

Learn Radio with the U. S. Army

RADIO NEWS

JANUARY
1940
25c

Uncle Sam has equipped his Field Artillery Units with the latest in short wave pack-radio transmitters



"SIGNAL-TRACING" vs. "CATCH THE GERMANS"
160 Meter "Cross-Haule" Transmitter
THE How AND Why OF THE OSCILLOSCOPE



DEEP-CUT PRICES ON AMATEUR RADIO

FEDERAL RECORDER PR12

With built-in radio. Complete with \$25.00 Mike and Heavy duty recording turn table

Formerly \$249.00. **Our Price \$110⁰⁰**

PRESTO RECORDER 5J

Complete with Capacity Mike

Formerly \$149.00. **Our Price \$89⁰⁰**

ACCESSORIES

Nationally known earphones, 2000 ohms **\$1.10**
Reg. \$1.49 Our Price

Nationally known crystal pick-ups **\$2.95**
Reg. \$3.51 Our Price

Nationally known doublet antennas **\$1.95**
Reg. \$5.00 Our Price

Spectacular Values in USED RECEIVERS

Limited quantities, subject to prior sale

National NC 100 XA with speaker..... **\$79.00**

National NC 100 X with speaker..... **\$65.00**

Paterson PR 10..... **\$39.50**

Paterson Preselector. **\$8.95**

McMurdo 10 Tube Model 5D..... **\$39.50**

McMurdo 8 Tube Model 5C..... **\$29.50**

Hallcrafters Sky Chief..... **\$19.50**

RCA MODEL ACR 111

2 Stages Preselection
Electrical Bandspread
Crystal Control

Formerly \$189.50. **Our Price \$94⁵⁰**

HALLICRAFTER Sky Challenger II

9 Tubes with speaker

Formerly \$87.00. **Our Price \$65⁰⁰**

HALLICRAFTER DUAL DIVERSITY

World's Finest Radio

Reg. Price \$750.00. **Our Price \$450⁰⁰**

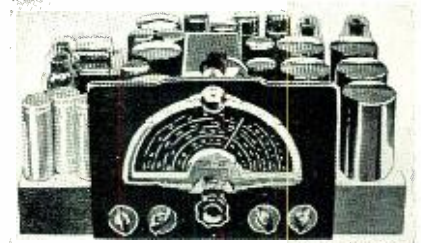
Public Address Systems all types in stock. All types microphones including astatic amperite American Electro-voice and brush.

Lowest Prices on Garrard Motors and Record - Changers

DAVEGA

Celebrate their 60th Anniversary by Smashing Prices on Everything You Need...

Almost 1/2 Price! McMURDO SILVER 15-17



Regular Price \$205.00

SALE PRICE \$104⁵⁰

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 Jenson-Silver 15" Giant electro-dynamic speaker. 30 to 8,000 cycles. Heavy welded one-piece chassis, 20" by 12 3/4".

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BILL, YOU'RE ALWAYS FOOLING WITH RADIO -- OUR SET WON'T WORK -- WILL YOU FIX IT?

I'LL TRY, MARY, I'LL TAKE IT HOME TONIGHT



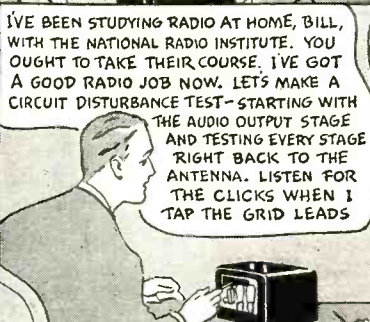
I CAN'T FIND OUT WHAT'S WRONG -- GUESS I'LL MAKE A FOOL OF MYSELF WITH MARY



HELLO, BILL -- GOT A TOUGH ONE TO FIX? LET ME HELP YOU



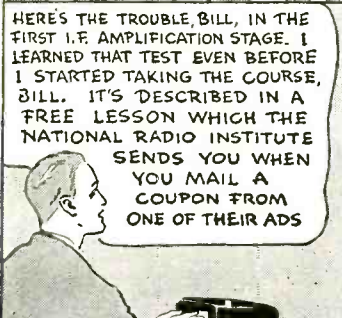
HELLO JOE -- WHERE'VE YOU BEEN LATELY -- AND WHERE DID YOU LEARN ANYTHING ABOUT RADIO?



I'VE BEEN STUDYING RADIO AT HOME, BILL, WITH THE NATIONAL RADIO INSTITUTE. YOU OUGHT TO TAKE THEIR COURSE. I'VE GOT A GOOD RADIO JOB NOW. LET'S MAKE A CIRCUIT DISTURBANCE TEST -- STARTING WITH THE AUDIO OUTPUT STAGE AND TESTING EVERY STAGE 'RIGHT BACK TO THE ANTENNA. LISTEN FOR THE CLICKS WHEN I TAP THE GRID LEADS



SAY -- WHERE DID YOU LEARN THAT TEST? IT'S A GOOD ONE



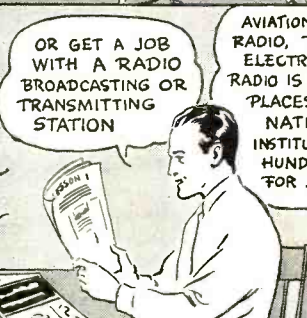
HERE'S THE TROUBLE, BILL, IN THE FIRST I.F. AMPLIFICATION STAGE. I LEARNED THAT TEST EVEN BEFORE I STARTED TAKING THE COURSE, BILL. IT'S DESCRIBED IN A FREE LESSON WHICH THE NATIONAL RADIO INSTITUTE SENDS YOU WHEN YOU MAIL A COUPON FROM ONE OF THEIR ADS



I'VE SEEN THEIR ADS BUT I NEVER THOUGHT I COULD LEARN RADIO AT HOME -- I'LL MAIL THEIR COUPON RIGHT AWAY



I'M CONVINCED NOW THAT THIS COURSE IS PRACTICAL AND COMPLETE. I'LL ENROLL NOW AND THEN I CAN MAKE REAL MONEY FIXING RADIO SETS OR INSTALL AND SERVICE LOUD SPEAKER SYSTEMS



OR GET A JOB WITH A RADIO BROADCASTING OR TRANSMITTING STATION

AVIATION RADIO, POLICE RADIO, TELEVISION, ELECTRONIC CONTROLS -- RADIO IS SURELY GOING 'PLACES. AND THE NATIONAL RADIO INSTITUTE HAS TRAINED HUNDREDS OF MEN FOR JOBS IN RADIO

I will send you a Lesson on Radio Servicing Tips FREE TO SHOW HOW PRACTICAL IT IS TO TRAIN AT HOME FOR GOOD JOBS IN RADIO



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.



YOU CERTAINLY KNOW RADIO. SOUNDS AS GOOD AS THE DAY I BOUGHT IT.

THANKS! IT CERTAINLY IS EASY TO LEARN RADIO THE N.R.I. WAY. I STARTED ONLY A FEW MONTHS AGO, AND I'M ALREADY MAKING GOOD MONEY.

THIS SPARE TIME WORK IS GREAT FUN AND PRETTY SOON I'LL BE READY FOR A FULL TIME JOB

Clip the coupon and mail it. I'm so certain I can train you at home in your spare time to be a Radio Technician that I will send you my first lesson free. Examine it, read it, see how clear and easy it is to understand. See how my course is planned to help you get a good job in Radio, a young, growing field with a future. You don't need to give up your present job, or spend a lot of money to become a Radio Technician. I train you at home in your spare time.

Jobs Like These Go to Men Who Know Radio

Radio broadcasting stations employ engineers, operators, technicians and many well-trained men. Radio manufacturers employ testers, inspectors, foremen, servicemen in good-pay jobs with opportunities for advancement. Radio jobbers and dealers employ installation and servicemen. Many Radio Technicians open their own Radio sales and repair businesses and make \$30, \$40, \$50 a week. Others hold their regular jobs and make \$5 to \$10 a week fixing Radios in spare time. Automobile, police, aviation, commercial Radio, loudspeaker systems, electronic devices, are newer fields offering good opportunities to qualified men. And my course includes Television, which promises to open many good jobs soon.

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

The day you enroll, in addition to my regular course, I start sending you Extra Money Job Sheets which start showing you how to do actual Radio repair jobs. Throughout your course I send plans and directions which have helped many make \$200 to \$500 a year in spare time while learning. I

send special Radio equipment; show you how to conduct experiments, build circuits. This 50-50 training method makes learning at home interesting, fascinating, practical. I devote more than 10 Lesson Texts exclusively to Television and Television fundamentals thoroughly in my Course.



I Also Give You This Professional Servicing Instrument

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Get Sample Lesson and 64-page Book Free--Mail Coupon

Act today. Mail coupon now for Sample Lesson and 64-page Book. They're FREE. They point out Radio's spare time and full time opportunities and those coming in Television; tell about my course in Radio and Television; show many letters from men I trained, telling what they are doing and earning. Read my money back agreement. Find out what Radio offers you. Mail coupon in envelope or paste on penny postcard--NOW!

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



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



OH BILL -- I'M SO GLAD I ASKED YOU TO FIX OUR RADIO. IT GOT YOU STARTED THINKING ABOUT RADIO AS A CAREER, AND NOW YOU'RE GOING AHEAD SO FAST

OUR WORRIES ARE OVER. I HAVE A GOOD JOB NOW, AND THERE'S A BIG FUTURE AHEAD FOR US IN RADIO

Dear Mr. Smith: Send me FREE, without obligation, your Sample Lesson and 64-page book "Rich Rewards in Radio" which tells about Radio's spare time and full-time opportunities and explains your 50-50 method of training men at home to be Radio Technicians. (Write Plainly.)

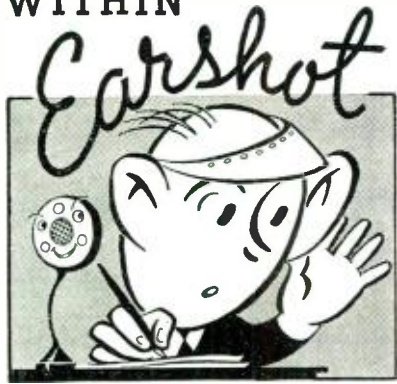
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14X-1

WITHIN



OF THE EDITOR

HOW far the War has gone to make the public shortwave conscious, can be seen from a cursory inspection of our daily newspapers. We find that a custom of over 15 years ago has been revived, and columnists are digesting and advising where and what the belligerents are saying over the ether. Makes interesting reading, too. If the warring nations have been remiss in carrying on the actual fighting along the front, they have been that much more ambitious in their war of words. When it comes to words, what a pity that the *Silver Tongued Orator*, William Jennings Bryan, is no longer on this coil. He would have been able to spot the belligerents 24 hours of broadcasts, and still be able to swing the people his way.

SOME of the newer developments of our office include a system of modulation without the use of a modulation transformer of any sort. Another thing that has us steamed up, is a new 1940 VOX System of voice operated transmitter control without the use of any extraneous tubes nor a separate amplifier. And the third and probably the best of all, is the complete ham station that can be remotely operated, both transmitter as well as receiver, without the use of wires or connections between the operating point and the location of the rig itself. It will have all the latest gadgets too, and will be a 'phone-cw rig of about 100 watts power. Some of the lesser developments include a ham's frequency modulated rig such as Major Armstrong uses, and a converter for use with any superhet so as to make frequency modulation reception possible for owners of the older sets. It looks like a very interesting year. Certainly it will be one full of surprises for the reader . . . and for us!

WITH this issue we have a debate of particular interest to the serviceman reader. The outstanding exponents of the *signal-tracing* method of servicing and the *catch-as-catch-can* method will lock horns in furious battle. We do not expect either to win, since they each have their good points, (More Earshot on page 56)



RADIO NEWS

Including Articles on POPULAR TELEVISION

The Magazine for the radio amateur
experimenter, serviceman & dealer

VOL. 23, NO. 1

Contents for January, 1940

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An instrument which every serviceman should have.
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14. Electrical Measuring Instruments.
15. Radio Transmission, the Broadcasting System.
16. The Receiving Station, Detection with Crystals.
17. Elementary Study of the Vacuum Tube.
18. Vacuum Tube Characteristics.
19. Construction Feature of Vacuum Tubes.
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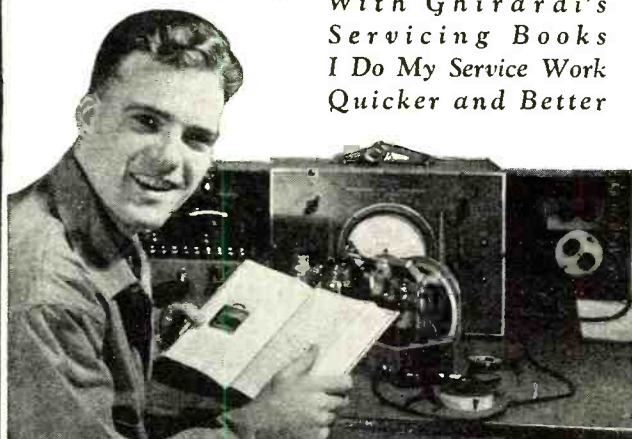
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CITY STATE

Please send me FREE descriptive literature.



An Army radioman is also taught everything about field telephones. Here we see the Signal Corps company of the 26th Div. in peace-time maneuvers during the fall of '35.

a
RADIOMAN
OF THE
U. S. A.

by **CHAS. E. CHAPEL, 1st Lt., U.S.M.C. Ret.**
 San Leandro, California

★ **Our Army offers every young man who can make the grade an education, a chance to see the world, a nice living, and above all, a career in any part of the radio field.** ★

THE Signal Corps of the United States Army offers qualified young men an opportunity to learn radio by practical, modern methods, and at the same time receive pay, clothing, living quarters, medical attention, and retirement privileges. Let us follow *Joe Jones*, a typical young American, from the time he enlists until he completes his first three years, and judge for ourselves whether or not our Army presents the most attractive radio proposition for those who are ambitious to advance.

Our typical "Joe" is a farm lad and does not know where to apply for enlistment, but he writes "Army Recruiting Officer" on the face of a penny postal-card, with the name of the nearest big town, and on the other side of the card simply states that he wants to find out more about his chances for radio training in the Army. Back comes the answer, in less than three days time, with illustrated literature and an invitation for Joe to call in person.

Joe is only eighteen, so he takes with him the written consent of his parents, and letters from leading citizens in his community which certify that Joe's moral character and habits are good, and that his reputation in the community is an excellent one. These papers are important, for no one under



A horse's saddle for an operating desk, and a man to turn the generator; these are some of the appurtenances of Army radio work. The set has a power of 15 watts.

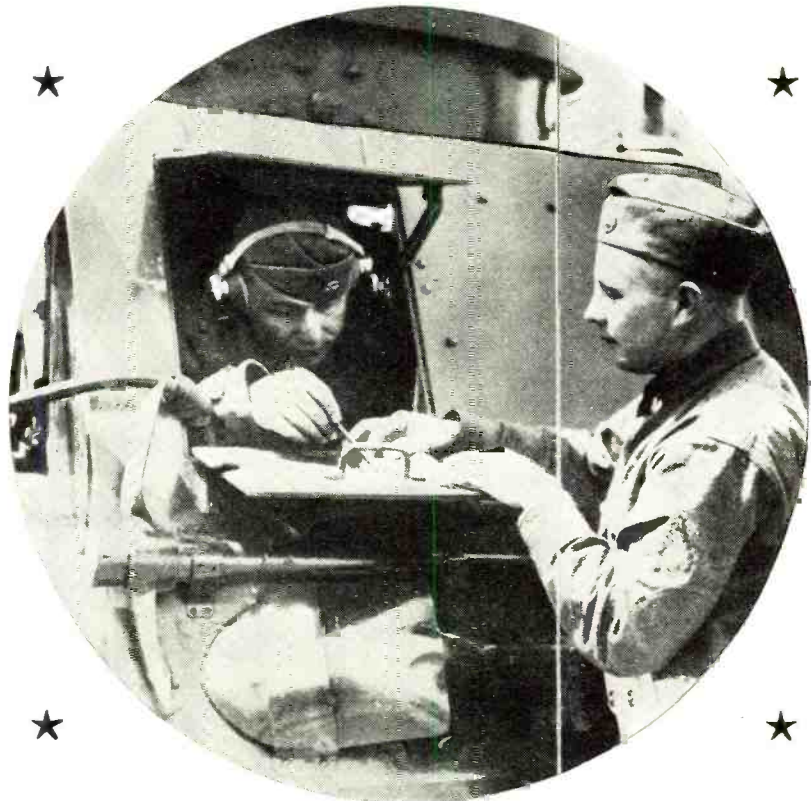
the age of 21 can enlist without the consent of his parents, and only the highest type of young Americans are desired in the Army.

Just to be sure about it, Joe takes along his birth certificate, and a statement of his school record, because he has read in the recruiting literature that American citizenship is essential, and the extent of his education is important in determining his qualifications for enlistment, especially in a technical branch like the Signal Corps, which is his goal.

At the recruiting office, Joe's papers are all in good order and the recruiting officer greets him with enthusiasm when he finds that Joe is a High School graduate, and that he passes the Army doctor's physical examination with flying colors. Joe is enlisted as a private, takes the oath of allegiance, and is given transportation to the nearest Army post with a Signal Corps complement.

From the time he takes the oath, Joe is entitled to his clothing, living quarters, medical attention, technical training, and his pay of \$21 per month. At first thought this might seem small, but out of that \$21 Joe's only legitimate expenses are \$1 a month for laundry, 50c a month to cover a haircut every two weeks, and a few cents for toilet articles. Everything else is

One of the tanks used by the mechanized First Cavalry, which gets all of its orders while under way by means of uhf radio.





Field radio stations are set up in cars and manned by trained specialists. Sets used, are the latest in the art.

furnished by the government, so he can easily save ten or fifteen dollars per month, and if he deposits his savings with the Finance Officer, it draws interest at 4%. By qualifying as a marksman on the rifle range, Joe can look forward to several dollars extra each month.

For the first few weeks, Joe is busy learning the rudiments of soldiering. He is up with the bugle at 6 o'clock in the morning, dresses and accompanies his new comrades in 15 minutes of calisthenics. This gives him a big appetite for breakfast, which comes at 6:30. He is through eating by 7 o'clock, returns to his quarters and cleans up his room for inspection which comes at 8 o'clock.

Inspection is completed by 8:30, giving Joe half an hour in which to get ready for his training classes which begin at 9 o'clock. When he has mastered the elementary routine of military life, this will be a course in his chosen subject of radio, but for the present Joe is busy learning close-order drill, tent pitching, horse-back riding, visual signaling, first aid, marksmanship, and a dozen other subjects which are so varied in scope that none become monotonous.

The discipline of the Army is the big surprise to Joe. The stories of old war veterans had given him the false idea that all sergeants were "hard-boiled," but instead he finds that as long as he obeys the few simple rules necessary when any large number of people are living together, the sergeants are like big brothers, with the officers exercising the firm but kind supervision that he had received at home from his own father.

With the first few weeks of military training behind him, Joe finds that the Army has kept faith with him, that the promise of a free education in radio made at the recruiting station is being

carried out to the letter. As an enlisted man of the Signal Corps, he finds that he can specialize in radio, telephony, telegraphy, submarine cables, meteorology, photography, and the care of messenger pigeons.

Joe has no trouble in making his choice. Radio communication is his whole life, and that is exactly what he gets. Each Army post has its own schools and although Joe looks forward to eventually going to the famous *Army Signal School*, at Ft. Monmouth, New Jersey, no time is lost in day-dreaming. Less than two months from the day of his enlistment, Joe begins to receive practical training with modern equipment under skilled instructors.

To Joe, radio was radio, and that's all there was to it. He had a typical "ham" station back in his farm home, and it had never entered his head that radio is today highly specialized, but in the Signal Corps Joe finds that radio communication training splits up into five specialized courses. These are: Field radio operator, Field radio repairman, Radio Operator, Radio Repairman, and Intercept radio operator.

"Field" operators and repairmen specialize in the operation and repair of "field" or "portable" equipment, while the radio operators and repairmen who are not "Field" men, concentrate on the operation and repair of permanent and semi-permanent installations. The "Intercept radio operator," on the other hand, learns to transmit with hand key and automatic key, using the "Universal code," with tone and sounder for receiving messages which he takes down on the special-keyboard telegraph typewriter, and this intercept operator also learns to take care of his own special equipment as well as operating it.

Some of Joe's "buddies" prefer wire communication to radio, and even

these men find that specialization is the order of the day, with duties divided among the Field Telephone Electrician, Outside Plant Telephone Man, Inside Plant Telephone Man, and the Teletype Maintenance Man. These "wire" courses do not appeal to Joe, but at least he is glad to know that the choice was there if a man wanted to take advantage of it.

Joe wants the "Radio Operator" experience, since that will give him the training necessary for securing a position in a commercial, civilian station if he decides not to re-enlist at the end of his three years, but there is a present vacancy among the Field Radio Operators, so he volunteers for that duty.

As a Field Radio Operator, Joe must learn to transmit and receive signals correctly in the Continental Morse Code. He knows the code already, having learned it to get his Amateur License, but under the modern teaching methods of the Army his speed increases rapidly, and he begins to feel like a veteran operator.

Along with his code practice, Joe is given practical experience installing and adjusting portable or "field" sets, the proper procedure for handling actual messages, and the disposition of "traffic," which includes among other things the routing of messages where several stations are involved.

Six busy, happy months have passed. Joe is sitting at a folding table in a tent beside a lake, "pounding brass," when the tent fly is thrown back, and Sergeant Sullivan enters. Sullivan waits for Joe to finish transmitting, and then announces his mission:

"Report over to the Repair Shop tomorrow, Jones; you're doing OK here, but we're going to make a repairman out of you!"

Joe takes the phones off and looks up anxiously.

"Anything gone wrong?," he asks.

Sullivan chuckles, and turns to leave, but as he walks off he says: "It takes all kinds of experience to make a real radio man. You're on the way up!"

Joe expects to lose some of his code speed on the repair job, but even with the repair group there is daily practice, under the supervision of expert operators, the main difference being that he now studies the basic principles of radio. He gets enough instruction in electricity and magnetism to lay a foundation for an intelligent understanding of radio circuits and associated electrical equipment, — not theoretical teaching, but practical laboratory work involving standard equipment. From this he advances to the elementary principles of radio theory, taught by constructing different types of basic circuit sets, and then he proceeds to learn how to build advanced equipment and how to repair

The stringing of field telephones is one of the most important duties of the Signal Corps company.

it with a few tools. Drawing and reading diagrams; inspecting, dismantling, wiring, assembly, cleaning, painting and adjusting equipment is taught. He spends hours in the machine shop, and even masters the servicing of motor and generator units.

When Joe finishes his training as a Field Radio Repairman, he is sent back to duty with troops on maneuvers. Here his balanced experience in both operation and repair of portable sets comes in handy and he attracts the attention of his non-coms and officers. Soon we hear that Joseph Jones, Signal Corps, United States Army, is no longer a private, but a Private First Class, with an advance in pay and responsibilities.

A year has passed swiftly. Joe is entitled to one month's furlough. He gets it, and goes back to see the old folks on the farm. His old "ham" set needs a little adjusting, but soon his call goes out over the air-waves and his school-day friends flock in to admire his uniform and hear of Joe's experiences as an Army "brass-pounder." There is even a strong wave of interest on the part of the young women in the neighboring village, but Joe has put his radio career first, so he returns to the Army, leaving behind a trail of broken hearts.

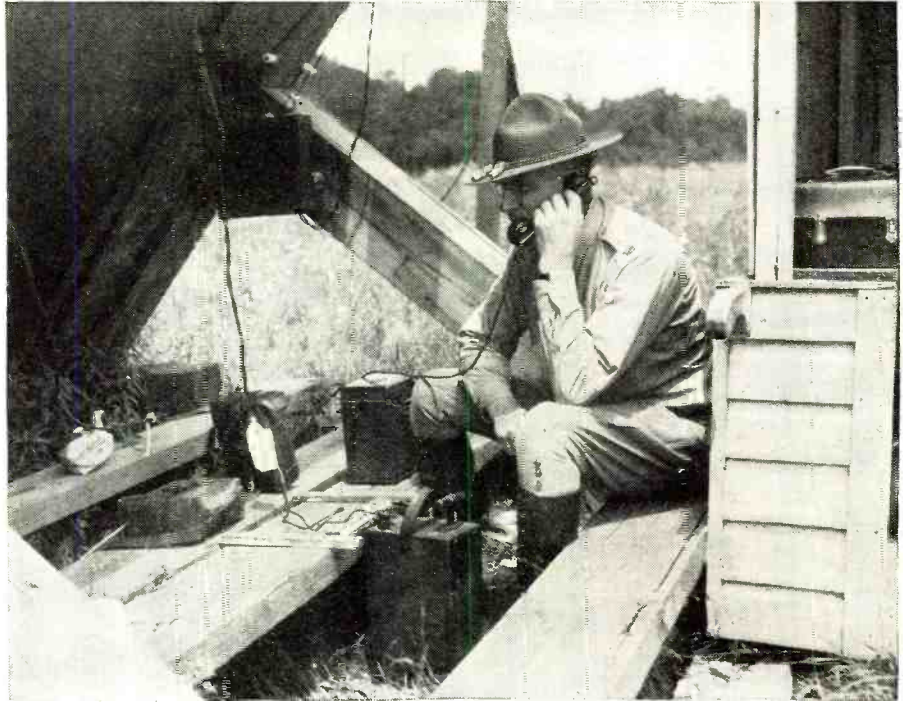
[The author does not guarantee the "broken hearts."—Ed.]

Back at the Post, there's a call for volunteers for duty with the Signal Detachment of the Fifteenth Infantry in Tientsin, China. Joe's record is as clean as the bore of his pistol; his request is granted, and since his is an East Coast Army Post, he travels by an Army Transport sailing from New York harbor.

The Transport transits the Panama Canal, stops long enough for Joe to see the sights of old Panama City, and then steams on to San Francisco, where he spends five glorious days and nights visiting Chinatown, the Mission district, and the new Bay Bridge.

From San Francisco the Transport sails westward, with stops at Honolulu; Guam; Manila; Nagasaki, Japan; and finally reaches Chinwangtao, China, where Joe and his buddies take a train for Tientsin.

In China, Joe finds himself in a strange new world of adventure, romance, and radio experience. A vacancy in the staff of operators for the semi-permanent radio installation in the barracks at Tientsin gives Joe his long desired opportunity to master the intricacies of radio equipment closely similar to that used by the big commercial stations in the United States. He had been somewhat impatient during his training with the field sets, but now he finds that he has built solidly, that all of his past practice in operating and repairing the portable sets has laid a sure foundation for his present



work with advanced equipment.

A year and a half pass quickly. Joe is sent back to the United States to receive his Honorable Discharge, and again he has the opportunity to visit strange ports beyond the fondest dreams of his old companions back in the farm country.

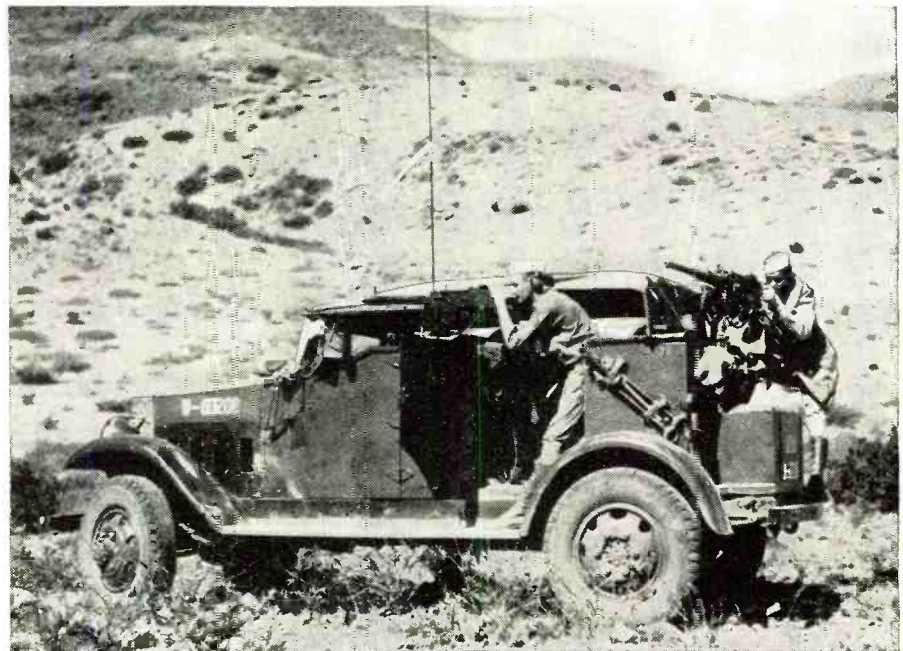
Back in America, Joe finds that he can take his Honorable Discharge and seek civilian employment, or re-enlist and receive a number of professional and financial advantages. A number of representatives from commercial radio stations are at the Post, and they offer him attractive jobs, but with them go no clothing allowance, no

food, medical attention, or retirement privileges, and he must pay for his own lodging out of his salary.

By re-enlisting, Joe receives a bonus of \$75. He has not been quite as thrifty as he had hoped to be; instead of saving the fifteen dollars each month, he only saved \$10, but even at that he has accumulated \$360, not counting the interest at 4%. He has two months furlough coming to him, so he re-enlists and goes home for another visit.

The first visit home had been a lot of fun, and Joe had felt at ease with his school-day friends, but this time *(Follow the career on page 43)*

The cavalry is now motorized with armored trucks and cars. These are equipped with shortwave radio transmitters and receivers as shown here.



AS I SEE IT!

by JOHN F. RIDER

Dean of the Servicemen

Signal-Tracing data from set manufacturers are showing the trend.

NOW that a number of test equipment manufacturers are offering signal tracing, there can be no complaint if we speak about such a system of trouble localization. What we are going to say makes us very happy indeed. While away on the nationwide tour we mentioned some time ago, we received a telegraphic communication from our office concerning the contents of a certain *General Electric* service manual.

The wire stated that the service manual in question contained data intended for signal tracing along the lines we had outlined many moons ago. That was one manual; how about the rest? Upon our return to the office late in October a feast greeted our eyes. Yes sir, every one of the new *G.E.* service manuals contained the information we dreamed about and fervently hoped would appear.

It does not replace the regular service data because it is not supposed to. For after all, operating voltage measurements, although comprising supplementary tests of lesser importance, nevertheless are tests which find application after signal tracing locates the defect. However, these new bulletins state the gain (or amplification) per stage with tolerance limits of plus 10 percent and minus 20 percent. In other words the type of information which will enable a man to find out what is wrong with a stage.

Such gain data embraces the entire system inclusive of the antenna transformer where used and even the *Beam-A-Scope* in the receivers which use it. The gain for each stage up to the second detector is given at certain test frequencies. For example in the *H-116* and *118*, the test frequency in the broadcast band is 1000 kc. The *Beam-a-Scope* is connected and the gain between the antenna transformer and the converter control grid is -3, that is the gain is down 3 times. Similar figures are given for tests on the two other bands.

Beyond the converter, we find the following information. Between the converter grid and the 1st i.f. tube, that is the gain in the converter as an amplifier at 455 kc. is 30. The gain between the 1st i.f. grid and the 2nd i.f. grid is given as 6 and the gain between the 2nd i.f. grid and the diode plate is 70.

Then we find audio gain data in terms of a certain value of a.f. voltage across the volume control and with the control set at maximum, a certain a.f. output is stated at the speaker. This also is subject to a tolerance of minus 10 percent and plus 20 percent.

In the receiver oscillator system we find information of extreme value, the kind of data we needed for years; information which will enable identifica-

tion of the condition of the oscillator system. In other words, the voltage developed by the grid current across the oscillator grid leak is specified on all three bands, each time at that frequency which prevails when the gang condenser is fully meshed. For example, on the "B" band, the voltage is 6.5; on the "C" band it is 7 volts and on the "D" band it is 2.8 volts. Of course, this voltage must be measured with such meters as will not interfere with the operation of the oscillator.

Now we can only hope that many other receiver manufacturers will do likewise, because it means much to the general advancement of the entire radio servicing industry. From information gathered during recent months, we feel confident that other manufacturers will publish such data. *G.E.* has had time to check the value of such information and it is really gratifying to witness the publication of such data because it means that other manufacturers will realize that such information is used for good purposes and not for a comparison of performance so as to influence receiver sales.

Motorola has published sensitivity data for quite some time and we hope that they will alter their presentation from so many microvolts input per stage to the gain per stage. It is true that signal input per stage for uniform output is the equivalent of gain and can so be interpreted, but we feel that gain per stage is preferable for a number of reasons. First, because there is a more abundant supply of equipment intended for gain measurement per stage than that which will furnish known values of signal output. Secondly, because measurement of gain per stage is more in line with signal tracing. Third, we feel that gain per stage will become standard in the future, because signal tracing will become standard.

Stating a known value of a.f. signal across the input to the audio system is preferable to stating a known r.f. signal at the antenna and a certain a.f. signal at the speaker, because it eliminates possible mistakes due to difference in percent modulation. If by chance the manufacturer's data is based upon 30 percent modulation and the test oscillator used as a signal source is 50 percent modulated, a variation of 66 percent is introduced immediately by the test equipment.

Much standardization already has been accomplished in service notes. Let us hope and trust that further standardization will continue and that among the standardized items will be information intended to further signal tracing and thereby make it possible for the radio service industry to service all radio receivers with identical ease and thereby enable the set manufacturers to give forth with the full



John F. Rider

talents of their engineering laboratories.

Prejudice

PREJUDICE is a terrible thing. We had the opportunity during the past thirty days to witness a few examples of the most unwarranted and unjustified hatred you can imagine to exist in the servicing business.

In one particular city where we addressed a number of servicemen one man in particular felt that he was right when he said that he preferred to lose a sale, therefore a profit, because he had a grievance against one particular set manufacturer. And what was the grievance? As we understood his explanation it was because this set manufacturer did not maintain an adequate stock of replacement parts at the jobbers and on one occasion a certain replacement part had been ordered from the factory and delivery was delayed for an unduly long time.

Now, it is not our intention to criticize this man, for after all he is entitled to his opinion, also to his feelings; but somehow or other we do not feel that he is warranted in feeling so badly towards this company as to refuse to accept a profit, because he does not wish to further the sale of particular manufacturer's product. Maybe the wisest thing to do is to buy replacement parts instead of exact duplicates, if the exact duplicates cannot be procured. Maybe he should buy from the local parts jobber if the set manufacturer's jobber cannot provide the parts in time, but why be down on the manufacturer and incur personal losses. There being nothing basically wrong with the manufacturer's receivers, it does not make business sense to feel as this man does.

And if by chance this one manufacturer's receivers are popular in this man's territory, it most certainly is an unnecessary waste of energy and brain matter to unsell a customer on one set, a standard well known receiver and to try to sell him another. And to cap the climax, the part incident in question took place a long time ago. . . . Why not let bygones be bygones? What set manufacturer is perfect? For that matter what serviceman is perfect? What man is perfect???

Tolerance

SPEAKING about perfect things reminds us about tolerance. In this
(Continued on page 50)

A Simple Vacuum Tube Voltmeter

By **SAMUEL PROCTOR**

Serviceman, Louisville, Ky.

The uses for the vacuum tube voltmeter are as varied as they are many. This one can be built, easily.

MANY versions of a vacuum tube voltmeter have appeared in print using various combinations of tubes and component parts to accomplish the reading of voltages without upsetting the circuit under test. One very simple method of obtaining the desired results is described in the following paragraphs. Many of the needed parts will be found in the workshop which may be used to good advantage in the construction of the VTVM and it is only necessary that the builder follow the values of all parts in order to duplicate the results had on the original model.

The complete unit may be housed in most any type of carrying case so that portability may be enjoyed. A unit of this kind may be either complicated or simple in design and it has been the intention of the writer to simplify this unit as much as possible.

Many measurements can be made with this VTVM and we shall set forth some of the more common applications. We may do the following:

1. Measure electrical pressure, either a.c. or d.c. without any current consumption whatever.

2. Extend voltage ranges in a unique manner, making it possible to measure easily to within $\frac{1}{400}$ th of a volt any voltage within its range. This is achieved by measuring a section of the voltage under test, with this sectional voltage spread over the entire meter

scale. This advantage is found only in the more complex version as shown in schematic No. 2. For instance if a voltage is known to be between 450-500v. the meter works with a 50-volt range and the balancing voltage varies from 450-500v. The meter would register 17v. were the voltage under test 467 volts.

One volt, above or below this value would be as easily read as though the meter was being used alone to check a voltage under 50v. The sectional voltage may be of any value, making it possible, where desired, to measure to a minute fraction the pressure in a high voltage circuit. This arrangement makes the meter's accuracy additive; if its accuracy is 2% at 50v., under the arrangement described it would be .2% at 500v.

This type meter makes possible closer measurement of voltage, with inexpensive equipment, than is possible with any but the most expensive laboratory equipment.

3. Measures pos. or neg. voltage without connecting tube grid to chassis

of radio or instrument under test, thereby eliminating inaccuracies due to strays.

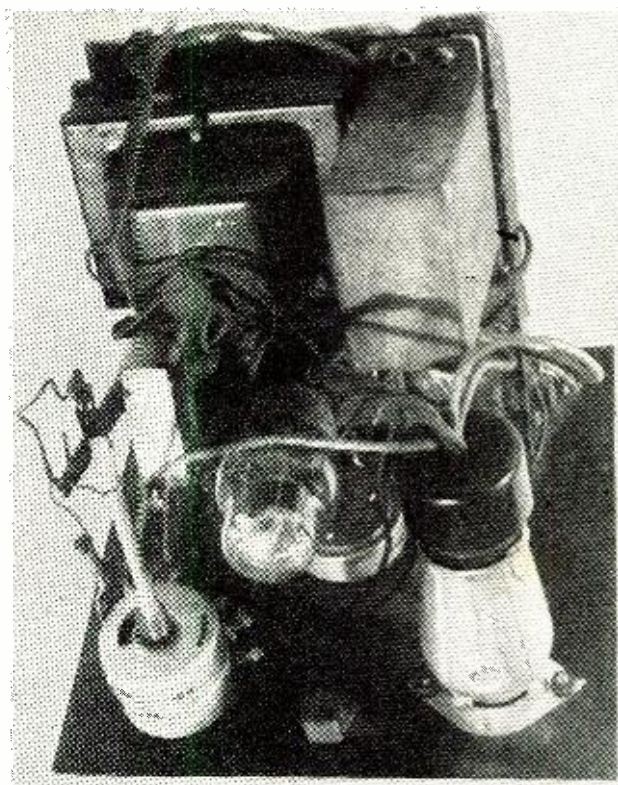
4. Measures a.c. voltage. The frequency limit being determined by the capacity of test leads and tube grid.

5. Simple construction, self-calibrating (assuring continuous accuracy), inexpensive to build and cannot be damaged by mis-use.

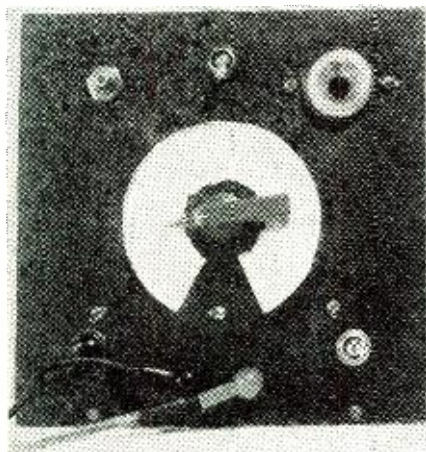
Operation

In measuring voltage, the instrument ground lead is connected to chassis and the control grid lead to point under test. The polarity switch is thrown to pos. or neg. depending upon polarity of voltage under test.

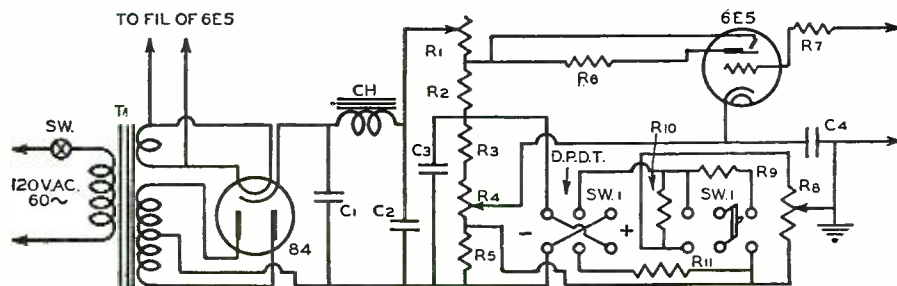
(Build further on page 59)



Back panel view showing the construction and the placement of the various essential component parts.



The panel looks something like this.



R_1 —10,000 ohms, wire-wound pot. Yaxley
 R_2 —10,000 ohms, 10 w. Ohmite
 R_3 —18,500 ohms, 1 w. Aerovox
 R_4 —1,000 ohms, wire-wound pot. Yaxley
 R_5 —20,000 ohms, 1 w. Aerovox
 R_6 —600,000 ohms, $\frac{1}{2}$ w. Aerovox
 R_7 —1 megohm, $\frac{1}{4}$ w. Aerovox
 R_8 —20,000 ohms, wire-wound pot. Yaxley

R_9 —180,000 ohms, 1 w. Aerovox
 R_{10} —22,200 ohms, 1 w. Aerovox
 R_{11} —20,000 ohms, 1 w. Aerovox
 C_1, C_2 —8 mf. 450 v. electro. Aerovox
 C_3 —12 mf. 450 v. electro. Aerovox
 C_4 —1 mf. 400 v. paper Aerovox
 T_1 —power trans. 350-0-350 v. AC @ 50 ma
 6.3 v. @ 2 A



WINGY MANONE, (with hat), orchestra leader and musician, said, "It has been a long time since I have gotten any enjoyment out of listening to any kind of an amplifier or recorder. As a usual fact, they are so flat and so distorted that they do not bring forth the music as it is played. Today I have been able to hear my own music played through this amplifier, and it leaves me amazed by the fact that it seems to come out of the loud speaker the same way I put it in at the recording studio. I know I have worked for years to acquire my own style and this is the first time that I have been able to hear it accurately reproduced for me. I think this amplifier is going to be 'going places.' It certainly will be an addition to the equipment of any student who wishes to study how musicians actually interpreted and played their music."

The 1940 FULL-RANGE AMPLIFIER

By **OLIVER READ, W9ETI, & KARL A. KOPETZKY, W9QEA.**
Technical Editor **Managing Editor**

How we worked from an original idea furnished us by the musicians, and how it led us into some very unusual circuits is found in this final article.

AS was explained last month, the RADIO NEWS 1940 FULL-RANGE amplifier was designed from the musicians' standpoint. That is, we felt that a musical instrument was best designed to the specs laid down by the man who knew the *most* about the field—the *musician*. When we started the series of conferences with these worthies, we despaired of ever accomplishing what they said was an absolute necessity. There were new terms to be learned and we actually took a short, but interesting course in music. The results, as we licked the "bugs" one by one—often

with much hard and long drawn out work—more than justify our confidence in our original premise.

One of the first things that we were asked to do, was to be able to replace that which the recording companies take from the artist's interpretation when he walks into the recording studio. That was easy, we thought. Just install the old "expander." The musicians reactions to our amplifier with ordinary expansion was curt, short, and to the point. "It smells!", they said with their usual directness. We found out that the real trouble lay in the fact that when the expander was

used, say for a bass passage, the treble expanded with it. This was not, we were told, the way the music had been played in the first place, and hence the reference to the odor of our efforts. What was needed, we were advised, was expansion not only "when" it was wanted, but "where" it was wanted. The amount of the expansion was also requested to be variable. That was a "horse of a different garage," we found out.

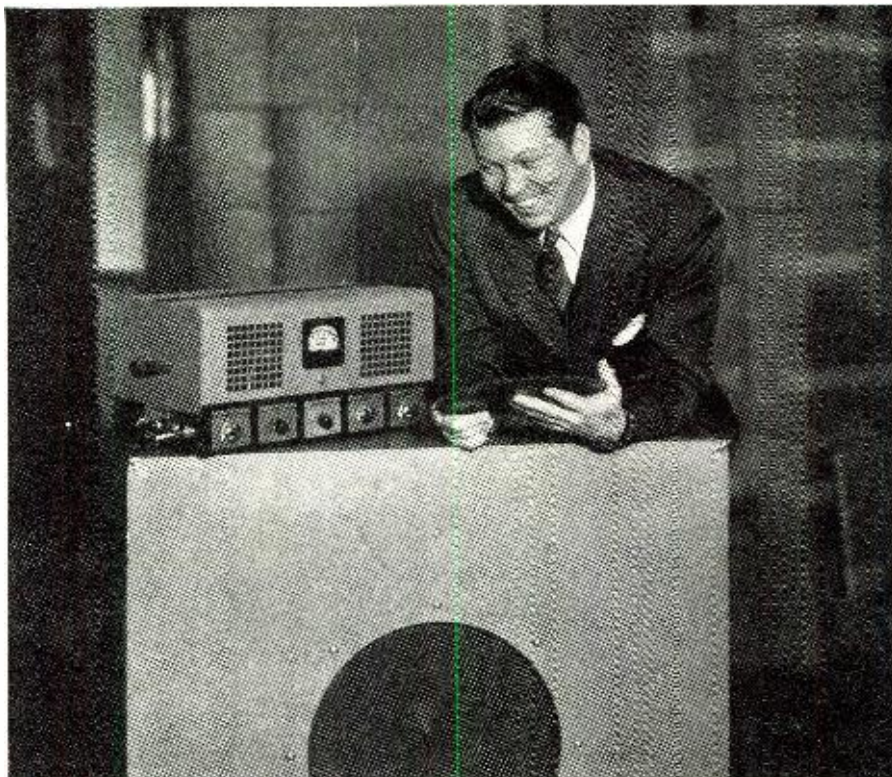
The solution finally worked out provided for *two* separate channels, one for the bass and one for the treble. Then the expansion was introduced—variable at will—in each channel and we were able to give the boys, for the first time, exactly what they wanted. While it is easy to write it, the work was another thing entirely, and many months of heartbreaking sweating over the books, soldering iron and the like made us grouchy before our efforts were crowned with success. But when it was over, we had a new type of P.A. that promised to revolutionize the recording market—at least from the listeners angle.

Of course, we had to have an amplifier to start with and this involved the consideration of various circuits.

Fundamentally, all amplifiers consist of a series of tubes arranged so as to give a certain amount of voltage gain from the microphone or input circuit to the output load. Since we were going to mix a microphone of low output and a phonograph pickup of high output, we had to have an extra stage for the microphone. The level of the microphone, therefore, dictated the number of stages if the output power was already determined to be 15 watts. These 15 watts were to be entirely un-



JOHNNY "SCAT" DAVIS, orchestra leader and *Warner Bros.* moving picture star said, "This is the first time that I have been able to hear an amplifier which replaced in a record that which the recording companies must, of necessity, eliminate when making their recordings. It is well-known that musicians study for years in order to acquire a style and an interpretation of music which identifies them. With this amplifier, it is now possible to reproduce for the ear, interpretation and style for which the musician has labored. In my humble opinion, this amplifier represents a substantial step forward in the reproduction of music. It should prove invaluable to students as well as to music lovers, since with its use they will be able to hear accurately music played exactly the way the originators wanted to have it done."



distorted, or as close to that state as the art would permit. Therefore, our circuit was a 6C5 microphone input, a 6C5 phono input, a 6L7 expander-mixer, a 6C5 mixer, another 6C5 driver and a pair of 6A3's in Class AB in the final. Power was to be obtained from a 5Z3 rectifier and also an 80 bias rectifier. This was the fundamental circuit with which we started; however, the considerations of distortion, expansion and individual channels for bass and treble changed this to a 6C5 microphone input followed by a 6C5 phono input, a 1612 mixer-expander, a 6F8G dual channel bass-treble discriminator, a 6F8 mixer-driver, and a pair of 6A3 Class AB1 output power tubes. Expansion was taken care of by a 6F8G amplifier and a 6H6 rectifier. Power supplies were furnished through a 5Z3 power rectifier and an 80 bias tube.

As the circuit now stood, the phono-input was fed directly from a 6C5 into a 1612 mixer-expander tube and from there into a 6F8G where the bass and treble were separated by means of networks in the cathode circuits. The cathode circuits were then fed into a second 6F8G expander amplifier and from there to the 6H6 rectifier. This latter tube rectified part of the audio presented at the grid of the 6F8G amplifier and applied this rectified current as bias to the 1612. This alters the fixed bias at the 1612 cathode and sets the voltage gain (up or down), thereby accomplishing the expansion of the frequency being expanded. The output of the 6F8G discriminator tube was mixed by another 6F8G driver and fed in the conventional manner into a pair of 6A3 push-pull output tubes. This then was the final circuit which

met all of the requirements of the musicians.

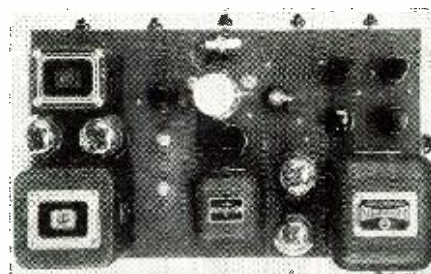
Some of the basic considerations which led to the development of the circuit just described, were: a circuit would have to have a basic range of from 30 to 15,000 cycles per second with a harmonic distortion not to exceed 2%; dual control capable of accentuating or attenuating both treble and bass has already been discussed. Naturally the selection of either of these two frequency ranges would have to be at will. The rate of expansion of the bass and treble frequencies was also provided for in the 6F8G amplifier tube. 15 watts was picked as an output level and though this output was fed into a 30-watt speaker, it was felt that the entire output was sufficient to allow for a reserve so that the low level bass would come through with excellent fidelity. The hum level, always an important item in the design of amplifiers, was kept at minus 53 db.

Designing the output stage, we had a choice of Class A, Class B, or Class AB1. Frankly, Class A presented the finest degree of fidelity, while Class B represented the greatest amount of power output for a given power input. However, Class A is an extremely difficult circuit with which to work, especially where 15 watts are required; and Class B—on the other hand—presents such a varied load to the speakers as to make the distortion content undesirable. For the final choice Class AB1 was picked. In addition to this, in order to have the least amount of distortion, low μ triodes, such as 6A3's, were used. In the idling current position these 6A3's draw 42 mils. at 340 volts. Extreme peaks will kick

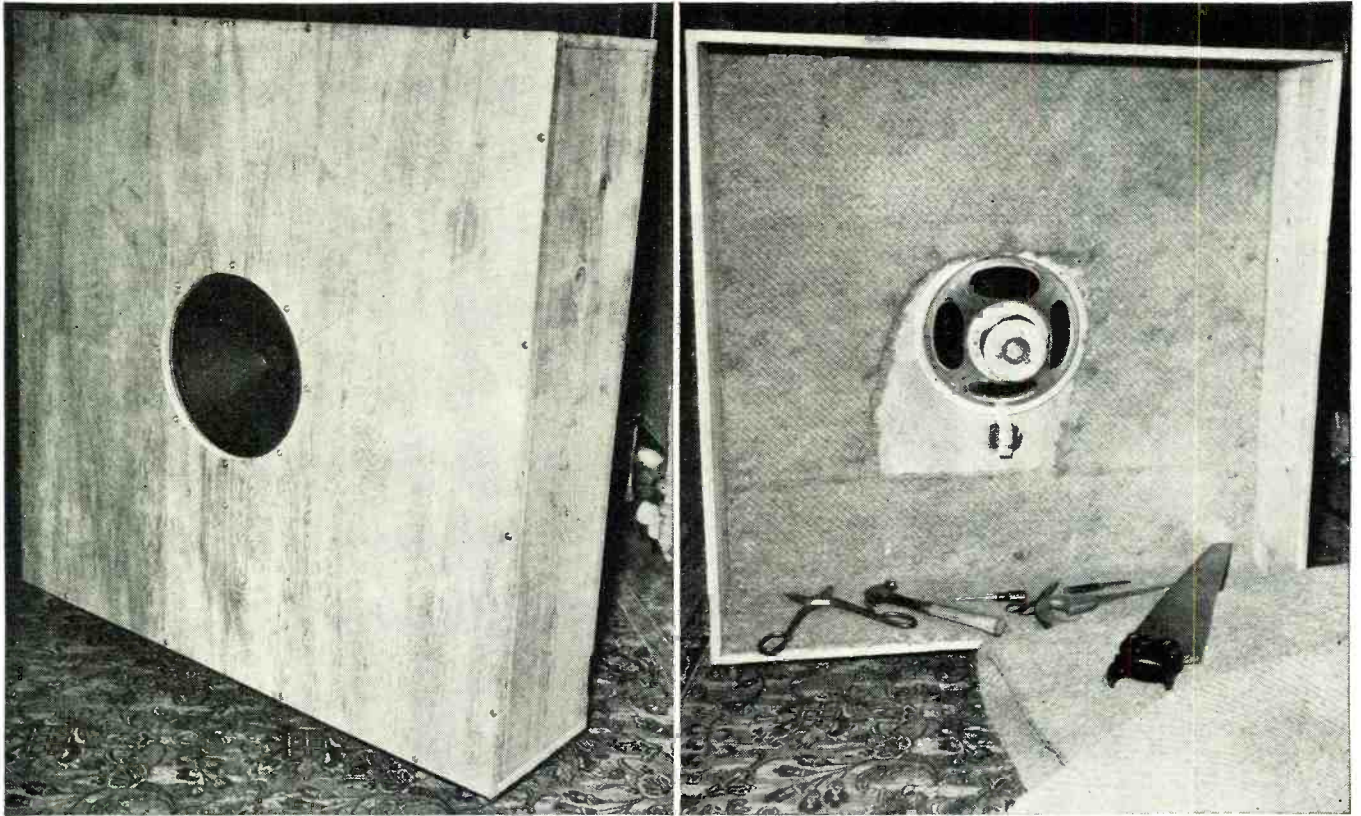
the current of these tubes up to approximately 60 mils. at the same voltage. That the voltage remain constant is one of the most important considerations in the design of the amplifier. If the voltage should shift with the increase in plate current, the distortion and overloading will immediately become apparent to the ear.

While on the subject of distortion it may be wise to note that the distortion of the order of 2% or less is not discernible to the ear; whereas it rapidly increases in detection from that figure up, and distortions of 5, 10 and 15%, while not at all uncommon, are very easily detected by trained ear of a musician. Since this amplifier was designed for that class of service, we had to meet the requirements which that type of profession demands.

In order to limit the distortion still further, the inverse feed-back of the most simple type was resorted to. This consisted of a 15,000 ohm, 1 watt, resistor in series with a .1 microfarad



One of the most important things is to see that the various transformers are properly placed on the chassis. By following the parts layout as is shown, any AC hum will be eliminated.



The construction of the home-made speaker baffle can be fully understood by following the detailed data and by watching the diagram below and these two clear illustrations.

condenser shunted from the plate of each 6A3 to its grid input circuit. This resistor-condenser-series-circuit takes a small amount of the audio from the plate and introduces it into the grid 180° out of phase. This causes the harmonic content to be diminished.

Frequency Discrimination

Probably the most fascinating thing that we got into was the matter of frequency discrimination. A great deal on this subject has been written and we managed to dig up as much on the matter as we could. The indications on what we read were that bass and treble discriminations were to take place in the cathode or the plate circuit of a single tube. Unfortunately, we wished to add expansion, and this would mean that the expansion could not be controlled with regard to the frequency range, so we had to design our frequency discriminator from scratch. The final choice can be seen on the diagram. Actually, the action of the 6F8G is as follows: The mixed bass and treble is presented at the grid of the tubes, which are connected in parallel. In the cathode circuit of the

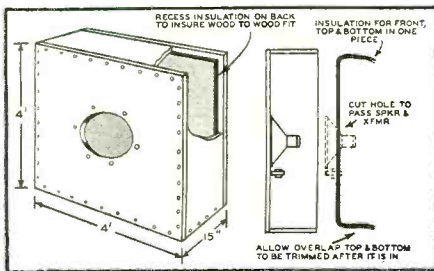
first section of the tube, the treble is accentuated and in the second cathode section the bass is accentuated. The accentuation, in the case of the bass, is accomplished by a 40,000 ohms potentiometer in series with a 500,000 ohms potentiometer in such a manner that in one position they may act with the greatest amount of resistance in the circuit, and at the opposite end of the control both resistors are shorted out. The arms of the potentiometer are connected in series through a special choke, such as is manufactured by *Thordarson Electric Mfg. Co.* The treble circuit presented the same type of potentiometers, but instead of the choke being in series with the potentiometer arms, a .03 microfarad condenser was used. As the slider moves up and down the two resistances, the

amount of bass or treble is accentuated, or attenuated, depending upon the position. This bass and treble accentuation or attenuation is presented from the cathodes of the 6F8G frequency discriminator tube jointly to the 6F8G driver and the last 6F8G expander amplifier tube.

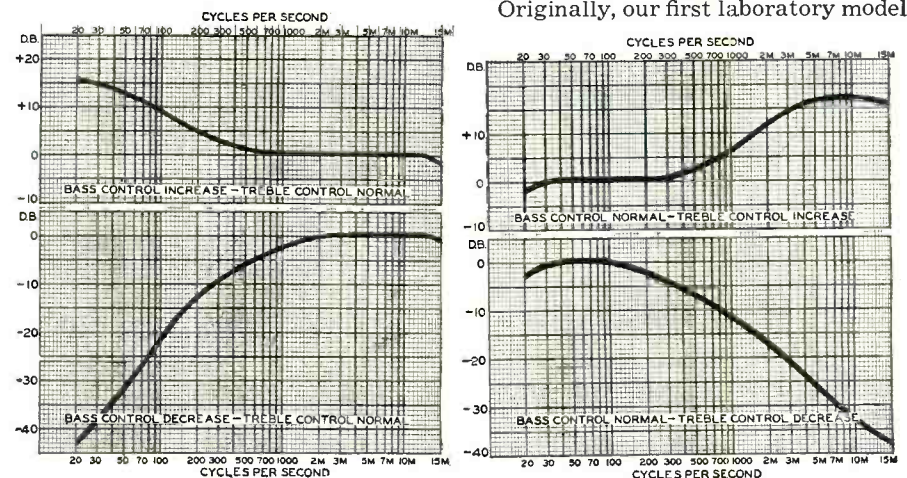
Construction

The amplifier is built on a *Par-Metal* 17"x12"x3" chassis, and the layout of the various component parts is clearly shown in the illustrations. This should be followed so as to eliminate all hum and feed-back. Whenever shielding is shown in the diagram, it must be closely followed and sometimes shielding will have to be run over condensers and resistors in order to eliminate any interaction between the stages as well as outside a.c. hum pick-up.

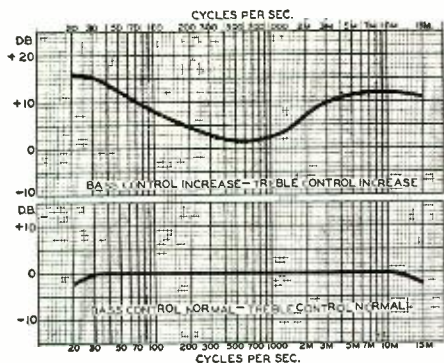
Originally, our first laboratory model



Baffle construction details.

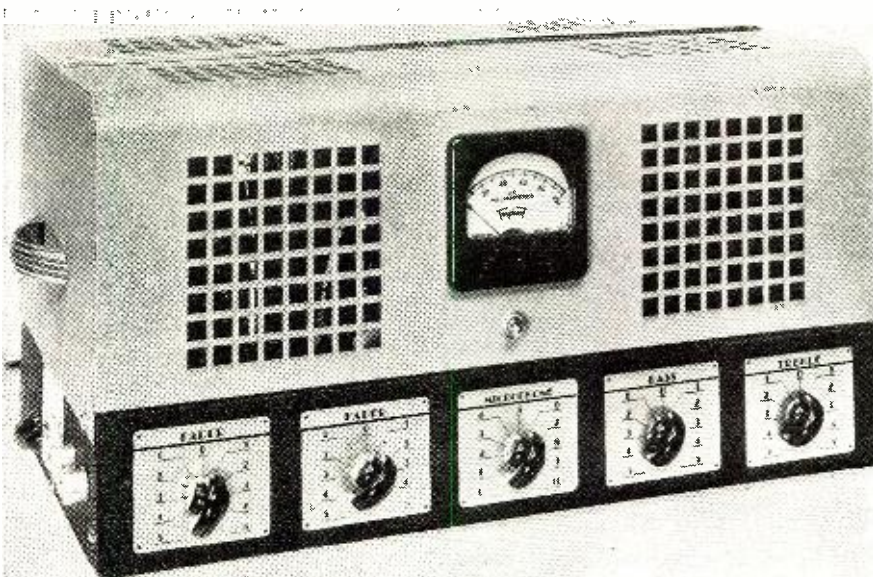


The amplifier response curves with certain control settings.



Amplifier response curves.

made use of a type 6L7 in the expander-mixer stage. This type of tube is very microphonic and we found that it picked up hum to an unusual degree. By substituting the 1612, as we did in the final model, these bad features were eliminated and the latter tube acted quietly and efficiently, providing only that the cathode to ground voltage is adjusted to a potential of exactly 15 volts. In running the shielding over the condensers and resistors, remember that insulation must be introduced between the shielding itself and the unit over which it is being run. Ordinary scotch tape and in some cases, *spaghetti*, if it is large enough, can be used to great advantage in this work. Be sure to tie every unit of the construction down tight; and also make sure that the connection is adequately and completely soldered, be-

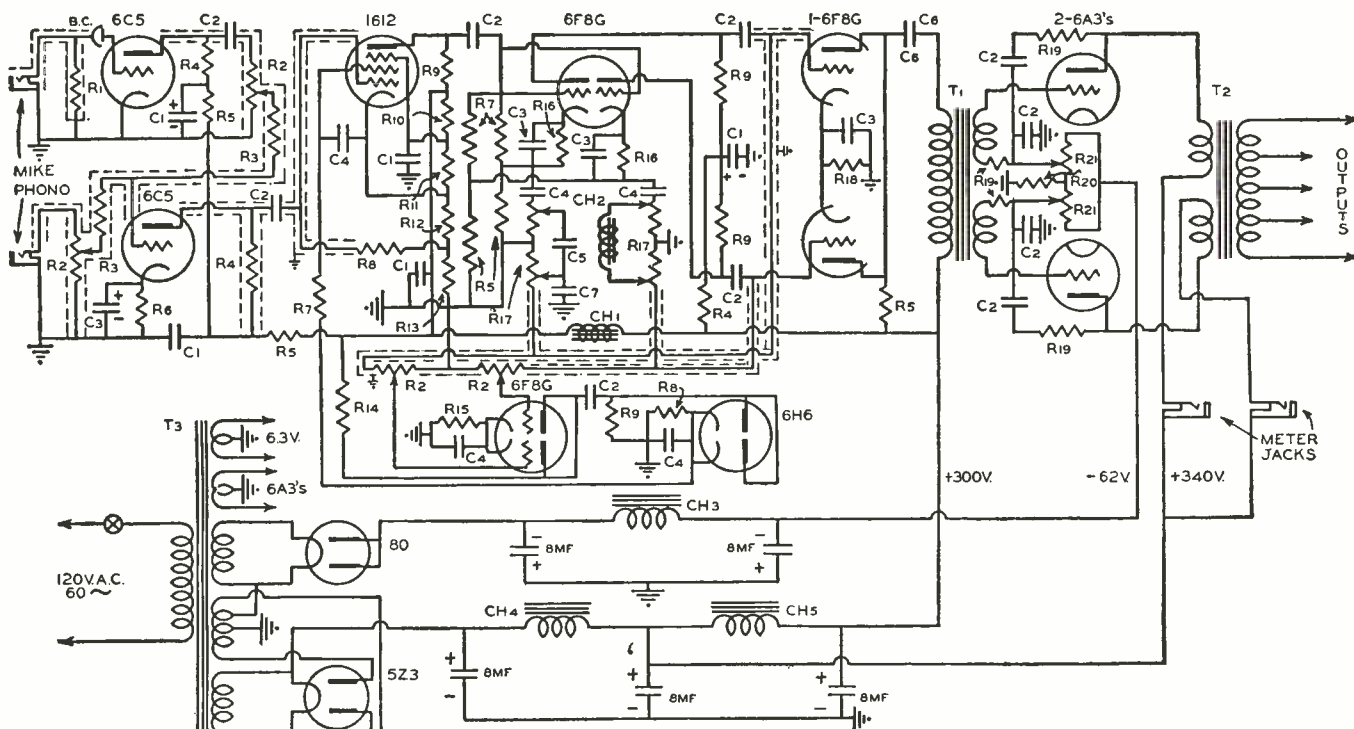


The completed amplifier, compact and easy to operate, includes power supply.

cause a rosin-core joint is one of the evils with which amplifier men have had to contend since amplifiers have been built. In the case of amplifier construction, the usual shortest-lead-possible construction is not followed and turns are made so as to be neat and to allow efficient and rapid servicing of the unit should the occasion arise. In order to adjust the current of the 6A3's, two potentiometers were introduced in the grid circuit. These are adjusted with a screw driver from the top of the chassis so that each tube

draws the proper plate current of 42 mils., idling. It will be found that in adjusting these tubes, when one tube is raised the other tube will lower and accordingly, adjustments should be made with each tube separately until the plate current in both is exactly alike. In the metal covering case of the amplifier we mounted a 0-100 milliammeter. By means of a switch located directly beneath it and a series of phone jacks it was possible to insert it in either plate circuit at will.

(Construct further on page 55)



- R₁—5 megohms 1/2 w. Aerovox
- R₂—1 megohm pot. Centralab
- R₃—500,000 ohms, 1/2 w. Aerovox
- R₄—25,000 ohms, 1 w. Aerovox
- R₅—50,000 ohms, 1 w. Aerovox
- R₆—2,000 ohms, 1 w. Aerovox
- R₇—500,000 ohms, 1 w. Aerovox
- R₈—250,000 ohms, 1 w. Aerovox
- R₉—100,000 ohms, 1 w. Aerovox
- R₁₀—10,000 ohms, 1 w. Aerovox
- R₁₁—10,000 ohms, 1 w. Aerovox
- R₁₂—800 ohms, 1 w. Aerovox

- R₁₃—200 ohms, 1 w. Aerovox
- R₁₄—50,000 ohms, 1 w. Aerovox
- R₁₅—5,000 ohms, 1 w. Aerovox
- R₁₆—3,000 ohms, 1 w. Aerovox
- R₁₇—Dual 40 M-500 M. pot. Thordarson R1068
- R₁₈—500 ohms, 1 w. Aerovox
- R₁₉—1,500 ohms, 1 w. Aerovox
- R₂₀—5,000 ohms, 10 w. Ohmite
- R₂₁—3,500 ohms, 10 w. Ohmite
- C₁—8 mf. 450 v. Sprague
- C₂—1 mfd. 400 v. tubular Sprague
- C₃—10 mf. 25 v. electro. Sprague

- C₄—.5 mf. 400 v. tubular Sprague
- C₅—.03 mf. 200 v. tubular Sprague
- C₆—.25 mf. 600 v. tubular Sprague
- C₇—.01 mf. 200 v. tubular Sprague
- CH₁—Thordarson 67C46 choke
- CH₂—Thordarson 14C70 choke
- T₁—Thordarson T-90A04
- T₂—Thordarson T-90S13
- T₃—Thordarson T-15R05
- CH₃—Thordarson T-18C92
- CH₄—Thordarson T-15C54
- CH₅—Thordarson T-74C30

"Signal Tracing" VS.

by

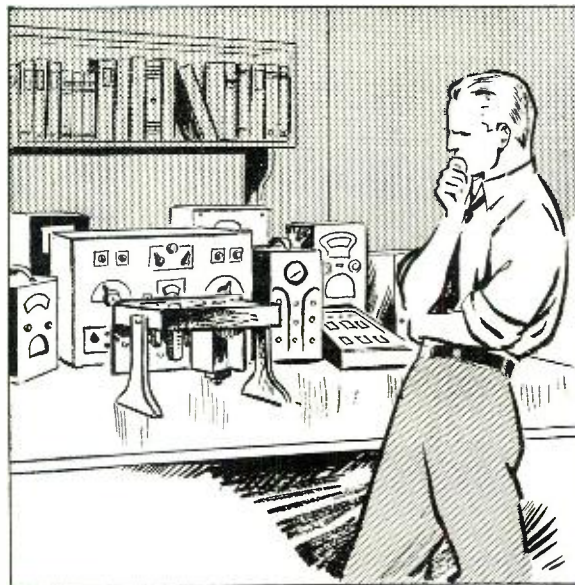
**JOHN F.
RIDER**

I HAVE been asked a question: "Is Signal Tracing any good to the 'catch-as-catch-can' serviceman?" The answer is: "Yes," very definitely so and there are sound reasons why. However, before starting the story, why not establish the status of this type of servicemen.

Strange as it may seem you will find him to be an experienced individual, a worker who after years of practice can service any receiver. After all, you must give the fellow his just due. He has developed a servicing technique all his own, although it is also used by less experienced people. What does this man do? His operations are a combination of things. He has developed the art of guessing to a fine degree and in many instances, if he guesses correctly, can work rapidly. His guesses are founded upon experience—experience with certain types of receivers and the interpretation of certain audible symptoms.

As a rule, he is not a proponent of modern test equipment. He feels that his knowledge of radio theory compensates for the lack of equipment; that he can improvise and in fact has in the past established the condition of certain portions of receivers and amplifiers by moistening his finger and touching various portions of the receiver, listening for clicks in the speaker and tapping tubes and listening to the ring in the speaker.

Without any attempt at flattery, we are going to say that he actually repaired radio receivers. But suppose that we investigate this subject of repair. What do we mean, "repair?" In the first place since the man is earning his livelihood as a radio serviceman, the first requirement is to repair the receiver at a profit. This means that the time element is involved. Any man can repair any receiver if he is given sufficient time, but sufficient time is not always available. After all, the customer desires that receiver as soon as possible and lack of servicing capabilities reflected in an excessive amount of time required for a job is something for which the customer is not responsible and should not be penalized by loss of utility of his receiver or amplifier. Profitable servicing can be accomplished in two ways:



The leading exponent of Signal-Tracing takes on an oldtimer in a heated debate on this question.

namely, by repairing the receiver in a proper amount of time and charging a fair profitable price or by charging for the unnecessary long period of time required for a service job when proper servicing capabilities are not available. It stands to reason that the former represents a solid foundation for earning a livelihood whereas the latter is a pretty risky gamble, if not a very tough thing to sell.

In the second place repair of a receiver or amplifier is really restoration of that receiver to its proper level of efficient operation. This is far removed from a receiver which operates and produces a signal. We can say

without fear of contradiction that every receiver which has been serviced and which is operating and producing a signal at the speaker is not necessarily functioning at the proper level of efficiency and as it really should. Primarily, this is so because certain tests must be made to establish certain defects which may be present, yet which will not interfere with the presence of some sort of a signal at the output.

With the above in mind, let us check the weaknesses in "catch-as-catch-can" servicing and see what signal tracing can do. Suppose we start with a receiver which is not entirely dead. Some sort of a signal is available in the output. The type of trouble is at the moment of no consequence. Where is the trouble? What is the defect? A man can guess, but there are two kinds of guesses, right and wrong, so that immediately there is a chance for a 50 per cent error—a 50 per cent waste of time. If it were only a matter of a mental operation, it would not be so bad, but a guess is of no use unless it is accompanied by some sort of a manual operation to substantiate or disprove the guess. Just how extensive this operation may be depends entirely upon the nature of the guess, the part or portion of the receiver or amplifier suspected, and last, but by far not the least, the type of defect.

In certain cases this manual operation might be the removal and replacement of a part, with an even chance of being wrong. And recognizing that myriad defects can cause the same type of symptoms, a man must really be a super-man, of which there are few, to guess right the first time. Some of the parts which may have to be removed are oftentimes very inaccessible and troublesome to take out.

Signal tracing on the other hand affords certain operating capabilities which are unparalleled if only to prove or disprove a guess, if a man wishes to continue guessing, which he does not have to do. Signal tracing enables proving a guess without the manual operation of removing and replacing. Hence there is a tremendous saving in time, even if the man guesses and

(Continued on page 18)

"Catch-as-Catch-can"

by

"TESTER"

BRADLEY

FIFTEEN years ago, when the sole difference between a set owner and a serviceman was often the ability to sprint on short notice, friend Hank used to "soup up" his sales spiels something like this:

"You touched that wire? Why, man—it runs directly to the feather coil—you're lucky if the syzygy isn't shot, too!"

It worked. The customer's teeth chattered; he fell back in awe, pulling at his collar with one hand, and at his pocketbook with the other. Hank wasn't exactly dishonest—he was merely abiding by current custom. It was during this lush period when the utterance of "radio frequency" was quoted at twelve dollars and fifty cents, cash on console.

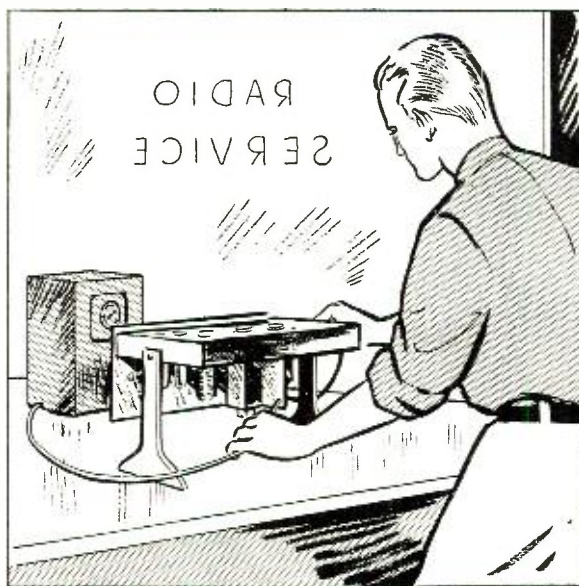
Hank continued his technical twaddle until all set owners came to associate abstruse words with exorbitant charges. Then he stopped talking and bought fourteen pieces of test equipment, hoping to continue his terrifying tactics tacitly.

This time, it didn't work. His customers were suspicious, started rumors, and fell away from him in groups, like rows of dominoes.

I have no desire to accuse Hank of gypbery—for we spent many a happy day together, before he went back to work for the ice company—but I do know his former customers were resentful. His was a borderline case. While they didn't think Hank was the sort who'd steal pennies off a dead man's eyes, they suspected he might have tried to swing a deal with the fellow who had put them there.

Hank's failure taught me the risk of customer offense in trick test gear. I have enough other troubles as I fight my way to the front of the eight-ball without cluttering up my technique with a bunch of shiny boxes. It is, of course, a matter of opinion—but I have found it to be a good working rule to limit one's self to test equipment less than four times the weight of the chassis under treatment.

Long before our sixteenth president split his first rail, it had been commonly accepted that simplicity is to honesty as complexity to phenagling. I find that if I run into a customer's



"Tester" undertakes the defense of the usual way by which the serviceman has been testing his sets.

home with three tools, a few common tube types, and a combination volt-and ohm-meter, he is favorably impressed. It is obvious to him I plan to restore his set quickly and with a minimum of ceremony and expense. If subsequent findings prove I have been too optimistic, the set owner sympathizes with me in my disappointment; when I reluctantly announce the chassis must take a trip to the shop, he helps me carry it.

But if I'd climbed upstairs in a struggle to make eighty pounds of test equipment portable, he'd think I was trying to build up a loose wire into an overhaul job.

The one objective I plan when I get a call is to see the customer smile as he pays me—the hall-mark of a completely successful job. I try not to out-engineer the people who pay my salary, and take care not to arouse needless suspicion with instruments.

Unlike those in the 'phone company, radio service calls are all person-to-person. This relation plays a 90% part in a successful repair transaction; instruments, the remaining 10%. When I see a competitor with elaborate equipment, I know he gives the technical side 90% of his attention, and that the customer won't be satisfied with what's left.

The technical tenth is, of course, essential. In my shop, I tolerate an oscillator—which I use whenever my work calls for it. I also have a tube checker which looks and operates somewhat like a slot-machine. I use it as a lead for set repairs, but never depend on it for a jack-pot in tubes alone. I have no oscillograph; still I eat.

When a call comes in, the customer tells me the model and complaint over the 'phone. Before I leave the shop I know the socket layout and two or three significant voltages. Common models form the bulk of my business, and—by an admixture of common sense, experience, and instinct—I usually analyze eight of ten chassis correctly before I reach the door-bell. Such pre-analysis, because it shortens the home examination period, is valuable. If I announce the set trouble within five minutes after I walk in, the customer is pleased; if I stay half a day with fancy paraphernalia, he expects me to pay rent.

My call is made to get confirming evidence, and to find out where I stand before I quote a price. During this time, I operate simply. No customer has ever mistaken my visit for a scientific expedition.

I learn by 'phone the set is a *Colonial 32*; complaint, hum. Do I need a meter to tell me the 8-8-8 electrolytic is probably acting up? When I enter the house, what test is better than the substitution of a single-8 section be-

(Continued on page 19)

Mr. Rider continues his argument on signal tracing from page 16.

maximum saving in time if he decides not to spend time guessing but makes a routine test. And by the way, it certainly does not seem to make sense to do service work for many years so as to gain experience for the sole purpose of being able to guess.

Interpretation of visible symptoms has been of aid to the "c-a-c-c" operation, for example in connection with possible shorts in power supply circuits, such as various indications upon the plates of the rectifier tubes. You know, red dot on rectifier tube plate, deeper glow, etc. Modern development of metal tubes kills this off, because nothing is visible and rectifiers are hot with and without short circuits.

The "c-a-c-c" operator can improve tests such as moving the antenna to various places in some of the older sets, but he is quite limited in the modern receiver, where the antenna feeds into the mixer, beyond which point it is i.f. and a.f. Shifting the antenna lead has helped localize, but it also helped confuse because of detuning, coupling to other circuits, etc. Shifting the test oscillator, if the "c-a-c-c" operation used such signal generator method of probing proved satisfactory at times, but was of use only in establishing conditions in coupling units, invariably shorts and opens. And in many receivers where imperfect shielding existed and leakage took place between stages, open circuits would pass undetected because a fairly good signal would be passed from a good winding to another good winding, both properly tuned and around an open winding. Interpretation of indications so gained requires much time because further isolation is required.

Signal tracing eliminates all of the uncertainties because each circuit is checked, and all of the components in each tube circuit are tested in accordance with its function—with positive indications of signal conditions—without involving more work—in fact less work than is required by the "c-a-c-c" method. The functional test of every component in every circuit cannot be accomplished by any other method but signal tracing.

Alignment discrepancies in r.f. systems are proved with signal tracing without involving any unnecessary work. The "c-a-c-c" operation cannot isolate alignment. If any one circuit is aligned in a modern receiver, all of the circuits must be readjusted. In signal tracing alignment conditions are instantly checked without involving the r.f. with the i.f. or with the oscillator.

Defects in the operation of the re-

ceiver oscillator are beyond discovery by "c-a-c-c" methods unless the oscillator is dead and even this requires improvising tests. Signal tracing enables instantaneous identification of not only a dead oscillator, but errors in frequency, erratic operation, insufficient output, each indication being positive and definite. Signal tracing can complete a full test upon the receiver oscillator in less time than is required by a "c-a-c-c" operator to connect an oscillator to replace the one in the receiver. And if we think in terms of modern receivers with automatic frequency control "catch-as-catch-can" operation is beset with tremendous limitations, each one of which is overcome by signal tracing.

Such defects as hum and distortion, regeneration and inverse feedback, all of which require testing with the sig-

from the antenna to the second detector, hum due to modulation of the receiver oscillator, coupling between input and output circuits through other and not associated leads, the presence of i.f. in a.f. systems, improper distribution of avc voltages, low "Q" coupling units, the presence of interfering signals in power supply circuits, high resistance grounds at radio frequencies, improper rectification in control circuits and very many others represent the confusing, time consuming problems which contribute to profitless servicing unless signal tracing is used. They are responsible for the increased difficulty in attempting to service receivers without utilizing the signal as the indicator of the defect.

Touching different points in a receiver or amplifier so as to identify which portion of the circuit is alive is all right as far as it goes, but the information gathered has only partial significance. It might show that an impulse can pass through the system, but that is no indication of the system. Since it is used primarily with receivers or amplifiers classified as being "dead," the possibility of more than one fault being present exists and in some receivers with intricate a.f. systems contained rectifier type control circuits which might lock the a.f. system unless an r.f. signal exists, the presence of a click in the speaker most certainly is an antiquated method of rendering judgment. It might have been satisfactory in days gone by many years ago, when circuits were very simple.

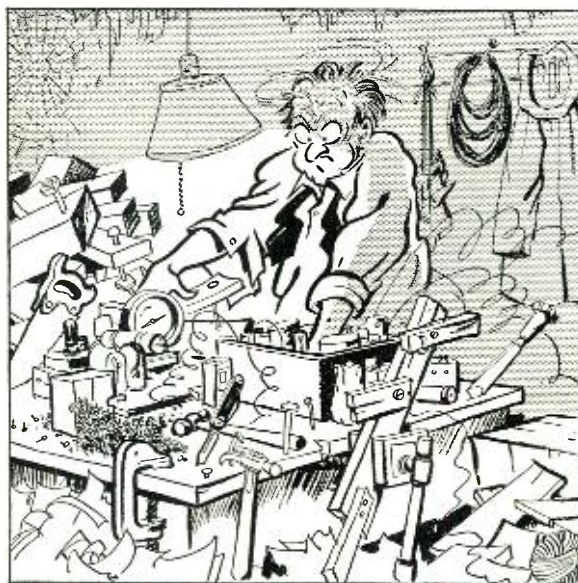
Signal tracing is just as embracing, permitting a man to encompass a complete section of the receiver or amplifier, but he secured positive identification of conditions with just as few operations as are used by the "c-a-c-c" man. "C-a-c-c"

operation calls for the measurement of operating voltages. Such measurements are satisfactory, but are not always indicative of signal conditions because all operating voltages may be perfect yet the signal can be absent. This has been a commonplace experience among many thousands of radio servicemen, both practical men of long standing and theoretical men of high calibre.

Signal tracing makes operating voltage measurement a secondary test, required in the minimum of cases, only when signal conditions cast suspicion upon a circuit. It stands to reason that if signal tracing shows the signal to be normal in an amplifier stage, operating voltages must be normal, hence need not be checked.

The measurement of control voltages, so vital to the proper operation of a modern radio receiver is a function of signal tracing, an operation entirely beyond the realm of "c-a-c-c"

(Concluded on page 59)



"Say, Mr. Rider, I wonder if I ought to learn something about signal-tracing?"

nal present lend themselves to rapid isolation by signal tracing, but not by the other method. Sure it is possible to guess at the various reasons which might cause hum and distortion, but establishing where the hum is introduced, particularly when it is not a commonplace condition requires freedom of operation—without in any way altering or impairing the conditions existing in the receiver. Signal tracing does not guess. It identifies conditions every place in the circuit. No wasted effort; information at every move without requiring the removal of parts, resoldering and other manual operations at every point suspected.

There are altogether too many possible defects which require the presence of the signal so as to identify the fault to permit "catch-as-catch-can" operation to survive in this modern day. Such items as partial rectification or overloading in r.f., i.f. and a.f. amplifier tubes, the transfer of interfering signals through the avc circuit

"Tester" Bradley continues his debate with John Rider from page 17.

tween each opened tap and ground? Isn't the owner impressed by my wish to help him, as evidenced by the addition of a temporary part? Isn't he prejudiced in my favor before I tell him shop work is necessary, and aren't my chances of selling tubes and accessories increased when I arrange a pre-hearing of set performance even before cost is mentioned? Is he convinced of my technical ability?

You bet!—and I've done it all without beautiful looking instruments!

On "noise" calls, I check the antenna first. If a good one isn't up, I install one. The best instruments in the world connected to an uninspected antenna couldn't give me more valuable data than that from a visual inspection. I always, I might mention, carry my eyes. Even if I did use instruments to measure signal-noise ratio, I'd probably derive data which told me to string a new antenna, anyway—so why isn't it logical to strike at the commonest cause of trouble first?

If the fault is "house" noise—usually from an obscure source—I side-step the work as gracefully as possible; not because I can't eventually find the trouble, but because, even though I do, the set owner thinks I should have located it in five minutes, and that any parts charge higher than \$1.15 is banditry. There's no use working at a loss of either good-will or money; and the fancier my gadgets are, the more ludicrous my actions become when I finally locate the noise source in an electric bulb which burns out by itself as I reach up to unscrew it.

The continuous fade is a cinch. After checking the antenna, I run a substitution test of tubes in the house. If it's still there, I pull the chassis and continue the substitution test in the shop.

The "intermittent," or *underhanded fade*, is different. Here the problem is to make the set fade before I start work on it. Although this is tough prerequisite in the trade, I have yet to come across a catalogue listing an

instrument which *causes a set to fade*. Often, as we know, the waiting period is prolonged; if I assemble a circle of instruments about me in the customer's living-room, and wait, crouched for the kill, the customer usually gets impatient and fades out before the signal.

How, you may ask, do I treat the exceptional cases which do not yield to conventional methods of attack? Well, I'm going to let down what's left of my hair and confess: I jolly well take the stubborn thing over to a distributor, pay him three bucks, and thereby clear my test bench for the more profitable work. The expedient

they are located—are simple. Usually, after I have repaired a time-killer, I am left with the foolish feeling that I should have ferreted the fault in a fifth of the time. On the next job, I *do*; the more I add to my experience, the less I rely on instruments to do my thinking for me.

I do not need exact standards to find resistor and condenser values. If my experience, data sheets, or the manufacturer's markings do not disclose them, a substitution soon does.

Sure—I'll admit intricate test apparatus is fun—so is a musical show—but I'm running a business, not a laboratory. I like to play with shiny dials as well as the next fellow; in fact, my problem has been to discipline myself *away* from the fascinating accouterments of science. I let the long-haired boys alone with their basement experiments. As far as I'm concerned, finding a good window display is more important to my store than discovering the best bait for a wave-trap.

If I ever buy a new test instrument, it will be because I have been shown proof of its value in terms of customer appeal. I never could understand why manufacturers deny servicemen this dials as well as the next fellow; in fact, my problem has been to discipline myself *away* from the fascinating accouterments of science. I

let the long-haired boys alone with their basement experiments. As far as I'm concerned, finding a good window display is more important to my store than discovering the best bait for a wave-trap.

If I ever buy a new test instrument, it will be because I have been shown proof of its value in terms of customer appeal. I never could understand why manufacturers deny servicemen this important information. If I plan to buy a car, the maker lets me drive one *under conditions of its intended use*. If my wife asks about a vacuum cleaner, salesmen fall over each other to show her how well it cleans two rooms of my home. But when I want to improve my customer appeal, equipment manufacturers offer me dry details to prove how accurate and wonderful their meters are in a laboratory. I'd

(Concluded on page 59)



"Tester" Bradley says that you can do this if you don't spend too much time with "signal tracing." This will give you time to think out new ways to make money.

is seldom necessary, and when it is used I usually come out of an unseasonal business flurry which leaves me with unexpected profit, and with no delays in my delivery schedule.

Most tough jobs are more difficult than they should be. Think back: Couldn't you have cleared out your last annoying chassis much more quickly if you'd drawn more on your experience, and less on your meters? I know if I look at a tough job calmly and remember that only *one thing is wrong with it*, the work is simpler. We all know that a charred resistor in series with a bypass indicates both are shot; and that, when a filter is grounded, the power transformer often gives its ruinous all; but failures usually come singly, and, in the sets which give off no odorous indication of trouble, only one component needs to be replaced. *All* causes of trouble—after

Serviceman's Experiences

by LEE SHELDON

Chicago, Illinois

Not all big deals are made in the service shop. Sometimes it will pay to go out and meet the customer at his play.

AT the beginning of every summer season, Nick O'Demus hires us to haul his p-a system to Wet Lake. He runs *Inferno*—a dance-floor entirely surrounded by water—six months a year. In the autumn, just before hell freezes over, he moves his floor show and dim bulbs into town, and sets up a night club called *Land of N.O'D.* Four purists from the neon sign company called for confirmation before construction was authorized.

Nick is one of our best customers. He pays us well to shuttle his mike equipment each spring and autumn, and usually is good for several maintenance jobs at each location. At the present writing, no data is available concerning the connection between jitterbug vibration and class B amplifier components, but I know—from a repairman's standpoint—that the relation is very profitable.

Al insists we attend each semi-annual opening. I disagree. Why should a serviceman who has been paid for work be called on to throw money back at the customer?

"One hand washes the other," Al said, corning a phrase. "Tonight, you are going to the *Land of N.O'D!*"

"I go there every night," I replied.

"I mean the night club," Al explained. "Overtime."

"After I punch out of *Salutary Sales & Service* at ten p.m.," I affirmed, "my time is my own!"

"Run home," my partner ordered. "Change into your full dress socks and cutaway cane. Your daily job isn't finished until you drop off to sleep. Continual alertness is one of the penalties for owning your own business. Meet you in front of Nick's place at ten-thirty. If the doorman screams, go home and change again!"

"I never try to hide dissipation and wasted time under the cloak of legitimate business," I stated, "and I firmly insist—"

Nick gave us a floor-side table. The occasion and surroundings were festive, but I wasn't. Al, whose perverse moods contrast mine, was gay.

"Does you good to get out once in a while," he said, "and it won't do the business any harm to meet our customers socially, either!"

"Foolishness!" I retorted. "Mrs. Lamb would never again trust me with

her i-f coils if she knew we were finishing our third drink in a place like this. Go easy on those highballs—don't forget we have to turn in the expense account to ourselves tomorrow!"

That, of course, was Al's cue to call the waiter.

"Bring us another round," he said, raising his eyebrows with a tremendous effort, "and ask Nick to step over here for a moment."

"Nick," my partner told him, "I don't like to complain to an old friend, but there's something wrong with your



"Do you mind awfully if I turn it on while you are looking it over?"

Scotch. The hangover seems to come before the lift!"

The boss sighed, pulled out a chair, and sat down.

"It's not the Scotch," he said sadly, "it's that orchestra. Had them five years, and they picked out a morning before opening for their first argument. Just listen—isn't it terrible?"

Some were playing *Sunny Side of the Street*; the others were protesting with *Lost in the Fog*. "A dissonant dissidence," Al hissed reflectively. "What's the trouble?"

"Labor tiff—some claim Mozart favored *Hired Help of America*, and the rest say he leaned toward *Willing Workers of the World*. I plug my ears—I close my eyes—and still I know how they sound. It's getting beyond the control of the air conditioning system. Look, boys—I like you—please go home!"

"We'll wait for the next number," Al said. "What's it called?"

"*The Colonel's Lady & Judy O'Grady—the Sisters That Get Under Your Skin*," Nick answered, "but they insist

Mozart was non-union. It'll be a duel, not a duet!"

"There must be some way out," Al replied. "I'll think about it—maybe I can help you."

"Keep on drinking," I warned, "and some one will have to help you."

"Before the sun rises," Al promised, "the night will be well spent."

"So will you," I forecast.

A most interesting phenomenon occurred at three a.m. I had been sitting quietly with my chin in my hand, and was roused by a very peculiar condition across the table. Al, who had eased up somewhat after the fifth, was moving slowly—

downward! He had been dozing; his face was relaxed. The passage was not jerky, but slow, gradually accelerating. He was like a new ship, which—after being smacked on the stem with a bottle of champagne—slides sedately down the ways and launches itself. I studied him dispassionately, objectively, as his vest buttons disappeared from view seriatim. Then, after a short pause at ear level, his curly hair passed out of sight in a quick final plunge.

"*Spurlos versenkt*," I murmured, with a philosophical shrug, and went home alone, thoroughly enraged at the extravagance of a business partner who pays a cover charge just for the privilege of sliding under the table. Continual alertness, indeed!

I beat Al into the shop by two hours the next morning, and busied myself by dusting out the tube bins, which is one way to move a large stock quickly. When Al came in, he said:

"Stop fooling around," he said, "we've got work to do. Go out to *United*; pick up that 50-watt amplifier, the best mike in the place, and four speakers. They've got to be installed before seven p.m.!"

"I don't think you slept late enough," I said, with grade four sarcasm. "Where did you get that order—while you were under the table?"

"That I did," he replied. "Even then—while you deserted me—I remembered our business. After the orchestra knocked off, I said to them: 'Boys, I don't want to get into your argument—but honestly, haven't you some sympathy for the customers? They love music—and I'll bet you do, too!'"

(More Experiences on page 58)

BENCH NOTES



by **LEE WARD**

Service Manager, San Francisco, California

Odds & Ends and the awards of the November "Problem of Conduct" take up the column this month. What to charge, is another item.

MARK TWAIN said: "Everyone talks about the weather, but no one ever does anything about it." I quote this merely because custom demands its use once under every title, and because I don't want you to dread coming across it later. More important business is at hand: contest winners renegade radio waves, and a horror story. Who cares about the weather in these swift days of science, that bring with them more tubes than you can shake a stick at? And who of us wouldn't enjoy doing it?

Weird Wireless

IN a way, it is deplorable that radio rushes so madly ahead, especially while some of the past mysteries of the art remain unsolved.

For example, how do you explain the travels of that radio signal ten years ago, which took four minutes and twenty seconds (*Proc. I.R.E., Oct. 1929*) for its trip from transmitter to receiver? Although catching it was immediately acclaimed as a signal victory, no explanation of its absence has been accepted as final.

The observations were made by Professor P. O. Pedersen, of Copenhagen, who, after waiting tensely for the return of the slow wave, probably muffed the proper greeting to the prodigal signal simply because there is no Danish equivalent to "Long time no hear!"

Of course, one can easily toss the occurrence aside by saying the signal stopped off for a beer; but those of us with unearthly ideas are not satisfied with such an excuse. According to the closest estimate allowed by my warped slide rule, it travelled 48 million miles. If it circled the earth under the Heavyside Layer, it must have made two thousand trips around the addled apple. A likely—as Groucho Marx would say—story! But—where was it?

Flash!

FROM such things we may conclude the soldering business is in a state of flux. Each day brings new puzzles, new confusions.

Only one clear, simple reassuring fact stands forth to encourage us. Perhaps I violate professional ethics

in disclosing it to the trade, but I am willing to take that risk in the hope it will help my colleagues face the future without flinching.

This inside information, you understand, comes straight from the fuse-box. From an unusually reliable

that repairmen are charging too little. Many prices were quoted; I averaged them. \$2.64!

Fellows, I don't want to have to be ugly about this thing—but that isn't enough. The car traveled twenty miles, at a cost of about five cents per; the tube, at forty and triple-ten off, cost thirty-five cents. The elapsed time—unless there were some sharp corners concerned—was two hours, at, say a dollar an hour. Figure it out—you'd have to borrow seventy-one cents from someone when you got back to the shop to *break even on parts*.

These costs do not figure in things like depreciation, obsolescence, and the other discomfitting items accounting experts pile up when they prove how closely your business has approached 77-b.

Soc Et Tuum!

IF any of us were C.P.A.'s, I suppose, we wouldn't be servicing; but you *can* try this: Estimate your year's store costs in round figures. Add ten per cent for getting old, and another ten per cent for the items you forgot. Strike this total, and divide by the number of calls you got that year. This quotient is what it *costs* you to walk into a customer's home; the amount of cold cash you must get on the job *before* you begin to show profit!

I tried this system out on my own shop once, and got a result that frightened me so much I nearly went to work on my 'phone line with a pair of diagonals. After I thought on it for a while, I charged more for my work. You can do this easily—once you prove to *yourself* higher rates are justified. After that, you stop being conscience-stricken when a job comes to more than one digit west of the decimal point.

If anyone accuses me of being mercenary, I must admit the charge is true. Is it so unnatural for a businessman to be mercenary? Should not pecuniary thoughts be evidenced in everything a serviceman does, thinks, or writes? Try calling in a plumber, carpenter, or electrician—you'll be surprised how quickly he walks out on a

(More Bench Notes on page 54)



"Say, can't you fix this radio? It lets the police calls interfere with the football scores!"

source, I learn that—at least while the eternal verities remain in power—there is little danger *Ohm's Law* will be repealed.

Ward's Awards

THE November *Problem of Conduct* propounded: "A rich eccentric, proud of his set, calls you ten miles from your shop to service his receiver. The trouble is caused by an 80-cent second detector tube. What would you do?"

All sorts of interesting answers were received. Most of them, stressing the point of honesty, show the average repairman is hampered because he is over-conscientious. One entry gave me, as if in horrified protest, a biblical reference. I must remember to look it up the next time I stop in a hotel.

The answers also indicated, after they assured me crime doesn't pay,

What's **NEW** in Radio

Especially appropriate for the den or recreation room is the Lafayette Model BB-27, one of the latest offerings of Radio Wire Television Inc. (formerly Wholesale Radio Service Co.), 100 Sixth Avenue, New York City. Such appropriateness is indicated by the sturdy, frill-less cabinet of modernized mission design, $14\frac{1}{2}$ x $6\frac{3}{4}$ x $8\frac{1}{2}$ inches in size.

No antenna is required for operating in the broadcast band but terminals for an external antenna are provided for use when tuning its short-wave band of 4.6 to 12.2 mc. Six buttons provide for instant selection of any one of six stations. These are set in a few minutes, and the setting can be



changed at will. Other stations, including the short waves are tuned in by means of a conventional knob and slide-rule type calibrated dial with inset tuning "eye." Tone control is continuously variable and the built-in speaker is carefully matched. The circuit is a superheterodyne of high sensitivity, the audio portion of which may be used for phono or television sound reproduction by means of terminals and switch provided at the rear. Operating power is drawn from either a.c. or d.c. lines.

The complement of 6 tubes includes: 12SA7, 12SK7, 12SQ7, 35L6GT, 35Z5GT rectifier and a 6AB5 tuning "eye."

Westinghouse Elect. announce several new model receivers. The last application is the addition of loop antennas to six of the most popular Westinghouse 1940 models. These are WR-166, the small, plastic sets in six colors; WR-468, the low-priced combination radio and record player table model; WR-474, the highest priced Westinghouse com-



bination console (photograph herewith), and three console models, WR-372, WR-373 and WR-374 which cover the low and medium price brackets.

In the consoles the domestic loop, of unusually large size, can be turned to permit clearest reception. Foreign band short-wave broadcasts are received on a separate loop

properly constructed and located for this service. Reception of foreign broadcasts is sharp with ample volume.

With the addition of loop antennas no external connection to the radios is necessary and they can be placed anywhere the user desires.

Illustrated herewith is one of the big Resistors recently introduced by the Ohmite Manufacturing Company of Chicago for heavy-duty service. It is 12" long, $2\frac{1}{2}$ " in diameter, and is rated at 500 watts. But it is second in size to the $2\frac{1}{2}$ " x 20" 1000 Watt Ohmite resistor, the largest vitreous-enamelled porcelain resistor made. These are two of more than 50 Ohmite resistor sizes which range from 1 to 1000 watts in a single unit, from $5/16$ " diameter x 1" long to $2\frac{1}{2}$ " diameter x 20" long. These big Ohmite Resistors are also furnished in Corrib Type with corrugated ribbon winding.

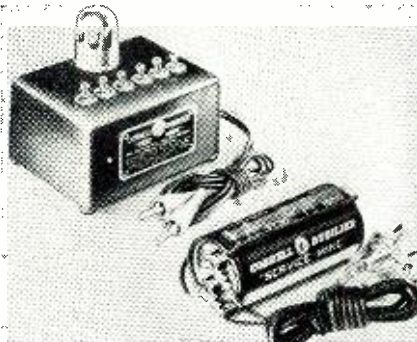
The resistance wire is accurately, uniformly wound on a porcelain core. Special



Ohmite Vitreous Enamel permanently locks, insulates and protects each turn of wire on the porcelain core—prevents shorts, efficiently conducts away generated heat, insures continuous trouble-free service. The resistance wire is both mechanically locked and brazed to the terminal lugs to assure good contact at all times.

These Resistors are available in Fixed, Adjustable, and Tapped, Regular and Non-Inductive, General-Purpose and Precision types. Hermetically-Glass-Sealed Precision Resistors are also available.

The new test instruments announced by Cornell-Dubilier will find a warm welcome among servicemen who undertake the replacement of capacitors in motor-starting circuits. In this type of service the original



capacitor oftentimes gives no indication of the required replacement value in which case it is necessary to try different values (ranging anywhere from 20 to 150 mfd.) until the one is found that provides maximum starting torque. Not only is appreciable time required in connecting these capacitors, one after another in making this test, but the service kit is cluttered up with perhaps a dozen individual capacitors.

The two instruments mentioned simplify this proceeding. The "Test-Mike" is a multiple-capacitor unit of the a.c. electrolytic type, with six toggle switches which in different position combinations provide twelve capacity values ranging from 18.75 to 150 mfd. In addition it includes a pilot lamp for checking operation of the mechanism which cuts out the starting capacitor when running speed has been reached. This instrument is enclosed in a case, $3\frac{1}{2}$ " x 5" x 3". The "Service-Mike" gains even greater compactness through the elimination of the case, switches and pilot lamp. It provides the same capacity range as the "Test-Mike" but the twelve variations are obtained through different interconnections of its four terminals. It is cylindrical in shape with a diameter of $1\frac{13}{16}$ " and over all length of $3\frac{7}{8}$ ".

The Hickok Elect. Inst. Co. announce a new instrument, equipped with a Hickok 4" rectangular meter having $3\frac{3}{4}$ " scale length. It provides highly accurate measurements at low values of resistance on two ranges—0-6 and 6-600. The special feature of the scale is the non-overlapping of the two ranges—thus permitting battery adjustment at the logarithmic center of the accurate section of the scale. Overall accuracy is approximately



plus or minus one degree of scale deflection, the scale being 100 degrees.

The instrument is completely self-contained, utilizing 3, easily replaceable, flashlight cells, connected in parallel to prevent frequent replacing of batteries. Change in battery voltage does not affect the accuracy.

Special low resistance leads of No. 8 stranded, rubber insulated wire are provided with large surface clips at each end.

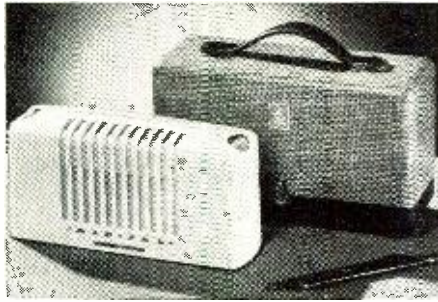
Hickok Meter 4975-S Ohmmeter may be used for accurate measurements in any very low resistance circuit.

Smaller than a cradle phone yet giving six-tube performance, the Air Pal midjet radio developed by Stewart Warner Corp., Chicago, Ill. was selected by the judges of the Fourth Annual Modern Plastics Competition, conducted by Modern Plastics magazine, to receive Honorable Mention in the Decorative Molded group of entries.

This tiny plastic radio, weighing only $3\frac{3}{4}$ pounds, stands out in radio design during the past year, especially as far as entries in the annual Modern Plastics Competition was concerned. It has an interesting contour, occupies exceedingly small space and exhibits

an entirely new plan of dialing knobs which permit it to fit snugly into a compact case for carrying.

Designed by Barnes & Reinecke, Chicago, Illinois, the Air Pal radio has an ivory colored housing with recessed coral colored dialing knobs at each end. It is molded by General Industries, Elyria, Ohio, from



Permo, manufactured by the same company. The dies for the piece were also made by General Industries and the press on which the molding is done was built by French Oil Mill Machinery Co., Piqua, Ohio.

A new Table Model Receiver is introduced by Majestic for Foreign and Standard Broadcast reception.

This unit, Majestic Model 2D60, is a 6-Tube superheterodyne including ballast tube and by dual purpose tubes is equivalent to 7 tube performance. It operates on AC or DC.

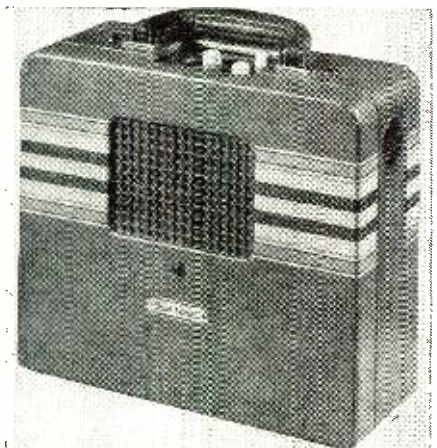
A large dial, distinctive in gold and silver finish provides full visibility for station selection. Standard American broadcasts are



tuned on the upper half of the dial, and with equal ease, England, France, Germany and other foreign broadcasts can be selected by the large aeroplane pointer on the lower half of the dial.

The cabinet is plastic, ivory or walnut finish, gracefully moulded in design.

A new portable Pick-Me-Up radio of radically different design which operates either on batteries or any house current,



has been announced by RCA Victor. Featuring the Current-Cutter, a battery-saving

circuit development which cuts drain on the "B" batteries up to 30%, this low-cost instrument features operating economy for all-purpose portables.

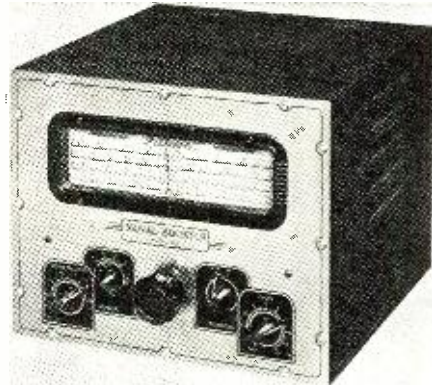
The new Pick-Me-Up is easily adjusted to current-saving battery operation by means of the on-off switch. When the switch is set for Current-Cutter operation, the "B" battery power output is reduced without affecting the instrument's tone or selectivity in any way. Further operating economy is provided by five low-drain RCA Victor tubes used in the powerful superheterodyne chassis which has six tuned circuits.

Housed in a cabinet only a little larger than a briefcase, the Pick-Me-Up is also protected against battery power loss through heat generated during 110-volt AC-DC operation. Complete ventilation of the cabinet interior is provided by small metal-grilled vents located in the end panels. All controls are conveniently located at the inset dial panel beneath the carrying handle which is set atop the perfectly balanced, easy-to-carry cabinet.

Meissner Manufacturing Company of Mt. Carmel, Illinois, announces that a new unit is now available under the name "Signal Booster."

Introduction of the "Signal Booster" follows extensive field and Laboratory research. The suggestions and ideas of outstanding DX operators were incorporated and the instrument designed for both Amateur and Commercial communications service.

Maximum selectivity and image attenuation are obtained through the action of three



tuned circuits utilizing the new 1852 "television" tubes. Complete coverage from 1,600 to 21,000 kc. is available in four bands with an average gain of 40 DB.

Sensitivity and signal-to-noise ratio are controlled by a front panel knob. Any type antenna may be connected to the "Signal Booster" since provision is made for standard or doublet feed lines.

A front panel change-over switch permits the operator to connect the antenna to either the "Signal Booster" or directly to the receiver. Input and output impedances are designed to match average values of antennas and receivers. A manual gain control regulates signal output.

The Meissner "Signal Booster" is housed in a black crackle-finished steel cabinet, 9" x 11 1/4" x 11 1/2" deep. The front panel is nickel plated, providing an attractive background for the black scales and control designations.

Wattage ratings of inexpensive and handy flexible resistors are now being stepped up several hundred per cent through the use of fibre-glass cores and braided coverings of the same material. Appropriately named Glasohms, these tiny power resistors are now announced by Clarostat Mfg. Co., Inc., 285-7 N. 6th St., Brooklyn, N. Y.

Glasohms make use of fibre-glass filaments 0.0002 (two ten-thousandths) inch in diameter, as the basis for the threads subsequently worked into cores and braided coverings. The result is extreme flexibility, since the fibre-glass mass has pliable characteristics comparable with silk or cotton. Due to the high melting point of the glass, these units may be operated at temperatures up to 1000 deg. F., or glowing red, without charring,

burning or deterioration. This means a 300% overload at usual ratings.

The units are handsome in appearance. The fibre-glass braid has a rich silky tan appearance for maximum eye appeal. Braided sleeves and metal ferrule ends are colored in accordance with R.M.A. resistance code. Pig-tail or other terminals are available. The units are self-supporting, and especially suited to point-to-point wiring.

Glasohms are available in two sizes: 1/16" dia. core, rated at 1 watt per body inch; and 1/8" dia. core, 2 watts. Resistance values run as low as 1/4 ohm or less per body inch, and as high as 700 ohms, and 750 ohms, respectively, per body inch. Units may be made up to 500 feet long.

The Model 311P Tube Tester of Radio City Products Co., Inc., 88 Park Place, New York City, is a counter instrument which aids the dealer to engender customer confidence by providing direct-reading tests of all old and new tubes, and of condensers, resistors, pilot lamps, miniature lamps and ballast tubes as well.

This model occupies bench or counter space 10" x 15" and is 7" high, overall. Its controls are mounted on a sloping panel but



the meter is horizontal to make it visible to both salesman and customer. This meter has a 4 3/4" scale, fully calibrated in four multi-colored ranges.

Test circuits are in accordance with the latest R.M.A. standards with a smooth 25-watt line control and special 6H6 circuit to insure high accuracy. Test features include provision for "hot" interelement short and leakage tests; checks of cold-cathode rectifiers; testing individual sections and elements of multi-purpose tubes, duo-diodes and full-wave rectifiers; full floating filament tests with any voltage available at any two prongs of all sockets, etc.

The direct-reading ohmmeter (power supply self-contained) provides ranges of 0-10,000 and 0-1 megohm. Direct-reading capacity ranges are .001-4 and .4-16 mfd. Neon indicator provides condenser leakage tests.

Bud Radio, Inc., of Cleveland, Ohio, has recently announced a very neat Code Practice Oscillator operating on 115 volts A.C. or D.C. and suitable for either individual or group code instruction. This oscillator is housed in a handsome grey-crackled case measuring 3 1/2" x 4 1/4" x 6" and is sold completely wired with built-in dynamic speaker and tube. The pitch of the note emitted by this unit may be changed by means of a switch on the panel, and a handsome etched nameplate it attached for identifying the controls. Provision is also included on the rear of the oscillator chassis for an additional speaker (available in matched case) and extra key for two-way communication.

In addition to its usefulness in teaching and learning the code, this oscillator is handy for furnishing a constant tone source for checking modulation percentage or P.A. coverage, and may also be used as a keying monitor for a transmitter.

A compact unit, known as the "Mystic Mike," broadcasts to any receiver in the same

building without connecting wires. It consists of a modulated oscillator with variable frequency, and radiates a signal within the tuning range of all types of radio sets.

Operation is quite simple: the unit is merely plugged in to any AC or DC light-line.

The manufacturers suggest numerous ways to use the Mystic Mike in the home, school, or office. This device is easily adaptable for entertaining, rehearsing, auditioning, and as a public address system. Many other ideas will occur to the professional or amateur operator who becomes accustomed to the versatility of the Mystic Mike.

Hygrade Sylvania Corporation announces a new electric sign for its dealers and servicemen which was made up from suggestions received from the field for an impressive sign at an inexpensive price.

It is a clean cut, eye-catching sign. The sturdy, metal frame is finished in green crackle. Chrome plated trim edges the glass panel which is printed in green, black and white. The words "Complete Radio Service" occupy two thirds of the illuminated front.

Two practical features are a flat base for



standing and an adjustable metal chain for hanging. Holes punched in the bottom edge receive the personalized nameplate hanger which up to now has been distributed only in connection with the Sylvania outdoor metal flange sign. The nameplate hanger is offered separately, imprinted with the dealer or serviceman's name. Thus the sign is personalized giving extra advertising value.

Two forty watt bulbs light the glass panel and throw a shaft of light downward illuminating the nameplate and the window. The sign measures $2\frac{1}{2} \times 8\frac{3}{4} \times 3\frac{3}{4}$ ".

Modifications in the Consolidated Model 9000 Dynamic Conductance Tube Tester which accommodate the testing of the latest type tubes have been announced by Consolidated Wire & Associated Corps., 526 S. Peoria Street, Chicago, Ill. This new construction permits extremely accurate testing of the new 117 volt tubes as well as the newest single-ended loktals.

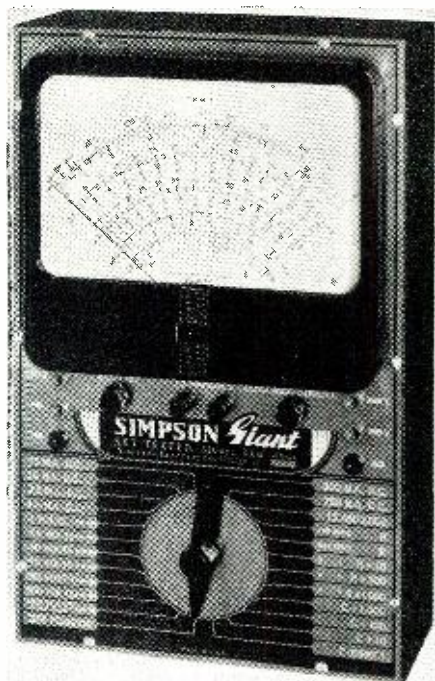
This counter or portable tester permits simple, fool-proof testing with the easy-reading tube chart indicating tester settings. It compensates line variation for the spread between 90 and 130 volts. A special feature of this unit is that it tests Christmas tree bulbs and pilot lamps.

The highly sensitive meter—with English reading dial—needs no special "Diode O.K." marking. A slip-hinge cover on the beautiful, natural finish, solid oak case permits easy conversion from portable to counter use.

A new set tester, a foremost feature of which is the large 9-inch meter, has recently been introduced by Simpson Electric Co., 5216 Kinzie Street, Chicago. This new tester, known as the Model 320 Giant Set Tester, incorporates fifty ranges. There are nine voltage ranges, both A.C. and D.C., from 0—to 3000 volts with a resistance of 1,000 ohms per volt. The ampere scale is from 0—15 Amps., and there are six D.C. milliamperer ranges from 0—to 750. The five resistance ranges cover 0 ohms to 50 megohms. Four capacity ranges are included, and seven decibel ranges from -20 to +48DB. All of the A.C. ranges may be used for output measurement.

The instrument is indirectly illuminated by two 6-volt bulbs. The panel is particularly attractive, and arranged for quick selection

of all ranges. Test leads, insulated for 3,000 volts, are furnished with each instrument. Wings are available, as illustrated, so that



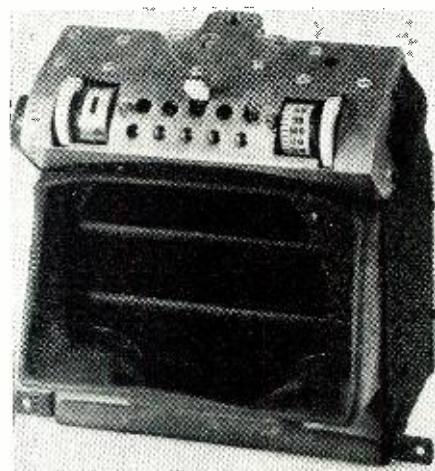
the Model 320 may be rack mounted.

The Model 320 is described in the new Simpson Catalog which may be obtained by writing to the manufacturer.

Instead of making car radios in three separate units—speaker, chassis and antenna—Ford engineers this year have developed a method of combining the three into a single unit. These new style radios are being produced for the 1940 Ford and Mercury cars.

Radio engineers consider this to be one of the most important advances in the car radio field in a number of years. The assembly of both speaker cone and antenna directly to the chassis reduces the number of wire connections to a minimum and gives vastly improved reception.

Particular attention has been paid to the location of the radio controls and to mak-



ing operation as simple as possible. Adjustment of the radio is possible without diverting the driver's attention from the operation of the car. The control panel is just above the radio grille in the center of the instrument panel for split-second visibility.

A "Roto-Matic" selector operated by a push-button gives instant choice of five pre-tuned local stations. These are not indicated by the usual call letters. Each station is identified by a large numeral as easily and quickly read as a speedometer dial.

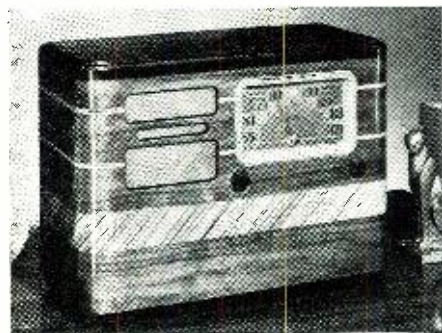
Three new Spade Bolt type Tubular Card-board Dry Electrolytic Condensers recently

announced by the Sprague Products Company are designed to serve as universal replace-



ments for the many condensers of this type now used in many popular radio receivers. Known as the Sprague Type SB Condensers, these units are equipped with spade bolt mounting and are of the standard Sprague sealed type construction. They include an 8-Smfd. 450 working volts unit capable of withstanding a surge of 525 volts; and 8-16 mfd. 450 unit with a surge of 525 volts; and a 12-16 unit of 200 working volts and handling a surge voltage of 225 volts.

This smartly styled battery-powered table model (Model BT-41) is the latest addition to RCA Victor's line of radios for farm homes. Combining high quality performance with low operating costs, the powerful instrument is equipped with the exclusive "Economy Blinker" on-off warning signal which has proved so popular in other RCA Victor battery receivers. Its four-tube superheterodyne of unusual sensitivity uses six tuned circuits and may be easily converted for 110-volt AC operation. Only a single AB battery pack is required for battery operation, and battery life under normal operat-



ing conditions is approximately 1000 hours.

Other features of the BT-41 include an easy-to-see clock type dial, magnetite core transformer for increased sensitivity, 5-inch permanent magnet speaker, moisture proof coils, automatic volume control, 1.4-volt low-drain tubes, and complete coverage of standard broadcast band and police band over tuning range of 540-1720 kilocycles.

The cabinet sets a striking new note in functional design and is finished in selected heart walnut veneer with a band of Zebra-wood across the front and sides. It provides storage space for the entire battery complement. Dimensions are height, $13\frac{1}{4}$ "; width, $17\frac{3}{8}$ "; depth, $7\frac{3}{4}$ ".

James Millen Mfg. Co., Inc., Malden, Mass., announce a complete line of amateur transmitter and receiver parts and accessories. Among the many items made by this concern are: Transmitting condensers, Dials, Drives, Scales, Knobs, Transmitting coils, Forms, Neutralizing condensers, Receiving condensers, Flexible couplings, Exciter tanks, RF Chokes etc. Illustrated herewith is one of the many sizes of transmitting condensers which incorporates several outstanding features, among them being more compact assembly and construction, center-fed rotors, isolantite insulation, and a highly efficient worm dial mechanism.

Other models of this condenser are made with provision for mounting the tank condenser directly on the condenser assembly and this includes a mounted r.f. choke. Shortest possible leads may then be used and a symmetrical layout will result. Condenser plates are semi-circular and will provide essentially straight-line tuning.

Amperex Electronic Products, Inc., Brooklyn, New York, announce a new 5 KW Air Radiation cooled tube of the $1\frac{1}{2}$ " anode diameter size. Same type is available in 2 inch and 3 inch anode sizes developing higher power output. Literature available on request.

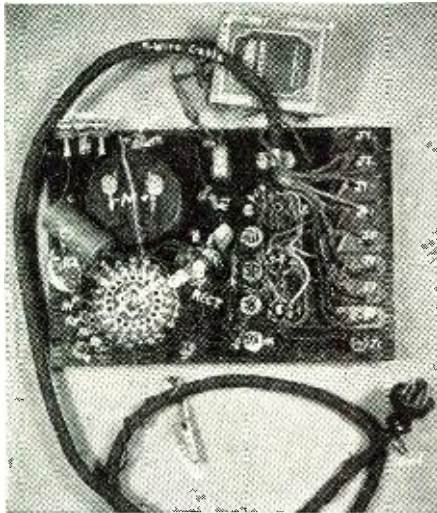
CHASSIS ANALYZER

by ROBERT J. CARTWRIGHT

Menomonie, Wisconsin

This interesting gadget can be cheaply built and used to test radio chassis.

WHEN the writer was in need of a good accurate analyzer, he set about the construction of his own unit to include many applications. The analyzer uses the new circuit-breaking jacks and an eight prong plug with adapters to fit all other sockets. A connection to the chassis of the set being tested without removing the leads from the analyzer

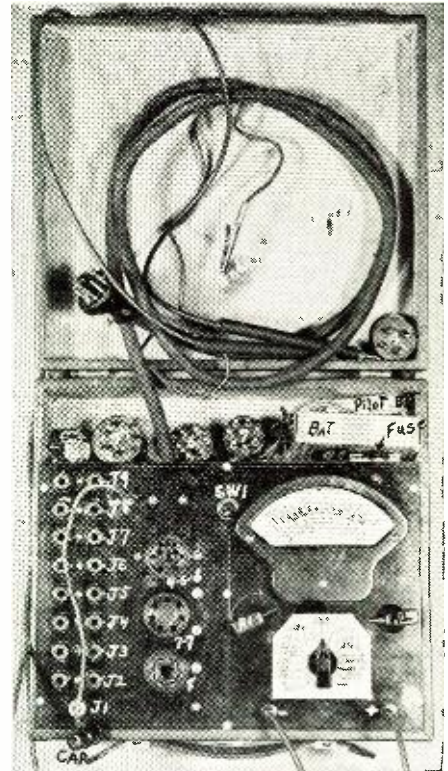


Connections back of the panel.

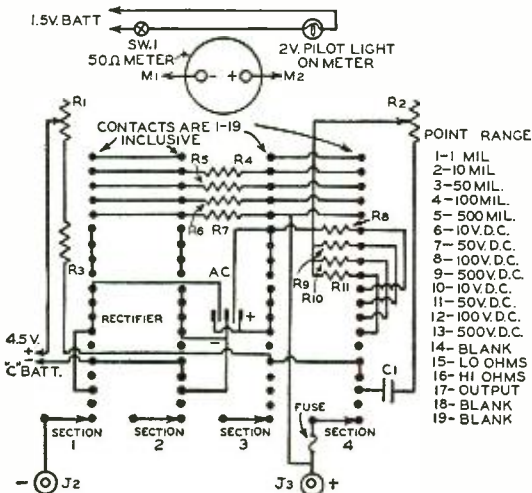
is one feature. The other features are that meter ranges are all under one knob and an internally lighted five-inch meter is used. The multimeter is a 50 ohm, 1 mil movement with the following ranges: 0-1-10-50-100-500 mils d.c.; 0-10-50-100-500 volts a.c. and d.c.; 0-500-200,000 ohms; and a continuously variable output range. The nineteen point-four deck switch makes simple operation possible and provides three extra points for future ranges.

The hard rubber panel was drilled for all parts before any were mounted. The meter was put on after all wiring was completed. Rubber covered hook-up wire is best to use for its high dielectric. The wiring of the switch was done first, great care being taken not to short any of the switch points with solder. The high voltage circuit especially must be wired accurately. A fuse protects the meter on the voltage and output ranges. The analyzer section was wired after the multimeter part was working. To lessen the cost of parts the same voltage multipliers were used on both a.c. and d.c. ranges. The rectifier makes it necessary to add an error of about ten per cent to the meter reading.

The meter shunts were all hand made, using a 50 mil factory made pre-

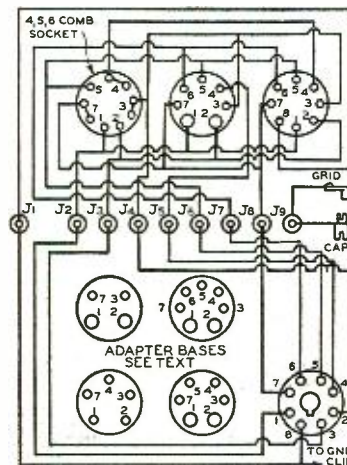


The unit is mounted in a box.



MULTIMETER PARTS:

M—0-1 mil. 50 ohm, Beede 5-inch fan type meter
4-deck-19-point switch. Mallory
2 volt pilot lamp and socket. Mallory
SW1—Toggle switch. H. & H.
R1—1M ohmmeter adjustment rheostat. Mallory
R2—100M output adjustment potentiometer.
R3—3,500 ohm, I. R. C. insulated resistor. I. R. C.
R4—10 mil. meter shunt. I. R. C.
R5—50 mil. meter shunt. I. R. C.
R6—100 mil. meter shunt. I. R. C.
R7—500 mil. meter shunt. I. R. C.
R8—10M precision resistor. I. R. C.
R9—50M precision resistor. I. R. C.
R10—100M precision resistor. I. R. C.
R11—500M precision resistor. I. R. C.
C1—5 mfd. 600 v. condenser. C-D.
7x10^{1/8} inch hard rubber panel
1/2 volt pilot light battery. Burgess



4 1/2 volt ohmmeter battery. Burgess

1 pr.—phono needle test prods with 7-foot, heavy-duty leads

ANALYZER PARTS:

1—combination 4-5-6 socket. Amphenol
1—combination 7 large and small socket. Amphenol
1—octal socket. Amphenol
J1—insulated phone tip jack. Mallory
J2 to J9—circuit breaking jacks. Mallory
5 ft.—9-wire analyzer cable
1—combination metal glass grid cap
1—octal analyzer plug. Amphenol
5—octal adapter tops. Amphenol
1—4-prong adapter base. Amphenol
1—5-prong adapter base. Amphenol
1—6-prong adapter base. Amphenol
1—small 7-prong adapter base. Amphenol
1—large 7-prong adapter base. Amphenol

cision shunt as a standard. The advance wire shunts were soldered directly to the switch points to eliminate long leads. The meter is illuminated by a pilot light through a hole drilled in the back of the meter. Aluminum paint inside the meter housing helps reflect the light over the dial.

A combination 4-5-6 prong socket was used on the analyzer to eliminate parts. As this socket has a common plate connection, all plate terminals were tied together to jack number eight. The common cathode terminals were then connected to jack number four.

The plug is a standard octal base with adapters that are wired to the corresponding terminals as numbered in the diagram. The adapters were made by first soldering the lead wires to the adapter top. Then the wires were pulled down through the base prongs and soldered.

As no engraver was available, a card was made for the switch to avoid confusion among the points. Engraving would add a professional touch. The case was made of plywood, glued and nailed, making a solid box that was sawed in two to form the case and

(Build further on page 60)

Ring the Bell

PROFITS

Broadcast advertising is one good way to get more business.

by **SAMUEL C. MILBOURNE**
Expert Serviceman, Greenwood, Miss.

IN this department, we are trying to help you increase your service business by the application of sound business methods and *effective* modern advertising.

This month we will consider local broadcast stations as a means for increasing radio repair sales.

I am not going to bore you with a fist-full of statistics which prove beyond a shadow of a doubt the effectiveness of radio broadcast advertising. If it were not effective, you wouldn't be in business today. It is a surpris-



A coast-to-coast hook-up is not the only broadcast advertising.

ing fact that though some 40,000 of us make a partial or total living as a direct result of radio advertising, few of us use it in our own business.

Many servicemen are confused as to the cost of time on the air. We read so much about this company spending a million dollars and that company shooting two million dollars for radio time and talent that we get the impression that such an advertising means is far beyond our feeble purses. Yet, spot announcements are available on more than one local station at as low as fifty-cents a throw if taken on contract for a month's time! Certainly this is not expensive advertising.

Of course, you can't walk into NBC, slap four-bits on the counter and demand a coast-to-coast hook-up. But, a wide-awake serviceman can usually find a way effectively to advertise his services by means of the radio, without permanently crippling his bank-account.

First, obtain a *station rate-card* from each radio station serving the locality you wish to reach. If you were located in New York, you wouldn't put advertising in a Chicago newspaper, so don't bother stations

which serve the wrong locality. If you were located in a small town, one hundred miles from a large city, you would not advertise in the large city's newspaper because only a fraction of its readers live in your locality. Therefore, a small local station serving your own town and immediate vicinity is a better advertising means than a radio station in a large city some distance away.

As you study these station rate-cards, have available the advertising rates for a comparative newspaper in your vicinity. Sometimes you will find that one or the other type of advertising will give you more for your money—in such a case, by all means use the better one. However, you must consider the number of people who buy the newspaper as compared to the number of people who listen to the radio station. If you can't get what you feel is accurate information about radio listener's habits in your locality, make a small survey yourself. Remember, a few hours spent in getting the facts may *save you money* which can be spent to better advantage.

Pick 50 houses in different sections of your community and ask the lady:

- (1) If she takes the local paper
- (2) If she has a radio receiver

LISTNER SURVEY BY JOHN DOE RADIO SERVICE CO.		ANS.
1	DO YOU TAKE THE LOCAL PAPER ?	
2	DO YOU HAVE A RADIO RECEIVER ?	
3	HOW MANY HOURS A DAY IS IT IN USE ?	
4A	DOES YOUR FAMILY LISTEN TO THE LOCAL STATION ?	
4B	AT WHAT PERIODS DURING THE DAY ?	
5	IS YOUR RADIO OPERATING CORRECTLY ?	

A listener survey will help decide the station and the hour to use.

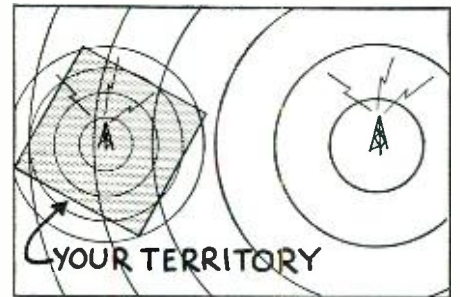
- (3) How many hours a day it is in use
- (4) If her family listens to the local station and *at what periods of the day*
- (5) Whether her radio is operating correctly.

Question No. 5 is purely a feeler question for new repair business. So long as you are spending the time on this survey, you may be pleasantly surprised with a few radio repair jobs that will pay for your time and effort.

Tabulate the results from replies to each of the first four questions and then compare them with the station rate-card and newspaper rates. The proper interpretation of these replies,

plus common-sense will steer you past the rocks of wasted ad dollars.

Let us assume that you have found it worth taking a shot at radio advertising. The next step is to determine the *time* during the broadcast day that you want your announcement broadcast. Often you are limited by the time the radio station has available. Also, because listener's habits are such that they are more likely to listen to a particular station at certain times of the day more than other times, that time is more valuable and may bring



Use your own local station even if it's small; support your own township.

a premium rate. On larger stations (those connected to the networks), evening time is more expensive than morning or afternoon time, the cheapest time usually being early ayem.

Local stations not tied-in with the networks are less likely to be effective after 6 P.M. as most listeners prefer the better programs served by larger stations during the evening hours.

People are most likely to listen to the smaller stations during:

- (1) News periods
- (2) Local events programs such as local football, baseball, or other games, parades, etc.
- (3) Civic programs such as banquets, the greeting of visiting delegations, programs by local organizations such as the Rotary, Kiwanis, Chamber of Commerce, etc.
- (4) When local talent of interest to the community is used.

I might also add that certain music periods such as "Jitter-Bug" time or "Recorded Classics" have their faithful following as well as even the "Mountain Music" folks and those who pine to be "Buried on the Lone Pray-ree."

Thus, you can get added listeners to

your advertisement if you are able to place it *immediately preceding or following a popular program.*

Another point to be considered is what is going on over *rival* radio stations during the times open for your advertisement. Radio listeners are a



You will find that local broadcasting advertising hits the spot.

fickle group. 70% may be listening to the finish of a favorite program on Radio Station A. This is then immediately followed by your spot announcement. In the meantime, if a particularly good program is then available on Radio Station B, a wholesale dial-twisting will result, leaving the announcer at Station A smack in the middle of your "plug." When this happens, you have lost the *effectiveness* of your advertising and it is exactly the same as printing 1000 handbills and throwing 750 away.

You can now see that choosing the *correct time* for your spot announcements is most important and will contribute greatly to its success or failure.

Next, how long should your announcement be? On this will depend the price asked by the radio station, or, putting it another way, the price you can afford to pay for this advertising will determine the length of the announcement.

Most radio stations have rates for:

- (1) 50-word spot commercials
- (2) 100-word spot commercials
- (3) 1-minute spot commercials
- (4) 5, 15, 30, 45 and 60-minute periods.

For most radio servicemen, the 50 or 100-word spot announcement will suffice. Other types are a little rich for the blood and mighty hard on the pocket-book.

Remember, *seven short announcements are better than one long one for the same money. Hit 'em often and regularly!* As seven days make one week, seven short commercials have the same effect on the customer's sales resistance.

Now that you have decided what station to use, the period, during the day, and the length and frequency of your announcements, the next thing to decide is *what to say.*

There are five important points you must get over to each listener. These are:

- (1) Your name. (*John Doe Radio Service*)
- (2) Your business. (*Radio repairs*)
- (3) Your location. (*1234 5th Avenue*)
- (4) Your telephone number. (*Main 9876*)
- (5) What you offer. (*Expert, prompt*

and reasonable radio service.)

Also, you must start your announcement with a sentence or phrase which creates interest such as:

- (1) "Are you getting full enjoyment from your radio?"
- (2) "If your radio is noisy, weak or distorted—"
- (3) "Does your radio sound as good as new? If not—"

Here are two examples of sample announcements which you can change to fit your particular needs.

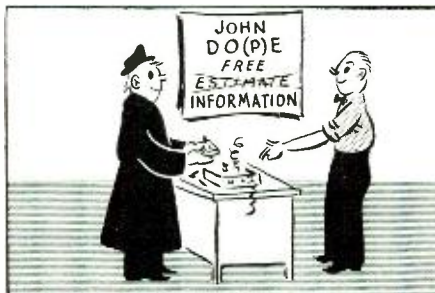
ANNOUNCER—Are you getting full enjoyment from your radio? Is it noisy, weak or distorted sounding? If so, phone Main 9-8-7-6 right now and John Doe's Radio Service of 1-2-3-4 5th Avenue will send an expert serviceman to your home. Our radio repair service is prompt, efficient and reasonable. An estimate is always given. Phone John Doe's Radio Service, Main 9-8-7-6 *today!*

ANNOUNCER—The use of your ra-



Be sure and state your name, your business, your location, your telephone number and what you offer. Customers must know where and what.

dio is the most inexpensive way to spend your entertainment dollar. Don't be satisfied with half-way radio enjoyment caused by faulty tubes or a noisy, weak or distorted receiver. Call John Doe's Radio Service, Main 9-8-7-6 *today* for a free estimate of your radio troubles. We guarantee our work. We offer prompt and efficient radio



DON'T! . . ." and the gimmick located right here. Can I sell you an iron?"

repairing at a reasonable price. Remember John Doe's Radio Service, 1-2-3-4 5th Avenue, telephone Main 9-8-7-6.

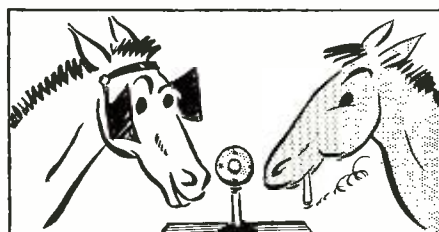
The use of sound effects or dialogue heightens the effect if sufficient time is available. A possible script follows:

ANNOUNCER—Let us listen-in on a telephone conversation between Mrs. Smith and her radio serviceman, John Doe: (Sound effect of telephone ring-

ing and phone being lifted from cradle.)

MRS. SMITH—Hello.

JOHN DOE—Good morning, Mrs. Smith. This is the John Doe Radio



Always change your "plug" for each broadcast so as to stay interesting.

Service. How is that radio of yours playing that we repaired last week?

MRS. SMITH—Mr. Doe, I'm really thrilled at how well I can get my favorite radio programs. It sounds like a new radio since you repaired it. No more distorted or noisy, crackling sounds that used to spoil my set.

JOHN DOE—That's fine, Mrs. Smith. We follow-up this way with all our customers to make sure that their radios are operating correctly and that we have given satisfaction.

MRS. SMITH—Indeed you have, Mr. Doe. And by the way, Mrs. Blanks and Mrs. White were visiting me this morning and they want you to give them an estimate to fix their radios as well as you repaired mine. I was glad to recommend you.

JOHN DOE—Thank you, Mrs. Smith. I'll call them right away. Satisfied customers are our best advertisement!

ANNOUNCER—Yes, sir! The news is spreading from one satisfied customer to another. John Doe Radio Service repairs radios quickly, efficiently and at a reasonable charge. Phone Main 9-8-7-6 or visit the John Doe Radio Service shop at 1-2-3-4 5th Avenue TODAY.

With the above examples and the help of the local radio station's script writer, any serviceman can whip together a number of good radio commercials. Remember that *you should never use the same "plug" twice.* Always vary your commercials because listeners expect new material even in spot advertising.

Now, we might well consider several ways to pay for these broadcasts without putting out all the necessary "Government Lettuce."

First, don't take the station's rate-card too literally. This is their "asking" price and if you do not think it is a fair price for the services, you have a right to make them a counter-offer. Understand, I do not advocate "chiseling," but it has been known to happen that a rate-card has been cut to ribbons when radio advertisers become scarce. Determine what you feel the service is worth to you and try to obtain it for that price.

Some radio servicemen help around the station with repairs or spell the announcer or engineer (if the serviceman has a broadcast ticket). Others (Ring it further on page 57)

TECHNICAL BOOK & BULLETIN REVIEW

TELEVISION and SHORT-WAVE HANDBOOK, written by F. J. Camm, and published by Fortuny's, New York City, contains 271 pages and 130 illustrations. This book has been written for the radio newcomer or student and is the fourth edition which has been completely revised to include many new chapters on television and receivers. This book does not only deal with television proper, but the many secondary applications of television principles. It includes the list of terms agreed by the television committee of the Radio Manufacturers Association. All of the information relating to disc receivers has been deleted, for low-definition television has ceased to exist. Now that regular transmissions of at least two hours a day are taking place, and in view of the great developments likely to ensue in connection with the erection of other television transmitters throughout the country, it is necessary for every listener to become acquainted with the elementary principles of television transmission and reception. The book is priced at \$2.50.

One of the most colorful books ever published about radio has been written by Lowell Thomas, himself one of the best known figures in radio, and illustrated by Anton Bruehl, internationally famous photographer. Entitled "Magic Dials," the book tells and depicts a spectacularly different story of the history of radio and television.

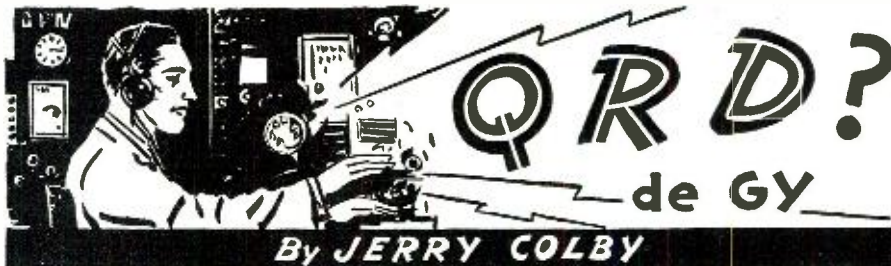
Designed to appeal to young and old alike, "Magic Dials" includes 62 full-page photos, including 16 in natural colors, in its 144 pages. The text begins with Marconi's first wireless message in 1896, traces the development of radio and television up to the present day. Thomas takes the reader behind the scenes into the factory, the broadcasting control booth and the television studio, while Mr. Bruehl's brilliant photography paints each scene for the reader.

Many of the photographs were taken in the RCA Manufacturing Company's radio and television factory at Camden, in its tube manufacturing plant at Harrison, N. J., and in the Radio City studios of the National Broadcasting Company. Development of a number of phases of both the radio and television arts is shown in pictures taken at the RCA Victor research laboratories.

"Magic Dials" is published by the Polygraphic Company of America, Inc., located at 310 East 45th Street, New York. A hard paper cover edition is available at a dollar, direct from the Polygraphic Company. A two dollar, cloth-bound edition is obtainable at bookstores.

PICK-UPS, published by Western Electric Co., 195 Broadway, New York, is a periodical devoted to the development in sound transmission. The July issue has an interesting article giving a description of Ameri-

(Further review on page 58)



AFTER reading through a maze of committee reports, agreements, whereas and wherefors contained in the publications recently issued by the *CTU-Mardiv* and the *ACA-Mardiv*, formerly known as the *ARTA*, we stopped wondering why so many of their members are so ill informed of their activities and negotiations. Their dryness is not conducive to avid absorption by the average radiop who doesn't aspire to any executive position. Whyinell don't they hire someone with a sense of humor to edit their reports and bring tears of hilarious laughter to otherwise dull statements? We are sure that if this were done the long-faced, worried expressions of radiops on the beach would disappear. Oh, Lord, save our sense of humor, for with it we save ourselves from ridicule. Even a state department, finding that its lengthy reports were not being read, petitioned a publicity man to rewrite and revise them. Now they are thinking of selling them to pay for the upkeep of the department. So it is. Life is too short for the average radiop to separate the wheat from the chaff to make a decision.

IT seems that shipowners are leaning on the much discussed *Neutrality Law* for their seeming indifference to negotiate with *ARTA* for contractual agreements. Furthermore, the shipowners do not like the war bonus demands of the unions and are using the neutrality debate as a screen. So it looks like the sixty-day extension agreement, which can be terminated by either the union or the shipowners, will remain in force until something final breaks in Congress. Therefore, old contracts will be in force until future negotiations make them better or worse. Incidentally, the shipowners have raised their rates from 20% to 50% whenever their ships must go through waters considered to be dangerous, but they are forgetting to make provision for the men who sail these ships by providing war risk insurance. In other words, a mine-bomb to the ship's hide is of greater importance than the men's hides.

THE *ARRL* has advised all Hamops not to discuss the war news while shooting the breeze. The Hamops may think this ruling entirely too drastic, but the *ARRL* means business and is continually checking the various freq bands. First, there is the possibility of spies using the shortwaves to pass information to their friends without even using codes. Furthermore, hamops opinions flying about loosely and haphazardly might give foreign observers an insight into American war opinions. So the *ARRL'S* ruling is not to be taken lightly and should be observed to the letter.

CW PREBLE, who just recently returned to these shores from faroff Alaska where he operated the phone equipment for the *Red Salmon Canning Company*, tells us that although the apparatus was of the best, there was quite a bit of trouble continually cropping up. Condensers blowing up and by-pass condensers burning out caused brother Preble no end of grief. This should deter a lot of lake shippers and coastwise vessels from installing the same type of equipment, or else to legislate for the final elimination of radiops. This latter kind of thought would be knocked into a cocked hat if ships' crews would flatly refuse to sail unless a licensed radiop were aboard to take care of the phone apparatus. Progress cannot be stopped—phone equipment will be installed more and more—but a licensed radiop must

accompany and wet-nurse said equipment if all is to be for the Safety of Life at Sea.

INCIDENTALLY, we learned from Brother Preble of a new wrinkle in this radiop business which is the extra job of tally-man. This means counting the fish as they are thrown aboard. We always thought fish were counted by weight, but this is one more thing we have learned. It looks like the radio schools ought to add to their curriculum the subject of fishing and tallying. One can never tell what new duties will be thrust upon the unwary radiop.

BROTHER CJ Bolvin sends us this wire quote . . . what youse guys doing—trying to outguess me? Questionnaire comes out last month—I suggest some dope on new commercial rigs (operating, constants, performance, etc.) and by golly next issue I get has full dope on a new airport rig. . . . Hi! Let's have lots more of same—most of us need it. We get off in the woods somewhere with a jalopy converted spark and mebbe don't see anything else for four or five years . . . then have to go look for a new job and find ourselves bogged down with a lot of buttons, dial tuning, etc. that we dunno anything about. Left *KMLJ (Seven Seas)* last fall. Went and got a BC ticket, learned a lil morse, and ended up riding this floating car-barn around Lake Mich as pursur/opr. Wuz to be relief op but been wkg so steady since April that I can't even be sure of getting off long cnuf to sign articles with the *YL* next month. Railroad biz better . . . 73 . . . unquote. Tnx CJ and good luck if the *YL* signs articles, but take a word of advice from an old domesticated side-winder. "Let her be the Navigator but never the Skipper. No, never."

BROTHER Don Hekking, he who was on the "sought" list some time ago, is advising all and sundry that he's now holding down *WAD* for the *Lorain County Radio-telephone Corp.* He's still working his 20 meter phone job and cw on 80, 40 and 10 mtrs with his old call ltrs *W8OZT*, just in case youse guys and *YLS* want to know.

DURING the recent convention of the *CTU-Mardiv* at Chicago, President Rathborne of the *ACA-ARTA* addressed a letter to it in which he pleaded for unity between the two organizations. According to *CTU*, the letter's contents were not even discussed by the assembled delegates, but were flatly turned down. *CTU* stated that unity could not be discussed until and unless certain high executives in the *ACA* organization were summarily removed from office. The matter stands thusly with the radiop movement still progressing—but slowly. We have always said that there can be only one voice for radiops and our glass-gazing proclivities believe that it won't be long before such will come to pass.

MATT MURRAY, *W6OJL* (Old John Law, now that he's the nursemaid for a bunch of police phone equipment of the *Los Angeles Police Department*) went to work recently when a terrific storm which fell across the phone cables broke the power lines, putting the whole works out of business. For almost 24 hours the City of Los Angeles was completely without communications but the City Hall had to have its ear to the ground. So Murray, Russel Camp and Supervisor John McGarry installed an ultra hi-freq xmtr-recvr in the City Hall and

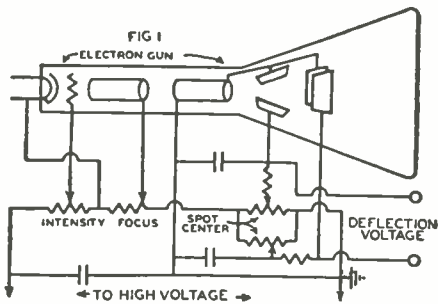
(More *QRD?* on page 59)

THE HOW & WHY OF THE OSCILLOSCOPE

by EDWARDS LOVICK, Jr.
Falls City, Nebraska

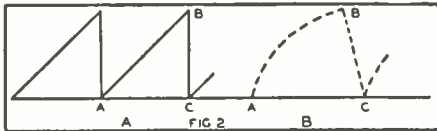
The 'Scope is one of the most useful pieces of equipment yet devised—providing you can both use it and interpret its tracings.

THE cathode ray oscilloscope should be considered and used as a special type voltmeter. Beside the usual voltmeter function of indicating amplitude, the cathode ray oscilloscope is unique in that it also describes a potential in terms of wave

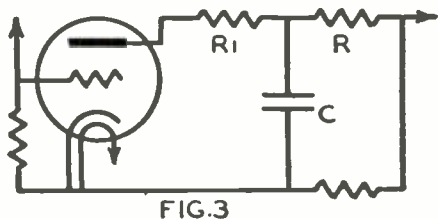


form, phase and frequency.

Cathode ray tubes, the heart of any oscilloscope, are basically all alike. All contain an electron source and an electron gun and all have provision for beam deflection. Fig. 1 illustrates the parts and operation of a typical cathode ray tube. A sturdy heater type cathode supplies electrons, the number regulated by the control grid,



which are attracted by the accelerating electrode. In the smaller tubes the accelerating and focusing functions are combined in one cylindrical electrode. Because this open cylinder presents minimum surface which can be hit by electrons, most of them overshoot and are attracted further by the high voltage electrode which is also cylindrical and also allows electrons (by now traveling at tremendous



speed) to overshoot and pass on through the deflecting system to the fluorescent screen.

Ordinarily the smaller cathode ray tubes employ electrostatic deflecting systems, small metal plates which can

be made to assume various potentials and, therefore, attract or repel the electrons comprising the beam, thereby causing the beam to shift. Larger tubes (in the 3" to 9" or larger sizes) may utilize electrostatic, electromagnetic or combinations of these systems. Design of electromagnets for the electromagnetic system is quite critical and hence is not used unless good isolation of the high voltage system must be obtained. Therefore, electrostatic deflection is much more common.

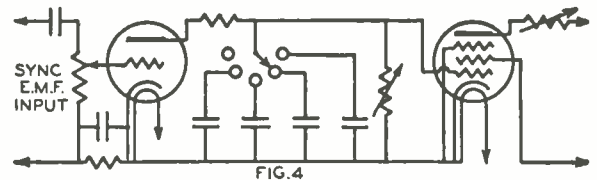
Because the 3" and the 1" tubes seem to be the most popular sizes design data will be presented for these tubes. The RCA 906, a 3" tube designed to operate from a 1000 volt d.c. supply, may be used at lower voltages with some increase in sensitivity but a loss in brilliancy. Similarly, the 913 may be operated at reduced voltage with the same results.

Ordinarily the voltage applied to the focusing electrode is about one fifth of the total voltage supplied to the high voltage electrode. This is true of large and small tubes. Bias for the control grid sufficient to cut off the plate current should be available. Spot centering can be readily accomplished by application of d.c. to the free deflection plates. Fig. 1 will make the method clear. Size and brilliancy of the spot can be controlled by regulating the focusing electrode's voltage and/or the grid bias. The control grid bias determines the spot brilliancy while the focusing electrode voltage determines the spot size. The table contains essential data, other characteristics can be found in the tube manuals.

The RCA 913 is unusual in that it is the only tube at present that is enclosed in a metal envelope. Two deflection plates, one of each set, are connected internally to the high voltage electrode which is in turn connected to the metal envelope. This feature alone makes grounding the positive side of the high voltage (the common practice) desirable. Other factors leading to such a connection are decrease of the danger from the high voltage

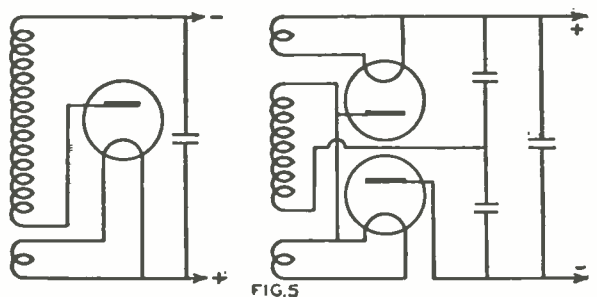
through the deflecting circuits (sometimes used without amplifiers) and elimination of voltages built up on the deflection plates by electrostatic induction.

In order that an incoming signal may be seen it must be spread across



the fluorescent screen. Such is the function of a "sweep" voltage. Several types of sweep voltages must be available so that full versatility of application may be realized. Most important, perhaps, is the "linear" sweep voltage which is simply a voltage of "saw-tooth" wave form. See Fig. 2. During the portion A B, the beam is shifted horizontally across the screen and during the portion B C, the beam is returned to the original starting point.

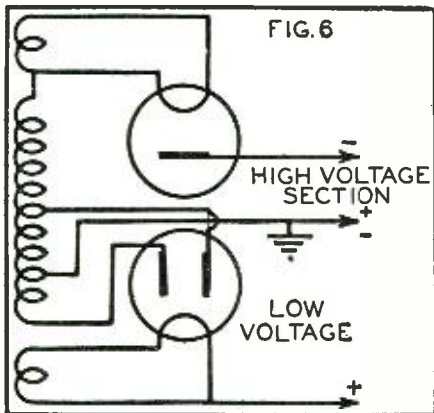
Fig. 3 illustrates the circuit used to



generate the linear sweep voltage. When plate voltage is applied to the tube (commonly the gas filled triode 885) through resistor R, condenser C is charged, also through resistor R, and the voltage across it rises. At a certain critical voltage the gas in the tube ionizes and the grid loses control over the plate current flow. Not until the plate voltage is reduced below the ignition point of the gas can the grid regain its control, which ordinarily amounts to plate current cut off. The ratio of the plate voltage to the grid voltage at which ionization occurs is the control ratio which is usually about 10 to 1. While plate current flows the plate resistance of the tube is very low and the condenser C discharges through it. Thus a cycle of

the sweep voltage is completed. Resistor R 1 serves to limit the plate current to a safe value for the tube (.5 ma. for the 885).

If the charging rate of condenser C



is too great (C too large or R too small) the plate voltage may rise to a value sufficient to cause a new surge of plate current before the tube has had time to deionize. This new surge would be a higher frequency oscillation which would cause a shift of the beam starting point. Properly designed sweep circuits must, therefore, have condensers of such size that neither excessive charging rate, the result of too large a condenser, nor unstable operation, the result of too small a condenser, will occur.

Although the sweep circuit just described will give good results the wave form developed is not that shown in Fig. 2, but is curved upward in the portion A B (the charging current is not constant but is greater in the middle of the charging cycle than at either end.) Such a condition causes the beam to be swung across the screen unevenly, its travel being more rapid in the center of the screen than at either side of the screen. Flattened and distorted images result from this defect.

Since the cause for the distorted sweep wave is the non-uniformity of the condenser charging current a compensating circuit designed to correct this fault is employed. A so called "constant current" device is used, a pentode being most satisfactory because it allows a sweep voltage of good wave form amounting to about 80% of the plate voltage to be generated. The tube, used in series with the 885 tube and condenser C, is operated in the region of the lower bend in its plate voltage-plate current curve. The decreasing rate of plate current increase is matched to the period of increasing rate of charging of the condenser so that very nearly constant current flows to the condenser, resulting in a uniform rise of plate voltage on the 885 and a generated sweep voltage of good wave form.

Synchronization of the timing sweep and the incoming signal to hold the image steady on the screen can be readily done by introducing some of

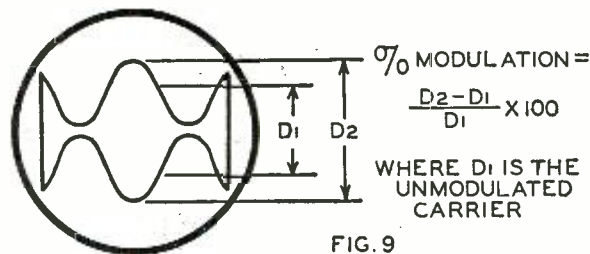
the incoming signal into the control grid of the 885 tube. Usually a volt or less will produce a steady image. Larger sync. voltages than necessary to just steady the pattern will cause distortion of the sweep voltage and possibly unstable operation.

Cathode ray tubes used without amplifiers may have a deflection sensitivity of perhaps .3 mm/volt to .5 mm/volt or even less (the 913 has .10 to .20 mm/volt sensitivity). Obviously a large voltage would be required to obtain useful deflection and often this is impossible unless amplifiers are used. Such tubes as the 57, 6J7 and 6C6 used in resistance-capacity coupled circuits provide gains of 50 or more with good frequency response and small distortion. Short leads, sufficient filtering and shielding are all necessary for that smoothness of operation that is so desirable.

Power supply for the entire instrument should be incorporated into the unit for the maximum dependability and ease of operation. High voltage may be obtained by means of half wave rectification of a high voltage a.c. or by means of a voltage doubler circuit. Both systems have advantages and disadvantages which must be weighed against each other. High voltage rectifiers cost more than low voltage tubes while the half wave circuit is less complex and only one filament power source is necessary. On the other hand the voltage doubler system offers cheap rectifier tubes and full wave rectification with its smaller filter requirements. Fig. 5 indicates both systems. Low voltage requirements for the sweep generator and amplifiers can be easily met by use of a conventional circuit, by use of the high voltage source, or by combining the two as depicted in Fig. 6.

Certain construction hints not often mentioned can be used to advantage by the home constructor. An iron case which is completely demagnetized (by heating, jarring or exposure to a strong a.c. field) should be used to shield the oscilloscope from stray fields which might influence the beam deflection. Both ends of the cathode ray tube should be firmly supported to minimize the danger of vibration damage and axis shift. Provision should be made to rotate the cathode ray tube so that the horizontal and vertical axes can be made horizontal and vertical. Safety glass over the tube screen represents an economy from the standpoint of tube replacement costs and protection from high

voltage circuits in event of accidental breakage. If the vertical and horizontal amplifiers are mounted horizontally exceptionally short leads to the controls can be had and the

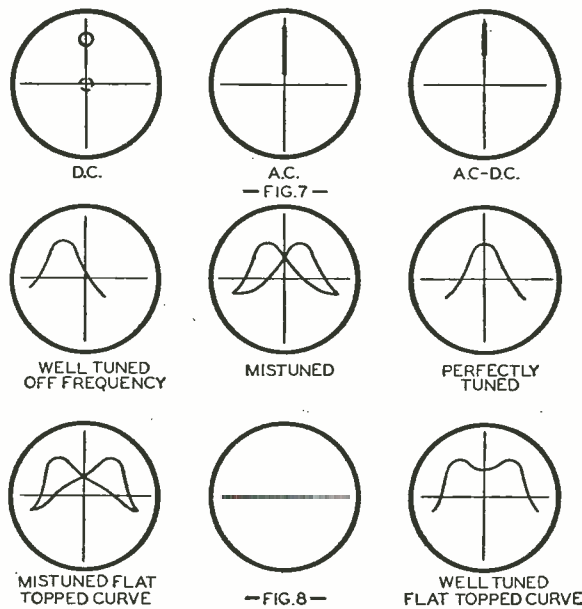


chassis can be used as part of the shielding.

Once one has mastered the theory and practice attendant to the operation of an oscilloscope many uses become apparent. And the mastery of the oscilloscope is easy.

Peak voltages and currents can be measured easily after the instrument has been calibrated with the aid of accurately known voltages or other instruments. If the instruments used give r. m. s. values multiply the reading by 1.4 to obtain the peak value (sine wave assumed). After voltage calibration has been effected current calibration can be obtained by measuring the voltage drop produced by the unknown current across a known resistance and using Ohm's law to find the current. Alternating currents and voltages will produce a line (no sweep being used) while d.c. will merely cause the spot to shift from the resting position to some other spot and remain steady. Combinations of the two will cause an apparent shift of

(Continued on page 52)



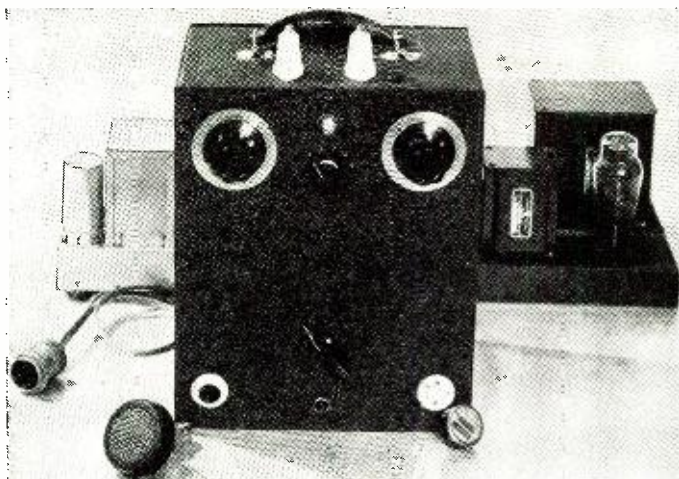
The Radio News

CROSS-HAULER

by **RAYMOND P. ADAMS**

Hollywood, California

This is the ideal rig for short distance transmissions. It should be used to alleviate the QRM on the u.h.f. bands.



The Cross-Hauler is mounted in a cabinet with a handle so that it may be carried easily around for QRR work.

NOT every amateur has had occasion to construct a portable-emergency transmitter suitable for strictly cross-town or limited range QSO's, or to use such equipment in irregular operating conditions encountered in field and emergency applications. Perhaps I should begin this writing with a brief discussion of the design and service considerations involved.

In the first place, it is logical to assume that the type of 'phone I have in mind will not be used as the main station transmitter except by the amateur newcomer for whom it might work out as a very practical low-power job. It will, rather, supplement the regular rig so as to afford the operator a means of effecting restricted or local area contact with fellow hams when power lines fail, when portable operation is desirable, or when apparatus for dependable communication must be set up without delay in temporary camps.

Therefore, the 'phone for the average user must suggest low first (construction) cost, operating economy, immediate application under either a.c. line or storage battery powering

(whichever circumstances permit or make imperative), portability—which involves small physical size *within limits* prescribed by proper parts layout conducive to *maximum* operating efficiency, and, rigid physical construction. That last is something which *must* be considered when one remembers that the instrument may be subjected to considerable rough handling.

Completeness is essential. While the powering devices may be separate units, it doesn't seem sensible to end the story so far as the main piece of apparatus goes with the L and C components in the final's plate circuit. The antenna coil and tapping switch, if any, and the antenna tuning condenser should logically be installed within the cabinet proper—along with any antenna power indicator (pilot light, neon bulb, h.w. ammeter or whatever it may be) desired or required.

Power output must be sufficient to guarantee full area-coverage regardless of time or of atmospheric and field conditions; but it should not be greater than is actually necessary—not because reserve power isn't a good thing to have on hand for occasional tapping, but because such power generally involves the use of the larger, costly tubes, considerable limitation upon a desirable compactness, and voltage and current demands well beyond the supply-capacity of the typical vibrapack or dynamotor powering device found in present amateur application.

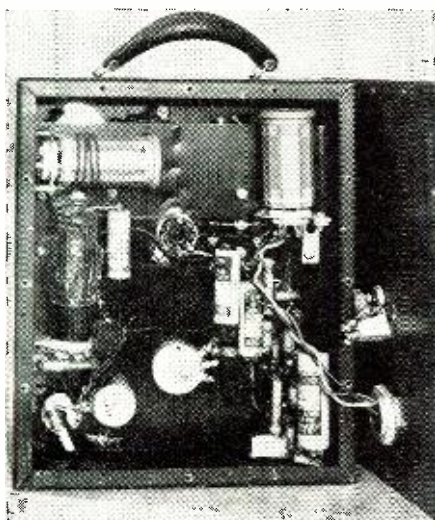
Experience has frankly indicated that a 'phone transmitter (low power emergency portable) operating at maximum possible efficiency and at a plate voltage of from 250 to 300 and with a plate drain not exceeding 100 ma., will produce *ample* output when the input to the final amplifier is approximately 12 watts—providing, of course, that the equipment is not called upon to make contact with stations beyond emergency or cross-town or comparable limited-area range.

Of course we all know what a low

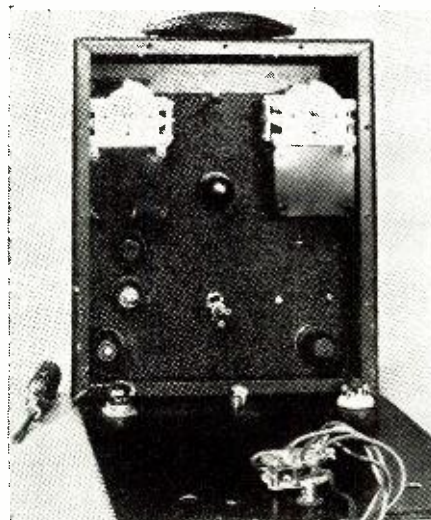
powered rig will do at times; many miracle miles may be covered. But normal, functional operation suggests simply sure-fire, day-and-night, all-weather transmission to points within average large metropolitan city limits, and that sort of operation is all that we're really interested in here.

The carrier must be modulated, of course—and plate modulated if possible. Grid modulation may be quite all right for certain higher powered rigs, but in the low power affair it would put efficiency in considerable question as any amateur knows. After all, anyway, 6 watts of audio power (really much less than six, for that matter, with complex speech waveforms) for the 100% modulation of 12 watts input to the final isn't a terrible lot of a.f. "soup." Any well designed receiver-type audio layout will provide it with no trouble whatsoever.

Lastly, we have the question of the proper operating band; and we think that 160 becomes the most logical, as it calls for relatively simple design, involves the use of no costly u.h.f. transmitter components, provides for maximum r.f. output with a given gen-



Note the mounting of the tube, coils.



The front panel opened up.

eral layout, and suggests both ease of adjustment and ease of antenna connection.

General Design

The *Cross Hauler*, so-called, does a pretty good job as a mobile-portable-emergency rig. In general, physical and electrical design meets these suggested requirements very well.

R.f. input to the final averages around 12 watts, 100% modulated by an a.f. system which might—I will agree—be simplified but which is quite in line with functional operation, mike output, required gain, output level, and power supply limitations all considered. A single 6C5 in a sure-fire Pierce oscillator circuit provides plenty of excitation for the 6V6G final in the r.f. circuit and simplifies tuning considerably.

All components except the 100ma. Vibrapack and the alternate a.c. power supply are installed within the cabinet proper. A heavy, sturdy steel box with removable front and rear panels and built to stand up and protect the works whatever the jolt, knock, stress, strain, and general manhandling to which it is subjected is used. The necessary controls—merely four—are mounted on the front cover: amplifier plate tuning condenser dial; antenna series condenser dial; antenna inductance tapping switch knob; and the knob for the a.f. gain control.

I like the idea of a crystal mike for use with a portable assembly. It's a diaphragm unit, swivel-mounted on an *Amphenol* shielded plug which fits directly into a matching receptacle on the cabinet panel. Output is — 70 db., and as it features an approximately 200-cycle cut-off and a rising frequency characteristic, a somewhat higher audio level may be maintained than would be the case were the response really wide range. Boominess in the transmission is excluded, by the way, and speech is clear-cut and sharp.

Other front-panel components are: the tuning indicator (a small flashlight lamp), and the transmitter-on pilot. The receptacle for the power cable plug and the jack for r.f. amplifier cathode current reading are on the back cover or panel. Antenna and ground posts are positioned on the cabinet top.

The chassis is installed vertically, forward components (a.f. transformers, metal tubes, tuning condensers) positioned as shown. Modulation and driver transformers, note, are at the top—tank and antenna tuning condensers above and supported by them. Both transformers, by the way, are high quality, shielded affairs—and not the open midgets usually found in compact, portable assemblies; and though they cost a little more and take up slightly more room they stand recommended for reasons patent enough to require no mention here.

As we have said, the 6C5 Pierce oscillator provides plenty of excitation for the Class C final. It requires no tuned circuit and is ideal for use in a 160-meter porto-emergency job, due

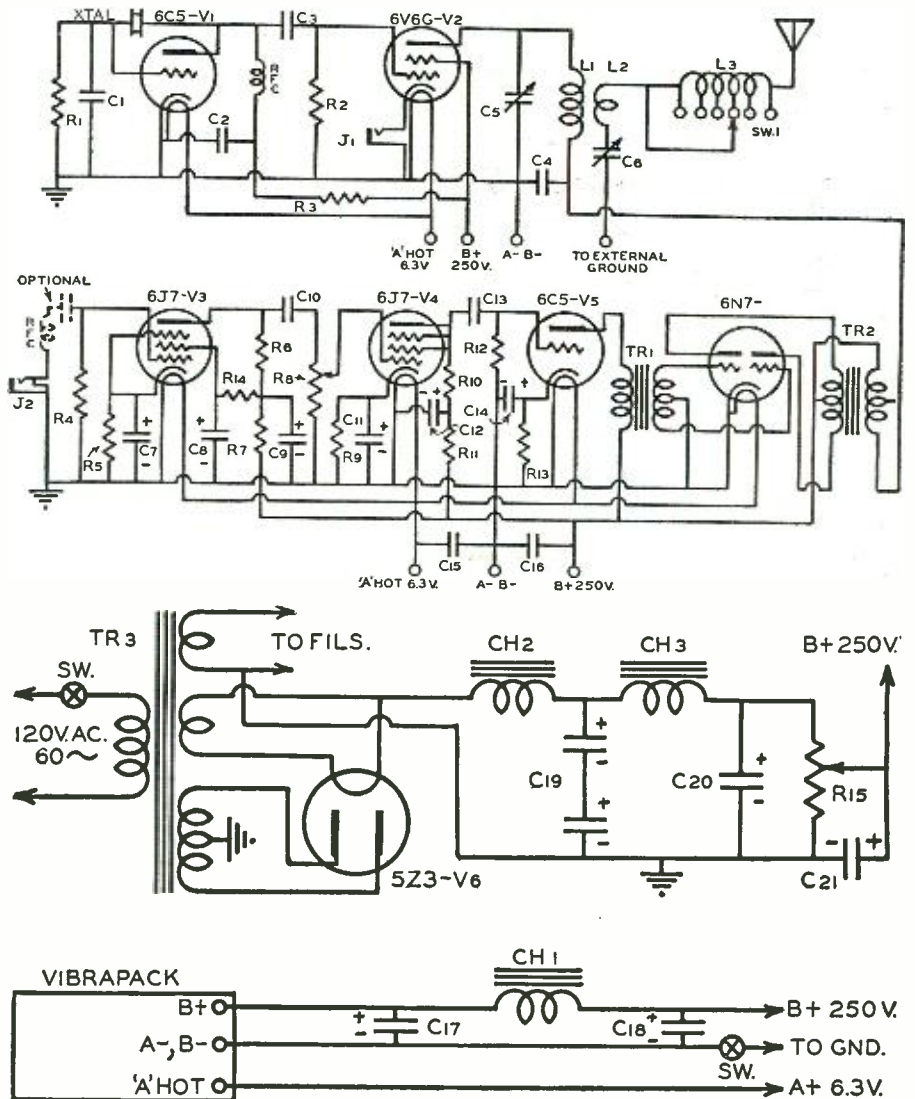
both to the simplification of transmitter tuning which it effects and to its operating dependability.

The circuit is quite conventional except that a shielded choke of 10 m.h. inductance and particularly effective at frequencies within the 160-meter band replaces the usual resistor in the 6C5 plate circuit. R3 drops the voltage down to a safe value. This is a fixed 5-watt resistor with adjustable tap so that it's value may be increased or decreased to effectively decrease or increase final amplifier grid excitation.

Similarly, the 6V6G layout is more

or less conventional. The tube is used as a straight un-neutralized screen-grid amplifier, operating with 250 volts of plate-screen supply, and drawing approximately 50 ma. under normal transmitting conditions. A standard receiver-type coil and a 350 mmfd max. tank condenser tune the plate circuit—slightly more than half the capacity being required to effect resonance at the high frequency end of the 160-meter band.

The a.f. circuit as shown is a four-stage affair—6J7 screen grid input, 6J7 triode voltage amplifier, 6C5 driven (Pse QSY to page 47)

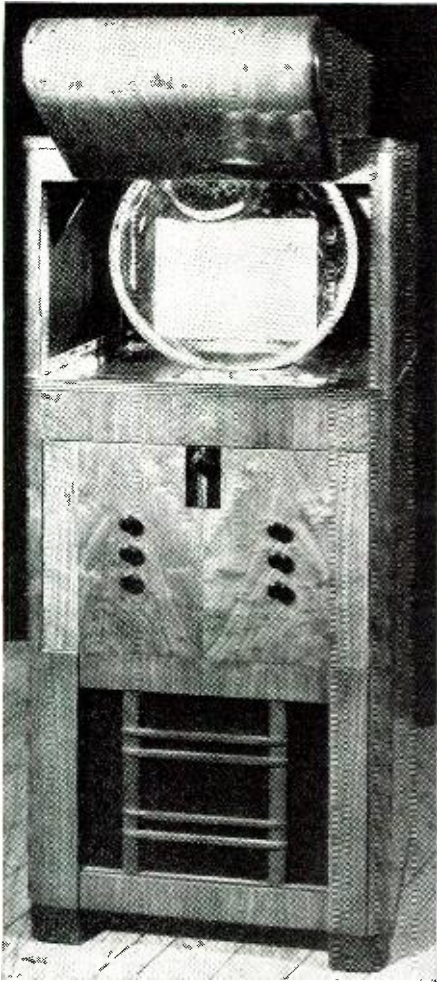


- C₁—.0001 mf. mica Aerovox
- C₂—.01 mf. mica Aerovox
- C₃—.0001 mf. mica Aerovox
- C₄—.002 mf. mica Aerovox
- C₅, C₆—350 mmf. Hammarlund MTC-350C
- C₇—10 mf. 25 v. electro. Aerovox PR25
- C₈—4 mf. 200 v. electro. Aerovox PR2
- C₉—4mf. 450 v. electro. Aerovox PR5
- C₁₀—.006 mf. Aerovox 1467
- C₁₁—10 mf. 25 v. Aerovox PR25
- C₁₂—4 mf. 450 v. Aerovox PR5
- C₁₃—.006 mf. Aerovox 1467
- C₁₄—10 mf. 25 v. Aerovox PR25
- C₁₅—5 mf. Aerovox 484
- C₁₆—5 mf. Aerovox 484
- C₁₇, C₁₈—8-8 mf. electro. Aerovox PBS-5
- C₁₉, C₂₀—8 mf. 450 v. Aerovox PR5
- C₂₁—8 mf. 450 v. Aerovox PR5
- RFC₁—10 mhy. R.F. choke Hammarlund CH-10-S
- R₁—30,000 ohms, 1 w. Continental
- R₂—100,000 ohms, 1 w. Continental
- R₃—25,000 ohms, 5 w. Ohmite
- R₄—5 megohms, 1/2 w. Continental
- R₅—3000 ohms 1 w. Continental
- R₆—250,000 ohms 1 w. Continental
- R₇—50,000 ohms, 1 w. Continental
- R₈—250,000 ohms pot. Yaxley type M
- R₉—3,000 ohms, 1 w. Continental
- R₁₀—50,000 ohms, 1 w. Continental
- R₁₁—20,000 ohms, 1 w. Continental
- R₁₂—250,000 ohms, 1 w. Continental
- R₁₃—2,000 ohms, 1 w. Continental
- R₁₄—1 megohm, 1 w. Continental
- R₁₅—30,000 ohms, 50 w. adj. Tru-volt
- Xtal.—Bliley LD-2 mounted
- CH₁—20 hy. 75 ma. filter choke Kenyon
- CH₂—input choke Kenyon T-515
- CH₃—Filter choke. Kenyon T-154
- TR₁—Plate & fil. trans. Kenyon T-212
- Vibrapak—Mallory—YP-552
- Amphenol sockets and connectors
- Yaxley pilots and jacks
- L₁—Hammarlund No. 43 coil
- L₂—See text
- L₃—Hammarlund No. 43 coil. "tap every 6 turns"

WHAT about sponsored telecasts? That's a question men in the industry have constantly avoided answering because it represents a sensitive phase of the new art's development.

It's not a sensitive topic, though, because they wish it to be. Rather, it's because they hesitate to be so bold as to assert themselves on commercial programs before the *FCC* has done something officially about removing television from the experimental classification it is now hampered by.

Telecasters, like manufacturers, make no bones about the fact that television will eventually have to be supported by advertising fees just as radio broadcasting has been for almost since its inception.



Something a little different in receivers, the RCA "Flask" televisor.

One of the chief obstacles in television's progress is the lack of funds to carry on extensive program schedules which, regardless of caliber, are experimental in the eyes of the *FCC* and therefore can't produce any revenue. Why not have commercial programs right now?

True, sponsors won't be too eager to spend sums anywhere near what they are spending on sound broadcasts. The very small number of television sets in use gives video advertising a very small circulation, indeed. But it's distinctly a class circulation and, with sponsors paying at least part of the cost of program production, the presentations could be made consist-

The VIDEO Reporter

by **SAMUEL KAUFMAN**

ently better and would in themselves be instrumental in selling receivers and increasing the potential audience.

We've heard it said that some financial aid from the Government would be welcomed by television interests. After all telecasters are not philanthropists and, even though they're building program services that will probably bring substantial profits in the future, it can't be expected that they can provide free programs for an indefinite period. And that, perhaps, is the chief reason experimental stations outside of the New York area are not any too eager to rush into regularly-scheduled programs. Once they start such a service, it's difficult to stop without injuring the good-will they originally set out to obtain.

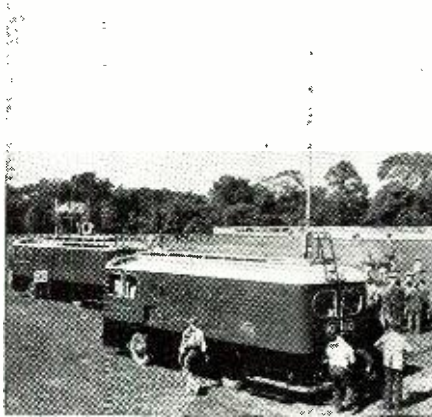
The New York set up is not a typical one because the first regularly-scheduled video service launched last spring by *NBC* also assists the network's parent firm—the *Radio Corporation of America*—in selling television receivers. So, to an extent, *NBC* is helping its parent if not itself. But, at the very same time, *W2XBS* is of equal value to other makers of video equipment who bear no part of the television program expense.

ment—in both equipment and programs. But there's still no reason to shelf the idea of sponsored programs which would actually help bringing on sooner the desired gains in the industry.

THE suspension of television program service in London has brought about quite a few problems to the trade and public alike.

The average Britisher is a very patriotic fellow, indeed, and, judging by the high standard of character the *Video Reporter* observed in Englishmen he met here and abroad, the elimination of television programs should be a very easy thing for them to accept in time of war. And we believe this holds true in the majority of cases despite the fact that each home television receiver represents a fairly substantial investment on which no entertainment return can be expected until telecasting once again resumes from Alexandra Palace.

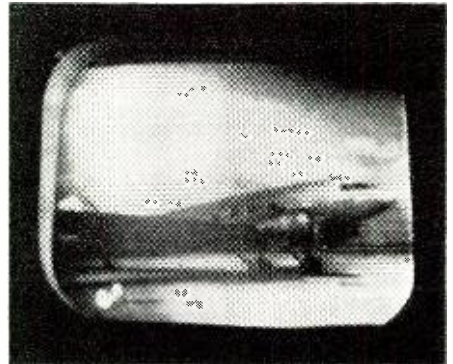
Video sets purchased on the installment plan, though, have brought up the problem of whether purchasers must continue payments when the receivers are no longer serviceable. But inasmuch as the fault for the ab-



Telecasts of football games were quite common this fall from *NBC*.

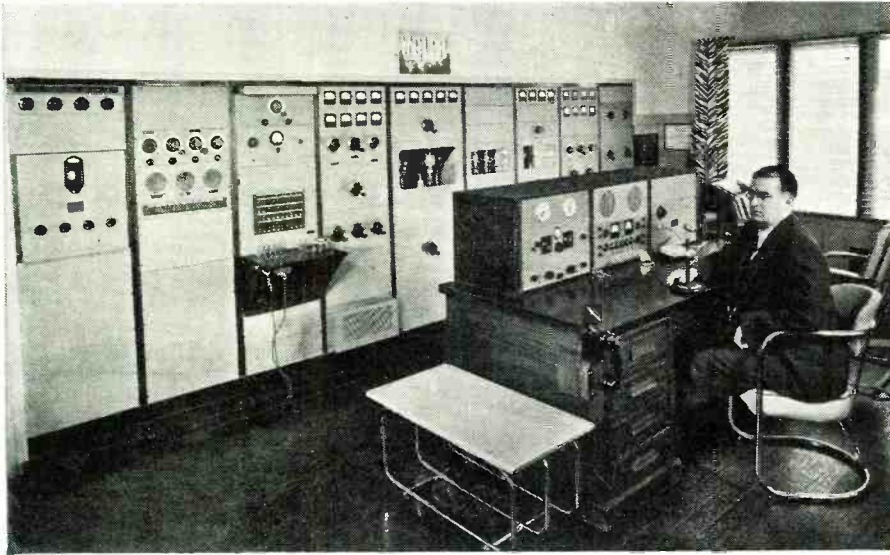
In England, television programs reached a very high level through a Government appropriation. But, of course, the money actually comes from the license fees paid by listeners. Television, like radio, is tax-free in this country and permits for competitive privately-operated services. Hence, television should be given the identical opportunity of being self-supporting.

Granting television stations to be commercial right at the start won't be doing things prematurely. Unlike other brand new industries, television has grown up considerably in the laboratory before it was let loose publicly. It certainly has lots to learn and there's plenty of room for improve-



The airliner telecast from the ground was received in the plane.

sence of programs lies beyond the jurisdiction of the manufacturers and dealers, it seems that the purchasers (Please turn to page 49)



No, Pal, it is NOT a broadcast station. This is W6ITH himself. Small place, eh? Hi!



CT3AD sports this cozy corner ham shack from which he works the DX.

H A M C H A T T E R

A permanent record of hamdom from coast-to-coast compiled by hams. The largest single ham-gossip column in the country.

A FOOL THERE WAS . . . In one of our larger cities there was a serviceman who pined away to advertise on the radio. He did not have the money. Sooooo he built himself one of those home recorders which we all know about. You know, the type that features an oscillator and you tune in the record on your radio receiver around 1200 KC. Only this serviceman fixed it so that he tuned in his phonorecorder around 650 KC. Added power to it, too. Got himself a mike, also. Then went to town. "Buy your P.A. from me" or "How's your radio working tonight?" he would broadcast. Then he'd sign his name, phone number, and address.

Came the F.C.C. man—came the dawn—came a fine and a warning—came the day when the serviceman was outta business!

Then, of course, you all know about the ham who was hauled up before the R.I. for being "disneutral" on the airwaves. "You can't say that about me," he squawked, "I'm strictly neutral. I don't care who kills that blanket blank bunch over there!" Yah got something. Brother, yah got something there!

HAM ALPHABET SOUP sent in by VE3AHS.

A—is for action, we work like the deuce When we hook our antennae to tall poles of spruce.

B—is for bottle, a tube big or small, You should know how they work if you're seeking a call.

C—for C.W. squeaks, dot'n dashes Mixed up in bad weather with goshawful crashes.

D—for detuning, it happens at times To the best of receivers in all sorts of climes.

E—for efficiency, just what we lack, If you don't like our methods, go sit on a tack.

F—is for frequency, low end or high, If we don't like your signal we'll sure pass you by.

G—stands for ground in most circuits you see. But it means something else if it's followed by D!

H—is for Ham, the ozone slayer. He's always assaulting the heavy-side layer.

I—for inductance in all coils of wire. The stuff that makes Henry a choke under fire.

J—is for juice, an X marks the spot. Of those who placed hands where the power was "hot."

K—is for Kentucky, where gals are aloof And hams are called pork and are found on the hoof.

L—is for letter, and also a word Which at times you're sure to have heard.

M—stands for meter, on panels they shine. I have room for six more on this old rig of mine.

N—is for number, those things convicts wear. To a serviceman, sets without numbers "ain't" fair.

O—is for "Op" with unreadable fist. Been shot 'steven times, but doggonit, always missed.

P—is for 'phone, the microphone game. Since cussin' is barred it's really quite tame.

Q—is most used in the Old QRA. Especially by "booties" who must move every day.

R—is for radio, like in RADIO NEWS. Which expressed redoubtable, extraordinary, imperturbable views. [*Thamc—Ed.*]

S—is for station, that hay-wire shack. That contains the rig in black panel and rack.

T—is for transformer, the heart of the set. To buy one of you'd sure get in debt.

U—is for Union, which our club represents. They pass motions in spite of my "2c."

V—is for Canada, when joined with an "E." Our rigs are dismantled, at War we do be.

W—is for U.S., who's old Unca Sam. The home of the first 'n last transmitting ham.

X, Y, & Z—is for hard language, I fear. Not fit to impress a "YL's" shell-like ear. [*For Goshakes!!!!!!Ed.*]

FROM the Mail-bag: Thought I would drop you a line or two to let you know that my Dad's yacht, the "California" is now in the south seas on an eighteen months' trip around the world, if war conditions do not change their plans.

The call letters of the "California" are WLFK. They contact an amateur in San Francisco, W6BIP, every morning—7 a.m. PCT.

WLFK's frequency at present is 12,452 KC on c.w., as they have not much power on board for phone. At 7:30 a.m. Sunday mornings, W6BIP talks to them by phone, they answer in code.

Thought this would be an interesting bit of news for some c.w. fans and amateurs. Signed—Wm. T. Polkinghorne, Oakland, California.

ACCORDING to Don Hull of Youngstown, Ohio. Erma W9ZQY Graver, is one of the consistent YL ops on 20M fone. By the time you will be reading this, she will have changed her QTH.

W8TAD was suddenly QRT with a burnt out appendix, but is back QSO'ing on 160. His signal lacks that something! Must be the appendix!

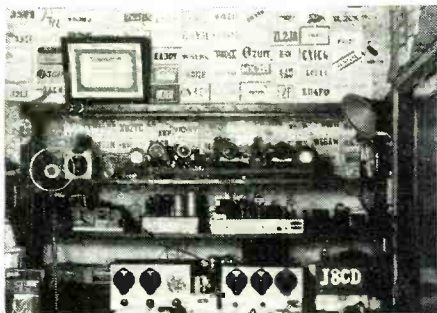
J5CW is being copied over here as late as 8 a.m. EST.

F8GO had half the 20M fone band calling him to bid him Godspeed when he left the air suddenly a/c war on Oct. 27. GudluckGO!

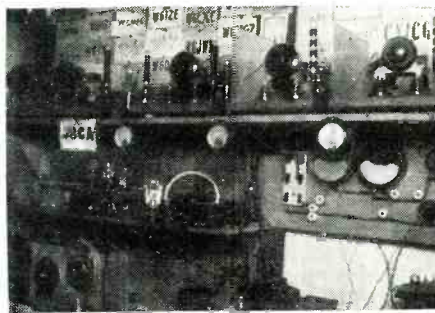
W2GFH, the "ole" Hillside "Winchell," bangs with the following:

W2KYG, with two kissable young girls, is now using a National FB-7 receiver instead of his Pro-9. Sam's in the market for some bandspread coils because tuning is too touchy with the general coverage coils that he has.

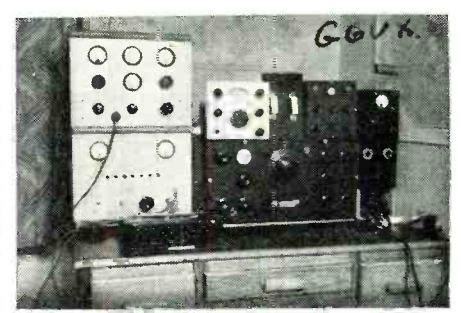
W2HIT missed his antenna tank coil all summer, and just found it in the College Radio Shack this fall. Bob has enough ham operating



This is J8CD, one of the most consistent sigs hrd in these parts.



'Nuther "J." This time its J8CA who pounds in regularly these cold ayems.



G6UX, closed a/c war, will probably have hissself a bigger shack later.



W7PHH who seems to have a tape recorder, has gone over, now, to phone.

what with being chief on at school and keeping his own rig going on week-ends.

W2JSX is nearly finished with his new home-grown superhet. He wonders how the *Hammerhead* people could have made such a swell job repairing the I.F. transformers he sent them. They sure were sad cases. Now they look like new! hi.

W2MHJ is a brand new station on c.w. (This correspondent cannot read his notes and thus doesn't know what band or what line-up.)

W2KBS has been getting out fb on 10-meter fone. John's antenna must be doing the work for his low-powered rig.

W2IWI is rebuilding W2JPK's rig. The new line-up will be 6L6-6L6-809 for the exciter, also to be used as a low-powered fone ring. Alden's own rig is still on 20-meter fone.

W2JRH has 200 watts on 20-meter c.w. at the present time. But wait until the next Sweepstakes or ARRL-QSO Contest and he'll be all over in less time than it takes to say it. Henry was hi man in last year's contest, in Northern Jersey.

W2IYU has recently switched from a new crystal mike to his old single-button (not 'nuff gain). He hasn't worked too much DX lately on 10-meter fone, but wait til the band opens up wide!

W2JBI was last seen with a new Antenna Handbook. Seymour is interested in some sort of a fixed beam for 20-meter fone.

W2GJD's thoughts are again turning to ham radio. After about four years off the air, Walt wants to get a small c.w. rig going on ten meters. He was one of the first of the gang to get on ten when the band was first experimented with.

W2AMS said, in a QSO with us, that he likes to come home at night and work his little 750-watt rig. (Oh, yes! before that, he mentioned the three 25,000 watt short-wave xmtrs that he runs for NBC, hi.)

W2GHO is getting his mobile rig installed in his car, as soon as W2HVK tries it out in the shack a little more. Ralph's ticket expired while he was at the shop this summer, and he had to take the exam over.

W2JBN has been getting into places where they never heard him before with his new rotary beam. Andy says he hears a lot of new stuff, too!

BILL W9VXS Berner, says:

W9EMX, the GE X-ray man has a new 3 element close spaced beam on 10 with a beer stein coupling to the tank. Ivar has also incorporated many novel ideas in his new xmtr.

W9WOG is on a six weeks' business trip thru the northwest.

W9MZY and W9ZYL were recently rushed to the hospital to have the sawbones remove a turn from their final tank coils. The MD's said something about an appendix.

W9LMB thinks he might be on 30 meters since he broke about one-fourth of his 40 meter rock off.

W9CEY is increasing power. From 3 watts to 26 watts.

W9JOO is on 20 meters, and has a xtal that has seven frequencies, but has no way of controlling it.

W9NCJ is rebuilding. The new ether buster will be 47-10-10.

W9WDY out Argo way, has left 40 meters for "one sissie."

W9MTW is heard on 2 1/2 meters and W9AFF and W9CLH are heard regularly on the South Side of Chicago on 5 meters.

W9LUS and W9MEL recently center-aisled-it. W9MUZ reports 1500 contacts on 10 and 40 meters the last 12 months.

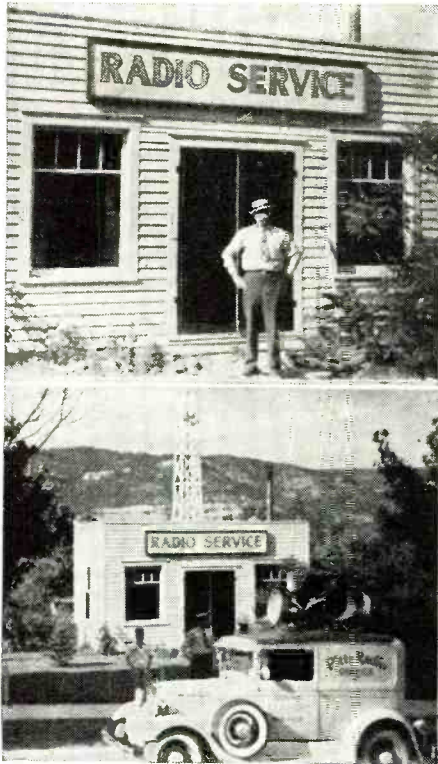
W9VXS has received photographic proof of who rewired the Packard, at the Hamfesters Picnic, replacing the spark plugs with beer cans, and filling the radiator with the amber fluid.

W9MIL is still engineering that 10 meter rotary beam. It should be a pip when the Skipper gets her completed.

HAM-GAB, Official Publication of the Hamfesters Radio Club, Chicago, recently made its appearance Planographed instead of mimeographed.

Almost three hundred HAMFESTERS claim that they can identify the attractive young lady that graced the front cover of the Oct. RADIO NEWS.

October 15th, 1939, proved to be the day that Al Knodell, W9TLQ, Chairman of the Inter-Club Activity Committee, of the *Chicago Area Radio Club Council* selected for the Simulated Emergency Field Day. Shortly after a member of the club was notified of the day of the contest the land wires started to buzz and some twenty members were notified, and a QST put on the air.



America's Orneriest Ham, W5AOH, runs a servi-station when not ham-QSO'g.

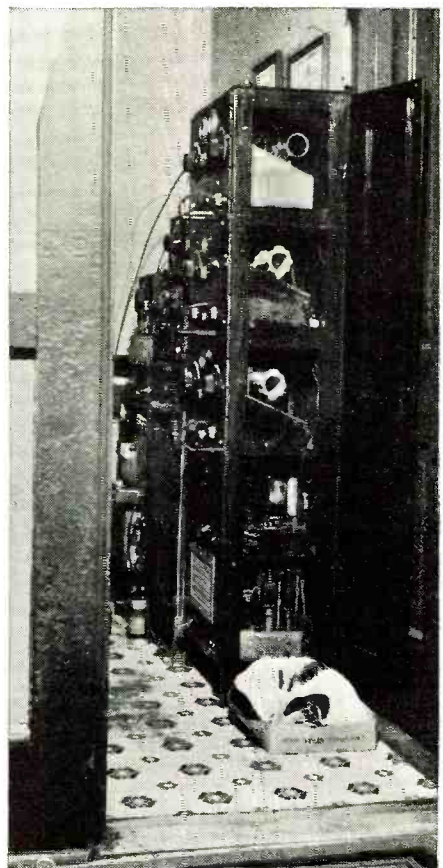
Promptly at 8 a.m. on the 15th, eight members of the various FD gangs of the club left their homes, proceeded to the designated meeting place which happened to be the W9YZV garage, and then took off for 67th and Crawford Ave. where the equipment was set up, and the key station was called at 9:03 a.m., just three minutes after the contest opened. Our call was not acknowledged for some time, and we received the OK to go ahead some half hour later. Despite an antenna that all agreed seemed to be almost perfect great difficulty was had in getting out. Almost immediately old man trouble paid us a long, unwelcome visit. A small gas generator refused to run because of stale gasoline. The old Ford power house was started up, the gas dumped out of the small power supply, and the carburetor dismantled for over-haul, when the large generator failed, because of a small spring releasing one of the brushes. The rig on the air was immediately switched over for battery operation, and it was then discovered that the service station had given us a dud, in place of a battery that had been rented for just such an emergency. Both of the generators were repaired about the same time, and the key station called for permission to change bands. Not contacting the key station, different antennas were tried, but still no answer from the key station, altho they were being called continuously. At 2 p.m. the receiver that was monitoring the key station, blasted out the order for dismantling the station, and moving at least a mile, and get back on the air, asking for all stations in the contest to OK receipt of instructions. Our OK was heard Q5, R7-8. From that time on things happened in true *HAMFESTER* fashion.

The antenna was taken down, the mast dropped, all equipment moved, set up at 57th Place, near Crawford, and the key station was being called in just 16 minutes, which was the fastest time made by any group in the contest. Contact with the key station was made immediately, permission to change to 160 fone given. From that time on nearly every station called was contacted, and every CQ was answered. A short time after that the key station requested us to change frequencies, as our powerful little 12 watt was QRM their 500 watts to other FD stations. Did we get a kick out of that.

Food was almost unknown. One of the operators had brought a lunch and in true *HAMFESTER* spirit divided his sandwiches among the gang. A gallon of coffee was secured, and this, with 10c worth of apples procured from a truck, was all the sustenance available for the day.

Five of the members of the various FD gangs, composed of *HAMFESTERS* assisted W9TLQ at the key station in monitoring the stations in the contest.

As in all previous Field Day



Note the mascot-cat asleep right where the 866's make heat. W9SKR.

Tests some very valuable experience was obtained by all who participated, both those in the field, and at the key station. Due to the type of the contest it showed our weakness more than other Field Days.

In closing we would like to tell the most amusing incident that occurred. One powerful station was on beat frequency with the key station, and when he was contacted, he was asked to QSY. When he came back he proved quite long winded telling us all about his rig, and his work at the steel mills, and stated that he could QSY, but didn't think it worth while. It made the op on duty at the time pretty hot, but being a stickler for rules and regulations, he came back something like this, W9TFA/9 back to W9—, OK if you don't care to QSY, but if you have ever seen melted iron runnin' out of the furnaces out where you work, you know it is white hot, sizzling, and hissin'. Well, they use that stuff for ice cream in de place the gang here think you ought to go. 73."

FOURTH DISTRICT RAMBLINGS by Keith C. Mathis, W4ARX!

From Savannah, Georgia-W4FOL is on 160 Phone.

W4FEC operated portable at the Savannah Fair and reports nice public interest in Amateur radio.

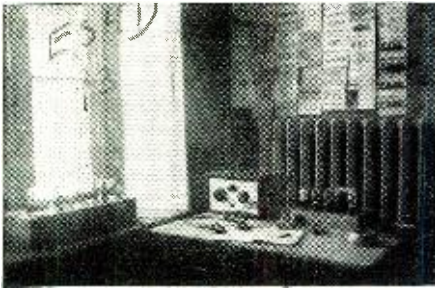
W4DZK on Wilmington island near Savannah is on 160 and 40 with 200 watts.

W4EIJ and W4CYN of Wetumpka, Ala. have both increased power and using 160 and 10 for their hamming.

W4FDJ of Lyons, Georgia, reports that his leg



This gorgeous layout belongs to a YL ham who is known all over the "Tall Corn" state of "Ioway."



Another furriner, ES4D whose shack looks like this. It's all homebuilt.

is improving and that he has increased power, also has a new antenna that helps him get out on 40, 80, and 160.

W4FCW says to advise his reading public that he is back in Cordele, Georgia, from Rochester, Minn., and ready for sum rag chewing on 160.

W4AJJ writes us from Yale University and says that it is plenty cold in the North. Plans to use 40 and 80 c. w. there soon.

Interest in the five meter band in the fourth district is on the increase with reports of activity from Atlanta, Jacksonville, Miami, and Waycross, Georgia. We would like to hear of some of the contacts made on five fellows.

Thanx to the West Florida gang inviting us down for a personal visit. Mebbe so some time fellows but it takes do-re-mi and we ain't got sum at present writing. However a post card will get you in RN.

"Doc" W4DHM Buchanan, Jaw-guh is on 10 at present. Wat is the XYL on Doc?

W4EPP, Newcastle, Ala., is on 160 meter phone.

W4DIM, Greenville, S. C., is active on 160.

Boy—the Valdosta, Georgia gang are getting very active with W4BWQ on 75 meter phone. W4DVK, C. C. Alderman on 40, 20, and 80 to a pair of tens, W4FDH, Luther and Red Harrell on 40 and 20 CW. W4GBT a new ham there on 40 CW. with ditto W4GCD and W4AAZ formerly of Tallahassee, Fla., getting a permanent QTH at Valdosta and will be on 75 meter phone. Nice work fellows and keep up the good work.

W4FBN advises us that he is active in Tallahassee, Fla., Tnx OM.

John Fowke, W4GEO, Atlanta, advises us that his rectifiers went west but is back on now wid 55 watts to a pr of 6L6s.

We know a ham in Brunswick, Georgia, that don't like the word transformer. It seems that he bought one for sixty nine cents and his XYL has given him one hundred dollars worth of qrm about it. Well, all we said was that it cost \$8.95 and we are plum innocent. Hi.

Our XYL says that our english in writing up the fourth ain't what it oder be. We have never known a ham who knew what english was Hi. Any way mebbe we have one reader hi.

Cathode modulation is being argued back and forth and seems all the fellows are going to try it. Wish somebody would settle the argument so we can get back to normal QSO's Hi. Some how or not, something for nothing is not our idea of modulation.

W4CYC, Phoenix City, Ala., is being heard on 75 meter phone, and is going to school at Auburn.

W4ERS recently used an input of one quarter of a watt on five meters and contacted W4BAC 14 miles away 1400 per cent.

Incidentally W4BAC is rebuilding his 20 meter phone rig and expects to be very active shortly.

If the rest of you hams appreciate the efforts of RN to give you hamchatter, why not help the OM out by letting us know what you are doing, if anything.

A ham recently said to us that advertising plenty of beer as an inducement for a ham fest was not very good publicity for hamdom. I sorter agree on that but then maybe the rest of the gang don't so it seems that we will just have to put up with it. Hi. Being a amateur though it oder be that we could at times be dignified enough to keep up a good name with the public.

W4GJR of Monroe A&M College in Monroe, Georgia, is now on 160 fone wid 675 watts input. Robert says that he is teaching radio operating at the school and instilling the ole amateur spirit into the pupils. FB Robert.

W4GHW at Damascus, Georgia, after rambling on 20 and 40 advises that he is on 160. He is another school teacher Hi.

W4FRQ of Panama City, Florida, lets us know that he is on 160, 40 and 20. Thanks OM about the nice words in regards to RN.

W4PBW is operating also on 160 from Pensacola and reports much activity down his way.

We missed, according to advice from RN, our usual space in *Hamchatter* for the December issue due to lateness of mailing in news but from now on we will try to mail in earlier as we have

received several letters of protest from Wis wanting to know why we are getting lazy. Not exactly our fault gang and if forgiven this time will try to do better from now on.

KEITH MATHIS' 4th Dist. Ramblings for Dec.

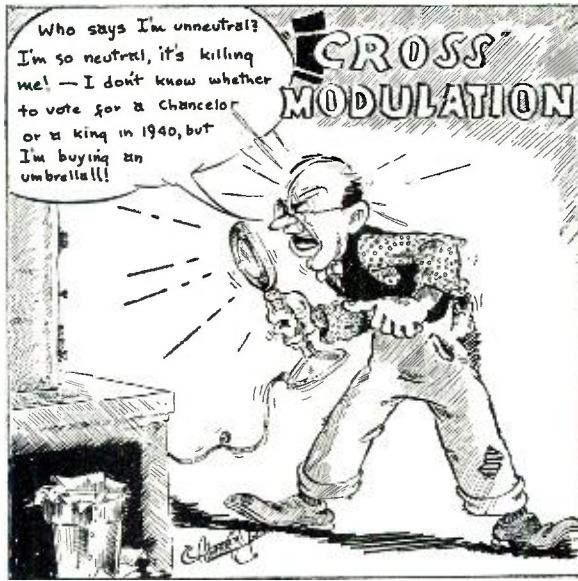
After those kind words from the Editor of RN last month we are glad to say that at least we have ONE reader. Tnx Mister and may our efforts be better.

FCD (Fried Chicken Dinner) at Midville, Ga., says that he appreciates our efforts also. Thanks Ernest.

AHT at Columbus says that he is on 80 and 40 CW.

The XYL and the writer had a nice visit with ERS at Waycross recently. The South Georgia boys are very active and always trying to build up Amateur Radio in the South. Keep up the good work fellers.

RADIO NEWS always having the interest of the American Amateur at heart certainly hits the nail on the head with the assertion that we licensed hams should at all times operate with idea that what has recently taken place in Canada could happen to us. Let's all get together regardless of whether a phone or CW man and forget district lines and work for the advancement Amateur radio in the United States. After all RN can't do much if we don't help . . . I for one believe that we do have a definite place in the future developments of the art and now is the time to show that we intend to do our part . . . Let's be fraternal, help each other out, cooperate and we will have nothing to worry about.



Next month we hope to have several visits with some of the Ala. gang and will reprt on what they are doing.

Tnx to that W4 who offered us a receiver but nope, we think SC will give us one Hi.

DON W6AM WALLACE writes in:

W6RPY still landed on the air with 160 meters.

W6M has a fine American Legion net working on 1825.

W6PLC is planning a trip around the world with a 10 meter rig.

The bedsprings, rotated within the Hotel room will be found to have directional effects says W6MRQ, who has no permanent station, but does operate portable all over the coast.

The fine towers on the *Whitcomb Hotel* formerly used by visiting hams as antenna supports, have finally come down. They were 200 feet high.

W6ICW is coming back to the Oakland Radio Club meetings again.

W6BOO was aboard the Pan-American plane flying West, when it contacted KLRB by radio.

W6AUU was married by a couple months ago, and is still a very active ham.

W6TT worked 18 South Africans on the day they folded up.

W6DUB hopes to become active as of yore.

W6DWR is on the job.

W6ISH arranged a special Sacramento club meeting to show the colored movies of W6XEJ's trip to Hawaii.

W6AXT has one of the most beautiful ham rigs we've seen.

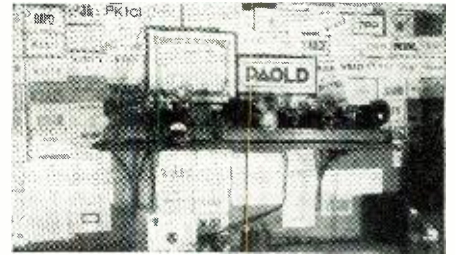
What has become of W6BYB?

W6BVK uses three DB-20's ahead of his receiver because of tremendous power leaks. Cross, an old time ship operator, is running a broadcast station these days.

W6FLR is a draughtsman.

W6KQQ moved from Sacramento and bewails the necessity of having to operate with a small rig in an apartment house until the new 1 acre ham location and residence in Oakland is done.

W6QPT is secretary of the *Oakland Radio Club*.



We cannot guarantee that this rig has not been "drowned" in the attempt by the Dutch to enforce neutrality, but when it was on the air, as PAOLD its sigs were v y fb here.

W6OBJ handled 20 messages per day with the *Wanderbird* this summer, as the *Wanderbird* cruised about the south sea islands.

W7LT has a new slogan for his power and bands, "40 on 160," and "160 on 40."

W7RT finally lost his Alaska call K7RT. 10 meter DX was rolling into the West Coast Last week.

One ham worked all continents 3 times on 20 meter in spite of the number of foreign hams shut down, so it isn't really so bad as first thought.

W6ERU is a 20 meter hound. W6UM still keeps track of the *Sacramento Radio Club*.

W6GZY is finishing his course at the *University of California*.

W6KME is a mobile transmitter hound.

W6EJC is getting ready for the March DX contest.

Esther, W6ALH and Shurley, W6AKE, McClara have moved to 323 Taylor Ave., Alameda. Shurley does not have so much time on the air since he works for the bus company.

The LA Gang are holding their DX roundup under the able direction of W6QD, Nov. 18. W6GVM hopes to win the Sacto Section DX Certificate again this year.

W7MB apparently has left the Beer business for good—ham radio is much more fun.

W6IT is rounding out a quarter of a century of ham radio.

W6BF had to stay home from club Halloween.

W6MVR is planning a marvelous new rotary antenna.

W6HS manages to keep interested in ham radio by decades.

Horace, W6TI still runs the most efficient QSL bureau we know of.

The Radio DX Contest will take place as planned, on the last week-end of November, and the first week-end in December.

W6SRV is radio operator on a 100 watt transmitter in a new bomber. He also shoots the rear machine gun (worst spot on the plane).

W7JN has a compact outfit in his apartment. W7GAE ex W9CYU is making a name for himself in Portland.

W7ADE manages to keep in the air.

Gordon Sloat is radio operator aboard the Portland Disaster Service Unit.

Tom W7AEK seems to have given up radio for a while.

W7IP plans to get on the air with a good rig. W7DNP does not have so much time on the air as before.

W7JK, still longs for the good old 40 meter days.

W7DZL was recently married. W7EAF keeps expanding.

W6BIP keeps a 1 1/2 hour schedule with the Yacht *California* each morning.

W6CNT has rid himself of key clicks. W6NYQ sure knocks off the Hawaiians on 20 phone.

W9BDO writes in abt Nebraska "White Spot" Hams.

"Aimee" had a small get-together for neighbor hams and aviators in late Oct.

BAE qsyd back to his original QRA of Huron, S. Dak., and sorri to lose you Elmer.

ARE the old C-A-A op moved into North Platte and is upped to Sup't of Maintenance of several of the beacon stations in the "White Spot."

BBS, Clyde with his two lots already covered with "ants" heists another rotary atop a 75 ft. pole.

PGA is shaking his fist from Lexington now: his Dak. WZB. Bill, is deputy sheriff thr.

EKP—every kinda people—visited hams, SF fair, Sally Rand, etc. on a vacation last summer. 1/2 KW on 75 at Don's.

HYR married last spring, biales forth wid FB sig on 75; as duz UZE the bc op thr, in the capitol city.

Lincoln must hv a heluva lotta noise as it "seems necessary for the OM's thr to use about a KW to talk around town to each other in the evenings—whilst the outstate hams cuss the QRM they cause. To bad, they and sum in Omaha, can't ape Rapid City hams who ether use junk-box xmtrs wid v y lo-pwr on 160 or



The smile belongs to W9BDO and the rig goes with the smile. Nice shack!

"Wild Bill" QQS ex-W7FLO operates his filling stations if customers cum, if not, the-rig! Muchly same, wid RGK es auto repairing. VRT has bn hrd on 80 es 160. QPY bit new home—rig next for main bands. UHT the molar-man likes his CW on 80, and uses 75 but lil bit. BDO—blonde dames only—mainly spouts off his 500 WPM on 75 "arguing" with any and all on any band or subject—just, arguing! CQG still oping beacon station and now back on 75 again. NXQ heard spasmodically on 160. IYN—innocent young nut—who last year courted and won a bride by radio on 160 is reported to have taken Mary his radio-bride PH and moved back to So. Dakota. Sorry to lose you Hank!



Windy W5HMV Bill who believes in publicity sent in this self-pix.

QRM from the 5th District by Windy W5HMV Bill. Enclosed find Pix of K5AT ZL1GI es shots of W5HMV. K5AT's lay out is as follows 6L6-Xtal-6L6-first doubler to 20 6L6 doubler to 10 into a pair of 630's in shove grab the ant. is a three element rotary beam, recvr is an 8X-17 there are five ops (were) Don Hal Pete Jim es Mack all of them RN fans hi. ZL1GI's Pix is of the rf section of his 28 Mc rig 6L6-6L6-6L6 PP T20's (also a RN fan hi).

QSY to 10 for their local QSO's. VIG—vinegar in grease—pops up on 160 wid his usual gud sig. but sew-furr nary a peep outa "Willie's Blue Underwear???" Recently hitched, but not to "his-Juliet" of last year, is the muchly-listened-to "Radio-Romeo" when BCL's, SWL's, etc. deserted the SC band by the thousands to cavestrop nightly on their verbal passionate utterances when their impetuous and whirlwind radio romance was going R9 plus til its abrupt termination. GDB flitters around from band to band but still takes greatest pride in his very large number of Nebraska contacts. IWV must mean "I Von't Wash mi ears," as he sure takes prize for being unable to hear anything but extremely loud sigs.

OED has been hopping around a bit but is holed up at Fremont now. QVJ on 40; but does anyone know which band Adeline the YL op of AUD is on now? Wuz on 30 last yr. Also whr ir ol' Loie "In the land of hard water and beautiful women:???" ND on him this fall. TRK shook a blonde off each arm es got outa the ethereal moth balls this Oct.—my watta mellow bellowtone with romantic infection of Jerry has! BYH on 80 and LCS on 40 represent their QRA consistently. PDH still packs the mail for the BCL's and a lil female for himself as he is a new-pop since last spring, as is neighbor MJY with a Jr. op.

RAM has a new rig, likewise yes on YL. QWD—quarter's worth doughnuts—new 10 M rotary eg FB. YLC—young lady's choice—wuz vy QRL punching holes in terra firma so the aqua pura wud gush forth for the rancher's bovines, but is now squirting forth FB on 160 agn. FXN es OW BJU visited TIF-BDO on Friday the 13th es while thr. their house es contents burned down. BJU has "divorced" him temporarily, taking the "harmonics" to town to skool. FXN-BJU will b back on 80 es 160 as sn as can replace burned equipment. ZQZ the romantic YL skoolmar'm is teaching at Comstock this yr. ERW having FB luck wid his 10 Watts inp on 80. HNP—his new pants—soldering joints mainly 75 sum. TIF—the independent farmer—"Voice from the soul shanty on the Kow Kamp" using 3 w inp on 160 to keep up with family gossip.

EYE an old timer may b hrd on 40 CW wid new rig. YUM—young unmarried man—wid his 90 foot pole again jumps outa backyard vy FB on 160 wid 10 W inp; fairly gud on 80 es 40. MEJ spends most of his time es money on new car, vy lil on 40. MGV—mustard garlic vinegar—qrt Mr. Farley es qsd to Henningford whr his biz is "elevated" (grain). His Bro KQX may b hrd any band any time. LWS on 80 es sum 160 F. INR ads to occupancy on 40.



ZL1GI, no more a/c war used to be hrd fm this QTH. Gud luck to u!



A sure cure for "burnt ham"!

W5HMV's Pix just show that I blieve in advertising. W5HMV is caretaker of a GRAVEYARD in Baton Rouge, La. W5HV1 really has a swell sig on 75 fone now. W5HMA NCRS net control station is also on 75 fone at last. W4AV75 was in QSO with a W6 the other day es signed his call as portable 5 the 6 came back and wanted to know what he meant by the portable 5 business and could he do that to and work out better. Hi! W5IIR by becoming a ham makes the technical staff of WJBO Baton Rouge, La., 100% ham radio ops there being 4AV 5FVK 4BG0 Corny (5IIR) couldn't resist so now he's one of the boys.

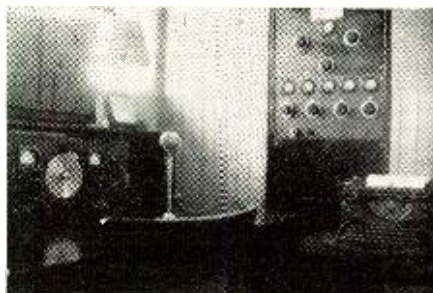
W5FVK who is experimenting with cathode modulation on 20 says he will not be responsible for burned out ant. coils when he works you so be sure es grd your ant. when U work him. W5BJZ is vy active on 75 fone. W5HBY has finally stepped up his modulation so that he doesn't sound like the whispering baritone any more. Hi, Sparks. W5GUX after sending 4 203A's west gave up the net control for AARS to W5ADJ who really works out on 1925 with a KW es a 127 ft. vertical ant. W5GX0 is really getting out on 10 with his new rig. Hello, Jake. W5AKZ es W5DAN are missing a good bet by not making recordings of some of the classic QSO's they have had on asbestos records. W5DAN used to blow the bugle in the army. W5BV is going up to 10 with his new rig. W5HIJ es W5FXF es sister es brother ops. W5GIZ is the proud possessor of a vy fancy signal shifter es a brand new shack. Hi, Mack.

W5WN 160 fone is crowding 70 es still going strong. W5AFW is having receiver trouble. W5GXQ has bought a record player es a bunch of classical records es given up ham radio unuh. Some stuff, Ralph. W5HEZ is still holding down 40. W5BRK is not vy active with his RW as new rotary he says it works so well it's not any fun working them any more it's too easy hi. Well I guess that's abt all fer nw until I work some one with a wide spaced beam 73.

W7PH reports: W7HOV at Diversion Dam, Boise, Ida., has a fine biz phone rig 20P kit and is now building a hi power final and modulator. T240 mod. T53 final. Gud luck, Bill. W7BZT will have a new QRA. Moving to Weiser soon. W7GPM puts out a wicked sig. on 160 Phone works lots of DX. Is up in mountains, reports juice 9c kilowatt but still works till wee hours. W7HOV and W7BZT visited W7PHP sometime ago. W7GPM works Chicago R8-9 but gets R3-4 in Boise about 40 miles. Hi, Hi! W7HPX is said to have a portable rig in his car that is really fine biz.

W1JOM reports from Boston: 4EEM was able to speak to his Mother and Dad through W1JOM who contacted W4FMN, a next door neighbor of Harry's (4EEM). The Boston Hamfest went over big. 1,300 tickets sold. LBO and XYL won a Howard 460 at the hamfest, but has not taken it out of the carton as yet. They just came down on ten. The OM, not having a call, paraded around the hall, at the hamfest with "WPA" on his lapel. Many of the local ten meter boys have purchased new receivers and have put new rigs on the air. GOU, DNL and LDR have new HQ-120.

AJA, using 100 watts and a beam on ten has worked 1:20 stations in three week-ends. The boys in and around Boston have organized a ten meter "wind bag" net. Just a general get together, with no special purpose except to get acquainted. DRL has acquired a 1st harmonic. Congratulations, Woody and Lil, Woody, as everyone knows (or should know) is quite an expert on ten meters. IPA and GOU are heard until the wee hours in the morning discussing the rigs they plan on building. The boys seem to change the plans every time they have a QSO. LPX, who should know better, tried to put 800 volts on a 2A5 amplifier on 40. It seems they aren't making them so good nowadays, because it wouldn't take it fer more than a few hours. JTG just got back from Hanover, N. H., where he and a few other boys installed a KW. phone rig. Charlie says he didn't get a kick out of working the rig, because every time he finished (More HC on page 44)



K5AT has this near-broadcast station and it sure puts out a fb sig.

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SERVICEMAN'S CASE HISTORIES

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.

CORONADO 850, 850B (Battery Operated)

- Intermittent reception 1) check all tubes
2) check all tubes intermittent, "open" in coupling condensers, coil terminals or switch contacts
3) loose connection in any of the wiring including antenna and ground lead-in
4) corroded socket or tube-pin contacts
- Weak reception 1) check all tubes
2) check batteries
3) check antenna or ground connections
4) "shorted" lightning arrester
5) check resistors, coils, a-f transformer, condensers and loudspeaker
6) check alignment of receiver
- Poor selectivity 1) i-f amplifier out of alignment
2) antenna too long
- Distortion . . . 1) speaker voice coil out of center
2) check tubes—especially the '30 and '950 tubes
3) AVC line "shorted" or "open"—evidenced by overloading of i-f or r-f stages on strong signals
4) one side of a-f transformer "open"
5) faulty output transformer on loudspeaker
6) "shorted" or "open" condenser in audio circuit
7) "shorted" or open resistor in audio circuit

- Excessive battery drain 1) check the "A" drain with a meter—it should not be over 0.68 amp. The "B" drain should also be checked—it should not be over 20 to 22 milliamperes on "low" volume. Excessive drain may usually be traced to "shorted" or "leaky" condensers, or a defective switch or tubes

- Batteries run down too frequently 1) check the "A" drain with a meter—it should not be over 0.68 amp. The "B" drain should also be checked—it should not be over 20 to 22 milliamperes on "low" volume. Excessive drain may usually be traced to "shorted" or "leaky" condensers, or a defective switch or tubes

- Tuning belt slipping 1) idler spring too loose
2) belt worn or stretched
3) condenser thrust bearing too tight, or not lubricated
4) faulty gear on condenser
5) if belt slips only slightly, apply a small amount of "belt dressing" or powdered rosin, to it
6) in the Model 650 receiver the idler tension may be increased by forming the long end of the spring so that greater tension will be placed on the lever. Should the belt tend to slip "off" the large pulley, it is an indication that the pulleys are not in line. The set-screw in the hub of the large pulley may be loosened, and the pulley moved on the shaft until it is in line with the lower pulley

- Code interference 1) all late productions of this model (had letter "T" marked on back of chassis and on carton) are equipped with a wave-trap No. 1736 to eliminate this trouble. This same wave-trap may be connected (with its coil end to the ant. terminal of the receiver and its condenser end to the ground terminal of the receiver) to all receivers not bearing this mark "T". After installation, it must be tuned to minimum response to a 456-kc signal applied to the antenna lead (or to minimum reception of the code interference)

CORONADO 7700

- Distortion . . . 1) defective speaker
2) defective input transformer. Replace with new unit

COURIER (see Peerless receivers)

CRANE 5

- Intermittent reception 1) check the value of the 50-ohm 1/2-watt resistor in the first a-f and output stage. If far off value, replace with 50,000-ohm 2-watt resistor
2) replace volume control

CROSLEY

See also "De FOREST CROSLEY" receivers

- CROSLEY RECEIVERS—General Service Notes
Speaker . . . 1) remove speaker diaphragm assembly and dip the voice coil in thinned shellac or varnish (should be very thin for good penetration). Al-

Repairing . . . 1) "Musicones" and "Dyna-cones" (types A to F inclusive)

low to harden, and repeat for a second coat
if cone is crushed, iron out the crushed cone with an ordinary hot flat-iron. Iron out only a small portion of the cone at a time, pivoting the point of the iron at the cone vertex. Place a resilient newspaper or magazine under the cone while ironing out. Straighten out the armature, apply a drop of oil to the adjusting screw. Center the armature accurately. (screw in until the cone rasps or rattles, then screw out until it rattles again . . . count the number of turns between these two points, and screw in exactly half that number of turns)
Slipping of dial 1) remove the dial. Knock washer off the shaft and remove the spring together with the back piece of brass. If a shoulder has worn into the brass piece, file or grind it off, replace and reheat the washer into the shaft. If you cannot get the washer to stay on the shaft, push it down tight on the spring and solder it in place. If it is difficult to remove the spring and brass piece, take the friction part and fit a piece of stove pipe wire into the slot into which the dial edge fits. It should be cut to fit snugly and be forced in tightly.

Hum in certain 1) if it is desired to save the cost of a replacement electrolytic condenser, first discharge the condenser by shorting it with a wire.
Mershon condenser models Drill a 1/4-inch hole in the bakelite top of the electrolytic unit, being careful not to damage the "insides." Fill with distilled water to a point about 1/4 inch from the top, and close up the hole with sealing wax

Hum . . . 1) shorting of the filament center-tapped resistors (which are arranged in tiers). Buckling of the strips upon which the resistors are wound will cause this trouble. Use 20-ohm replacement units
Inoperative . . . 1) if blue haze appears in rectifier tube and all plate voltages are low, look for "shorted" r-f by-pass condenser
2) examine to see if receiver has fuses connected in series with the primary. If fuse is blown, first check to see what caused the overload. Look for "shorts" and "grounds" in the B-plus circuits. Test the electrolytic condensers—possibly by substituting another electrolytic unit. Sometimes corrosion develops between the condenser terminals, resulting in excessive leakage. Remove this corrosion with a stiff wire brush, or scrape it away. After cause of trouble has been located, install new fuses

Noisy volume controls 1) noises often develop in those receivers using carbon-strip controls. Replace with wire-wound units
Volume poor . . . 1) in the receivers which use an autodyne first-detector circuit, volume is often poor at certain portions of the dial. If it persists after the tuning condenser tracking has been checked, try another '24 tube in the det.-osc. socket. As this tube is "fussy" several may have to be tried before a suitable one is found

1933 CROSLEY RECEIVERS

- Inoperative after 1) i-f transformer damaged because of its close proximity to the heat from the tubes in the receiver. Replace with new unit
check O.K.)

CROSLEY "BAND-BOX"

See Case History listings under Crosley 601 "Band-Box" receiver

CROSLEY "BUDDY", "CHUM"

- Inoperative . . . 1) open-circuited 10,000-ohm screen-grid circuit voltage-dropping resistor (wired with a carbon unit even though the above resistor may test O.K.)
Hum . . . 1) check the electrolytic condensers for excessive leakage. A quick method is to do this by substitution

CROSLEY "CHIEF"

(See Crosley 132 "Chief" receiver)

CROSLEY D-5

- Noisy reception .1) defective type '42 tube

- Inoperative . . . 1) defective electrolytic filter condenser in power pack

CROSLEY "FIVER"

- Volume control 1) replace defective 5,000-ohm inoperative volume control resistor
Intermittent reception 1) a 2.5-volt pilot light has been installed in the receiver instead of a 6.3-volt bulb, resulting in reduced heater current and a rise in voltage
Erratic oscillator operation
Noisy when jarred . . . 1) poor ground connections on the tuning condenser rotor. Ground with a small piece of flexible braid

CROSLEY "GEMBOX"

(See Crosley 608 and 610 "Gembox" receivers)

CROSLEY "GEMCHEST"

(See Crosley 609 "Gemchest" receiver)

CROSLEY "JEWELBOX"

(See Crosley 804 "Jewelbox" receiver)

CROSLEY "ROAMIO"

- Insensitive over most of dial 1) examine small choke-type first detector, antenna, and grid coils for reversal

CROSLEY "SHOWBOX"

(See Crosley 706 "Showbox" receiver)

CROSLEY "TOTEM"

- Smoking, odor 1) heat developed by filament resistor melts insulating compound in filter condenser.
Re-mount the resistor and the plate choke so this will not happen

CROSLEY "WASHINGTON"

- Inoperative, . . . 1) volume control burnt out.
No voltage on r-f tubes 2) Replace with new unit
r-f voltage resistor burnt out

CROSLEY 5M3

- Inoperative . . . 1) "shorted" section of electrolytic condenser in can above chassis

CROSLEY 7

- High-frequency audio response 1) on No. 7 receiver, clip the tinued bare wire which goes from the end of the condenser nearest the tone-control to the plate of the '2A5 tube. On the No. 10 receiver clip the tinued wire coming out of the end of the condenser nearest the tone control
Hissing . . . 1) connect a 2- or 3-meg. resistor in series with the screen of the '58 first detector tube. By-pass this with a 0.01-mfd. 400-volt condenser

CROSLEY 7H2

- Poor reception, 1) "open" 11,000-ohm section Volume control in Candohm resistor (the section does not operate properly connected from screens to ground)

CROSLEY 7H3

- Motorboating . . . 1) high-resistance ground connection in the shielded wire going to the grid cap of the 6B7 tube

CROSLEY 8H1

- Excessive "hiss" between stations 1) replace small, flexible 500-ohm '6F7 tube cathode resistor with a 250-ohm unit. Also shunt a 2,000-ohm resistor across the cathode bias resistor of the type '6D6 tube nearest the power transformer
Inoperative, . . . 1) plates of balancing condensers located on top of i-f coil cans "short" to mounting screws or pillars when they are moved out of their original position

CROSLEY 10

Same Case History as that listed for Crosley 7 CROSLEY 27, 28

- Inoperative, . . . 1) faulty 1-mfd. by-pass condenser connected between the screen-grid of the '32 detector and ground. It is in a can holding two condensers with two terminals exposed and the common one "grounded"

CROSLLEY 30-S

See also Case Histories listed for Crosley 31-S, 33-S, 34-S

- Volume cannot be cut when replacement vol. control is installed .1) short-circuit the 3,500-ohm resistor (which is in series with this control) completely out of the circuit
- Noisy, 1) if detector plate current is above normal, check the 0.05-mfd. condenser by-passing the det. cathode-bias resistor.
- Unstable 2) check the 55,000-ohm detector plate resistor for drop in value.
- 3) check the mica 0.001-mfd. det. plate by-pass condenser
- 4) check the 0.5-mfd. audio coupling condenser
- 5) check the two paralleled 11,000-ohm stabilizing resistors between the first audio plate feeder and ground
- 6) if rectifier plate current is very high, check the electrolytic filter condenser and replace any units found faulty

CROSLLEY 31-S, 33-S, 34-S

- Inoperative . . . 1) terminals of tube sockets short-circuiting to chassis, as holes admitting them are too small for safety. Enlarge the holes
- Hum 1) leaky electrolytic condensers. Replace decrease in value of 11,000-ohm resistors connected in parallel in the bleeder circuit. Replace with 5-watt units
- 2) check each electrolytic condenser and replace all units drawing more than 5 ma.
- 3) check the tuning condenser bearing for excessive wear. Make sure that the condenser plates are well centered. Wear in the bearings may be compensated for somewhat by installing a pig-tail from each rotor to chassis
- 4) replace the coupling condenser between detector and first audio tube
- Low volume. . . 1) connect a 15,000-ohm resistor between the positive side of the 55,000-ohm detector plate resistor and ground
- Poor tone . . . 2) try several tubes in the detector stage, as a tube with the proper characteristics is essential for best results
- Apparent "shorted" coupling condenser . . . 1) check socket prongs for "shorts" to chassis. As the chassis socket holes are sometimes too small to clear the socket prongs, the prongs often short to the chassis. trouble which should always be checked before making an analysis on these receivers

CROSLLEY 40-S

See also the Case Histories listed under Crosley 41-S receiver

- Intermittent operation . . 1) loosened rivets on the bias resistor for the screen-grid tubes. Solder each end to the supporting rivet. Frequently, it is necessary to unwind one or two turns of the resistance wire to make proper connections.
- Distortion, . . . 1) if analyzer check shows a positive bias on the first audio tube together with excessive plate circuit, replace the 0.5-mfd. coupling condenser connected between the detector and the first audio grid
- Low volume . . . 1) defective 750-ohm resistor on the resistor strip causing improper bias on the type '45 tubes. The defect is apparent only when the receiver heats up
- Excessive hum, (hum disappears when set is removed from cabinet) 1) condenser block punched by one of the screws which hold the chassis to the cabinet, thereby short-circuiting the condenser. When screw is removed, the hum ceases, since the condenser is no longer short-circuited

CROSLLEY 41-S

- "Noisy" and "distortion" at high volume . . 1) replace the 440-ohm resistor under the chassis
- 2) check the first r-f coil for an intermittent "short"
- Low volume, . . 1) high-resistance connection between the tuning condenser rotor and the frame. Solder flexible pig-tails from the rotor shaft to the frame
- Noisy reception . . . 1) defective 0.5-mfd. r-f cathode by-pass condenser. Replace with new unit
- 2) defective coupling condenser between the plate of type '27 detector tube and the control-grid of the first a-f tube. Replace with new unit
- 3) broken solid-wire leads running from the voice coil to the connecting lugs. Replace

- Poor tone 1) with flexible leads replace the by-pass condenser connected between the detector and first audio grid tube)

CROSLLEY 42 (Using 45-mil. "Dynacoil" Speaker)

- Low volume, . . 1) change in value of large 6,000-ohm carbon resistor. Replace with 6,000-ohm 10-watt wire-wound unit
- Poor sensitivity
- No reception, . . 1) short-circuited r-f by-pass condenser
- (no r-f plate voltage) 2) open-circuited 1,400-ohm r-f resistor
- Poor quality, . . 1) replace the coupling condenser between the detector plate and first-audio grid—even if it tests O.K.
- Low volume . . . 1) defective Mershon condenser readjust balancing condensers clean variable condenser plates and solder a pigtail lead from rotor to chassis
- Hum 1) clean volume control contacts and strip
- Oscillation . . . 1) defective Mershon condenser readjust balancing condensers clean variable condenser plates and solder a pigtail lead from rotor to chassis
- Irregular noises 1) when tuning
- Fading 1) clean volume control contacts and strip

CROSLLEY 42-S

See also all Case Histories listed for Crosley 40-S receiver

- Distortion . . . 1) low detector tube grid-bias voltage due to leakage between sections of the dual 0.5-mfd. by-pass condenser across the detector and first a-f bias resistors
- Poor tone . . . 1) 5,500-ohm bleeder resistor "open," raising all voltages range switch or sensitivity control noisy. Solder a flexible pigtail from the wiper on the switch to "ground"
- Over-sensitivity 1) remove cone from speaker, and glue voice-coil form to cone
- Noisy 1) check to see if bottom plate of chassis is touching the center terminal of the volume control. Eliminate any such contact
- Speaker rattle . 1) faulty electrolytic condenser in filter circuit—likely one with excessive leakage
- Low volume . . 1) defective 0.5-mfd. condenser connected between the speaker voice coil and the type '45 tube grid-bias resistor terminal. Replace with new unit
- Hum 1) check coupling condenser between detector plate and '45 grid. Replace with a unit that will stand 300 volts

CROSLLEY 53

- Inoperative . . . 1) defective 0.5-mfd. condenser connected between the speaker voice coil and the type '45 tube grid-bias resistor terminal. Replace with new unit
- Noise and distortion . 1) check coupling condenser between detector plate and '45 grid. Replace with a unit that will stand 300 volts
- Overheating . . 1) make sure that the 1,650-ohm bias resistor for the '45 tube has not been burned out
- 2) replace the 0.5-mfd. condenser between the speaker voice coil and a terminal of the grid-bias resistor

CROSLLEY 54

See also Case Histories listed for Crosley 53 receiver

- Audio "howl" . . 1) change in value of the 150,000-ohm coupling resistor connected between the detector plate choke and the audio coupling condenser, and one side of the a-f choke. Replace with new unit
- 2) change in value of the 1-megohm type '45 tube grid resistor. Replace with new unit

Intermittent oscillation when analyzer is plugged into power tube socket (plate voltage decreases and grid-bias increases when this condition occurs)

- Intermittent operation . . 1) if accompanied by increased '45 tube plate current and noise, check the 0.1-mfd. detector to power tube coupling condenser; the 1.0-megohm power tube grid leaks; and the 0.5-mfd. condenser connected between the voice coil and center tap of the 2.5-volt filament winding of the '45 tubes. Use 600-volt type condensers for any condenser replacements necessary
- Raspy, harsh, . . 1) in models using the Dynaco speaker, harsh, raspy or fuzzy tone is usually due to hardened rubber damping of the armature in the unit. Replace these with new ones out from thin, live rubber. Reassemble unit and adjust properly.

- Low volume, . . 1) leaky 0.1-mfd. condenser between the plate of the detector tube and grid of the audio tube. Replace with a new unit if the leakage resistance is more than 50- or 75-megohms
- Poor sensitivity 1) replace the 150,000-ohm detector plate resistor with a 300,000- or 400,000-ohm unit

- Noise and distortion . 1) check coupling condenser between detector plate and '45 grid. Replace with a unit that will stand 300 volts

CROSLLEY 57

- 1) check coupling condenser between detector plate and '45 grid. Replace with a unit that will stand 300 volts

CROSLLEY 58

- Inoperative . . . 1) check metal-cased condenser (containing r-f plate screen and cathode by-pass condensers) for "shorts"
- 2) check both of the Candohm resistors at back of chassis defective detector grid-bias resistor by-pass condenser. It is usually short-circuited, but is cleared up by the least change of voltage. Replace with new unit
- Inoperative, . . . 1) (switch has to be put off and on a number of times before receiver starts), (tubes and voltages test O.K.)
- Insertion of the analyzer cable or test prods starts the receiver operating
- Fading 1) rewire the filament circuits with direct connections instead of leaving one side grounded

- Distortion . . . 1) check the two detector plate-dropping resistors. They should be 25,000 and 150,000 ohms respectively
- 2) disconnect the detector screen-grid from the r-f screen grids, connecting it to the detector plate in series with a 250,000-ohm resistor, and by-passing it to ground with a 0.25-mfd. condenser

- Hum 1) replace 1-megohm resistor in '47 grid circuit, connecting to high-voltage secondary tap (not traceable to filter trouble)

Intermittent reception, Noise

- Improving the receiver . 1) replace the '24 tubes with 58's by installing 6-hole sockets and connecting the suppressors to the cathodes
- 2) replace the volume control with a 10,000-ohm unit with same connections. If the new volume control has an A.C. line switch, the space left from the original switch may be used to install a tone control

CROSLLEY 59

- Hum 1) replace 1-megohm resistor in '47 grid circuit, connecting to high-voltage secondary tap (not traceable to filter trouble)

CROSLLEY 72AF

- Oscillator does not "track" . 1) mica condenser connected across oscillator trimmer is "open" or making poor contact. Replace it if faulty

CROSLLEY 77

- Fading 1) replacement of one or more (intermittently) faulty 0.1-mfd. condensers which couple the r-f coil sections to ground. Check by substitution

CROSLLEY 82-S

Same Case Histories as those listed for Crosley 40-S receiver

CROSLLEY 84

Same Case Histories as those listed for Crosley 77 receiver

CROSLLEY 95 "Roamio" Auto Radio

- Insensitive 1) some of these receivers were assembled with the connections to the antenna coil, grid coils and detector coils reversed. Reverse the connections to these coils one at a time until normal sensitivity is obtained. Then realign the receiver
- 2) check the tuning condensers for mechanical alignment
- Weak reception, 1) often caused by speaker field coils being reversed due to the polarity of the car battery. Reverse these leads

CROSLLEY 102 Auto Radio

- Oscillation . . . 1) faulty type '6B7 second detector tube, having low emission. Replace with new tube excessive current drawn from A-battery. Either one or both vibrator condensers "shorted." (These condensers are accessible by removing the side cover of the vibrator housing)
- 2) metal cover touches terminal of the lead from the i-f tube grid. Bend terminal so it clears the cover
- Intermittent reception . 1) break in the flexible lead from the r-f transformer to the rubber-mounted gang condenser.

(More Case Histories on page 60)

SHORT WAVES IN THE WEST

By John D. Clark

(All Times Listed Are Pacific Standard)

China

XGX, CHUNGKING—The Chinese National Station XGX (formerly XGOX and XGOY) has shifted frequency from 17.8 to 15.2 meg. for the daily 6 to 7:40 p.m. transmission to North America. News in English is released from 6:50 to 7 p.m., followed by comments in English on current topics from 7:05 to 7:15.

XPSA, KWEICHOW—Still being received daily on approximately 6.98 meg. from 2:30 to 8 a.m., despite the fact that verifications received from the station list frequency as 7.14 meg. Relays news in English from XGX (11.9 meg.) at 6 a.m.

XMH4, SHANGHAI—Jumping around on the dial between 11.85 and 11.91 meg., but still maintaining regular 4 to 8 a.m. schedule. Verification gives frequency as 11.85, but often heard on high frequency side of XGX. Broadcast American news commentary at 6:15 a.m.

XOJ, HANKOW—Seems to have shifted frequency from 6.85 to 6.88 meg. to avoid code interference. Now being reported as early as 2 a.m., although schedule should be 3 to 5:30 a.m.

CRY9, MACAO—Again being received on the Pacific Coast with fair volume on 6.08 meg. Announced schedule is Tuesday only from 5:30 to 7 a.m. Announcements are in Portuguese, English, and Chinese.

XGOK, CANTON—Now operated by the Japanese and on the air from 2:30 to 5:40 a.m., using 11.81 meg. Special program of news and comments in English at 5 o'clock.

XGAP, PEKING—Also in the hands of Japanese. Reported irregularly near 6:45 a.m. on about 9.56 meg., sometimes blocked by KZRM.

XOY, CHENGTCU—Again reported by several listeners on 9.37 meg. from 6:45 to 7:30 a.m. after being off the air for a short period. Still no reports on XOZ which is scheduled to be on 15.51 meg. at the same time.

UNIDENTIFIED—A powerful new Oriental has appeared on 9:51 meg. near 5:30 a.m. as we are going to press. This may be XGX, Chungking, using this assigned frequency in place of 11.90 meg. during the winter months. . . Another new Chinese broadcaster is at approximately 7.95 meg. at 5:30 a.m.

Philippines

KZIB, MANILA—Latest verification gives schedule as 3 to 6:05 a.m. and 5:30 to 11:40 p.m. on 9.56 meg. The morning transmission is received with excellent volume on America's west coast, and the evening broadcast is fair after 10:30.

KDB, MANILA—Phone station heard regularly on 17.95 meg. at 4 p.m.

KZRM, MANILA—Now broadcasting simultaneously on 6.13 and 9.57 meg. from 1 to 7 a.m., although reception on the lower frequency is often interfered with by other Oriental stations.

KZIB, MANILA—Now using an additional frequency of 6.04 meg. from 3 to 6:05 a.m. Do not confuse this with the new KZRB on 6.00 meg. which is on the air at the same time.

KZRH, MANILA—Now announcing as "Voice of the Philippines." Has shifted frequency to approximately 6.11 meg. to avoid interference with code stations.

Australasia

VLW2, PERTH—Several listeners have reported reception of a new Australian broadcaster on approximately 9.56 meg. near 4 a.m. This may possibly be the new Perth station VLW2 which was scheduled to begin operations soon with 5,000 watts on 9.56 meg.

VLR3, MELBOURNE—Has been remaining on the air until 6 a.m. since the war started in order to relay news from London at 5:30 followed by local news. The 11.88 meg. frequency is only used until 4:15 p.m., PST, and a changeover is then made to 9.58 meg. Excellent reception is now available on the lower frequency from 10 p.m. to 6 a.m.

ZL3, WELLINGTON—A last-minute unconfirmed report states that another new Australian is broadcasting simultaneously on 6.09 and 9.54 meg. near 3 a.m., the later frequency heterodyning VPD2 in the Fiji Islands which is on the air at the same time. It is possible that this is the new New Zealand National Station which has been assigned frequencies of 6.08 and 9.54 meg.

VK9MI, M.V. "KANIMBLAY"—Again being heard irregularly after a silence of several months. Usually signs off with "God Save the King" on 6.05 meg. near 4:15 a.m.

ZZB, WELLINGTON—Three listeners report reception of this one on 6.96 meg. signing off one Saturday morning at 4 a.m., but not heard again.

Japan

OVERSEAS PROGRAMS—Although the Broadcasting Corporation of Japan states that JZK (15.16 meg.) and JZI (9.535 meg.) are both carrying the 9 to 10:30 p.m. and 4 to 6:30 a.m. transmissions, only the latter is audible on the Pacific Coast as we go to press. It is possible that a changeover from JZK to JZJ (11.8 meg.) may be in process, but JZJ has not been reported as yet. . . JZK (15.16 meg.) has been heard with good volume from 5 to 6 p.m., since replacing JZL (17.78 meg.).

JVB, NAZAKI—Back on the air again relaying the regular Nipponese network programs in the early evening. May be heard on 14.6 meg. with gongs for time signals at 7 p.m. nightly.

JVA, NAZAKI—Phones on 18.91 meg. near 5 and 10 p.m. irregularly.

JIE, TYUREKI, TAIWAN—Stations JIE (7.395 meg.) and JIE2 (9.695 meg.) located in Tyureki, Taiwan, and relay the programs of JFO (9.63 meg. from 6:05 to 7:20 a.m.). Both are heard in all parts of Western America with excellent volume.

UNIDENTIFIED—A powerful new Japanese broadcaster has been logged on about 6.09 meg. near 1 a.m.

East Indies

VPB, COLOMBO, CEYLON—After returning to the air for a few brief test transmissions, this transmitter has now closed down its short wave relay and operates only in the broadcast band.

YDD, BANDOENG, JAVA—Heard irregularly on 6.06 meg. from 2:30 to 5:30 a.m. with programs of native music. This station does not relay programs of the regular Jayanese network.

YDX, MEDAN, SUMATRA—Now working on 7.22 meg. from 7:30 to 11 p.m. and from 3:30 to 6 a.m. As yet only reports on morning reception have been noted.

PLE, BANDOENG, JAVA—Operating on phone daily at 4 p.m., and often at 11 p.m., using announced frequency of 18.83 meg. Received with tremendous volume on Pacific Coast. Uses inverted speech almost continuously, but may be identified by waving carrier which is peculiar to all Javanese Government phone stations.

YBF, MEDAN, SUMATRA—Another phone station which works on about 9.93 meg. and is usually heard near 3 a.m. with good volume. When poor reception conditions prevail on this frequency, YBG (10.425 meg.) is used in the circuit.

UNIDENTIFIED—A new and unidentified Java station has been reported on approximately 4.85 meg. (just above Calcutta's VUC2 on the dial) near 5 a.m. Signals of the newcomer are slightly weaker than those of YDE2, Solo, Java, which is on 4.81 meg. at the same hour.

PLV, BANDOENG, JAVA—Heard on phone using plain voice with tremendous strength on 9.42 meg. about 6:50 a.m.

India

VUD2, DELHI—Now being heard on a new frequency of 5.995 meg. from 4:30 a.m. until it fades out shortly after 6:30.

VUD, DELHI—A late and unconfirmed report indicates that this transmitter is again being received on 15.29 meg. from 6 to 7 p.m., with English news bulletins at 6:50.

VUB2, BOMBAY—This one is consistently reported from 1 to 3 a.m. on 9.55 meg., although scheduled to work only from 6:30 to 8:30 p.m. and 10:30 p.m. to 12:30 a.m.

VUC2, CALCUTTA—Verification gives schedule as 1:06 p.m. to 1:06 a.m. on 9.53 meg., and 3:30 to 9 a.m. on 4.84 meg. Many fans have logged the morning broadcast near 5 a.m., but so far as we know there are no reports of actual reception on the higher frequency.

VUC2, MADRAS—Announcement heard on 4.92 meg. near 5 a.m. indicates that this station is also on 11.87 meg. from 12:30 to 1 a.m. every Monday, Wednesday, and Friday.

VUD3, DELHI—Probably the most reliable Indian station now being heard in this country. May be picked up with excellent volume on 9.59 meg. from 3:30 a.m. until it begins to fade out shortly after 7 a.m. News in English is broadcast daily at 4:30, and the newscast from London is relayed at 5:30.

Indo-China

"RADIO SAIGON"—Seems to have again altered its schedule. Now heard on 11.78 and 6.13 meg. simultaneously, signing off at 7:50 a.m. with good signal. A woman announcer states in English that "this is a special broadcast for the United States. We do not expect that many listeners in that country will hear this transmission, but we would appreciate reports to be addressed to P. O. Box 412, Saigon." Programs in English are released on 6.13 meg. from 3 to 3:45 a.m. and on 11.78 meg. from 5:30 to 9:45 a.m. Several fans report reception of "Radio Saigon" on 11.78 meg. near 11 p.m., but we believe this is really MTCY of Hsingking, Manchukuo, which has lately been heard with excellent volume on that frequency.

Siam

HSPJ, BANGKOK—A comparatively new broadcaster now operating simultaneously with HSSPJ on 6.13 meg. from 5 to 7 a.m. daily except Monday. Opening and interval signals are three ascending chimes.

HSSPJ, BANGKOK—Seems to have increased its power and is now heard with surprising volume on 9.51 meg. Frequent announcements in English.

HSP, BANGKOK—Phone station working on 17.74 meg. near 4 p.m.

Miscellaneous

Our listeners tell us . . . that XYZ of Rangoon, Burma, is again received with fairly good volume on 6.007 meg. until sign-off at 7 a.m., and is sometimes mistaken for VUD2 of Delhi on 3.995. that ZLJ of Penang, Straits Settlements, has been remaining on the air for as much as 40 minutes past closing time (5:40 a.m.) for phone work on 6.08 meg.

that the heterodyne which many fans have noticed on TGWA before 10 p.m. is caused by the powerful new French transmitter which is working on approximately 9.68 meg. until 10 p.m.

that Moscow's RV96 (15.18 meg.) is now reaching the Pacific Coast from 8:15 to 11 p.m. that VIG of Port Moresby, Papua, is on the air second and fourth Saturdays of each month from midnight to 2 a.m., according to verification. However, actual reception has been reported only on the second Saturday.

a.m., is badly interfering with "Paris Mondial" on 9.88 mc.

NEWFOUNDLAND—Desmond Callan of Readville, Mass., writes that VONG (5.98), St. Johns, signs-off along with broadcast station VONF (6.40 kcs.) at 8:30 p.m. The signal strength is good but modulation poor.

PARAGUAY—ZP8 (most recently reported near 9:04), "Radio Nacional," Coronel Martinez 274, Asuncion, operates nightly from 6 to 9:30 p.m.

PHILIPPINES—KZRH (9.635 and 6.10), "The Voice of the Philippines," Manila, is being heard from 5 to 11:30 a.m.; best near 6 a.m., according to C. H. Hodger of Longbeach, California. Who is the Manila station on 6.14 mc., KZRM or KZEG?

POLAND—The Polish station heard on 11.99 mc., during the early days of the war was HFC, a portable operated by Polskie Radio, whose location was known only to high officials.

PORTUGAL—"Radio Nacional," Lisbon, is believed to be operating as follows: on CSW4 (15.215), 7 to 9 a.m. to India and 12 noon to 1:30 p.m. to Angola; on CSW6 (11.04), 1:35 to 3:45 p.m. to Angola; on CSW7 (9.74), 4 to 4:45 p.m. to South America; on CSW8 (7.26), 5 to 5:45 p.m. to Europe, and on CSW7 (9.74), 6:45 to 9 p.m. to North America.

PUERTO RICO—Broadcast station WKAQ, San Juan, relays sustaining programs of WCAB and WCBX, while WNEL of San Juan, relays the sustaining programs of WNB and WRCA of New York City.

SPAIN—The nightly program to North America, is broadcast over EAQ (9.86), from 7:45 to 8:30 p.m. The program opens with the Spanish National Anthem, and a clock chiming the quarter hour, followed by the news in English, read by a woman announcer.

SWEDEN—The program for North America, broadcast by Motala stations SBT (15.155) and SBP (11.705), Wednesdays and Saturdays from 8 to 9 p.m. is being received with good signal strength. For about five minutes prior to the opening of the program a soft chimes signal, consisting of an eight-note melody played over and over, is transmitted as an aid in tuning in the stations.

SWITZERLAND—The regular broadcasts for North America are now being radiated by HBL (9.34) as follows: Mondays and Wednesdays from 8:45 to 10:15 p.m.

U. S. S. R.—RV96 (15.41), Moscow, is being heard after 6 a.m. almost daily. RV96 (6.03) is being heard from 8 to 9:30 a.m. and RV96 (9.52), is being heard irregularly from 9:30 to 10:15 p.m. The North American transmission from Moscow, is heard best over RNE (12), nightly from 7 to 8:50 p.m. RNE also operates from 9 p.m. to 1:30 a.m.

UNITED STATES—Watch for short-wave broadcasts direct from the front lines. NBC's reporter on the Allies side is General Henry J. Reilly; on the German side is Warren Irwin. . . The American Telephone and Telegraph Company are operating two new 400 watt short-wave telephonic transmitters at Hialeah, Florida. One operates on 10.79 and 14.51, the other on 10.97 mc.

YUGOSLAVIA—The new 10,000 watt transmitter at Belgrade is transmitting nightly to North America from 9:05 p.m. on either 15.24 or 11.74 mc. A horn signal of about 12 notes is repeated several times before the station signs-off with the National Anthem. The same transmitter broadcasts daily from 3:40 to 4:15 p.m. in English, on a frequency of 9.505 mc.

VENEZUELA—Earl Roberts of Indianapolis, Indiana, reports reception of YV3RF (3.49) and YV3RV (3.50) on the tropical band, near 8 p.m.

Television

Perry Ferrel of Linwood, New Jersey, informs me that W2XAB, the new CBS television transmitter in the Chrysler Tower in New York City, went on the air for initial tests on October 9. The first video tests were made on October 12. Sound transmissions are made on a frequency of 55.75 mc. visual transmissions on 52.25 mc. . . W2XBS, the NBC television transmitter in the Empire State Building, New York City, is now telecasting afternoons, Wednesdays through Sundays at 2:30 p.m., and evenings, Wednesdays, through Fridays at 8:30 p.m. and on Saturdays at 9 p.m. . . Very good visual reception of W2XBS was recently had on a television receiver mounted in a plane 21,600 feet above Washington, D. C. The airline distance between the two points is more than 200 miles.

Last Minute Notes

FREQUENCY CHANGES—D.R.—HHS back to 6.43.

GUATEMALA—TGWB to 6.42.

HAITI—HH3W to 9.78.

NEWFOUNDLAND—VONG to 9.475 mc.

GENERAL NOTES—No Colombian or Venezuelan stations will be allowed to make English announcements during the duration of the war.

CUBA—According to John Larsen of Geneva, New York, stations COCA and COBX have not been heard recently.

BRITISH HONDURAS—ZIK2 (10.6) has replaced ZIK3 (5.3).

SOUTH AFRICA—South African amateurs left the air on Sunday, October 29, for the duration of the war.

YUGOSLAVIA—According to Earl Roberts of Indianapolis, Indiana, the official calls for the new 10,000 watt Belgrade, Yugoslavia, station are: YUA/YUB (6.100), YUC/YUD (9.505), YUE (11.735) and YUF/YUG (15.24).

MANUFACTURER'S LITERATURE

James Millen Manufacturing Co., Malden, Mass., have issued their first catalog. Many new ideas are incorporated within the design of many of the parts. Among the transmitting equipment will be found an assortment of variable condensers having several outstanding features, such as compact assembly and the provision for the tank coil to be mounted directly on the condenser assembly. This catalog also contains many other items used in construction of both transmitting and receiving equipment. A new phenolic bearing the name QuartzQ is used in many of the parts to afford excellent insulation quality at low loss. Coil forms using this material are available with special mountings, and the constructor may wind his own coils and use these lo-loss forms for rigid support. A new type flexible shaft is also shown which features a ball-and-socket arrangement for least possible waste motion and to gain a maximum transfer of power to the condenser being driven. (RADIO NEWS No. 1-106.)

Chicago Wheel & Manufacturing Co., Chicago, makers of the popular HANDEES tools have recently published a new catalog describing all of the products of their manufacturer. Many of these are to be found in a radio shop and in industrial plants engaged in this, and allied fields. Many of our readers are engaged in metal or wood-working as a hobby or profession, and many of the items illustrated and described will find application for making work more easy and more efficiently accomplished. A copy is available on request. (RADIO NEWS No. 1-107.)

The General Cement Mfg. Co., Rockford, Illinois, have released their new catalog, No. 140, which contains a complete listing of all products manufactured by this concern. Many different varieties of solvents for use in radio manufacture are listed, together with a large assortment of accessory items. Description is also given on Cements, coil dopes, compounds, crayons, dial-cables, enamels, grille cloth, grommets, knobs, record cleaners and solvents, rotary switches, polishes, repair kits, tools and various other items too numerous to mention. Many of the items are especially designed to aid the radio serviceman in the care and repair of consoles. These will appeal to those servicemen who make a practice of keeping a customer's set in good condition and exercise proper care in handling the property. (RADIO NEWS No. 1-103.)

Shure Brothers, 225 W. Huron St., Chicago, Ill., announce their new catalog, No. 152, which is just off the press. A complete listing and description of

all of the products of their manufacture are given, together with a complete explanation of "Stop Feedback." This tells in everyday terms how this may be accomplished by using the proper microphone. All types are covered and the features of each discussed. Special types for amateur applications are also shown. These make use of a built-in r.f. choke to offset the tendency of the mike to pick up extraneous currents present in close proximity to the unit.

Many phono-pickups and associated units are described, as well as a selection of replacement cartridges for use in servicing present pickups. (RADIO NEWS No. 1-104.)

A new 160-page catalog has been issued by the Burstein-Applebee Co., Kansas City, Mo. This contains hundreds of new items in both the radio and electrical fields. Up-to-the-minute PA equipment is completely described and illustrated. All the latest test equipment is shown, together with a complete assortment of microphones and accessories for use in conjunction with modern installations. Many new model receivers in both communication and broadcast types are described. The book is arranged for ease in locating any particular part with a minimum of time and effort. (RADIO NEWS No. 1-105.)

National Union Radio Corporation released from its Newark headquarters this month a service equipment encyclopedia for use by N.U. distributors throughout the country.

The compilation is 8½ by 11 page size and includes, in addition to listings of National Union tubes, condensers and panel lamps, and information on N.U. gift merchandise, the complete catalogs of leading instrument manufacturers, such as, Jackson, Precision, Supreme, Triplett, Webber, and Weston.

The book is provided with tabbed index sheets for ready reference.

The N.U. service equipment encyclopedia is said to be the only publication of its kind in the field which carries under one cover complete specifications, illustrations and technical data on more than 150 radio service instruments and shop accessories.

National Union state that, while copies cannot be supplied directly to retailers, all distributor salesmen handling the National Union line are provided with one of the books so that dealers may see it. (RADIO NEWS No. 1-108.)

Radio City Products Company has just issued the new 1939-40 edition of its catalog. The book encompasses the complete RCP line of test equipment—tube testers, combination tube and set testers, analyzer units, signal gen-

erator and special instruments. Under each model illustrated the performance specifications and price are listed. Inquiries are invited for special industrial electrical test units and production line testers. In a Foreword to the book appears this statement: "The R.C.P. trade-mark is just as much an assurance of confidence on printed page (advertisement, correspondence or catalog) as it is on every company product."

Copy of new 12-page Catalog, No. 121, can be obtained on request from Radio City Products Company, Inc., 88 Park Place, New York City. (RADIO NEWS No. 1-102.)

The new Majestic Catalog is off the press, incorporating illustrations and descriptions of the forty-one models of Majestic Radios that comprise the Majestic 1940 line.

The latest Majestic models which have made their bows to the radio trade and public appear for the first time in the pages of this new catalog. Push-Button controlled portable; 2-Wave Band Aeroplane Dial Table Model, the new type Majestic Rotoscope Antenna on the new Majestic Console, and many other Majestic "firsts" are illustrated.

The color scheme of the catalog is blue and gold. The front cover illustrates a swooping Monarch of the Air over a world of cities. The first inside pages introduce the Majestic personnel and following is the impressive array of Majestic receivers. Orange background brings out the darker tones of cabinets in artistic manner.

The back pages of the catalog show the different dealer helps. Newcomers in this series are complete newspaper mats and advertising helps, a Neon sign and a new console display. (RADIO NEWS No. 1-101.)

Just off the press is an eight-page booklet, completely illustrated in color, describing the unique process of molten-welding copper to steel in the manufacture of Copperweld. The booklet describes the rolling, drawing, and stranding of Copperweld wire and strand, and also describes the manufacture of Copperweld ground rods. Write to the Advertising Department of Copperweld Steel Company, Glassport, Pa., for a free copy. (RADIO NEWS No. 1-100.)

Hipower Crystal Co., Chicago, are featuring their new Hipower "Emeralds" and at reasonable price. The manufacturers claim exclusive grinding methods and large production has made possible a better crystal at lower prices for the amateur operator. The revised regulations covering amateur transmitter stability have made the selection of accurate crystals more important than ever before. Catalog "E"

is available from the Hipower Crystal Co., 2035 Charleston St., Chicago, on request or from this publication (RADIO NEWS No. 1-109.)

INTRODUCING a new service to RADIO NEWS readers. Each month we will print short reviews of the leading manufacturers' literature. Under each review will appear a reference number (for instance, the Hipower Catalog number this month is, RADIO NEWS No. 1-110). All you have to do is to fill out the coupon at the end of the page indicating by number the catalogs you wish to receive, and we will do the rest. There is no charge, unless the review says that there is, and then that is charged by the manufacturer, not us. Each coupon is good for the time limit stated thereon, and no guarantee is made by us that the manu-
(Continued at top of next column)

U. S. Army Radioman

(Continued from page 9)

there is a strange gulf between them. At first he cannot account for it, but gradually it dawns on him that he has been acquiring a technical education, he has traveled over much of the world; he has boxed, wrestled, ridden horseback, swam in the beach at Waikaki, and done a hundred other things that are beyond the imagination of even the most successful of his pals.

In town, the difference is even more marked, for Joe walks erect, with military bearing. There is a gulf between him and his former friends. By the time the two months are up, Joe is glad to get back to the Army.

During his second enlistment, Joe is promoted to the rank of Corporal, and receives \$42 a month, all clear, the first year; the following two years he gets \$2.10 more each month as an extended service "fogey" or bonus. His extra pay for marksmanship continues, and on passing an examination he is sent to the Army Signal School at Ft. Monmouth, New Jersey. Here he is taught all of the subjects he received at his first Post schools, but in addition to these subjects he is trained in advanced methods for operating and repairing the latest and finest of radio equipment, both civilian and military.

Joe is by no means "tied down" in the Army. Every three years his contract of enlistment expires, and in the mean time he can always request a "discharge by purchase." The amount he must pay to receive this "purchase discharge" depends on whether he is on duty in the United States or in a foreign country, and on the length of his service, but in any case the amount is not great, the *maximum* being \$120 for soldiers who are in America, and have served *only one year*.

If Joe stays with the colors for 30 years, he can retire at the age of 48 at a rate of pay based on three-fourths of his active duty pay, plus \$15.75 per month added for quarters allowance.

manufacturer will send out catalogs to all who ask for them, though they usually

have done so in the past. We merely forward your request to them.

**RADIO NEWS, Catalog Dept.
608 South Dearborn Street, Chicago, Illinois.**

Gentlemen:

I have checked the literature I should like to have the manufacturers send me. If I have checked an article for which I must pay, I enclose the money.

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Name.....
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Call letters, if any..... This offer expires February 8, 1940.



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THERE'S a good reason for the High signal-to-noise ratio in the "HQ-120-X." The first tuned circuit of any receiver controls the signal-to-noise ratio. When an antenna is coupled to this very important circuit, there is usually a detuning effect. This detuning effect lowers the signal-to-noise ratio. The antenna compensator on the "HQ-120-X" provides a control for restoring resonance, regardless of the effects of the antenna system. In high gain, highly selective circuits this control becomes a necessity if peak performance is to be had. Try an "HQ-120-X" and note its superior signal-to-noise ratio.

An improved highly efficient noise limiter; accurately calibrated main

dial; band spread dial calibrated for 80, 40, 20 and 10 meter amateur bands; sensitive "S-Meter" and variable selectivity crystal filter are a few of the other features which have made the "HQ-120-X" one of amateur radio's most popular receivers.

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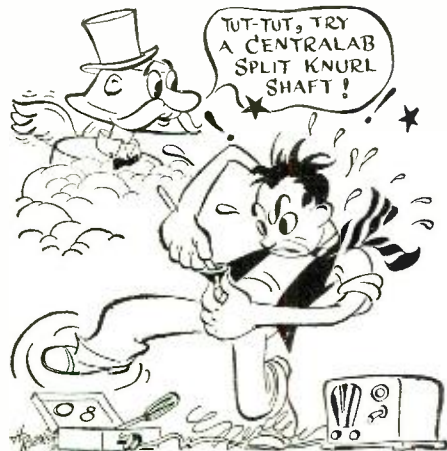
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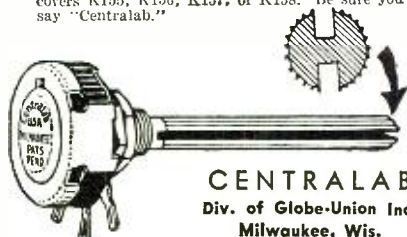


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Sh! It's a dark dank secret . . . known only to several thousand service men . . . it takes a special shaft to fit the knobs on many of the new (1938-39-40) sets.

So, instead of tearing your heart out thinking up new cuss words, get in touch with your nearest Centralab jobber for a Universal Split-Knurl control with the shaft that cuts as easily as butter.

Shaft is brass—3/16" long from mounting surface. For switch type add Midret Radiom switch covers K155, K156, K157, or K158. Be sure you say "Centralab."



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Choose the sound you want to amplify! Imitation satin-chrome finish; trouble free operation. 13-15 DB differential between front and rear pick-up eliminates audience and background noises. Moisture-proof crystal; blast and mechanical shock proof; Level—58 D.B. with 25 Ft. cable set. Range: 30-10,000 cycles. 90° Tilting head. Free wiring diagrams.



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A sensational! Combines more important test functions than ever offered before for only . . .
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The smallest retired pay he could receive, even if he were only a private, is \$35.43 per month; the largest is \$133.87, in the case of a Master Sergeant. If Joe continues to advance at his present rate he is certain to reach the grade of Technical Sergeant before he retires, and this will pay him nearly \$100 per month for the rest of his life. If we figure interest at 3%, this means the same thing as having \$40,000 in the bank. What civilian radio jobs can guarantee that a man can retire at the age of 48 with that income?

Sounds almost too good to be true, doesn't it? That isn't all, either. Joe, or any other soldier who has had more than 20 years of good conduct service, can live, free of cost, at the United States Soldiers' Home, in Washington, D. C., where the veterans have all the recreational and entertainment features of a rich man's club, and in addition have their own Soldiers' Home Band to play stirring marches reminiscent of their active service days under the flag.

Joe is only 48 years old when he retires—much younger for his years because of his active, outdoor life and exercise than most men who spend their lives in the drudgery of inside work. He has his \$100 a month, and with that as a back-log, he can start a new career in civilian life in any number of radio specialties that he learned while he earned,—following the flag in the Signal Corps of the United States Army!

-50-

Hamchatter

(Continued from page 37)

working a YV, on 20, a K6 or K7 would call him. He says it's not ham radio, more like commercial stuff.

Herbie, GEJ, says that the auto arm is so bad on ten, that if he ever gets back on five, he'll never again mention those squishing receivers. GOU worked a W6 on ten who said he was in a submarine, 90 feet under water. Ernie is waiting for his card. Incidentally the boy on the sub is using a three element beam and 720 watts. *(Hnnnnnnn! Ed.)*

The five meter band is practically deserted, but 2 1/2 meters is pretty active. Almost as many on as there were on 5, a year ago.

DRL has a new recording outfit and is going to make records of the gang.

CAV is back on ten after a long absence. Using 420 watts.

ISC is rebuilding and is going to increase pwr to a KW.

LYH has built a new beam which really beams.

Almost every station around Boston has or is planning on having a beam.

WV has his new 10-20 Mims up and it is working f.b.

FBX purchased a UHX-10 for use on the boat on which he is radio operator (probably be on ten).

6NWQ is back in town agn. He is attending Harvard Business School.

CIB put up a GOU "special variety Y match antenna" and thinks it's pretty punk. Most of the boys who use it think it's the nuts, though. He'll have a 3 element beam soon.

PH is on 20 with a Mims and is really going to town. He can even work DX on ten with his harmonic.

LEV who has a Collins 500 watt job is working for his special 1 KW. outfit from the same firm.

KZD after trying out 20 fone for one week is back on ten.

"RELIABLE" Ed (Michigan City) Lewis posts us:

Announcing a newcomer in our midst—Theodore "Ted" Emmons, W9AEO. Ted has a very schmozy lookin' rig running 200 watts to a pair of T40's. Fortunately he has a lot of room in the back yard for a 1/2 wave sky wire, a 250 ft. doublet fed by a twisted pair. Guess all the local boys helped Ted iron out the bugs before he went on the air. Even the Army Net gave an opinion on harmonics. Ted's YXL sez she's not converted yet but we're givin' odds that she will

soon be an enthusiast. We all have our fingers crossed fer ol' man BCL Trouble. Understand Ted received a mysterious phone call threatening dire consequences. Tch, tch, to what ends these practical jokers will go. It's all in fun, Ted!

W9VML has acquired his class A ticket and a new crystal mike but still maintains that he prefers CW. Ken's old sky wire usa light up the neighbors' garage light so he put up a new one which not only lights up the garage but also the front porch. For evensake, Ken, don't put one up that lights the bedroom!

W9OZZ has been assisting W9LNI and W9NKB in their plating shop. It's nice that the hams help each other thataway. Joe sez he has been makin' so many changes in the ol' rig that he don't know where he's gonna put all the parts.

That sure was a nasty crack that Steve Early, the President's secretary, made about the hams deciphering government code messages and divulging their contents. Hope he gets a flood of protests!

Fred R. Allen, W9ETE of Gosport, Ind., is the new 2nd trick op. for the Monon Rr. at Michigan City. Fred is strictly a CW man. Doesn't get enuf key work on the job, apparently. He called on 9OZZ and wanted to see the boy that was a ham. Fred, don't you remember, he calls himself "Old Black Joe?"

W2IOP burns in with: The neighbor of an amateur, with some personal grievance, has instigated a law suit against the ham. Samuel Elner, W2TC, erected a fourteen foot tower on his one story house to support a twenty meter rotary beam. When it appeared one of his eighteen neighbors objected to the structure W2TC applied for a building permit to avoid any legal complications. The original application was denied by the Building Commissioner. The appeal was immediately filed; and Mr. Elner hired an attorney, Robert Birkhann of Lawrence, Long Island, to represent him. Birkhann argued that W2TC should be permitted his beam because it was a usual accessory necessary for the operation of his amateur transmitter. Further report on the case will appear here. Meanwhile W2TC has an injunction for the time being, and the beam is still up. Hi.

DX isn't what it used to be, but it could be lot worse. Twenty meters, as usual, is supplying most of the meat. Morning DX is by far the best. Japanese stations are coming through fairly well, among them J2OV, J3DG, and J8PG.

Recently KA1HR has broken through at 7PM Eastern Standard Time. Among those to work him were W2IOP, W3QP, and W9VDQ.

In the morning KA's are the most consistent DX with KA1ME; KA1HR; KA1FG; KA1AF; KA1JK; KA7F; KA1FF; WA1LZ; and KA1LB all coming in quite well.

Asians are well represented, although XU8MI; XU6K; XU6DX; J2OV; J3DG; and J8PG seem to be the best of the lot.

Some of the other things to be worked are: U1AD: UK3DQ; XE1PL; XE1D; XX1M; K4FCV; CX1CX; CX1B; XSV1SM; PJ7B; CE3DG; PY2CO; USAH; EA3A; XE1CM; OA5L; OA1I; PY3BF; I1MH; I1KN; CX2AJ; EA7AV; PY2HT; XE3B; XE1AM; LU2CW; LU4DQ; K7BAQ; TG9BA; CE3BF; CE3AJ; KAIHS; TI8AB; ES6G; VP7NA.

XSV1SM is operating in the South Pacific, at the present time.

CX2AJ lost about 500 QSL cards sent to him. Exactly how, we don't know, but the second district QSL manager is certainly showing the real amateur spirit in getting some of them back. Hank printed up forms which requested a duplicate card and sent them to most of the second district stations he's worked (Are there any that CX2AJ hasn't?). The results so far are only fair, but it is a mighty fine gesture on the part of W2SN.

While on the subject of QSL's; all of us could afford to at least co-operate with the QSL managers who are doing such a fine piece of work. Many hams don't even claim their cards which pile up at the bureau. A recent visit to a QSL bureau showed cards for one prominent DX man from M3XB, F1SAC, TF5C, several PK's, and the like (hold on boys, they're not for sale).

W2SN just sent out tracers to a list of over 125 W2's whose call begins with A—who have unclaimed cards. Just multiply 125 by the letters in the alphabet and you see what they are up against!

W8AU is still working DX, when he isn't too busy with other things.

W3DUK spots us EK1AA and XU8MI.

EK1AA is on 14100 KC. QSL to EK1AA, c/o *Italian Legation*, Tangier International Zone, North Africa.

W2IOP just rebuilt his putter-outer and reports it working very well. Larry has been scheduling KA1HR in the morning and evening.

By the time you read this the SS contest will just be a nightmare. It is doubtful if there will be any new records set with seven Canadian sections inactive. The VE's were always well represented in this classic contest so, no doubt, they'll be missed. The week before the big contest was a remarkable one in so far as activity was concerned. New signals appeared on all bands. Contest lovers came out of hibernation; the gang started hunting tough sections (the ones you didn't QSO); QRM just blanketed the bands; and last but not least, conditions got good!

The reports previously circulated that W3BES would be out is evidently unfounded, if the ORS Party is an indicator.

There is a movement afoot to cut the time of the ORS parties from 20 hours to 15 hours. It sounds logical enough. There are not nearly as

many ORS stations active in a party as amateurs in the SS, yet the contest is one half as long. The move to limit the time to 15 hours would eliminate the endurance element and make it a pure test of operating skill.

W2HMJ and W8OFN are canvassing the ORS stations, and if sufficient interest is shown, the change will be formally proposed to the ARRL. East Coast ORS stations are asked to drop a card to W2HMJ; others to W8OFN. W3DUK and W8AU were heard conjuring up a KA for the SS.

W9UTB, always a threat in Illini, is only going to work 7 MC.

W9VES has been using W9VEZ's bug; he'll probably keep it until the SS is over, hi. The super W2 club did not materialize. The New York gang was just too busy to organize.

Odds are that the *Frankford Club* of Philadelphia repeats its SS triumph.

There should be a handicap to fellows with a QTH like Togranoxie; Shanateless; Chateaugay; Damariscotta; Ishpeming; or Szentgotthard. A handy trick the SS'ers use is to ignore the local town name and send the most convenient one nearby. For example—Upper Darby, a suburb of Philadelphia, becomes plain Phila during the contest. Strictly speaking it is legal and within the rules, since technically Upper Darby is a part of Philadelphia proper.

Poorest represented large town in the SS is New York City. State-expected - to - be - rare - which - never-is-department: North Dakota. W9ZOP and W9ZOU can usually be counted on. W9EIG/9 is also there.

Two and a half meters has produced no amazing occurrences on Long Island. W2LJJ of East Rockaway reports W2BZB from Palisades, N. J., a consistent R7/8 and W2JND at Syosset, the North Shore, a good RS/9.

W2JND has worked several W1's, but being only across water, it represents only fair DX.

W2JND and W2BZB have worked each other, a distance of 30 miles.

BZB has a 5 element beam; JND a 3 element beam.

W2MLO is using a fixed beam 70 ft. high.

W2KTW is still being heard on the Island.

W2LJJ is using an RK34, as is W2LFL.

W2JZX is still quite inactive. There's a big blank in East Rockaway where W2AZ's three 85 ft. masts used to stand. W9KJM, whose last name is Ham, has a fine portable mobile rig in his automobile. On the East Coast, where he is operating, Charlie has received R9 from all districts and Hawaii.

W9KJM uses a second hand airplane generator for power. The receiver is an automobile sner with a converter; the transmitter runs around 50 watts input.

Brooklyn Technical High School's Radio Club has probably got the largest amateur staff of any high school radio club in the country. Hams in the club include: W2KZP; W2LRC; W2LDY; W2LJU; W2LOE; W2LOK; W2LMP; W2LVC; W2LVE; W2LZU; W2MQP; W2MLN; W2MNM; W2MIV; W2KNE; and two teachers, W2GWK and W2MET. The school, besides housing W2CXN, is headquarters for WYNE as well as the emergency station of WNYC. The radio club transmitter ends up in a pair of T55's. Receiver is an RME.

W2LOE is President of the club which holds television meetings Monday; code classes Tuesday; advanced theory classes Wednesday; amateur meetings Thursday; and elementary theory on Friday.

Brooklyn Tech boasts of several hundred amateur alumni.

W2KZP is trying cathode modulation on ten. To date he has had not QSO's because he doesn't trust the quality. Incidentally he is using a plate transformer for audio work.

The *Nassau Communications Association* continues operation with W2FHR as the helm.

W2HO and W2TC are first and second vice-President respectively.

W3EVA, the man with the tape transmitter, told us that he built the entire thing from the scrap heap. Bob has a piece of equipment that cost almost four hundred dollars without the

tape puncher. The entire outfit is worth nearly seven hundred dollars and represents ham ingenuity at its best.

We should have gotten out an extra for this one. OY2C has been reported on 7 MC. in the early morning. On November fifth around 6 P.M. a tone modulated signal broke up the low frequency end of 40 meters. For some time it sounded like a pipe organ, then two voices, on different frequencies, but comparatively close, started working break-in talking a foreign tongue. Many stations noted it, and reports concerning the incident would be appreciated.

W2OT, the "old timer" from Oceanside, is working on a new rotary beam. Kirk just treated himself to a HQ120 and now spends all his time thinking about the stuff he missed when the

band was good. W2OT worked his first ZS on phone just before they left the air.

W2IRJ is going in for some rebuilding.

W2MET with a nice shiny new HQ120 and has started work on a transmitter that will match.

W2IYI, off the air for two years, threatens to come on again. The 40 meter crowd that we spoke of in the last issue must have been embarrassed by the publicity because they don't seem to be together much. Did the QSO's get too involved?

SA4AB, heard on 14 MC. in the morning claims to be "somewhere in Europe."

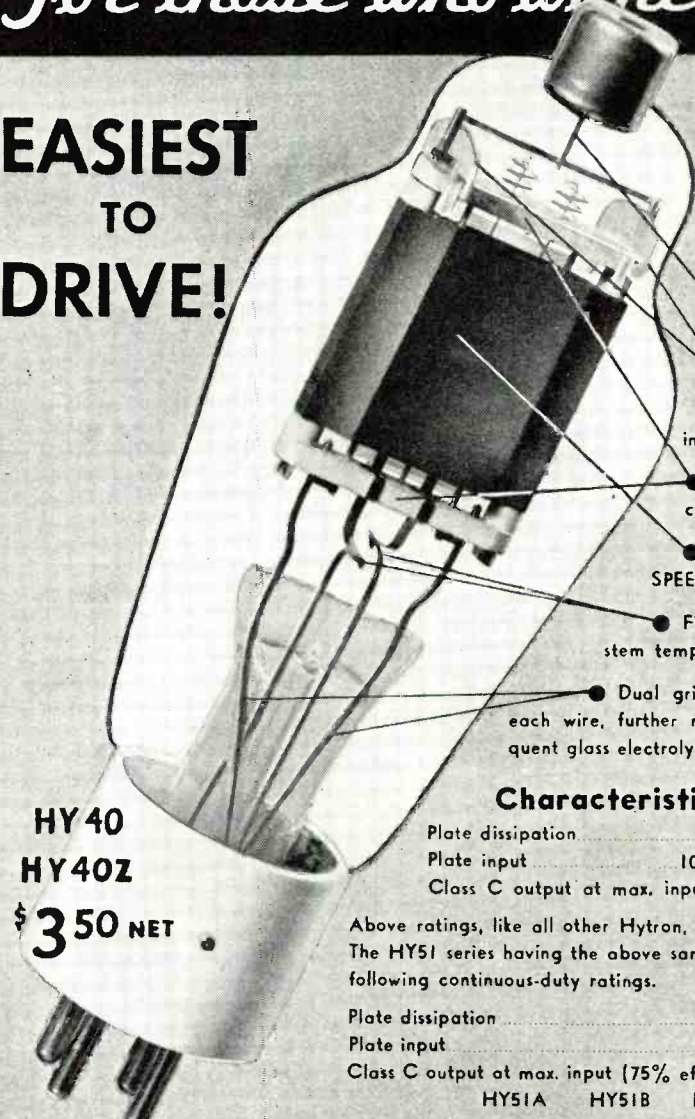
LX1SS may be all right, but for the time being we won't classify him as DX.

(Please turn the page)

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- Short, direct connections to both sides of plate.
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Characteristics of HY40 & HY40Z

Plate dissipation	40 max. watts
Plate input	1000 max. watts and 115 max. ma.
Class C output at max. input (75% eff.)	86 watts

Above ratings, like all other Hytron, are for continuous-duty operation. The HY5I series having the above same outstanding features carries the following continuous-duty ratings.

Plate dissipation	65 max. watts
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Class C output at max. input (75% eff.)	131 watts

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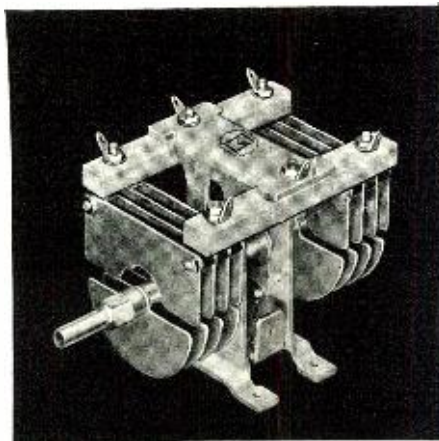
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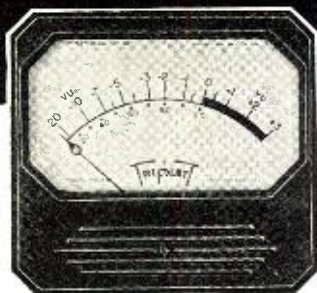
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TRIPLET ELECTRICAL INSTRUMENT CO.
Bluffton, Ohio

(Hamchatter continued from page 45)

EXCERPTS FROM THE VARIOUS HAM PUBLICATIONS:

HAMGAB (Chicago, Ill.): The two "D" stations on the air are really German government agency stations. They ask all they work about the war, pump for information on public reactions, feelings, etc. In other words, they are asking us to violate our neutrality code. We must watch and have nil to do with any such. We must not give information to a belligerent—and had best keep entirely clear of 'em.

W9ZFH calling QRR. He won a voltage divider at the picnic, baywired it into the rig, it falls off the chair and breaks his four S66's. Reason for the QRR. What shall he tell the XYL when she finds the pay envelope \$6.18 short?

It is rumored that several of the Field Day groups are reorganizing and are really going to show up that W9VXS gang next year.

W9HWN admits "fooling around" trying to get on 10 meters.

Rolly Long, W9NLP, is the last call added to the membership list.

Did you notice **Karl Miles** and his new (to us) bride out on October 20? **Karl** paid his dues, too.

W9ULY and **Marion Renner** center-aisled it. They are living in Whiting, Ind., and working 10 meters. Cupid has sure been busy in the club of late. Better hurry, **Millie**.

W9WFG had the misfortune to have his new General Rotary Beam fall when he was raising it. Tuff!!!!

W9KQ, W9ZGN, W9BEZ went on a wee fishing trip up around **Hastings, Michigan**. Upon his return, **W9KQ** sent 'em a HT6 xmtr., and had regular skeds wid 'em, hoping that they would broadcast the eye witness report of the catching of a whopper. They are home now telling how good the bacon and eggs were. Congrats to **Ray Franke, RADIO NEWS** Technical Lab. Chief, **W9JU**, on being a swell little filler-inner. With but a couple of hours notice, he took over the program when the skeded program was cancelled, and did a swell job of it.

Has anyone ever seen **W9MTW** skin up a pole with a pair of climbers?

W9JZY is new Asst. Radio Aide, and has charge of all CW nets in the Sixth Corps AARS Area, which includes Wisconsin, Michigan, and Illinois.

W9ZCH is new state net control station. **W9QLB** has replaced **W9MRQ** as net control of net ILL. He really must know how to pound brass. Over 1,000 QSP's in 30 days. Last meeting finds our ex-secy., **Rus Eby** and his wife of **Syracuse, New York**, renewing old acquaintances. The new piece of man-made static at the Eby's is a bouncing boy.

Do you know which of our crack CW men eluded the traffic cops, and broke all speed laws to get home to keep a sked with the **Kansas YL**, and after calling her several times, it finally dawned upon him that daylight savings time is a thing of the past?

W9EDS and **W9YZV** have been appointed to assist **W9TLB** with the Membership Committee. Ops that have just signed up include **W9QIM** and **W9EAY**.

The **Coast Guard** is looking for 4300 radio operators for regular duty. If interested, apply to the local Coast Guard.

S.R.C. Ham News (Spokane, Wash.): "It being Sunday, and a very hot day at the same time, I decided to take the family out for a picnic a few miles out on the **Milk River**. We drove for quite a few miles and due to the heat and unusual number of grasshoppers, the trees seemed to have lost their foliage and we couldn't find any shade for our picnic. One of the kids noticed a nice grove of trees on the other side of the river from us.

Rather than go many miles back to cross the river on the bridge at **Havre**, we set to work and built a small bridge out of cottonwood trees that grew on our side of the river. We were soon able to cross it and had a swell picnic in the protection of the shaded groves on the other side. It began to get late and we packed up and headed for our homemade bridge, intending to cross the river and drive home on the road. I'll be darned if we didn't find that the hungry grasshoppers had eaten up the bridge, right down to the last stick. We had one deuce of a time in fording the river to get home. It just goes to show you that almost anything is possible in these times.

—**Bill C. Roper, W7DPK, Havre, Mont.**
[Can anyone beat this? Ed.]

M.V.A.R.C. News (Lawrence, Mass.): We have rec'd a letter from **W1KTO** of **South Newbury, Vt.**, that someone has been using his call illegally, so be on the watch.

With the new Jr., the new **Qra**, it's no wonder that we don't hear **Leo, W1DXR**, on the air now. I suppose all his junk is stored away in the cellar, or maybe he has had to hock it.

Ted, W1HZZ, is so busy, that even Sundays is no more holidays for him, asks his Xyl, she knows.

Henry, W1GGO, has completed his loop portable QRM shooter, so watch out you bootleggers, he also has his modulation and c. w. monitor, combined, and it sure works beautiful. **Fb Henry** ob.

Bud, W1BMO, our newly appointed President, called **Paul, W1HXE** on 40 meters, till he was blue in the face, **Paul** sez, he can't hear **Bud**. We all would like to hear why.

We see by a recent issue of *Radio*, that **Jerry, W1LSN**, has gone out and worked himself sum **Fb DX** on 5 meters. Congratulations **Jerry**. While the rest of the gang on 5 are smouldering, you are out shouldering.

We understand that **New York** is behind Greenwich time because America was not discovered until a little later. [Hmumm! Ed.]

Johnny, W1BLO, has completely revamped his shack and we understand he did a **Fb** job.

We understand that **Joe Bernick** will be taking that long expected trip to pay old man **RI** a visit, very shortly, we got our fingers crossed.

W1GQM-W1JTP-W1JXO have allowed their tickets to expire.

Russ, W1JDU, is now taking up music, and as we understand is quite a swing master, who know but wat we have a second **Bene Bernie** in our midst.

W1AHE-Elmer, finally on 10 meter fone wid **Fb sig**, while **W1LEA-Ray**, on 10 c. w., wid a wallop.

W1IWR-Fred, now has a new directional antenna stuck on the horizon and they say it's the berries.

Radio News Magazine, is looking for our magazine, so you fellows want to get in plenty of stuff and such for your paper, let's give these big magazines an eye-ful. Dig in fellows. [Well??? Ed.]

Army Amateur Radio Bulletin (New York, N. Y.): Your State Radio Aide had the pleasure of working into the **N. J. State Net** direct from the 1st Army Field Maneuvers near **Plattsburg Area W3ZL/1** was operated from **Group Aviation, 1st Army** located at **Fort Ethan Allen, Vermont** just across the **Lake** from **Plattsburgh Barracks**. Skeds were kept with **W3FSI, W3BZX** and **W3HVO (W3ZT's YX)** as many times as possible. Due to the fact we were using the regular **Army Air Corps** ground station, which stood 2-1/2 hour watches on many frequencies, it was impractical to work many other stations except those in the maneuver.

Congratulations to **Pat Jessup, W2GVZ WLNI** who was just recently appointed **Section Communications Mgr.** for **Northern N. J. Section, ARRL**. Give **Pat** your honest support in **Section matters**, he is a good man and well deserves it. **Pat** also reports that he will be able to give more time to **AARS matters** this season due to a curtailment of **DX stations** on the air, at the present time. He will take over **Alternate NCS** for **Saturday night** hereafter. **W3F SI** will be alternate **NCS** for **Thursday** and **W3ZI** on **Tuesday**. There still are two nights which have not been assigned as yet. It will probably be up to **W3VE** and **W3EFM**, as each **State Alternate** is expected to take at least one other night per week besides regular drill on **Mondays**.

[Aside to **W2GVZ: Didn't I know you at 8XM in '24?** Ed.]

Amateur radio operators—proudly rejoicing in the nickname "hams"—from the **United States, Panama, and the Philippines** recently sent short-wave air greetings to **Amateur Radio Station K6PLX**, owned and maintained by **Headquarters Battery, 2nd Battalion, 13th Field Artillery, Schofield Barracks, Hawaii**. The greetings were sent complimenting **Staff Sergeant John Hopkins**, under whose name the station is licensed, upon the occasion of the **13th Field Artillery's** recent **Organization Day**. Most of the messages came from other **Field Artillery "DX-ers"** also operating amateur radio stations as a hobby. **AARS K6PLX** operates on the 40-meter band, at 350 watts and is a unit of the **U.S.-Hawaii-Philippines Net**.

The 75 meter phone net is having its ups and downs, mostly downs. With three members having resigned, including the **NCS**, that leaves only two regular members, **W2CHK** and **W2IRC**, plus **W2JVP**, who is a new **Acting member** and as yet unheard from. The vacancy of **NCS** must be filled and the finger can be pointed at **W2CHK** who should fill this position due to seniority in **AARS affairs**. **W2CHK** might appear as a new member but let it be said that **Gil** has been a member of the **AARS** since **Hector** was a pup. Reminiscing, we fondle the memory of the days when **Gil** was **NCS2** of the **SNY State Net** to yours truly and operating under the call of **W1NLM!** Which brings to mind the predictions of **Pop Jones**.

The 5 meter net still consists of **W2HF**, sole and loyal member. **Herb** is now a **Captain** of the **N.Y.N.G.** and still trying to find some five meter boys to join him in forming a network on that band. With the improved conditions down there these days it should prove more interesting to operators in no fashion than in the days of self-excited splatter rigs. Try to help **W2HF** in his difficult task.

The 40 meter net is going full blast under the able direction of **W2HMJ** with **W2AXZ**, the old standby, acting as **NCS2**. The season has only started and they already have a few new members, which looks pretty promising.

AND that about winds up the longest Hamchatter we have edited to date. May we take this opportunity to thank each and every contributor who has gone out of his or her way to see that this column has gone over. We are proud to report that we now have the largest Ham chatter column in the country. Let's keep it that way. You may be sure that you will always find the news of hams here. Yrs wid '33, Ye Ed.

—50—

Hamchatter is paid for at our usual rates.

Why not send in yours?

Cross-Hauler

(Continued from page 32)

er, and 6N7 modulator—capable of 100% modulation of the final with plenty of reserve power when used with crystal mikes of medium output; and it may be considerably simplified through the exclusion of the second or triode 6J7 providing a mike similar to that we ourselves have employed is used.

For that matter, low *Mu* triodes may replace both J's when the mike is a high-output carbon job—the triodes being separate tubes or simply cascaded sections of a 6N7, 6A6, 6C8G, or 6F8G (a popular layout employs two 6N7s, one with sections in cascade for both pre-amplification and last stage driving, one as modulator). Really, there is considerable range of choice for the individual builder who for any reason cannot or does not desire to follow lab. model design in its entirety; but it is anyway suggested that the modulating tube itself remain the recommended 6N7.

The r.f. amplifier draws 50 mils or so in normal operation, the oscillating 6C5 around 4 mils, the 6C5 driver 8 ma., pre-amplifier tubes less than 10 mils collectively. The resting *I_p* for the 6N7 modulator is 17 ma., so that the total remains less than 90 ma. with zero modulation. As the 6N7 is driven to only slightly more than half its maximum possible output of 10 watts, drain under modulation infrequently goes up beyond Vibrapack capacity (100 ma.) for the whole transmitter, and then only on peaks which the 30% overload rating for the pack safely permits.

Construction

Construction won't be difficult. The photos show the positioning of major parts, and wiring procedure is conventional. Be that as it may, however, a few pointers may be helpful to the man contemplating a more or less precise duplication of our original design.

1. Fit the chassis snugly into the cabinet and secure it in place in such position that horizontal tubes particularly the 6J7 mike amplifier will clear the front panel. At the same time see to it that the space between chassis and back panel becomes as great as possible—if only to assure minimum contingency of chassis and panel to the amplifier plate coil and antenna loading inductance. Then position the two coils along a center line between chassis and cabinet.

2. The tank coil socket is elevated from the chassis side drop sufficiently far for prong clearance and is placed high enough within the cabinet to permit easy removal of the 6V6G, whose socket is supported from the front panel by means of angles. The antenna series or loading coil mounts rigidly at the other side and may be a plug-in inductance or simply a fixed coil of about 2" diameter having 60 turns, tapped for six points switching.

3. The tank condenser, which mounts over and on the modulation transformer, and should make good contact with the transformer shield, which in turn should be well grounded to chassis. Though the antenna series condenser, which is in similar position, may be grounded in this same manner—better practice is to insulate the frame completely from the transmitter chassis and connect it by means of a separate lead to the terminal for external ground connection.

4. The receptacle for the power supply cable is installed on the rear panel, lower center. The meter jack in the final's cathode circuit goes like—
(Please turn the page)

HOW TO LEARN CODE

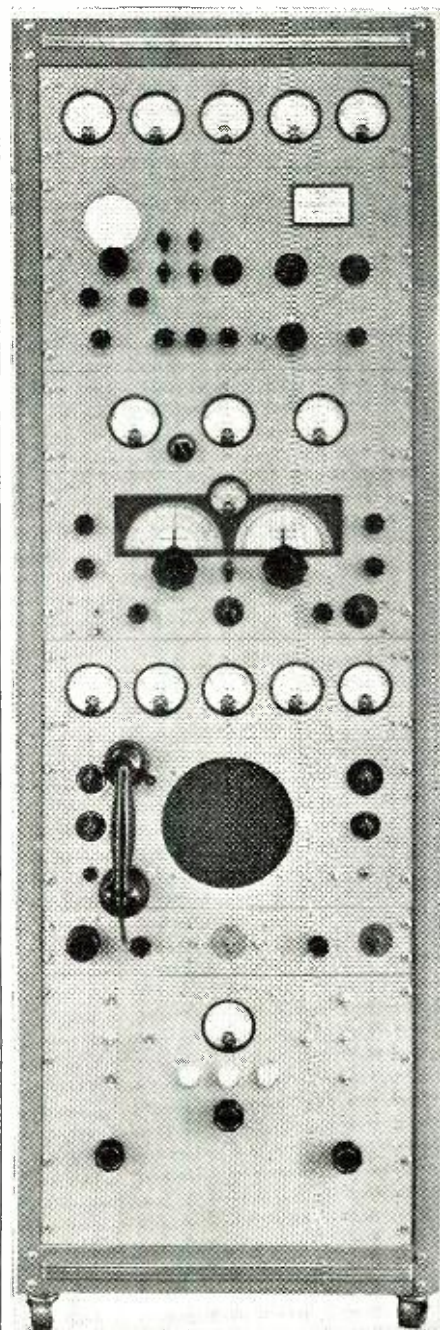
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- RADIO NEWS 56MC PRESELECTOR
- RADIO NEWS CONTROL CONSOLE
- RADIO NEWS D. F. LOOP
- RADIO NEWS FIVE-BAND PORTABLE TRANSMITTER-RECEIVER

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TYPE	MAX. SEC. D.C.	AUDIO TUBES	AMATEUR NET PRICE
T-471	200 M.A.	Single 6F6	\$2.40
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wise on this panel, about half way up toward the top.

5. Ground the gain control shell carefully. Shield the lead (through chassis) from this control to the grid of the second 6J7 (or to the driver if the second "J" is eliminated). Few other shielding precautions will be necessary if connections are made short and direct, by-pass and resistor units are grouped near associated stage sockets, and the general layout as indicated is followed.

6. Build up the a.c. supply (it's conventional enough) and, with the transmitter wiring OK and all tubes in place, cable it up to the main cabinet, turn it on, and adjust R14 for approximately 250 volts output. Check the a.f. system for hum and feedback at all gain levels. Test the Pierce circuit to make sure that it oscillates, and the r.f. amplifier for proper stability whether excited or no.

7. Build up the Vibrapack supply, following the printed installation instructions carefully. Remember that the Vibrapack itself, though a complete factory-made unit, is *not* filtered for a.f. The usual input and output filter capacitors will be required, along with a choke whose resistance should *not* exceed 200 ohms. Remember, too, that leads from the pack to the energizing battery must be as heavy and as short as you can get them—in any event of such cross-sectional area as to prevent any possible voltage drop.

Check the pack for filter wiring, substitute it for the a.c. job, then adjust the switching (on the Vibrapack unit) until the measured output (filtered B plus to ground) is the required 250 volts.

8. Check for vibrator "hash," which is due to r.f. effects and *not* to insufficient a.f. filtering. Generally the condensers C15 and C16 at the transmitter will prevent noisy operation—but experiment a little with their values and with r.f. choking here and there if trouble arises. Distinguish, by the way, between noise of this type and that introduced by inadequate values of CH1, C18, C17.

This transmitter is designed for use with a single-wire Marconi antenna of any suitable length from 20 to 130 feet, worked against a good water-pipe or emergency ground. When the antenna is of the longest length mentioned (quarter wave grounded, series tuned) no loading coil (L3) will be required; otherwise it must be loaded up to proper effective length through proper coil tapping. As the antenna coil is installed within the transmitter cabinet, and the series tuning condenser with it, and as the six-place tapping switch is right on the front panel, it is simple enough business to tune any old antenna to resonance. No external apparatus of any type whatsoever will be required.

Before using the transmitter, however, the set-up should first be adjusted properly. Most hams know well enough how such adjustment is

effected. They know that it can be done more quickly than a word description of the operation can be read. But for the beginner who may not know how really simple the business becomes we'll close with a few pointers on proper procedure.

Usually, with a Class C amplifier, it is customary to bias the tube beyond cutoff so that with given and maximum possible grid excitation or oscillator output the d.c. grid current runs around 25% of normal, grid measurement made with plate voltage off. In this simple set-up, however, with 250 volts fixed screen-plate supply applied to a 6V6G, and with no bias resistor required, our only variable is the excitation itself, which is adjusted through the simple expedient of varying the oscillator output.

A grid current reading for the final will really not be necessary, and our first move would be simply to vary the resistance of R3 until the r.f. excitation is as high as possible up to the overload limit, remembering at the same time that the oscillator stage will provide ample output to drive the amplifier hard enough for Class C operation well before any such overload limit is reached.

Now couple the antenna, which may be from 20 to 130 feet long, loosely to the plate coil by means of the link. This may have from 5 to 10 turns, which should be of rigid, untinned, spaghetti-insulated copper wire. Positioned at the cold or B Plus end of L1. Connect the link to C6 and L3, apply plate-screen voltage to the 6V6G, note the cathode reading (which will be 50 ma. approximately), then tune C5 for plate circuit resonance as indicated by maximum dip in this reading. Add the external ground.

The antenna circuit should now be tuned to resonance through adjustment of the loading coil switch SW1 and variation of C6 to resonance as indicated by maximum brilliancy of a low-voltage flashlight lamp and link coupled to L3 or to a few turns made in the external ground lead.

The next job is to load the tank circuit back up to 50 ma. reading by either increasing the number of L2 link turns, moving the link farther up toward the hot or plate end of L1, or in other ways increasing the coupling, re-tuning the plate condenser with each change in load coupling to compensate for the slight detuning which will be effected.

Check for quality minimum carrier shift, and proper modulation on such monitoring equipment as is available, bring up the a.f. gain control to proper position.

If downward, instead of upward modulation is indicated, which is to say if the meter reading drops instead of rises on the sustained whistle, decrease the excitation by increasing the value of R3, then increase the antenna coupling until proper load reading of 50 ma. is restored—repeating the process until the desired upward modulation is obtained.

Video Reporter

(Continued from page 33)

will have to continue their payments according to original agreements.

Manufacturers, too, are bearing their share of television investment that must remain dormant until telecasting starts anew. It is understood that the set makers were reaching an advanced production stage when the video market snapped completely and the completed models on hand must remain on hand with no financial return in sight, perhaps, until the war is over.

The suggestion has been made that a skeleton program service be presented to ease the situation for dealers who have many sets sold on the installment plan.

WE are in receipt of an exceptionally attractive promotional booklet entitled *Television for Everybody* published in England for distribution through trade channels as part of an intelligent video merchandising campaign. Unfortunately, the suspension of television programs in London has delayed trade progress, but the high initiative reflected in the merchandising of video receivers indicates that the British manufacturers will quickly catch up on their selling once the programs are resumed.

The booklet plays up in words and pictures the vast scope of material available from Alexandra Palace. Particularly impressive from the trade angle are the clever advertising lines of set makers. Here are a few samples:

"Worth looking into."

"You can't shut your eyes to it."

"Look into it now."

"You can see the difference—"

"Clearly the best!"

THE twentieth anniversary of the *Radio Corporation of America* was the occasion of a television stunt that achieved one of the best newspaper publicity breaks to date. But it was a stunt that, clever as it was, won't do much to advance the art of sight transmission beyond the exploitation results achieved in getting television in the headlines.

Flying in a United Air Lines plane in the stratosphere 200 miles south of New York, a group of *NBC* technicians and New York journalists saw and heard David Sarnoff, *RCA* president, and W. A. Patterson, president of *United Air Lines*, as they conversed before a *Radio City* iconoscope. To achieve television reception in the plane this great video distance from New York, a flying height of 21,600 feet had to be reached to keep in a line-of-sight position with the *Empire State Building* transmitting antenna.

An interesting highlight of the stunt was the manner in which the plane's occupants were able to watch their own ship land at *North Beach Airport*. *NBC* had dispatched its mobile television unit to the airport and the passengers had the rare thrill of seeing the manner in which their plane approached the field and landed.

All indications point to a long series of television stunting. The quest of publicity was true of radio's early days and it is true of television today. The real stunting stage will first start

when *CBS* starts telecasting in the New York area. It takes competition to bring out the best—or worst—of stunt ideas. And the desire to register with the public with all sorts of stunts as long as they are "firsts" is considered a trait of good showmanship.

An important thing to consider, though, is "Will such stunts sell television sets?"

SHERMAN GREGORY, general manager of *KDKA*, Pittsburgh, recently told us of the enthusiastic reception accorded *KDKA's Temple of Television* at the *Allegheny County Free Fair*.

The demonstration consisting of an *RCA* "jeep" transmitter and sixteen receivers drew the attention of over 1,000,000 persons during a seven-day run.

Pittsburgh went wild over television and this enthusiasm has been duplicated in other big cities where "jeep" demonstrations have been held.

All of which points to the fact that *the public wants television*. But in view of the disappointing number of receivers sold in the New York area during the first half-year of regularly scheduled television programs, what chances are there for smaller cities?

For our own answer to that question, we must reiterate our stand that set prices are too high—much too high—for mass sales. Lower prices, plus better merchandising, would put television on the map in the New York area in no time at all. And we are basing our opinion on the skeleton type of program schedule now available. When the second and third New York stations start operating, the video art could reach boom proportions that would stimulate the launching of regular services in other American cities.

AS a service to television set owners in the New York area serviced by Station *W2XBS*, *NBC* has launched the distribution of a free weekly schedule. The printed piece lists each week's video presentations in detail and, in addition, contains a questionnaire to obtain the viewers' comments on the programs.

Distribution of the weekly program cards should prove invaluable to *NBC* in many ways. Aside from the goodwill angle and the promotional merits involved, the network can compile a fairly complete list of television set owners and, in time, this data can represent a strong selling point for the network when it pursues television sponsors. The cards, an *NBC* spokesman tells us, will be offered at frequent intervals during telecasts.

W2XBS is attaching great importance to the public's comment on these early telecasts. And that is as it should be. But it seems that more specific criticism should be invited than the simple checking arrangement under the questionnaire headings of "excellent," "good," "fair" and "poor." *NBC* should prompt reasons for their opinions, not merely the opinions themselves.

CBS executives haven't got much to say these days on television topics. The long-anticipated launching of *W2XAX* atop the *Chrysler Building* is still being delayed at the time these lines are written and one network spokesman says it's pretty certain that it won't be until January, 1940. —50—



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February Issue



★ ON SALE JANUARY 10 ★

As I See It! (Continued from page 10)

case tolerance is associated in instances with radio parts, measurements and the like. Moving around the country as we have been doing during the past thirty days and speaking before about 10,000 men during 23 meetings, we have found opportunity to answer many questions and discuss many subjects, lots after each meeting was officially over. One of these related to tolerance in replacement parts and adjustments of various kinds.

Essentially there are two kinds of tolerances, namely "absolute" and "percentage." The former expresses a numerical quantity irrespective of the basis of comparison, whereas the latter expresses a numerical quantity which is dependent upon the basis of comparison. Confusion between the two is what has given rise to criticism of some replacement parts. Also the fact that many men fail to recognize the practical side of things.

Let us for a moment consider some replacement parts. We know that many men check volume controls before using them for replacement and many such controls have been unjustly rejected. Assuming that the controls are satisfactory from the noise viewpoint, a control marked 500,000 ohms measures 700,000 ohms upon an ohmmeter, and is rejected as being unsatisfactory. In fact the manufacturer of the control is condemned as making a poor product. Is that product really poor? Is a 700,000 ohm volume control satisfactory in place of a 500,000 ohm control? How accurate is "accurate?" What should the tolerance be? These are some questions to be answered.

The 700,000 ohm volume control represents a plus tolerance of 40 percent and actually is satisfactory for use in practically every place we can think of. There is no need for absolute accuracy in the majority of places where volume controls are not specifically identified as requiring a certain tolerance. This does not mean that any plus tolerance is satisfactory, but 40 percent will pass in practically every place without any change in operation. This percentage tolerance is by all means satisfactory in all places where it is used as a shunt across a signal voltage circuit. In fact in such positions, one should worry about the "minus" side rather than the "plus" side. It is of course also true that we must concern ourselves about the plus side, as well as the minus side in diode circuits where the volume control is the load, but even here a 40 percent tolerance above the rated figure is not subject to a great deal of criticism. This is particularly true when we consider that there is no particular need for extreme accuracy in most places where the usual run of volume controls are used.

Very seldom, if ever, do we find occasion or need for the declaration of absolute values of tolerance with such variable volume controls. Invariably percentage values are employed, although some service men have confused these two values and have felt that a resistance variation of 50,000 ohms is sufficiently high so that a control rated at 500,000 ohms or even

1,000,000 should not be off by more than 50,000 ohms. They forget that while 50,000 ohms is a high figure as sums go, it is only 10 percent in the case of a .5 meg resistor and 5 percent in the case of a 1.0 megohm resistor. Volume control units with plus tolerances of 5 or 10 percent are special and not the kind which find their way into commercial radio receivers.

The fact that such tolerances, as have been named, exist in radio receivers and in replacement parts do not mean that all volume controls employ such high plus tolerance. Many are much less and more closely approach the rated figure. But when a plus 20, 30 or even 40 percent tolerance is found, it should not be considered as a reflection upon the manufacturer. It by no means indicates the inability to produce accurate controls. It simply conforms with the standard practice of employing fairly liberal tolerance in circuits which are not critical with respect to accuracy and in that way keep costs down. Those costs are of interest to the public as well as the manufacturer of the receiver, his jobber, the dealer, the parts producer and the serviceman and once more the customer.

The same applies to fixed condensers of the usual bypass variety. Once more we find tolerances which run as high as plus 40 percent, although as a general rule, the tolerance is about 20 percent. The tolerance that can be permitted depends upon the manner in which the condenser is used, that is its location and function in the circuits. At any rate, the item of importance as far as servicemen are concerned is that a bypass condenser to be used across a cathode bias resistor is perfectly okay if it plus 20 percent or even higher. By and large the thing to do is to worry about minus tolerances, although even on the negative side, we find instances where a 10 or even 20 percent variation does not interfere with the operation of the system. Usually, fixed condensers run towards the plus side rather than the minus side.

Invariably, receiver manufacturers specify the tolerance in those condensers which are critical, usually in the high frequency circuits and in such cases tolerance is something to be concerned with. But even here, it is a matter of percentage tolerance rather than absolute. In other words even in such critical capacities the tolerance will be quoted in a certain percentage of the total capacity instead of a specified number of micromicrofarads.

Practical experience has shown servicemen that a 20 percent or even 30 or 40 percent plus tolerance means very little in normal bypass work. In many instances when .1 mfd. condensers are not available a .2 mfd. of proper working voltage is used, providing that it will fit into the allotted space. Under the circumstances, what harm is there if a .1 mfd. condenser when measured indicates .121 mfd. or even .138 mfd.?

As in the case of volume controls, the fact that a replacement condenser purchased at a jobber's store does not measure "on the nose" does not mean that the condenser manufacturer cannot make an accurate condenser. It is no reflection on his ability. All can make accurate condensers, but the more accurate they are, the more do they cost. It is common practice to

identify condensers accurate to within 5 to 10 percent "special" and those which approach 1.0 percent are coming close on to being "standards." After all a .001 condenser accurate to 1.0 percent is from 990 micromicrofarads to 1010 micromicrofarads or .00099 to .00101 mfd. and in a higher value, say .1 mfd., it means a top of .101 mfd.

What does all of this mean to the serviceman? It means greater peace of mind; more friendly relations between the jobber and the serviceman, the serviceman and the manufacturer and consequently, the jobber and the manufacturer. It means that the cost of a service job is less because the serviceman has less work checking capacities, making returns, etc. Recognizing such tolerances means less criticism and the application of practical considerations.

Our Trip

YOU remember we spoke about a prospective trip. Elsewhere in this issue we mention having spoken in 23 cities before about 10,000 servicemen. We would like to tell you about a few impressions on this trip.

First of all, we doubt if there are any salmon in Puget Sound. Four of us spent 12 hours one Sunday hunting the so called abundant salmon. We saw blackfish cavorting, but no salmon. In fact we believe that a conspiracy was afoot, between the blackfish and the salmon. Where we went the blackfish were ahead of us. In fact they left certain spots before we did and went to where we talked about going.

Remember four of us fished and finally caught one salmon. I blush to think of its size. In fact I think that it ran away from the herring, usually its food. I think that it felt safer on Andy Nash's hook than in Puget Sound among its prey. Of course, there were plenty of fish the day before we got there and no doubt the day after, but not that Sunday. For those in the know, we left Seattle and fished Possession Head and Hat Island, otherwise known as Gedney Island. And by the way don't malign the fishing ability of the people in the party. For the sake of those in the Pacific Northwest, one of the men was Lloyd Marsh—and that boy knows how to fish!

Maybe the next time we go to Seattle someone will be kind enough to dump a small shipload of canned salmon into Puget Sound and we'll fish with a magnet instead of herring.

I DON'T know who is responsible for the picking of the stewardesses on the various plane lines, but they certainly do make a journey more pleasant. And believe it or not, they can play knock rummy, make up a berth, serve a meal, administer oxygen, pacify babies, be charming and, when the occasion arises, be stern. If ever there was, they are a group of accomplished young ladies—and pretty to the bargain. From what we hear, they usually marry within a year after taking to the air, either to a pilot or to one of the passengers. Gentlemen, it's a pleasure to fly.

IN Frisco we met a ham, I think it was W6BIP. He had been on contact with a friend of mine, who, with a few others had bought or chartered a yacht and in this troublesome and

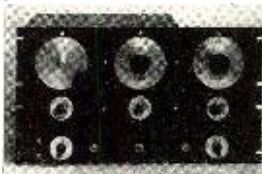
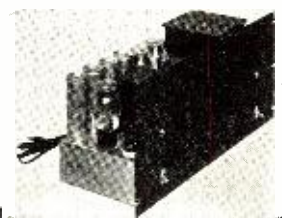
turbulent time was cruising the South Seas, seeking who knows what. At any rate, we had not heard from this friend of ours for quite some time. When the San Francisco (never say "Frisco" in San Francisco) meeting was over, W6BIP came over and gave us the message from the Marquess Islands, wherever they are beneath the Equator. I think the call letters of the yacht California are WLKP or WLKB, I'm not sure.

Says we, if this bird can talk to the Marquess Islands, certainly he should be able to talk to New York—so we gave him a message for Mrs. R. Believe it or not, he got through the QRM, avoided the skip (or "made" the skip) whichever took place the following morning and we received addi-

tional blankets for the tent when we got to Texas. Ham radio sure did make a good showing in San Francisco. Maybe it's the California KW's.

INCIDENTLY, there is a lot of land between Chicago and Salt Lake City. Maybe the nation could use a few more Coulee and Boulder Dams. I don't mean to become involved in politics, but I think there is room for a few more, particularly after looking at what grows in some of the irrigated portions of the West.

12,000 feet is high but it sure is a fine place to look down upon good old American grandeur. Snow on mountain tops—pines just blanketing mountain sides. Let Europe have its Alps. *I'll take the Rockies, the Cascades and Peace.*

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RADIO PHYSICS COURSE

by Alfred A. Ghirardi

(Continued from December issue)

Necessity for tuning: Up to this point in our discussion, we have assumed for simplicity that the only voltage induced in our receiving antenna is that caused by the action of the radiated fields of the one station we desire to receive. Although it may seem surprising at first, it is nevertheless true that practically every radio station in the entire world which is broadcasting radiations of any frequency (whether the transmission be that of code messages or sound programs), will induce voltages of corresponding frequency in our antenna circuit and therefore cause currents to flow up and down in it. The radiated fields from a 5-watt station located 1,000 miles away are impinging on our antenna just as sure as those of a local 50,000 watt broadcasting station (unless they have been greatly weakened by some material obstruction on the earth causing a shielding or screening effect; or are affected by skipping or fading). Although the induced voltages and currents caused by comparatively weak or distant stations will be very much weaker than those induced by powerful or local stations, nevertheless they are there just the same. Of course, we do not hear all of these stations with present day receivers because many of these signals are so weak when received, that the receiver does not amplify them enough to make them heard. Nevertheless, there will be enough comparatively strong signals set up in any antenna which we might erect, to cause several of the stations to affect our receiving equipment strongly enough so they will all be heard at once, and thereby interfere with the clear reception of any one of them at a time. *Therefore, since we want to hear only one station at a time, we must in some way weaken the signal currents of all of the stations it is not designed to hear and allow the currents of the station it is desired to hear to flow through the receiving equipment with as little loss of strength as possible;* in fact in modern radio receivers we even amplify the signal we desire to hear by means of vacuum tube amplifiers. Fortunately, this can be accomplished by employing the principles of electrical resonance previously studied. All radio transmitting stations in the same vicinity send out their signals at different carrier current frequencies. We know from our previous work, that a series-tuned circuit offers a very low impedance (actually equal to its resistance) to the flow of current of the frequency to which it happens to be tuned to resonance, and offers a much higher impedance, in varying degrees, to the flow of currents of all other frequencies above and below this. Conversely, a parallel-tuned circuit offers a very high impedance to the flow of current of the frequency to

which it happens to be tuned to resonance, through the circuit in which it is connected. It offers a much lower impedance, in varying degrees, to the flow of currents of all other frequencies above or below this value.

Antenna resistance and selectivity: Since the resistance of the entire antenna and ground wire and that of the contact between the earth and the water pipe, (or whatever is used for actual connection to the earth), is directly in the tuned circuit in the single-circuit system just described, the tuning is rather broad, that is, there is no great difference between the strength of the current set up by the signal of the *wanted* station and the currents set up by the signals of all the other *unwanted* stations.

Since the current flowing in the circuit at resonance is equal to the signal e.m.f. induced in the antenna divided by the high-frequency resistance of the total antenna circuit, it is evident that if this resistance is high we may not gain very much by tuning, for even at resonance the high-frequency ohmic resistance of the circuit might be high enough to keep the current set up by the wanted station from being very much stronger than that set up by the unwanted stations. In order to obtain sharp tuning therefore, it is evident that the ratio of the *reactance* to the *resistance* of the tuned circuit must be made high.

(To be continued next month)

Oscilloscope Explained


(Continued from page 30)

the a.c. line away from the resting position.

Null indication in connection with a.c. bridges is an important function which can be done conveniently by an oscilloscope. Generally at balance the second harmonic of the bridge voltage becomes prominent while the fundamental drops out. Some indicators do not give sharp null points because the second harmonic comes through to excite them. The oscilloscope screen will show a rapid decay of the fundamental and its replacement by the second harmonic (unless the exciting voltage is absolutely sinusoidal) indicated by the sudden doubling of the number of cycles of the bridge voltage seen on the screen. Linear sweep is used in this application.

Receiver alignment by cathode ray oscilloscope and frequency modulated signal generator has received much publicity and rightly so because it is very positive and accurate and has a very good customer impression value. The oscilloscope should be connected to the output of the detector in tuned radio frequency receivers or the second detector in superheterodyne receivers. Then the i.f. and r.f. can be readily adjusted to produce the desired curves. Several manufacturers have been supplying these curves in their service data for several years. See drawings for several samples and expla-

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nations. Here too linear sweep is used.

Measurement of modulation percentage is easily done with an oscilloscope. The linear sweep may or may not be used, giving rise to two methods of measuring modulation percentage. Perhaps the most accurate method is the so called trapezoid system. This shows the essentials of this system. Voltage from the transmitter output is introduced into one set of deflecting plates while the corresponding voltage from the modulator output is fed into the other set. More convenient is the second method employing a linear sweep to reveal the audio voltage on the carrier. Since the output of the transmitter is all that is required wiring to the oscilloscope is much more simple, a pickup coil often sufficing. Again consult drawings.

Tube testing can be performed by introducing a signal (sine wave) into both the control grid of the tube under test and the horizontal deflection plates and similarly introducing the tube's amplified output into the vertical deflecting plates. Under standardized conditions all tubes of a type give very similar curves. Incidentally this setup offers a rapid means of obtaining curves of tubes operated under non-standard conditions. Furthermore, it is entirely practical to test amplifier stages in this same way.

Frequency determination is relatively easy with an oscilloscope. Low frequencies may be measured using the linear sweep as one deflecting voltage. If the sweep frequency is known the unknown frequency can be measured by counting the waves seen on the screen and multiplying the sweep frequency by this number to get the unknown frequency. For fairly high frequencies *Lissajou's* figures should be used. A standard voltage of known frequency should be impressed on one set of plates while the unknown is applied to the other set. *Lissajou's* figures, which are different for each ratio of frequencies, appear on the screen. The study of these figures can occupy many pages or even books so it has been deemed inadvisable to more than touch the subject. References included below provide plenty of information on this interesting subject.

RCA Cathode Ray Tube Manual.
 Theory and practice of cathode ray tubes and circuits.
 QST, December, 1936, pp. 37; January, 1937, pp. 22.
 Construction data on 913 oscilloscope.
 The Cathode Ray Tube at Work. Rider. RCA Service Manuals.
 Receiver alignment and service data.

Figure 2a illustrates the ideal wave shape for a linear sweep. Figure 2b presents the wave shape commonly found when no compensation is used.

The pentode effectively takes the place of resistor R in Fig. 3. Variation of the tube's plate resistance by changing its control grid bias provides a means for controlling the frequency generated.



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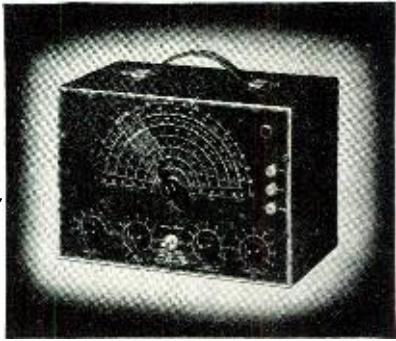


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Bench Notes

(Continued from page 21)

job when he is asked to throw away seventy-one cents!

None of the entries, unfortunately, conformed with my intentions when I presented the problem. In some quarters this will undoubtedly be taken to mean that my ideas aren't the only good ones in the profession. There is a bare possibility this is so. I am put into a spot somewhat similar to the one the old-time broadcast sponsor found himself when—after presenting the first four lines of a contest limerick—it was discovered the only possible fifth line was unbroadcastable.

The point I was trying to bring out was that the serviceman is *not a moral arbiter*. When an eccentric wants someone to fan his vanity, and is willing to pay him, why should the repairman deprive him of the privilege? Honest and competent work are taken for granted; few customers think a serviceman is dishonest—unless the serviceman first *thinks* he thinks so.

I would have suggested item after item of work to the customer, telling him at the same time the work was not the sort usually accorded an ordinary set. No matter what I did, or what I charged, I would remember I was selling *satisfaction*, and would be determined not to let the fact I was a serviceman hamper me in my work. No matter what happened between me and the set, the important factor would be what the customer thought of me when I left the house. If he thinks more of his conceit than of his set, why shouldn't I be paid for facing the fact, and selling him what he wants to buy? The alternative is a low price and a dissatisfied customer.

The Winnahs!

DAVID GNESSIN (W8SQM) of Ashland, Ohio, takes first prize with some very practical philosophy.

Second prize goes to Eugene M. Beck of West Los Angeles, California.

John Stine of Winchester, Indiana, is runner-up with: "Since it is the customer's *second* detector tube, why sell him a third? Put the first one

back and leave the house—the job isn't worth-while, anyway. Do I win?"

You do not, John. But, because you came so near, I am sending you a *close-pin*, which I hope you will use to keep up your courage.

Problem No. 4 will appear in the next issue. Hope you like it!

They Shall Not Pass

I'M the boss in my family, but when the wife asks me to take a walk with her, I go. The other night we found ourselves in front of an auto accessory store, looking at the washing machines, tail lights, and oddly-shaped midgets. The senior partner discovered an electric mantel clock of pleasing line. Unthinkingly, I examined the trade mark and announced it was of good manufacture.

"I want one," she announced.

"I can," I said, "get it for you wholesale."

She was so pleased when the clerk showed it to her she bought three: one for a wedding present, one for a sister being launched on a career, and one—with a greediness I forgave because it involved really good merchandise—for our living-room.

Walking home, with so much time on my hands, I fell to wondering why I couldn't implant ideas and snare sales from persons who weren't even shopping. I had previously thought of my window as something which must be kept bright and clean so the store wouldn't be mistaken for a speakeasy.

The next day I commissioned Cliff—who has had no special training in window-dressing—to work on our "sidewalk salesman." He did an admirable job. In one lower corner, a frilly wad of crepe. From there, stretched diagonally upward to the opposite corner, a one-inch strip of paper leading the eye to the screen of our 'scope, which was connected across the output of a receiver we play through the day. From the screen, a short strip of paper led to a sign:

You now see a voice. When television receivers are on sale, we will let you hear a picture!

Well, it stopped pedestrian traffic twice during the first day. Persons who formerly passed our familiar

Statement of the ownership, management, circulation, etc., required by the Acts of Congress of August 24, 1912, and March 3, 1933, of Radio News, published monthly at Chicago, Illinois, for January, 1940. State of Illinois, County of Cook, ss. Before me, a notary public in and for the State and county aforesaid, personally appeared A. T. Pullen, who, having been duly sworn according to law, deposes and says that he is the business manager of Radio News and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit: 1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, W. B. Ziff, 608 S. Dearborn St., Chicago, Ill.; Editor, B. G. Davis, 608 S. Dearborn St., Chicago, Ill.; Managing Editor, K. A. Kopetzky, 608 S. Dearborn St., Chicago, Ill.; Business Manager, A. T. Pullen, 608 S. Dearborn St., Chicago, Ill. 2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.) Ziff-Davis Publishing Company, 608 S. Dearborn St., Chicago, Ill.; W. B. Ziff Co., 608 S. Dearborn St., Chicago, Ill.; W. B. Ziff, 608 S. Dearborn St., Chicago, Ill.; B. G. Davis, 608 S. Dearborn St., Chicago, Ill. 3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None. 4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and that affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him. 5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the twelve months preceding the date shown above is: (This information is required from daily publications only.) A. T. Pullen, Business Manager.

Sworn to and subscribed before me this 27th day of September, 1939.

[Seal.] M. Gnass, Notary Public. (My commission expires February 26, 1940.)

facade suddenly realized we were still in business. A few started a conversation to ask questions. It is probable that no more than two of every ten stoppers knew what it was all about—but what difference did that make? They sensed a successful attempt to entertain them, and it didn't do us any harm.

The display was topical, arresting, and—appropriately for a radio store—the greenish pattern danced mysteriously. Cost, \$1.30.

Of course, we have been deprived of the use of the 'scope on the test bench—but I've seen it lie idle there for days. It's going to work a twelve-hour shift in the window until passers-by again pass!

-30-

Full-Range Amplifier

(Continued from page 15)

When the amplifier has finally been adjusted, it will be possible to switch from one plate to the other plate without the meter showing the slightest difference in current. After the wiring has been completed, it is best to check the potentials at the various tubes. They are as follows, measured from ground, with the unit "on" but the gain controls set in the "off" position. 6C5 mixer input plate, plus 140 volts; 1612 plate, plus 200 volts; 1612 screen, plus 100 volts; 1612 cathode, plus 15 volts; first 6F8G plate, plus 125 volts;

An Epidemic OF TRUTH!

▼ Can you imagine a city in which, on an instant's notice no one could tell a lie! Can you picture the turmoil that sheer, naked truth would cause, if it were unfettered, loosed by some powerful means impossible to avoid? Would you yourself like to admit without your wilful consent the truth about every bit of your daily life, for just one day? Then don't fail to read **Truth Is a Plague!** Its dramatic tenseness will hold you spellbound! . . . just one of the many thrilling stories in the

BIG FEBRUARY ISSUE

AMAZING STORIES

Now On Sale—Get YOUR Copy!

second 6F8G driver plate, plus 125 volts; third 6F8G plate, plus 150 volts; 6A3 grid, minus 62 volts; 6A3 plate, plus 340 volts. All of these readings are with a source line voltage of 115 volts AC.

One of the most important things in the construction of an amplifier is the construction of the unit to which the ear listens, namely, the loud speaker. Much has been written on the construction of loud speakers and of baffles, and the constructor has a choice either of buying a unit similar to the *Cinacudagraph SU 18*, which we used, or in building a similar type unit, such as we did in our laboratory. For those who want to build their own baffle construction, the following information will be extremely valuable.

Infinite Baffle Construction

The ability to reproduce the extreme low notes will depend upon the range of the amplifier, the size and characteristics of the speaker, and the dimensions of the baffle. One of the best types to use is known as an "Infinite baffle" and is of the completely enclosed, variety with a sound-proofing material within the enclosure. The size of speaker used will, to a great extent, govern the size of the baffle needed to reproduce all of the frequencies.

A choice of speaker was made that would enable us to reproduce all frequencies down to 30 cycles and this dictated that the baffle be at least four feet square and about 16" deep. The method of construction is clearly shown. The speaker is a 15" Utah model H15P. The line-to-voice coil transformer is securely bolted to the baffle directly under the bottom edge of the speaker shell.

The speaker must be mounted with at least eight bolts in order that no vibration take place which would be very annoying to the ear. The entire inside of the baffle is covered with a blanket of 1" hair felt and is tacked in place with regular shingle nails that have a large head and are about 1½" long. The back is also lined with the same material with an uncovered border all around of ¾" to allow for the back piece to fit snugly in place.

Finally a half-inch hole is drilled in the exact center of the back cover to allow free motion of air caused by the back-and-forth movement of the speaker cone. As a finishing touch—a heavy coat of grey deck enamel was applied and left to dry.

Conclusion

Charts are shown to indicate what actually takes place within the tone control tube and its effect upon the response of the amplifier. Note that it is possible to *boost* either the highs or lows as well as to *attenuate* them. Furthermore, we may expand any combination as we please and this can only be appreciated after once using this new system. May we again stress the importance of using the very best parts available for construction of this amplifier.

(Continued on next page)

Is That Rider's New Book?



Yes, Servicing by Signal Tracing.

What d'ya think of Rider's new system of radio servicing?

It's the **only** method of dynamic testing.

So what? I can find out what's wrong with a receiver by the same method I've used for ten years.

Sure you can, but the sets we're getting in here right now are so complicated that it takes too long to diagnose the troubles by old style methods. Take my word for it, you better read up on Servicing by Signal Tracing today, because you'll use it tomorrow if you're gonna keep up with competition.

How's servicing by signal tracing make it easier?

By tracing the signal!—the one thing that's fundamental in any make receiver.—Find out where **that** departs from normal and you've found the trouble.

Then that method could be applied to any receiver, and to servicing P. A. systems, Television or most anything.

Sure, any type of electrical equipment through which a signal passes. The first part of this book tells about the behavior of a normal signal from the antenna post to the loud-speaker, and the signal characteristics. The second part explains the signal tracing method step by step. Why don't you get a copy, it only costs \$2.00.

Is that all? Why it's got 360 pages! I will get my own copy.—And, thanks a lot for a darn good tip.

. . . and Believe Me The Ten Rider Manuals

combined with the system of Servicing by Signal Tracing make servicing faster, easier and more profitable.



JOHN F. RIDER, Publisher 404 FOURTH AVE., NEW YORK CITY

Export Div.: Rocke Int. Elec. Corp., 100 Varick St., N.Y.C. Cable: ARLAB

We have attempted to give the reader a musical instrument that he may build and from which much enjoyment may be realized. There should be many prospects for such a layout from schools, churches, auditoriums, band shells, and from musicians who want the finest reproduction possible.



GUTHMAN
Presents
**THIS MONTH'S
FEATURE**



U-50 "SUPER"

HERE'S THE BUY! 11-Tube Communication Receiver, complete with sensational new Gun-Sight Tuning, illuminated and magnified 2½ times; Six bands, 525 to 62,000 kc., Controlled regeneration; R.F. Stage, 3-gang condenser; improved Noise-Silencer; Pre-selection Stage and every other vital control, only \$69.98, amateurs not wired with tubes, or build it yourself. Kit supplied assembled\$49.95

At your jobber's, or order direct, giving jobber's name, if out of stock.

Edwin I. Guthman & Co., Inc.
400 S. PEARIA ST. CHICAGO, U. S. A.
SOLE AMERICAN OFFICE—CHICAGO

Moreover, this amplifier has everything to offer for use as a recording amplifier. It is only necessary to include some type of volume indicator between the output and the cutting head. A 10 db loss pad will improve the response of the head—particularly if this be of the magnetic variety.

One more thought — use a phono turntable that runs steady and smoothly and use a good high-impedance pickup. Change needles often and keep the records clean and free from dust accumulation. If an automatic record player is used, do not leave the unplayed records on their holder arms as this will cause warping and spoil the results. Always lay the records on a flat surface or stand them up in a vertical position in holders.

It will take considerable time for the P. A. man to become thoroughly familiar with the new type of construction and operation described herein, but once he has mastered the controls he will find that he will have an instrument which will far surpass anything which he might have built previously.

-30-

Within Earshot

(Continued from page 4)

and the only reason that we are running the articles, is because we felt that here was such a controversial subject—such a vital issue for the man who makes his money at radio repair, that you would all be interested in the material that the two opponents had to say. We invite comment on the debate, and promise to print the best letters which we receive, regardless of which side they side with.

(Continued on next column)

WE received so many requests to run an article on the U. S. Army radio system, that we finally got around to it. You will find the story as fascinating as it is instructive. For your information, we understand that there are vacancies right now with the armed forces of our country. There could not be any finer way for you young fellows to get properly started in radio, see the world, earn a living, get free medical attention, and be patriotic at the same time than to join the government radio services by enlisting. Why not investigate?

ONE of the most unusual broadcasts that we have ever heard was one on one of the big networks recently. A gentleman, described as the inventor of the "death ray," was introduced. He claimed to have been able to destroy pigeons at a thousand yards, as well as rabbits, and other small game. He went on to say that he had destroyed the machine and had refused to build another because it was too horrible or some such sort of thing. What a pity! In the first place this gentleman set himself up as a judge of the only use to which the machine could be put—destruction. Secondly, he did not mention that he had offered it to the U. S. Government, although he did say that he had thought of it, but had refrained, fearing that some other nation might get through the usual espionage channels. Had he ever considered that there are other things equally as dangerous as a death ray,—carbolic acid, for instance? But the beneficial uses of that chemical are innumerable in the medical field. We only hope that the so-called "death ray" was *not* the answer for the cure of cancer, since by withholding it from the world, this gentleman has prolonged its suffering—something which, from his voice, we just can't get ourselves to believe. If he would care to do something about this, we offer our services, free, as a go-between a number of reputable research workers in the field of cancer and himself, to see if the "death ray" has any medical value at all. He may get in touch with us by just dropping us a line.

IF you like good music, well-played, do not miss the opportunity to build yourself the amplifier described in this issue. The life-like reproduction will amaze and please you to an extent never before possible with an ordinary record. The unit is fine for the Holiday season, too, and will serve in the place of an orchestra at small gatherings. We were most flattered when a well-known music teacher said that he was having his local serviceman build him up one of these 3 dimensional amplifiers, to be used in the instruction of classes in *music appreciation*. It seems that we have more closely approached the music as it is actually played, rather than how it comes from the recording studios.

(Continued on next page)

SERVICEMEN

How to make more money !!!



Sell Records

Why stock your shelves with slow moving records? Down Beat magazine gives advance information on newest releases. Price \$1 for 4 months (8 issues); or \$3 per year.

Service Orchestra P.A. Systems

Orchestra P.A. systems need plenty of servicing. Down Beat magazine tells where the bands are playing in your territory. Send \$1 for trial subscription (8 issues).

Sell DOWN BEAT

Record customers will come in twice a month for Down Beat magazine. Then you sell 'em the latest records. Send postcard asking how to become a Down Beat dealer.

Down Beat, Dept. SRN
608 S. Dearborn, Chicago

EDITING has its amusing side, too. Recently we came across a letter requesting information as to what the "C.P." meant after the call-letters of a station in the Federal Communications Commission's reports. Not thinking on it too hard, we told our secretary to answer, figuring that she must of necessity know the correct answer. We barely had time to stop the mail clerk from letting the answer get into Uncle Sam's mail.

"C.P.," our efficient office worker wrote, "means 'Candle Power'."

Of course everyone knows it means, "Construction Permit" . . . or are we presuming?

FOR those of us who might be super-curious, the transmitter in the foreground of the picture of our Army's radio equipment shown on page 7 of this issue, is one manufactured by Cardwell with a power output of about 15 watts. The gentleman with the two cranks is the power supply. He turns a generator which furnishes the high voltage for the B plus. The men in the back-ground are known as "horse-holders" and that's what they are doing. We thought you might want to know.

AND that about winds up another column and another issue. We promise that the new year will find R.N. further out in front in the subject of technical articles than ever before. Some of our serviceman items will also find their "first" here. We expect to have a number of construction articles on units that cannot be bought, and we certainly expect to be able to point with pride to the fact that, as heretofore, "If it's News, it's in RADIO NEWS." So watch the future issues carefully, the answer to your problem will surely appear here. Eventually we get around to all of them . . . and solve them.—KAK.

Ring the Bell

(Continued from page 27)

furnish tubes or parts to small stations for time on the air—usually getting about twice the time normally indicated on the rate-card by "swapping" in this manner.

Another possibility is to help sell other merchants air ads on commis-

sion. In some cases stations offer time on the air to the salesman equal to the time he sells on contract. In this way, for every 24 spot announcement contract the serviceman sold, he would get 24 free spot announcements of his own in lieu of a cash commission.

Still another way to earn air time is to sell the station manager on your ability to work up a series of interesting programs such as an amateur hour, a Quiz hour, etc., taking all the work of auditions and rehearsals off his shoulders for a few "plugs" whenever the time is available.

The possibility of hooking-up with a local radio station on P.A. rentals is always good. Offer to furnish the equipment and split 50-50 on the profits if they will plug the service during the broadcast day on unsold spots. Point out that the more plugs you get, the more profit they will make.

Many servicemen object to the use of the phrase "Free Estimate" in radio advertising. This is particularly true in the large cities where "shopping around" for radio repairs is prevalent. However, I, personally, offer a free estimate and my percentage of lost repair sales is almost negligible.

The main point to remember when making this offer is that it constitutes your willingness to tell the customer *how much it will cost to have the set repaired*, NOT *what is specifically wrong with the set*.

So many servicemen curse the "Free Estimate" idea when the trouble lies with their use of it—not the idea. Never tell a prospective customer that, for instance, he needs a 12SA7, a 12SQ7 and a new I.F. transformer ("That one"—pointing to the defunct unit). No wonder the "slick" customer takes you for an easy mark. Merely tell him that two tubes and a coil are required and the price of each plus your labor charge. If he asks you what tubes and what transformer, tell him a Pentagrid Converter, a Duodiode High-Mu Triode and an Intermediate Frequency Transformer. If you feel that this is too much of a giveaway or he still comes back for more specific information, remind him that the *estimate* is free. If he wants a detailed diagnosis of what is wrong with the receiver, there will be a charge. If he objects, tell him that if the repair is not made by you, your diagnosis will be of no value to him. On the other hand, if he decides to have you do the work, all parts used will be itemized on his bill for his complete protection.

Next month we will continue to expand our ideas regarding *effective* advertising. In the meantime, keep those two accounts growing; we'll need 'em.—

—30—

Servicemen! There's money in recordings. Don't fail to read February issue of RADIO NEWS.

EASY TO LEARN CODE

It is easy and pleasant work to learn the modern way—with an Instructograph Code Teacher. Ideal for the beginner or advanced student. Many tapes available ranging from alphabet for beginners to typical messages on all subjects. Speed range 5 to 40 WPM. Always ready, no QRM, beats having someone send to you.

FOR SALE OR RENT
STANDARD with 10 tapes, book of instructions, A.C. motor. \$24.50 with spring-wound motor. \$18.50
JUNIOR with 5 tapes and book of instructions (not rented). \$12.00

RENTAL Standard with 10 tapes and book of instructions \$3.00 first month. \$2.25 each additional month. References or \$10 deposit required. All rental payments may be applied on the purchase price should you decide to buy the equipment.

Write for details today

INSTRUCTOGRAPH COMPANY

Dept. NR, 912 Lakeside Place, Chicago, Illinois
Representatives for Canada:
Radio College of Canada, 54 Bloor St., West, Toronto

Keep up with Radio. Read RADIO NEWS

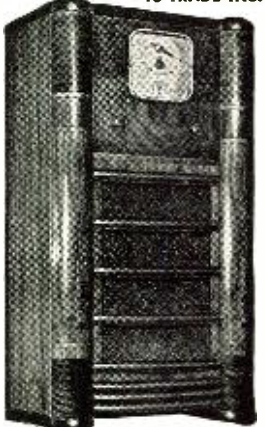
HOW TO MODERNIZE YOUR OLD RADIO
MIDWEST FACTORY-TO-YOU 20th ANNIVERSARY SPECIAL!



WITH TELEVISION ADAPTATION

Here's today's biggest radio value—the 1940 TELEVISION-ADAPTED Midwest at sensationally low factory-to-you price. Amazing foreign reception. Absolute satisfaction guaranteed on money-back basis. Other models from 5 to 17 tubes, and up to 5 Wave Bands. Send 1c postcard for FREE 1940 Catalog. (User-agents make easy extra money!) See Midwest's Answer to TRADE-INS!

PUT THIS 1940 14 TUBE CHASSIS IN YOUR PRESENT CABINET \$19.95 COMPLETE CHASSIS WITH TUBES AND SPEAKER



SAVE UP TO 50% 30 DAYS TRIAL EASY PAY PLAN

14-TUBE CONSOLE \$29.95 COMPLETE

MIDWEST RADIO CORPORATION Dept. 11-C Cincinnati, Ohio

POSTE COUPON ON 1¢ POSTCARD...OR WRITE TODAY!

MIDWEST RADIO CORPORATION
Cincinnati, Ohio Name.....
Dept. 11-C Address.....
Send me your new FREE catalog, complete details of your liberal 30-day Trial offer, factory-to-you wholesale prices. Town.....State.....
User-Agents Make Easy Extra Money. Check here [] for details.

IF IT'S RADIO
ALL YOUR RADIO NEEDS
Here in this one big book you will find everything you need in radio . . . sets, parts and supplies . . . public address systems . . . amateur equipment . . . testers and kits . . . your nationally known favorites at lowest possible prices. Write today for this big valuable catalog and save money.
PROMPT SERVICE
FREE CATALOG
BURSTEIN-APPLEBEE COMPANY
1012-14 McGEE STREET, KANSAS CITY, MISSOURI



Nazi Bombers Over Scotland!

Swiftly the Nazi bomber roared toward its objective, the Spitfire in close pursuit! Whitey Trail dove grimly down . . . his motor thundering a promise of death to the bomber! In a moment the great bridge below would be blown to bits, unless Trail stopped the Nazi raider! Down . . . down . . . down, like a flashing comet . . . then Whitey Trail sobbed, broke, whirled the plane viciously away. Before his eyes loomed the up-thrust pylons of the bridge. Pylons! Always pylons! Trail couldn't stand pylons. They made him remember something . . . something that threw utter terror into his soul! An unreasoning, resistless terror that made a coward of him. Dimly through his fear-clouded brain he heard the roar of exploding bombs. The Nazi bomber had reached his objective! And he, Whitey Trail, could have prevented it. Why hadn't he? Why did he go into a blue funk at the mere sight of the pylons? Don't fail to read the answer in

SPITFIRE SQUADRON
IT'S JUST ONE OF THE MANY MODERN
AIR STORIES IN THE THRILL-PACKED

February
Issue

AIR
ADVENTURES

NOW ON SALE
AT ALL NEWSSTANDS

Book Review

(Continued from page 28)

ca's "Chief Engineer" which has been compiled from information as a result of a survey recently made by an analysis of 300 engineers throughout the country. Other articles include chapters on: New 1 KW Transmitter in modern style which employs the Doherty system, Broadcast antennas, Police Radio, The new 357A tube and its applications, and a new transcription pickup 1300A.

-30-

Serviceman's Experiences

(Continued from page 20)

Scratch off the jam, and you'll find most musicians are well-bred. Would you say Mozart sanctioned the stuff you put over those loudspeakers to-night? They gathered around me—some curious, some ashamed, and some angry.

"What do you care?" one of them asked. "That amplifier of yours sounds like a load of coal. We put *Hearts and Flowers* into the mike, and what comes out?—*Nuts and Bolts!* Fine one you are—appealing to our better natures. The best music in the world couldn't get through your equipment without sounding like gravel going through a meat-chopper!"

"That didn't stop me. 'Fellows,' I confessed, 'I'm a radio man, not a musician. All I know about music is that you should kick a player-piano if it stops before the nickel is all used up.' The sister act giggled. 'But I know tonight's performance didn't help your reputation any. Look—if I persuade Nick to install the best equipment on the market, will you get together?'

"They glanced at each other uncertainly for a while; then thawed out, laughed, and promised.

"I found Nick in his office, closing out his books. I sold him an amplifier quickly, as soon as he heard what I'd done. He shook my hand, and was almost in tears when he said: 'Al, you are one marvelous man. Such friendship! This Greek is having no word for it!'

"You see," Al continued, "only one partner wasted time last night. Tonight, we are going to the *Land of N.O'D*—to hear some good music!"

"I came in here," I said, feeling sort of foolish.

"This is where you go out," Al corrected, "to get that stuff from *United!*"

I paused in the doorway. "As a serviceman," I said, "you're getting to be quite a musician."

"Yeh," Al admitted, "I wanna ring bells—the ones on the cash register. Start swinging!"

-30-

Servicemen! Don't overlook the P. A. Market! RADIO NEWS brings you the latest in P. A. equipment and recorders. RADIO NEWS, 608 S. Dearborn, Chicago.
25c per copy.

Signal-Tracing

(Continued from page 18)

type of service procedure. The correlation between signal input and automatic volume control for the purpose of identifying sensitivity condition and the ability to handle high input level signals without distortion has been a vital necessity in servicing for many years. It is something "c-a-c-c" servicing can not do, but is a normal function in signal tracing. The identification of such conditions contributes to a service job, which approaches the ideal.

Striking a tube and listening to the ring in the speaker is akin to touching certain points and listening to the click in the receiver. Modern tube design intended to keep a receiver free from microphonics and the use of metal tubes retards such operation, so that such methods of identifying so called live circuits require no further discussion.

In summary let it be said that signal tracing being founded upon the most fundamental element in communication, namely the signal itself is independent of every limitation which has existed heretofore and which limitations were experienced by men who operated more efficiently than "catch-as-catch-can" methods permit, consequently is so much more efficient than "c-a-c-c" methods that it is not right to compare the two, even though we do so in this article. Actually a full resume of the capabilities of signal tracing, its universal application to all types of receivers, past, present and future, broadcast, facsimile, television; in all fields, home broadcast, army, navy, aircraft, police, mobile, commercial; in all countries irrespective of the origin of the receiver, would require many full issues of this magazine. To attempt to show the fruits of such a system, is impossible in such few words. All that can be said is that it opens up every portion of a communication system, every component.

Whereas "catch-as-catch-can" is guesswork, signal tracing is positive identification, knowledge of what is going on at every point in a receiver.

-30-

Catch-as-Catch-Can

(Continued from page 19)

buy new meters tomorrow, if someone could prove to me—by data taken under actual competitive servicing use in the field—that they would find favor with the customer, and increase either good-will or profit.

Meanwhile, in my store, no instrument fills the bill unless it fills the till. Once, years ago, I was frightened by the announcement: "With the coming of the complicated circuits of the new B eliminator, the 'screwdriver me-

chanic' is surely doomed." Since then, as I read the similar announcements which appear at regular intervals, I am unmoved. I'm still in business at the same old test-bench, satisfying the same customers—with, incidentally, the same screwdriver.

-30-

QRD? de Gy.

(Continued from page 28)

worked police cars on 1712 with perfect results. Murray seems to be one guy who is always around when an emergency exists. Just a Ham without a dull moment. Incidentally, he's building a rig which he hopes will go out on 10 mtrs.

CHARLES WEIR, radiop of the *Moore-Mac M/S Donald McKay* and member of the *ACA-Mardiv*, received a \$99.00 check for overtime work during a 42 day trip. He handled 125 msgs during this time, outside of his other regular duties. He stated, upon his return, that on many days eleven hours were spent continuously in the radio shack. This certainly should take the glamour off the radiops job and bring it down to the level of regular employment.

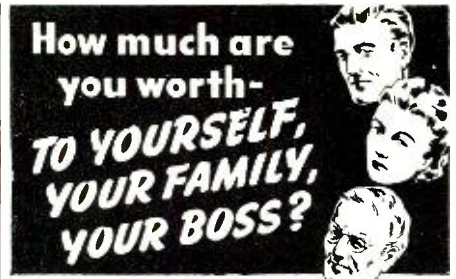
CTU-Mardiv continues to sign agreements with the various lines and has won many increases in pay for the radiops of these lines. Notable increases of from five to fifteen dollars per month have been won and additional privileges added to those previously agreed upon. Such lines as the *Clyde-Mallory, A. H. Bull & Co., Merchants and Miners, Ocean SS Co.* of Savannah, *Seatrain*, etc. and etc. have been placed on the dotted line to tune of \$125 per month and better, plus extra money for clerical work. Which still goes to prove that a union can bring to pass that which was impossible for the individual to accomplish. And it wasn't so very long ago when \$90 per month was considered top pay. So with this for a thought we sign off with 73 . . . ge . . . GY.

Vacuum Tube Volt Meter

(Continued from page 11)

This places the tested voltage in series with a voltage originating within the meter of opposite polarity. When these two are exactly equal the effective voltage on the control grid of the 6E5 is 3v. neg. (approximately) and the shadow angle is zero, as the tube is biased to have the shadow just closed with no balancing voltage and the test leads shorted.

(Continued on next page)



● You can earn more money by training for a better job in

RADIO & TELEVISION ENGINEERING

Men who are not satisfied with their progress . . . who feel that they should have a share of the big jobs and salaries . . . are the very ones who will want to know more about the benefits of CREI spare-time training.

Men Who Know More—Earn More!

You owe it to others as well as yourself to "make good" in a field that needs men with modern technical training. Your basic radio experience qualifies you to prepare for the better job that CREI training makes possible. We can help you as we have helped other ambitious men to **actually succeed** rather than "just thinking about it!"

Write for Free Booklet: "The CREI Tested Plan"

48 interesting pages with scores of photographs and complete outline and description of CREI radio and television courses.

CAPITOL RADIO Engineering Institute

Dept. RN-1, 3224-16th St. N. W., WASH., D. C.

BUYING GUIDE FOR HALF A MILLION RADIO MEN!
this Free catalog can save you plenty!
 WRITE TODAY FOR FREE CATALOG NO. 78
LAFAYETTE RADIO
 Dept. 2A—100 Sixth Ave., New York, N. Y.

Read RADIO NEWS!

IT'S LIKE HAVING YOUR OWN BROADCASTING STATION

MYSTIC MIKE WIRELESS OUTFIT

NOW 2 MODELS TO SELECT FROM

AN ORIGINAL UNIQUE, ENTERTAINING CHRISTMAS GIFT!

Now offered in two models: the **LITTLE MARVEL** at only \$3.95, and the **DELUXE SUPERTONE** in a beautiful bakelite cabinet with built-in spring-activated microphone at only \$5.95. Either set enables you to do your own broadcasting from any part of your home, office, or store. **NO WIRES CONNECTED TO RADIO.** Simply plug this unit into any AC or DC electric light socket, speak or play music into the microphone and the sound will be picked up by any radio anywhere within the same building. Both sets have variable frequency control for easy radio dialing. Use it for entertaining, auditions, rehearsals, as a public address system—hundreds of other uses. Both sets come complete—nothing else to buy. Phonograph can be attached to Deluxe Model. Order today.

FREE MONEY BACK GUARANTEE! **OLSON MFG. CO., 362 Wooster Ave., Akron, Ohio**

Tear out this ad, write name and address in the margin, mail \$3.95 or order C. O. D. and we will send outfit at once.

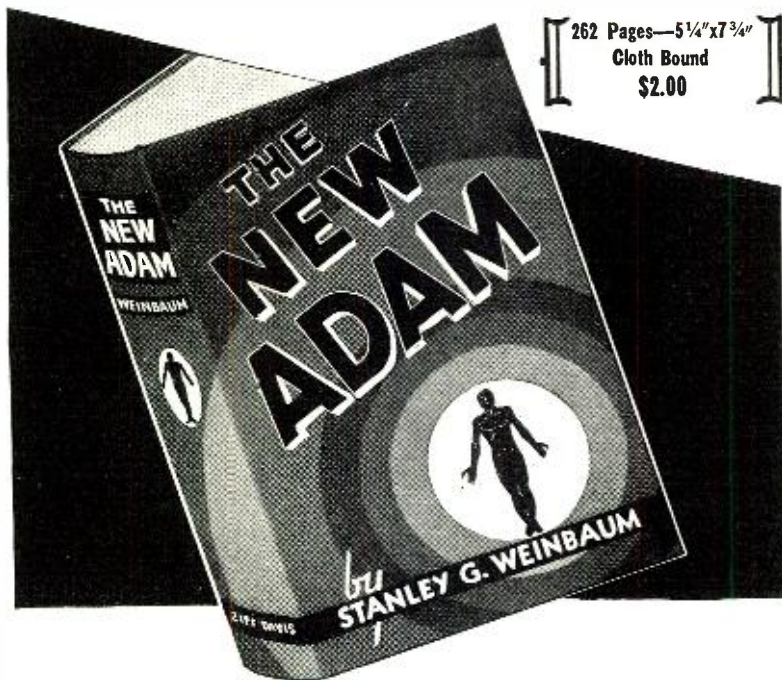
Complete Set With Microphone and Tube \$3.95 ADD 15c POSTAGE

Super Deluxe Model Complete \$5.95 ADD 15c POSTAGE

A SUPER STORY OF A SUPERMAN

- No writer has been better qualified to write about the *story of a superman* than Stanley G. Weinbaum, America's greatest writer of science fiction. He was a master in the field of imaginative and scientific fantasy, with a loyal following of hundreds of thousands of devoted readers. In *THE NEW ADAM*, Weinbaum created the super novel . . . the greatest of all his works . . . a novel that surpasses the best of science fiction.
- *THE NEW ADAM* is the story of a superman . . . of the coming of a man whom nature has placed yet another rung higher up the ladder of evolution. How will he fit into a world populated, in his opinion, by creatures as far below him as the ape is below us? What will he achieve? What will he want? How will he find happiness? Would we be his enemies or his slaves? The gifted pen of Weinbaum answers these questions in this brilliant novel relating the life of Edmund Hall, The New Adam!

Here is a **BIG** novel in every sense of the word! A story of tremendous meaning . . . of amazing scope . . . of fine entertainment! You will want *THE NEW ADAM* to read and read again; to treasure in your library for years to come.



262 Pages—5 1/4" x 7 3/4"
Cloth Bound
\$2.00

● Place Your Order with Your Book Dealer ●

OR—USE THIS CONVENIENT COUPON

ZIFF-DAVIS PUBLISHING CO., BOOK Dept. R140
608 South Dearborn Street, Chicago, Illinois

Gentlemen: I enclose \$2.00. Please send me a first edition copy of *THE NEW ADAM* (postpaid).

Please send C.O.D. postage added. (C.O.D. in U. S. A. only)

NAME

ADDRESS

CITY & STATE

When voltage balance is reached the value of the balancing voltage, which is exactly the same as the measured voltage, is indicated upon a scale over which a pointer travels, connected to the arm of the pot. supplying the balancing voltage. A better arrangement is to use a voltmeter between the pot. arm and the low side of the pot.

Calibration is accomplished by shorting the test prods, turning the balancing voltage to zero, adjusting the "zero" control until the voltage across the pot. is exactly the voltage of the highest range of the instrument. This must be done with the aid of an external voltmeter where the "scale-pointer" type of indicator is used.

With proper voltage across balancing pot. turn pot. to zero, short leads and adjust bias on 6E5 until eye just closes. Once these adjustments are made, the only further adjustment necessary is that of control B for zero adj. and line compensation. Pot. C controls bias on 6E5 and need not be changed, once set, unless the tube is replaced.

The meter may be used for a.f.c. alignment and to check oscillator operation in intermittent receivers. This is done by using a 2 meg. resistor between the osc. grid and the test lead. The high resistance will not change the frequency of the osc. and since the meter requires no current whatever, the resistor could be 20 megs. so far as the meter is concerned.

-50-

Chassis Analyzer

(Continued from page 25)

box. Imitation leather glued on the outside completed the job.

In making connection for output measurements the adjustment knob must be set at maximum resistance to prevent burning the fuse by the surge of current into the condenser. Ohmmeter adjustment is made by turning the selector switch to the low range and adjusting current to one mil. A little corrosion may form on the switch contacts at times making errors in ohms and mils readings. This is cleared by rotating the switch past the point several times. The author believes that this instrument is well worth the time needed for construction.

-50-

Servicemen's Cases

(Continued from page 39)

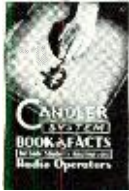
CROSLLEY 120

Noises, but no .1) dynatron oscillator not functioning properly. Shunt a 2,000-ohm resistor across the voltage-divider section which supplies the oscillator plate voltage. Since most '24 tubes now available have "treated" (carbon-coated) plates and will not afford circuit oscillation in dynatron circuits, it may be difficult to get proper '24 replacement tubes for this important position in the receiver. However a 57 tube can easily be substituted for the '24 by making the proper circuit changes. The tuned circuit need not be disturbed. Apply 90 to 100 volts on the screen grid.
Inoperative over 1) clean the screw and station-

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- lower part of dial only
- to clean the screw plate carefully and apply a thin coat of vaseline to each part before replacing to prevent further oxidation
- Intermittent reception . . . 1) replace the small 0.02-mfd. condenser between the '24 and '27 tubes and under the resistor strip. This unit breaks down quite frequently
- Noisy . . . 1) try adding a 0.01-mfd. condenser from the a-c plate of the rectifier to the ground
- Hum 1) check the tiny resistors used in this receiver for "break-down." Replace any faulty ones with good grade metalized resistors
- General Poor performance . . 1) check the tiny resistors used in this receiver for "break-down." Replace any faulty ones with good grade metalized resistors
- CROSLLEY 122**
- Type '24 oscil- 1) 1,300-ohm wire-wound plate lator tube fails to oscillate at low frequency end of dial
- Distortion at . . 1) 1,300-ohm wire-wound plate and screen-grid voltage resistor faulty
- Improving early 1) if the changes which the factory production receivers made in the later production of this model are made in the early-production receivers, improved performance will result. These changes are itemized here:
- change 60,000-ohm detector plate resistor to 25,000 ohms
 - shunt a 300,000-ohm resistor across the secondary of the push-pull input transformer
 - change the 1-meg. pentode grid resistor to 300,000 ohms
 - change the 2,500-ohm volume control resistor to one of 650 ohms. Eliminate the 1,100-ohm shunting resistor entirely
 - change the 3,000-ohm oscill. screen resistor to one of 1,790 ohms
 - change the 25,000-ohm r-f screen-grid resistor to one of 20,000 ohms
- CROSLLEY 124**
- Inoperative . . . 1) open-circuited 2,000-ohm flexible bias resistor between the cathode of the oscillator tube and ground. Replace with new unit
- Intermittent re- 1) defective "bathtub-type" captioned "closed" condenser unit located underneath several other units. Test each section after being inoperative for several hours
- Intermittent re- 2) replace the 0.1-mfd. r-f screen by-pass condenser
- Oscillation 1) "open" r-f or i-f cathode bias condenser
- Noisy reception, 1) defective volume control. Install a new 5,000-ohm unit
- Intermittent re- 1) defective 15,000-ohm r-f and i-f tube screen-grid resistors. Replace with new unit
- Low volume . . 1) defective 4-section 0.1-mfd. condenser block. Usually requires complete replacement (Part W22412)
- Fading 1) 2) look for cold-soldered joint on i-f transformer lug
- Oscillation . . . 1) move position of type '47 tube grid wires from between socket terminals of the type '27 detector tube and type '51 tube screen terminal to a position near the detector choke
- "Rasping" tone 1) distorted voice coil, rubbing against pole pieces. Replace with new coil
- Low frequency howl
- High control- 1) change in value of grid-bias resistors. Connect a 400- to 750-ohm resistor between the volume control and ground, which will keep the bias under control
- General 1) check the tiny resistors used in this receiver for "break-down." Replace any faulty ones with good grade metalized resistors
- Speaker 1) faulty push-pull input transformer. Substitute another even if the bad one checks O.K. If a hum results when new transf. is installed, it may be due to the position it was mounted in. Try shifting it around
- CROSLLEY 124-1**
- Fading 1) high leakage in one of four 0.1-mfd. condensers located in condenser block No. W22112
- Intermittent re- 2) "leaky" two 0.25-mfd. units and 0.5-mfd. unit in condenser block No. W23736
- reception 1) replace condenser block No. W22112 which contains the four 0.1-mfd. condensers

(Continued on next page)

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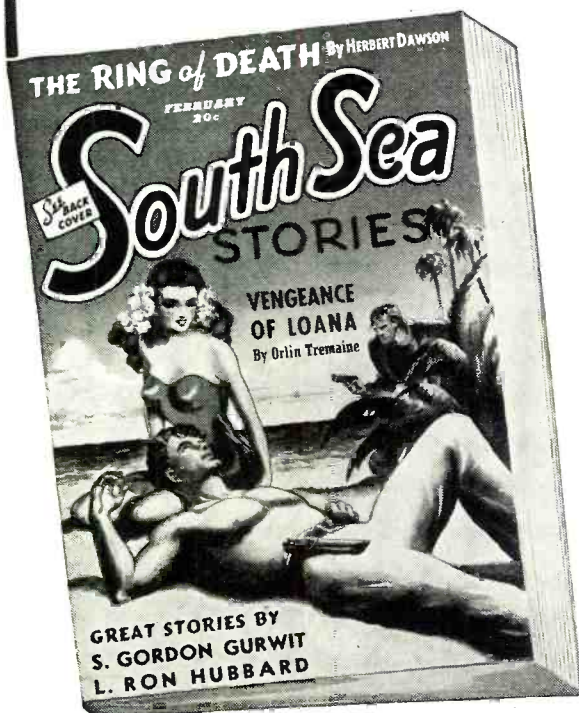
"IF IT'S WAR! YOU WANT...!"

... no time now to lose! He was in the water like a seal ... swimming below the surface toward the powerful Messerschmitt! Barney swung lightly in the surface swell, then cautiously climbed the pontoon, and was in the pilot's cockpit in a flash ... crouching so he could not be seen by his enemies aboard the Posen! Suddenly there was a sharp cry aboard the ship: "The plane! She's loose!" A shiver raced through Barney ... his heart pumped like a trip-hammer! He was risking everything on this one bold play ... and if that failed ... then once again lovely Pahua would be the base for ruthless war pirates ... and the sunken treasure of 1918 would be used to turn the peaceful South Seas into a new theatre of naval warfare! Here is a glamorous, exciting novel of the South Seas! Don't fail to read this dynamic story of modern raiders and sunken treasure ...

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CROSLLEY 124J

- Impossible to align at 175-kc
- 1) grounded or short-circuited winding on first i-f transformer. Replace with new unit
 - 2) defective type '27 oscillator tube. Replace with new tube
 - 3) check "phasing" of twin speakers

CROSLLEY 125

- Inoperative below 875 kc
- 1) faulty 6,500-ohm resistor across primary of oscillator coil (LW 34008). Connect a variable 50,000-ohm resistor across the coil in its place and vary it until best reception is obtained. Check the value of this resistance with an ohmmeter, and substitute a permanent resistor of this value across the coil
- Noise when volume is adjusted
- 1) due to poor slider-contact on the volume control resistance, or to poor contact between the slider and its bearing. Install a secure pigtail contact between slider arm and center contact. But insulate the pigtail so it will not "short" against the metal case of the volume control. Also wash the entire control with gasoline, alcohol, or Carbona

CROSLLEY 126-1

- Distortion
- 1) defective audio coupling condenser
 - 2) speaker out of adjustment

CROSLLEY 127

- Volume drops suddenly
- 1) partial "short" in the i-f transformers
- Tuning meter fails to indicate
- 2) screen grids in '47 tube become red hot, causing them to sag and "short" out. Replace the 6,000-ohm 1-watt resistor which feeds the screen grids of these tubes. Use a 6,000-ohm 10-watt unit

CROSLLEY 128

- Neon pilot light flashes intermittently when set is turned off
- 1) if all condensers in set are O.K. but a milliammeter in B+ lead shows an approximate drain of 0.2-ma. when set is turned off, and increases to about 0.3-ma. every 20 seconds or so, at

which time the pilot flashes, change the wiring of set as follows:
Remove lead from antenna coil to ground on chassis. Run new lead from coil terminal, under coil shield and up to center terminal of volume control. Run new lead, from chassis terminal to point on 4-pole, single-throw switch, to which the black and yellow or 4-2 volt lead is attached. Use well insulated wire. Be sure that volume control is insulated from chassis, as sometimes the fibre washers have been removed. It is sometimes necessary to replace lead from pilot lamp socket to filament prong socket of the '30 oscillator. With this hookup, set and pilot lamp operate normally, but if antenna is grounded or lightning arrester is defective, the pilot lamp will glow continually when the set is turned off and antenna switch is in "distance" position

CROSLLEY 129

- Oscillation at high frequencies (tubes and voltages test O.K.)
- 1) change in value of critical 200-ohm fixed portion of volume control. Check its resistance. Replace with a new volume control unit. In some receivers it is necessary to connect a 25-ohm resistor in series with the 200-ohm section (raising the value of this fixed section to 225 ohms) for proper operation

CROSLLEY 130

- Reception drifts off frequency setting of tuning dial
- 1) leaky or open-circuited 8-mfd. 300-volt filter condenser section of dual condenser unit. Replace with new 450-volt unit
 - 2) leaky or open-circuited 4-mfd. 150-volt screen grid condenser section of dual unit. Replace with new 200-volt unit
 - 3) adjust the oscillator trimmer condenser
- Oscillation, Hum
- 1) check 4-mfd. 300-volt section of dual cardboard type dry electrolytic condenser. Use a 450-volt unit for replacement

CROSLLEY 131

- Weak reception, Fading
- 1) replace '47 second detector and output tube (even if tube tests O.K. in tube tester) test volume control, and replace if necessary

CROSLLEY 132 "CHIEF"

- Low volume, (tubes and voltages test O.K.)
- 1) short-circuited 0.0001-mfd. condenser between the cathode of the '56 tube used as a diode-detector and the 5-megohm resistor. Check the latter unit for change in value also

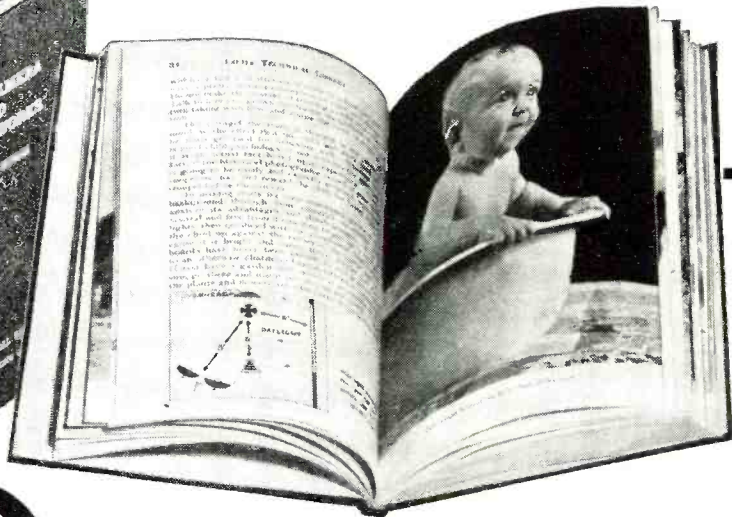
CROSLLEY 132-1

- No AVC action
- 1) defective 0.15-megohm resistor (R-4). Replace with new unit

(Continued on page 66)

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SHORT WAVE ASIATIC LOG for the WEST COAST

Asiatic Station Log

Recently, a complete Asiatic DX log was printed in this column, listing all the weaker and more irregular trans-Pacific broadcasters. The log which appears below this month shows the stronger and more reliable Asiatic transmitters—stations which are heard regularly with good volume in all parts of the Pacific Coast. Most of these stations are also being received consistently in the central and eastern parts of the United States.

- 4.27 meg., RV15, Khabarovsk, U.S.S.R.; one of the oldest and most reliable short wave broadcasters in the world. Heard daily with fair volume from 11 p.m. to 1 a.m., and with excellent volume from 1 to 7 a.m.
- 4.96 meg., YDF, Batavia, Java; a new station usually heard with fair volume near 4:30 a.m.
- 6.00 meg., ?????, Chungking, China; a new transmitter heard well near 4 a.m. with news in English at 3:45 a.m.
- 6.13 meg., "Radio Saigon," Saigon, Indo-China; a super-powered new station, announcing in French, English and Chinese, and broadcasting from 4 to 6:15 a.m. daily. Reported in all parts of America with excellent volume.
- 6.19 meg., JLT, Tokyo, Japan; off the air at the present time, but will be used again this winter from 5 to 6:30 a.m.
- 6.72 meg., PMH, Bandoeng, Java; old and reliable Dutch East Indies transmitter which broadcasts native music from 2:30 to 7:30 a.m. daily.
- 6.80 meg., RV15, Khabarovsk, U.S.S.R.; often uses this frequency near 5 or 6 a.m.
- 6.98 meg., XPSA, Kwei Yang, China; on the air with good volume from 3 to 7:15 a.m. daily. English announcements and news in English at 7 o'clock.
- 7.28 meg., JLG, Tokyo, Japan; off the air during the summer months, but will be used again in the near future, relaying programs of the Broadcasting Corporation of Japan.
- 7.32 meg., ?????, Tokyo, Japan; unidentified Nipponese broadcaster heard with tremendous volume until 5:30 a.m.
- 7.51 meg., JVP, Tokyo, Japan; off the air at present, but will be used again within the next few months on several transmissions of the Japanese Overseas Program.
- 8.54 meg., RV15, Khabarovsk, U.S.S.R.; very strong harmonic of RV15 heard on this frequency in certain locations. Sometimes as loud as the original 4.27 meg. wave near 5 a.m.
- 9.50 meg., KZRG, Manila, P. I.; heard with fair volume from 11:15 to 11:45 p.m., and from 1 to 6 a.m. daily.
- 9.51 meg., VK3ME, Melbourne, Australia; good volume during the 1 to 4 a.m. transmission daily.
- 9.53 meg., JZ1, Tokyo, Japan; off the air at present, but will shortly be used again from 5 to 6:30 a.m., relaying the Overseas Program of the Broadcasting Corporation of Japan.
- 9.54 meg., VPD2, Suva, Fiji Islands; received with good volume during broadcast from 2:30 to 4 a.m. daily except Sunday. Recorded programs and English announcements only.
- 9.55 meg., YDB, Sourabaya, Java; relays the network programs from 2:30 to 7:30 a.m. daily, to 8 a.m. Friday, to 8:30 a.m. Saturday. No English announcements.
- 9.57 meg., KZRM, Manila, Philippines; heard with good volume from 1 to 7 a.m. daily and to 8 a.m. Saturday. Sometimes heterodyned by W1XK from 3:30 to 5 a.m.
- 9.58 meg., VLR, Melbourne, Australia; the most reliable and consistent Australian station available at the present time. Heard with excellent volume daily from 12:15 to 5:30 a.m., and on Saturday to 6 a.m.

- 9.59 meg., VK2ME, Sydney, Australia; heard with fair volume from 10 p.m. to midnight Saturday, and from 2 to 6 a.m. Sunday. Sometimes heterodyned slightly by VUD2 on morning broadcast.
- 9.59 meg., VUD2, Delhi, India; good volume from 4 to 7 a.m. daily. Still on the air but gradually fades out after 7 o'clock.
- 9.62 meg., JFO, Taihoku, Formosa; received with fair signal strength from 5 to 7 a.m. irregularly. Usually gives news in English at 6 o'clock.
- 9.645 meg., JLT2, Tokyo, Japan; new station now carrying overseas programs from 1:30 to 2:30 p.m. daily.
- 9.69 meg., ZHP, Singapore, Straits Settlements; surprisingly good volume from 1:40 to 6:40 a.m. daily. English announcements and news in English at 5:30. Often remains on air until 7 a.m. or later when relaying programs from London.
- 9.92 meg., JDY, Darien, Kwangtung; heard well from 3:45 to 5 a.m. daily with occasional announcements in English. News in English at 4:45 a.m.
- 10.26 meg., PMN, Bandoeng, Java; relays programs of YDB (9.55 meg.) from 2:30 to 7:30 a.m. Sometimes returns to the air at 7:40 a.m. with program of native music.
- 10.53 meg., JIB, Taihoku, Formosa; usually on the air simultaneously with JFO (9.62 meg.) from 5 to 7 a.m., broadcasting news in English at 6 o'clock.
- 10.66 meg., JVN, Tokyo, Japan; formerly used to relay programs of Japanese National Network, but at present used only for phone work irregularly between 9 p.m. and 4 a.m.
- 11.00 meg., PLP, Bandoeng, Java; relays programs of YDB (9.55 meg.) from 2:30 to 7:30 a.m., and is usually the strongest of all Javanese stations on the air at this time of day.
- 11.705 meg., JLG3, Tokyo, Japan; relays the Overseas Programs of Broadcasting Corporation of Japan from 11:30 a.m. to 1 p.m., and from 1:30 to 2:30 p.m.
- 11.73 meg., JWV3, Tokyo, Japan; relays programs from Japanese National Network from 10:40 to 11:30 p.m., and from 1:50 to 4:40 a.m. Excellent volume reported by listeners in all parts of the Pacific Coast.
- 11.785 meg., "Radio Saigon," Saigon, Indo-China; new frequency now being used from 5:30 or 6 a.m. after 6:13 meg. frequency closes down. Good volume.
- 11.80 meg., JZJ, Tokyo, Japan; relays programs on Overseas Broadcasts from 4 to 4:30 a.m., and from 5 to 6:30 a.m., working simultaneously with JZK (15.16 meg.) and JLU3 (15.135 meg.). In the near future, JZJ will also be used from 5 to 5:30 p.m. and from 9:30 to 10:30 p.m.
- 11.88 meg., VLR3, Melbourne, Australia; heard with fair volume from 10 p.m. to midnight, usually broadcasting horse races and recorded music. Sometimes heterodyned by TPA3.
- 11.90 meg., XGOY, Chungking, China; new station which has replaced the old 9.50 meg. frequency. Excellent volume from 3 to 7:50 a.m. daily.
- 14.60 meg., JVH, Tokyo, Japan; relays programs of Japanese National Network from 4:20 to 4:40 p.m., from 6:30 to 7:15 p.m. and irregularly at other hours throughout the afternoon and evening.
- 15.135 meg., JLU3, Tokyo, Japan; new station now in use for relay of JZK (15.16 meg.) during Nipponese Overseas Program between 5 and 6:30 a.m. daily.
- 15.16 meg., JZK, Tokyo, Japan; used for Overseas Programs of Broadcasting Corporation of Japan from 11:30 a.m. to 1 p.m. (weak); from 9:30 to 10:30 p.m. (very

Asiatic Short Wave Log

(Continued from page 64)

- good); from 4 to 4:30 a.m. (good) and from 5 to 6:30 a.m. (good).
- 15.19 meg., XGOX, Chungking, China; formerly on the air from 6:30 to 8:30 p.m., and more recently from 10 p.m. to midnight. Scheduled to resume tests on this frequency near 9 p.m. in near future.
- 15.29 meg., VUD4, Delhi, India; heard with fair volume from 6:30 to 7:30 p.m. nightly (extremely close to Germany's DJQ on the dial).
- 17.78 meg., JZL, Tokyo, Japan; used for Overseas Programs of Broadcasting Corporation of Japan from 5 to 5:30 p.m. daily. Excellent volume.
- 17.80 meg., XGOX, Chungking, China; now on the air experimentally from 10 p.m. to midnight. May shortly shift these test broadcasts to earlier hour.
- 19.83 meg., PLE, Bandoeng, Java; now used only for phone, but usually heard with excellent volume near 4 p.m. -30-

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broadcasting, aviation and police radio, servicing, marine radio telegraphy and telephony, Morse telegraphy and railway accounting taught thoroughly. 48 weeks' Engineering course equivalent to 3 years of college radio work. All expenses low. Catalog free. School established 1874. Dodge's Institute, Oak St., Valparaiso, Ind.

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PASSAIC, N. J.: A practical, constant, portable means of supplying a radio or a direct video television signal for the investigation of circuit characteristics during the development and for routine production testing and servicing of television receiving equipment, is announced by the Allen B. DuMont Labs., Inc., Passaic, N. J. Type 202 Phasmajector Television Signal Generator has been developed to supply a high-definition television picture signal, with sufficient video output to modulate an external ultra-short-wave signal generator such as the Weston Model 787 high-frequency oscillator. The carrier frequency of this oscillator is variable from 30 to 150 megacycles, and its modulation carries a standard high-definition television signal with synchronizing and blanking impulses. The television signal generator may also be used as a source of signal for direct application to video amplifier testing, since an output of positive or negative phase of variable amplitude is supplied.

GE TELEVISION PAMPHLET OUT

NEW YORK.—The General Electric Company has prepared an interesting pamphlet on television for distribution to stockholders. The pamphlet covers the firm's television achievements in transmitting and receiving.

Prominent mention is made of long-distance reception accomplished by GE engineers. Transmitter and receiver facts are included as well as a description of the firm's video display at the New York World's Fair. A forecast of what television will be like six to eight years from now is also made.

"Just as the telephone did not do away with the telegraph," the pamphlet summarizes, "radio did not do away with the telephone, and television will not do away with radio. But television can now aid these other great benefits by extending man's horizons, and contributing to his material comforts."

RMA REPORTS TELEVISION TO FCC

NEW YORK.—According to the Radio Manufacturers Association, the second television report of the Federal Communications Commission, concerning economic factors and pending applications for commercial licenses, will be delayed until fall. The FCC television committee is said to be studying additional economic data.

The RMA reports that financial interests as well as radio manufacturers are participating in the distribution of the association's television statement issued last June at the Chicago convention. The statement, setting forth the RMA stand on visual broadcasting, received wide publicity and RMA headquarters is filing many requests for copies. -30-

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● Where space is decidedly at a premium, when the pocketbook is exceptionally flat, and if only a normal-duty service is expected of components, then by all means consider the DANDEE midget-can electrolytics. Nothing could be more ideal to fit such conditions.

In addition to the extensive listings of single-section units, in 25, 50, 150, 250, 350 and 450 v. D.C.W., from 4 to as high as 100 mfd., you now have the dual-section units for still greater space savings, as follows:

DUAL DANDEES

Type	D.C.W.V.	Size	List Price
8-8	450	1 X2 3/16	\$1.05
8-16	450	1 X2 3/8	1.30
8-8	200	3/4 X2 3/16	.80
8-16	200	1 1/16 X2 3/16	1.00
16-16	200	7/8 X2 3/16	1.15
8-8	150	3/4 X2 1/2	.80
8-16	150	7/8 X2 1/2	.85
20-20	150	7/8 X2 3/16	1.05
10-10	50	1 1/4 X1 1/4	.80
10-10	25	1 X1 1/2	.60

New CATALOG . . .

Just off the press. Lists Dual Dandees and many other new types of condensers. Ask your local jobber for your copy—or write us direct.



Servicemen's Cases (Continued from page 62)

CROSLLEY 137
Insensitive 1) defective oscillator coil. Replace with new unit
No distant reception

CROSLLEY 143
Distortion 1) replace coupling condenser in '30 driver tube circuit
2) if plate current of '30 driver tube is low, replace 3.0 megohm tone control as it is part of the network which regulates the bias to the driver tube

Neon pilot bulb 1) check the 8-mfd. 150-volt lights when set condenser for leakage. Re-switch is in off place it if necessary

CROSLLEY 146
Insensitive 1) open-circuited 12-mfd. condenser section of dual 12-8 local stations
Weak reception on mfd. cardboard encased filter unit. Replace with a 400-volt unit
No distant reception (voltages test O.K.)

CROSLLEY 148
Inoperative 1) charred or open-circuited semi-flexible wire-wound 750-ohm type '42 tube bias resistor. Replace with a new unit. Also check the 8-mfd. 25-volt by-pass condenser shunting this resistor
2) short-circuited 6-mfd. 300-volt, and 8-mfd. 25-volt dual electrolytic filter condenser. Replace with new unit

Inoperative 1) sometimes due to shorting of the I-f tuning condenser suspended in a square hole cut in the chassis between the '58s. Caused by puncture of the mica spacer driven down too tight. Slip a small piece of mica under the hinge part of the condenser plate, and realign. Also check for similar trouble in the other postage-stamp condenser located on top of the chassis
Inoperative, or 1) increase in value of wire-wound impregnated resistor under chassis from I-f coil to plate and cathode of '58. Replace with an 8,500-ohm and 25,000-ohm resistor (both 10-watt types)

Inoperative be- 1) faulty 6-8-mfd. electrolytic condenser (even though it may test O.K.). Substitute a unit of higher voltage rating and note result
low 1200 kc. Volume control inoperative past first 1/2-revolution.

Oscillation all over dial
Intermittent 1) replace the 2.5-volt pilot light with a 6-volt bulb. The pilot is wired across the 6.3-volt tube filament circuit and often reduces the heater voltage below normal—especially if the line voltage drops
Poor operation on low line-voltage

Intermittent re- 1) dirt in padding condenser causing a high-resistance short-circuit. Clean unit with Carbona
ception

Weak reception 1) defective tone-control condenser
Oscillation, 1) try a 0.02 mfd. 600-volt condenser from the power transformer side of the a-c switch to ground
Hum

Fading 1) make sure to use 6-8-volt pilot lights, as 2.5-volt pilots will cause fading
Distortion, 1) grounded speaker winding. Locate and correct the "ground"

Distortion, 1) flow in the plate circuit of the output tube)
Volume drops, 1) see if the twin "cub" condenser in the resistance-coupling network between the '57 detector and the '42 output tube is reversed. The 0.03-mfd. signal-coupling condenser should be connected between the '57 plate and the '42 tube control-grid. The 0.0006-mfd. by-passing condenser should be connected between the detector plate and ground. (In some receivers of this model, the latter is a 0.001-mfd. condenser instead of a 0.0006-mfd. unit. Due to wrong markings on some condensers, the latter unit is incorrectly connected between the ground and '42 tube control-grid)

Carrier hum 1) connect a 0.006 to 0.05-mfd. condenser from the power-transformer side of the a-c switch to "ground" of the chassis—on the outside of the chassis

CROSLLEY 154
Weak on 1) check for 5-meg. grid leak changing value to about 3,000 ohms after 5 or 10 minutes of set operation
low-frequency end of dial

Signals low and 1) first detector-oscillator cathode bias resistor has greatly increased in resistance, putting as much as 50 volts instead of the proper 14 volts on the grid. Replace with resistor of proper value
Distortion 1) check the 150,000-ohm plate-

(starts after set warms up)
Speaker rattle . . . 1) coupling resistor for excessive change in value remove the nuts and washers between the speaker and baffle. Bolt the speaker tight to the baffle

CROSLLEY 156
Will not oscil- 1) remove the regeneration condenser, bend the plates away from each other
late regardless of regeneration control or volume control setting

CROSLLEY 157
Motorboating . . 1) make sure that shield over the '6Q7G tube is making good contact
2) check for "open" r-f plate by-pass condenser

CROSLLEY 158
Weak reception 1) "open" 750-ohm resistor connected from grid of '58 to ground
2) falling off in capacity of the electrolytic condensers

Intermittent . . . 1) "open" in the 0.02-mfd. condenser connected from the "high" side of the 3-megohm resistor on the antenna coil to ground

CROSLLEY 159
Set dead 1) burnt-out resistor in the cathode circuit of the type '43 output tube. Replace with a new unit. Also check the condenser which bypasses this resistor

CROSLLEY 160
Weak reception, 1) check the '59 tubes to see if they are matched. If trouble is experienced matching push-pull stage plate currents, connect a 100-ohm 1/2-watt non-inductive resistor in series with each control-grid—right at the tube sockets
2) check oscillator circuit for trouble. The 20,000-ohm cathode resistor can be re-ohm unit for better reception

placed with a 5,000

CROSLLEY 163
Low volume . . . 1) open-circuited 3-megohm and plate voltage of 300,000-ohm plate load resistors in the type '77 second detector tube drops to about 5-volts)

CROSLLEY 167
Inoperative 1) insulate leads to the dial-lamp socket with spaghetti. The original leads often ground to the chassis
2) faulty electrolytic filter condenser. Replace with new unit

Inoperative 1) leaky or shorted 6-mfd. 300-volt condenser in the dual electrolytic filter condenser unit. Replace with a W-27-488-A condenser (which has a 6-mfd. section with a working voltage of 450 volts)

Inoperative 1) see remedy listed for this same trouble in the Crosley 148 receiver
Chassis smokes, 1) short-circuit between the positive terminals of the 6-mfd. condenser connected between the output transformer primary and ground and the 8-mfd. condenser connected between the cathode and ground. This places a heavy load on the 750-ohm flexible resistor connected between cathode and ground, causing it to burn out. Replace the resistor and the condenser units

Weak or inter- 1) "leaky" or short-circuited 0.1-mfd. condenser across 3,500-ohm resistor in the cathode circuit of the type '58 first detector-oscillator tube
mittent reception on low frequencies

Fading 1) make sure to use 6-8-volt pilot lights, as 2.5-volt pilots will cause fading

Distortion, 1) leakage between filter condensers and the type '2A5 tube cathode by-pass condenser section. Both of these units are contained in a common can
Low volume

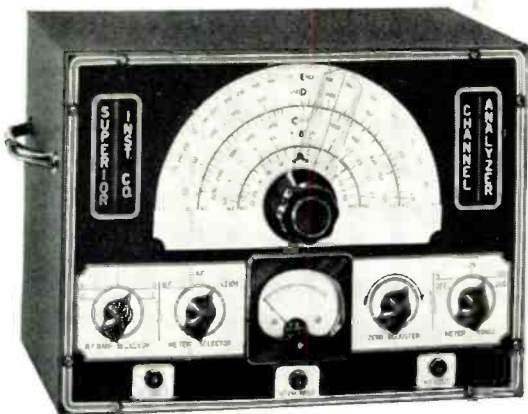
Oscillation all . . 1) "open" or "lowered value" electrolytic filter block on underside of chassis directly beneath power transformer. To locate the faulty unit, shunt an 8-mfd. high-voltage test condenser across one at a time
over dial when volume is turned on full
2) try a 0.02-mfd. 600-volt condenser from power-transformer side of line-switch to ground

CROSLLEY 168
Hiss in back- . . . 1) replace the dual 8-mfd. 25-volt condensers in the cathode circuit of the second detector and output tubes, with 75-volt units

Lack of AVC 2) try several 2A6's, 56's and 2A5's. If this does not help, connect from 400,000 to 100,000 ohms across the primary of the first I-f transformer (use the highest permissible value)

THE NEW CHANNEL-ANALYZER

Follows the SIGNAL from Antenna to Speaker



The well-established and authentic SIGNAL TRACING METHOD of locating the very circuit in which there is trouble, and the very component that causes the trouble, is now for the first time available at a price any radio serviceman can afford.

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 - ★ Check exact operating voltage of each tube.
 - ★ Locate leaky condensers and all high-resistance shorts, also show opens.
 - ★ Measure exact frequencies, amount of drift and comparative output of oscillators in superhets.
 - ★ Track down exact cause of noise.
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A complete testing laboratory in one unit, the Model 1280 combines the Models 1250 Multitester and 1240 Tube Tester. (See specifications of each below.)

- ★ Instantaneous Snap Switches Reduce Actual Testing Time to Absolute Minimum.
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- ★ Works on 90 to 125 Volts 60 Cycles A.C.



Even those servicemen who through past purchases know they can always get SUPER-VALUES from Superior, will be amazed and delighted when they read the specifications of this all-purpose instrument and then note the unbelievably low price. The Model 1280 features a 4 1/2" D'Arsonval type meter for easy reading of the various scales, and in line with our new policy of stressing appearance as well as serviceability in our new 1200 line of test equipment, our Model 1280 utilizes an aluminum etched panel, designed for beauty as well as ruggedness. The primary function of an instrument is, of course, to make measurements accurately and when designing test equipment this is our first thought. However, we also appreciate the important part the appearance of an instrument plays in the impression a serviceman makes on his customers, especially on home calls. We have, therefore, paid special attention to the outward design of all of our new instruments. For instance, the panel of this Model 1280 is made of heavy-gauge aluminum and etched by a radically new process which results in a beautiful, confidence-inspiring appearance.

Model 1280 comes complete with test leads, tabular data and instructions. Shipping weight 18 pounds. Size 13"x11"x6 1/2". Our net price **\$19⁹⁵**

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SPECIFICATIONS

Complete A.C. and D.C. Voltage and Current Ranges	High and Low Capacity Scales .0005 to 1 mfd. and .05 to 50 mfd.
D.C. Voltage: — 0-15, 0-150, 0-750 volts	3 Decibel Ranges
A.C. Voltage: — 0-15, 0-150, 0-750 volts	—10 to +19, —10 to +38, —10 to +53
D.C. Current: — 0-1, 0-15, 0-150, 0-750 ma.	
A.C. Current: — 0-15, 0-150, 0-750 ma.	Inductance: 1 to 700 Henries
2 Resistance Ranges 0-500 ohms, 500-5 megohms	Watts: Based on 6 mw. at 0 D.B. in 500 ohms .006000 to 600 Watts

Model 1250 works on 90-120 volts 60 cycles A.C. Comes complete with test leads, tabular charts and instructions. Shipping weight 9 lbs. Size 9 1/2"x11"x6 1/2". Our net price **\$11⁸⁵**

Portable Cover \$1.00 Additional

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Tests All Tubes 1.4 to 117 Volts

Sockets for All Tubes—No Adapters

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- ★ Tests all tubes, 1.4 to 117 Volts, including 4, 5, 6, 7, 7L, octals, locals, Bantam Jr., Peanut, single ended, floating filament, Mercury Vapor Rectifiers, the new S series, in fact, every tube designed to date.
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- ★ Tests by the well-established emission method for tube quality directly read on the GOOD ? BAD scale of the meter.
- ★ Jewel protected neon.
- ★ Tests shorts and leakages up to 2 megohms in all tubes.
- ★ Tests leakages and shorts in all elements AGAINST all elements in all tubes.
- ★ Tests BOTH plates in rectifiers.
- ★ Tests individual sections such as diodes, triodes, pentodes, etc., in multi-purpose tubes.
- ★ Latest type voltage regulator.
- ★ Features an attractive etched aluminum panel.
- ★ Works on 90 to 125 volts 60 cycles A.C.

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It has all the fine features of the former model *plus these quality additions:* 1 Additional Stage of I.F. (2 I.F. Stages in all); 1 Additional Tube (making 9 tubes in all); Dickert Automatic Noise Limiter; Separate Electrical Band Spread—Inertia Controlled; Drift-Compensated High Frequency Oscillator; 3 Watts output; *Both Dials Illuminated.*

Of course it retains all the essential features of the former model such as a Stage of Pre-Selection; Sponge Mounted Speaker; Beat Frequency Oscillator; Continuous coverage from 545 kc to 44 mc, etc.

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