a high background level such as from moving traffic on the streets.

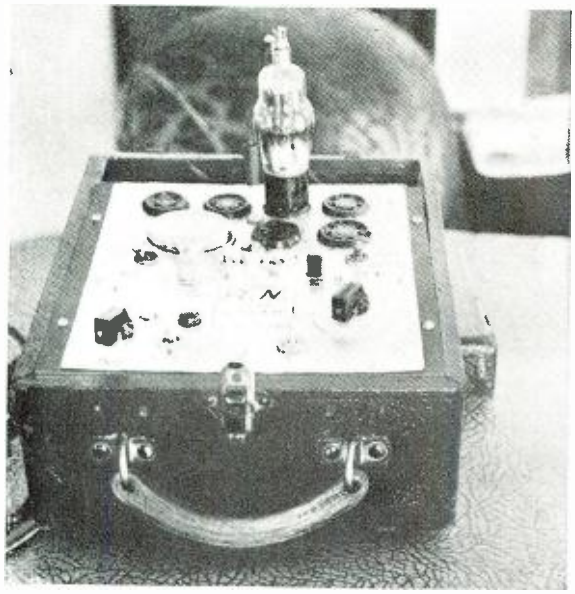
Two toggle switches are used—one to turn on the filaments, and the other to turn on the plate voltage for tuning purposes. Once the rig is tuned—further operation is done by means of the push-to-talk switch located on the handset. This switch connects in parallel with the plate relay coil.

Three toggle switches or pushbuttons are also mounted on the control unit and are used in the following manner; Suppose we wish to transmit on the ten meter band. The 10 meter switch is closed and the dial spun from the 10 pulse position. If the

(*Construct further on page* 48)

R_1—*50,000 ohm, 1 watt Aerovox*
R_2—*25,000 ohm, 50 watt adj. Ohmite*
C_1—*.01 mf. mica Aerovox*
C_2—*.01 mf. mica Aerovox*
C_3—*.01 mf. mica Aerovox*
C_4—*.0005 mf. mica Aerovox*
C_5—*50 mmf. variable*
C_6—*.005 mf. mica*
C_7—*.01 mf. mica Aerovox*
C_8—*100 mmf. variable*
SW_1—*spst. toggle switch (plate control)*
SW_2—*spst. toggle switch (fil. control)*
SW_3—*spst. toggle switch*
SW_4—*push-to-talk (on microphone)*
SW_5—*single pole—5 position switch. Mallory*
SW_6—*dp 5 position switch (3 sections used). Browning*
SW_7—*3 pole double throw. Mallory*
SW_8—*dp 5 position sw. (3 sections used). Browning*
L_1—*Five-band grid coil assembly. Browning 5G*
L_2—*Five-band plate coil assembly. Browning 5P*
RFC—National R100 choke
RFC_1—*Bud 876 choke*
Relays—Guardian Elect. 6 volt dc.
M—Temco 10A Handset
Cabinet—Bud
Sockets—Amphenol
Dials—Crowe
Note: The Browning Tuners consist of all coils with associated switch assembly and plate by-pass condenser





The checker is portable, 'n everything!

TUBE CHECKER

by JACK MEEKER
Rapid City, So. Dakota.

Showing what can be done by following an article that appears in RADIO NEWS. The author's tube checker would be a welcome addition to any service shop.

THE basic circuit of the tube checker was in the Feb. 38 issue of RADIO NEWS. The only changes which I introduced were to use some push-button switches, which I had on hand, instead of toggle switches and the addition of two other switches for testing types 6P7G, 5X4G, 5Y4 and 5Y4G metal tubes. The cost of construction was very low as I had nearly all of the parts required.

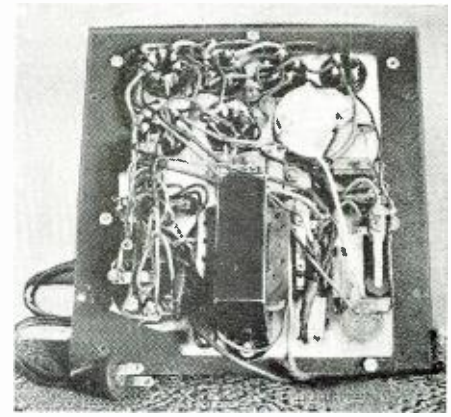
As to the construction, I first located all parts, sockets, switches, meter, transformer, potentiometer and jewel. Second, I wired in the filament circuit. Third, I wired in all of the circuit connected to Sw. 1, then all of the circuit connected to Sw. 2 and so on through Sw. 5 and T. C. Fourth, I connected meter, jewel, potentiometer and quality-short switch, and, fifth, connected line cord and put tester in carrying case.

The carrying case may be bought, home-built, or a case that you may have on hand as was my case. The complete tester, in its case with cover closed, measures 5⅜x9¼x12 inches.

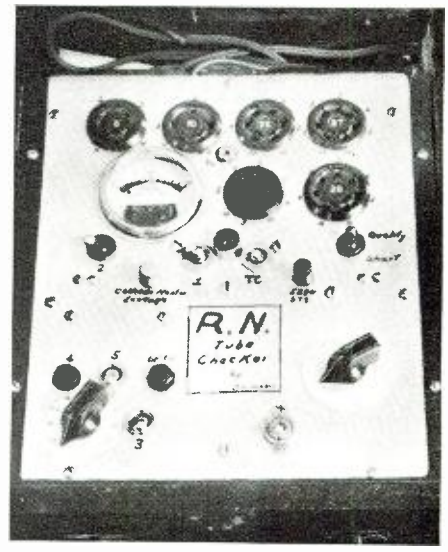
The outstanding characteristic of the tester is its sensitivity. For instance, the leakage test is just as critical as the neon lamp in a commercially built tester. The quality selector switch setting for tube quality test is determined by testing tubes whose condition is known.

To operate tester throw Sw. No. 6 to short position, Sw. No. 2 to left, all other switches down. If the jewel glows some element is shorted to the filament. If not, move all the switches up and down singularly also Sw. No. 2 to the right and back to the left. If the jewel lights with any of the switches in this position it indicates

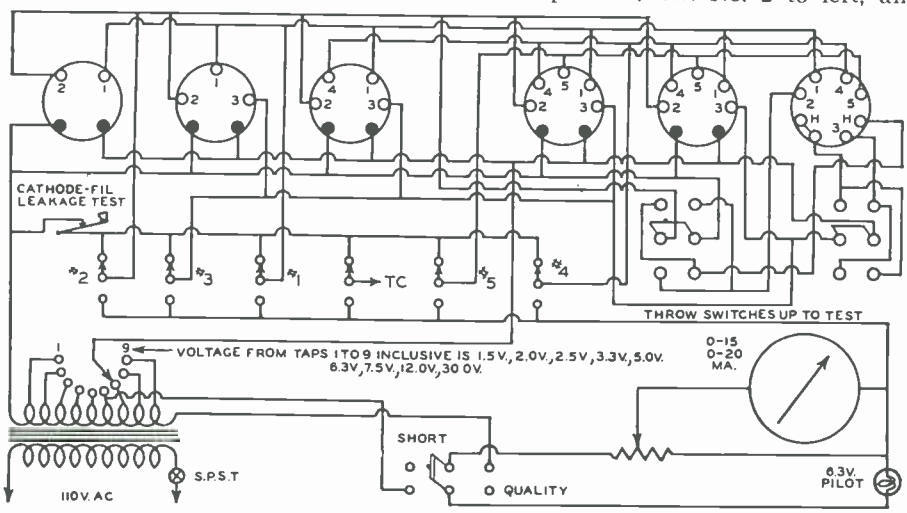
(Continued on page 53)



Compact wiring in a compact unit.



Inscription helps to identify sockets.



PARTS LIST PRICES

Tube sockets	
One 4 prong bakelite	$0.07
One 5 prong bakelite	.07
One 6 prong bakelite	.07
One 7 prong bakelite (small)	.07
One 7 prong bakelite (large)	.07
One 8 prong bakelite	.09
Switches (toggle)	
6 S.P.D.T. @ .21	1.26
3 D.P.D.T. @ .36	1.08
1 S.P.S.T.	.17
(Pushbutton) line cord	.14
1 S.P.S.T. (tap)	.25
1 S.P. 12 throw	.44
1 Baby Volume Control, 5000 ohms	.29
1 D.C. Milliammeters (0-15) or (0-25)	1.95
1 Metal and Glass Tube Cap	.12
1 Jeweled Pilot Bracket	.15
1 Pilot Light Bulb (6-8)	.09
1 Tube Tester Filament Transformer	1.25
1 Aluminum Panel 7x10	.42
1 Tube Tester Case (not listed) (can be home built)	1.50
Cost for parts	$9.55

LESTER W. (W9UHN) Olson, who recently was giving forth on 160 from near Ellison's Bay, Wis., is now gone pro with the radio dept. of U.A.L., Municipal Airport, Chicago.

B. G. Davis, Editor of this mag, is now a full-fledged member of the *Greater Camden Amateur Radio Association.*

W6MPC es W6ONQ are staff operators of W6USA — the it-tunes-itself-while-you-watch xmtr.

W6USA Committee is composed of W6GEA, W6NYQ, W6TI, W6SG, W6FBW, W6IBQ, W6HC, W6NGV es W6AJF.

Owen Callin's colyum in *The Ohio State Journal* is super super fb, fellers! Gives all the latest ham dope and gossip. Write him your news.

Most famous QSL is K6OJI's. Costs 10c to get one. Awah-awah-awah!

VE5AGO uses only 6 (count 'em) watts to work W8SYC! What kindofa skywire.

WAT-THE!!! Here's another one! KD6QSX requires a nickel for a QSL!

Did W9AOB hear that speech of Byron Hargrove's, "The Care and Feeding of Ants?" We wonder, because his subject is titled, "The Care and Feeding of the E.C.O." How about the "Care and Feeding of Speakers?" Hi!

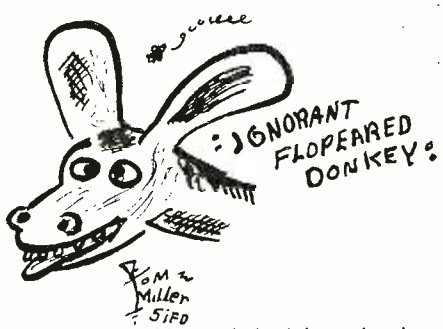
Congrats to the *ARC* which has gone 100% American by eliminating all furrin phrases, etc. For those who (like ourselves), were unable to understand the various words, we append a dictionary furnished by Prof. U. Tellim Wye, as follows: *Facta Non Verba* means, "How's my modulation?"; *Coup D'oeil* means, "Pse QRT u twerp, cuz I wanna talk nw"; and *Excerpta Laudis* means, "How's my modulation? We feel that clears up the matter to everybody's satisfaction. If the *ARC* comes out with more furrin words, and we don't understand 'em we'll always be willing to publish the correct translation, but we feel sure that the meaning will mostly always be the same, "How's my modulation?" . . . or somepin! Hi!

The Hamfesters, Chi's biggest & finest will hold its usual superb outing on August 27th at Frankfort Park at the intersection of Routes U.S. 30 and U.S. 45, just S.W. of the Windy City in Illinois. Twenty-five hundred are expected to attend. A really complete YL-OM program has been arranged. Plan to attend if you are in the vicinity, and you'll not be sorry.

FROM the Mail Bag:

"Dear OM:—I wud like to inform you that W5IFD, 'Ignorant Flopeared Donkey' is a new ham at Webb City, Oklahoma, and is a double cousin of 5ELW, also of hr. so U

Sincerely Urs



may engage this rattle-brain's script in a wee bit of 'Hamchatter'. Hi!"—W5IFD.

[*How about it, you hams! If you can draw; (hi) send it in, and maybe we'll publish it! Ed.*]

From G. T. Beyer: "Find your column a feature of real interest and sure hope that you keep up the good work. Items of interest seem to be very frequent by W9ISR. The 'Wempusite' story was a revelation that very few of we laymen knew about, Hi!"

THE golfer who made the hole-in-one at Beverly Shores Country Club (Michigan City, Ind), which inspired Harry Gonder, the club pro, to start a hole-in-one marathon, was none other than Bill (W9DHK) Voltz, veteran ham of Michigan City. This stunt received nation-wide publicity, with several radio flashes and hourly news service.

Incidentally, Bill collected a $25 bet after the pro failed to produce an ace in 15 hours.

If you were observing, you probably noticed W9TOM and W9BIM inspecting the *RN 1940 Transmitter-Receiver* on Ham day at the *Show.* Quite a coincidence, having two famous uncles together at the same time. Wonder if they know each other.

And was W9ETI feeling his oats that day. You should have heard him cracking wise about installing voice control on your mother-in-law and the Jr. Ops. Bet he was kinda embarrassed when he found he was demonstrating to an announcer how to cut out commercials.

W9VML is on 160 phone after 3 years of cw. Ken just visited the RI for renewal.

The xmtr of W9GGZ (2 goats and a zebra) blew up recently. Harry sez he's building bigger and better. Keep it out of the basement, Harry.

W9LMH and W9NKB, who have gone into partnership in the plating business, haven't been on the air much lately. Willis and Chuck say that as soon as they get straightened around they will be heard from.

Old Zero Zero, one-half block from phantom park, (marble orchard to you) is still putting out good sigs. when conditions aren't too bad. We always like to hear Joe's husky chuckle comin' through the spkr.

The above offering was inspired by the fact that I found out what a friendly bunch of guys you are and your plea for more ham news. Am not a ham myself (that's my fault), but I get around. Hope you like these choice bits from Michigan City. Please delete or edit as you see fit. Chatteringly yours, Edward R. Lewis.

[*Tnx, Ed. fer the fb dope.—Ed.*]

WHAT RN-Draftsman's face is very, very red? He can't spell "separator." (He has been told to write "Now I can spell 'separator'" 1,000 times as punishment.) Tnx to W2GFW fer the hint. EOG, the offender wore his arm off doin' the above! Hi!

The *Newark College of Engineering Radio Club* (W2JPK) has been shut down for the summer vacation after one of its most successful years. Thanks are extended to all those with whom noon-hour skeds were held as well as to all the 40 m gang we contacted.

A new Canal Zone Station is K5AP (14020 KCT9). Full QTH is F. J. Chris, Albrook Field, Canal Zone.

W2HHY has a HK354 in final for his new KW rig. A tasty feature of Ed's rig is the detachable oscillator for portable and emergency work. Watch out for Paley Award come floods or sandstorm to East Orange!

[*Tasty??? How's it taste? Editor.*]

W2HHC is putting finishing touches on his new *Stancor 20-P.* Expects to start it on 10 M.

W2LKK has a new "bug" and 50 watts instead of 10.

W2IDU has new modulator power-supply so is up on 160 m. Fone again.

W2JON uses his one-watt mobile rig quite a bit lately. Watsamat Al? Too much BCL QRM at home?

After nine years on cw, W2APU has gone 10-meter fone. His 6-element Yagi Array should help.

W2LIP pulled the ten outta the final, and left the base in the rig!!

W2LIC has a new *Howard* rcvr. & sez it wrks fb.

W2GWJ quit 160 m. fone fer a while agn and is giving 40 M cw a try.

I BELIEVE a new record has been hung up in 2½ meter dx., by W1JUN and W1BOO. According to the dope in current radio periodicals, 25 to 30 miles seem to have been the limit for 2½-meter two-way QSO, and that with beams, usually.

W1JUN has worked W1BBM (14 watts, at No. Harwich, Cape Cod) from his home in West Warwick, R. I., a distance of approximately 73 miles, as near as I can figure it out, airline, on the map.

W1JUN and W1BOO have worked W1SS in Arlington, Mass. (also 14 watts, about 8 miles N. W. of Boston, Mass.), a distance of about 55 miles airline from both W1JUN and W1BOO. W1JUN used about 100 watts and W1BOO 30 watts at the time, neither using a beam antenna, on June 1, 1939.

I believe W1BOO was the pioneer ham on 2½ in the Fall River, Mass. territory about 3 years ago. Since then he has built up nine 2½-meter receivers and six transmitters for the hams hereabouts. The most satisfactory transmitters are push-pull HY25's in a copper tubing, tuned plate-tuned filament oscillator, using no condensers or resistors. (A ham can build one for just the cost of the tubes, two sockets and six feet of copper tubing, costing a total of only about $4.00.)

W1BOO has constructed a very successful, simple, close-spaced 3-element rotary beam, using no insulators or supports of any type, the parasitic elements being connected together at their centers by copper tubing—a simple version of the "plumbers' delight" becoming popular on ten and twenty meters.

Following is a list of 2½-meter stations heard and worked by W1BOO the last month. I also believe there is probably more activity in this section of New England than in most places. Asterisk (*) denotes stations worked; as all these stations are W1's, the "W1's" are omitted.

W1AHP*	Fall River, Mass.
AHP	Port. mobile, Fall River, Mass.
AIK	
BBM	No. Harwich, Mass.
BGA	Pawtucket, R. I.
BJE*	Port. mobile, F. R.
BOO*	Port. mobile, F. R.
CRN*	Fall River, Mass.
DTW	Apponaug, R. I.
EBA*	Port. mobile, Providence, R. I.
FBH	Providence, R. I.
FDR*	Olneyville, R. I.
FZA	Providence, R. I.
FZU	Fall River, Mass.
GIL	
GPE*	Port. mobile, Providence, R. I.
GWL*	Port. mobile, Providence, R. I.
IVA*	Fall River, Mass.
IYR*	Providence, R. I.
JCD*	Fall River, Mass.
JUN*	W. Warwick, R. I.
JQA	Randolph, Mass.
JXO*	Berkeley, R. I.
KEL*	Providence, R. I.
KFL	Apponaug, R. I.
KZN*	Providence, R. I.
LCN	Georgiaville, R. I.
LEM	So. Boston, Mass.
LKH*	Port. mobile, Providence, R. I.
LKN	Providence, R. I.
LNK	Providence, R. I.
LRO*	Providence, R. I.
LVN	Newton, Mass.
MFJ	Providence, R. I.
MHB*	Graniteville, R. I.
MLB	
MXA*	Providence, R. I.
MXW	Providence, R. I.
MXO	Olneyville, R. I.

OIF	Providence, R. I.
SS*	Arlington, Mass., and several stations in New Bedford, Mass.

W4FFI is new Net Control for Ga. 160 Army net.

The *Crisp County Radio Club of Cordele* gave a ham fest on July 2nd, with about 40 Georgia, Ala., and Florida hams in attendance. EQB, FAN, CCJ, GAA won prizes.

W4AUO has a new 10-meter beam.

W4AJI won a scholarship to Yale.

W4AUS, the kilowatt from Phoenix City, Ala., after a three-year sojourn on 20 and 10 has a peanut whistle on 75.

W4ERM is a new ham in Kellerton, Ala.

W4ERS is still going great guns on all bands.

W4ENS is awaiting a new ticket.

The Army gang at *Fort Benning* headed by W4DXW, W4CCJ, W4ACR, are very active at present.

The Athens, Ga., gang is giving a pure hamfest for the 160-meter gang on September the 2nd, so says W4EEZ.

W4FAN, Jacksonville, Fla., is active on 160 with 200 watts.

W4FCW is trying to get 500 watts to work.

There are rumors of a television station at Savannah, Georgia.

W4BDZ is a new ham in Brunswick, with FCZ and the rest of the gang very active there. EQB has a new Jr. op.

W4KB at Valpariso, Fla. gave another of his annual hamfests this year and EFD says that they had a FB time.

4FNC, "JC" has a new vertical on 160 that the South Carolina gang says is a honey!

A W9 told ARX the other night that he had three RME receivers but hinting didn't do any good.

The Miami gang is very nil at present.

W4FWD is a new ham in Atlanta, with W4GEO ditto.

The 40-meter gang still use the same old formula when rag chewing.

W4KT, Thomasville, does some swell operating on 75.

Most of the 4 District seems badly neglected in RADIO NEWS.

Most of the gang on 40 are getting tired of foreign interference.

W4CCV is dx-ing on 10.

W4FDE is rebuilding.

The Florida Army net is swell FB.

W4ENJ, the mighty atom from Troy, Ala., is strangely absent from the 160-meter band. Rebuilding?

FFI is vacationing at Jacksonville Beach.

W4FRF is very active on 10 with a 200-watt Collins job.

JOHNNY TRINKO, W9MGH, writes:

"Suh,

So 9ISR thinks that *Wempus* of his is something remarkable, does he? Ask John if he has ever heard of the more famous, as also more valuable, beastie commonly designated by the nomenclature of "mendacium magnum." This unusual animule blames its existence to the now extinct, though equally famous "Bisiellus garrulus" (no relation to 'talkative BCL').

"The most important factor concerning the former beastie, whom through familiarity we now call 'Mendy" is the fact that all his molars when used as detectors in place of receiving crystals or carborundum have unbelievable qualities not only of detection, but also SELECTIVITY PLUS SENSITIVITY. As a matter of doubt . . . I mean . . . As a matter of fact, hearing Australia on the broadcast band in broad daylight, on a ten-inch spkr, 5 kc. away from the 50kw. WMAQ local is nothing very unusual. Another illustration of this selectivity is the fact that the 'Mendy Molar' when used on 160-meter phone band cannot receive a single modulated signal, due to the wide sidebands set up by the supposedly 100% modulation.

"These 'Mendy Molars' are on sale at all leading paint stores. If your local dealer cannot supply you, send in ur QRA together with the grid caps of five 866's and the name of ur local laundryman, and we will see that he is promptly supplied."

FROM Helmut Giese of Port Washington, Wisconsin, we hear:

W9KOL, Port Washington, is now a commercial op. at WAD, ship-to-shore station.

W9OFM, Port Washington, has gone on cruise, on great lakes, with Naval Reserve.

W9QXI, W9WHX, W9HNX, and W9NJF have formed a Marine service net for yachts and traffic on Lake Michigan.

W9DDD, has just left a bevy of pretty nurses in the hospital, and is recuperating from an appendicitis operation. And is very active on air these days.

JACK POLLARD, W9MET sent in the following gossip:

W9HZC has a facsimile receiver and is trying to get a picture from Des Moines, Iowa. It uses the *Finch System* and is a *Crosley* Receiver. He *ain't* tried it yet, but is hoping.

W9ANZ (first person on 20), is building a new 300-watt rig. It's on 160 now.

W9EKK got chased out of the living room by the XYL and built hisself a nice soundproof room in the basement. Mike will be cooler there anyhow. It's rumored that he is going to have higher power soon.

W9FWW has just put up an 8JK beam and has high hopes. He has some swell dx cards too.

Radio's Insane Engineer, W9RIE, is supposed to be building a kilowatt.

Some small-power boys in Lincoln are wondering why the high-power ones won't talk with them. They wonder if their watts have gone to their head.

IT'S rumored that W9QMY, who has Class C, won't knowingly talk to anyone unless they have over 100 watts.

Some of the boys are wondering what has happened to W9ZNA.

W9MET followed W9ANZ portable from Lincoln to the Beamer Picnic but lost his signal near Wahoo due to heavy line noise and 200 watters.

W9WOA just finished building a small portable emergency 160 rig. It uses 201A's.

W9NXS can't be heard lately. Betcha he is building a new rig.

Why is it that these high-powered fone stations can't take code?

W8KXS advises:

"On Sunday, October 16, The Penn State Airmen, an organization of student pilots, held their first annual air meet at the State College Air Depot. The instructor and owner of the airport, Mr. Sherman Lutz, who is also my flying instructor, asked me if I could incorporate some radio into the proceedings.

"We installed a portable five-meter tranceiver in an Aeronca 40, which is a small two-place training ship. The rig consisted of a '19 unity-coupled oscillator, a '19 class B modulator and a 30-speech amplifier. It was powered by 135 volts of B batteries. A Western Electric handset was used and a pair of Trimm headphones. The antenna was a four-foot piece of aluminum rod taped to the cabin strut and fed by an eight-foot single wire feeder.

"The ground installation was a haywire transceiver with a 2A5 and two '27s, using a fishing rod and an eight-foot feeder for an antenna.

"In order that the crowd could hear the communications a P.A. system was set up. The velocity mike was placed near the ground transceiver and picked up both the voice of the ground operator and the plane operator.

"In the first demonstration, the plane rig was used just as a receiver. A student went aloft and I ordered him to do various maneuvers. The crowd got quite a kick out of hearing me over the P.A. system tell him to rock the ship and seeing it done immediately, or make banks, wing-overs, etc. In the next trial, W8KXS took the plane with W8QDR on the ground and a two-way communications was made, the crowd hearing both ends through the loud-speakers.

"We all had a swell time and in view of the fact that hardly any time was taken in preparation for the day; we were well pleased with the results.

"This was an 'amateur' day all the way—both in flying and radio."

CANADIAN brother, Allen Ford of Portneuf Station, Quebec, gives the following dope:

VE1KK has been active on 10 and has six countries to his credit. 1KK hails from the apple-growing district in Nova Scotia. He also works 160 phone in the 2000-2050 kc. band.

VE1LQ, Sussex, N. B., has been trying e.c. near 2000 kcs. with 205D's in the final.

VE1OE, Halifax, another new one on 2010 kc. phone. VE1FS, VE1OA, VE2JU, VE2AJ, VE3APC, VE3AYD and VE2PF, all have xtals within 3 kcs. of each other on 2003 kcs. We are expecting a little trouble with QRM when 2AJ gets his 100 watts on the air shortly.

VE1MD worked out to St. Thomas, Ontario with 5 watts input on 1785 kcs. fone.

VE1MJ is active again on 1785 kcs. with his 6A6 final and 12-watts input.

VE3AWF has one of the best signals on 75 fone. Dillon has deserted 160 but we have hopes he'll take a look around on the old band sometimes.

VE1IZ is a brass-pounder on 2010 kcs. 30 watts to a 6L6 final.

VE2OF is portable at Lorette, Que., for the summer months.

VE2PG is an army station at 101 Grande Allee, Quebec City. 400-watts input near 1950 kcs.

VE2JU is a new one on 2003 kcs. fone. QTH is 10796 St. Hubert St. Montreal.

VE2QP, Toro Rapids, Que., contacted VE2PF and VE1MQ for initial contact on 2020 kcs. fone.

VE2QN, Quebec City, is another new one.

VE2AJ says that after he put up his new transmitting antenna for 160, one of his neighbors complained that it was absorbing all the signals and that he couldn't hear anything on his radio.

W1MAW broke his crystal in two and ground one-half about 10 kcs. higher so he can QSY when QRM has him down. Hi!

VE2RO, Quebec City, uses 30 watts output on 2014 kcs. fone.

VE3AMZ has a T9X sig. near 3800 kcs. with only a 59 osc. and 11-watts input.

W2MBH is another low-powered boy on 3.5 megs. 15-watts input to a 6L6 osc.

W2LJN is operating portable at Camp Chickawah, Harrison, Me., on 160 fone.

W1HXC, W1LBJ, W1DQK and VE2PF had a four-way QSO lasting from 6 to 7 P. M. All signals were R7 to 9 in Canada. Not bad for summer conditions.

W4AVG heard by VE2PF on June 22, 1939, at 11:15 P. M. on 160 fone.

VE2PL uses a 6L6G final on 160 fone.

VE4KI, Strathmore, Alta. has a 579X sig. on the East Coast on 40 meters.

CM5RV is 585X on 40 in Quebec.

Can someone gives us the QTH of W9ASB?

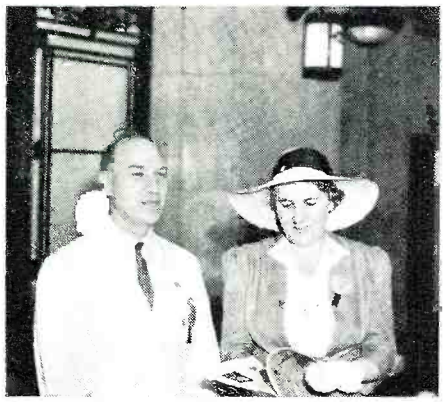
WHO is the station on 2013 kcs. that has been transmitting *tclevision* late at night? His signal covers the entire Canadian band!

Gleanings from the *Official Bulletin of the Toledo Radio Club:* It is rumored that the Commonwealth of Pennsylvania is about to pass a law taxing radio receivers. . . . Wonder why the big, BIG build-up fer "that" radiomag? . . . Aside to the sec'y of that rag: If there *are* duplications in these columns, it aint becuz we don't try, but a body can do just *so* much . . . *Soto voce* to L.B. Chapman of TRC: Write us a letter, we might know where there's a loose Hallicrafter around here. . . . According to the above rag HR5C is unlicensed. Is that true? . . . Pretty nice mag the TRC puts out at that, (that ought to rate us a plug!) . . .

VR4AD has been heard in Chi very faintly by FJB. Comes in on Sundays if you fellers want to go after him.

GLEANINGS from the *Kilocycle Splatter* current issue: "W9YVK, Claude Winegar, is back on the job after an illness of five months in the Veterans' Hospital at Minneapolis. He is now rewiring his transmitter and trying to figure the proper grid bias for a mousetrap. (We have seen the

(*More Hamchatter on page* 53)

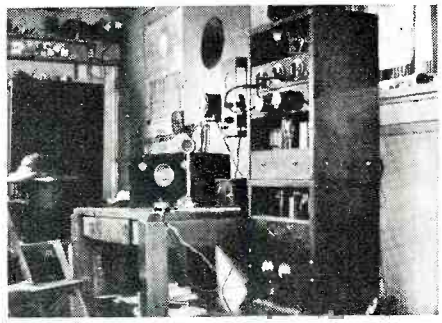


Johnny W1QP Reinartz es his XYL attended the Pittsburgh Convention, where he spoke.

A. L. Budlong, ARRL's Asst. Sec'y, has a good time at the Pittsburgh Convention.

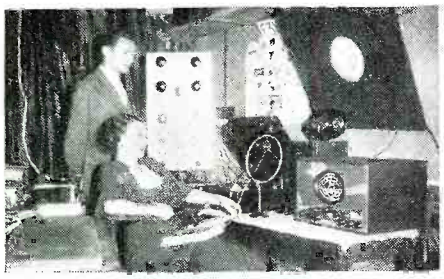
ARRL's prexy E. C. Woodruff, (W8CMP), took keen interest in Pittsburgh Convention.

Portable W8KXS working 56MC to airplane from in front of State College Air Depot



This is W9WKL's QTH. Notice the old oil or coal stove to the extreme left. Swell?

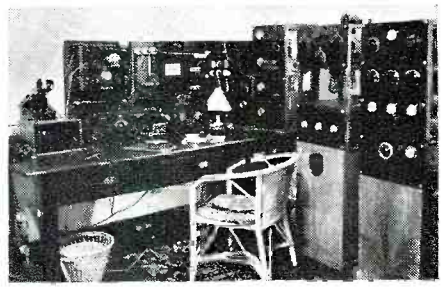
HAM



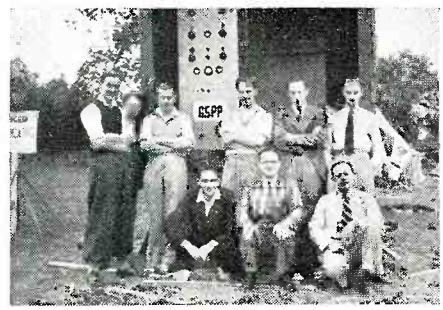
J. H. Hood, of Greenville, S.C., sent in this fine picture of F3N4 es XYL. Notice mike?

W2IKV uses broadcast station fittings in his shack. His dx contacts are impressive.

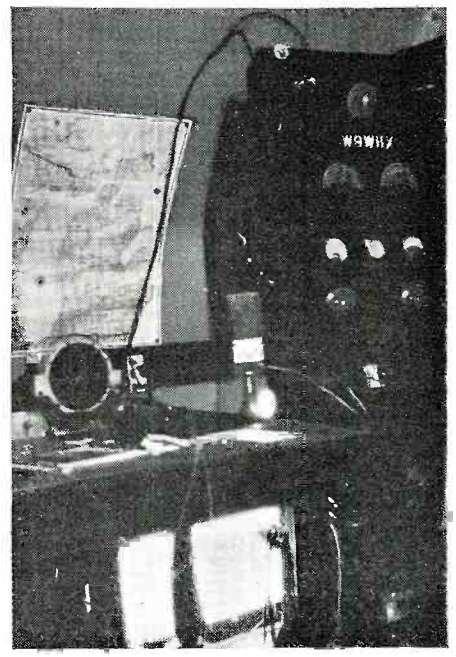
This is CT1QH. It looks 100% American.



G. T. Beyer sent in this pix of C T 3 A B.



Portable G5PP, and his gang, in the field.



The radio shack of Station W 9 W H X.

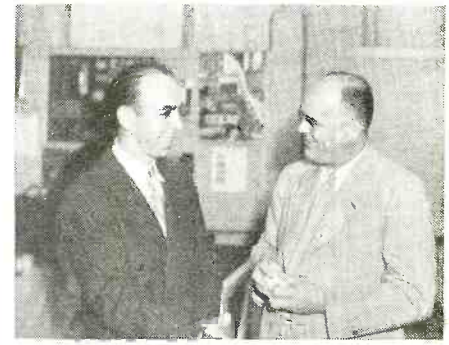
PIX

Ollie W9ETI Read uses the big rig at the RMA Show to contact his friends in N. Y.

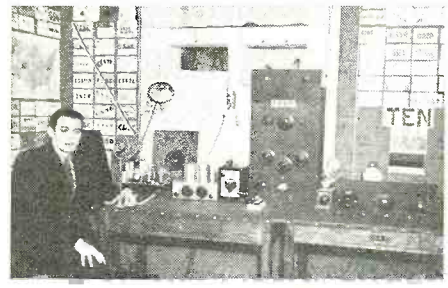
Bill W9WZE Halligan relaxes from the ardours of the Pittsburgh ARRL Convention.

By Hargrove, of *Johnson,* caught QSO'ing with W2HXQ. Fixing it up for the Fair, By?

This fine layout belongs to W-9-triple-D. The station can be heard nightly wkg. dx.



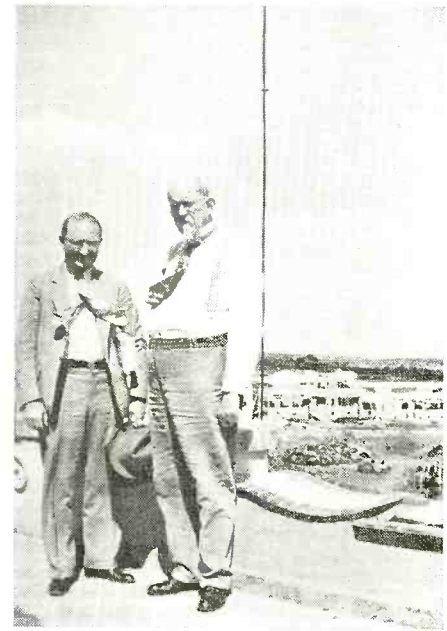
Frank W9ECA Hajek & Rex W9LIP Munger pass the time of day at Pittsburgh. Rex made a fine speech on *Taylor* tubes.



ES5D who operates a lot 'on 10 meters has this superb station. That's him at the left!

ON4SG sent this fine photo of his rig to W1LNK. Everything is rack and panel there.

This is G5PP's rig at his home QTH. The mike is one of those peculiar to Europe.



Doc Weintraub, W9SZW visited the famous Dr. Hard, XE1G while on vacation.

TECHNICAL BOOK & BULLETIN REVIEW

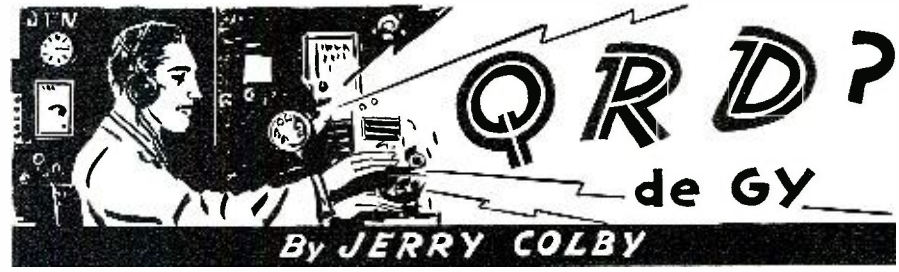
RADIO'S MASTER ENCYCLOPEDIA, published by the United Catalog Publishers, Inc., 258 Broadway, New York City, is a complete manufacturer's guide on all types of radio equipment. The book contains various sections which are divided into groups in the manner of a classified directory. This publication meets the demand for a complete source of information on the source of supply and the names and addresses of the suppliers. Complete listing as to names and addresses are given so that the reader may easily locate practically any item now appearing on the American market. Reprints from the various manufacturer's catalogs are contained and in most cases give the prices of the particular product illustrated. Much time and effort may be saved the prospective buyer with the above information at his finger tips. Copies may be obtained from the United Catalog Publishers at the above address.

PRODUCTION AND DIRECTION OF RADIO PROGRAMS, by John S. Carlile, published by Prentice-Hall, Inc., 70 Fifth Avenue, New York City, was written to provide a useful volume on radio production for those who are busy performing tasks within the industry and for those who hope to enter radio's gates to create or direct, entertain or inform, or to assist in any capacity. Few text books have been available which cover the intricacies as found in the production of radio programs in the studio, and the writer has thoroughly covered all phases of this type of entertainment. The book is written in four parts, which include "The Production and Those Who Produce It," "The Production of Musical Programs," "Presentation and Routine," and "Speech." The author takes the reader through all of the various branches of radio productions, not only the musical program but the skit, sound effects, etc. The book is well suited to the reader who is interested in staging a dramatic or musical show where sound effects can be used to good advantage as the author explains how all of the various sounds used in broadcasting are produced in the studio, which in most cases make use of material found in the average American home. Stage setups, musical setups, cues, stand-bys, etc., are all explained within its pages.

RADIO TECHNICAL DIGEST, published by Radio, Ltd., 7460 Beverly Blvd., Los Angeles, California, for May and June, 1939, reviews the outstanding articles appearing in the various publications in the Radio industry. Among them are: "Terraine Clearance Indicator," "The Square-Cornered Reflector Demonstration of Frequency Modulation," "F. C. C. Watches Sun Spots," "Microphone Ratings," "Induction Tuning, Theory and Application," "Transmitter Safety Technique," "Static Suppressor," "U. H. F. Radio Telephone," and a complete review of the Field in general. The book is a handy reference to the engineer, amateur and serviceman as a means of identifying outstanding articles. The same publication for July and August features the following articles: "Standard V. I. and Reference Level," "An Improvement in the Constant Frequency Oscillator." "Transmission Lines as Circuit Elements," "Input Resistance of R.F. Receiving Tubes," "Pressure Capacitors," "As I See It," and "Serviceman's Experiences."

THE WIRELESS ENGINEER for May 1939, published by Iliffe & Sons, Inc., London, England, includes an editorial on the measurement of the "quality" of coils. Interesting reading is also found in the following chapters: "The New 'All-Glass' Valve Construction," "Input Impedance of Self-Biased Amplifiers," "An Electrically 'Cold' Resistor," correspondence, abstracts and references, and some recent patents. This publication is designed primarily for the engineer and will provide interesting material for the American student.

-30-



TECHNOCRATS, wherefore art thy doctrines? Things go along swimmingly, and suddenly from a clear sky comes word that some bright lad perfects a machine, the Reperforator. Thousands of op jobs are endangered! The darn thing does everything but eat, drink and sleep. Western Union has already installed a few of these $100,000 robots and the boys at these offices are just plug-pushing poppas. F'rinstance, Squeedunk, Va., will have a msg for Bigtown, N. Y., which would be xmtd via Washn. and N'Yoik. In the past it was transmitted, received and then retransmitted from office to office. Now, by pushing a plug like a telephone op, Squeedunk can work directly with Bigtown without any further handling. Cute, what? But what happens to the ops who are replaced??? Ah, progress!

THE *CTU-Mardiv* continues to chalk up victory after victory with the counting of the radiops' ballots on the *Waterman-Pan Atlantic SS Co.* and those of the *Seminole SS Co. CTU* was voted sole bargaining agent. The former is the termination of a two-year attempt to get a bargaining agent for the ops of the line. We congratulate *CTU* on its continual progress.

THEY said it couldn't be done and even the inventor himself had admitted it couldn't be done. But after years of intensive research and experimentation, Professor Edwin H. Armstrong has at last perfected absolutely noiseless, QRMless, crackleless signal reception. The elimination of static had been put into the same category as perpetual motion and a few such items. So this same man who gave the regenerative circuit, the super-het circuit and the super-regenerative circuit to the radio art decided he'd take a crack at this tough nut, too. But after 8 long years of effort he gave up the search. Then, after a lapse of time, Armstrong got a new idea and tackled the problem again. And this time he has produced not only a 100% elimination of static but also a 100% high fidelity reproduction, reduction of transmission costs and has made available more broadcast channels which hitherto had been considered commercially impossible, the ultra-short wave bands. We insist that radio is still in its infancy!

OUR old friend, Putzker, makes the headlines again with a new method of going to jail . . . and getting paid for it! Brother P, a staunch citizen of the thriving village of Hayward, California, was approached by the local constabulary general (Sheriff, to you) to take over their short-wave broadcast apparatus. So Brother P now ambles to the hoose-gow each a.m., straps on his trusty 45 and takes over the calling-all-cars system. And at $170.00 per month it's not bad work, if you can get it, eh.

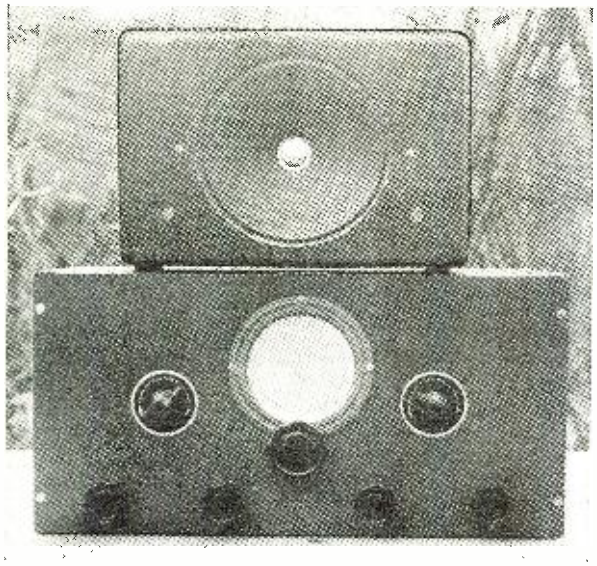
TO some men honors are a mere nothing. ARTA is having a difficult time keeping a man permanently anchored in their San Diego office. Every time they get some one to remain permanently, some tuna-fishing skipper gives him a billet and he amscrays the eachbay. Brother Jordan, who has again taken over the affairs of Local 7, ARTA, is endeavoring to work something out with Brother Yurgionas in this respect. So San Diego may be the gainer and Pedro the loser if Yurgi takes over the watch.

WHILST we're down in the San Diego locale, Brother Harold Craig has a legitimate squawk coming up. Whyinell don't the tunaclippers install small Xmtrs and Recvrs for the 600 meter band only? That's his beef and here's the whyfore. . . . While he was down at Magdalena Bay on the *White Eagle*, the whole crew of the *TC Funchal* had to be rescued from an island on which they had beached their burning vessel. They had sent out repeated SOS on the 36 mtr band, the tunafish frequency, but it was at an hour when there were no ops on watch. Fortunately, they were close to the island and the whole crew were rescued. If they had Xmtd their distress on the commercial freq, there would have been a dozen ships to their rescue in no time because the shipping lanes along the Pacific coast are close to the fishing banks. . . . There's the case of the *TC Belle Isle* which left Pedro with 11 fishermen and was last seen at San Quentin Bay, 100 miles South of Ensenada. She sailed out of the Bay and was never heard from. She might have sprung a leak, called for help on 18, 24 or 36 mtrs, and gone down with all hands in the very vicinity of tankers plying up and down the west coast. . . . And if Eddie Barrett hadn't walked into his shack, unconsciously turned on his receiver to hear if any of the boys were shooting the breeze, and caught the SOS of the *TC Reliance*. Brother McFadden and the rest of the crew of the *Reliance* would now be feeding the fishies in tropical waters. The pumps could not drive the water out as fast as it was coming into a leak in the hull of the *Reliance* and it was but a few hours after they had been taken off by Barrett's *TC White Star*, that the boat took its nose dive. A 600 mtr call would have completed the rescue a lot quicker . . . without the prayer that somewhere a tunaboat op would be standing a watch. . . . They used headwork on the *Ivan Luiz* when one of the crew caught a fishhook in his eyeball socket. He was in terrible pain and there was the added danger of losing his eye. The op called KFS who relayed their position on 600 mtrs and request for medical aid and in no time there was a tanker standing by to take the injured man on board for transportation to 'Diego and hospitalization. . . . The Coast Guard planes will not go further South than San Quentin Bay, which is plenty far enough. So that either union should go to bat for this cheap Auxiliary xmtr-recvr. Brother Craig is absolutely right and for safety's sake pressure should be brought to bear on the tunaboat owners to install this equipment.

THERE'S cheery news on the East Coast since the *Export Lines* announced their possible designation as official tender vessels for the *Atlantic Clippers*. This will mean an added radiop on each boat used. Of course, the op will be required to know all the specialized duties of the radiops at the land beacon stations such as meteorology, etc. . . . It's rather clever how the *Export* boats will operate. They will continue their regular freight schedules, but they will be so regulated that they will never be more than 600 miles apart across the Atlantic Ocean in a path along which the *Atlantic Clippers* will fly. Each op will be able to advise the *Clippers* about weather conditions and other data along the route while continuing their regular duties as freight carriers. This does away with the stationary mid-ocean tenders and about a dozen more operators will be needed for this special work. Three cheers!

'TIS sad, but one of the lads was fired often his job t'other day because he couldn't repair his receiver whilst at sea.

(*More QRD? on page* 52)



The completed unit is attractively mounted in cabinet with the loud-speaker separate.

1.4v. Han Superhet

By HARRY D. HOOTON, W8KPX,
Henderson, West Va.

For that field day contest, for any far-from-line-voltage work, this excellent superhet will do a real job. It covers from 200 meters down to 10.

ALWAYS on the alert for new developments in economical radio operation, the short wave experimenter should be interested in the little five-tube superhet to be described. Designed around the new 1.4 volt battery-type tubes which were recently released, this receiver operates from only a single 1.5 volt dry cell "A" battery, a small 4.5 volt "C" battery and two midget 45 volt "B" batteries, yet it is capable of extraordinary performance.

The circuit, as the schematic diagram shows, consists of a 1A7-G mixer, a 1A5-G oscillator, a 1N5-G IF amplifier, another 1N5-G as detector and a 1A5-G as output. Regeneration is used in both the mixer and the detector circuits to boost the sensitivity, especially in the 14-28 megacycle region, and to provide a simple and effective means of receiving CW code signals. The method of obtaining feedback in the 1A7-G circuit is novel—a small RF choke coil, consisting of 25 turns of No. 24 enameled wire wound on an old broadcast RF choke core, is placed in series with the positive filament lead, close to the tube socket as shown in the photograph.

The negative filament lead is connected to ground through a small tickler winding on the coil form as indicated in the diagram. A .05 mfd. bypass condenser across the filament terminals of the socket keeps both legs of the filament at the same RF potential. Although the 1A7-G tube cannot be made to oscillate in this manner, the sensitivity is enormously increased; it is necessary to provide a 2,000 ohm control across the tickler in order to keep the regeneration within reasonable bounds. The image response, while not completely eliminated, can be very effectively reduced by the use of the RF regeneration control and the mixed trimmer condenser.

The separate 1N5-G oscillator provides much better stability on the higher frequencies, around the 14 and 28 megacycle amateur bands, and is less likely to be affected by adjustments in the antenna circuit. The oscillator output is introduced into the mixer circuit through the 1A7-G grid No. 1, as shown, grid No. 2 being tied directly to the "B" plus end of the 70,000 ohm screen dropping resistor. This arrangement has proved quite effective and should not be changed if maximum performance is to be expected.

The receiver is built up on a 7x13x2 inch chassis and a 7x14 inch panel. Both are supplied with the steel cabinet shown. The various controls on the front panel, left to right, beginning with the lower row, are as follows: (1) RF regeneration control; (2) mixer trimmer condenser; (3) oscillator trimmer condenser; (4) detector regeneration control. Top row: (1) AF tone control; (2) AF gain control. The dial is of the micrometer type, capable of being read to an accuracy of one-tenth of one division.

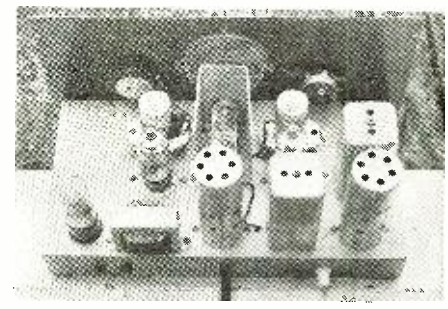
The coils are of the plug-in type, five pairs being required to cover the range from 9.5 to 200 meters. The 10 and 20 meter coils are wound on the midget one-inch isolantite, five-prong forms; the 40, 80 and 160 meter coils are wound on the standard 1½-inch forms. The coils for the three low-frequency bands carry their own band-setting condensers inside their forms; the 10 and 20 meter coils are tuned only by the dual 15-15 mmfd. tuning condenser and the 20 and 35 mmfd. trimmers. This results in a great increase in sensitivity on these bands.

Iron-core, 460 KC IF transformers and regeneration in the detector circuit boost the gain at the IF level. A single 1A5-G pentode AF stage provides plenty of volume for speaker operation on most of the stronger signals.

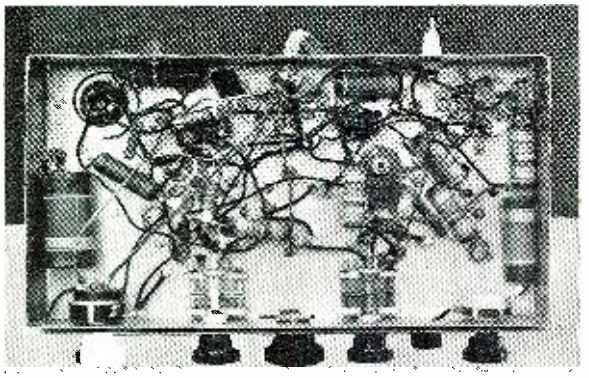
The actual construction of the set is not difficult but the work should be done slowly and carefully. The holes for the tube and coil sockets and the large panel cuttings are made before the panel and chassis are fastened together and before any of the parts are mounted. It is best to drill as many of the small holes as possible before mounting the sockets, tuning condensers, etc., in order to keep the metal "dust" off the insulation. Once imbedded in the isolantite, these small cuttings are extremely difficult to remove and will certainly impair the efficiency of the set even if they do not cause an actual short-circuit.

The same precautions must be observed when soldering the various connections; use just enough of the *rosin-core* solder to make a good joint and keep the iron hot, clean and well-tinned. Use either the solid or stranded hook-up wire for connecting the parts together and keep all leads, especially those in the mixer and oscillator circuits, as short and direct as possible.

After the receiver has been wired, go over each circuit carefully in order



The parts are mounted in rotation for ease in wiring. No trouble here.



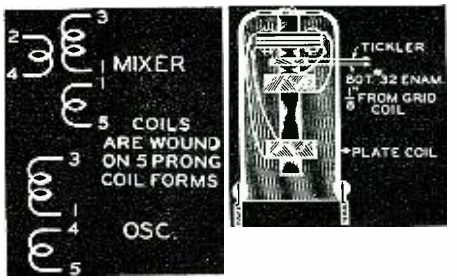
Under chassis view shows clean wiring.

to make sure that all of the connections are correct. It is always a good policy to test from each "B" plus lead to the chassis in order to determine whether any "shorts" are in existence. If everything appears to be correct, the batteries may be connected as shown and the process of alignment carried out.

It is usually best to align the IF circuits from the signal of a 460 KC test oscillator, if one is available. Transmitted high frequency signals are poor for this purpose because of their rapid fading. If nothing better is on hand, the circuits may be aligned in the following manner: Place the switch in the "on" position and turn up the mixer and detector regeneration controls slightly and try to tune in some weak broadcast station operating on a frequency around 6,000 kc. Adjust the mixer and oscillator trimmer condensers, or the band-setting condensers, for maximum signal volume.

Now, using a non-metallic screwdriver, beginning with the secondary of the output IF transformer, adjust each IF trimmer in turn for maximum volume. If the volume becomes too great during the adjustment, reduce the input from the antenna to the mixer circuit; do not, under any circumstances, reduce the volume by turning down the volume or gain controls. It is usually necessary to go over the IF trimmers three or four times in order to obtain an accurate alignment.

The tuning and operation of the various controls is extremely simple. The dial shown on the receiver is a new precision type, having a ratio of about 10:1 in 270 degrees and is capable of being read to an accuracy of one-tenth of one division. This is extremely useful when tuning on the crowded amateur bands and actually permits razor-edge logging of signals no matter how weak or distant they may be.



Coil and IF xfmr construction dope.

Normally, the mixer regeneration control is turned about three-fourths on while tuning. It is not necessary to adjust this control when changing bands; if the tickler coils are wound exactly as specified in the coil table, the same setting will serve no matter whether the 10 or 160 meter coils are in the sockets. Generally, the following operating technique is used: Rotate the oscillator trimmer condenser to about one-half scale, turn up the mixer and detector regeneration controls slightly and adjust the mixer trimmer condenser for the highest noise level. Rotate the dial for a signal, keeping the detector regeneration control just below the point of oscillation for phone and just above for CW code reception. It may be necessary to readjust the mixer trimmer

(*Construct further on page* 61)

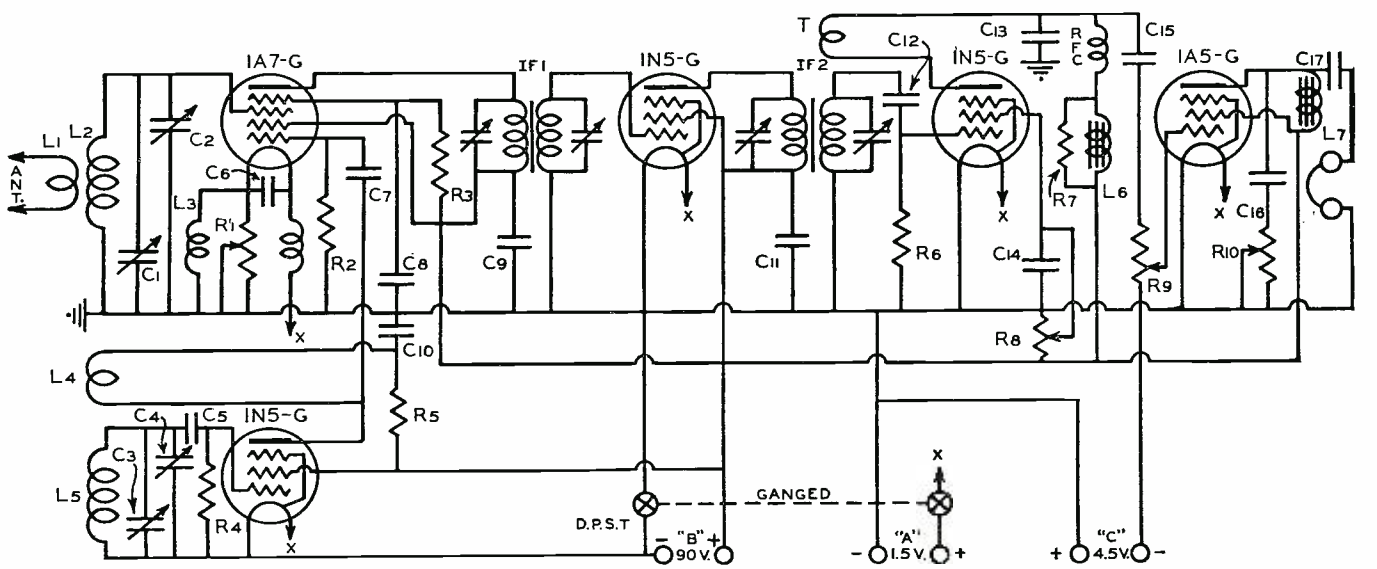
Coil Data

Range	Mixer Grid	Osc. Grid	Ticklers	Wire	Spacing
9½-15	4 *	4	3	No. 16	1″
15-30	12 *	11	6	No. 18	1¼″
30-60	17¾ †	15½	8	No. 22	1½″
60-150	38 †	31	12	No. 26	1½″
130-270	82 †	65	15	No. 28	1½″

* Wound on 1″ forms.

† Wound on 1½″ forms with 140 mmfd. band-setting condensers inside the form. Range given is in meters. Spacing is the distance between the grid and filament ends of the coil, not the distance between turns. Wind ticklers in the same direction as grid coil and on the "cold" ends of the form. All wire enameled copper.

C₁, C₃—Variable condensers, 35 mmfd. each. Hammarlund.
C₂, C₄—Dual section tuning condenser, 15-15 mmfd. per section. Hammarlund.
C₅—Mica condenser, .0001 mfd. Aerovox.
C₆—Paper condenser, 0.05 mfd., 600 volts. Sprague.
C₇—Mica condenser, .00005 mfd. Aerovox.
C₈—Paper Condenser, 0.1 mfd., 600 volts. Sprague.
C₉—Paper condenser, 0.5 mfd., 600 volts. Sprague.
C₁₀—Paper condenser, 0.1 mfd., 600 volts. Sprague.
C₁₁—Paper condenser, 0.1 mfd., 600 volts. Sprague.
C₁₂—Mica condenser, .00025 mfd. Aerovox.
C₁₃—Mica condenser, .001 mfd. Aerovox.
C₁₄—Paper condenser, 1.0 mfd., 600 volts. Sprague.
C₁₅—Paper condenser, 0.01 mfd., 600 volts. Sprague.
C₁₆—Paper condenser, 0.05 mfd., 600 volts. Sprague.
C₁₇—Paper condenser, 0.25 mfd., 600 volts. Sprague.
R₁—2,000 ohms potentiometer. Yaxley.
R₂—200,000 ohms resistor, ½ watt. I.R.C.
R₃—70,000 ohms resistor, 1 watt. I.R.C.
R₄—50,000 ohms resistor, 1 watt. I.R.C.
R₅—100,000 ohms resistor, 1 watt. I.R.C.
R₆—3 megohms resistor, ¼ watt. I.R.C.
R₇—250,000 ohms, 1 watt. I.R.C.
R₈—50,000 ohms potentiometer (regeneration). Yaxley.
R₉—500,000 ohms potentiometer (volume). Yaxley.
R₁₀—1 megohm potentiometer (tone). Yaxley.
L₁—Antenna coil, three or four turns around "cold" end of the mixer grid coil form. See drawing.
L₂, L₃, L₄, L₅—Mixer and oscillator grid coils. See coil table.
L₆—100 henry AF choke (AF transformer primary and secondary in series will do).
L₇—30 henry AF choke. 20 ma.
IFT₁—460 KC, iron-core, input IF transformer. Meissner.
IFT₂—460 KC, iron-core, output IF transformer (see drawing). Meissner.
DPST—Switch on potentiometer.



Conquer the Code with Rhythm

By DON BEAT
Communications Engineer, Sarasota, Florida

"It don't mean a thing if it ain't got that swing." The author stresses the importance of spacing, and describes, for the first time, his original five BSL. If you're trying to learn the code without knowing what a keying cycle is, it's two-baud.

IN MOST electrical codes, intelligence is transferred by a succession of two conditions: *signal,* or "mark"; and *no signal,* or "space." With a radio transmitter, these two conditions are expressed by alternate periods of *radiation* and *no radiation;* with a blinker, *darkness* and *light;* on the diagram, *black* and *white.*

The two conditions need not be absolute. For example, a heliograph utilizes *daylight* and *sunlight;* and while the contrasting conditions are both represented by light, its intensity is varied to distinguish the conditions from each other. *Any* two things which form a contrast might be used for signaling. A person could, by letting a ham sandwich *with mustard* express a difference from one *without,* signal in code, although it would probably take so long he would eat one before the message was finished. In that event, the other would *not exist as a signal.*

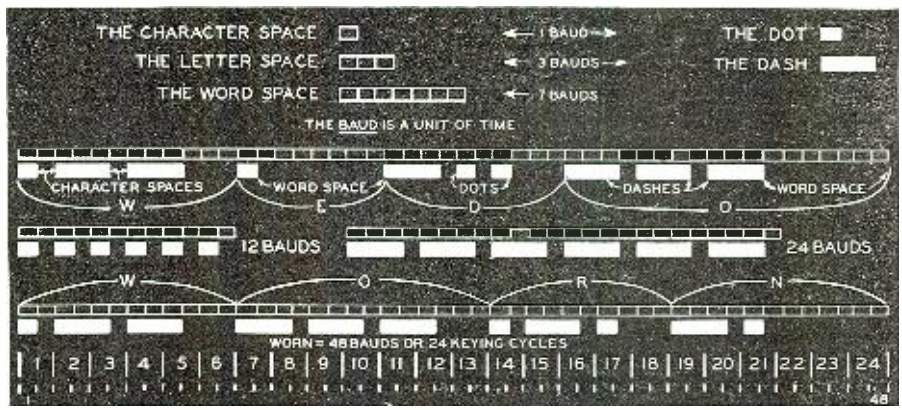
A telegraph sounder expresses both conditions by *silence.* The clicks have no signaling duration; the silences representing "mark" may be distinguished from those of the other — "space" — condition by the difference in clicks which precedes them. One sound designates a point in time where "mark" begins and "space" ends; the other, the point of transition from "mark" to "space." Either silent period sounds the same as the other, if it is heard alone; it is not a signal until it is followed by another, a contrasting signal.

It becomes apparent that learning the code concerns more than the one condition represented by dots and dashes. They do not represent the necessary two conditions, but are "mark" lengths, differing only in duration. The "space" intervals, without which dots and dashes do not exist, are equally important.

Ever copied the back-wave of an arc transmitter, which gives a sound, not for dots and dashes, but for the intervening spaces? You can, by hearing the spaces alone, let *sound* represent "space," and silence, "mark." In this manner, two signaling conditions are present. Here is a state of affairs where you can copy code *without hearing the dots and dashes.* If the "spaces" are so important, we might as well learn the "spaces" and "marks" together. When you have finished your sandwich, let us look at the diagram.

In *International Morse* (radio) *Code, all* signaling is accomplished by various successions of five Basic Signaling Lengths. First, the dot, of one unit length. Second, the dash, of three. Third, the character-space, of one unit; no dot nor dash is a signal unless it is followed by one. Fourth, the letter-space, of three unit lengths, to which each code letter owes its existence. Fifth, the seven-unit word-space, which, when following a group of letters, carries the significance that a word has been completed.

A typical grouping of these five



Basic Signaling Lengths is shown on the diagram, representing in code the words "we do." Notice the part of the three "space" lengths play in the combination. Of the 48 time units, 26 are "space"; 22 are "mark."

The word "baud" is a terminological blessing which honors *M. Baudot,* inventor of the five-unit printer code. It replaces the clumsy near-equivalents "half cycle" and "time unit." The baud is the primary structural interval in telegraphic mechanics, and has a duration—at any speed—of one-half a keying cycle. It is basic because it is the shortest possible time in which either keying condition can be represented.

The five *BSL,* being built of these primary units, bear relation to them. On the diagram, this is expressed in bauds; a dot or a character-space is one baud long; a dash or a letter-space, three; and a word-space, seven.

A surprising fact transpires when the BSL are arranged in temporal sequence; although a dash is three times as long as a dot, it takes twice as much time to *send* them. The reason is that the dots cannot be sent unless followed by a character-space; neither can dashes. The combination of "mark" and "space" which compose a dot is two bauds long; a dash, four. Similarly, no letter can be used as a signal unless it is followed by a letter-space. The words "we" and "do" must be so designated by a word-space.

The one feature which is common to all the code devices described in this text is *rhythm;* the relation, not only of dot and dash, but the relation between the five Basic Signaling Lengths. When you practise, keep their time relations in mind, *even before you learn the code.* The reason for this will become apparent when you get up to about 10 words per minute—when you pass this point, you will stop counting signal "marks," and think of the code as various rhythmic groups, rather than as quantitative buzzes.

Start, before you memorize the chart, by feeling the mechanical rhythm of dots, character-spaces, and dashes. Send a continual series of dots at any speed. They will be simply an alternation of "mark" and "space" units of equal length. Then practice dashes—*three* parts "mark," followed by one part "space." After that, memorize the code, add the letter-space and word-space, and practice word groups.

Diagram the alphabet and numerals on graph paper; it will help you to picture the timing and proportion of what you are sending. If the total time units is *odd,* you will have made a mistake in combining the five groups. All letters, numbers, and punctuation require an *even* group of time units. All code groups require a certain number of *keying cycles* (bauds divided by two), and all keying must come out to a prime number of keying cycles. Don't worry about it until you get above 50 words per minute. The only time it

(*Conquer further on page* 56)

SOLVING THE

Continuing the series on the bugaboo of the serviceman,—the intermittent,—the author describes some more of the places where to look.

Typical Locations

A DETECTIVE, following a known criminal, must stay within striking distance until the fugitive can be arrested "with the goods on him." It is the same with a serviceman seeking out the source of an "intermittent"—he cannot make a replacement unless the trouble has been isolated while the closely-guarded set has been "caught in the act." A repair made under any other conditions is a gamble.

All repairmen who have had an "intermittent" chassis on the bench while it refuses to "intermit" know how strong becomes the urge to mash it with a brick. Like the doctor who threw cold water over each patient upon his first call—because he knew how to treat chills, but nothing else—the serviceman feels that, if the set could only be broken down, repairing it would be simple.

This natural urge has given birth to various "egging-on" methods. There is the "over-voltage" method—during which the serviceman, starting from 120 volts input, raises the pressure until something gives way. Whatever goes bad is replaced with the hope that the cause of the "fleeting fade" is the component that burned out.

There is the mechanical, or hammer, method of precipitation, which involves bouncing the chassis and speaker up and down on the workbench—the height of the excursion varying, not with the weight of the set, but with the extent of the bouncer's tantrum.

Then there is the "trial by fire," which introduces an abnormal degree of heat into the chassis by means of some unnatural outside source. The thought here is that the errant part must be sweated into confession.

These three methods have some basis in logic, since all "intermittents" are caused by:

Voltage failure,
Heat failure, or
Mechanical defect;

and although one case (say) in fifty might reveal its origin as a result of brute force, I am against the use of these overloads in routine repair work.

Operating the set at an unusually high temperature will certainly bring out—or cause—*some* failure, but the odds are two to one against the serviceman guessing which of the three types of failure is to blame. He is playing with fire, and the odds against his locating both the cause of the "intermittent" and the point of weakest resistance to heat in one and the same component are too great to be practical.

Even if it were possible to locate the trouble by "trial by fire," there is always the danger of introducing other latent sources of trouble within many components. It appears that the cure is worse than the disease, and that the repairman would best serve his customer by continuing the heat treatment to its perfect ultimate by throwing the whole job into the furnace.

Intentional heat, voltage, and mechanical overload may have their place in a factory or laboratory, where all conditions of test are under positive control—but there are better means of locating trouble in the repair shop than by a mixture of hope and random abuse.

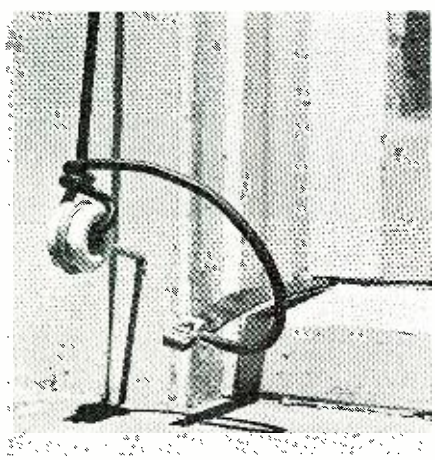
The serviceman's best bet is to *observe every feature of the customer's installation while he is in the house,* and to *preserve every possible condition to which the set is subject in normal home operation.* Both of these precautions serve to make it easier for him to locate the one fault in which he is concerned—the one which made the customer call him. While the set owner might not know any of the technical considerations behind an "intermittent," he is no fool when he uses his ears; he will know immediately if the original fault is still present if you muff the job and replace the wrong part. So—nurse the set with extreme care until the source of trouble is found.

The problem, after the set is in the shop, is to simulate *normal* operating conditions. (Of the total number of 'phone calls to service "intermittents," the majority are caused by the antenna system; the window-strip being the most frequent offender. Just now, we are concerned only with the chassis faults.) A simple voltage test for the type of fade which occurs in the customer's home when a light switch is snapped somewhere in the block can be made by producing similar surges with a flasher near the set. The resultant surge is harmless because it does not cause overload; it simply saves time by "lumping" a month's clicks into a half-hour.

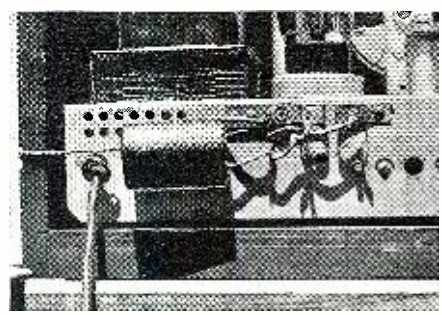
A simple procedure for heat test that has frequently been helpful is to retard heat dissipation from the chassis by laying a newspaper over it. Ventilation is slowed down; the set operates at a temperature close to that in the customer's semi-enclosed console, and there is no danger of abuse. What little difference there may be between ambient temperatures in the shop and in the home is small compared with the normal operating temperature.

Mechanical shock may be simulated by prodding with a non-metallic dowel, by bending, or by snapping. The tyro usually tries this method first, poking everything that juts out from the chassis, and turning to some other method when the first fails. Considerable experience must go into prodding: each set part requires a different treatment. A tap on a carbon resistor might indicate fault, but the same one on a wire-wound unit would be wasted. A 27 in one socket would sound differently when it was struck than the same tube in another socket. Only training will determine what to listen for; but until you have become experienced, raise the volume control, tune between stations, and strike thoughtfully, slowly, and thoroughly—not as if you were d'Artagnan fighting himself out of a tough corner!

You will find that, as your experience increases, these methods will become simpler, and you will turn to the most probable sources without deliber-



Faulty lead-ins are common sources.



Antenna transformers cause them, too.

INTERMITTENT

by "TESTER" BRADLEY

ate thought. For instance—there is one *Lyric* model which, if bolted a certain way in the cabinet, will cut off and squeal. If the chassis is sprung a certain way, the tuning is affected. Simple? Sure—but the first one I came across took three embarrassing trips from the customer's home, and was located only after I swore to live with the set until the trouble came to the surface. After that, I loosed all *Lyric* chassis bolts with the juice on, and have saved myself and the people who hired me a lot of headaches.

All "intermittents" are simple—*after* you have located the cause! The recognition of typical sources is valuable in every job; it is a time-saver, and it is the means of positive repair which will gain good-will by distinguishing you from your competitors. Let's look at some of these typical sources.

First, I believe that instruments play too great a part in starting "intermittents" in the shop. (Before some meter manufacturer mails me a time bomb, let me repeat: STARTING them. Once the condition is established, use whatever meters you find most convenient.) This does not mean that an experienced repairman should tackle an "intermittent" with his bare hands; it does mean, however, that a little knowledge and thought as to the commoner causes are more useful than a meter which is used only as a sop to one's confusion or inertion.

Typical of mechanical failure is the cold-soldered joint often found on voice coil or r.f. coil lugs. The fine wire makes factory soldering difficult, and when the enamel is improperly removed, a cause of future trouble is created. For a short period some years ago, *AK* experienced trouble from more than their share of such connections. They are not, of course, found in only a few sets; such trouble may be found in any radio receiver, and the blame is one of undetected production peculiarity rather than neglect in design.

When the cold joint is in the voice coil leads, all chassis voltages check normal. If speaker hum is heard during the bottom phase of the fading cycle, these wires are due for inspection.

Loose strands often short at the ends of shielded wire, or cause repeated cut-offs when the middle of the wire is punctured. The *AK 46* has such a shield between the antenna post and the volume control. Test by bending it, or by disconnection and replacement with a jumper. Visual inspections are seldom worth while. (Fig. 1)

The *Columbia SG-8* (Fig. 2) sometimes presents a typical failure. Its r-f chokes short themselves out by voltage breakdown, and the set delivers a much lower volume than normal or cuts off completely. (Grid-plate capacity across the *24* usually allows the set to operate at low volume.) Press each choke as if you expected it to bend; these coils return to normal when the short "burns itself out," and sometimes, either by physical or electrical test, the condition can be artificially induced. Replace them all if there is any reason to suspect them as a source.

A common "intermittent" source is found in many of the older *Philcos* which used the type of bypass shown in Figure 3. There are various interpretations of the reason for trouble in these units, but it is fairly certain to say it was a temporary manufacturing defect which was quickly remedied by a change of specification in the later replacement parts. In working on these sets, it is a good idea to press each rivet firmly with the set running, and to move each lead at the point where it enters the eyelet, in order to isolate the bad one. The customer usually notices an abrupt shift in volume when a light switch is snapped on or off.

An interesting shielding peculiarity shows up on the *RCA R-121*, a 6-tube, 2-band super. It cuts on and off if the shield is improper around the i-f *58;* it cuts off completely if the shield is removed. The socket layout is shown in Fig. 4. When a customer moves, he often takes out tubes and shields, and forgets to replace them all. I don't suppose any serviceman ever gets experienced enough to spot a missing tube cover on any set. This being so, it is good practice to look for a telltale mounting rim around the tube socket if the customer is in a new home with a blocked set showing normal voltage readings.

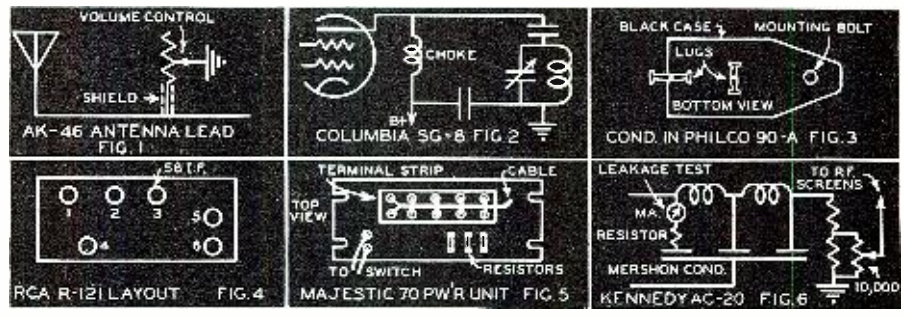
The terminal strips in sets which have a power supply-to-tuning chassis loom terminated in a multiple contact wafer—such as the *Majestic 70* strip in Fig. 5—fade when the connection is not electrically perfect at the power pack. The condition is usually evidenced by a slow rise and fall in volume, following contact and interruption in the filament leads. The trouble often follows re-installation after a repair job, when a serviceman mistakes a good mechanical connection for a good electrical one. To check for the point of trouble, press the edges and center of the contact strip *before* loosening the nuts. After the trouble has been isolated by watching the tubes go on and off, remove the strip, tighten the lower nuts, and replace the terminal assembly.

Heat and voltage failure are often related. The familiar copper-colored *Kennedy AC-20*—which uses a 3-section 8-mike Mershon—presented one such case when it was brought in on a fading complaint. The customer said that operating the set was a gamble: "You snap the switch—maybe the set plays, and maybe it doesn't." The power switch was snapped off and on repeatedly, and the trouble was found to be a result of improper healing in one section of the filter condenser, as indicated by leakage current through a milliameter connected as shown in Fig. 6.

This trouble is more common to the condenser than to this model set; the *20* stands out in my memory only because I delivered it too quickly. The owner called me back after two days, reporting another "intermittent"—or the same one—and I found a creeping short between turns on the voltage divider. My exuberance cost me plenty; when the resistor went out, so did my prestige!

One voltage failure which has a relation to many other sets was found on the *Silver-Marshall 35A*—a 9-tube superhet with a 10-wire cable between power chassis and tuning chassis. The

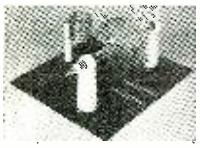
(*Search further on page* 56)



Common sources of intermittents.

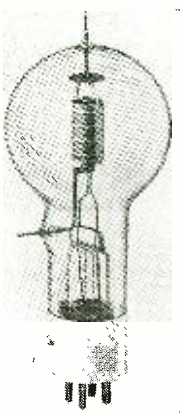
What's NEW in Radio

The Lindberg Manufacturing Co. of 1848 West 14th Street, Chicago, Illinois, is now manufacturing a high efficiency coil and condenser combination designed for the ultra-high frequencies. Known as the High "Q" Loop, this unit features simplified tuned circuit construction affording a minimum insulation loss on both 5 and 10 meters. The assembly consists of an air-wound inductance coil of stiff copper wire supported at its center tap by an Alsimag insulator. The ends of the coil are sweated to a pair of circular copper condenser plates. These have holes in their centers through which a pyrex tube passes. The tubing, together with two shorter pieces which fit over the first mentioned tube, form a compression arrangement for the circular condenser plates. Adjustment is accomplished at the end of the tubes, inasmuch as the inductance coil itself acts as a spring, the condenser plates are forced outward, which counteracts the inward thrust of the pyrex compression tubes. These units are available either for 5 or 10 meters.



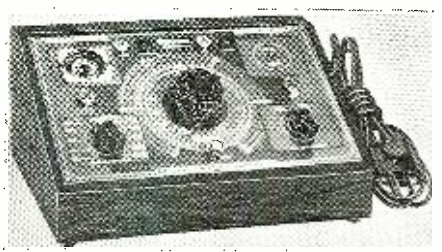
Sprague Products Company of North Adams, Mass., announce the introduction of their type DR condensers which are of the can type, in addition to the Type RP rectangular cardboard container condensers. The manufacturers claim that the actual capacities are from ⅛ to ½ those of dry electrolytics in the same size container. Leakage and power factor are extremely low. No polarity has to be observed. Thus, the new paper units are unexcelled as dry electrolytic replacements in the high voltage P. A. systems, power amplifiers and high voltage filter circuits. Types DR (inverted can types) are available in four capacities, 4, 8, dual 4-4 and dual 8-8 mfd. All are conservatively rated at 600 volts working. Dimensions of an 8 mfd. can Type DR are 4⅜" high x 1⅜" diameter. List price is $1.75. An 8 mfd. Type RP is only 4⅛" long x 1⅜" high x 15/16" wide.

Eitel-McCullough, Inc., San Bruno, California, have brought out a new transmitting tube known as the Eimac 75T. This tube is a radiation cooled triode designed especially to develop a high power output while requiring a low voltage on the plate. The 75T has an entirely new feature in the form of a heat shield directly over the plate. This shield acts as a control to protect the plate-lead seal from excessive heat. Straight line construction provides a great improvement over the conventional type tubes in that interelectrode capacities are extremely low and electrical efficiencies are greatly increased. Short, straight leads go from grid and plate directly through the glass bulb. The use of a rugged five-volt thoriated tungsten filament permits extra high power operation. Tantalum elements, specially treated by the exclusive Eimac process, insure long life and trouble-free performance. The tube is designed for vertical mounting and ample ventilation should be provided.



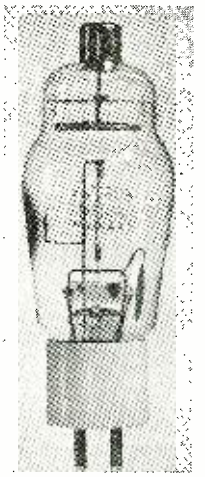
Stewart-Warner Corporation, Chicago, Illinois, has just introduced its 1940 radio and television line to the Trade. Among the 15 new models is the introduction of three plastic sets bearing reproductions in full color of recent photographs of the Dionne quintuplets. Model D7-513-1Q is constructed along the modern lines followed by most of the manufacturers with the addition of the reproduction, which is located on the top of the plastic case. Incorporated within the new models several exclusive features in construction and design are to be found, according to the manufacturers. A television receiving set has also been perfected and is now offered to the Trade.

Radio City Products Company, 88 Park Place, New York City, presents a new addition to their line in the form of RCP Model 660, which is an Electronic Multitester. This instrument was designed for industrial laboratories and for those servicemen aware of the importance of being properly and completely equipped. The vacuum-tube Volt-Ohmmeter, Model 660 has voltage readings as low as 0.1 v. (full division) and as high as 6000 v. The ohmmeter range is from .1 ohms to 1,000,000,000. Maximum voltage used in the ohmmeter is 7½ v. The operator is protected by properly insulated terminals and the manufacturers claim an input resistance on all ranges above 6 v. to be 2 megohms and 40 megohms on 6 v. Model 660 is supplied complete with handsome hand-rubbed sloping walnut case. Further information on this tester may be obtained by writing to the manufacturer.

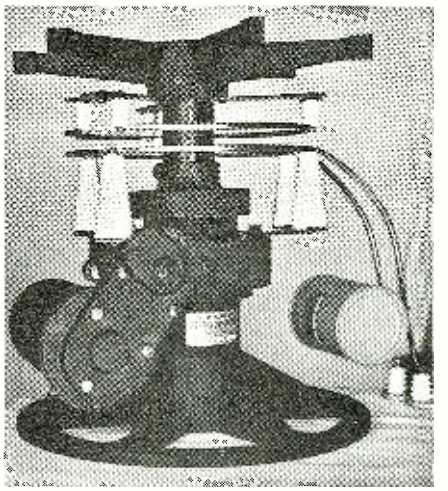


Operadio Manufacturing Co., St. Charles, Illinois, announces the Model 855 AR, 55 Watt Base Type Amplifier. Among the features included in this new unit are four channel input, electronic mixing of three microphone circuits simultaneously with phonograph or auxiliary input, volume compression, volume expansion, provision for remote controller, electronic visual overload indicator, electronic visual output level indicator, non-resonant equalizer used as tone balancer for both high and low frequencies, master gain control, six stages and thirteen tubes. A neon lamp in the top of the housing gives warning when a power tube becomes defective, thereby preventing damage that might result from a shorted output tube. The electronic eye in the center of the control panel, indicates accurately not only when the amplifier is being overloaded, but also the average watts output which is going into the speaker system. With the "percent power" control, one can check various percentages of power from the maximum down to the minimum. Specifications and further details may be had by writing Operadio Manufacturing Co., St. Charles, Illinois.

Hytronic Laboratories, 76 Lafayette Street, Salem, Massachusetts, present a low-power version of the popular 866 mercury rectifier known as the new Hytron 866 Jr. tube. This rectifier with plate connections at the top incorporates all the desirable features of the mercury vapor rectifier. An indirectly-heated cathode is employed for increased efficiency. The tube has a filament rating of 2½ v. at 3 Amperes. Two of the 866 Jrs. may be connected in series to replace on type 83. This tube will operate at a.c. voltages up to 1250 and a pair of these tubes will deliver 250 ma. It may be used to replace 83's now used in circuits having more than 500 volts. The 866 Jr. is not recommended as a substitute for the standard 866 because with a filament drain of only 3 amperes as compared with 5 on the 866, excess filament voltages may be applied when the 866 Jr. is substituted for the larger tube. Furthermore, the 866 Jr. has only half the current capacity of the standard 866.



Mims Radio Co. are now manufacturing complete rotary-beam antenna kits for both 10 and 20 meters in the two and three element types. The units feature an inductive method of coupling the line to the radiator which eliminates the disadvantage from the standpoint of feeding the antenna with other methods. A special matching transformer is included to match a 2" line to the system. Heavy duty construction prevents damage from high winds and the use of an oversize shaft tends to hold the beam in a stationary position after it has been rotated to a given position. These kits are stocked by many jobbers in any of the four types and come complete with all holes drilled and hardware furnished. The kits are complete with the exception of the motor control wires and the feed line.



A direction indicator is designed to show the operator the position of the beam right from the operating position and is supplied as part of the kit. The rotator is designed for 110-120 volt, 50-60 cycle current. A suitable transformer may be had to operate the beams from a 220-240 volt source.

Bud Radio, Inc., 5205 Cedar Avenue, Cleveland, Ohio, have added a new series of midget low-loss transmitting type inductances to their versatile line of equipment. This series, known as "air wound" contains a selection of small oscillator and buffer coils which are intended for low power transmitter stages. These are mounted on glazed ceramic bases which fit into standard five prong sockets and are available in either

(*Continued on page* 62)

1940 Radio News "ALL PURPOSE" TRANSMITTER-RECEIVER

by KARL A. KOPETZKY, W9QEA and OLIVER READ, W9ETI
Managing Editor, RADIO NEWS Technical Editor, RADIO NEWS

The interconnection of the various chassis and the putting of the unit on the air, finishes this series.

ADIOMEN are prone to keep to the well-trodden paths, partly of necessity, and partly because of the fact that there seems no reason to stray. Their work is mostly concerned with alternating current voltage and high voltage direct current. The action of *high current,* low voltage direct current *emf* is more or less left severely alone. In building the RADIO NEWS "All-Purpose" Transmitter-Receiver the latter condition will have to be conquered, since all of the d.c. control circuit is in the primary side of the motor-generators.

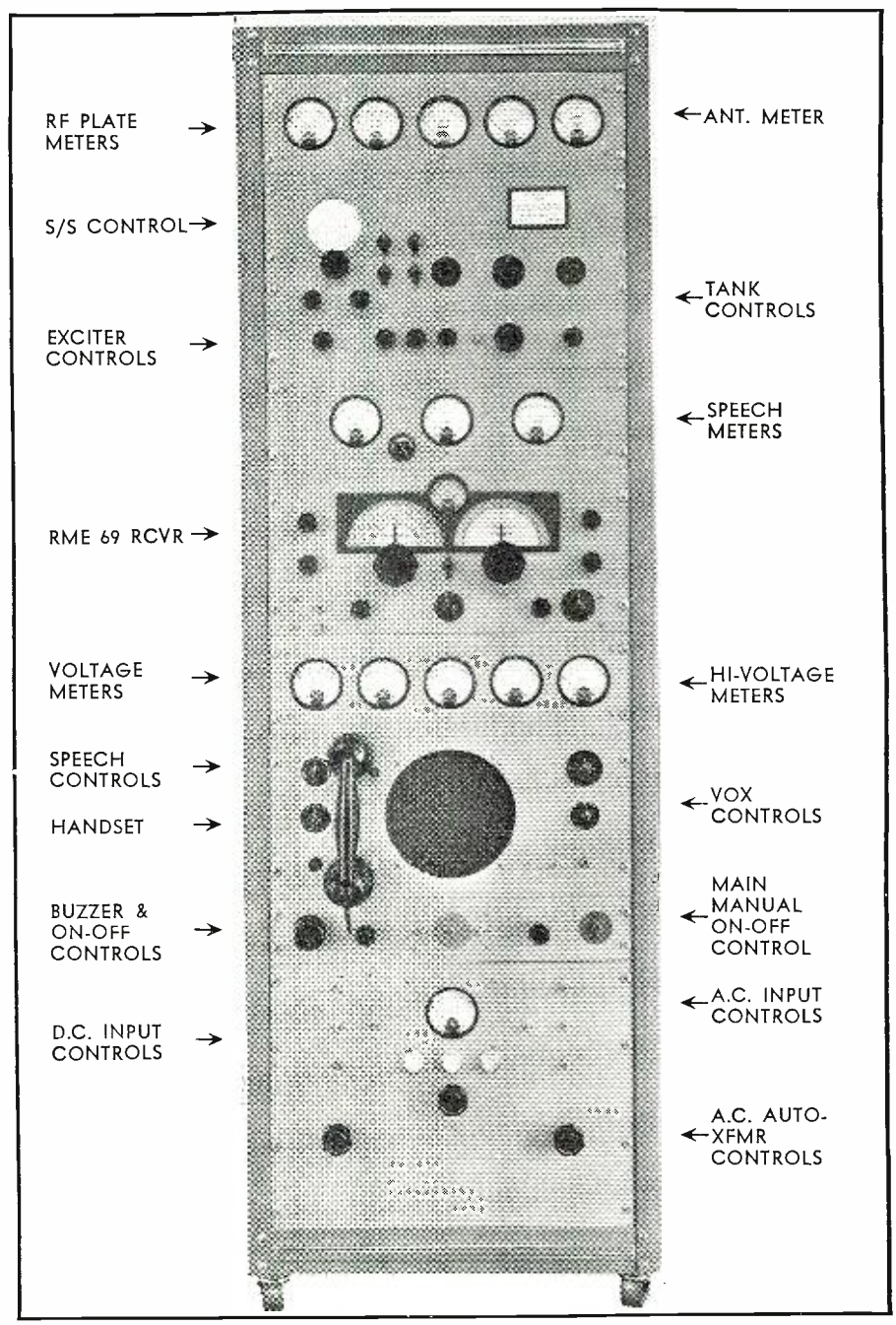
A kilowatt of d.c. generators draws considerable amperage from the line, and relays that would handle a kilowatt of a.c. with ease and without sparking, are devils with arcs, flashovers, and the like. Unless the relays act smoothly and without such electrical phenomena, the unit will fail at the very moment when it will be needed most.

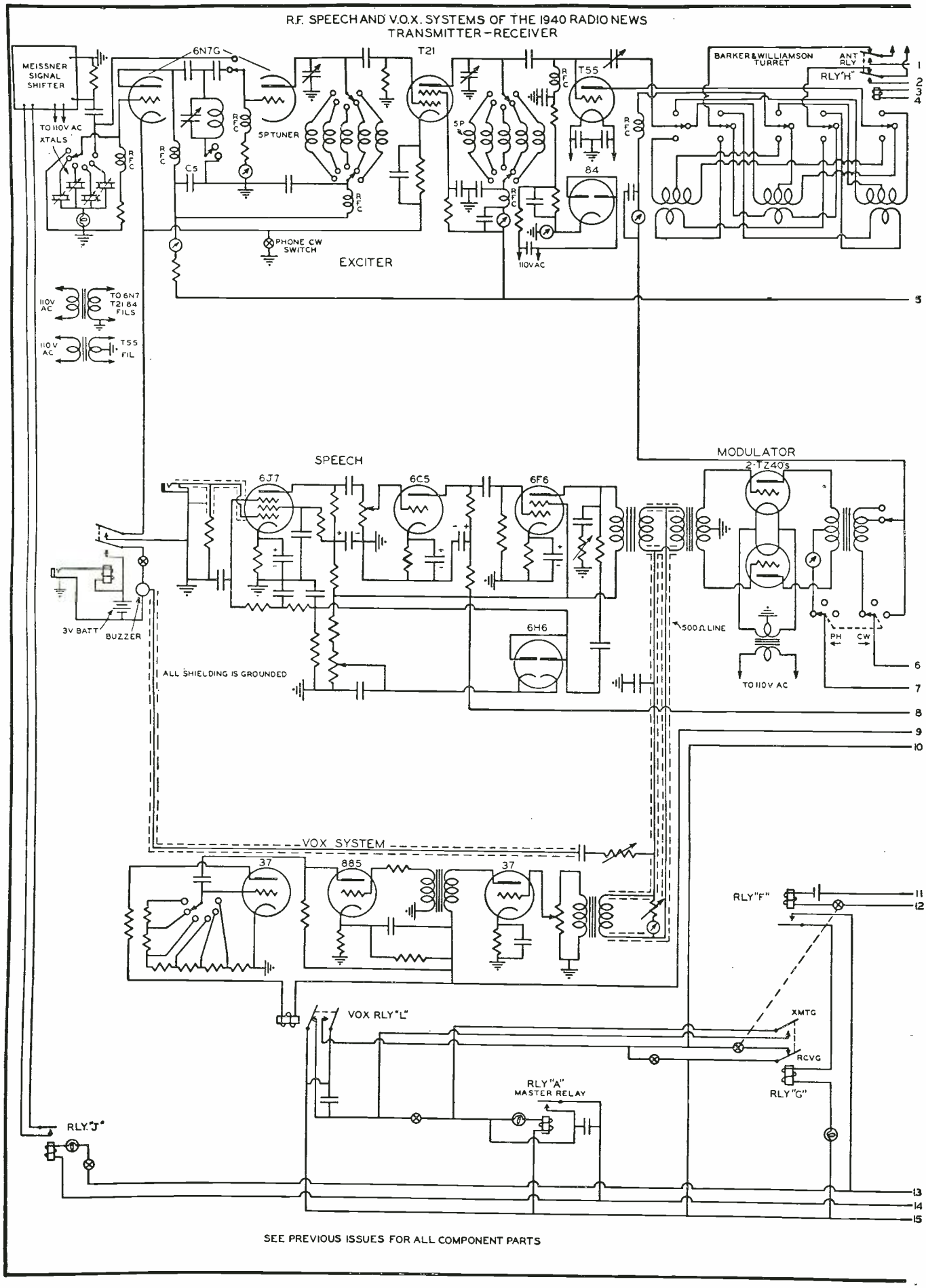
Control System

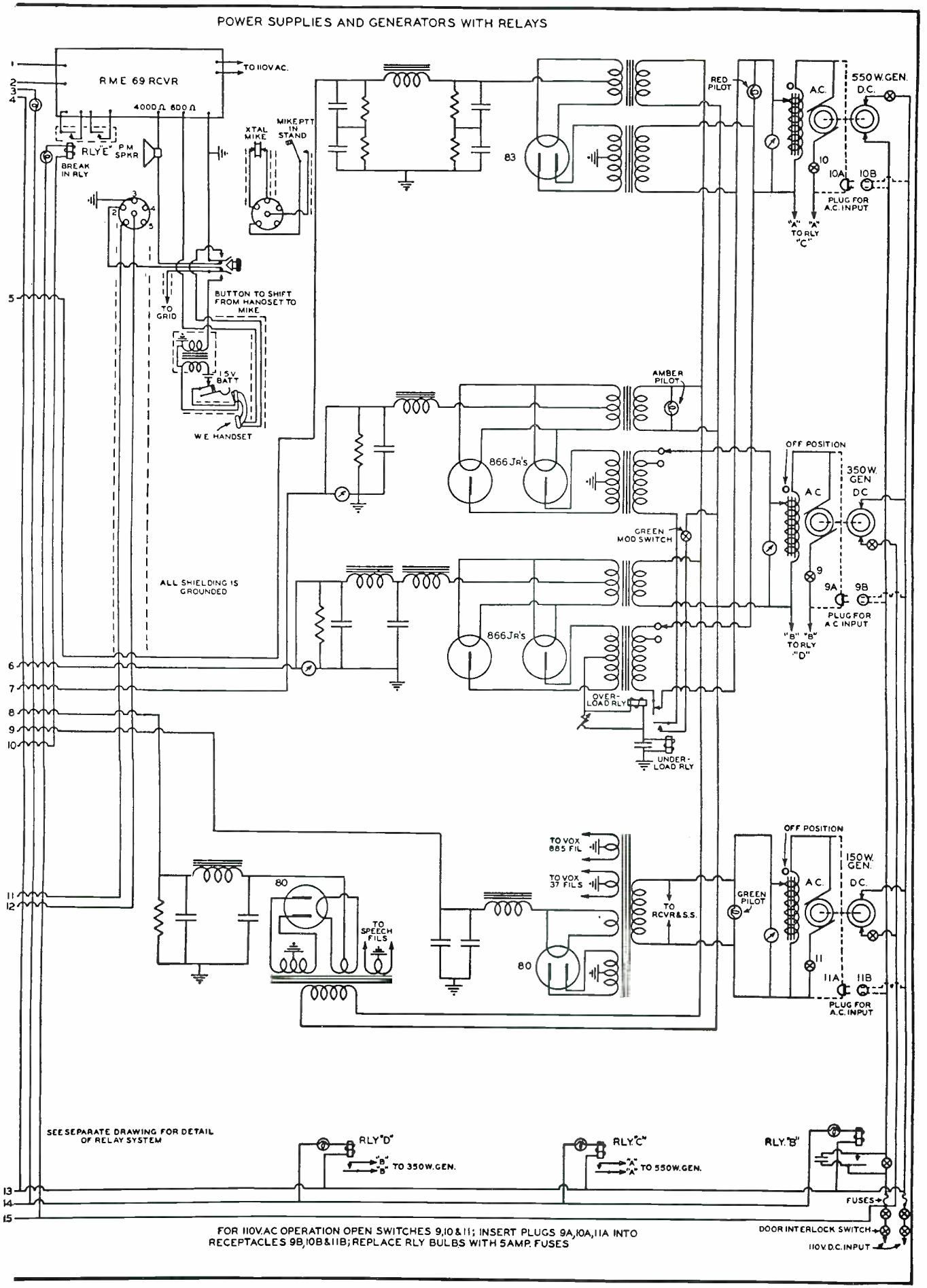
Having built all of the component parts, they should be mounted as indicated in the two illustrations. The *Control Relay Panel* contains the four main relays and it is from this point that the whole operation of the transmitter as well as the receiver is controlled. It will be found that Relay "B" will require a condenser of 0.5 mfd. across the contacts to prevent arcing. The same will have to be done with the transmitting contacts of the *VOX* relay and also the push-to-talk relay.

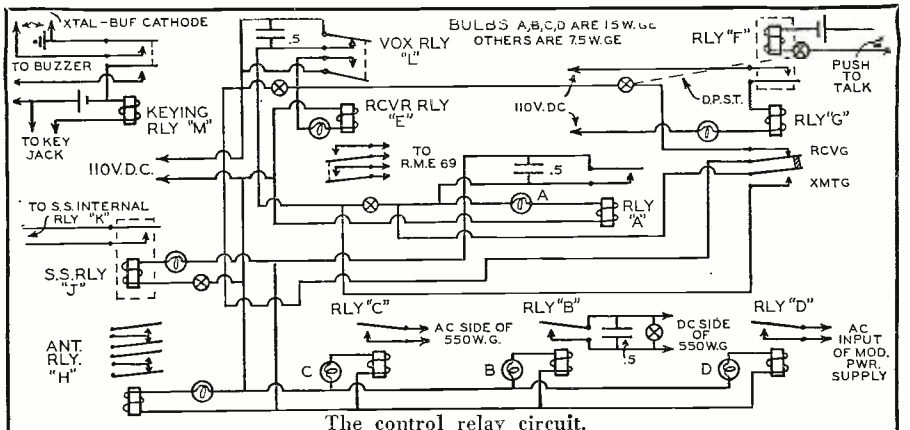
The value of the condenser is quite critical, since a larger one will cause the circuit to lag while the condenser discharges itself through one of the relays.

All wiring which carries the heavy d.c., low voltage, current should be of No. 10 gauge, flexible. We used 10 strands of No. 30 wire in a heavy cloth covering. All a.c. wiring should be done with No. 14 tinned copper, solid insulated wire (Consolidated Wire Co.). All high voltage, d.c. emf should be wired with high tension, rubber covered (No. 4027—Consolidated Wire Co.—Ignition wire), all wiring between chassis, which was not of the high voltage d.c., or the *high current* low



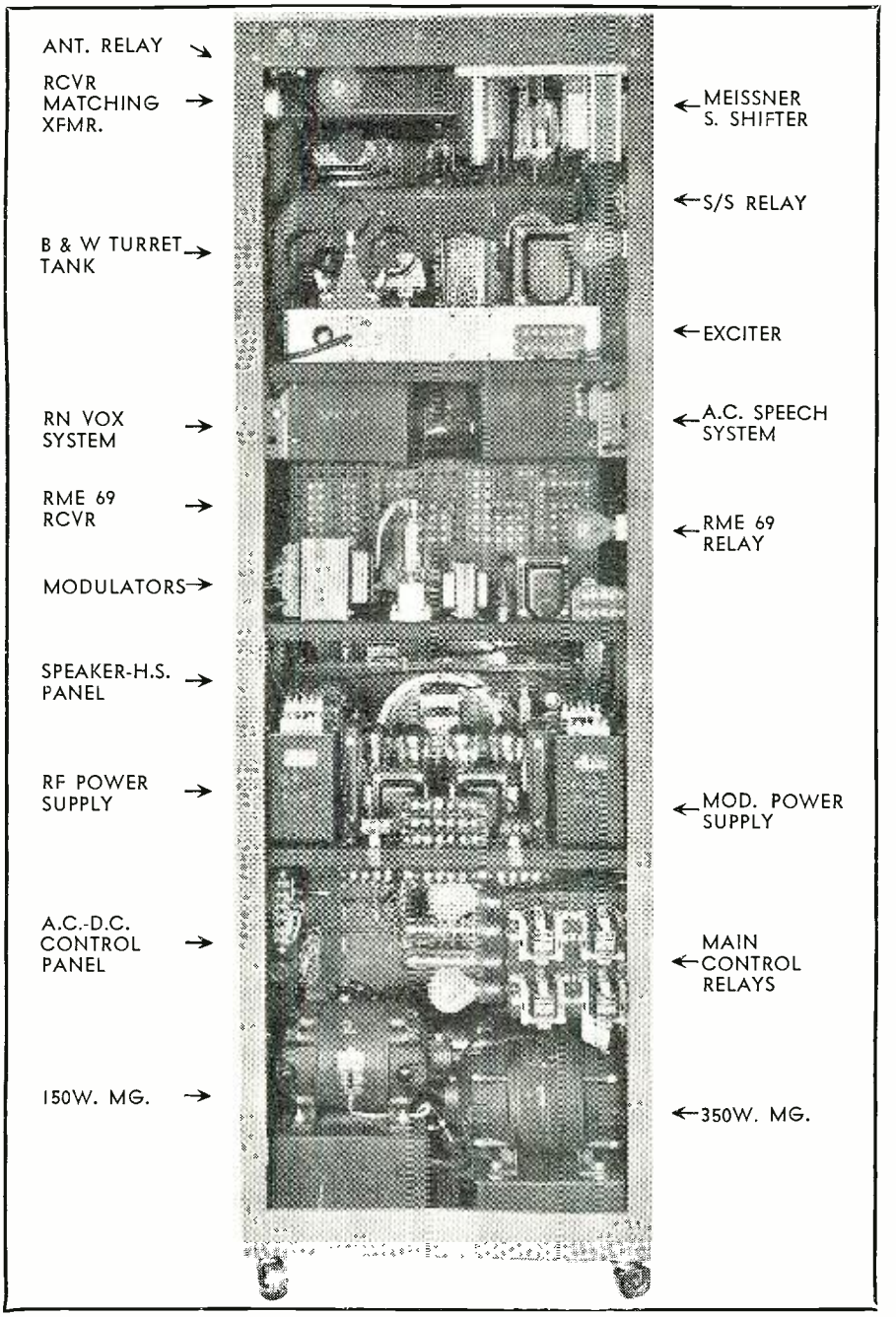






The control relay circuit.

Underload	*Guardian*	*"F"*	*Dunco RA-1*
Overload	*Guardian*	*"G"*	*Ward-Leonard 507-531*
"A"	*Ward-Leonard 81-103*	*"H"*	*Guardian Ant.*
"B"	*Ward-Leonard 81-103*	*"J"*	*Ward-Leonard 507-510*
"C"	*Ward-Leonard 81-103*	*"K"*	*Meissner Special*
"D"	*Ward-Leonard 81-103*	*"L"*	*Guardian 15-1000 A2B3*
"E"	*Guardian R-100*	*"M"*	*Dunco RA-1*



voltage d.c., should be done with twisted rubber covered pair (No. 18—Consolidated Wire Co.).

After trying many ways in which to interconnect the various controls (and there were some 300 of them), it was found that the best method was to follow commercial procedure and make a drawing of each chassis or control panel and give the connecting points individual consecutive numbers. By saving these as you worked along, it became a simple matter to match up the various outlets, following the diagram.

All shielded wiring is in a two-to-the-shield type, and the shielding was grounded at several points. The entire cabinet was then bonded together with braid, and the chassis interbonded with a single piece of braid running the length of the cabinet. After the braid has been installed, it should be run over with solder and an iron to make the braid solid, yet have a certain amount of give.

Testing of each part before installation is a necessity, since once installed, the amount of work to remove any stray "bugs" from the circuit becomes almost insurmountable. In using the relays on d.c., it was found that a 7½-watt bulb in series with the coil was exactly right for all but the larger control relays "A," "B," "C," and "D," which require one of 15 watts each.

After the whole has been individually tested and found working and installed, the control system is tried out without the 866 Jr. (Taylor) tubes in their sockets, and with one side of each of the power transformers disconnected. Testing is done as follows.

Apply the d.c. to the unit, and try the receiver relay by activating the correct manual switch. Then turn on the 160-watt motor generator. The green bulb in the base of the unit should light and the a.c. meter should indicate that the voltage is being delivered. Turn on the a.c. switch to the receiver and it, too, should operate. Now adjust the voltage by means of the auto transformer (Stancor) to 115 v. a.c. The receiver should bring in signals if properly tuned. Try the relay switch, and if it is working the receiver should go on and off.

Next start up the 350-watt generator and apply the voltage through the a.c. switch to the various units. Check to see that the filaments that are supposed to be lit, are actually lit. Turn on the speech amplifier, and the *VOX* system. Adjust the voltage with the auto-former to 115 v. a.c. Turning the d.b. meter control to the position that places the most amount of resistance in the circuit, wait for the tubes to heat, and then try the speech. Gradually increasing the gain, and reducing the resistance in the d.b. meter circuit, see if there is an indication on the d.b. meter. If there is, then a pair of headphones may be connected across the 500-ohm line and the quality tried out. It should be clear with plenty of sock. Try out the *QRM-avoidance* part of

(*Pse QSY to page* 49)

BENCH NOTES

by LEE WARD

Service Manager, San Francisco, California

That "Key" Problem

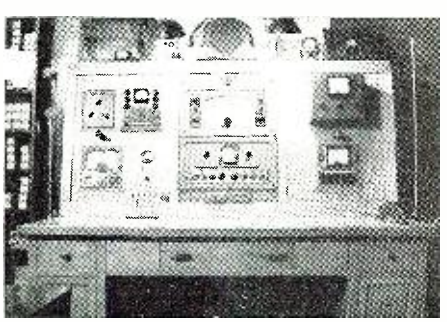
'N the July issue, this question was asked: "A man and a woman, - - on their way home from the movies, leave their house key with you, asking you to repair their set while they are out. Although you do not like the idea of working alone in a strange house, business is slow, and you need the job. What would you do?"

Two repairmen-partners I know have a novel method of solution to this problem of conduct: one of them, upon receiving the key, writes down the customer's name, address, and make of set on a regular call sheet. He wraps the key in the order, laying them both on a stock shelf while the customer watches him do it. While the set owner is out, the other partner packs tubes and tools in the truck in preparation for quick flight.

The customer usually drops in on the way home, and the first partner, pretending surprise when they see *the key has not been touched,* bawls out his co-worker for negligence, and orders him to get "over to Mr. Smith's house right away—he's been waiting for three hours!"

The scheme invariably works, and avoids the unpleasant and inevitable rise of suspicion which accompanies paper-work or special arrangement.

No customer, of course, should ask a serviceman to make a "blind" repair, especially if he is a stranger; neither should the store owner be put in a spot where he must trust the customer. It is the repairman who stands to lose in such conditions, and it is up to him to decide if he wishes to risk loss of a pay job in order to protect himself.



This fine setup belongs to the Herring Radio & Television Service. It is complete in many respects and it shows careful thought in its assembly.

I have heard stories of professional claimants who get ambitious tradesmen into their homes only to establish bases for lawsuits. It is probable, however, that most customers order "blind" repairs in good faith. But even then, there is the chance that the most innocently-intentioned customer may jump to unpleasant conclusions if anything is missing after a serviceman has been called in for work in an empty house.

A nearby serviceman once told me that—the day following a solo repair —the set owner came into the shop and demanded the return of his wife's ring! Things were prettily messed up for a few days; the customer threatened everything he could think of; and my friend answered him by saying things no businessman should *ever* utter.

The set-owner's wife spent a hysterical day in bed—until certain transpirations prover *her dog had swallowed the ring!*

Although the repairman escaped formal prosecution, he lost a customer. Since then, his solution has been never to work alone; he says he can't depend on *every* dog to have a silver lining!

Years ago, I was involved in a similar case. A wealthy real estate operator, whom I rated as one of my three best customers, and whose family I had known for years, suddenly cooled off after I worked on his set while he was out of town. It worried me, and finally—at a local get-together—I asked him point-blank what the trouble was. He turned his back on me.

More than a year later, he visited my shop with a bottle of wine and an apology. After that last job, he said, a hundred-dollar bill had been missing. He was positive he had placed it in a top desk drawer; it had been there for years, and no one else had been in the room. This particular greenback (or are they yellow?) was one to which he was sentimentally attached, because it was the profit he made on one of his first developments. Although I have been surrounded by conditions which prevented sentiment ever reaching three figures, I expressed sympathy.

He kept me on edge until we finished the wine, and then told me why he dropped over to see me: the bill had been scraped off when he opened the top drawer, and had fallen to the bottom of the drawer space, where he found it a year later.

This fellow pulled his punch because of our long friendship—but I get chills whenever I think of what dynamite could have been packed into the same occurrence had he been a stranger!

The Winnahs!

The serviceman who sent in the best solution, and who won a year's subscription to RADIO NEWS, was Otto C. Langfield, 589 Twenty-Second Street, Oakland, California. He has the customer sign an order for service when the key is accepted. He carries this order with him on the job, and requires no one to accompany him. The signed form not only protects him against damage claims following the call, but also serves as his written authority for being in the house if anyone questions his right to be there. It's easy to see how many an embarrassing situation might be relieved by this simple procedure. The forms may be printed or typed, and should read something like this:

I have requested the bearer, John Doe, to repair my radio during my absence on the date below. I hereby release him from all liability for damage which might result from his acts or omissions.

Customer's name .....
Address .....
Date .....

Serviceman D. E. Thomas of Somerset, Ohio, won a six months' subscription by being first to suggest a commoner expedient: having the customer arrange for a friend or neighbor to stand in your presence during the time you are at work.

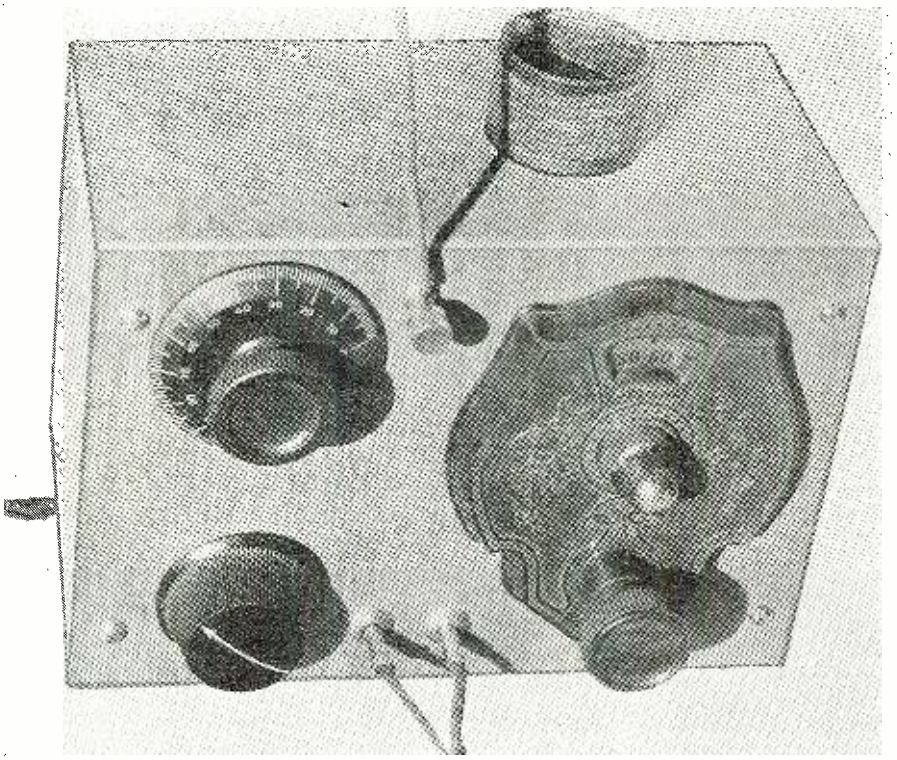
None of the letters recommended giving up the job because of the obvious risk. Some of the contestants brought up certain matters of law which probably would serve to protect the serviceman, but we are repairmen, not lawyers, and Nevada's presumptions might let us down in South Carolina.

Among the runners-up were James R. Pou of Courtland, Mississippi; Charles G. Shaffer of Olean, N. Y.; Casimir Peterman of Regina, Sask.; W. G. Oldham, Jr. of Montebello, Calif.; Earl Price, Jr. of Honey Grove,

(*More Bench Notes on page* 62)

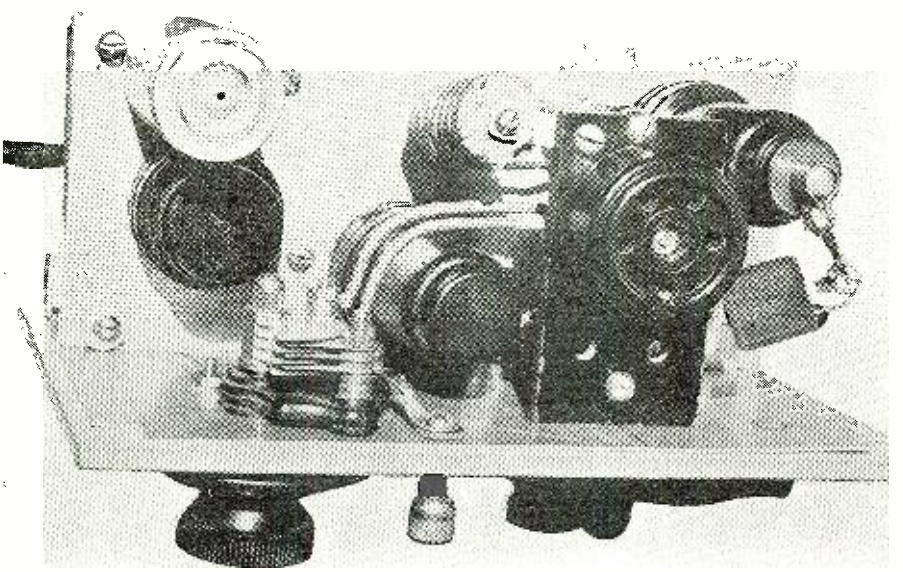
TINIEST HAM RECEIVER

For something to take on that hike, or to school, try building this 9.5M-700M mighty radio midget.



A bandset dial plus a vernier and a volume control are all that are used.

Simplicity itself is used in mounting the component parts.



THIS little all-wave receiver is just what you need to take on trips, away to school or to listen to special frequencies that your regular receiver does not cover. It is a good general purpose headphone receiver.

The antenna coupling arrangement gives the receiver a range from 10 to 700 meters with only six coils, and yet the tuning on the highest frequencies is not critical, as the tuning condenser is not exceptionally large. You can listen to the amateur bands, to broadcasting stations and even sit-in on SOS traffic on 600 meters.

The antenna condenser gives satisfactory coupling at its maximum capacity for the longer waves while the circuit oscillates to 30 megacycles.

The coils being wound on 5-prong forms provide an extra unused tap which is connected to the antenna post. Then, if necessary, with short temporary antennas the tuning condenser may be wired directly to the antenna or a fixed condenser may be wired in the coil in parallel with the antenna condenser.

The largest coil is a standard broadcast coil mounted on a bottom sawed from a 5-prong tube base. A small mica condenser is mounted on it, and a small miniature blade switch installed on the coil (after the photo was made) to cut the fixed condenser into or out of circuit, to extend the range to 700 meters.

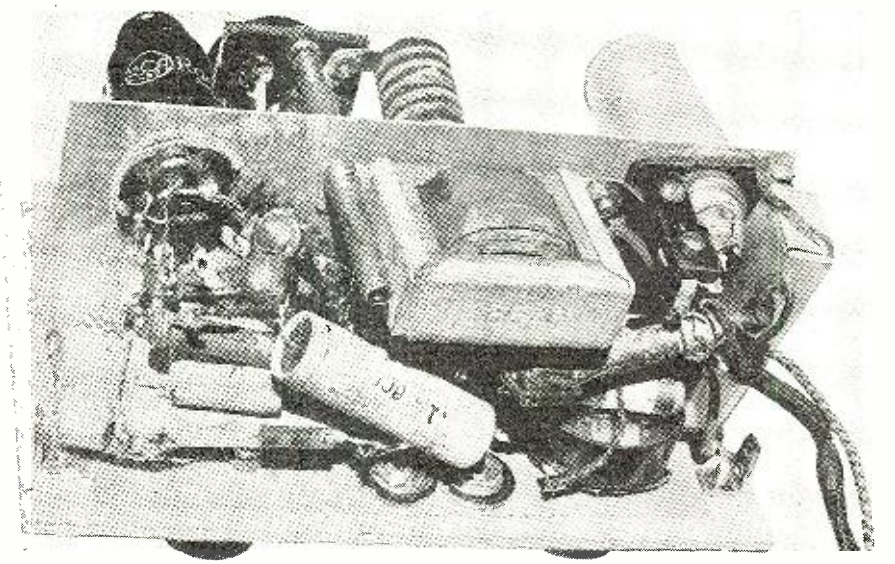
After the proper size condenser has been found, it is mounted inside the coil. A capacity of about 100 to 120 mmf will do the trick.

If it is desired to listen to the longer wave stations in preference to the very short waves the grid condenser capacity may be doubled and a .0001 mfd condenser wired in parallel with the antenna condenser, but it will be found the capacities given work very well over the wide range, if all specifications are followed.

The 6K7 detector, which is used in preference to the 6J7 because of its smoother operation, and better behavior in loud signals is resistance coupled

By
EDWARD
LINDBERG

Sherman, N. Y.



Underside the chassis shows the easy wiring job.

to the 6C5 amplifier. The plate resistor is somewhat smaller than ordinarily used, but the value given was found to be the most satisfactory with the low-plate voltage.

The 6H6 rectifier has its elements paralleled to double its 4 mil rating, and is by-passed to eliminate tunable hum. As the receiver only draws about 3 mils, this little tube gives excellent service. The 5,000-ohm resistor cuts down the line voltage to the 6H6's rated 100 volts.

The 4 mfd. condenser may be replaced with an 8 mfd. unit if hum is too apparent, but the 4 mfd. value puts less strain on the rectifier.

The parts under the sub-panel are rather closely packed, but this is because the parts used are larger in size than necessary. By using parts of no greater rating than given in the list, there will be ample room.

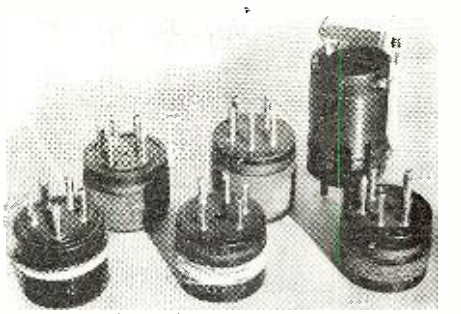
The r.f. choke is a home-made pie wound unit but good r.f. chokes are commercially available if one does not desire to make it.

The panel is shielded by aluminum behind it. This shield is in two pieces, the lower part being an extension of the sub-panel bent down. If desired, the inside of the box may be shielded and a shield mounted over the coil, but the panel shielding is sufficient to eliminate body capacity. The two parts of the shielding are connected together by wires bolted to the parts.

The panel is held to the box by four small angle brackets, each having two tapped holes. Flat-head screws in the box and round-head screws through the panel engage the brackets. The various panel parts not connecting to the shield are insulated by enlarged holes in the shielding and by using insulating washers.

The coil socket comes up to the surface of the box, a hole for the coils being cut in the top surface. The coil socket is supported by a bakelite strip fastened to the panel at the front and mounted on a pillar on the sub-panel at the rear. The pillar is tapped at the bottom and a threaded rod passed up to it so that an extension pillar may be fastened below and furnish support by continuing to the inside bottom of the box.

Placement of wires in a compact receiver is very important. Twist the heater leads and run them as shown in the drawing to minimize hum. Keep

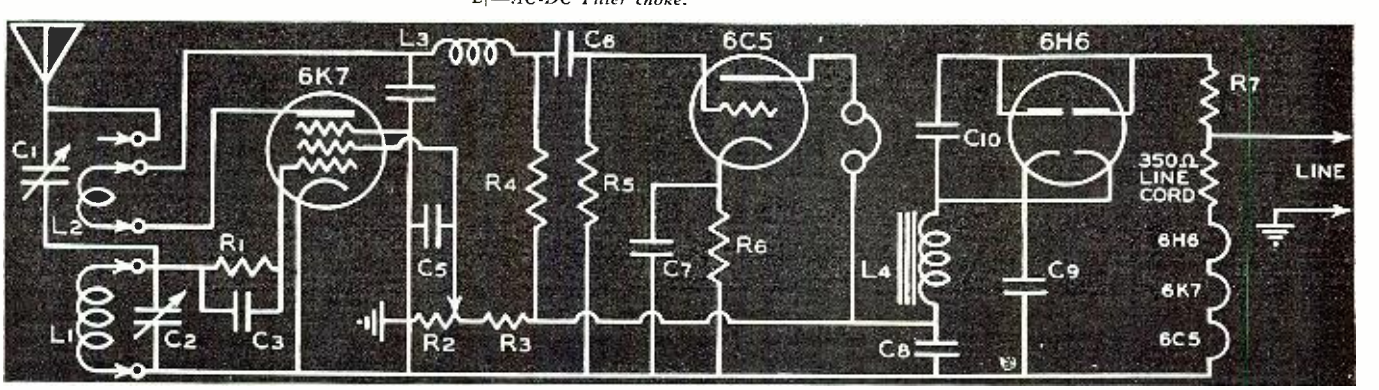


This set of small coils takes up very little room in your pocket.

them down near the sub-panel. Arrange parts so that signal leads are short and direct. Bond all grounds. It will be noted that the negative power line is grounded as it comes in and then continues over the 6K7 grounded heater terminal. These provisions help insure quietness.

Use a good vernier dial for the tuning condenser and a small 2-inch rheostat dial for the antenna condenser to permit lagging. A pointer knob is good for the regeneration control. —30—

C_1—*5 plate midget var. cond. 25 mmf.*
C_2—*23 plate midget var. cond. 100 mmf.*
C_3, C_4—*100 mmf. conds.*
C_5, C_6—*.1 mfd. 200 v.*
C_7—*1 mfd. 200 v.*
C_8, C_9—*8 mfd. 250 v. Electro cond.*
C_{10}—*.01 mfd. 250 v.*
R_1—*3 meg. 1/4 watt.*
R_2—*50,000 ohm pot.*
R_3—*.25 meg. 1/2 watt.*
L_1—*AC-DC Filter choke.*
R_4—*50,000 ohm. 1/2 watt.*
R_5—*.3 meg. 1/4 watt.*
R_6—*1250 ohm 1/2 watt.*
R_7—*5,000 ohm 1 watt.*
L_2—*RF choke.*



Serviceman's Experiences

by LEE SHELDON
Chicago, Illinois

The possibility of a fatal shock is something that every serviceman should consider,—and know how to treat.

THERE is a furniture store across the street with which we maintain a reciprocal merchandising agreement. *Salutary Sales & Service* will sell no table lamps as long as *Crouch's Couches* don't carry radios. We get some pretty good repair jobs from them now and then, and I make a habit of dropping in on the boss every day on the way back from lunch.

"High, boy," he greets me.

"Low, boy," I respond. "Got any work for me?"

"No," he answered on this particular day, "but my lights are out. Want to fix 'em?"

"Sure," I said, little realizing what a trip to his basement would lead to before the calendar changed. I replaced the fuse, crossed the street, and tried to sneak into the back of our shop without Al seeing me. But he sensed something unusual from my furtive manner, and stopped me with:

"What's the matter? You act as if you had just sassed your mother-in-law!"

There was nothing I could do but stop and face him.

"Jeepers creepers!" he exclaimed, "where'd you get—"

"In the line of duty," I interrupted hotly, "and I shall resent any flip comment you might make concerning them. Haven't you ever seen a black eye before?"

"Yes—but never two so large, and so evenly matched," he answered. "If you painted rims on them, they'd look like sun-glasses. What happened—did you run into *two* doors?"

"I was following some of your silly advice about the precautions to be taken when working around electrical equipment," I replied. "Remember that stunt you told me to use when I tested for unknown voltages? You said it was dangerous for a person to hold his fingers across two conductors as if he was ringing doorbells, because if the juice caught him, his contracting arm and finger muscles would make a better contact. So I did it *your* way—I turned my hand so the palm faced me. Then, just as I had my knuckles biased for anything up to 120 volts, I came across 240. You and your lineman's tricks!"

"What happened?" he asked, as if it wasn't obvious.

"Naturally," I said, "my muscles contracted."

"Did that break the contact?" he asked.

"Too well—my hand changed into a fist and I hit myself smack on the nose! And right *on* the nose, too!"

Al is the coarse type of fellow who laughs at such incidents.

"You could have used *one* knuckle," he said, just to rub it in, "and 120 would have been the most you could have got no matter *what* you touched in a 3-phase supply. Or you could have carried a test lamp. Things might look black to you just now, but a sock amongst the face is better than a lily athwart the chest!"

"Sure," I said, "but I blame you for what happened. If you hadn't told me about the knuckle trick, *nothing* would have happened."

"No—nothing you could remember," he replied. "By the way, Lee—did you glance through that first aid booklet I brought in for you?"

"Of course not," I replied. "Resusciation is a bridge I intend to cross after I come to it. In the meantime, I have more important bridges to cross—bridges with a more direct connection to our food supply!"

Al shook his head to express extreme tolerance. "He jests at swoons who never smoked a cigar," he corned. "What good is food when you can't taste it?"

"You're getting excited about things that never happen," I told him. "Usually, you're yelling at me to become a better serviceman, but now you want me to be a trained nurse. Make up your mind—is *SS&S* to continue as a radio store — or a hospital?"

"Life is more important than livelihood," my partner replied, "and it might interest you to know that the time I have spent studying first aid methods is for *your* safety. In other words, I am considerate enough to learn how to take care of you if *you* ever made a high voltage mistake. What would you do—right now—if I were shocked into unconsciousness?"

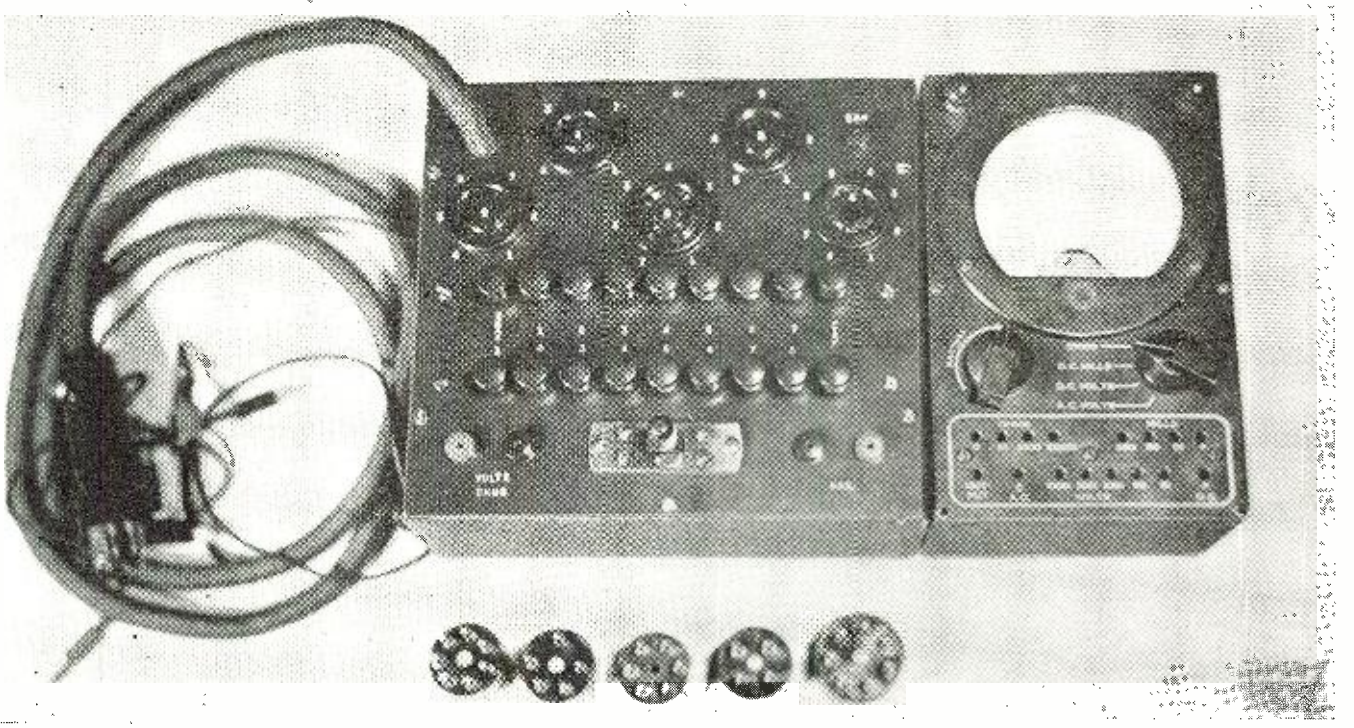
"I'd 'phone for a doctor," I said, "one who didn't sit up nights worrying about what he'd do if his radio broke down!"

Al looked at me sadly. "You'd be useless unless you had prepared for the emergency," he said. "Why don't you study up on the stuff? You're the sort of bloke who'd lock himself in a lion's cage before you asked if he was herbivorous."

"Worry more about business," I replied, "and be satisfied to safeguard your life with ordinary precautions against electrocution. This conversation is so much wasted time—I'm

(*More Experiences on page* 60)

THEY'LL DO IT EVERY TIME! **by HATLO**

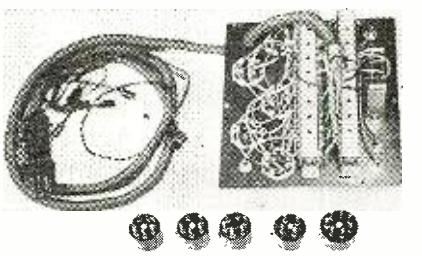


The unit is thoroughly commercial in appearance and use.

Free Point Analyzer Un

by RALPH L. STEARS
Findlay, Ohio

Every serviceman will want to use a free point analyzer unit. This one, which won 2nd prize in the RN cash contest is a dandy. Build it!

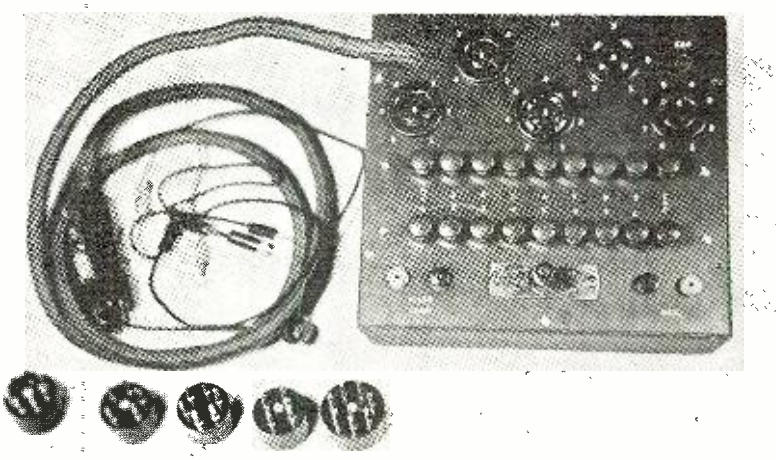


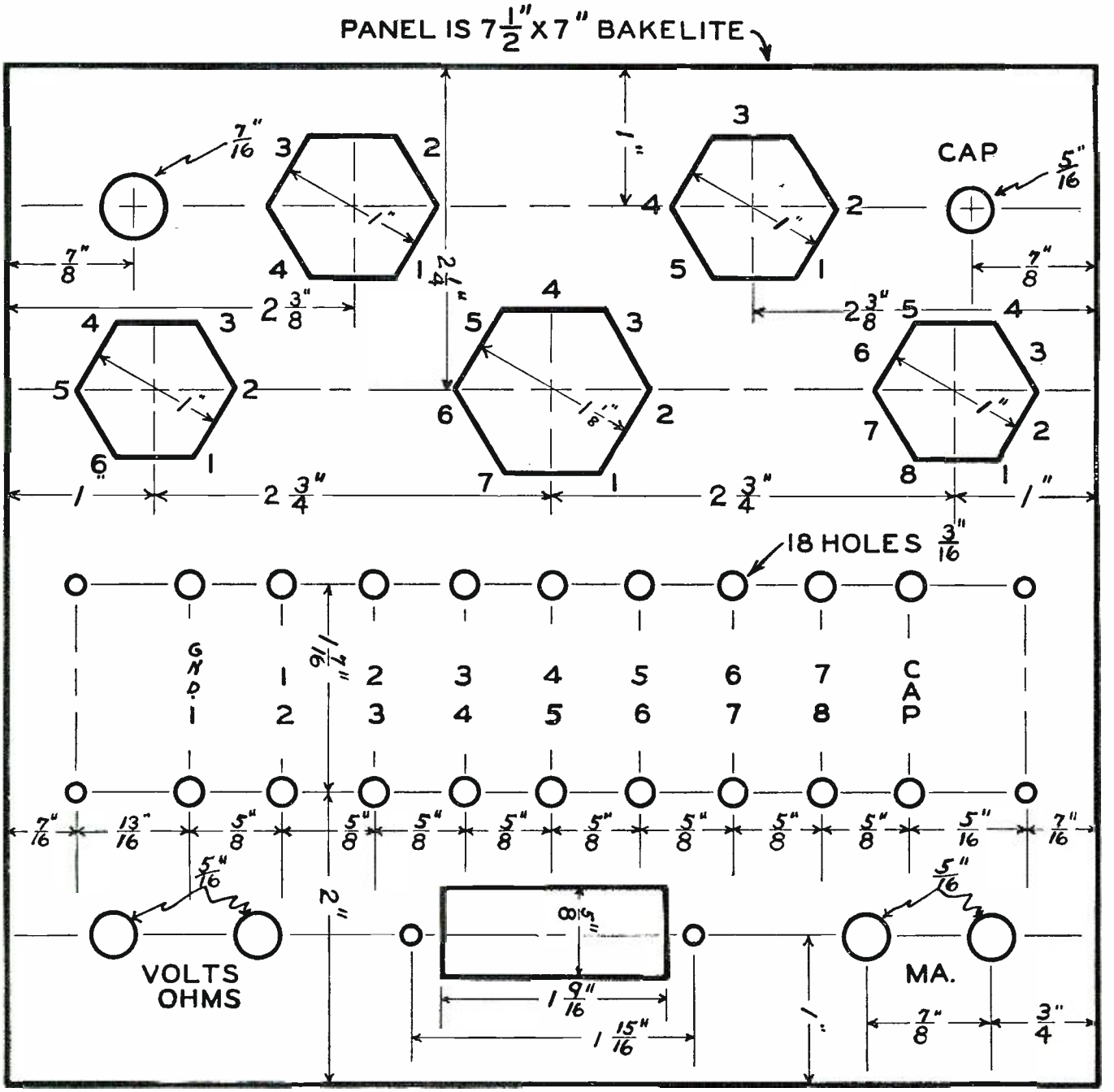
The wiring is not as hard as it looks, if directions are followed.

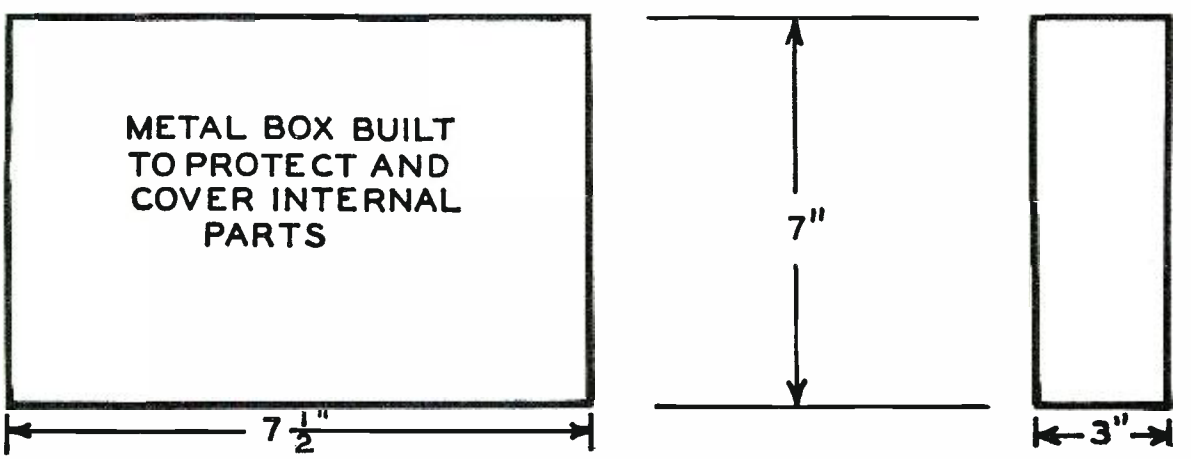
A complete tube tester with *RMA* numbered sockets is also included.

IN THIS article is described what is believed to be the ultimate in simplicity of construction and operation yet seen in any analyzer unit. All switching is done automatically by the two 9-button push-button switches. This unit provides for a flexible point-to-point resistance and voltage analysis as well as the conventional current-voltage analysis. The sockets are numbered by the *R.M.A.* system and the numbers beside the push buttons refer to the pin numbers located around each socket.

The 4 P.D.T. anti-capacity switch is a worthy addition to the unit. In neutral position both the voltage and the current sections are open and the meter is isolated from all circuits, thus being a good protective device. Pushing this







MECHANICAL DRAWING OF THE PANEL AND CHASSIS OF THE TESTER.

switch to the left the current section is shunted out and permits voltage and resistance measurements to be made. Pushing it to the right disconnects the voltage section and inserts the milliammeter in the circuit which the switch has opened, thus permitting current measurements to be made.

Construction

A study of the illustrations and fig. 2 will give the details of the mechanical construction of the unit. The case is made from sheet steel and is 3"x7"x7½". The panel measures 7"x7½" and is made from ⅛" bakelite. The numbers and letters are stamped on the face of the panel and filled with white crayon.

All parts are mounted directly on the panel. Mount all sockets so that the heater prongs point down toward the bottom of tester. The 9-button D.P.S.T. switch is mounted next to the sockets and the 9-button S.P.S.T. switch next to the jacks and 4 P.D.T. anti-capacity switch. The push buttons are pressed on after the switches are mounted on the panel.

The cable is brought into the unit through the bakelite panel and is wired directly to the top, or "Selector," switch. Different color wires to match the cable wires are used to wire the unit, thus keeping the circuits clear. If the schematic circuit diagram (fig. 1) is followed closely no trouble will be experienced in wiring the unit. After all wiring is finished, mount in the case or on a test bench and fasten by means of several small screws.

Before using the unit it is best to first thoroughly check all wiring by means of a continuity test from the pins of the adapters, when inserted into the analyzer plug, to make sure that all wiring is continuous to the correct socket terminals, and to the tip jacks when the switches are in their respective positions.

Procedure for Use

Plug the analyzer plug, together with its proper adapter into the set socket on test. Insert the tube in the proper analyzer socket. Connect the top caps on both the set to analyzer plug and unit to tube, if the tube is of that type. Connect ground clip to chassis.. Connect the voltage and current jacks to the proper ranges of your multimeter or analyzer by means of the phone tip plugs and leads.

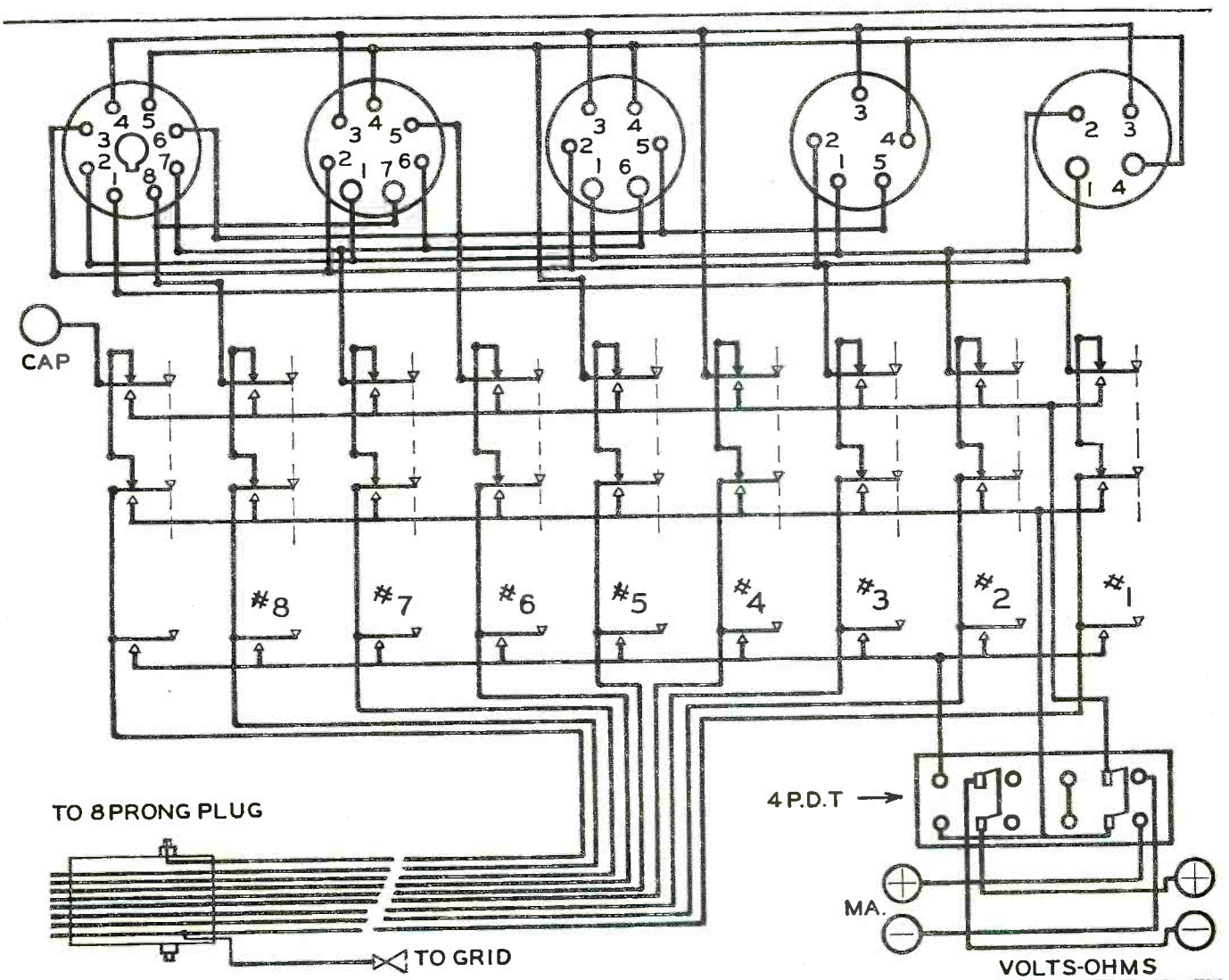
The top row of buttons is the circuit selector, or current switches. Press any one desired and push 4 P.D.T. switch to the right and you will have measured the current in that line. The bottom row of buttons are the meter return switches. Press any two buttons, one in each row, and push 4 P.D.T. switch to the left, and you will have measured the voltage between those two points.

The top row of figures between the push buttons is for 4-5-6-7 prong sockets. The lower row of figures is for the 8-prong octal socket.

For resistance measurements turn off the power in the set. Connect the two voltage-ohms tip jacks to the resistance ranges of your meter. Push the 4 P.D.T. switch to the left and the resistance will be indicated between any two points by pushing any two buttons, one on each row.

With this tester, this serviceman can easily do many jobs which would ordinarily require other and expensive equipment.

(*Continued on page* 48)



WIRING DIAGRAM OF THE FREE POINT ANALYZER TUBE TESTER

Servicing

by ALFRED A. GHIRARDI, B.S., E.E.

Author of "The Radio Physics Course," "Modern Radio Servicing"; member Radio Servicemen of America, New York Electrical Society, Institute of Radio Engineers.

ATWATER KENT 96

Inoperative, high positive grid voltage, 180 volts, on i-f tube)	1)	small i-f secondary shunt resistor touches i-f coil, permitting it to "short" to the plate winding of the input i-f transformer, causing positive plate voltage to be supplied to the grid of the i-f tube. This resistor may be found by removing the i-f coil shield. It is tucked in near the first detector plate coil. Insulate it from the plate winding by wrapping it in cardboard, fibre, or tape and move it away from possible contact with coil winding
Neon tuning indicator inoperative or erratic		
Intermittent reception	1)	heater current through the type '35 i-f tubes and type '24 AVC tube too high, causing the AVC tube to draw grid current when heating and resulting in an erratic action of the AVC resistor network. Insert a heavy wire-wound resistor in the heater circuit in order to cut down the heater voltage slightly. This will prevent grid current from flowing in the AVC tube grid circuit

ATWATER KENT 99

Inoperative, high positive grid voltage, 180 volts, on i-f tube)	1)	see Case History for this same trouble listed under Atwater Kent 96
Neon tuning indicator inoperative		
Inoperative	1)	resistor in i-f transformer
Erratic operation of neon tuning indicator, ("Tonebeam")	1) 2)	"shorting" to side of can. Move away and insulate defective neon tube. Replace intermittent contact between the end terminals of the 40,000- and the 6,000-ohm resistors which constitute part of "Tonebeam" voltage divider system, resulting in the shorting out of the circuit of the "Tonebeam" potentiometer. This causes a disruption of the biasing arrangement. Provide a better means of insulation between the two resistors
Weak reception	1)	"open" first r-f sec.-return by-pass
	2)	"open" second r-f secondary by-pass
Intermittent reception	1) 2)	"open" first r-f secondary by-pass
Fading	1)	"open" second r-f sec.-return by-pass leaky first r-f secondary return by-pass condenser
	2)	leaky second r-f secondary return by-pass condenser
Poor AVC action	1)	replace tube in AVC stage

ATWATER KENT 136

Intermittent. Weak reception	1)	"shorted" 0.1-mfd. tubular condenser (marked No. 1021 between 6F6 cathode and 0.1-meg. resistor. Replace

ATWATER KENT 145

Audio squeal, (condition is aggravated by touching the grid cap of the type '2A6 tube, but is not affected by touching the grid caps of the '2A7 or '58 tubes)	1)	remove and discard the metal clamp around the type '2A6 tube grid lead at the point where it is grounded. Solder the wire twisted around the grid lead to point where clamp was grounded. (Set analyzer does not reveal this trouble.)
Operation O.K. on short-wave bands but "dead" on broadcast bands	1)	check the 730-mmfd. broadcast band series condenser (long, flat paper-covered condenser rivcted to rear wall of the chassis near the 2A7 socket. An intermittent "open" condition develops. A 700-mmfd. mica condenser may be used for replacement. Re-adjust padder condenser in usual manner for max. output at 600 kc

ATWATER KENT 155

Hum, Distortion	1)	leaky dual and triple filter condensers. Replace with 8-mfd. sections
	2)	change in value of volume control from normal value of ½-megohm. Replace with new unit
	3)	adjust trimmer (between tuning condensers and speaker at the top front of chassis) for loudest volume
Weak, Distortion, Receiver gets out of alignment, Screen-grid resistor changes in value	1)	replace the type '85 tube with a type '75 tube, making the following changes in the circuit: connect a 0.25-megohm resistor in series with the 0.1-megohm resistor and B-plus. By-pass this resistor to ground with a 0.1-mfd., 200-volt condenser. Also connect a 4-mfd., 30-volt condenser across the 300-ohm resistor connected between the chassis and the a-c—d-c switch
	2)	small 0.5-megohm metalized grid-return resistor for the '42 tube needs replacement. It is located at the grid terminal on the '42 tube socket

ATWATER KENT 165

See also Case History listed for Atwater Kent 185 receiver.

Oscillation, Hum, Distortion	1)	decrease in capacity of second electrolytic filter condenser (8-mfd.)
Oscillation,	1)	wire-wound p'gtail type bias
Weak, reception. Cross-talk		resistor for '57 first detector-oscillator tube "open"
Slipping tuning drive	1)	install new bearing race
Vibrating noise at loud volume	1)	end play in variable tuning condensers
Noisy, when tone control is operated	1)	weak contact spring in the tone control. Put washer under control arm—or replace unit

ATWATER KENT 184

Inoperative, low voltage	1)	check padder condenser between '6C6 tube (second detector) and i-f coil for short circuit (red or brown wire)

ATWATER KENT 185

Oscillation (when volume is turned on full)	1)	replace the double 250-mmfd. condenser which connects from the plate of the 58 i-f tube to the two diode plates of the 2A6. Use two single bakelite units for replacement

ATWATER KENT 188

"Rattling" at the least vibration, Noisy reception	1)	replace all the control-grid wires to the r-f tubes. The mineral content sometimes present in the rubber insulation may make it conductive, causing interaction. This defect does not usually show up under ordinary tests
Poor tone (usually worse at low-volume levels than at high-volume levels)	1)	volume control resistance has probably increased from normal value of 500,000 ohms up to as much as 1,000,000 ohms. If it has increased to more than 550,000 ohms, replace it

ATWATER KENT 206

Dial calibration at low frequency end of broadcast band incorrect	1)	adjust broadcast-band oscillator padding condenser. This is the screw at rear of chassis (looks like a mounting screw set back slightly through an opening in the rear wall of the chassis)
Noisy reception,	1)	increase tension of wave-band switch contacts
No short-wave reception	2)	clean switch contacts with "Carbona"

ATWATER KENT 217-D

Same Case Histories as those listed for Atwater Kent 7-D.

ATWATER KENT 237Q

Intermittent operation (affected by snapping power switch and short-wave switch on and off	1)	poor contact in the first-detector — oscillator circuit. Check all resistors in the plate, oscillator-plate and screen-grid circuits. Their values are 2,500, 5,000 and 10,000 ohms respectively. Also check the by-pass condensers for these circuits—by substitution

ATWATER KENT 246

Audio howl as volume control is advanced with tone control in "low" position	1)	defective 500,000-ohm volume control. Replace with new unit
Intermittent reception	1)	poor connection at filter choke from plate of type '58 first detector tube, caused by loosening and corrosion of the brads that hold the connection on both sides of the coil

ATWATER KENT 260

Set requires about 2 or 3 hours after the switch is turned on, before it begins to operate. This is only the case in cold weather or when the set has not been used for some time	1)	it is necessary to cool the chassis (possibly by placing it in a refrigerator), then test the individual components when cold. Since the a-f transformer is sealed in a can with pitch, the pitch contracts when cooled, pressing against the windings and possibly causing a short-circuit between two poorly insulated points. When the pitch is heated, it will expand, releasing the pressure and eliminating the short-circuit
Poor tone (usually worse at low-volume levels than at high-volume levels)	1)	volume control resistance has probably increased appreciably from 500,000-ohm normal value. If it has increased to more than 550,000 ohms, replace it

ATWATER KENT 275

Inoperative	1)	speaker field "shorted" due to internal short in negative connections in triple electrolytic condenser C-14. If receiver voltages are below normal, check condenser for open sections
Hum	1)	receiver does not use the chassis as a ground return, consequently stray currents in shield and chassis are carried around to all parts of circuit, causing hum. Connect a short lead from the common ground point to chassis, being sure to make good contacts

ATWATER KENT 277

Weak reception, Distortion,	1)	open-circuited first detector cathode-bias resistor
Oscillation	2)	leaky by-pass condenser
Cross-talk	1)	use red antenna lead and ground bias antenna lead.

ATWATER KENT 310

Inoperative, no r-f or i-f plate voltage (low output plate voltages)	1)	small AVC and second detector coupling condensers shorting to primary of second i-f transformer
Inoperative, (all voltages test O.K., plates of '80 rectifier tube heat excessively)	1)	open-circuited r-f choke in diode circuit (open circuit due to pigtails of the choke)
Shadowgraph operates		
Inoperative, (no plate voltages)	1)	filter choke "grounding" to core or shield. Insulate choke from chassis with a strip of insulating material and mark it "hot"
Thin line on shadowgraph		
Hum at resonance	1)	oscillator tube cath.-htr. short-circuit
Distortion,	1)	open-circuited section in output transformer primary
Screen element of type '2A5 tube red hot		
"Sizzling" when receiver is switched on	1) 2)	temporary breakdown of electrolytic condensers change type '80 rectifier to direct-heater type tube
Intermittent reception	1)	particles of solder splashed on wave-band switch contacts
Intermittent reception, Inoperative	1)	open-circuiting 0.0014-mfd. oscillator series condenser due to poor internal contact. Replace condenser
Audio oscillation	1)	mismatched type '2A5 tubes in the push-pull audio stage. Replace with matched tubes

Case Histories

The very popular series by Mr. Ghirardi is continued with this installment. These trouble-shooting hints are proving money-makers to the servicemen who use them.

ATWATER KENT 317

Inoperative on broadcast band (short-wave reception O.K.)	1)	check the plate voltage on the oscillator section of '6A8 tube. It should be approx. 185 volts. If lower, replace the gray 30,000-ohm, ½-watt plate voltage-dropping resistor. This is connected from the oscill. plate coil to the rectifier filament
Oscillation ... (while tuning for foreign stations on short-wave bands)	1)	disconnect the "bucking" or "neutralizing" coil in the 2nd i-f transformer. Unsolder yellow and white leads from the transformer and connect them directly together, leaving the neutralizing coil out of the circuit

ATWATER KENT 318

Intermittent, or no reception, at low-frequency portion of broadcast band	1)	poorly soldered connections to either the top terminal lug of the broadcast band oscillator coil (to which the blue lead from a tap on the third section of the waveband switch is connected), or to the terminal lug next to the unused lug on the coil. This coil may be recognized by its one unused lug terminal
	2)	oscillator coil section "open-circuits"
	3)	corroded or dirty contacts on the oscillator section of the waveband switch. Clean contacts carefully
Weak reception, Distortion (high pitched), Shadowgraph indication narrows, No cathode voltage on '55 tube socket when bottom chassis-shielding cover is in place	1)	cathode terminal of '55 tube socket grounds to one of the self-tapping screws which hold the bottom chassis-shielding cover. Shorten this screw, or bend cathode terminal down to give more clearance
First and third, or the second, short-wave bands inoperative (except for a "hiss" or "rushing" noise at the low-frequency ends of these bands)	1)	check the connections to the two coils located between the r-f type '58 sockets and the type '2A7 socket. The short leads between the lugs on these coils break, either at the coil or the grounding lug. Check continuity between the "control-grid" of the type '2A7 tube and chassis
Intermittent reception	1)	poorly soldered connections. Pull on all leads while receiver is operating
Fading, Volume changes abruptly	1)	push, and pull, on the volume control shaft to ascertain its condition. Replace the volume control if necessary
Fading, ... (oscillator drift on short-wave bands)	1)	clean all contacts of waveband switch, being careful not to disturb positions of the wires to the waveband switch
	2)	bond frame of waveband switch to chassis with short lengths of bonding braid

ATWATER KENT 328

Noisy reception	1)	clean volume control. Check action for noise
Distortion	1)	check grid bias on the '6F5 tube. It should be from 1¼ to 2 V. A higher value produces distortion and is usually due to an increase in value of the 22-ohm bias resistor connected from ground to the center-tap of the high-voltage secondary

ATWATER KENT 337

Same Case Histories as those listed for Atwater Kent 317

ATWATER KENT 345

Intermittent reception. Cuts off completely	1)	defective '2A7 detector-oscillator tube. Replace with new tube

ATWATER KENT 376

Same Case Histories as those listed for Atwater Kent 206

ATWATER KENT 414, 416

Inoperative or weak. Intermittent reception	1)	replace the shorted 0.1-mfd. tubular condenser (marked No. 102) between the cathode of the '6F6 tube and the 0.1-meg. '6Q7 plate resistor

ATWATER KENT 425

Same Case Histories as those listed for Atwater Kent 165

ATWATER KENT 427-D

Same Case Histories as those listed for Atwater Kent 7-D

ATWATER KENT 435

Inoperative. Constant hum	1)	"open" 0.05-mfd. by-pass condenser C5 in the grid circuit of the 6K7 i-f tube
Oscillations (tunable)	1)	replace the oscillator grid coupling condenser. Move 0.03-mfd. tracking condenser to opposite side of oscill. coil

ATWATER KENT 416

Same Case Histories as those listed for Atwater Kent 416

ATWATER KENT 447

Same Case Histories as those listed for Atwater Kent 318

ATWATER KENT 448

Poor tone (usually worse at low-volume levels than at high-volume levels)	1)	volume-control resistance has probably increased appreciably from 500,000-ohm normal value. If it has increased to more than 550,000 ohms, replace it

ATWATER KENT 465Q

See also all Case Histories listed for Atwater Kent 665Q

Distortion. (sounds like defective speaker). "Howling"	1)	open-circuited 8-mfd. electrolytic condenser connected between B-plus at speaker cord and ground. Replace with new unit

ATWATER KENT 169

Distortion. Weak, or fading-out on low-frequency end of dial	1)	use a 0.001-mfd. padder and a small trimmer to replace the 0.00145-mfd. fixed padder condenser located under the oscillator coil. Tune it as you would the regular low-frequency trimmer (i-f is 130 kc)
Poor tone (usually worse at low-volume levels than at high-volume levels	1)	volume control resistance has probably increased appreciably from 500,000-ohm normal value. If it has increased to more than 550,000 ohms, replace it

ATWATER KENT 489

Poor tone (usually worse at low-volume levels than at high-volume levels	1)	volume control resistance has probably increased appreciably from 500,000-ohm normal value. If it has increased to more than 550,000 ohms, replace it

ATWATER KENT 509

Hum	1)	try substituting several '56 type tubes in the set until hum disappears

ATWATER KENT 510

See also all Case Histories listed for Atwater Kent 310

Audio oscillation	1)	mismatched type '2A5 tubes in the push-pull audio stage. Install matched tubes

ATWATER KENT 511-W TUN-O-MATIC

Inoperative	1)	inspect leads soldered to tone-control switch. Make sure they do not touch and "ground" to volume control housing
	2)	make sure that rubber insulated pieces on tone-control leads are back in place
Hum	1)	first try reversing the antenna and ground connections if hum appears
	2)	try replacing the 5Z3 and 2A3 tubes, as they are critical to hum
Automatic tuning feature does not shut off	1)	check 9-point normal, off and automatic switch at the right of the front panel. If the switching blades are too wide and sometimes contact two points at once (preventing proper opening of the circuit) file the blades down a bit narrower, or replace with the later type switch available from the factory

ATWATER KENT 525

Oscillation when volume control is turned on full	1)	replace the double 250-mmfd. condenser which connects from the plate of the 58 i-f tube to the two diode plates of the 2A6. Use two single bakelite units for replacement

ATWATER KENT 515

Stations shift on dial over short period of time	1)	If stations shift on dial and then shift back to their right numbers in a few days, replace the leaky 0.00036-mfd. condenser C3 in the first detector-oscillator 6A7 circuit

ATWATER KENT 557

Same Case Histories as those listed for Atwater Kent 318

ATWATER KENT 612

Line fuses "blow"	1)	short-circuited buffer condensers
	2)	inoperative type '83 rectifier tube (not burnt-out)
Noisy, intermittent reception	1)	loose connection to oscillator series condenser
	2)	loose element in type '57 tube
Noisy reception	1)	open-circuited or leaky buffer condensers
Distortion on low volume (clear on high volume)	1)	volume control "open"
Sensitivity excessive	1)	substitute an '80 tube for the '83 feeding the r-f stages. This will not affect local station reception
Silent tuning control irregular in action	1)	this tube plays a very important part in the correct operation of the receiver and must be a perfect tube. When trouble is experienced with the receiver, check this tube first—possibly by substitution

ATWATER KENT 627

Oscillation. Unstable	1)	open-circuited first detector cathode by-pass condenser
	2)	add small 85-mh. r-f choke in cathode circuit of r-f stage
No signals on low-frequency part of dial. Oscillation	1)	loose rivets on 0.1450-mfd. condenser located in oscillator can. Use a special lead "grounded" to the mounting of this condenser

ATWATER KENT 637

Inoperative on "broadcast band." ("Short-wave" band O.K.)	1)	plate voltage on oscillator section of '6A8 tube should be 185 volts. If this voltage is low, replace the gray 30,000-ohm plate-dropping resistor that has increased in value.

ATWATER KENT 665

See also all Case Histories listed for Atwater Kent 165

Oscillation	1)	make sure that the screen grid stage control lead spring (which serves as a shield) is kept away from the 2A5 tube

ATWATER KENT 665Q

Fading about 15 minutes after set is switched on	1)	disconnect the red positive wire from the air-cell battery and short-circuit the resistor, making it possible to use the cell for several weeks more
Poor tone	1)	open-circuited connection on speaker coil. The coil is replaceable on early models, but on later models, the entire unit requires replacement
Noisy reception at low volume, (noise somewhat like a fog horn)	1)	defective black electrolytic condenser. Replace with new unit

ATWATER KENT 667

See also the Case Histories listed for Atwater Kent 7-D receiver

Over-accentuated bass reproduction	1)	tone may be improved by replacing 0.02-mfd. condenser C12 on the 2A5 to 0.006 or 0.01 mfd.

ATWATER KENT 667-D

Same Case Histories as those listed for Atwater Kent 7-D

ATWATER KENT 708, 711

Inoperative,	1)	defective tubes
Noisy reception	2)	defective silencing adjustment resistor
on short-wave band	3)	faulty wave-change switch. Resolder all connections here. Realign receiver

ATWATER KENT 808

Broad tuning, Frequency shifting, Poor tone	1)	trouble in AVC circuit. Check the cathode voltage on the r-f 58 and 1'st i-f 58 tubes (with no signal tuned in). A reading of 110 volts should be obtained from cathode to ground on each tube. Now check the cathode voltage while tuning receiver to a station. The reading should now **increase** as resonance is approached. If it does not increase, check the 0.05-mfd. r-f and 1'st i-f grid filters in the secondary returns of these stages for a "shorted" or "leaky" condition. Also check the 2-meg. load resistor in the AVC circuit

ATWATER KENT 810

Audio howl, Motorboating	1)	"open" 10-mfd. electrolytic condensers. Replace with 10-mfd., 200-v. unit
	2)	check 1,000-ohm carbon resistors connected from 6F6 tube plates through 0.01-mfd. condenser to ground. If heating has made them change value, replace with 1,000-ohm, 1-watt units

ATWATER KENT 812

See also all Case Histories listed for Atwater Kent 612

Poor tone, Blocks at maximum volume setting	1)	value of ½-megohm potentiometer connected to diode plate 2 of the second detector has changed to about 1-megohm. Shunt with fixed 1-megohm resistor to restore potentiometer value to normal
Double-spot tuning	1)	set double-spot tuning trimmer (fourth on 5-gang tuning unit) for minimum signal with test oscillator operating at 1400 kc and receiver dial set at 1240
Noisy reception, Intermittent reception	1)	loose connection inside the sleeving of the wires connecting one end of 1,450-mmfd. condenser inside oscillator coil shield
Erratic operation of silent tuning control	1)	loose element in one of the type '57 tubes in the silent tuning control stage. Replace with new tube
Erratic "tone-beam" operation	1)	intermittent shorting of 46,000- and 40,000-ohm carbon resistors in this circuit. Insulate from each other
No "tone-beam" action	1)	open-circuited 40,000-ohm "tone beam" bleeder resistor

ATWATER KENT 856

See also Case Histories listed for Atwater Kent 317

Double-peak tuning	1)	check the AVC circuit for high-resistance to ground

ATWATER KENT 944

Weak reception, Sensitivity control adjustment has no effect on signals	1)	"open" 1-megohm resistor connected from the 4-mfd. filter condenser to the grid of a '57 tube

ATWATER KENT 976

Same Case Histories as those listed for Atwater Kent 317

ATWATER KENT 1935 Auto Radio

Inoperative (no voltages)	1)	faulty '6Y5G tube
	2)	faulty condenser across plates of rectifier tube

AUDIOLA JR. (WESTMINSTER)

Inoperative	1)	check all the resistors in this direct-coupled receiver as they cause frequent trouble
Weak, Distortion	1)	400-ohm bleeder resistor between detector screen and ground "open." Also check all resistors in receiver, and replace any which show large change in value
	2)	to increase volume, replace the 50,000-ohm resistor section in series with the screen-grid lead with a 35,000-ohm resistor, so as to raise the screen potential
Fading (reception restored to normal when the chassis is tapped)	1)	poorly soldered connections at all three grid cap clips. Resolder these connections
Oscillation	1)	high-resistance ground connection due to a loose rivet between the dual 0.1-mfd. metal case condenser and the chassis. (This rivet also holds one side of the second r-f tube socket.) Solder a pigtail from the condenser can to chassis
	2)	re-balance tuned circuits
	3)	if oscillation is not eliminated by re-balancing, insert a 0.0001-mfd. fixed condenser between the detector plate and ground and re-balance
No plate voltage	1)	0.01-mfd. condenser between plate of '45 tube and "ground" "shorting"

AUDIOLA 30-B

No control of volume on powerful local stations	1)	adapt the receiver for use with type '35 tubes. Substitute a 10,000-ohm potentiometer for the old volume control, connecting one end of it to the antenna and the other end to a 25,000-ohm bleeder resistor for the screen voltages; connect also at this latter terminal the original r-f bias resistor. The movable arm of the potentiometer is grounded to chassis. Replace tubes with type '35s
Noisy reception (intermittent, frying noise)	1)	replace push-pull input transformer

AUDIOLA 31

Intermittent fading, Weak at low-frequency end of dial	1)	high-resistance contact between terminal lugs and stator section of gang condenser. Tighten screws, being careful not to throw the stators out of alignment position

AUDIOLA 7330

Oscillation	1)	clean the gang tuning condenser rotor wipers of all graphite, etc. When replacing the wipers, make them sufficiently tight for good contact only—friction must not be excessive

AUTOMATIC RADIO MF'G CO.

(See also listings under AIR MASTER)

AUTOMATIC C15 Auto Radio

Inoperative (no plate voltages but vibrator operates)	1)	check the leads from the power transformer to the plates of the '84 tube for "breaks." Install new stranded-wire leads for these

BALKEIT A3, A5, A7

Noisy reception	1)	faulty audio transformer
	2)	faulty phono-pickup jack
	3)	faulty electrolytic condenser
Fading	1)	worn carbon strip in volume control

BALKEIT 41A

Oscillation	1)	high-resistance or open-circuiting contacts of loose or improperly fitting tube shields. Solder flexible pigtails between all tube shields and the chassis
	2)	interaction between the wires from the diode plates and control-grid of the type '75 tube. Separate the leads

BELMONT 41, 42A

Inoperative	1)	short-circuited primary winding in the output transformer. Replace with a new unit

BELMONT 51-C

Inoperative, (no plate voltage on the type '57 detector tube)	1)	defective 250,000-ohm 57 detector plate-supply resistor. Replace with new unit. Inspect rectifier socket and leads for defects also
Noise at high volume, (banging the set will bring this noise out at any level)	1)	broken type '80 tube plate lead terminal between the wafers of the tube socket, resulting in intermittent contact. Replace the socket

BELMONT 71C

A-f modulation of oscillator (head all over the dial)	1)	grid leak for the '56 tube increased in value. Replace with one of proper resistance value.

BELMONT 100

Fading, Noisy	1)	try replacing the volume control (1-megohm unit)

BELMONT 415

Inoperative	1)	"A" or "B" batteries discharged
	2)	4-amp. fuse in A-battery line blown
	3)	tubes make poor contact with sockets, or grid clips make poor contact with the caps of the tubes
Weak	1)	"A" or "B" batteries weak
	2)	see trouble (3) under "Inoperative"
Noisy	1)	defective tubes. Check all tubes
	2)	see trouble (3) under "inoperative"

BELMONT 420

Whistle, Oscillation	1)	oscillation in type '38 power pentode amplifier tube, due to change in value of control-grid and cathode-grid resistors. Replace with new resistors if values have changed appreciably
	2)	change in value of type '76 r-f amplifier tube plate resistor. Replace with new unit
Does not tune down to 1712 kc	1)	see that green **(grid)** and black **(ground)** wires connected to the antenna coil are well separated from each other. Also keep the green leads to the grid cap and the antenna away from the tube shield

BELMONT 440

Replacing pilot lights	1)	the chassis must be removed from the cabinet to do this. Pilot lights are wired in series—use 6-8 volt 0.15-amp. bulbs

BELMONT 525

Noisy	1)	inspect all carbon resistors and push away any leads which may be resting against them

BELMONT 540 AC-DC

Inoperative on all but strong local stations	1)	check the 25-mfd. condenser (C13) connected from the cathode of the 25Z5 tube to choke

BELMONT 578, 585 (Series A, B, C & D)

Oscillation, Distortion	1)	by-pass condensers "open." Replace all defective units
Hum, Motorboating, Low volume	1)	electrolytic filter condenser "shorted" or defective. Replace with new unit
Low volume, Distortion	1)	open- or short-circuited by-pass condenser across type '42 tube bias resistor. Replace with new unit
	2)	electrolytic condenser "shorted"

BELMONT 588

Oscillation, Distortion	1)	by-pass condenser "open"
Excessive hum, Low volume, All d-c voltages below normal	1)	electrolytic filter condenser "shorted"

BELMONT 661, 667 Auto Radios

Inoperative,	1)	defective tubes
Weak,	2)	tubes making poor contact with sockets
Noisy	3)	grid clips making poor contact with tube caps
Fuse blows out frequently	1)	if fuse blows out frequently even though the insulating sleeve is in place over it properly, the trouble is probably in the vibrator, and it should be replaced

BELMONT 670-A

Fuse blows out frequently	1)	defective vibrator unit. Replace with new unit
Inoperative, Noisy reception, Weak reception, Case "buzz",	1)	defective tubes (even though they may check O.K.) Replace by substitution
	1)	loose screws in top or bottom case covers
Case rattles	2)	loose tube elements. Replace tubes
	3)	loose tube or r-f coil shield
	4)	loose grille cloth

BELMONT 675

Inoperative	1)	"open" section in bleeder resistor—usually the 13,000-ohm section
Inoperative (tone control at "Bass" position)	1)	0.02-mfd. condenser across output transformer "shorted"
	2)	check 13,000-ohm screen-dropping resistor for "open"
Planetary vernier-dial drive mechanism inoperative	1)	cracked or broken compression ring. Disassemble dial drive by removing the two screws which fasten it to the dial bracket
Excessive hum, Intermittent reception, Low volume	1)	electrolytic condenser "shorted." Replace with new unit
Distortion, Oscillation	1)	by-pass condensers "open." Replace all defective units

BELMONT 685, 686

Dial drive slippage	1)	install new type belt take-up assembly now available from manufacturer for these receivers

(More Case Histories on page 48)

SIGHT & SOUND NEWS

CBS DEMONSTRATES RADIOTYPE

NEW YORK, N. Y. (Special to RADIO NEWS): Radiotype is the name of a new communications device developed by the International Business Machines Corporation. It functions somewhat like a teletype, receiving impulses via ultra-short waves. The device was demonstrated in New York through joint arrangements with the Columbia Broadcasting System and the American Radio Relay League at the award luncheon tendered by William S. Paley, CBS president, in honor of Wilson E. Burgess, winner of the Paley trophy for 1938 amateur achievement.

Messages of congratulation were sent by amateur stations in all parts of the country to the A. R. R. L. station at the New York World's Fair and a Radiotype transmitter relayed them to the Hotel Pierre where they were projected on a large Radiotype screen.

STORES USE TELEVISION TO DEMONSTRATE FASHIONS

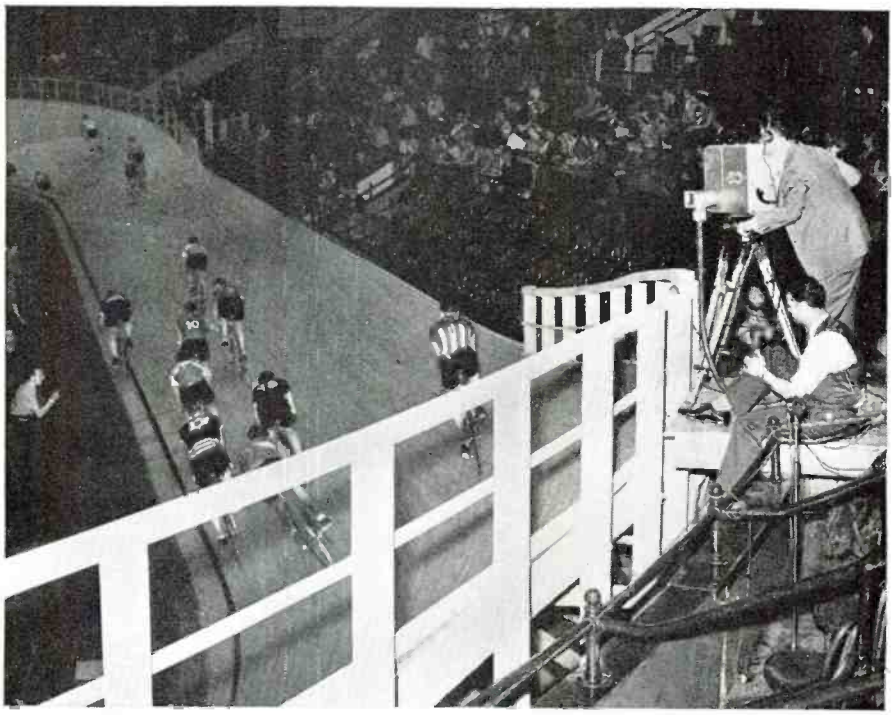
NEW YORK, N. Y. (Special to RADIO NEWS): Radio dealers and department stores demonstrating television are discovering that the tests are drawing big crowds. Although sales are slow, the dealers feel it is excellent promotion to draw interested spectators. Even though many of the onlookers may not be in the market for television, the dealer has the chance to interest them in other merchandise.

Department stores were quick to recognize the drawing power of television demonstrations and one large establishment used a transmitting and receiving system functioning over wires to demonstrate fashions.

Some store demonstrations have been poorly staged from a showmanship angle, some trade observers believe. But the manufacturers of leading television lines are striving to instruct the dealers on good demonstration and sales methods.

SARNOFF ADDRESSES N. Y. CONVENTION

NEW YORK, N. Y. (Special to RADIO NEWS): Top executives of RCA and NBC are active in exploiting television. David Sarnoff, president of RCA, has written a paper entitled "Probable Influences of Television on Society" for the Journal of Applied Physics, and Lenox R. Lohr, president of NBC, addressed the recent New York convention of the Edison Electric Institute on "The Present Status of Television." With key men of the industry going to bat for television in this manner, the video art is receiving invaluable prestige in important professional fields.



Televising the 6-day bike races for the first time over 'phone wires.

AMERICAN TELEVISION ELECTS VICE-PRESIDENT

NEW YORK, N. Y.: The American Television Corporation announces the election of Dewey Bullock as vice-president. He will continue as a member of the board of directors. Mr. Bullock is president of Roger Verseput and Co., investment brokers, of Grand Rapids, Michigan.

In recent announcements the American Television Corporation introduced "telesurgery," its device for making televised surgical details available to medical students; "tele-sales," a system that televises merchandise from a central studio in department stores so that customers can look on at remote points in the store; and Videor, popular priced television sets for the home.

Recently named on the board of the television company are Adolph W. Tahaney, of Holland, Michigan; Raymond Starr, former Attorney-General of Michigan; and Maxwell Landsman, theatrical producer.

THE TELEVISION PEEK-A-BOOTH

PASSAIC, N. J.: To facilitate the proper demonstration of television in day-lighted or brightly illuminated stores, a handy booth referred to as the

An operation was televised for the medical students with surprising success.

Peek-A-Booth is now made available to its dealers at actual cost by the Allen B. DuMont Labs., Inc., of Passaic, N. J.

The Peek-A-Booth was conceived and designed by Leonard F. Cramer, General Sales Manager of the DuMont organization. Attractively finished in colors and taking a DuMont console or a table model television set, this booth forms a huge shadowbox so that television images can be viewed under ideal conditions of dim illumination.

TWO-WAY TELEVISION COMMUNICATION WITH SINGLE C-R TUBE

PASSAIC, N. J.: An improved system of two-way television communication in which a single cathode-ray tube at each station serves both as pickup device to develop picture signals for transmission and as a receiver or viewing device to reproduce images transmitted from the remote station, is disclosed in U. S. Patent No. 2,157,749 just issued to Allen B. DuMont, Assignor to Allen B. DuMont Labs., Inc., of Passaic, N. J.

This system greatly simplifies and reduces the cost of the apparatus over that of prior systems in which separate pickup and viewing tubes must be used at each station. Another advantage is that of simultaneous two-way communication, instead of having to go from one tube to another for the respective transmitting and receiving functions.

The DuMont two-way television communication system is based on the use of a dual-function cathode-ray tube which includes both photo-sensitive screen (pickup) and fluorescent screen (viewing) side by side or in an otherwise convenient arrangement, but served by a single or common cathode-ray beam. Thus when the tube is transmitting an image, the cathode-ray beam swings over to the photo-sensitive screen or photo-electric mosaic, which it scans in the conventional manner, while at the other end the cathode-ray beam swings over to the fluorescent screen which it scans in order to reconstruct the images being transmitted from the remote station. This switching of cathode-ray beams may be accomplished manually or automatically, the invention covering various means of switching, climaxed by a revolving switching means which alternates the beams from transmitting to receiving positions, for simultaneous two-way television communication.

NBC DOUBLES PROGRAM HOURS FOR TELEVISION

NEW YORK, N. Y.: A new television program schedule, more than doubling the number of program hours offered to home viewers by the National Broadcasting Company over Station W2XBS, was announced today by Alfred H. Morton, NBC vice-president in charge of television. The new schedule will become effective Tuesday, June 20.

Under the plan, evening studio telecasts from Radio City are to be increased to three a week. Two are telecast at present. These studio programs, which will include several features of one hour's duration in the

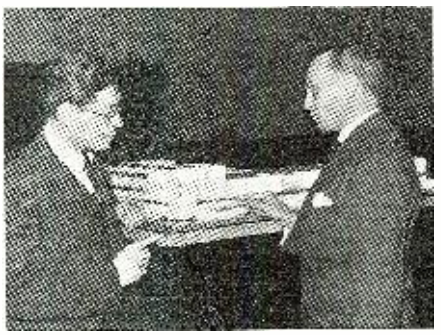
(*More S & S News on page* 62)

The VIDEO Reporter

by SAMUEL KAUFMAN

THERE'S been considerable talk these early television days regarding the limited service area for sight-and-sound entertainment. The old theory that video signals on ultra-short waves won't go beyond the horizon has been disproved in various tests but, chiefly to protect the consumer from possible disappointments, the television engineers of leading companies still see fit to adhere to the fifty-mile range when discussing "guaranteed" reception areas.

At this stage of the game, it is best to be conservative in video claims. This is true, particularly from the merchandising angle, manufacturers feeling that they can break down sales resistance more readily in a concentrated area than over a vast section of the country. And once the ice is broken in one spot, it is believed a gigantic thaw will set in and television on a mass commercial scale will become an accepted thing in many parts of the United States.



Your Video Reporter (left), interviews A. H. Morton, NBC's vice-prexy.

G.E.'s New York World's Fair Bldg., where crowds gather to see telecasts.

Breaking the television ice is the big job now on manufacturers hands and they have picked New York to do it in. To the date of this writing they haven't chipped off enough of the frozen water to cool a small glass of lemonade. And yet everyone concerned seems content with the way things are going. And that's because they have been making progress. Slowly but surely the public is being won over to the new art. NBC, at huge expense, has been staging sensational programs which have done much to stimulate a sales interest. And other key centers are watching the New York video activity avidly so that, on short notice, duplicate systems may be put into operation.

Considerable sales resistance arose from the much ballyhooed theory that the signals won't go beyond a half-hundred miles. To many persons this would infer that the impulses would be proportionately weaker on the fringe of the announced service area than they would be close to the point of emanation. The *Video Reporter* was very much concerned with this belief so, one recent night, he journeyed some forty-seven miles out of New York to the home of O. B. Hanson, NBC Vice-President and Chief Engineer, at Westport, Connecticut.

There he witnessed a solid hour of flawless television entertainment coming from W2XBS atop the Empire State Building. Reception on an RCA Victor receiver at the virtual extreme service location was *equal* to any reception the *Video Reporter* witnessed in New York! Image definition and audio quality were tops! The demonstration proved conclusively that huge television receiver sales can be anticipated throughout the heavily-populated suburban areas.

The General Electric Company has reported good reception of New York's television transmissions at its Schenectady, New York, laboratories. This is a distance of 130 miles. Reception was achieved through a very elaborate antenna arrangement. And A. H. Whiteley, head of the Whiteley Electrical Radio Co., Ltd., who recently visited the U.S.A., told the writer that London's television programs are received in his Nottinghamshire plant on an ordinary commercial receiver over a distance of 120 miles.

It seems that the idea of bringing television to the entire nation is not as fantastic as it once seemed. But the conservative approach of the trade on the point of coverage is to be commended.

New Yorkers are getting used to television program surprises. There have been so many eye-opening demonstrations and telecasts recently that pioneer observers are becoming a bit calloused about the whole thing and are accepting video developments in a matter-of-fact rather than awe-stricken way And this definitely infers that the new art is catching on. In becoming a work-a-day medium, television is rapidly passing the novelty stage.

Although the trade observers—and that goes for the *Video Reporter,* too!—have been calm and cool over numerous excellent demonstrations, one particular test came along that showed them that the new art has by no means stopped springing sensational new things.

This particular eye-opener was the demonstration of the Biard Television Corporation's theatre-sized television system. The program the *Video Reporter* witnessed in the Gaumont-British movie projection room was observed on a screen twelve feet by nine feet! It was only the physical limitations of the room, Baird engineers assured the onlookers, that prevented showing the images as large as twenty by fifteen feet—the size that will probably be adopted by theatres expected to use Baird apparatus at an early date. Television for theatres is quite a thing in England and there have been impressive stories from London regarding the popularity of the system with persons paying ten shillings each to fill several Baird-equipped theatres to witness the Derby.

The big Baird picture is achieved through

(*More Video Reporter on page* 61)

SHORT WAVE FLASHES

BY CHARLES A. MORRISON

and JOHN D. CLARK

By Charles A. Morrison

Frequency in megacycles *Time is Eastern Standard*

Special Good-Will Programs

SUNDAY, August 20, from 1 to 3:30 a.m. EST, over TGWA (9.685), TGWB (6.49), and TGWC (2.32), all of Guatemala City, Guatemala . . . Sundays, of September 10, 17, 24th, at 12:01 a.m. EST, and Sundays, of November 12, and 19th, at 10 a.m. EST, over YL2CD, operated by A. Vitolins of Miera Isla 52-5, Riga, Latvia, on a frequency of 14.04 mc. for the first three programs, and on 28.08 mc. for the latter two programs.

Lawrence-Thaw Trans-Asiatic Expedition to Use Short-Wave Radio

The four mobile motor units in the Lawrence Thaw trans-Asiatic Expedition, which recently left Paris on the first leg of a 14,000 mile tour that will take them to Budapest, Istanbul, Damascus, Baghdad, Herat, through the Khyber Pass, Delhi, Calcutta and finally into Bombay, India, sometime next Spring, will be able to maintain contact with each other by the use of four ultra-high frequency transmitters and communications receivers installed in the cars.

Two medium-high frequency transmitters and receivers have also been installed in the cruiser sedan and trailer, which will permit clear reception up to distances of 200 miles or more. The equipment is powered by standard car batteries. Antennae for the ultra-high frequency sets are of the one-quarter wave fishpole type, while a 128 foot span of wire strung from the transmitter to a collapsible 30-foot pole will act as antenna for each of the two medium-high frequency sets. Short-wave listeners and amateurs are invited to listen for transmissions from the Expedition's radio stations.

Daventry's Extended Service

Further extensions have been made to the BBC's services. On June 4 daily bulletins in Portuguese and Spanish, broadcast respectively at 5 and 5:15 p.m. EST, were added to the service of news bulletins in foreign languages radiated expressly for European listeners over GRX (9.69) and GSA (6.05).

On July 3, the BBC's new program service especially for Latin-America was inaugurated. This all-Latin transmission is now radiated daily from 6:25 to 9:20 p.m. over GSO (15.18) and GSC (9.58); the former frequency being intended for reception south of the Amazon River, the latter frequency being intended for reception north of the Amazon River.

Simultaneously with the initiation of the new Latin services, an increase of twenty-five minutes in the program time of transmissions 5 and 6, came into effect, the former now continuing to 9:15 p.m., the latter now extending from 9:40 to 11:40 p.m. EST. Reports on reception on the above new services are requested by the British Broadcasting Corporation at Broadcasting House, London. The BBC does not issue verifications for reports on the Daventry transmissions.

New Short-Wave Stations

COLOMBIA—HJ4DAX (4.795) of Medellin, has been heard relaying broadcast station HJ4ABA of the same city, from 9:30 to 10:30 p.m. irregularly.

PHILIPPINES—According to C. J. Fern of Maui, Hawaii, a new station KZEH, presumably to relay KZEG of Manila, was heard testing on an announced frequency of 9.58, although actually closer to 9.585, near 7 a.m. EST, and requesting reports, to be sent to P.O. Box 119, Manila.

ROUMANIA—A mysterious new station, with all announcements in an unknown foreign language, being heard nightly from 8:55 to 10:15 p.m., which some listeners believe to be located in Moscow, U.S.S.R., according to Martin Olthoff of Independence, Kansas, is "Radio Bucharest," at Bucharest, Roumania. He further states that the program opens with the Roumanian National Anthem, which is followed by the news in Roumanian. There are no interval signals or other identifying announcements.

TAIWAN—Roger Legge of Binghamton, New York, writes that JIE (7.295) and JIE2 (9.695), of Tyureki, Taiwan, both 10,000 watts, are transmitting simultaneously from 9:05 to 10:20 a.m. EST, for Chinese and South Seas listeners.

VENEZUELA—YV1RT (4.77), "La Voz de la Fe," a new station at Maracaibo, is being heard near 9 p.m.

Under Construction

AUSTRALIA—A new 2000 watt national transmitter now under construction at Wanneroo, West Australia, will operate when completed on frequencies of 6.13, 9.56, and 11.83 mc., under the call VLR6.

BERMUDA—A powerful short-wave transmitter, capable of radiating programs to the United States, and other parts of the world, is soon to be constructed by the Wireless Section of the Bermuda Volunteer Engineers at Smith's Hill, near Hamilton. The latest Bermuda news will be broadcast on Mondays, Wednesdays and Friday evenings.

IRAN—Two powerful short-wave broadcast transmitters, ordered from the British firm "Standard," for erection near Teheran, are expected to be ready in the spring of 1940. In addition a powerful short-wave telephone transmitter for commercial purposes, purchased from the German firm "Telefunken," is being installed at Kasr Kajar on the road to Shimran, and should be in operation by next September.

UNITED STATES—The new 50,000 watt transmitters for W8XAL at Mason, Ohio, will probably not be completed before January of 1940.

Notes of Interest

John Larsen of Geneva, New York, writes that an unidentified station on 15.12, nights until after 10:25 p.m., using a language similar to French, may be CSW4, Lisbon, Portugal.

ARGENTINA—LSX (10.35), Buenos Aires, is now broadcasting on Fridays from 4 to 5:45 p.m. according to A. Tuff of London.

AUSTRALIA—VLR (9.58) has replaced VLR3, Melbourne, in that portion of the daily transmission from 12 mid. on. Both VLR and VLR3 are now issuing QSL cards in place of the former letter verifications . . . 9MI (6.055), the S.S. Kanimbla, is now broadcasting a children's program Saturdays near 2:45 a.m.

BAHAMAS—ZNS (6.09), Nassau, power 200 watts, is now relaying Daventry nightly from 6:20 to 8 p.m. before the opening of the usual program which extends from 8 to 9 p.m. and on Sunday nights to 10 p.m. EST.

BOHEMIA—The usual nightly program for North America, from Prague, is now being broadcast from 6:55 to 9, or 10 p.m., over OLR5A (15.23).

BRAZIL—PSE (now 14.94), is being heard with loud signals from 6 to 7 p.m.

BRITISH HONDURAS—ZIK3, Belize, is supposedly broadcasting three nights a week on 5.3. Has anyone heard this station recently?

CHINA—August Balbi of Los Angeles, California, writes that XMHA (11.86) of Shanghai, often relays W6XBE near 9 a.m.

COLOMBIA—Martin Olthoff of Independence, Kansas, notifies me that the slogan for HJ7GAB (4.89), Apartado 37 of Bucaramanga, is "Radio Santander."

CUBA—COCQ, Havana, announces its official frequency as 8.83, but it is actually operating on 8.85 nightly until midnight.

DOMINICAN REPUBLIC—H15P (6.565) has not been heard lately.

ECUADOR—The Guayaquil station on 9.188 is HC2ET, "Radio Telegrafico," which formerly operated on 4.56 . . . John Larsen of Geneva, New York, reports hearing HC 1GQ (9.17), from 8:30 to 10:30 p.m.

GUADELOUPE—The ILA advises that FG8AH (7.44), "Radio Guadeloupe," is soon to be increased in power to 1000 watts. The schedule will then be changed to 9:30 to 11 p.m. and announcements in English will be instituted. The address of the station is Pointe-a-Pitre, French West Indies.

GUATEMALA—Prizes are now being awarded weekly, for the best; the most complete and the most distant report received on the dx program broadcast each Sunday morning from 2 to 2:30 a.m. EST, over TG2 (6.195) of Guatemala City, Guatemala . . . The programs for North America, heard on Mondays, Tuesdays, Thursdays and Saturdays, over TGWA of Guatemala City, are normally broadcast on a frequency of 9.685, but during the summer months these broadcasts are sometimes radiated on TGWA's optional frequency of 15.17.

A sample of the QSL from TG-1, Guatemala, C. A., which is entirely written in the Spatari Radio Language. Vy fb.

HAITI—The special Wednesday night programs for Jamaica, radiated by HH2S (5.98) of Port-au-Prince, have now been discontinued for the summer months.

HONDURAS—Despite reports to the contrary, HRN (5.875) of Tegucigalpa, is still on the air and broadcasting nightly from approximately 6 to 11 p.m.

IRELAND—August Balbi of Los Angeles, California, writes that EIRE (17.84) of Athlone, is broadcasting irregularly from 11:30 a.m. to 5 p.m.

JAVA—The Semarang, Java, station believed to be YDF, is now operating on a frequency of 4.945. It carries the same program as PMH on 6.72.

NEWFOUNDLAND—VONG (5.975) of St. John's, uses chimes similar to NBC's in connection with announcements which are made approximately every quarter-hour.

SPAIN—EAQ (9.86), Madrid, now starts its nightly program for North America, at 7:45 p.m. with the words, "Hello North America, Hello United States, Hello Canada, this is Radio National Spain, Station EAQ, Madrid." Following this a woman gives the news in English, after which a discussion on some topic concerning the future outlook of Spain, is given and the balance of the program up to sign-off at 8:30 p.m. consists of musical numbers.

SPANISH MOROCCO—Roger Legge of Binghamton, New York, reports that EA9AI (7.18) of Melilla, is still being heard Saturdays from 9 to 10 p.m. with loud signals.

URUGUAY—CXA2 (9.57) of Montevideo, may be heard irregularly to as late as midnight or 12:30 a.m.

UNITED STATES—The Magic Key of RCA program which is now being heard at a new time on Monday nights from 7:30 to 8 p.m., over the NBC-Blue network, and W8XK (11.87) of Pittsburgh, specializes in

unusual short-wave stunts and pickups from remote corners of the earth . . . Each Saturday at 10:45 a.m., a program describing the natural wonders of Rocky Mountain National Park, is broadcast direct from this paradise of wildlife, fields and forests, by means of a short-wave pickup, which is then relayed to the NBC-Red network, and short-wave station W2XAD (15.33), via KOA in Denver, Colorado . . . The Rattlesnake Placer Mine, near Downieville, California, is now using two short-wave transmitters. KQDL and KQDK, each with a power of 20 watts, and operating on a common frequency of 2.726, for emergency communications . . . A new coastal harbor radiotelephone station will soon be in operation at Mackinac Island, using frequencies of 2.738 and 2.55 . . . The coastal harbor radiotelephone station WAY at Lake Bluff, Illinois, is now operating on a frequency of 2.55, with a power of 400 watts . . . The news reports broadcast to Latin America over NBC shortwave stations W3XAL and W3XL are prepared by a journalist of more than 25 years experience, namely, Hudson Hawley, news editor of NBC's International Division. He graduated from Yale in 1914, and successively held jobs with the Hartford Times, the New York Sun, and as bureau chief of the International News Service in Paris, Rome, Berlin and London . . . CBS station W2XE at New York City, is now radiating French, German and Italian news broadcasts weekdays, starting at 4 p.m.. on a frequency of 17.83 mcs. . . . *U.S.S.R.*—According to word from Radio Center, Moscow, the transmitter that operates on 9.52 and 6.03 is not RW96 as it is given in the program releases from Moscow, but RW96.

VENEZUELA—John Larsen of Geneva, New York, advises me that YV4RD (6.3), is the only Venezuelan, so far as he can ascertain, that is still broadcasting on its old frequency in the 49 meter band, all of the other stations having definitely shifted to their new frequencies in the 62-meter band.

Revised Schedules

AUSTRALIA—VK2ME (9.59), Sydney, now broadcasts Sundays from 12 midnight to 2, from 4:30 to 8:30 and from 11:30 a.m. to 1:30 p.m.

BRAZIL—PSH (10.22), Rio de Janeiro, broadcasts weekdays from 6 to 7 p.m. in Portuguese: Mondays, from 8 to 8:30 p.m. in English, and on Fridays, from 7 to 7:30 p.m. in Spanish; PSE (14.94), Rio de Janeiro, now operates Wednesdays from 4 to 4:10 p.m. in German; Thursdays, from 3 to 3:30 p.m. in Italian, and Saturdays from 3 to 3:30 p.m. in French, also the first Thursday in each month from 11:18 a.m. to noon.

FRANCE—The latest schedule for the Paris stations is as follows: from 1 to 4 a.m., over TPB6 (15.13), for Africa; from 5 to 10 a.m., over TPA2 (15.243), for East and Far-East; 8:30 to 10 a.m., over TPB3 (17.85), for East and Far-East; from 10:15 a.m. to 12:15 p.m., over TPB11 (7.28), for West Africa; from 1 to 5:15 p.m., over TPB11 (7.28), for West Africa; from 6 to 8:15 p.m., over TPA4 (11.718) and TPB12 (11.885), for South America, and from 8:30 to 11 p.m., for North America, over TPA4 (11.718) and TPB11 (11.885).

ITALY—According to the latest official schedule from the E.I.A.R. at Rome, the short-wave transmitters of the Short-Wave Center at Prato Smeraldo, are now in operation as follows: 2RO3 (9.63), daily from 12:05 to 9 p.m.; 2RO4 (11.81), 100,000 watts, daily from 4:30 to 8:45 (also Sundays from 3:15 to 4:30 a.m.), and from 10 a.m. to 9 p.m.; 2RO6 (15.3), 50,000 watts, daily from 4:15 to 4:55, from 10 a.m. to 5:30 and from 7:30 to 9 p.m.; 2RO8 (17.82), 50,000 watts, daily from 5 to 8:45 a.m. and from 6 to 8:25 p.m.; 2RO9 (9.67), 25,000 watts, daily from 12:40 to 9 p.m.; 2RO12 (15.1), 25,000 watts, daily from 3:45 to 5 and from 5:30 to 8:10 a.m., and 2RO13 (11.9), 25,000 watts, from 10 a.m. to 12:30 p.m. The last two named frequencies are being used on an experimental basis only.

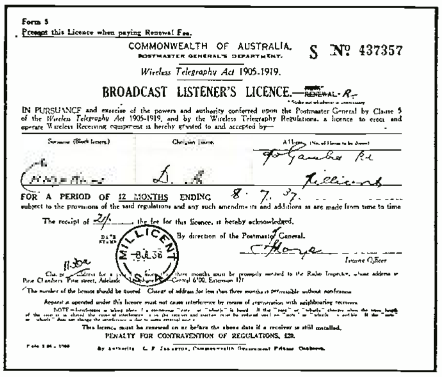
NETHERLANDS—The present schedule of the Dutch stations is as follows: PHI2 (17.77), Sundays from 6:10 to 9:35 a.m.; Mondays, and Thursdays, 7:10 to 8:30 a.m. and Tuesdays, Wednesdays, Fridays and Saturdays, 7:10 to 8:15 a.m. . . . PCJ (9.59), Sundays from 1:40 to 3, and from 7:15 to 9:50 p.m.; Tuesdays from 1:45 to 3:30, and from 7 to 10:15 p.m.; Wednesdays from 7:15 to 8:40 p.m. and Fridays from 8 to 9 p.m. . . . PCJ2 (15.22), Sundays, Mondays and Thursdays, from 7:10 to 8:30 a.m.; Tuesdays, Fridays and Saturdays from 7:10 to 8:15 a.m. and Wednesdays from 7:10 to 8:15 and from 9:30 to 11:30 a.m.

JAPAN—The present schedule for the Tokio transmitters follows: 1:30 to 2:30 a.m., over JZK (15.16); 7 to 7:30 a.m., over JZK and JZJ (11.8); 8 to 9:30 a.m., over JZK, JZJ and JLU3 (15.135); 2:30 to 4 p.m., over JZK and JLG3 (11.705); 4:30 to 5:30 p.m., over JLG3, JLT2 (9.645), and JZL (17.785), and 8 to 8:30 p.m., over JZL.

NORWAY—The correct schedule for the Norwegian National transmitters is as follows: Daily, over LKQ (11.735), from 2 to 6:40 and from 10 a.m. to 3 p.m.; over LKV (15.17), from 7:40 to 10 a.m. and over LLG (9.61), from 3 to 6 p.m. LCL (8.025), is used for test broadcasts.

SIAM—HS8PJ (9.51), is broadcasting Thursdays from 8 to 10 a.m. and on Fridays and Saturdays irregularly from 8 to 10 a.m.

UNITED STATES — W1XAL, Boston, Mass., is broadcasting on the following schedule: on 21.46, Sundays, from 9 or 10 to 11 a.m., and Tuesdays and Thursdays from 9 to 10:15 a.m.; on 11.79, Mondays, Tuesdays, Wednesdays, Thursdays and Fridays, from 2:30 to 5:15 p.m.; on 6.04, Sundays from 2 to 6 p.m., Mondays, Wednesdays and Fridays, from 6:30 to 8:30 p.m. . . . W1XAR, Boston, Mass., operates as follows: on 15.13, Sundays from 9 or 10 to 11 a.m., Mondays, Tuesdays, Wednesdays, Thursdays and Fridays, from 2:30 to 5:30 p.m. and Mondays, Wednesdays and Fridays, from 8:45 to 9:45 p.m.; and on 11.73, Sundays, from 2 to 6 p.m., Mondays, Wednesdays and Fridays, from 6:30 to 8:30 p.m. EST.


Form 5
Present this Licence when paying Renewal Fee.
COMMONWEALTH OF AUSTRALIA. S № 437357
POSTMASTER GENERAL'S DEPARTMENT.
Wireless Telegraphy Act 1905-1919.
BROADCAST LISTENER'S LICENCE.—RENEWAL-R.
IN PURSUANCE and exercise of the powers and authority conferred upon the Postmaster General by Clause 5 of the *Wireless Telegraphy Act* 1905-1919, and by the Wireless Telegraphy Regulations, a licence to erect and operate Wireless Receiving equipment is hereby granted to and accepted by—
Surname (Block letters.) Christian name. Address
FOR A PERIOD OF 12 MONTHS ENDING 8. 7. 37.
subject to the provisions of the said regulations and any such amendments and additions as are made from time to time
The receipt of 21/ the fee for this licence, is hereby acknowledged.
DATE STAMP MILLICENT S.A. By direction of the Postmaster General.
Issuing Officer
This licence must be renewed on or before the above date if a receiver is still installed.
PENALTY FOR CONTRAVENTION OF REGULATIONS, £20.

This is what an Australian license for listeners looks like. Sent in by Leo Hertz, who collects radioana.

Frequency Changes

CUBA—COBC to 9.99; COBZ to 9.025; COCH is varying from 9.436 to 9.44; COCM is still variable in the vicinity of 9.82; COCO to 8.695; COCQ now on 8.845, and COJK to 8.65, where it seems to be operating from 8 to 8:30 p.m. only.

DOMINICAN REPUBLIC—HI1J, San Pedro, to 5.92, where it signs-off nightly at 8:30 p.m.; HI9B to 6.39, where it seems to be operating from 5 to 8:40 p.m.; HI1S to 6.43.

HAITI—HH2S to 5.99; HH3W to 9.78.

NICARAGUA—YNOP to its old location on 5.76.

PERU—OAX4G is reported to have moved to 6.205.

URUGUAY—CXA6 to 9.625.

Data

ALBANIA—ZAA is now broadcasting weekdays from 6:30 to 8, and Sundays from 6:30 to 8:30 a.m. on 7.85, and daily from 1 to 2:30 p.m. on 6.085.

AUSTRALIA—VK2ME (9.59), Sydney is now issuing an attractive white QSL card, with the call in yellow, featuring an outline map of Australia, and a picture of a Kookaburra bird.

BOHEMIA—According to A. V. Deterly of Baton Rouge, La., the QSL card from OLR4A, has a picture of the world famous astronomical clock with moving figures on the Old Town Hall at Prague. The address is still given as Prague, *Czechoslovakia*.

BOLIVIA—According to a QRC item furnished the NNRC, CP 12 (6.255), "Radio Fides," at La Paz, power 250 watts, operates from 7 to 8, 11 a.m. to noon and from 7 to 9 p.m. It is owned and operated by a Jesuit School. The address is: Observatorio San Calixto, P.O. Box 283, La Paz.

CANADA—CHNX (6.13) Halifax, power 500 watts, operates weekdays from 7 a.m. to 11:15 p.m. and Sundays from noon to 11:15 p.m. A Mail Bag program is broadcast on Sundays at 5 and 9 p.m. Reports are solicited. The QSL card is pink with blue lettering.

CHILE—CB1174 (11.745), "Radio Hucke," P.O. Box 6009, relays CB93 of Santiago, until 10:30 p.m. . . . CB946 (9.46), to relay CB150 and CB118 of Santiago, is reported to be under construction. It will have a power of 5,000 watts.

CHINA—XGOY (11.9), operated by the Central Broadcasting Administration at Chungking, transmits daily from 5:30 to 7:10 a.m., directed to Japan; from 8 to 10:30 a.m., directed to South China; from 11 to 11:30 a.m., directed to the U.S.S.R. and from 4:30 to 6:30 p.m., directed to Europe. XGOX (17.8), broadcasts nightly from 9:30 to 11:30 p.m., directed to the United States. The power of the station is 35,000 watts . . . Alan Breen of Dunedin, New Zealand, writes that XMHA (11.855) of Shanghai, power 500 watts (to be doubled soon), transmits weekdays from 5 to 11 a.m. and from 11 p.m. to 1 a.m. and on Sundays from 10 p.m. to 11 a.m. Monday . . . XPSA (7.01), the Kweichow Broadcasting station at Kweiyang, verifies with a carbon copy of a circular letter signed by T. L. Tung. The schedule is daily from 5:30 to 11 a.m. with news in English at 9 a.m. relayed from XGOY. The program opens with the Chinese National Anthem and closes down with "Song in Memory of Dr. Sun Yat-Sen." . . . According to a verification received by Gail Beyer of Chicago, Illinois, the Chinese station near 11.4, is XRVG, Chungking. This transmitter went off the air the latter part of February.

COLOMBIA—HJ1ABP (4.925), Cartagena, signs-off nightly at 10:30 p.m. with "Under the Double Eagle March."

COSTA RICA—TIPG (9.612), San Jose, is now operating from 7 to 9:30 a.m., 12 noon to 2, and from 8 to 11:30 p.m.

ECUADOR—HC2ET (9.19), Guayaquil, broadcasts nightly from 8 to 10 p.m., sometimes signing off a few minutes before 10. The interval signal consists of 12 chimes, which are sounded when the station first comes on the air and before the station identification is given . . . HCJB (12.46), Quito, issues a white card with black call letters which gives the schedule as daily except Mondays, from 7 to 8:15, 11:30 a.m. to 2:30, and from 5 to 10:30 p.m.

GUATEMALA—Eduardo Perez Figueroa, Director General of Communications for Guatemala, notifies me that announcements in Spatari, the new universal radio language, are now being given on the regular weekly dx programs which are radiated from TG2 (6.195) of Guatemala City, each Sunday, from 2 to 2:30 a.m. Reports in Spatari will be verified with special TG2 Spatari QSL cards.

HUNGARY—According to several different listeners the new experimental Budapest station on 7.221, is HAAT2, H for Hungary, A for America, A for America, T for Tibet, No. 2, instead of HAAQ2, as given in this column for last issue.

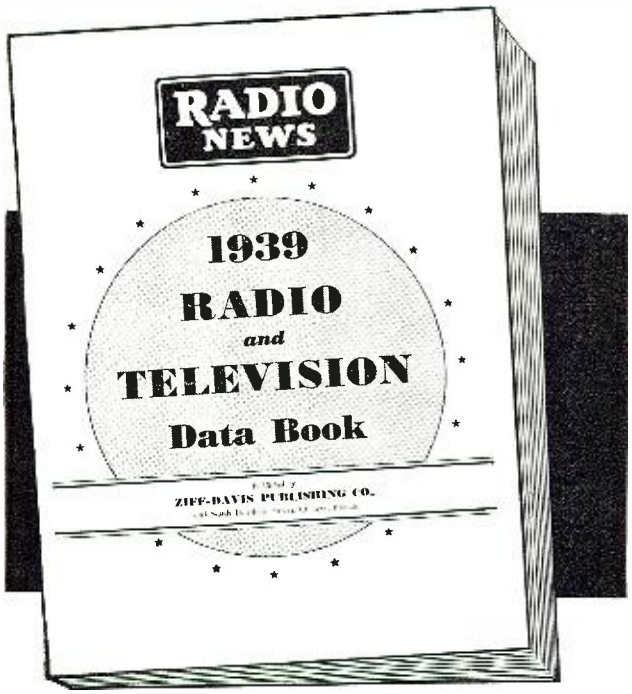
IRAQ—Alan Breen of Dunedin, New Zealand, writes Y15KG (7.14), the Qasr El-Zehoor Broadcasting Station, at Baghdad, Iraq, issues an attractive photograph of H.R.H. Prince Faisal, bearing call letters in black with blue shading and the address in arabic characters, as a QSL card. Power of the transmitter is given as 1000 watts.

LITHUANIA—LYR (9.29), power 500 watts, has been testing daily from 12 noon to 2 p.m. and from 12 midnight to 1 a.m., since last February.

MACAO—CRY9 (6.08), of Macao, operates Mondays only, from 8:30 to 10 a.m., closing down with the words, "CRY9, Macao, closing down until next Monday at the same time."

NICARAGUA — YNDG (formerly

(*More Flashes on page* 51)



FREE

RADIO NEWS 1939
Radio and Television Data Book

FOR THE SERVICEMAN EXPERIMENTER AMATEUR

You can obtain this great book *absolutely free of charge!* Fill out and return the coupon with your remittance of $1 for 12 issues of RADIO NEWS, and we will rush a copy to you without any additional cost! If you are already a subscriber and want this book, mail the order blank with your remittance and your present subscription will be extended. Act now—our supply of these valuable books is limited!

JUST GLANCE OVER THIS PARTIAL LIST OF CONTENTS

● TELEVISION

Television Occupations of the Future
Television Words and Terms
Building a Television Receiver

● RECEIVER SECTION

The Jones 8 Tube Superhet.
Radio Tuner for P.A. Systems

● TRANSMITTER SECTION

Visual Deviation Meter
20-watt Bandswitch Transmitter
U. S. Government Amateur Radio Regulations

● INSTRUMENTS

An Electric Calibrator
Home-Built Audio Oscillator
A Vacuum Tube Volt-meter

● GENERAL SECTION

Wire Table—Winding Turns per inch
Building a Radio Treasure Hunter
International "Q" Signals

● EXPERIMENTER SECTION

Dual Diversity Coupler
Constructing a Polarized Relay
Home-made Scratch Filter
Single Tube Announcer

● SERVICEMEN'S SECTION

Service Problems with Interference
How to Advertise Your Shop
Handy File System
Measuring Power Output
Servicing A.F.C. Systems
Tips on Radio Noises

● AMPLIFIER SECTION

An AC-DC 4-watt Amplifer
A Scotchman's Special Amplifier
Making Your Own Records
DB 2-4000 ohm Conversion Chart

● GADGET SECTION

Home-made Pilot Light Socket
Meter Kinks
Increase Voltmeter Utility
Fish-pole Antenna
Plugin Resistors
Projection Device for CR-913 Tubes

Numerous illustrations, charts, hook ups and diagrams. Many different items and articles, giving complete radio coverage. A wealth of invaluable radio information. Actual size, 8"x11".

Radio News, Dept. 99D
608 S. Dearborn St., Chicago, Ill.

Enclosed find $1. Send me the next 12 issues of RADIO NEWS and rush a copy of the 1939 RADIO DATA BOOK to me without charge. (If renewal, check here ☐.)

Name .....

Address .....

City ..... State.....

Please describe your occupation: ....

Dialomatic Rig

(*Continued from page* 16)

original position of the switch is set to proper position, the stepper will advance the switch in the trunk compartment exactly ten steps. As soon as the pilot contacts are reached by the stepper—the stepping relay cannot operate the switch beyond the proper setting and the lamp will light above the 10 meter selector button.

The next band is selected by closing the proper switch in the same manner. If the next band is not to be used, it is only necessary to close the proper switch and to dial until the proper pilot lamp goes on. As the stepper reaches proper position, the relay will automatically drop out and stop rotation. This stepper will operate at the fastest speed to which the dial can be set, and the change from one band to the next requires only about one second.

Next month's article will describe the remote amplifier which features pre-tuned r.f. circuits, simplified audio peak-compression, and automatic loading of all bands to an eight foot vertical antenna. This versatile unit has self-contained *Eicor* Generator, for furnishing power to the amplifier-modulator and is ideally suited to many radio services. —30—

Servicemen's Cases

(*Continued from page* 42)

BELMONT 740, 741

Same Case Histories as those listed for Belmont 588

BELMONT 750

Failure to operate over both bands	1)	defective type '2A7 tube (even though it may test O.K.) Replace with new tube by substitution
	2)	defective wave-change switch contacts
Slipping dial drive	..1)	slide the bronze washer drive assembly either closer or farther away from the variable shaft, in the slot in which it is mounted

BELMONT 770

Hum, (intermittent, appearing after receiver is "on" for some time and disappearing if line switch is snapped "off" and "on")	.....1)	common lead of the dual 0.1- and 0.25-mfd., 200-volt condenser "opens" at the point of attachment of the lead to the foil of the condenser. Replace the entire condenser unit by two separate units of identical capacity and voltage rating as the components of the original unit. The 0.1-mfd. condenser is a screen by-pass for the '6B7 tube; the 0.25-mfd. cond. is a hum filter for the bias voltage of the '42 tube
Frying noise (heard only until tubes warm up)	..1)	due to scintillation of the special "regulator" type electrolytic filter condensers used in this receiver. Do not replace condensers because of this scintillation noise — it shows normal operation

BELMONT 777

Same Case Histories as listed for Belmont 578 and 770 receiver

BELMONT 777 (Series B, C)

See also Case Histories listed for Belmont 770

Inoperative ...1) oscillator coupling coil "shorted" by terminal of 19,000-ohm resistor (in '76 oscillator tube plate circuit) making direct contact with terminal of 100-ohm resistor in this same plate circuit. Keep these two resistors apart

BELMONT 778, 786, 787

Dial drive slip- 1) install new type belt take-up page assembly now available from manufacturer for these receivers. (Note: some Model 787 dial drives are equipped with a wide red belt. In these receivers, this belt will still give trouble even if the newer type belt take-up assembly is installed. It is advisable to replace the belt with a newer two-ply type)

BELMONT 804

Same Case Histories as listed for Belmont 415 receiver

BELMONT 878, 879

Dial drive slip- 1) install new type belt take-up page assembly now available from manufacturer for these receivers

BELMONT 888, 889

Same Case Histories as those listed for Belmont 588 receivers

BELMONT 1170

Same Case Histories as those listed for Belmont 588 and 685 receivers

BELMONT 1170B

See also Case Histories listed for Belmont 588 and 685 receivers

Inoperative ....1) check the 0.1-mfd. condenser (tubes check O.K.) (**Part No. 100.20**) located at the base of the 6F5 tube. (It is connected from the center of the two 100-ohm resistors which are connected in series from the plate of the 6F5 tube to the primary of the input transformer.) Replace with a 0.1-mfd. 600-volt unit

BELMONT 1171, 1172

See also Case Histories listed for Belmont 685 receiver

Pilot lights do not light 1) 2-amp. line-fuse blown (in those chassis equipped with a '5Z4 rectifier tube and a line fuse). First disconnect all power. Then remove fuse cover located on back flange of chassis. Replace blown fuse with a 2-amp. fuse. If replacement fuse also blows out, check all tubes (particularly the '5Z4 rectifier) circuit, repair or replace inoperative tubes or parts

BELMONT-GAMBLE 777 Series B-C, 778 Series A

Intermittent hum, (disappears when line switch is snapped off and on) ...1) Intermittent open-circuiting of the common lead of the dual condenser unit (0.1—0.25-mfd., 220-volt) comprising the bias voltage hum filter and screen by-pass condensers. Replace the entire unit with two separate units of same capacity and voltage

BEST 4 TUBE MIDGET

Inoperative, (only voltage present across speaker field)	...1)	defective type '25Z5 tube, caused by an open-circuit inside one of the cathode leads. Replace with new tube
Difficulty in tuning, Set drifts off frequency setting	...1)	loose tension of the springs on the tuning condenser rotors. Solder pigtails across rotors and springs

B.O.P. Auto-Radio Receivers

See also Case History listings under United Motors

B.O.P. "AIR MATE" Auto Radio

Inoperative	...1)	substitute a new vibrator
Distortion, Poor tone at high volume	....1)	decrease of value of condensers in electrolytic condenser block. Replace the complete section if any unit is defective (never replace single units)

B.O.P.—BUICK

Inoperative (jolting the receiver starts it, dead again after it has been turned off)	....1)	faulty vibrator. Substitute a new one
Motorboating Steady whistle	..1)	(in 1934 receivers) generally due to breaking of an r-f cathode by-pass condenser lead. Inspect the largest condenser of cluster of three, jammed between lid and the other two

BOSCH CB 49

Same Case Histories as those listed for Bosch 16, 17, 18

[*This interesting series by Mr. Ghirardi will be continued next month.*—ED.] —30—

Free Point Analyzer

(*Continued from page* 39)

PARTS LIST

1—8 prong octal analyzer plug (Bud)
5—Analyzer plug adapters 8-7L; 8-7S; 8-6; 8-5; 8-4 (Bud)
1—9 wire cable, 5½ ft. (Bud)
1—9 button switch (2 S.P.D.T. on each button) (Oak)
1—9 button switch (1 S.P.S.T. on each button) (Oak)
1—4 P.D.T. Anti-capacity switch (Federal)
3—Black Insulated Phone Tip Jacks (Bud)
2—Red Insulated Phone Tip Jacks (Bud)
1—Black Insulated dual grid cap (Bud)
1—Red Insulated alligator clip (Bud)
1—Black Insulated Phone Tip Plug (Bud)
1—8 prong octal socket (Eby)
1—7 prong universal socket (Eby)
1—6 prong standard socket (Eby)
1—5 prong standard socket (Eby)
1—4 prong standard socket (Eby)
1—Bakelite panel, 1/8"x7"x7½"
1—Steel case, 3"x7"x7½"
4—Rubber feet; hook-up wire, mounting screws, etc.

—30—

RADIO NEWS Transmitter
(*Continued from page 32*)

the speech (tone control). If correctly built there should be a deep bass tone in one setting. That is the one which will cut through the QRM.

Next advance the sensitivity control of the *VOX* system and listen for the *VOX* relay to throw over. If it cannot be heard, put the receiver on, and place the receiver in the *VOX-operative* condition. The *VOX* should cut out the receiver and throw the relays for the transmitting side (as evidenced by the resistance lights lighting). If previous checks have been made as indicated above, everything should function perfectly.

Testing and Tuning the RF

It is assumed that the r.f. is now ready for test. Place the final r.f. phone-c.w. switch in the *neutral* position, to prevent the high voltage from getting to the final. Turn on the filaments of the (Taylor) 866 Jr.s and allow them to heat for at least one-half hour. This precaution should be observed with any of the high voltage mercury rectifiers when they are first placed in service. Later they need only be warmed up for a few minutes.

Next turn the auto-transformer which governs the a.c. output of the 550-watt to the minimum position (about 10 v. a.c.) and turn on the a.c. to the various power transformers.

Using any one of the variable crystals, adjust in the normal manner. Check each crystal in turn, and also the *Meissner Signal Shifter*. The tuning of the crystal, 1st buffer and 2nd buffer sections should be without hitch since the former requires no neutralizing (used only as a doubler) and the latter is a beam-power pentode. There should be at least 20-30 mils of grid current available at the final.

Once everything is in resonance, the voltage of the 550-watt generator may be brought up to 115 v. a.c. The readings of the various meters should be as follows: (for the 20-meter band) xtal-buffer plate—65MA; 2nd buffer plate—90MA; Amplifier grid—22MA; 1st buffer grid—4-8 MA.

Next the final is neutralized in the normal fashion.

Reducing the voltage to the final power supplies again to about 10 volts, the phone-c.w. switch is placed in the c.w. position and the rig turned on. Place a load across the output terminals and increase the voltage steadily until the final reads just 200MA at 115 v. a.c. input to the final power supply. The r.f. is now adjusted.

Turn the rig off, and place the phone-c.w. switch in the phone position. Turn it on again, and the underload relay should pick up and the modulators should be in the circuit. The idling current of the (Taylor) TZ40's should be about 35-50MA, and they should be able to be swung to about 150MA under full speech impetus.

The rig is now ready to be placed on the air.

Conclusion

It will take a little time before the amateur becomes thoroughly familiar with the operation of the rig in all of its features. This is true because of the fact that it contains probably as many of the outstanding advantages which have been developed for ham radio today as is possible to place in one cabinet.

From time to time certain of the circuits will require slight "touching up" and occasionally a "bug" may appear which can be easily located. But all in all, the rig is so constructed that it should be one which can be kept intact for a considerable period of time.

In building the rig the authors had in mind that most of the amount of change would come in the r.f. section and with the type of construction used it is a simple matter to replace the present r.f. chassis with one of newer design when the latter will be evolved.

Some complaint may be found because of the mounting of two tubes under the r.f. chassis, making them hard to replace. Information from the manufacturers of these tubes (Taylor and RCA) led the authors to believe that replacement need only be made at the end of several thousand hours of operation. In ordinary ham parlance this would mean about once every 18 months. To replace these tubes it is necessary to remove the r.f. chassis. In doing so, be sure to tag all of the connector leads so that they will be replaced in proper order.

In building in the *RME* receiver, the connections to the a.c. input and to the relay are by means of male and female connector plugs. This was used so as to make it possible to remove the receiver with the minimum amount of effort enabling the operator to get to the *VOX* or speech amplifier systems.

The modulators are accessible at once as are the power supplies and the generators. Any generator may be taken from the cabinet simply by pulling the plugs which connect it to the a.c.-d.c. control panel.

The equipment should be taken care of and should be dusted on the inside and outside regularly. The generators should be oiled with a light grade of machine oil about once every month, and if the rig is inoperative for an appreciable amount of time the generators should be run from 15 minutes to a half hour once a month, without load, to prevent the brushes from sticking and to keep the commutators shiny.

One last word of warning: in constructing the RADIO NEWS 1940 "All-Purpose" Transmitter-Receiver, the *Signal Shifter* was included for rapid QSY. This does not indicate that it should be used to comb any one the band used from one end to the other, causing unnecessary QRM. It will be found that staying on one frequency, moving slightly by either crystal or *Signal Shifter* control will enable the operator to complete almost every QSO, 100%. That is the purpose of the variable frequency control in the unit.

—30—

[*The authors wish to thank the following manufacturers who, by their cooperation and assistance, made the construction of the* RADIO NEWS *1940 All-Purpose Transmitter-Receiver possible.*—ED.

Radio Manufacturing Engineers, Browning Laboratories, Bliley Electric Co., Cardwell Mfg. Co., Aerovox Corporation, Ward-Leonard Mfg. Co., Guardian Electric Co., Shure Bros. Co., American Phenolic Corporation, Consolidated Wire Corporation, Taylor Tubes, Inc., Triplett Electrical Instrument Co., Par-Metal Products Corporation, Pioneer Genemotor Corporation, Standard Transformer Corporation, Barker & Williamson, The National Co., P. R. Mallory & Co., Inc., Ohmite Manufacturing Co., Meissner Mfg. Co., S. S. White Mfg. Co., and Martin-Flash Key Corporation.]

"I'ZE ON THE AIR"

O you advertize to "Alkalize,"
And radioize to slenderize;
But it's gosh darn hard to mesmerize
The air waves all the time.

While you synchronize to vulcanize
And pasteurize to iodize,
Don't you think it's time to realize
What the air waves lack is RHYME?

For you hypnotize with alibis,
And paralize with lullabizes;
But you've still got time—apologize,
And give the air lanes RHYME.

Must you burglarize to commercialize?
Can't you systematize and organize?
The South Sea Islands visualize—
They're "daffy" over RHYME.

While you humanize and specialize,
Don't dramatize but sympathize
With those too dumb to patronize
Until they hear this RHYME.

You could carmelize to appetize,
(Never atomize to spiritualize
Those few with nerve to criticize
The author of a RHYME).

Can't you Evangelize to emphasize,
Or capsize to compromize?
And show the spunk that petrifizes
The ones who dial this RHYME.

Next you specialize and popularize,
And tantalize the "publicize,"
Who'd censorize and penalize
Just 'cause they ain't got RHYME.

Boy—to fraternize and chastize
Let's summarize and memorize
The fact that you will capitalize
And "air" this little RHYME.

So long; No time to eulogize
To generalize nor sterilize;
WE'VE JUST GOT TIME TO BAPTIZE—
THE RHYME GOES "ON THE AIR."

(By "Anna Lize.")

—30—

Short Wave Flashes

(*Continued from page 46*)

YN3DG) of Leon, Nicaragua, operates regularly on a frequency of 7.66, but shifts to 13.9, Saturday nights at 10 p.m., in order to transmit a special program for dx'ers. Special announcements in Spatari are given. All correct reports enclosing a dime to defray return postage are promptly verified. An attractive photograph of the station is available for 25c.

NORWAY—The Oslo station has been assigned a new call and frequency, to be used whenever the occasion may demand, namely, LLN (17.825).

PARAGUAY—ZP14 (11.72) of Villarica, broadcasts Mondays through Fridays from 5 to 8 p.m. and on Saturdays and Sundays, from 11 a.m. to 6 p.m.

P. I.—KZIB (9.49), broadcasts direct from the floor of the Manila Stock Exchange, nightly from 8:30 p.m. to 2:40 a.m.

REUNION—"Radio St. Denis," located at St. Denis, power 60 watts, broadcasts irregularly on a frequency of 9.6.

SPAIN—The official announced schedule for EAQ (9.86) of Madrid, is weekdays from 7:45 to 8:30 p.m.

SWEDEN—According to the Newark News Radio Club, the new calls and frequencies for the Swedish stations are: SBT (15.155), SBP (11.705), SBU (9.535) and SBO (6.065). SBT replaces SM5SX, the experimental station at Motala.

TURKEY—An official letter from TAP (9.465), informs me that the Correspondence Section of the station is in the process of catching up on back correspondence, and that just as soon as this is completed, QSL cards will be prepared for future reports. TAP broadcasts a Post Bag program in English and German on Saturdays at 3 p.m., and dance music daily at noon and 4:20 p.m. EST.

URUGUAY—The correct schedule for CXA6 (9.62), Montevideo, is, according to A. Tuft of London, daily from 10:30 a.m. to 12:30 and from 3:30 to 9:30 p.m.

UNITED STATES—According to the IRM, weather reports may be tuned in from various stations as follows: from WMI (2.55, 6.47 and 11.37) of Lorraine, Ohio, at 11 a.m. and 10 p.m.; from NNG (2.662), Mobile, Alabama, at 12 midnight and 10 a.m. and from NNC (2.662), at San Francisco, California, at 10 a.m. and 12 midnight.

VENEZUELA—John Larsen of Geneva, New York, writes that YV5RO (4.94), "The Voice of Venezuela," in Caracas, announces in Spanish at five minutes after the hour and every fifteen minutes, and in English at 9:55 p.m. before signing-off at 10 p.m.

Amateur Reception Notes

BELGIAN CONGO—OQ5AA (14.10), is back on the air again and being heard near 6 to 6:30 p.m. . . . OQ5AE has sailed for the Congo and expects to be on the air in the Fall.

CEYLON—VS7GJ is now enjoying a visit to Europe, but he will QSL when he returns to Ceylon in about 6 months.

FRENCH INDIA—Gail Beyer of Chicago, Illinois, writes that FN1C (14.084) of Chandernagore, operates with a power of 100 watts, almost daily from 7:30 to 9 a.m. His QSL card is a real beauty, picturing a ball of blue in the center with the head of a bengal tiger within it in yellow, and the call letters in black.

GIBRALTAR—ZB2B (14.135), P.O. Box 201, is being heard from 6 to 8:30 p.m. irregularly.

GREECE—There is under consideration a law authorizing issuance of new licenses for amateurs under certain conditions. Stations now licensed are SV1CA, SV1NK, SV1KE, SV1GR and SV1MP.

JARVIS ISLAND—John W. May of Wilkinsburg, Penna., informs me that KG6NVJ verified with a QSL card having the call in blue outlined in black against a silver background.

NEWFOUNDLAND—VO1P finally verified a report of reception submitted in 1937, stating that VO5 are no longer allowed to operate on phone on 40 meters.

PALESTINE—ZC6IIS (14.3), P.O. Box 163, Haifa, is being heard near 5 p.m. Reports to ZC6IIS and other ZC6 stations should be sent in sealed envelopes with no mention of radio or call since all amateurs operating in this country are believed to be unlicensed. ZC6RL will soon be operating on phone on 14.07.

PHOENIX ISLAND—According to Roger Legge of Binghamton, New York, KF6DHW (14.378), verified with a white QSL card having large red and silver call letters. The operator Charles Calley, Jr., has returned to Honolulu, his place at Phoenix, having been taken by KF6PMO.

TIBET—AC4YN, whose new 100 watt rig was built by FN1C, is reported to be on the air on 14.292 and 14.290, with a beam directive to North America. He is supposedly being heard near 1, 6:30 and 8 to 10 a.m. EST.

Ultra High's

W2XMN, the 40.000 watt, static-free station of Edwin H. Armstrong, at New York City, may still be heard conducting tests on 42.8 . . . W4XA (26.15) of Nashville, Tenn., operates weekdays from 11 a.m. to 8 p.m., or later. W4XA originates most of its programs and features an excellent variety of classical music. Radio dealers in the vicinity of Nashville, are reported to be doing a land office business, building, and installing converters to adapt any broadcast receiver to W4XA's frequency. Full information about the convertor may be had by writing to Tom Stewart of the station . . . X8XUJ (26), Cincinnati, Ohio, transmits facsimile with a power of 1000 watts, daily from 2:15 to 3:15 p.m. . . . W9XA of Kansas City, Missouri, may soon shift to a frequency of exactly 26 mc., where it will maintain a constant frequency so exact that it may be regarded by amateurs and others as a substandard of frequency . . . John M. Sherman, the Technical Director, for WTCN, Minneapolis-St. Paul, writes that relay broadcast station W9XTC has been temporarily withdrawn from service.

(*Continued on next page*)

Television

NBC's television station W2XBS has increased its studio telecasts for viewers in the New York area to three a week, namely, Tuesdays, Thursdays and Fridays, from 7:30 to 8:30 p.m. EST. Outdoor telecasts relayed by the NBC mobile television station from the World's Fair will likewise be stepped up to three hours weekly. These will be seen and heard Thursdays, Fridays and Saturday afternoon. Movie telecasts will be made on Tuesdays, Wednesdays, Thursdays, and Saturdays from 11 a.m. to noon. . . . Contrary to theory that television programs can be received only 40 or 50 miles from the transmitting station, General Electric engineers on a mountain-side near Schcnectady, which is 130 miles from New York, have been receiving the telecasts from W2XBS regularly with good definition and clarity . . . A feat, long considered impossible, was accomplished recently in an NBC telecast of the six-day bicycle race at Madison Square Garden in New York, when images were transmitted over an ordinary telephone line to station W2XBS, and then sent out over the air for viewers in the metropolitan area. This opens up an enormous field of possibilities including the possible projection of pictures at a later date over network wire facilities . . . Latest applicants to apply for licenses for construction of television stations are: Don Lee Broadcasting System, Inc. of Los Angeles; Leroy's Jewelers, and the May Department Store, of Los Angeles, Calif. . . . On June 14, the General Electric Company of Schenectady, New York, inaugurated for the first time, the sale of television receivers. Five models are featured. Picture images range in size from 3 x 4 to 12 inches square.

SHORT WAVES FOR DX'ers on the WEST COAST

by JOHN D. CLARK

All Times Are PACIFIC STANDARD

Indo-China

"RADIO SAIGON," located in Saigon, Indo-China, and recognized as one of the strongest Orientals now being heard in the short wave spectrum, is still not following its printed schedule. This powerful transmitter is on the air daily until 7 a.m. and even later. The first part of the transmission, beginning at 3 a.m. is released on 6.12 meg., while the last hour or so comes through on a frequency of 11.785 meg. The exact time for changeover seems to be rather irregular, sometimes taking place as early as 5 a.m. and as late as 6:15 a.m. The station requests reports on both frequencies from American listeners, and address is given as P. O. Box 412. Announcements are made in French, English, and Chinese; and a special English program is given at approximately 5:45 a.m. daily.

"Radio Boy Landry," after being unreported for several weeks, is again being received by several Pacific Coast listeners near 5 a.m. on its 9.7 meg. frequency. Although its schedule calls for operation until 6:40 a.m., signals usually fade out near 5:30.

China

Station XGOX of Chungking, China, is just concluding a series of special tests as we go to press. This government-operated transmitter sent test broadcasts on 15.19 meg. from 10 p.m. to midnight for a short time and then shifted to 17.8 meg. on the same schedule. Announcements just received indicate that these experimental programs will shortly be continued on the same wavelengths, but probably on a new time schedule. XGOX is attempting to find the most suitable wave and schedule for regular broadcasts to America which will probably be inaugurated in the near future. The next series of tests will be run near 8 or 9 p.m.

Another Chungking station, believed to be XGOY, is relaying the programs of XGOA on 7.17 meg. from approximately 330 to 6 a.m., then shifting to 11.9 meg. and continuing until fade-out near 8 a.m.

XTC of Shanghai, China, is reported to be back on 9.295 meg. after a silence of several months, but a careful check has failed to reveal any trace of this one at our headquarters. The schedule is supposed to be from 5 to 6 a.m., although one listener reports it only from 3:30 to 5 o'clock.

Straits Settlements

ZHP of Singapore has evidently shifted to 9.7 meg. permanently to avoid interference. Although scheduled to sign-off at 6:40 a.m., this popular station often stays on the air until 7 o'clock when relaying programs from London, and closes at 7:40 on the first Wednesday of each month.

Several reports indicate that a Singapore station is working on approximately 6.04 meg. near 5 or 5:30 a.m. It has been signing off at 6:10 a.m. with "God Save the King," indicating rather conclusively that it must be located in Straits Settlements, although definite identification has not been accomplished as yet.

Australia

A new English-speaking station has been logged on approximately 6.12 or 6.13 meg. near midnight. It is very possible that this may be the new Australian broadcaster which was to be located near Perth in West Australia. According to the latest available information this new transmitter has been assigned frequencies of 11.83, 9.56 and 6.13 meg. No reports have been received as yet on either of the two higher frequencies, but it seems quite probable that the station which so many fans have been hearing on 6.13 meg. is the new Australian.

VLR of Melbourne, Australia, has increased its power for both frequencies. It appears that the schedule has again been shifted, since the 9.58 meg. frequency has been reported several times before midnight. It is possible, however, that this was mistaken for the 9.56 meg. wave of the new Perth broadcaster.

Japan

A new and unidentified Nipponese station is operating irregularly on about 6.13 meg. near 10 p.m. This is evidently a phone station, but call letters and location are still undetermined.

There has been no change in the schedules of Overseas Broadcasts from the Broadcasting Corporation of Japan. JZK (15.16 meg.), however, will probably soon be replaced by JZJ (11.8 meg.) for the daily 9:30 to 10:30 transmission.

The Broadcasting Corporation of Japan informs us that the scope of the overseas programs will soon be considerably extended, but no definite information on this is available as yet.

Miscellaneous

Our listeners tell us . . . that the new Javanese station YDF is heard with good volume on 4.96 meg. near 4:30 a.m. . . . that a station announcing as ZMDF, location unknown, has been logged several times on about 9.4 meg. near 11 p.m. . . . that FO8AA of Papeete, Tahiti, now remains on the air until after midnight Friday, but has evidently cancelled the Tuesday transmissions . . . that Japan's JVW3 is on the air as early as 10 p.m. irregularly (11.73 meg) . . . that two new Orientals are working on about 6.28 and 6.54 meg. irregularly near 4:30 a.m. . . . that the mysterious Nipponese transmitter on 7.325 meg. is signing off at 5:30 instead of 7:30 now . . . that another new Oriental station has been logged by many fans on about 8.5 meg. between 3 and 4 a.m. —30—

QRD? de Gy

(*Continued from page 22*)

It seems that the bewitched box would quit whenever it seemed to get the notion. It was as temperamental as a Hollywood movie star, always going off at a tangent whenever it was most urgently needed. Well, upon his return to port he was given his discharge. Sadly, he related this tale to a friend of his who told him everything would have been OK if he had only done one simple thing. Does any bright lad in the audience know what he should have done to take the temperament out of the receiver? (Remember, the boat is in tropical waters.) The answer will be in next month's column, but we'd like to hear what you would have done in like circumstances.

IT is with deep regret and sorrow that we learn of the passing of our friend, Harry

Chetham. He was one of the original old timers and gave many hours of his time corresponding to cheer up old shipmates and aiding in many other ways to help all and sundry. His last duty was as Chief of the Police Radio Xmtr at Somerville, Mass., which he installed. His memory lingers on.

IT is with great pleasure we note the many replies which came to ye Ed in answer to last month's police radio equipment installation. The scope of education and the previous experience of each applicant was indeed gratifying to me because it bespoke the advanced knowledge and continual studying that each op had done. Each letter is being turned over to the person in question and if any one is chosen they will hear directly from him. When men, with qualifications such as were sent in, are out to connect up with a good berth, there is no question but that it is only a matter of getting their applications into the proper hands before they are permanently placed. Men such as these are needed in this radio art. It is forever expanding, forever building up and "knowledge is power," especially in radio. Just another case of doing something worthwhile and darn well . . . so keep the chin up . . . and with 73 . . . ge . . . GY.

—30—

Tube Checker

(*Continued from page* 17)

a short between two other elements of the tube.

If tube is not shorted, proceed as follows for tube quality test. Throw Sw. No. 6 to quality position, Sw. No. 3 up and all other switches down. Set potentiometer to predetermined position and read tube quality on meter. If no reading results Sw. No. 3 is not the cathode connection of the tube under test. If such is the case move the switches separately up and down until a reading results. While reading condition of tube on meter depress Sw. No. 7 and if meter needle does not return to zero the tube has Cathode Heater Leakage.

Be sure to use the proper filament voltage on all tubes. On all filament type tubes it is not necessary to throw Sw. No. 3 in upper position, but simply to read meter. The diodes of duodiode triodes may be tested independently by throwing the switch connected to one diode down, Sw. No. 2 to the right and all other switches *up*. Then the other diode may be tested in the same way.

This tester has proven itself as to accurate performance and I would recommend it to anyone.

—30—

Hamchatter

(*Continued from page* 19)

need for a grid-controlled mousetrap ourselves, Ed.)"

"W9CLR writes that he has organized a new radio club in Alexandria and that so far he is the only licensed amateur in the club. Mr. Young also says that one of the members is working on a radio-controlled model airplane and promises us an article and possibly a picture of it in the near future! Nice going W9CLR!"

Ironic though it was, a tornado swept through Anoka, Minnesota, and surrounding towns right during the height of ARRL Field Day activities, Sunday, June 18th. The Saturday Minneapolis Tribune carried an article headed, "PRACTICE SET FOR CALAMITY BY RADIO CLUB. Pretending

that Minneapolis has been struck by a calamity such as an earthquake or flood, members of the Minneapolis Radio Club will demonstrate Saturday and Sunday what they can do to provide emergency communication." Similar activity was carried on by the St. Paul Radio Club resulting in them running up a high score in the National Field Day

Ye Technical Ed at the RMA Show.

Contest and almost completely tiring themselves out when the tornado hit nearby toward the end of the contest. Adding insult to injury, the tornado heaped trees, a roof and a trailer into the house and yard of W9CWI, at Anoka.—the very house where the permanent Disaster Committee had its first meeting a few weeks ago!

The St. Paul Club activities at Mounds Park broke up on hearing of the disaster. W9PKO was dropped off in St. Paul where he maintained valuable contact with W9IBD operating mobile on 10 meters enroute to Anoka, assisted by W9VED. In Minneapolis, W9NNO, W9OTE, W9ITQ, and N9BP got together and started activities on 10 and 80 meters. W9NNO rushed out to the Minneapolis field day location, but found the bunch had already left. N9BP and W9ITQ called on 80 meters and listened on 80 and 10 from about 5 p.m. on, as did W9HCC at Wayzata. W9MZL drove to Anoka with his 10 meter mobile rig, but received zero cooperation from the local police department, so he returned. It was apparent that a relay point was needed between W9IBD (assisted by W9VED in Anoka on 10 meters) and the Twin Cities. W9OTE and W9JFH jumped in to fill this gap and set up a few miles this side of Anoka at the home of John Dick, Jr., where a gas driven power plant was placed at the disposal of our gang. Messages were relayed, W9IBD to W9OTE to W9NNO, with W9QKX later taking some of the load from W9NNO by receiving and delivering alternate messages. A large volume of highly valuable emergency traffic was handled from Anoka to Minneapolis.

The storm was still close enough so that static was very bad on 10 meters but nothing compared to 80 meters where everyone said it was the worst they had ever heard. With the gain control open one-third, the noise was terrific, and to hear low power emergency rigs more than a mile or so was a feat. Stations in the cities on high power could scarcely hear each other. It is little wonder that the Minneapolis Club station, moved to Anoka by W9TAT and W9YPT, was unable to get through, but these lads deserve plenty of credit for trying desperately.

The St. Paul Radio Club portable station was ably handled by a gang of old timers, mostly presidents and ex-presidents of the club, such as W9BHY, W9JIE, W9ZWW and W9BBL. They got through with St. Paul Police escort and set up right in the center of the disaster strip. N9YCR and N9ZGT following later with the best antenna could not crash the police and National Guard lines to get through to Anoka. Schedules had been arranged with W9ORA, and W9ITQ, N9BP and W9BQY were attempting also to make contact from the cities between about six and ten p.m., but listening to "Chinese Press" all this time was very tiresome and it seemed apparent no signals on 80 meters could get through the awful racket, so most of the gang in the cities went to bed just as the fun began. W9KYC, the St. Paul Club station, contacted N9BP in Minneapolis shortly before eleven p.m. and through horrible static proceeded to unload distress messages. At times each word would have to be sent many times, the signals were so down in the noise, while at other times fair speed was made with BP copying on the mill and his wife phoning the messages. One news report, handled after urgent messages were off, contained 960 words. When BP was asked how he managed to copy anything through the terrific static, he replied, "Well, it was tough, but I tried various combinations until I used the combination of the selectivity of the SX-17, the noise silencer, a five meter vertical receiving antenna, and a heavy chin strap on the phones to keep the static from blowing them off!" Perfect break-in was used both ways, being on opposite ends of the 80 meter band, and all operators had nothing but the highest praise for the others. At about 1 a.m. W9HCC copied parts of W9KYC's messages to N9BP on his Super-Pro, and when static and traffic let up at six a.m. W9BPK was worked, and the nets concluded at about 8:30 a.m. While N9BP fought static fifteen hours after a day's work, those that had participated in the field day activities had not had much sleep the night before, so in a way were poorly prepared for the emergency than ordinary, being all tired out practicing for an emergency!

Actually, the stricken area was narrow and wire communication was possible a few miles distant, but amateur radio was more convenient and a time saver. The main point is that the gang jumped in and did a swell job under actual distress conditions and gained valuable experience not to be learned in a dozen practice field day contests—putting up antennas where things are blown flat; getting through police lines; operating under martial law; working with the Red Cross, Boy Scout messengers, and National Guard; operating under most freaky weather conditions; relaying short distances on 10 meter phone with mobile rigs—these and other conditions encountered have never before been even simulated in a field day contest.

IN the July issue of *QST*, hams were warned not to pass up VS6BF as just another VS6 because that was the call used by the *Pang-Jin*, a Chinese junk bound from Hong-Kong to the N. Y. W. F. and manned by a group of American youths. The *Pang-Jin* was scuttled by her crew in the Red Sea on June 12 after the vibration of tow ropes and a heavy sea opened seams in the junk while it was being towed by a Greek steamer. The *Pang-Jin* had sailed 10,000 miles, over half its journey, without mishap from January 5 until its Red Sea disaster. The balance of the trip was completed in the more orthodox manner. Homer Merrill, LaPorte, Indiana, was one of the crew. Who was, or were, the ops?

Just a few days after my report on W9OZZ, Joe was called out of his shack to check a neighbor's BC set. He had just gone on the air and did not throw the switch before leaving. When he returned the transmitter had blown up. This climaxes a long ordeal of neighbor squawks; most of them for spite rather than interference. Hope Joe can raise the necessary soon to make the required replacements.

9DHK is apparently celebrating the winning of bucks 25 from the would-be-hole-in-one pro by working DX. We eavesdropped on a recent chat with Ferdy at CT2BP. Yuh gotta admit 25 cookies is a nice inspiration.

WINDY BILL writes:

W5HMV has bn wrking lots of DX on 10 fone es 20 CW.

5BRR is an ex-W6 in Baton Rouge wid a KW on 20 CW. He is a big DX man.

W5HVI is an old ham (ex-W5 1921) wid a new call. He is at present on 40 CW.

W5GXO, McComb, Miss., is rly a swell guy. He and W5HMV are planning to visit all the hams in La. on a tour vy sn.

W5HRC has just bought a new revr. Look out DX.

W5ADJ has bn on 1925 KCS. fone wid a KW for many yrs. es is known frm coast to coast.

W5HMV has sure sold lots of Aug. R.N. and give it plenty of adv. on the air. (My PiX. Hi!)

W3EWN tells this story of a neighbor ham whose call he will not mention for obvious reasons. Jerry had a schedule with VK4VD on 14 mc. fone. He called on schedule but could not hear the VK at all. His telephone rang and the neighbor ham called and informed Jerry that VK4VD was calling his head off and coming in fb. Next morning the schedule worked out OK and Jerry found that VK4VD had missed the schedule on the previous day and had not called at all. W3EWN began to have doubts and to wonder if his neighbor was using his imagination, so waiting till he knew this party was on the air and would be listening he made a blind call to ZU6P calling just as if he expected to raise him and sure enough the neighbor bit taking hook, line and sinker. He called Jerry on the phone and said he could hear ZU6P fine business solid copy R7. Jerry is convinced that imagination will bring in more DX than his receiver.

WIDTJ has the right idea. His high voltage power supplies are located in the basement of his home and the leads are brought upstairs in individual conduits covering the highly insulated wires. He uses oil immersed transformers and chokes and has both manual and relay switching systems. He says this allows him to build his eight hundred watt fone rig in half the space it would normally occupy.

W9KRK is making a *bicycle* trip from Chicago to the West Coast. We bet Ed doesn't ride a bike that far. He must have a trailer concealed somewhere along the route. He started out with another ham who returned to Chicago within a few days.

W9RLH acquired a 35T and intends to increase his power to 225 Watts on 14 mc fone within the next week. Be careful of that high voltage, Marshal.

W9TLO spent the nite with W9TB and worked a lot of DX. Johnny hasn't been having much luck at his own station.

W9ISR has just built a new speech amplifier but isn't satisfied with the way it is working. He also installed a crystal microphone.

SCOOP!!

W9AM is at present planning a trip around the world. He has a 150-watt fone rig along on the one-hundred-twenty-seven schooner *Starling*. His antenna is 120 feet above the waterline and is 37 feet long with simple capacity coupling. Ray sez he plans to take in Pitcarin Island, the Fiji Islands and all other points of interest along the way. It is a pleasure trip and he intends to visit as many hams as possible. The regular marine call of the *Starling* is KMND and can be heard on 3105 kc, 6210 kc, and 1285 kc and Roy is the regular operator. He will hold schedules with W9SZY in Chicago on 14 mc fone. He will also have a WIO call which has not been assigned as yet. This column hopes to print the call letters as soon as they are issued. At present the *Starling* is equipping at Brooklyn, N. Y., and will set sail as soon as these details are attended to.

W9FXT is back on 20 meters after a short sojourn on ten. Guess we will hear a lot of him as he is on a two weeks' vacation.

W9CVK, Dave, had a telephone pole put up for his beam antenna and now he is getting out all over the world with a much louder signal.

—30—

Solving the Intermittent

(*Continued from page* 27)

rubber insulation was faulty; cracked and crumbled at at least one point because of either too sharp a bend during shipment or from being dried out with age. Dirt and moisture made the set erratic. While there are many similar cables in use, failures in them are infrequent; for this reason the repairman often forgets to consider them as a source of trouble. Flex the loom slowly, and—if trouble is found—don't be satisfied to run jumpers to take the place of the affected leads. Replace the entire loom. An annoying job, but necessary for the protection of shop reputation.

Coupling condensers should always be viewed with suspicion. It has been my experience that they get more attention than they deserve because they are checked first. Failures in r-f or filter condensers are as common, but the coupling condenser seems to be in such a sinister circuit position that the repairman is quick to suspect it. Give it prior examination if you so wish—that's better than neglecting the unit. The most obvious "intermittents," however, are never the most troublesome ones!

A peculiar inversion of heat failure occurred at a call I answered two weeks after the set had been sold. The complaint was that the customer had trouble heating his house ever since the set had been installed! After all, a serviceman gets a lot of queer squawks— "It plays too slow" is typical—so I spent the time on my first call pacifying him in order to cinch the set sale. The violence of the second call, though, put me to work in earnest. They had been listening, they told me, to the set while they wore fur coats!

Naturally, I found the trouble—but I am ashamed to confess the time it took. Warm air had been rising from the console past a furnace-regulating thermostat. It was a heat failure which *didn't* affect set performance!

While electrical failures play an important part in the problem which faces a serviceman tackling an "intermittent," of more importance is his treatment of the customer before, during, and after the work is done. Customers are unusually cynical and suspicious when they order work on a fading set, and so there is the problem of good-will to contend with. Unfortunately, smoke seldom accompanies an "intermittent," and the customer has to be prepared for a price which will cover the unusually difficult procedure the remedy involves.

The repairman must break the set down, repair it following difficult methods of test, and insure himself against ill-will by checking against future fades from *any* source. These requirements are not impossible, but they're plenty tough!

[*This is the second of a series of three articles on "intermittents" by "Tester" Bradley. Next month, the author invites you to go with him on a call. If you are an oldtimer, follow him step by step for comparison; if you are a beginner, it will be an excellent opportunity for you to learn how a veteran handles his equipment and his customers under the most trying conditions.*—Ed.]

—30—

Conquer the Code

(*Continued from page* 25)

will concern you before then is when you estimate your code speed.

A "word," in radio code, is the amount of intelligence that can be expressed in 24 keying cycles. "Worn," on the diagram, happens to require exactly that amount. Words of various code—and letter-length are, of course mixed in transmission without regard to the *actual* word length, but their average code length has been determined at 24 cycles of keying, or 48 time units. The computation involves an elaborate consideration of word lengths compared with the frequency with which they appear; and of the code lengths of letters, compared with the number of times they are used. Don't bother to check the figures unless you anticipate being wrecked alone on a desert island, or are unoccupied until after Europe pays its war debts.

If the word "worn" is sent in three seconds, the rate will be 20 words per minute (w.p.m.). The ratio between keying speed (in cycles per second) and w.p.m. is two to five. The rate in c.p.s., then, would be eight. At this keying speed, each dot *cycle* would last an eighth of a second; each two-cycle dash, a quarter second. At ten w.p.m., at a keying speed of four cycles, the dot cycles would be a quarter second long, and the two dash-cycles, a half second. "Worn," at this speed, would be sent in exactly six seconds.

The five BSL proportions on the diagram, of course, hold good at any keying speed. Estimating your speed by means of BSL will give you more accurate results than by the usual "counting of letters per minute and dividing by five." The BSL method is based upon the *code* lengths being sent, while the other considers all letters of equal length. With the latter method, to illustrate with an extreme, a count of five-letter groups of *e's* would indicate a much higher speed than corresponding groups of *o's*, even when the actual keying speed was the same in both cases. While *e* and *o* are both single letters, *e* requires two cycles; *o*, seven. So estimate your code speed by the actual BSL total; when you are tested, it will be with automatic equipment which is calibrated in keying-cycle rate, not letter-rate.

The application of these rhythmic fundamentals will be valuable in terms of circuit operation. A good fist, aside from its beautiful sound, has another intrinsic worth. As one of the most important factors in signaling is the

optimum contrast between the two carrier conditions, good sending—to take advantage of the available contrast—is fully as important as good equipment. Under adverse conditions of static and fading, the maximum speed and distance is possible only when the BSL proportions are kept. For instance, if the sending is "chirpy," or light, the dot "mark" does not occupy as much of the dot-cycle as it should, and hence contrast between the two conditions is lost. If sending is "heavy," the dot "mark" equals more than half the keying cycle. The best efficiency between transmitter and receiver is maintained by dividing the cycle into equal parts of "mark" and "space"; any divergence from this proportion results in either a lower speed or a reduced range. A good fist, then, is as important as new tubes or increased power. Cultivate the ideal sending proportions and put your money in the bank.

Quite frequently I am asked by beginners how the painful code-learning interval may be shortened or ameliorated. There is no shortcut or analgesic. During the war, code students were told to wear live earphones while they were asleep. The theory was that they would absorb instruction more rapidly by subconscious osmosis. It might have been based on good psychology, but I remember that my problem was to keep the buzzing *out* of my ears at night after I practised code during the day.

You will suffer more in raising your speed from 0 to 10 w.p.m. than from 10 to 50. Once you pass 10, you *feel* the code, sensing its sequence and proportion rather than analyzing each word as a number of signals. Perhaps the best system is the one suggested by a professional friend of mine: "Make your ears positive, your hands negative, and short-circuit your brain."

It is a good idea to "short-circuit your brain" when you listen to music—in this condition you get the greatest emotional wallop. It's the best way to listen to code, too; for code has varying pitch, changing volume, and a basic rhythm. A good brass-pounder puts music on the air.

—30—

Bibliography

"Time Division Mutilplex in Radiotelegraphic Practise," by J. L. Callahan, R. E. Mathes, and A. Kahn; Proc., I.R.E., January, 1938.

[*An excellent source of information for those interested in a more technical treatment of modern commercial code operation.*—Ed.]

As I See It!

(*Continued from page 9*)

customary for many years to take certain operations to be found in a radio receiver as a matter of fact—to judge the performance of certain sections of a system by the final effect. Considering the subject from the educational viewpoint only, elevation of the technical level of the serviceman of the world is enhanced because his daily activity enables him to check or establish the practical performance of that which he studied in theory.

The fact that many different types of defects are productive of the same final effect has in the past greatly interfered with maximum comprehensive interpretation of theory in practice. In fact, the limited scope of service operation in the past has hindered full recognition of the actual function of the numerous components in a radio receiving system. Experience proves that the consequences of the limited scope of service operation in the past combined with limited knowledge of theory has interfered with the complete understanding of such an important matter as the distribution of the signal in a radio receiving system.

To the above it is possible to add the lack of understanding of the function of many of the components used in the receiver—components which, while associated with the signal, were located external of the usual coupling units—and when defective, were as a rule, pregnant with complications and productive of defects extremely difficult to find.

Modern communication system design differs radically from what has been used in the past, although it is true that basically all radio receivers are alike. But components considered vital and necessary in the past, in order to avoid certain effects, now are deliberately omitted so as to create this so-called undesired effect, for what beneficial action it has upon the performance of the modern system with respect to the signal. We refer to the by-pass condenser, regeneration, and degeneration.

The idea of locating a defect by tracing the signal provides the means of studying the action of the various components, since all of the components are associated with the signal. The ability to trace the signal affords the opportunity of identifying the zone of influence of the various defects and in that way establishing the zone of influence of the components. Such information is extremely instructive because it provides a greater insight to the role of the various components. It is by studying the effect of a repair that we learn the actual function of the part.

Yes sir, the process of signal tracing, whether you listen to the signal, check the level or its character, as a means of establishing the defect affords tremendous advantages in connection with study and further familiarity with radio theory. . . . And to that we will add, by sticking our neck out, that it will become the universal method of trouble localization.

A Few Suggestions to Manufacturers and Jobbers

ALTHOUGH the usual abundance of comment has ceased, the need for certain information still exists in the radio servicing field and those manufacturers who cater to the industry can

well afford to give some thought to the subject. The same applies to parts jobbers who aim to serve their customers.

A need exists for a recapitulation of radio receiver owners divided into territories with a breakdown to show the possible customers in various parts of the country, with a summary in accordance with the population of towns. In other words, an average of receivers in use with respect to population will afford data concerning the possible customers a service shop can draw on in any one community. This is of great value to the service shop owner by enabling him to decide if his present operating area is sufficient—or if he has to expand—and if such expansion is justified with respect to cost and added business.

The jobber who wishes to serve his customers best can do so by giving information relative to the choice of locations in different communities. Many jobbers are selling nationally known brands of radio receivers and it is very possible that such receivers can be sold through well-located radio service shops. In fact, it is highly probable that some such modification of service station activity is vital to the welfare of the service industry. If such is the case, then it is high time that servicemen gave some thought to activities which would be founded upon efforts more direct than "word by mouth" advertising.

The average successful jobber is successful because of certain activities, selling, displays, advertising, location, etc. In the past, the radio service industry has waited for instruction from the parts manufacturers. Maybe the parts jobbers can serve equally well, if not better in this advisory capacity. Maybe some of the service meetings run by jobbers in conjunction with some manufacturer or without the support of a parts manufacturer can be devoted to a discussion of such items as have been mentioned herein. Maybe some of the catalogs furnished by parts jobbers can contain instruction material along such lines.

The service industry is not too proud to accept help. It needs help and possibly a revision of its activities. Maybe the ideas which have been entertained in the past are not of the best and some change is required. Who can tell? All that is known is that the volume of technical service business coming into the average service shop is not sufficient to carry the shop.

We mentioned several months ago that we felt service activity must embrace appliances. It seems that this is correct because a number of servicemen have made connections with electrical shops—in fact have gone into partnership with electricians and find it advantageous. The electrician partner drums up trade for the service part of the business and the serviceman drums up trade for the electrician. Both, also, try to get as much set business as possible—small sets of course—or at least sets priced at figures within the financial possibilities of the partners.

Do These Stories Have a Moral?

THE running board on our car was damaged when another car sideswiped us. We took the car to the service station and we were "sold a bill of goods" to have the running board replaced. It was done and later on we discovered that the running board could have been repaired, but the man tried to sell a new one, because it meant more business, and he succeeded. Was he taking unfair advantage or was he a salesman?

Of course, we were angry when we discovered that it could have been repaired, and when we again approached the individual he explained the situation by stating that the car was in excellent shape and a repaired running board was not compatible with the remainder of the car. He could not guarantee that the repaired running board would not develop a rattle but he could guarantee the new one. He compared the cost of repair with the cost of the new installation. Naturally the latter was more expensive, but in the final analysis he convinced us that what we had done was best for our own interest.

We used an anti-freeze fluid in the car last year and the year before. As the spring of 1939 approached we had the radiator drained and flushed. The summer arrived and the car motor overheated. We went to our favorite service station and they suggested that it would be best to remove the radiator entirely, boil it out properly and in that way accomplish best results. It was done. For a month things were fine, then one day the family buggy again looked like an 1895 locomotive running away from the Indians. Steam was coming out of every hole in the hood.

Back to the service station. Why of course they would correct matters without any charge. Didn't they charge for the first repair?—therefore they could not charge for the work to be done this time. That made us very happy and we went back to the office. That same day they called up and said that they had discovered scale in the motor and in the water pump. Also the water pump had been dismantled before and had been cleaned, so that the new scale no doubt had come from the motor, therefore there would be a slight charge of several dollars for taking the water pump apart and for washing the motor. Well they sold us on the idea. What was supposed to be free, turned out to be a $6.40 job.

Is there anything wrong with this picture? Before you answer just remember that the service station is the manufacturer's own service shop—reliable and with an excellent reputation. They are not really taking an advantage. *They are selling!* They are converting what would be a loss into, if not a profit, at least an even break.

Would you call these people dishonest? I would not! This leads us to

ask the question, "Are radio servicemen too honest?" There are moments when we feel that they are entirely too honest. Not that we advocate "gypping," but some steps must be taken to return a reasonable income—a profitable income.

As we write these lines we are gazing at a price list sent out by a radio service shop in Windsor, Ontario, Canada. Replacing one by-pass condenser up to 1. mfd, inclusive of pick-up and delivery, is $4.25. Replacing a triple 8 mfd filter block, inclusive of pick-up and delivery is $7.50. Replacing a single resistor up to 10 watts, inclusive of pick-up and delivery is $4.25. Replacing a volume control with similar pick-up and delivery arrangement is $5.00 and if it is a dual unit, the cost is $6.00.

Prices such as these would be considered exorbitant in these United States. Particularly so, when additional resistors or condensers are charged for at list, but we venture to say that the *Machin Bros.*, the organization who forwarded this price list are making money by selling their service. Of course these prices include a check-up and realignment if found necessary, and lest you get some peculiar ideas all receivers DO NOT require alignment, providing that you can check the condition of alignment.

Did you ever analyze the operations of business in general? The business must make a profit otherwise it cannot survive and no one invests money in business because they wish to go broke. A department store, the most reliable department store has "leaders," low priced items, to attract you to the store and when you are there you buy many items which are not so low priced. They call it merchandising. When you find some standard, nationally advertised product offered at a low price and you are sold a specially packed store brand product, that is known as merchandising. Would it not be considered merchandising to sell something which the receiver installation can use, although its use is not imperative, but advantageous, each time a call is made? We don't know, we are asking you. We know that according to the interpretations placed upon many acts in general business, such selling would most certainly not be classified as dishonest. It would be merchandising!

If check-up of the receiver on a repeat call shows that certain operations can be effected to the advantage of the customer, although perhaps not vital to the operation of the receiver, it would be good merchandising to sell that improvement. Naturally the repeat call would be free. Don't you think that it would be good merchandising? It's being done day in and day out in every other form of maintenance and the public is perfectly content.

After all is said and done, one thing is certain—serviceman income must be increased. Merchandising is a good way to accomplish this.

—30—

RADIO PHYSICS COURSE

by Alfred A. Ghirardi

(*Continued from August issue*)

How the energy is received: The purpose of this chapter is not to present a complete description of modern sensitive receiving sets, but simply to set before the student an elementary conception of how the radio energy is received at the receiving station and what must be done to it to convert it most efficiently into a form that we are able to hear. While it is true that receivers with crystal detectors are used very little at the present time, the author has found that the student can gain a great deal of fundamental theory concerning radio receivers by studying a simple crystal receiver at first. By doing this, most of the theory of tuning and detector action may be developed simply, without the necessity for introducing any of the complications brought in by vacuum tubes. After these receiver fundamentals are firmly grasped, the study of vacuum tube receivers can be pursued with ease.

It should be remembered that these fields go through every non-metallic body which may be in their path. If now, a conductor of any kind is erected in their path, as for example the aerial wire, a voltage will be induced in it by the rapidly passing fields. In the case of the reception of very high-frequency fields (short wave work), the antenna may consist merely of a wire, but with the receiving apparatus at the center instead of the generator. This is called a "doublet" antenna. In order to be efficient for broadcast band reception, the length of such a doublet would have to be too long to be practical.

The antenna usually employed consists of a flat-top aerial portion which is connected to the radio receiver by the *lead-in* wire. The other side of the receiver circuit is connected to the ground either by connecting it to a metal plate buried in the ground, or connecting it to a water pipe which serves the same purpose, since the pipe runs through the ground for a considerable distance and therefore makes electrical contact with it. It is evident that the combined aerial and the lead-in wires form one plate of the condenser and the earth and ground wire form the other. The distributed capacity action thus set up is illustrated by the small condensers shown distributed at intervals between the ground and these parts in this illustration. The capacitance of a simple receiving antenna of the type shown and used for radio broadcasting reception, may be as much as 150 to 300 micro-microfarads (200 mmfd. being a good average). The inductance of the wire may be as much as 50 to 100 microhenries and the total resistance may be anywhere from 25 to 100 ohms, depending on the length of the wires, resistance of the ground contact, etc.

[*To be continued next month*]

—30—

Serviceman's Experiences

(*Continued from page* 36)

going out to Wet Lake and pick up that big p-a job. If you're scared to snap the lights on this evening, leave them off until I get back!"

Maybe, I thought as I drove away in the truck, those remarks were a bit inconsiderate—but my partner gets after me for the most outlandish things, and sometimes I can't help losing my temper.

I pulled in with the amplifier at sundown. Al had gone for supper, and had left the window lights out. Sarcasm, eh? I opened the shop, turned the lights on, and sat down to simmer.

Opporchancity knocks but once! Here was the ideal time to show Al I could run the shop, and both our jobs, all by myself. I hooked up the equipment on the bench, wired in a shop output transformer and speaker with a few lengths of twisted pair, and had just begun to test when in walked Al.

"What's this?" he asked, "trying to steal my job? Get out of here—I'll take things over!"

He walked between me and the amplifier, and pushed me to the middle of the room. What happened then is still something of a mystery. He must have brushed against those frazzled output leads with his arm while he had the other hand on the chassis. Anyway, he doubled up quickly, like he'd been hit in the stomach with a line drive, and landed heavily at my feet. I looked at him dumbly for a moment, and then jumped for the telephone.

My hands were shaking so much I couldn't dial properly. I sat back to regain composure, and hunted in the wrong directory for "hospitals." I thought of calling the operator, but when I grabbed the handset I was so nervous it slipped from my hand, struck the floor; broke cleanly in two.

Then I thought maybe he was fooling, to scare me; I took a long look at him. He didn't move, and his face was the wrong color for fooling. He seemed so strangely different lying on the floor than he did while he argued with me! I got some water and threw it on his face, but it didn't help. I slapped his wrists, like I saw once in the movies—but that didn't help.

By this time, I was nearly frantic—afraid to leave him alone while I ran out for help, but not knowing what to do for him if I stayed. I ran back and forth uselessly a few times, wondering where to find out what to do; I even yelled, like a fellow does when a nightmare gets too tough. Finally, I knelt by his shoulders, raised his head in my arm, and fanned him with some papers. Gosh, but I wished I could help him! It was pitiful—his relying on me to help him, and me not knowing *how*. I called to him brokenly, remembering all we'd been through together.

In spite of the wrong things I had

done trying to bring him to, Al moved a little. I fanned more rapidly. He opened his eyes, spit out some water, and his face ran through the spectrum to pink.

"At last!" I shouted happily, "good old Al! Speak to me!"

He groaned some words I couldn't understand.

"What was that, again?" I asked, bending closer.

"Landlord, what weak walls you have," he murmured.

"Forgive me, Al, for acting and talking the way I did this afternoon—I've learned my lesson—believe me, I'll study first aid until I can bring a rock to life—I didn't know—"

When his eyes came into focus, the first thing he saw was the pamphlet I was fanning him with. He grabbed it disgustedly, as Hardy would from Laurel, and handed it back to me.

"Here," he said weakly, "take this home with you, and let me walk back from the Valley of the Shadow alone!" I took my arm away; he sighed, closed his eyes, and laid his head back resignedly on the floor.

I held the impromptu fan up to the light and saw it was titled "Resuscitation Following Electrical Shock."

It's a swell little book, and I know it by heart now. —30—

The Video Reporter

(*Continued from page* 44)

the use of a projection-type cathode-ray tube. The intensely bright image on the screen end of the tube is adequately enlarged by a lens arrangement. The projector, when used in theatres, necessitates the ripping out of about fifteen seats some twenty-eight feet from the screen. The unit is somewhat bulky due to the fact that all equipment is in duplicate to prevent any lull in a performance due to the failure of any part. All controls are mounted on the projector so that the entire unit can be manipulated by a single operator.

Approximately 50,000 volts are required to operate the projection tube and a special rectifier unit is employed. This power unit, too, is in duplicate and is in a caged compartment some distance from the projector itself.

Ian C. Javal, Baird's commercial director, who supervised the New York demonstration, declared that his organization would soon be in the market with made-in-U.S.A. home television sets of a non-projection type.

1.4 V. Ham Revr.

(*Continued from page* 24)

occasionally in order to obtain the proper "tracking" between the two r.f. circuits.

Having progressed thus far, most readers undoubtedly will wish to know just what results may be expected from the little receiver. At the author's home in West Virginia (which is by no means the ideal receiving location) numerous VK, K6, XU, G and other long distant stations have been heard on the 14 and 28 megacycle amateur bands. Also, the usual British, German and other popular short-wave broadcasters are received with almost local-like regularity and volume. The antennae used are a single wire 25 feet high and 50 feet long and a Johnson "Q" 10 meter beam. —30—

Bench Notes

(*Continued from page* 33)

Texas; Jackson C. Ream of Albuquerque, N. M.; Anthony E. Rutkowsky of Freedom, Pa.; C. G. Kimberly, Jr. of Hawkinsville, Ga.; Harold Sedwick of Washington, D. C.; Don D. Daymon of Findlay, Ohio; Richard Laplander of Hubbell, Mich.; Stanley J. Bieda of Cleveland; and C. Burger of Fort Davis, Canal Zone; T. H. Mackintosh, Elon College, N. C.

Thanks to all; the correspondence has indicated that the professionals over the continent are very much interested in discussions of customer problems which are excusably absent from text-books, and that each serviceman, while he might have ideas which differ from those of his fellow-professional, is sincere in his ultimate desire to build up a respectful clientele.

If your entry came in late, or if you didn't send one in, answer next month's "Problem of Conduct." I am convinced that the exchange of information which follows will benefit us all, and so the series will be continued.

The Reader's Right

Dear BENCH NOTES:

(The correspondent mentions the fact he is able to align most a-c/d-c midgets at various points on the tuning condenser dial by increasing or decreasing the trimmer capacities, and continues:)

As tentative rationalism, I offer: at higher frequencies, with the trimmers closed, this capacity constitutes most of that in the circuit. The electrostatic field is thus compressed into one square inch or less. Opening the trimmers puts more of the r-f voltage on the relatively large, air-spaced tuning condenser, which squirts lines of force all over the place. No prize is offered for the correct solution, as virtue is its own reward.

Hiram Mathematics
Detroit, Mich.

Mr. Mathematics' analysis seemingly flies into the face of an established condenser formula, but the subject is interesting—who hasn't had intriguing experiences with eccentric midgets? Perhaps some sympathetic design engineer will offer a few general rules which we can use on current little jobs which refuse to respond to the conventional alignment procedure.

S&S News

(*Continued from page* 44)

near future, will be transmitted on Tuesday, Thursday and Friday evenings, from 8:30 to 9:30 p.m., EDST. Outdoor telecasts, relayed by the NBC mobile television station from World's Fair and other points in and about New York City, will likewise be stepped up to three hours weekly. These will be seen and heard Thursday, Friday and Saturday afternoons, according to Mr. Morton. —30—

INTERMITTENTS?
See page 26

What's New in Radio

(*Continued from page* 28)

end or center link types. The inductances are conservatively rated to operate in stages having up to 50 watts input. In addition to these coils, the above company has also announced a complete new series of transmitting condensers to be known as the "Giant" line. These units utilize a plate approximately 6" in diameter and are intended for high power amateur applications and commercial installations. Copies of the new general catalog (just off the press) describing these items may be secured by writing the manufacturer.

Within Earshot

(*Continued from page* 4)

3. New Customers are just as valuable to you as Old Customers—remember that; for each New Customer is an Old Customer in the making. See that you do your part to make him want to come back to your shop, and bring his friends to trade there.

4. Impress upon him the fine goodfellowship of your shop; the "No-trouble-to-help-you" Spirit. Never be perky, pungent or fresh—the customer pays your salary. He is your immediate benefactor.

5. Snap Judgments of men oftentimes are faulty. A man may wear a red necktie, a green vest and tan shoes and still be a gentleman—and a good Customer. The Unpretentious Man with the soft voice may possess the Wealth of Croesus. The Stranger with the cowhide boots, broad brim and

rusty black may be President of a Railroad or a Senator up from yonder hollow. You cannot afford to be superior or sullen with any Patron of your service shop!

6. Have everyone who deals with you feel that for his money you want to give him more sincere service than he has ever before received at *any* service shop.

7. Issue these instructions to your staff, and keep them ever before yourself: *No person in your shop, including yourself, is allowed the privilege of arguing any point with a Customer.* He (and you, too) must adjust the matter at *once* to the Customer's entire satisfaction. Wrangling has no place in the successful service shop!

It is the keeping of these rules that will make your customer say, "I had the So-and-So Radio Shop fix my set," instead of "I had it fixed." It is the following of these rules that will give you prestige and lots of word-of-mouth advertising, which will make the customers beat a bee-line to your door.

* * *

ON SUNDAY, June 28, 1939, *The New York Times* published an editorial which drew attention to the fact that the cost of television programs would be the stumbling block on which the advance of that industry would stub its toes for many years to come. The statement is endorsed by Gene McDonald, *Zenith Radio Corp.'s* prexy, with the following note—and we quote—"At long last—a television editorial that makes sense." It seems that both *The Times* and Mr. McDonald have missed the boat. Neither will deny that the received picture in the home is as close to appearing like a talking moving picture show as it is humanly possible to make it. So the natural conclusion must be that recourse will be had to television moving pictures where the studio setup is already available and the costs can be shaved. At the receiving end there is not any difference, and much can be done with location sequence to bring down the cost of production. The use of film eliminates the expensive co-ax line and wire charges, and good kilowatt transmitters are currently available from RCA at $100,000 each. With the range of each of such transmitters more than enough to cover most of the cities of our United States, there is not any reason why television should not advance rapidly. Incidentally, there are many advertisers who not only can afford to, but will use the moving picture televised film, who now are not users of broadcast sound advertising because their products are those which are sold on eye appeal alone.

No, we cannot agree either with *The Times* nor with Mr. McDonald that production costs will be the ultimate stumbling block of television. Besides, if it were so, then why has the same Mr. McDonald's firm taken out a television license and put shows on the air experimentally for the past several months? Aren't your television re-

ceivers ready for the public yet, Gene?

* * *

PERHAPS the *Times* and Mr. McDonald believe the by-now-old saw that the Perisphere at the New York World's Fair *is really the egg layed by Television!*

* * *

INCIDENTALLY, one of the weirdest uses of the word "television" by spelling it "Tela-vision" is for a rear view mirror recently introduced by an eastern manufacturer for automobile's radio antennae. Well, of all things . . .!

* * *

IN THE June, 1939 issue of *PARTS*, Colyumist C.H.F. has this to say: ". . . NBC has already leased the three highest spots in the Windy City in anticipation . . ." (of television.) Guess CHF must have heard our broadcast over WBBM on March 17th last, when we made that statement, and amplified it to the extent that Zenith would be on the air publicly with television programs as soon as NBC made up its mind. What CHF didn't say and might want to learn, is that NBC will probably use the Chicago Opera House as its studios since there are full studio facilities available there right now. Incidentally, CHF is wrong in his statement; NBC only has *options*, and has not actually leased any place as yet.

* * *

WHILE on our Eastern trip we were reliably informed that a story is making the rounds that RN was *forced* to drop the ARRL Housecleaning Campaign, and that this coercion came from the advertisers in general and from one in particular. Let us put our readers straight from the start. The campaign is *dormant*, not dropped. We were never forced to drop it and certainly not by the advertisers. We feel that we said everything that could have been said about the subject, and should ever the cause arise that more information should be placed before the American Ham, you may rest assured that RN will be on the front line, firing away.

* * *

MANY of you experimenters are busy every night at your various tables and shops with radio problems. Many of you would like to divert your energies into productive channels. You would like to work on something that would be an advantage to radio. Well, we found out that there are many unsolved problems in the field on which you can work. For example: the airline people would very much like to have a direction finding device which would locate airplanes in the air and make it possible for them to plot the course of the plane as it wings its way over its route. It seems that the problem is not solved with the ordinary loop, because of various interferences and aberrations which enter into the field over hilly country. No fool-proof ground loop has yet been devised. Why not work on that one?

(*Continued on page* 65)

Classified

Rate 15c per word. Minimum, 10 words.

CORRESPONDENCE COURSES

USED Correspondence Courses and Educational Books sold or rented. Inexpensive. Money-back guarantee. Write for Free Catalog listing 4000 bargains. (Courses Bought.) Lee Mountain, Pisgah, Alabama.

PATENT ATTORNEYS

INVENTORS—Before disclosing your invention to anyone send for Form "Evidence of Conception;" "Schedule of Government and Attorneys' Fees" and instructions. Sent free. Lancaster, Allwine & Rommel, 414 Bowen Building, Washington, D. C.

PATENTS—Advice and booklet free. Highest references. Best results. Promptness assured. Watson E. Coleman. Patent Lawyer, 724 9th Street, Washington, D. C.

INVENTIONS WANTED

INVENTIONS Commercialized. Patented or unpatented. Write Adam Fisher Company, 278 Enright, St. Louis, Missouri.

RADIO ENGINEERING

RADIO Engineering, broadcasting, aviation and police radio, servicing, marine and Morse telegraphy taught thoroughly. All expenses low. Catalog free. Dodge's Institute, Elm St., Valparaiso, Ind.

RADIO

DIRECT Coupled Amplifiers described in July 1939 Radio Craft. Basic Kit 10 Watt Model $9.68; 20 Watt Model $14.52. Send for Free Circular. Amplifier Co. of America, 17-21 West 20th Street, New York City, N. Y.

WE buy and sell used radio testing equipment. Harold Davis, Inc., Jackson, Miss.

DETECTION. New Theory; Circuits. Book 50c postpaid. D'Arcy Ford, Gandy Street, Exeter, England.

RADIO Beginner's Data Catalog. Laboratories, 7700-H East 14th, Oakland, California.

QSL's—Printed same day order received. Samples. W5GG, Cleveland, Mississippi.

MISCELLANEOUS

YOUNG Man (radio amateur) wants work in any radio establishment. Will go anywhere and work hard. Andrew Barberelis, 11 Kimball-Haverhill, Mass.

IT IS claimed that a certain well-known radio engineer, who must remain nameless for obvious reasons, has perfected a cathode-ray system by which a spot appears on a C-R tube front over which is superimposed a transparent flight map. The spot is the location of the plane in flight. This is not to be confused with the problem above where the location of the plane in flight is sought by the ground crew. The engineer has the solution for the flight crew, if we are to take him at his word. If the system is real, it will advance the airplane travel to a point of safety never before experienced. Our sister publication, *POPULAR AVIATION,* please note!

* * *

FREE prediction: The next War will be won with radio propaganda and not guns!

* * *

ONE of the better yachtsmen, when approached by us as to why he had not installed one of those ship-to-shore radiotelephone systems, answered, "What, and be bothered 'way out here?" Which is a hard question to answer!

* * *

OUR younger sister's hopeful, who at the tender age of 7 is delving far into the mysteries of scientific phenomina asked us why a roof could not be covered with photo-electric cells, and the resultant sunlight converted into electricity. We were rather shaken by this startling question, and confessed that we could, on the surface, see no reason why not. "Then *Reader's Digest* must be right," was his unusual rejoinder. But coming to think of it, we think he—or the author who mentioned it in the *Reader's Digest*—has something there.

* * *

AND that about winds up the column for another month, excepting this; you can be definitely sure that a deep sunburn gives off electrons. If you could turn those electrons into electricity that you could use, then you could carry your own refrigeration plant with you, and stay cool. . . . Get it? KAK. —30—

Airline Radioman

(*Continued from page 8*)

ing device for assisting pilots to reach their desired field.

The CAA at present employs upwards of two thousand men and the requirements are on the whole similar to those set up by the major airlines with the exception that college training is not stressed to as a considerable degree; experience and graduation from a leading technical school, the license requirement and code, typing and teletypewriter experience substitute to a large degree. However, even in this field, college training pays dividends and progress is more pointed with possession of an E.E. degree. At present the would-be candidate might find

more encouragement in the airlines since replacements are rather slow in the CAA.

The third of your potential employers is the humble but very much alive individual airport (there's one in your town). If yours is the average or even if it isn't the chances are that it does maintain a radio operator. A third-class radiotelephone license will suffice plus a little practical elbow grease. An airport station has communication only with aircraft in its immediate vicinity, hence the power supply is low and its design relatively simple. All transmitting is done in the region of 278 kilocycles and usually fifteen watts is sufficient. Let's take a typical installation and pick it apart for a moment.

The output circuit to start with is arranged for feeding into a quarter-wave antenna and ground system or it may work into a r.f. transmission line. The final power amplifier may use a two-tube 865 layout with a third 865 exciter as oscillator. Quartz crystal control of course with two type 59" tubes or acceptable substitutes in parallel to modulate the power amplifier. The first audio amplifier tube may function as an audio oscillator by throwing a single switch to the ICW position, thus affording a single source for a run-way localizer or other aid in navigation.

Several receivers, usually one of the intermediate frequency type and one of the high frequency outfits complete the bill. At some of the larger airports as many as eight receivers, one for each transport frequency may appear but that's the unusual not the conventional.

Your duties will include announcing, design and perhaps even construction in a small airport while the larger air units will give you a specialized capacity. If your airport is small and doesn't even boast a radio station, don't give up. Make a tieup contract with the airport manager to service all aircraft, private planes and semi-commercial jobs and in so doing, absorb all you can about practical servicing and professional flight equipment. A string of references from individual airports make an impressive sight to a personnel supervisor and aided and abetted by your license and diploma from technical school may make the connection you desire.

Before I close this lengthy epistle let's take a quick view toward the employment (and more important the unemployment) figures and see what your chances are, assuming you have the makings.

Reports range all the way from United Airlines who advise that they hire new employees only as replacements, to the more optimistic American Airlines who state that they are on the lookout for at least twenty new employees come every new Spring and Summer. Now let's take a flying leap to the other extreme and ponder the words of the chief engineer of a large operating concern whose words are "The field for qualified radio engineers, technicians and radiomen is unlimited. The future indicates exceptional opportunities for well-qualified men. Such men are hard to obtain."

For your convenience, I have enclosed a list of the twenty-two prospective airlines, one of whom you hope to make happy by your presence. If at all possible, see each and every one of them personally, if that proves impossible write and outline your requirements, then sit down with profound hope and deep meditation. If at first you don't succed try the airports, the CAA, in fact, try everything and everybody until at last some day in the future I may gaze proudly into the oft-maligned crystal and see that you have become a part of aviation radio. With the advent of the giant clippers and the dawn of transoceanic service, daily, week in and week out, in all kinds of weather, the opportunity for qualified radiomen was never greater. Acquire the training, go after the job and you will land safely and satisfactorily. In the meantime, I am your

Hopeful and optimistic,
DAD.

APPENDIX

List of Scheduled Air-Carriers

Airline Feeder System, Administration Building, Newark Airport, Newark, New Jersey.
American Airlines, Inc., Chicago Municipal Airport, 5036 W. 63rd Street, Chicago, Illinois.
Boston-Maine Airways, Inc., Boston Municipal Airport, East Boston, Mass.
Braniff Airways, Inc., Braniff Building, Oklahoma City, Okla.
Canadian Colonial Airways, Inc., Room 901, 650 5th Avenue, New York, N. Y.
Chicago and Southern Air Lines, Inc., Lambert Field, Robertson, Mo.
Condor Air Lines, San Francisco Bay Airdrome, Alameda, California.
Continental Air Lines, Municipal Airport, Denver, Colorado.
Delta Air Corporation, Box 111, Monroe, La.
Eastern Air Lines, Inc., 1775 Broadway, New York, N. Y.
Inland Air Lines, Box 1807, Casper, Wyoming.
Inter-Island Airways, Ltd., Fort and Merchant Streets, Honolulu, Hawaii.
Marine Airways, P. O. Box 2808, Juneau, Alaska.
Marquette Airlines, Inc., Lambert-St. Louis Municipal Airport, St. Louis, Mo.
Mayflower Airlines, Inc., East Boston Airport, East Boston, Mass.
Mid Continental Airlines, Inc., Municipal Airport, Kansas City, Missouri.
National Airlines, Inc., Albert Whitted Airport, P. O. Box 868, St. Petersburg, Florida.
Northwest Airlines, Inc., Holman Municipal Airport, St. Paul, Minn.
Pacific Alaska Airways, Inc., Fairbanks, Alaska.
Pan-American Airways, Inc., 135 E. 42nd Street, New York City.
Pennsylvania Central Airlines Corp., Allegheny County Municipal Airport, Pittsburgh, Pa.
Transcontinental and Western Air, Municipal Airport, 10 Richards Road, Kansas City, Mo.
United Air Lines, 221 N. La Salle Street, Chicago, Illinois.
Western Air Express Corp., P. O. Box 697, Burbank, California.
White Pass Airways, Inc., Skagway, Alaska.
Wilmington-Catalina Airlines, Ltd., Catalina Airport, Avalon, Catalina Island, California.

—30—

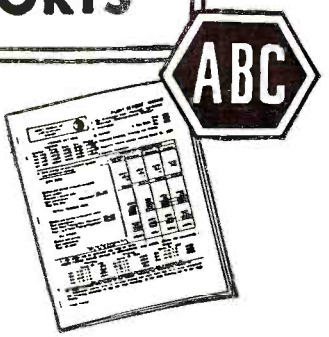
There are 2 WAYS to buy ADVERTISING SPACE

1 *The* **HAPHAZARD WAY**

by rumor, guesswork, and hasty judgment

2 *The* **AUDITED WAY**

by the facts presented in ABC REPORTS



TIME was when buying advertising space seemed like groping in the dark. With no facts to serve as guide through the mysteries of circulation, you had to rely on rumor and hearsay. You had to pick your papers by guess-work . . . and hope for the best results as far as sales were concerned.

That day is past. Discerning advertisers now buy space with as sound a basis of fact as they buy a ton of coal or a dozen of eggs.

The source of this enlightenment is the A.B.C. report—the complete official, audited report of circulation facts. A.B.C. reports reveal and analyze NET PAID CIRCULATION—how large it is, where it is, how it was secured.

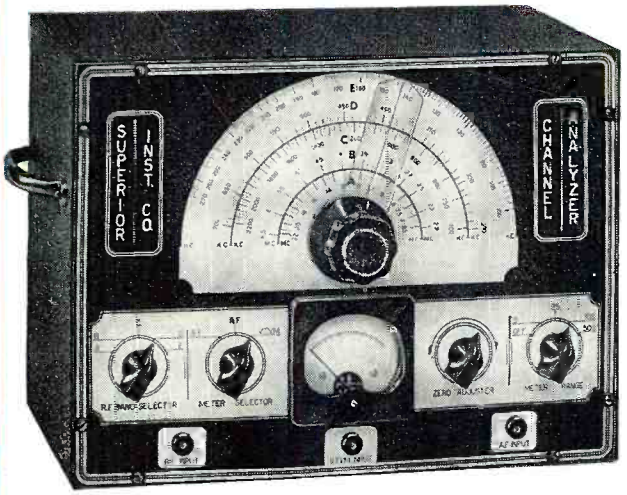
It is your insurance that you will get what you pay for. It protects the buyer and the honest publisher. It is made possible by over 2000 publishers, advertisers and advertising agencies. Together they provide you with this insurance policy. Use it. It costs you nothing. It may save you much.

We will be glad to give you a copy of our latest A.B.C. report, containing the facts by which you can judge the value of RADIO NEWS

RADIO NEWS

An A. B. C. Publication

A.B.C. = Audit Bureau of Circulations = FACTS as a yardstick of advertising value



SUPERIOR ANNOUNCES—FOR THE FIRST TIME!! THE NEW

CHANNEL-ANALYZER

Follows Signal from Antenna to Speaker of Any Set

THE CHANNEL-ANALYZER WILL—

1. Follow signal from antenna to speaker through all stages of any receiver ever made.
2. Instantly track down exact cause of intermittent operation.
3. Measure both Automatic-Volume-Control and Automatic-Frequency-Control, voltages and circuits without appreciably loading the circuit, using built-in highly sensitive Vacuum-Tube Voltmeter.
4. Check exact gain of every individual stage in receiver.
5. Track down and locate cause of distortion in R.F., I.F., and A.F. amplifier.
6. Check exact operating voltage of each tube.
7. Locate leaky condensers and all high-resistance shorts, also show opens.
8. Measure exact frequencies, amount of drift and comparative output of oscillators in superhets.
9. Track down exact cause of noise.

Fundamentally, what the Superior Channel-Analyzer does is to permit the serviceman to follow the **SIGNAL** from antenna to speaker through each and every stage of any set ever made, and inferentially, of any set that ever will be made, using the **SIGNAL** as the basis of measurements. Thus if there is trouble in one particular channel or stage of a receiver, the serviceman can isolate the faulty stage and then proceed to ascertain the very part or component that causes the trouble.

Many of the troubles in modern receivers are due to the Automatic-Volume-Control and Automatic-Frequency-Control circuits and ordinary instruments do not permit measurements directly upon these circuits, so the Superior Channel-Analyzer includes a direct-current Vacuum-Tube Volmeter that DOES make these measurements directly and with a negligible loading of the measured circuits.

Other problems cease to be problems too, when the quick-solution method of the Channel-Analyzer is applied. For instance, suppose a local oscillator in a superheterodyne drifts. The Channel-Analyzer has a switch operated, tuned input circuit with amplifier, whereby not only the presence of drift may be discovered, but also the amount and direction of drift.

Distortion is another difficulty that often nettles a serviceman. The Channel-Analyzer has a jack for the insertion of earphones so that you can listen to the signal directly from any stage and, therefore, discover the stage in which the distortion takes place. Next, the VTVM is used to discover the very component in that circuit that is causing the trouble. How often have you cherished the hope that someday you would own an instrument that enables you to measure the actual signal voltage across the load of any stage in the set, and thus by comparison determine the gain per stage. The Channel-Analyzer enables those dynamic voltage measurements and does a whole assortment of other work besides, yet at a price much less than that usually asked for a dynamic voltmeter alone.

D.C. Voltages have important bearings on receiver performance. All these voltages can be measured on the Channel-Analyzer with the receiver in reproducing operation. In fact, that one important consideration, MEASUREMENTS WITHOUT MOLESTATION OF THE RECEIVER, gets rid of the drawback of most conventional equipment which greatly reduces the very voltage it attempts to measure, or kills the signal completely.

Tubes that are used in the receiver under test are also given a thorough check by the Channel-Analyzer and as such a specialized tube tester, this new and remarkable instrument is proof against any possibility of obsolescence.

Noise, another serious problem to servicemen, can be located with the aid of the Channel-Analyzer and can be done with incredible speed.

Here are the basic components of the Channel-Analyzer:

1. B Supply rectifier and filter circuit.
2. One-stage, high-gain flat amplifier and linear diode detector.
3. Tuned-circuit, high-gain amplifier and linear diode detector, 100 KC. to 20 MC.
4. D.C. Vacuum-Tube Voltmeter, for measuring the rectifier R.F., I.F. or A.F., and for independent use on external circuits, all by front panel switching.

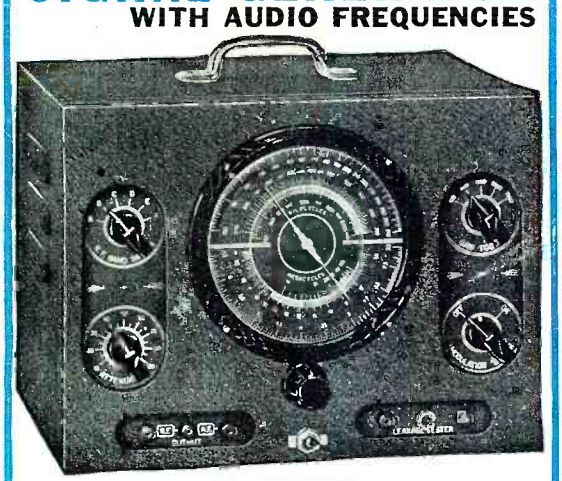
By adroit engineering and skillful application of a wide knowledge of servicing requirements based on Superior's years of experience, the four components listed above are made to do so many things and do them so well and fast that a large benefit is bestowed on servicemen, their tasks lightened, their work speeded and their experience greatly extended, all at record-breaking low price.

The Superior Channel-Analyzer comes housed in shielded cabinet and features an attractive etched aluminum panel. Supplied complete with tubes, three specially engineered shielded input cables, each identified as to its purpose. Also full operating instructions. Size 13"x10"x6". Shipping weight 19 pounds. Only $19.75

THE NEW 1130-S

SIGNAL GENERATOR

WITH AUDIO FREQUENCIES



SPECIFICATIONS:

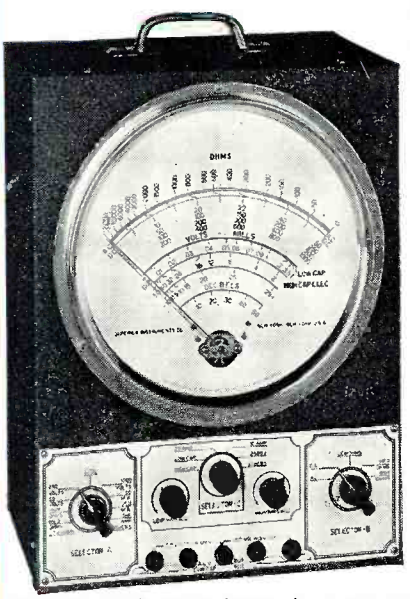
1. Combination R.F. and Audio Signal Generator, R.F. 100 kc. to 100 Mc., A.F.—100-7,500 cycles. All Direct reading, all by front panel switching. 2. R.F. and A.F. output independently obtainable alone or with A.F. (any frequency) modulating R.F. 3. Accuracy is within 1% on I.F. and Broadcast bands; 2% on higher frequencies. 4. Audio frequencies in 5 bands; 100, 400, 1000, 5000, and 7500 cycles. 5. Giant airplane full vision, direct-reading dial. 6. Condenser and other leakages tested to 100 megohms. 7. All services on 90-130 volts A.C. or D.C. (any frequency).

Model 1130-S comes complete with tubes, test leads, carrying handle, instructions. Size 12"x 9"x6½". Shipping weight 15 pounds. Our net price..... **$11.85**

THE X-RAYOMETER

FEATURES NEW GIANT 9" METER—AND A BUILT-IN POWER SUPPLY ENABLES RESISTANCE MEASUREMENTS UP TO

30 MEGOHMS



SPECIFICATIONS:

RESISTANCE MEASUREMENTS IN 3 RANGES: 0-1000 Ohms, 0-100,000 Ohms, 0-30 Megohms.

D.C. VOLTAGE MEASUREMENTS IN 5 RANGES: 0-50, 0-250, 0-500, 0-1000, 0-2500 Volts. Television and other high voltage power supply circuits easily measured.

A.C. VOLTAGE MEASUREMENTS IN 4 RANGES: 0-50, 0-250, 0-500, 0-1000 Volts.

D.C. CURRENT MEASUREMENTS IN 6 RANGES: 0-1 Ma., 0-50 Ma., 0-250 Ma., 0-1 Ampere, 0-10 Amperes, 0-25 Amperes. High current ranges suitable for automotive and industrial work.

CAPACITY DIRECTLY READ ON METER SCALE IN 2 RANGES: .005 - 1 Mfd. . . . 2 Mfd. - 50 Mfd.

PERCENTAGE OF LEAKAGE of electrolytics read DIRECTLY on meter scale. Actual condition of condenser quickly determined.

INSULATION, INTER-ELEMENT and A. V. C. LEAKAGES directly read on meter scale up to 30 Megohms.

OUTPUT MEASUREMENTS IN 4 RANGES: 0-50, 0-250, 0-500, 0-1000 Volts. Built-in blocking condensers enable rapid alignment of radio equipment.

INDUCTANCE MEASUREMENTS IN 2 RANGES: 0 - 7 Henries, 7 - 703 Henries.

DECIBEL MEASUREMENTS IN 3 RANGES: D.B. based on 6 M.W. at 500 Ohms. —10 to +29, —10 to +43, —10 to +49. Audio frequency measurements in both radio and P.A. amplifiers.

X-RAYOMETER comes housed in a new army gray crystalline, heavy gauge cabinet. Complete with test leads, instructions and tabular data. Shipping weight 20 pounds. ONLY **$17.95**

SUPERIOR INSTRUMENTS CO.

136 LIBERTY ST., DEPT. RN9 NEW YORK, N. Y.