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Why Do You Want to Succeed?

THERE are several answers to this question. You may want to succeed for the very human reason that you want more money with which to enjoy life or . . .

. . . you may have a family—wife—children—whom you desire to surround with those comforts they so well deserve—a home—a new car—good clothes—insurance—financial security.

Or, your ambition to succeed may be prompted by the desire to bring happiness to an aged father—mother—or other near and dear relatives whose chief hope in life is to see you enjoy prosperity—prestige, to see you on the pinnacle of success.

Any one of these may be the backbone of your ambition. Each is admirable. That you do have ambition is evidenced by the fact that you have studied to get away from the rank and file jobs—the humdrum existence of low pay—insecure employment. It only remains for you to give full play to this ambition—to follow its dictates and go forward to victory. With ambition "the game is in your hands."

A new year is at hand. New Year's day is frequently used to make lightly considered resolutions for the coming year. Most of these resolutions are forgotten before New Year's dinner is out of the way. Don't waste time in making resolutions to "do this" and "not to do that" when the "do's and don'ts" are of minor importance.

Concentrate on ONE RESOLUTION. Determine what is *your* reason for desiring Success. "Why do you want to advance?" With this thought in mind resolve, firmly, that you will never allow your ambition to weaken—that you will never swerve from the path which leads directly to your goal. This is a worthwhile resolution—one to which all others should be subordinated. *Make* this resolution and KEEP it and not only 1936, but all the years to come will be much happier for you—much more prosperous.

E. R. HAAS,
Vice-President and Director.

Chief Instructor J. A. Dowie writes about . . . .

Radio Vacuum Tubes With Metal Envelopes

YEARS ago, when the manufacture of Radio receiving sets and vacuum tubes became a roblem of large scale production and distribu-on, the Radio industry and the buying public uld not understand why the vacuum tube had be so fragile.

Tube engineers, it must be conceded, have im-oved on the original two and three element ube in which there was very little metal within e glass envelope, until at the present time the ass tube is a remarkable assembly containing veral grids, plates, and cathodes, the weight which is greater than the glass envelope. lthough the tube's internal construction is urdy and rugged, the glass envelope is still ore or less fragile.

Tube engineers and manufacturers have, for me time, felt that tubes should be improved on by doing away with the glass envelope, pecially nowadays when vacuum tubes are ing used more and more for industrial pur-ses, where tubes of rugged construction, hich will withstand mechanical shock, must available.

So, by the latest introduction of vacuum tubes closed in metal, Radio tube engineers have minated the long-standing objection of the adio industry and have fulfilled the needs of e future.

It should, however, be clearly understood that e only important new feature in the so-called ll-metal tube" is the metal envelope. To be re, the ability to enclose several electrically olated elements in a tube of steel and draw t all the gas to a high vacuum is an engineer-g feat worthy of every recognition.

In introducing a radically different type of cuum tube, the tube manufacturers in co-eration with the Radio industry as a whole, cided that certain previous errors and poor sign which crept in the development of the ass tube should be eliminated. So, in making ese new metal tubes the first design change as to make them somewhat smaller than the esent type of glass tube.

The bulb or shell diameter is 1" except at the se where the maximum diameter is $1\frac{5}{16}$". e shell is all metal, and the lead wires from e internal elements are brought out through ass beads fused to eyelets in the "header" hich is the metal disc that seals the steel shell the bottom. The shell is connected to a base n and operates at ground potential to elimi-te any danger of electrical shock. The over-l length of the tube is also reduced.

The metal tubes were made smaller, not solely to reduce the chassis size, but for the following reason:

Since the elements are smaller, the internal capacity between the grid and cathode; grid and plate; and plate and cathode becomes smaller—without materially changing any of the other characteristics—so that the tubes become more useful in all-wave receivers, especially in the 20 megacycle band.

Another feature of the new tube is its base. A new type of octal base has been developed which has provisions for eight pins, or prongs, uniformly spaced with an aligning or locating plug and key. The plug is slightly longer than the tube pins.

Where fewer than eight pins are required, by the tube, the unnecessary pins are omitted and the spacing of the remaining pins is unchanged.

This arrangement makes it possible to use one type of socket for all tubes, to set up a universal pin numbering system, and also makes installation of tubes very easy under difficult circumstances, such as poor light or in sockets not easily accessible.

To insert a tube in a socket, all you have to do is to place the central aligning plug in a hole centrally located in a special 8 hole socket which has a key-way cut in the insulated material of the socket, rotate the tube until the key slips into its key-way cut or groove, and push the pins into their holes.

As all the new metal tubes will go into any 8 hole socket, (the pins and socket arrangement make this possible) it is advisable to be very

(Page 4, please)

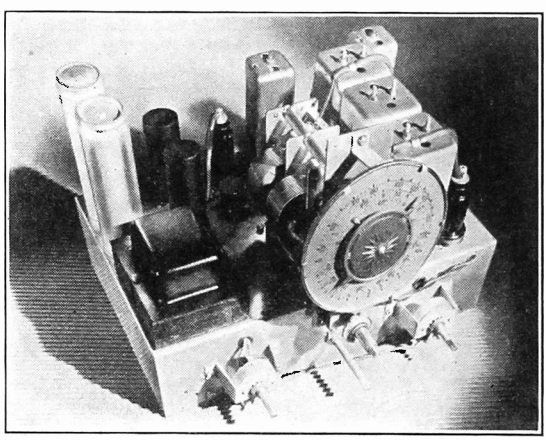


Fig. 1 Chassis of modern all-wave Radio receiving set using metal tubes.

(Courtesy Stewart-Warner Company)

All Metal Tubes (Continued from page 3)

careful and replace the proper tubes in the right sockets when servicing Radio receivers using metal tubes. Therefore, when removing these tubes from the chassis, make a note which socket each tube was taken from, otherwise you will need a chassis layout of the receiver to get all the tubes back into their proper sockets.

Numbering of the pins begins at the shell connection, which is always the first prong to the left of the aligning key when the base is viewed from the bottom with the key toward the observer. This is prong No. 1. In an 8 prong tube, the remaining prongs are numbered 2, 3, 4, 5, 6, 7, 8, when traced in a clockwise direction. For tubes with less than 8 prongs, any prong will have the number corresponding to the same position in an 8 prong tube.

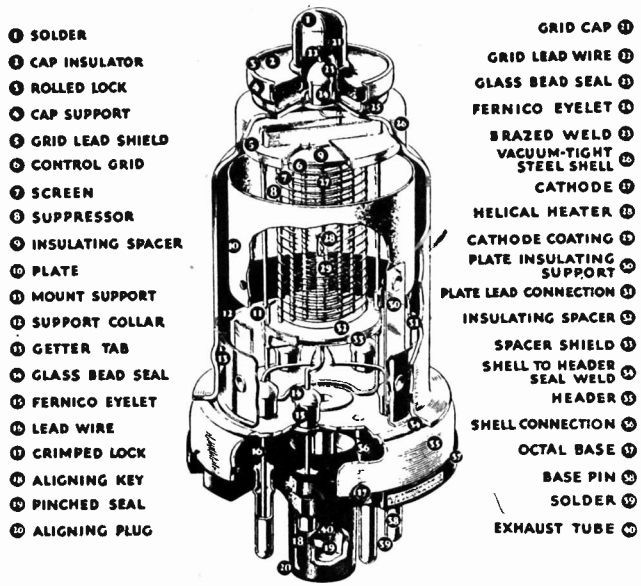


Fig. 2—Internal Structure of All Metal Tube
(*Courtesy RCA*)

Characteristics and operating conditions of the first ten metal tubes and the bottom views of the bases with pin numbering and schematic arrangement of the tubes are shown in Table No. 1.

In general, the metal tube characteristics are very similar to the popular 6.3 volt filament glass tube types. However, in no case are standard glass tubes and metal tubes interchangeable.

The similar types of glass tubes you will notice are listed in the last column of Table No. 1, opposite the metal tube types.

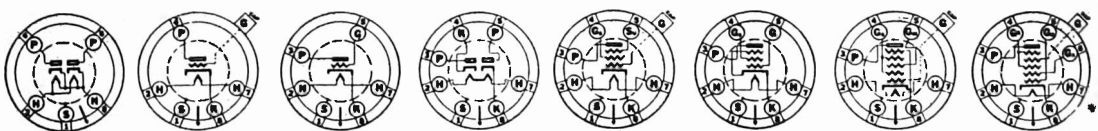
The following is a summary of the ad-

(Page 24, please)

Type	Use	Base	Dimensions In Inches		Filament Rating		Plate Volts	Negative Grid Volts	Screen Volts	Plate Current ma.	Screen Current ma.	Plate Resistance Ohms	Mutual Conductance Micromhos	Amplification Factor	Load Resistance Ohms	Milliwatts Undistorted Output	Similar Glass Type
			Lgth.	Dia.	Volts	Amps.											
5Z4	F. W. Rectifier	5-L	5⅛	1⅝	5.0	2.0	400	RMS Volts/ Plate		125							80
6A8	Converter	8-A	3⅛	1⅜	6.3	0.3	250	3.0	100	3.0	3.5	500,000	†650				6A7
6C5	Amplifier	6-Q	2⅝	1⅜	6.3	0.3	250	8.0		8.0		10,000	2,000	20			76
6D5	Power Amplifier	6-Q	3¼	1⅝	6.3	0.7	275	40.0		31.0		2,250	2,100	4.7	7,200	1,400	45
6F5	Amplifier	5-M	3⅛	1⅝	6.3	0.3	250	2.0		0.9		66,000	1,500	100			*
6F6	Power Amplifier	7-S	3¼	1⅝	6.3	0.7	250 ‡250	16.5 20.0	250	34.0 31.0	6.5	80,000 2,600	2,500 2,700	200 7	7,000 4,000	3,000 850	42
6H6	Rectifier	7-Q	1⅝	1⅝	6.3	0.3	100	RMS Volts/ Plate		2.0	Maximum						*
6J7	Detector, Amplifier	7-R	3⅛	1⅝	6.3	0.3	250	3.0	100	2.0	0.5	1,500,000	1,225	1,500			77
6K7	Amplifier	7-R	3⅛	1⅜	6.3	0.3	250	3.0	100	7.0	1.7	800,000	1,450	1,160			78
6L7	Mixer	7-T	3⅛	1¾	6.3	0.3	250	6.0	150	3.5	8.0	2,000,000	‡325				None

†Conversion Conductance. *Type 6F5 is similar to the Triode Section of Type 75, and Type 6H6 is similar to the Diode Section of type 75.
When used together they become equivalent to the 75. ‡Triode operation.

Bottom View of Bases



SYMBOLS—H-Heater; P-Plate; K-Cathode; S-Metal Shell; G-Control Grid; Gs-Screen; Ga-Anode Grid; Go-Oscillator Grid; Gm-Modulator Grid; Su-Suppressor Grid; □ Top Cap; ——→Locating Pin.

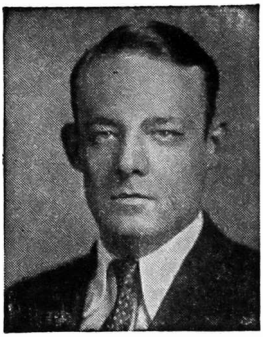
(*Courtesy Hygrade Sylvania Corp.*)

Table No. 2—Characteristics

The Service Forum

Conducted by

J. B. Straughn, N. R. I. Service Consultant



ZENITH MODELS 835-880 **SERVICE NOTES**

Dial Slips or Binds. Tighten lugs on planetary drive. See that both pointers are free. Make sure gang is squarely lined up with dial.

Off Calibration. Check for loose set screws on dial assembly to condenser shaft. Black pointer may be loose on shaft.

Poor Tone. Defective tubes in audio. One side of push-pull circuit faulty. Check audio and output transformers. See A. V. C. blocking.

Insensitive. Out of alignment, weak tubes or defective by-pass condenser.

Shadowgraph Inoperative. Weak 76 tube, burnt out shadowgraph, open resistor in 76 plate circuit.

Distortion at Medium Volume. Defective 75 tube, defective volume control. Separate green volume control-lead and speaker-lead close to grid of 42 tube.

Insensitive on Any Short Wave Band. Check alignment, make sure R. F. circuit is not aligned to image frequency. Change 6A7 tube. Change position of fixed condensers adjacent to rear section of wave change switch. Location of these condensers in relation to each other and their distance from the chassis will effect dial calibration and sensitivity, especially on the Blue Band.

Stops Oscillating Around 9 M. C. Change 6A7 tube, leakage in 50 mmfd. or .0029 mfd. condenser.

A. V. C. Blocks. Shorted resistor on antenna choke. C-14 padder shorted. Grounded R. F. grid circuit.

Oscillates on Broadcast. Check alignment. Push brown wire away from 6A7 socket. Grounded cathode on 1st R. F. or grounded to 500 K. C. padder. Check for open by-pass condenser.

Noisy. Shorting plates in gang condenser. Poor contact in band switch. Loose shields or shield bases. Static shields may be touching leads under gang condenser.

Overheats. Check pilot light and heater circuits for partial short or ground.

Flutters. Rearrange leads under chassis especially around 6A7.

Oscillates on Short Wave Bands. Make sure brown R. F. grid return lead is pushed away from 6A7 socket. Check for ground on any A. V. C. lead. Open by-pass condenser.

Tone Control Inoperative. Resin joint or poor contact on tone control switch. Defective condensers in tone control circuits.

Continuous Audio Whistle. Rearrange leads in audio circuit.

———*n r i*———

ATWATER KENT MODEL 55 **NOISY LOCAL DISTANCE SWITCH**

Turn knob back and forth rapidly until trouble disappears.

———*n r i*———

STROMBERG CARLSON MODEL 29 **HUM**

Increase the capacity of the filter by connecting an 8 microfarad electrolytic condenser between the high voltage side of the speaker field and the chassis.

———*n r i*———

SENTINEL MODEL 289 **OSCILLATION**

Install a new resistor in the grid return of the first audio tube. This condition makes itself apparent when the volume control is advanced and after the set has been on a short time.

———*n r i*———

SIMPLEX MODEL P **DEAD**

Shunt the .00008 microfarad condenser connected from the negative filament of the first detector to the chassis with another of about the same size. This condenser often opens.

———*n r i*———

SILVERTONE MODEL 1580 **MORE PEP**

Replace the 400 ohm resistor in series with the volume control with another having a value of 200 ohms.

———*n r i*———

SILVERTONE MODELS 1806, 1824, 1829, 1830, 1823 and 1831 **DEAD**

Check the lock washer under the screws that mount the number 3 and number 4 band short wave coils to their trimmer condensers as it may cause a short to the stator plate of the trimmer. It is also possible for the washer to short to the movable plate of the trimmer. If the tuning meter fails to function properly in these models (1806 has no meter) or if the

(Page 7, please)

Talk Over Light Beam

President Roosevelt, Governor Lehman Dedicate Highway

IN dedicating the Whiteface Memorial Highway in the Adirondacks of New York State, President Roosevelt spoke from atop the 5,000-foot mountain over a beam of light to the crowd at the Lake Placid Airport, seven miles away. This was made possible through the installation of special apparatus by General Electric engineers, both on the mountain top and at the airport.

The night before, Governor Herbert H. Lehman of New York State spoke over the same distance by means of the light beam. So thrilled was he with his unique experience that after the president had spoken the next day, Governor Lehman asked if he might repeat the feat to show members of his family who were with him how the apparatus worked.

Both the night and day demonstrations were most successful, and not a word was missed, although once or twice the talk by Governor Lehman at night faded to low tones when small clouds floated by the mountain top and partially covered the light beam.

Atop the mountain there was installed a 24-inch searchlight, on which the voice of the two distinguished speakers was modulated. It was necessary to transport an engine-driver power plant and a dozen or more storage batteries, as both alternating and direct current were required to operate the apparatus. At the airport, where electricity was available, the installation of the other 24-inch mirror disk for reception was comparatively easy. The signal, as picked up from the light beam from the mountain top, was amplified and fed into a public address system. By means of short-wave equipment, also installed by General Electric, it was possible to talk back from the airport to the mountain. State Conservation Commissioner Lithgow Osborne, who introduced Governor Lehman, enjoyed this experience of a two-way conversation. He talked over the light beam and listened over a Radio receiver.

In addition to the light beam demonstration on the mountain, another unique use was made of the light beam and a photoelectric tube. It was used as an "invisible" rope by Governor Lehman for the unveiling of a tablet at Wilmington Notch, in the heart of the Adirondacks, commemorating 50 years of conservation in New York State. Upon concluding his remarks, Governor Lehman reached for this "rope" and in doing so intercepted the light beam, which automatically started electric equipment, pulling the covering from the boulder bearing the tablet.

Governor Lehman of New York speaking into the microphone which carried his voice over a beam of light.

The third use of the light beam and phototube was in demonstrating the gun which shoots "bullets" of light. This was set up in the Lake Placid arena and proved a most popular novelty for the hundreds who were attending a three-day rod and gun meet sponsored by the state. In this case an incandescent lamp was encased in the barrel of the gun. In pulling the trigger a short flash was emitted. The target was a standard bull's eye, but in the center of the black circle was a small opening facing a phototube. When the light struck this, a relay was set in action, ringing a bell and lighting a red-colored lamp atop the target.

Insuline Catalog

NATIONAL RADIO NEWS has just been informed that the new, 1936 catalog of the Insuline Corporation of America, manufacturers of insulating materials, Radio and Television parts and apparatus, is ready for distribution.

Any reader of NATIONAL RADIO NEWS who so desires, can obtain a copy free by writing to the Insuline Corporation of America direct at 23-25 Park Place, New York City.

The Service Forum (Continued from page 5)

A. V. C. fails to operate examine the mounting of these coils to their condensers under the chassis. The trouble can be eliminated by loosening the screw, pushing the lock washer away from the condenser and then tightening the screw while holding the lock washer in the proper position.

———*n r i*———

SILVERTONE MODELS 1823 1824, 1829, 1830 and 1831 — TUNING METER BURNS OUT

If the soldering lug on the small choke coil should touch the metal bottom cover of the chassis a short circuit will occur that will burn out the tuning meter. This can be prevented by gluing a piece of thin fibre to the chassis cover, immediately under the choke, or better by bending the lugs of the choke in such a way that it would be impossible for them to touch the chassis bottom cover. In a few cases, it may be necessary to unsolder the lead of the choke so that the choke can be remounted with the lugs at a different angle to prevent the possibility of a short. Then replace the lead.

———*n r i*———

SILVERTONE MODEL L711 — AUDIO HOWL

This is generally caused by the coil shield on the right front of the chassis (looking from the rear) touching a nut holding the speaker to the front of the grill. Enlarging the chassis bolt holes on the backside and floating the speaker to the front of the cabinet on cardboard will clear up the trouble.

———*n r i*———

GENERAL MOTORS MODELS A and B — INTERMITTENT RECEPTION

Try a new first R. F. cathode by-pass condenser. One having a value of .25 microfarads will prove satisfactory. In case of oscillation check the connections between the rotors of the tuning condensers and the chassis. Also consider the installation of a flexible pigtail connector from the condenser rotor to the chassis.

———*n r i*———

GLORITONE MODEL 24 (Early) — EXCESSIVE HUM

Check the speaker field for shorted turns. A continuity test between the yellow and red speaker field leads should show a resistance of about 2,500 ohms when the field is hot. In these early models a .006 microfarad condenser was connected from the power transformer primary to ground. An open in this condenser will cause a hum. Try reversing the A. C. line plug.

———*n r i*———

ARVIN MODEL 16 — MORE PEP

Remove the resistor in series with the cathode of the second detector tube. This is the resistor which serves to bias the diode of the detector. The removal of this bias will enable the weakest signal to come through. When motor noise is present this increase in pep will be objectionable particularly between stations.

———*n r i*———

ATWATER KENT MODEL 55 — IMPROVING

Some improvement in this model can be made by using 35 type tubes in place of 24 type tubes. The change is made by disconnecting the cathodes of the 24 type tubes from the original bias resistor, leaving the low end of the volume control connected so as to ground through the bias resistor. Connect the cathodes of the 24 type tubes together and place a 100 ohm resistor from this lead to the chassis. Disconnect the lead from the old bias resistor and connect it to the cathode of the 1st R. F. tube. Install the 35's in the 24 type sockets. Some improvement in selectivity will be noted.

———*n r i*———

CHEVROLET MODEL BOP 980459 — INTERMITTENT

Generally caused by a partial short in the primary of the push-pull input transformer. If another push-pull input transformer is available it will be worth while to try it as it is very difficult to check the defect in the old one.

———*n r i*———

COURIER MODEL 65 — OSCILLATION

When all the usual remedies for oscillation fail and everything checks okay, connect a .1 microfarad condenser from the ungrounded end of the control to the chassis.

———*n r i*———

CROSLEY MODEL 95 — DISTORTION AND WEAK RECEPTION

Try reversing the leads to the speaker field. Incorrect polarity on the field will cause the action noted above.

———*n r i*———

CROSLEY MODELS 58 and 59 — MORE PEP

Disconnect the screen of the 24 type detector tube and connect it through a 2 megohm resistor

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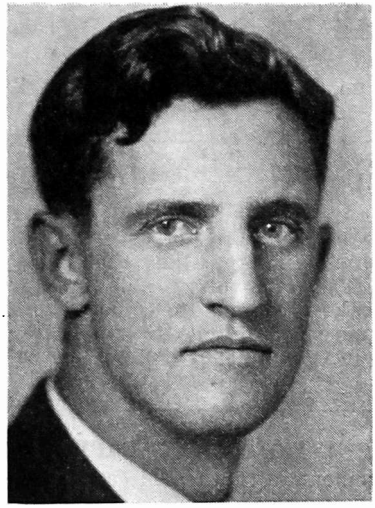

DAVID SMITH
N. R. I. Instruction Staff

Here is a man who has never before written for National Radio News. Not that he is a newcomer to the National Radio Institute—he has been on the Instruction Staff for years—but this is the first time we have ever been able to get him to write for publication. He knows Radio—and knows the problems of the men in the field. He gives us here a new kind of an article—one we believe will be a great help to our readers. We are going to do our level best to get him to write some more articles for future issues.—Editor.

I Know a Fellow

THE fellow I have in mind had very little to start out with outside of his N. R. I. Training and a whale of a determination to make good in Radio. From my experience I have found that this is usually enough to send a fellow forward to success.

This fellow saw big opportunities in the public address field—and that's the line of work he is following. His name is Louis W. Thomsen; he operates as the Capital Amplifier Company of Washington, D. C., and his big blue and orange truck, darting here, there, and everywhere, is a familiar sight on the streets of this city.

Thomsen went to a ball game. The game was in Griffith Stadium, home of the Washington Senators of the American League, and incidentally, one of the largest parks in the League. On the center field wall are a number of horns which represent the public address system of the park. He listened to several announcements. He questioned several people sitting near him about the volume and tone of the system, and learned that they thought it was pretty poor. He lost no time in going to the management. It was decided that a new system was required. Bids were asked. This young fellow, in competition with several large corporations, landed the job. Mr. Griffith's ball yard is now equipped with a public address system installed by our young friend's Capital Amplifier Company. But that's not all!

In addition to clearing up a profit of about $750 on that job, he also secured a five-year contract to service the equipment, which nets him a nice profit. As a result of the good installation and the fine service he has given, he certainly has an inside track on the job of replacing this system when such replacement is necessary.

One good job leads to another. I had an opportunity, just a few days before this article was written, to attend a football game at Griffith Stadium. George Washington University was playing Alabama. The buff and blue of George Washington, the crimson of Alabama, the bands playing, the 30,000 spectators on a beautiful fall day, made a colorful scene. To add to the enjoyment, Thomsen was on hand with a public address system that covered the stadium like a blanket. If there was a spectator in the park who did not hear every play clearly announced over the system, it was because he was deaf. Here's how that job came about.

Football crowds have come to demand loudspeaker systems at their games. George Washington University wanted such a system. Physical conditions did not warrant the use of the regular public address system of the ball park. Since Thomsen had previously erected the P. A. system in the stadium, he easily got the job for this football game.

A tower was built alongside of the stands which held the student cheering section. At the top of this tower were eleven ten watt speakers, fed by a 100 watt class B high fidelity amplifier.

I saw him on at least two other jobs—one a Police Benefit Boxing Match, and the other at a horse show in Virginia. On both of these jobs he used his P. A. system mounted on a truck. He landed one of these jobs by going direct to the head of the committee in charge of the Police Benefit, and selling him on the idea. In the case of the horse show, he found out that this was being sponsored by a large oil company, and he immediately contacted the chief executive of the local branch of that organization and made the sale through him. In all these cases you'll note he gets right to headquarters and does his selling.

He tells me that most of his success in obtaining so many large jobs is in the difference in his selling methods and those of his competitors. "Most of them" he says, "do not realize that in the majority of cases they are talking

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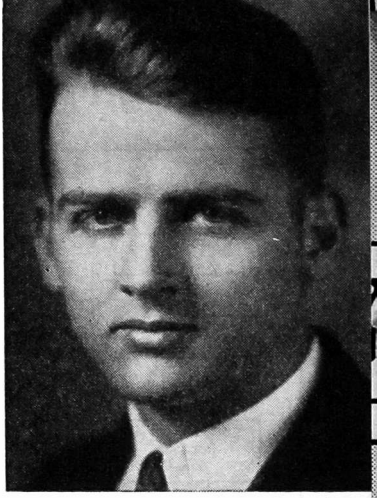
Monitoring Problems In Radiophone Transmitters



PAUL H. THOMSEN
NRI Communications Consultant

THERE are two practical ways of monitoring a Radiotelephone transmitter during operation. They are: (1), The visible method using a vacuum tube voltmeter or a cathode ray oscillograph, and (2), the audible method using a power detector and a loudspeaker. Regardless of the system used we will usually question the fidelity of our check. Unquestionably, we will find that the first procedure using the cathode ray oscillograph will be the better; however. the faithfulness of our measurement is still, to be sure, questioned. I will therefore cover briefly some of the problems experienced. I will suggest to you how to overcome some of the problems involved, and furthermore supply you with schematic wiring diagrams of Radiotelephone transmitter monitors giving the values of the parts for operation in the broadcast band.

A Typical Monitor Circuit

The circuit combination shown in Fig. 1 is that of a typical monitor employed in some Radiotelephone transmitting stations using low power. The circuit is simple and straightforward. Briefly. the monitor consists of the following units: The pick-up antenna, the antenna tuning condenser C1, the antenna coupling coil

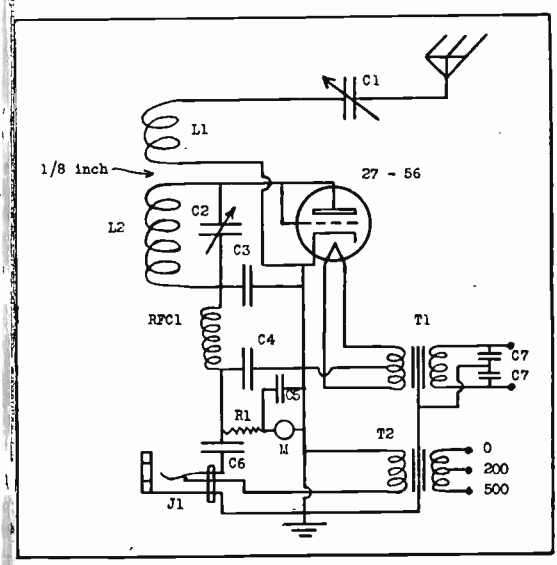


Fig. 1

L1, the detector a 27 or 56 connected as a half-wave rectifier heated by the filament transformer T1, the tuned circuit L2-C2, the R. F. by-pass condenser C3, the RFC1 rejecting high frequency choke further by-passed by the condenser C2, the rectifier load R1 connected to an indicator or meter M by-passed by condenser C5, the A. F. coupling condenser C6, the telephone jack J1, and the output matching transformer T2. Two R. F. by-pass condensers C7 are employed to reduce R. F. pick-up from the power line supplying filament voltage. For those interested in building the simple and effective monitor, I am listing below the values of the parts required for operation in the broadcast band.

C1—350 or 500 mmfd. variable condenser.
C2—350 or 500 mmfd. variable condenser.
C3—250 mmfd. mica condenser—non-inductive.
C4—500 mmfd. mica condenser—non-inductive.
C5—2 mfd. paper low voltage non-inductive condenser.
C6—2 mfd. paper 600 volt non-inductive condenser.
C7—1 mfd. paper 250 volt A. C. non-inductive condenser.
L1—25 turns of No. 28 D. C. C. wire on a 2 inch form.
L2—60 turns of No. 28 D. C. C. wire on a 2 inch form.
R1—15,000 or 25,000 ohm 2 watt resistor.
J1—telephone jack (closing circuit type).
T1—step-down transformer, 110 volts to 2.5 volts.
T2—single plate to line matching transformer.
RFC1—6.5 millihenry R. F. choke.
M—0 to 5 milliampere D. C. meter.

Proper Adjustment of This Monitor

Now for correct adjustment of this monitor we require 2 milliamperes of rectified current flowing through R1. This current should flow with the condenser C2 tuned to the exact frequency of the transmitter. This is indicated by

(Page 10, please)

Monitoring Problems In Radiophone Transmitters (Continued from Page 9)

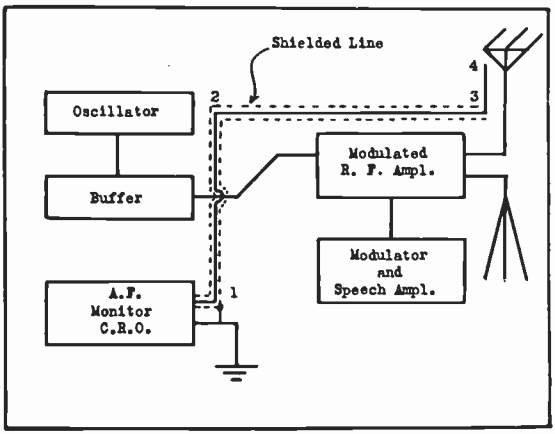


Fig. 2

the point on the dial controlling C2 where maximum rectified current flows through the meter M. We can limit the current flowing with the adjustment of C1 so that the rectified current will be of the desired value with C2 still tuned to indicate maximum current through M. With this adjustment we will obtain from 0 to 20 D. B. A. F. output across the secondary of the transformer T2. This will be sufficient power to operate a loudspeaker at normal room volume. Furthermore, the output of the monitor may be fed into a shielded line to A. F. amplifiers operating loudspeakers about the studios or offices of the station.

Coupling of Monitor to Transmitter

We can expect this combination to deliver very good A. F. when properly coupled to a radio transmitter. I say when properly coupled because this point is oftentimes overlooked. For instance, let's monitor the modulated carrier of a Radiotelephone transmitter similar to the one shown in Fig. 2. We find the usual crystal oscillator, buffer, R. F. amplifier and modulated R. F. amplifier feeding the antenna system. Yes, the modulator and its associated speech amplifier is included. These units are mounted in separated sections and coupled together with unshielded R. F. lines as is the usual practice in semi-composite jobs. We found that due to mechanical reasons the monitor could be placed over the buffer stage of the transmitter and we decided to put it there. This then requires that we run our pick-up antenna past the R. F. amplifier section of the transmitter to the radiating antenna of the transmitter. In this particular case we found that only 5 feet of unshielded wire running from the monitor point No. 1 to point No. 2 in Fig. 2 is required to give the desired rectified current through the meter M. We are now ready to test our monitor by listening to the A. F. detected. Actual tests indicate that during modulation the A. F. received from the secondary of transformer T2 is extremely low. This occurs even with 100% modulation of the transmitter carrier. Why don't we receive more A. F. voltage from the output of the monitor? Well, to be sure, the R. F. fed to the monitor is not modulated! This is true because we are picking up unmodulated R. F. from the buffer amplifier of the transmitter. The signals radiated by the antenna do not override the unmodulated R. F. fed into the monitor. This is due to the small spacing between the short pick-up antenna on the monitor and the R. F. coupling lead to the R. F. amplifier in the transmitter. This is a very important point and should not be overlooked by operators of Radiotelephone transmitters regardless of the service offered; broadcast, police, aircraft or amateur. Monitor the modulated R. F.!

Let us see what can be done to correct this condition. We may shield the pick-up lead from the monitor point No. 1 to point No. 3 and then make an extension of the pick-up lead to point No. 4. This then will make it necessary to use very close coupling between the unshielded portion of the pick-up lead and the transmitting antenna lead-in. Close coupling is necessary in order to obtain sufficient rectified

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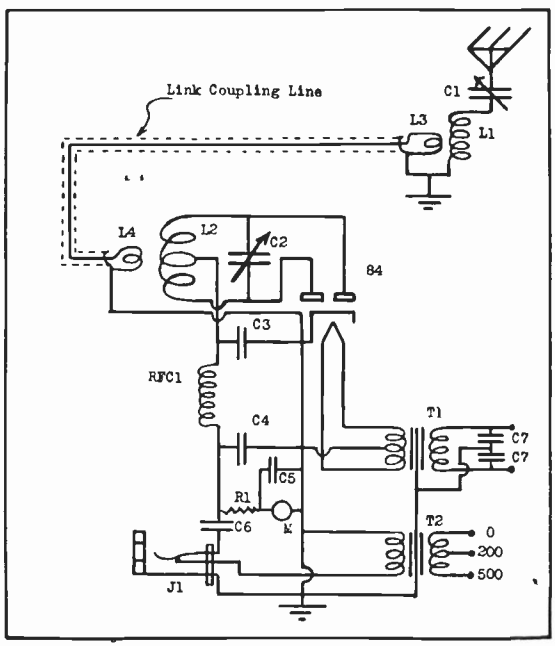


Fig. 3

Monitoring Problems In Radiophone Transmitters (Continued from page 10)

current in the monitor due to the absorption of energy by the high capacity surrounding the lead-in to the monitor. To overcome this loss, let's look at Fig. 3 and see how it is done. Note in particular that the pick-up unit C1-L1-L3 is mounted near the antenna lead-in to the transmitter. A low impedance link coupling system is used to feed the R. F. through the line to the monitor mounted in the original position. By doing this we can overcome line losses and obtain coupling to the part of the transmitter doing the radiating. L3 and L4 consist of 3 turns each about 2.5 inches in diameter. The line may be any length up to 100 feet. If possible you may eliminate C1 and L1 and couple L3 closely to the antenna coupling inductance of the transmitter. L3 may be mounted on a hinge, thus permitting any desired amount of coupling.

Careful examination of Fig. 3 will disclose that the much preferred push-pull detector or full-wave rectifier is used. This combination employs the same part values as those used in Fig. 2, with the exception of the 84 type tube, the center-tapped inductance L2 and the 6.3 volt secondary winding on the step-down transformer.

Non-Linear Modulation Is Also Indicated

It is possible to indicate non-linear modulation with the monitor circuits described. This will be noticed by an increase or decrease in the rectifier current indicated by the meter M during modulation. An increase in current with

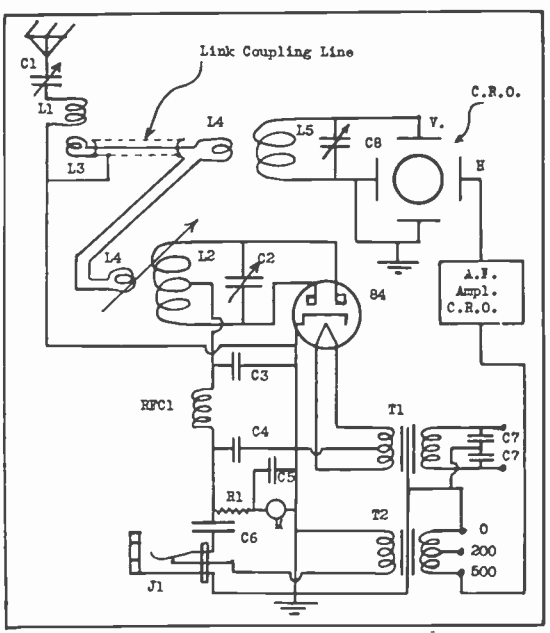


Fig. 4

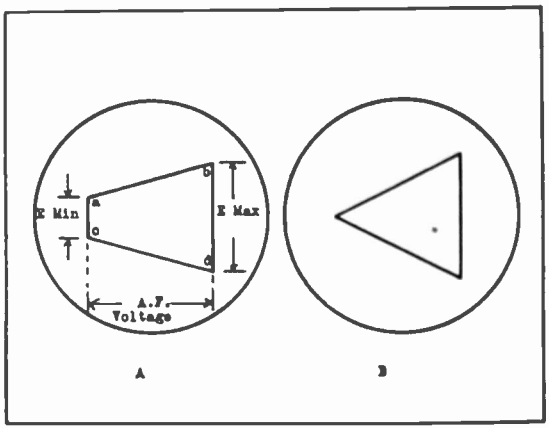


Fig. 5

less than 100% modulation means excessive positive peaks and likewise a decrease means an excess of negative peaks. This is only true when the tuned circuits L2 and C2 are adjusted to the exact resonance frequency of the transmitter. Under no condition should the meter M change during modulation for high fidelity broadcasts.

Connections To Cathode Ray Oscillograph

No doubt you have noticed that Fig. 2 shows a cathode ray oscillograph—C. R. O.—mounted with the A. F. monitor. This is necessary to indicate the visual method of determining the exact percentage of modulation and modulation distortion. The C. R. O. may be coupled in the circuit as indicated in Fig. 4. Again we employ the link coupled circuit, using two coupling coils at the receiving end.

Practically all C. R. O.'s employ two internal amplifiers—the vertical and the horizontal plate amplifiers. The amplifier feeding the horizontal plates must be used to raise the voltage to a high enough level to swing the spot on the C. R. O. across the screen. When using the C. R. O. amplifier, we must shunt the secondary of the transformer T2 with a 500 ohm resistor, thus loading the circuit properly. The amplifier feeding the vertical plates has a definite frequency limit, usually 100 kilocycles. This then makes it necessary to feed the R. F. directly to the vertical plates. Thus we use the inductance L5 and the condenser C8. The actual amount of inductance used in L5 is equal to that used in L2. Furthermore, C8 has the same capacity as C2. The leads running from the vertical plates connected on the cathode ray oscillograph should be short and shielded.

Checking Modulation

With the equipment indicated in Fig. 4 we

(Page 15, please)

How Are Things Looking?

H. E. LUBER

Manager Graduate Service and Employment Departments

NO less than half a dozen times a day I am asked that question. That is because it is a necessity in my department to keep a finger on the pulse of the Radio industry in order to render the best possible services to graduates. Consequently, when your Editor asked me for an article for NATIONAL RADIO NEWS it was the most natural thing in the world to select as a subject that same question, "How Are Things Looking?"

One of the surest barometers of Radio industry activities is the number of receiving sets sold. We all agree that 1934 was a fine Radio year. In fact, when the smoke cleared away at the end of the year and we got all of our figures straightened out, it was found that the industry had hung up a new, all-time high in number of receiving sets made and sold—over four and one-half millions.

Along came 1935, and in the first half of the year 1934's first six months figures were pushed into the background—they were outsold by approximately 370,000 receivers. At this writing, figures for the fourth quarter are not yet available, and those for the third quarter have been estimated.

Since the 1935 trend, up to this time, has been about 20% ahead of 1934, the third quarter, 1935 sales should be well in excess of one and a quarter million receivers, while the fourth quarter, based on a 20% increase over that period for 1934, should be above the one and three-quarter million mark. To sum this up, it looks very much like that industry will manufacture and sell between 750,000 and 1,000,000 more receivers in 1935 than they sold in 1934.

"How," you may ask, "does this affect the Radio servicing branch of the industry? Does this stream of new receivers indicate that there will be less income for the Radio serviceman?" A new set buying trend, in addition to creating additional employment all down through the manufacturing and selling line, is a benefit to the Radio servicing branch of the industry for two reasons:

First, these sets, in the greater majority of cases, are installed by Radio servicemen. New set installations and the usual call back to get the customer satisfied, create work for the Radio serviceman. Second, when the Radio buying public goes on such a spending spree as we are now witnessing, it usually indicates that set owners are also on a spending spree having older sets put in condition. This is true, because the same urge that makes some of the people want new receivers, makes others want their older Radios in top notch condition. Result—work for the serviceman.

This is not a theory—it is backed up by numerous reports from servicemen in the field—servicemen who have reported to me from all over the United States and Canada.

Another thing which pleases me because it indicates the increasing stability of the Radio industry, is the fact that finance companies are handling more and more Radio time payment contracts.

There was a lot of such financing done back in 1929—but it took a terrible drop during the depression and is just on the rise again. By this financing plan, a dealer can increase his business because it is not necessary for him to finance all of his time payment accounts. Now, he devotes his time to selling and turns the financial end of the deal over to a financing company, much in the same way as an automobile dealer handles his time payment contracts. The fact that these companies are coming back into the field is evidence that business in the Radio field in general is good.

"How Are Things Looking?"

I think they're looking fine.

Graduate P. M. Ohlinger of Portsmouth, Ohio, has an interesting article, "Five Tube Radio is Built Into Table Lamp," in the November, 1935 issue of *Modern Mechanix* Magazine.

n r i

If an automobile dealer drives a car 500 miles, it's just nicely broken in. If you drive it 50 miles, it is a used car.

—Tips and Topics

RADIO-TRICIAN
REG. U.S. PAT. OFF.
Service Sheet
Compiled Solely for Students and Graduates
NATIONAL RADIO INSTITUTE, WASHINGTON, D.C.

FADA MODEL 1462 SERIES

VOLTAGE READINGS.

No Signal Input — Wave Band Switch — Right

Type of Tube	Position	Plate Volts	Plate MA Current	Cathode Volts	Screen Grid Volts
6A7	1st Det.-Osc.	121	2.4	3	70
6D6	Int. Freq.	117	5.3	7	117
75	1st Aud.	58*	.1	1	...
	2nd Det.	...	..	..	...
43	2nd Aud.	99	22.0	17	107
37	Spk. Rectifier	...	26.0	..	...
25Z5	"B" Rectifier	...	42.0 TOTAL	..	...

6A7 Osc. Anode Voltage—100 and Current—3.3 ma.

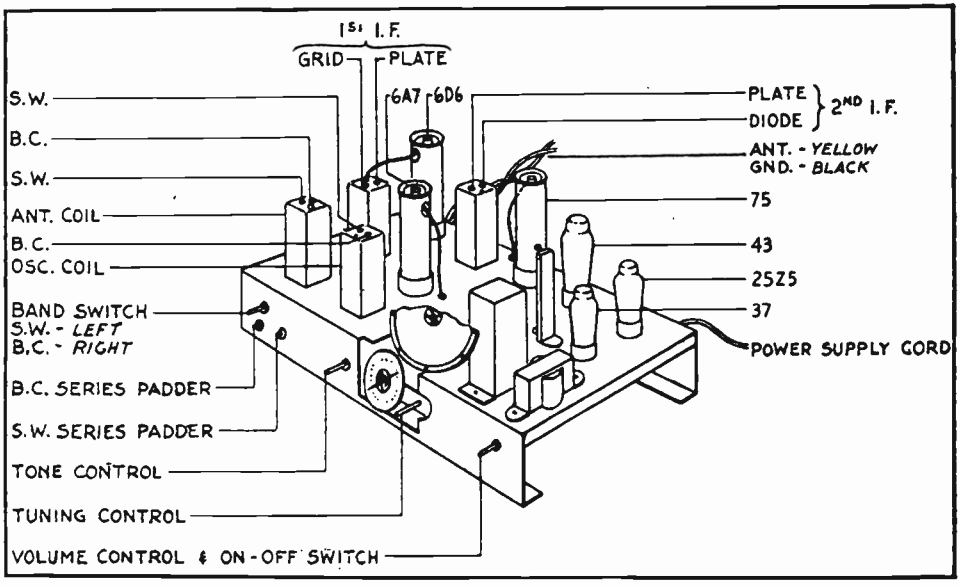
*Readings taken with 1,000 ohm per volt meter; not indicative of effective voltages.

* * * * *

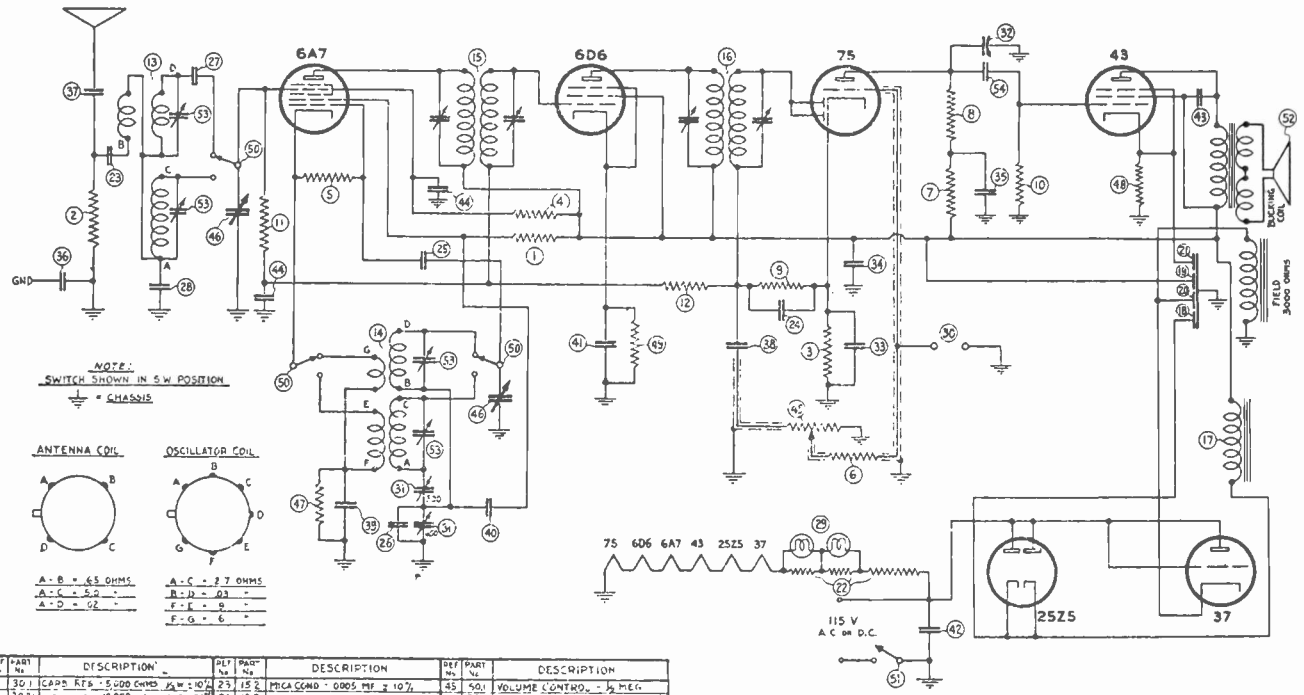
Voltage Across Electrolytic Condenser: 1st Section 139; 2nd Section 124.
Voltage across speaker field 80 volts; voltage across filter choke 15 volts.

D. C. Resistance Values

Speaker input transformer; Primary 330. ohms; Secondary .42 ohms.
Speaker field coil; Primary 3,000. ohms.
Speaker voice coil; Primary 3. ohms.
Speaker bucking coil; Primary .38 ohms.



Readers who file Service Data in separate binders remove page carefully, trim on dotted line for same size as Data published heretofore.



REF No.	PART No.	DESCRIPTION	REF No.	PART No.	DESCRIPTION	REF No.	PART No.	DESCRIPTION
1	30.1	CARB RES - 5,000 OHMS ½W - 10%	23	15.2	MICA COND - .0005 MF ± 10%	45	50.1	VOLUME CONTRO. - ½ MEG.
2	30.31	" " 10,000 " " " 20%	24	15.2	" " .0005 " "	46	25.2	VARIABLE CONN "
3	30.21	" " 10,000 " " "	25	15.3	" " .0051 " "	47	133.2	WIRE RES - 350 OHMS ½W. FX
4	30.7	" " 15,000 " " " 10%	26	15.19	" " .0015 " "	48	130.1	" " 625 " " "
5	30.3	" " 50,000 " " "	27	15.5	" " .002 " " 3%	49	130.3	" " 1600 " " "
6	30.26	" " 90,000 " " " 20%	28	15.6	" " .0025 " "	50	45.1	BAND SWITCH
7	30.26	" " 50,000 " " "	29	126.1	PILOT LIGHT 6 - 8 V .25 A	51		ON-OFF SW ON VOL CONT (45)
8	30.20	" " 250,000 " " "	30	125.1	PHONO JACK	52	105.1	SPEAKER - 3,000 OHMS
9	30.23	" " 500,000 " " "	31	25.1	PADDING COND - 650 - 500 MMF	53		MIN ADJ ON COILS
10	30.23	" " 500,000 " " "	32	55.1	TONE CONTROL	54	10.6	TUBULAR COND - .01 MF - 200 V
11	30.22	" " 1 MEG " " "	33	10.12	TUBULAR COND - .10 MF - 300 V			
12	30.22	" " " " " "	34	.02	" " 1 " " "			
13	20.26	ANTENNA COIL	35	10.7	" " 1 " " "			
14	31.16	OSCILLATOR "	36	10.3	" " .006 " 400 "			
15	33.39	1st I.F "	37	10.4	" " .01 " 200 "			
16	33.80	2nd I.F "	38	10.4	" " .01 " " "			
17	40.1	CHOKE - 300 OHMS	39	10.5	" " .05 " " "			
18	70.1	ELECTRO COND BLOCK - 10 MF 450 V	40	11.5	" " .05 " " "			
19	20.1	" " " 10 " 40 "	41	.05	" " .05 " " "			
20	20.1	" " " 4 " 60 "	42	10.3	" " .05 " " "			
21	20.1	" " " 4 " 25 "	43	10.10	" " .01 " 400 "			
22	115.1	LINE RESISTOR - 180 - 38 - 30 OHMS	44	10.6	" " DUAL .05 " 200 "			

1st I.F TRANS	2nd I.F TRANS
PRI - 14.5 OHMS	PRI - 14.5 OHMS
SEC - 14.5 "	SEC - 14.5 "

I.F - 456 K.C.

FADA RADIO & ELECTRIC CO
LONG ISLAND CITY, N.Y.

MODEL 1462

DRAWN BY: CJO — DATE: 7-17-35

CHECKED BY: [illegible] — APP. RFS

Another Prize Winner

In the October-November, 1935 issue of NATIONAL RADIO NEWS we carried a story on page 1 about Graduate Jack Kirk, who won a ten day trip to Jamaica in the Philco Radio sales contest.

NATIONAL RADIO NEWS has just learned, as a result of this article, that another N. R. I. graduate, E. G. Riggle of Massillon, Ohio, was also a prize winner in this contest.

As fourth prize winner he received a beautiful eleven tube all-wave Philco model 16L.

Mr. Riggle says, "Here's just another case where I owe thanks to my N. R. I. Training."

Radiophone Transmitters

(Continued from page 11)

may check quite accurately the percentage of modulation of the carrier during a regular program. The reproduced figure on the C. R. O. will be in the form of a trapezoid. The picture indicated in Fig. 5A is that of a trapezoid. This figure informs us as to the relation between the modulated signal and the audio frequency component. The vertical movement of the spot indicates the modulated carrier voltage. The horizontal shift of the spot indicates the audio voltage used to modulate the carrier. Therefore, it is possible to have a stationary figure on the screen of the C. R. O., as the amplitude of the carrier is the modulation frequency. This same frequency is used in the timing, and thus the two voltages are in synchronism. We see that the positive peak is indicated by the long right-hand line, E, the maximum voltage. The negative value of R. F. voltage is indicated by the vertical length of the left-hand line, E, minimum. The percentage of modulation at any given level may be determined quite accurately by the following formula. Percent of modulation is equal to

$$\frac{E\ max. + E\ min.}{E\ max. - E\ min.} \times 100.$$

100% modulation will be seen on the C. R. O. screen similar to the figure in 5B.

Checking for Distortion

The trapezoidal pattern will indicate many important factors regarding a Radio transmitter's ability to take modulation. Distortion of some form occurs when the upper and lower lines, ab and cd respectively, are not straight. Insufficient excitation, too tight coupling, regeneration due to improper neutralization, overloading of the modulator or poor regulation are some of the causes. I will not go into the details for their correction, however. A careful study of the particular transmitter's meter readings will usually inform you why the distortion occurs.

Resistor Cabinet

A resistor cabinet with novel features is being offered by Continental Carbon, Inc., 13900 Lorain Avenue, Cleveland, Ohio, with the purchase of thirty-five standard insulated resistors. The cabinet is designed to hang on the wall, and has bins for 130 resistors. Opposite each bin a range of resistor values is printed on the cover to facilitate quickly locating any

desired size. In addition, the cover has a rotary color code dial with metal eyelets so arranged that the disc can be rotated with the tip of a pencil or a screwdriver to determine the resistance value represented by the three characteristic colors in the R. M. A. system of resistance designation.

Under the color code dial, a chart giving the relation graphically between the watt rating and the maximum voltage, which may be applied to any standard resistor, appears. By simple calculation, the maximum current which may be carried by the resistor of any given size and watt rating may be determined on the chart by dividing the watt rating by the maximum voltage, which may be applied to it.

The resistor cabinet serves the additional purpose of providing a clean receptacle for these important Radio components, and it impresses customers who observe a serviceman utilizing the resistor dial and the chart.

The Editor,
NATIONAL RADIO NEWS
Washington, D. C.

Dear Sir:

We were very pleased to receive the October-November issue of NATIONAL RADIO NEWS. May we take this opportunity of congratulating you upon what we believe to be one of the finest publications of its kind.

Very truly yours,
J. W. MILLER COMPANY,
Los Angeles, Calif.

A Trip Through the Farns

THE article "A Trip Through a Tube Factory," published in the last issue of NATIONAL RADIO NEWS, met with such widespread favor and caused so many congratulatory remarks that your Editor decided to give you some more of this material.

After racking our editorial brain in an effort to decide upon a good subject for the next article, we came to the conclusion that since Television is a much discussed subject at the present, with newspapers and magazines carrying columns—even pages—devoted to it, we could do nothing better than to make a trip to some place where Television is really being developed and give you the whole story through the pages of NATIONAL RADIO NEWS.

Since Mr. Philo Farnsworth, of Farnsworth Television, Inc., is a graduate of the National Radio Institute, we decided to call on him and get his version of the Television story as it stands today.

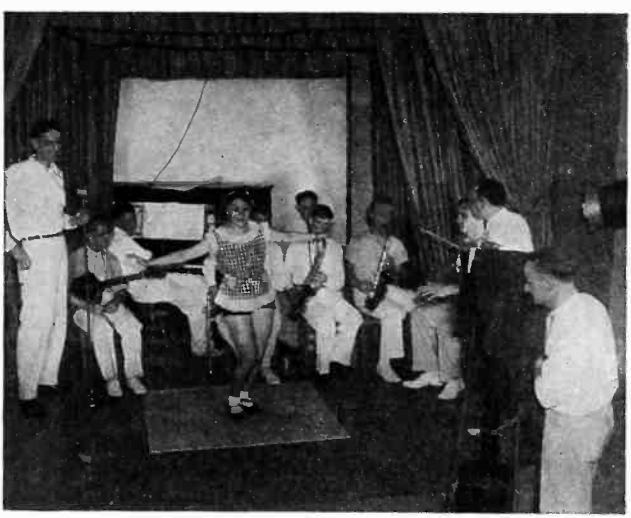
Consequently, your Editor, arming himself with a half a dozen newly sharpened pencils and a notebook, put in an extra pint of oil, cranked up the old bus, and started out from Washington to Philadelphia. Several hours and three flat tires later, we arrived in the City of Brotherly Love, and proceeded immediately to the laboratories of Farnsworth Television, Inc., located at 127 East Mermaid Lane, in that city. This address turned out to be a picturesque stone building in a setting of fine old trees out beyond Fairmount Park. We were soon to find the quiet exterior belied the activity within.

Inside of the building we were greeted by a pretty blonde young lady who informed us that Mr. Farnsworth was busy with some other visitors, but that Mr. Somers, one of Mr. Farnsworth's assistants, would be glad to show us around in the meantime.

Seated in Mr. Somers' office, we immediately started talking Television, and were informed that Mr. Farnsworth has no interest whatever in the mechanical scanning method of Television. The chief difficulties, we were told, with mechanical scanning, were in obtaining a uniform rotation at the transmitting and receiving ends. Also, it is felt that the set buying public would hesitate to place a whirling mechanical gadget in the home.

PHILO T. F
Vice-President, Fa

Mr. Somers further stated that black and white pictures in Television are an accomplished fact. They will be the first generally accepted pictures, although better intensity and brilliancy can be obtained by using pictures with a greenish tint. In answer to one of our questions, we were informed that Television in colors, similar to the technicolor moving pictures which we occasionally see, will be very simple to develop when the proper time comes. We were then escorted to various offices, experimental laboratories, chemical laboratories, a glass blowing department, numerous libraries, etc., which required a couple of hours. We saw small Television equipment, and large Television equipment—in fact, more Television equipment than we realized existed. We saw transmitting apparatus; small receiving equipment of the size to be used in the home, and mammoth equipment for use on stages, in auditoriums, halls, etc. Every place we turned were cathode ray tubes in various stages of completion. We saw tubes undergoing experiments in the development of new ideas of Mr. Farnsworth's—tubes ranging in size from the



Photograph at the left shows an act being televised in one of the studios of Farnsworth Television, Inc.

Take You On

cth Television Laboratories

ORTH
Television,

6-inch home receiver type to tubes the size of a ten gallon gas tank, which we learned were for auditorium purposes.

We saw a demonstration of Mr. Farnsworth's new invention, the "Cold Cathode" tube, which he believes will revolutionize the present oscillator tube.

By this time Mr. Farnsworth had finished with his previous guests and your Editor was taken to his private office for an interview.

Never having had the pleasure of meeting Mr. Farnsworth before, we were quite surprised at his youthful appearance. Somehow or other when one thinks of scientists who have accomplished as much as Mr. Farnsworth has, we are apt to associate them with bald heads and long beards. Not so Farnsworth. A recent college graduate would be a much better comparison.

We were particularly pleased when Mr. Farnsworth, although extremely enthusiastic about the future possibilities of Television, did not tell us that "Television is right around the corner." In answer to a definite question on this subject, Mr. Farnsworth stated that he does not feel that we will see Television sets on the commercial market in the United States during the year of 1935, but has very optimistic views on what 1936 will bring forth. Knowing that Mr. Farnsworth had recently returned from Europe where he had been studying conditions and making plans for the future of Farnsworth Television, Inc., we questioned him about the publicity we have seen on the advances being made by Television on the European continent. To which Mr. Farnsworth replied:

"Much of the talk that we hear of the advances being made by Television in Europe are a bit misleading. No Television sets are being sold over there—but quite a bit of Television broadcasting is going on. The broadcasts are being received by a number of sets which have been placed out by the large Television companies for experimental purposes. I do feel, for this reason, that commercial Television will come sooner in Europe than in the United States."

Said Mr. Farnsworth further, "While it is true that some of the European countries are slightly ahead of the United States insofar as a direct approach to the sale of Television receivers is concerned, they are far behind us in Television Engineering. Some of the European countries are still using mechanical scanning, and are doing the majority of their research and development along that line. On the other hand, Baird of England, and General Bosch of Germany, are at present operating under Farnsworth's licenses, using material and equipment which is developed right in these laboratories. In fact, one shipment of our material left this plant this morning for a European destination."

We were told that the Farnsworth home receiver is planned to give a 6-inch picture. Means are available to produce a much larger picture for auditorium and theatre use. Of course, under the Farnsworth system, two receivers will be necessary—one for Television and one for sound, but Mr. Farnsworth explained to us that it is planned to simplify the controls and synchronize them in such a manner that one operation only will be necessary to tune in Television stations and the accompanying sound effects.

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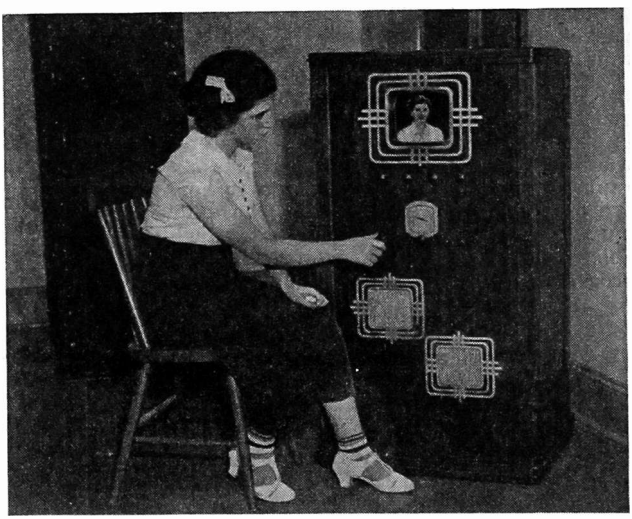

Photograph at the right shows one of the Farnsworth Television receivers in operation in the studio. Note that both Television and sound receivers are incorporated in one compact unit.

Farnsworth Laboratories

(Continued from page 17)

Your Editor, still associating scientists with long white beards, questioned Mr. Farnsworth on the subject of his personnel, making particular reference to the fact that all of them were such young men. His reply was prompt. He stated that he is operating on the theory that by having a young organization—and all of the eighteen men employed in his laboratory in Philadelphia are young men, he will obtain more original ideas. He feels that older men become set in their ideas and this is detrimental to laboratory work in a field as young as Television. He points out that Television is very young—it needs men with free and open minds —men who can operate on one theory today and be willing to cast it aside and develop something better tomorrow. Television, according to Mr. Farnsworth, requires men with a great amount of imagination.

It is very interesting to reflect on Mr. Farnsworth's statement that Television will be very good for the broadcasting industry. It is his idea that with Television on a commercial scale, less advertising time will be necessary, due to the ability of the set owner to see, as well as to hear what is going on. Less time will be required, therefore, for the "advertising plugs," and more time can be given to entertainment, which is certainly the best from the listener's point of view.

Farnsworth Television, Incorporated, had, at the time of our visit, just finished giving a public demonstration at the Franklin Institute at Philadelphia. They went there for a one-week engagement, but due to the demand, stayed ten days and could have stayed longer, but the rush of business prevented. They demonstrated such outdoor events as tennis, swimming, track meets, etc., proving the possibility of televising outdoor subjects. The Franklin Institute was packed to capacity at each one of the Farnsworth demonstrations.

What we have seen of Farnsworth Television and the organization behind it was extremely interesting to us—but of even greater interest was the man, Farnsworth. He is a typical example of what a man can do if he has the proper background of training, the ambition to push forward—and the imagination which enables him to look into and prepare for future progress.

"Radio Today" magazine tells one about a fellow who wrote to RCA and wanted to buy a *Magic Brain* to use on his son who was getting poor marks in school.

Iron Dogs Growl

In the last issue of NATIONAL RADIO NEWS we told you about an N. R. I. graduate who made gasoline pumps talk. Here's one about a man who made a watch dog out of a cast iron lawn ornament.

It seems like this gentleman, and he doesn't want his name mentioned, had a spacious lawn in the front of his house. At one point, near the walk which lead from the street to the house, there was a large, cast iron dog, put there for ornamental purposes. The owner equipped this dog with a large buzzer and adjusted the armature to emit a ferocious growl-like sound. Then he rigged up a General Electric photo-electric relay, commonly known as an "electric eye," in such a way that it would scan the sidewalk. As a result, when visitors approached, they were startled by the growl of the iron dog, for in walking up the sidewalk they interrupted a beam of light focused on the electric eye, and thus actuated the relay, which, in turn, energized the magnetic voice.

Mr. Watton Gets an Argument

Editor,
NATIONAL RADIO NEWS,
Washington, D. C.

Dear Sir:

In the August-September issue of NATIONAL RADIO NEWS, Volume 6—No. 9—Page 31, was an article by Mr. G. F. Watton, Norfolk, Virginia, on the subject of "A Spray Shield Tube."

I do not agree with Mr. Watton concerning the painting of a tube with aluminum paint for a shield.

The Aluminum Company of America has informed me that the aluminum in paint consists of small flakes, which are treated and polished, and which serve as an insulator, rather than as a conductor.

A better idea for those who wish to use a spray shield tube, is to use the new form fitting shields, because you have your choice of connecting the shield to the cathode lead, or to the ground. The latter is often better, because the cathode will be at a different potential than the ground, and in many circuits will cause unbalance.

C. W. BOURNE, Ainsworth, Nebr.

RADIO-TRICIAN
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Service Sheet
Compiled Solely for Students and Graduates
NATIONAL RADIO INSTITUTE, WASHINGTON, D.C.

General Electric Model A-53

ALIGNMENT PROCEDURE

I. F.	Broadcast	Short-wave
465 kc.	580 kc.	6000 kc.
	1500 kc.	

In order to properly align this receiver, it will be necessary to have the following service tools:

1. Test Oscillator capable of producing the above alignment frequencies.
2. Non-metallic alignment screwdriver.
3. Output meter.

I. F. Alignment. The I. F. amplifier should be tuned to 465 kc.; set the oscillator dial at this frequency. Set the volume control at maximum and short-circuit the antenna and ground leads. Tune the receiver to a point where no signal comes in and ground the chassis.

Connect the test oscillator output between the 6A8 converter tube grid and the chassis. Connect the output meter across the cone coil of the speaker and adjust the oscillator output until a small deflection is observed in the output meter.

The three I. F. trimmers are adjusted in the following sequence:

1. Secondary trimmer on second I. F. transformer.
2. Secondary trimmer on first I. F. transformer.
3. Primary trimmer on first I. F. transformer.

Throughout all adjustments output should be maintained at a low level by decreasing the test oscillator output as the various stages are brought in line. After these adjustments have been made the same procedure should be repeated as a final check. The I. F. alignment will then be complete.

R. F. Alignment. The R. F. and oscillator transformers are aligned at 580, 1500, and 6000 kc. With the tuning condenser plates fully meshed, line up the pointer and dial by adjusting the dial set screws so that the line at the extreme end of the dial is indicated.

Broadcast Band. With the band switch in the clockwise position, set the tuning dial to 1500 kc. Set the test oscillator at 1500 kc. and adjust the oscillator trimmer for the broadcast band for maximum output. Next, set the R. F. trimmer for maximum output, taking care that the output from the test oscillator is not high enough to overload any part of the set. After these adjustments, tune the set and the test oscillator to 580 kc. Adjust the broadcast padding capacitor for maximum output while rocking the tuning condenser back and forth until maximum output is obtained. The dial setting after this adjustment may not agree exactly with the frequency, but this is not important.

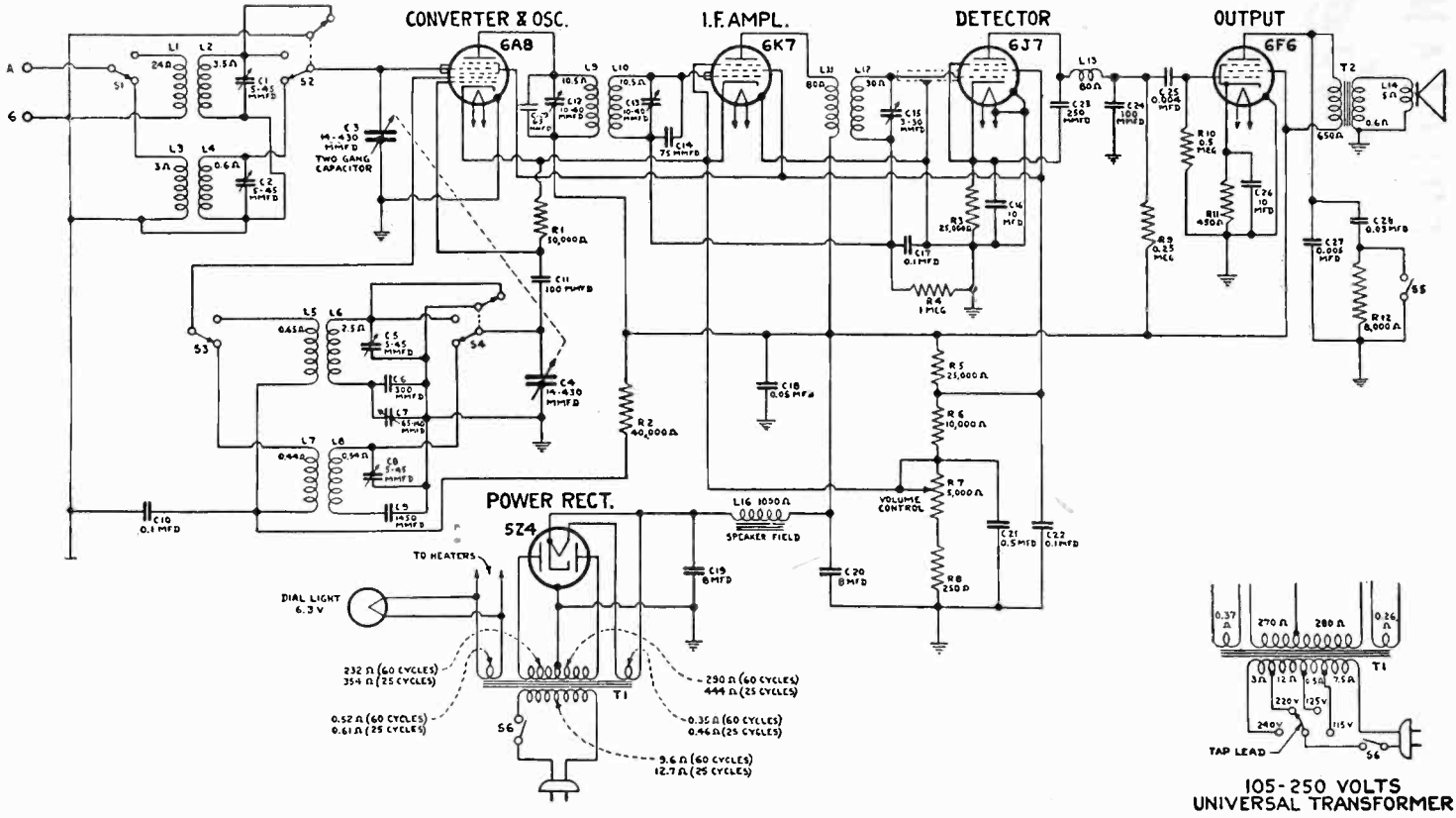
To complete the broadcast band lineup, repeat the adjustment at 1500 kc. as before.

Short-wave Band. With the frequency band switch in the counter-clockwise position, set the receiver dial to 6.0 mc. Set the test oscillator at 6000 kc. and adjust the short-wave oscillator trimmer for maximum output. Next, set the short-wave R. F. trimmer for maximum output. Repeat these adjustments a second time. After aligning the S. W. band, turn the test oscillator to approximately 6930 kc. with the receiver dial still at 6mc. Increase the test oscillator output until a signal is heard in the neighborhood of 6930 kc. This is the image frequency and if the set has been properly aligned the sensitivity at this point will be much less than at 6000 kc. In the event the image frequency cannot be found, the alignment should be rechecked at 6.0 mc. It will be noticed that the oscillator trimmer will have two positions at which the signal will give maximum output. The position which gives the lower trimmer capacitance obtained by turning the trimmer screw counter-clockwise is the proper adjustment.

When these adjustments have been completed the receiver will be in alignment.

Readers who file Service Data in separate binders remove page carefully, trim on dotted line for same size as data published heretofore.

General Electric Model A-53



In Our Next Issue

Mr. Joseph Kaufman, N. R. I.'s Director of Education, had a problem. He is a lover of good music and he wanted a Radio which would bring him the best quality of reception possible —to use his own words, he wanted "to feel that the performers were right in my own living room."

Furthermore, he wanted such a receiver housed in a cabinet which would be harmonious to the surroundings.

In addition to these points Mr. Kaufman desired such a receiver to be relatively inexpensive.

He set to work on this problem—has solved it, has the completed Radio in operation in his home. After seeing and hearing this receiver, our Editor came to the conclusion that there must be hundreds of other persons in this country who also want quality of reproduction, a harmonious cabinet, and an inexpensive job. So we have asked Mr. Kaufman to write an article showing exactly what he did and how he did it. This article will appear in the next issue of NATIONAL RADIO NEWS. Watch for it.

Reverse English

Below are nine first class rules which every fellow should remember:

1. Believe in luck. Training and ambition are a lot of hokum.

2. Don't study—it won't get you anywhere.

3. Today alone counts. Don't look to the future.

4. Put off 'til tomorrow, or some other time, what you don't feel like doing today.

5. Pay no attention to the experiences of others—they are old-fashioned.

6. Jump around—don't stick to any one thing.

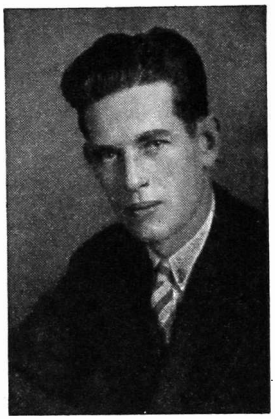
7. Avoid all habits of self improvement.

8. Never let your personal appearance bother you—it's so easy to be slovenly.

9. Pity yourself—the other fellow gets all the "breaks."

These rules point out nine good ways to go backwards—to get nowhere—to fail. Remember NOT to follow them.

Subways and Cellars



by S. M. ARMSTRONG
N. R. I. Director of Student Service

THEY say that when John MacDonald first proposed to build the great subways of New York City, there were many who were ready to rush him away to the insane asylum.

"What," people wanted to know, "about all the conduits, cables, gas and water mains, sewers and other obstructions which are under the ground? How would he overcome these difficulties, to say nothing of the fact that he would have to dig through almost solid rock of which Manhattan is composed?

"Dig a tunnel—under all the streets, houses, and skyscrapers of New York City? Impossible! Surely the man was crazy."

To the questions above MacDonald replied: "You've got a cellar under your house, haven't you? And the people on either side of you have cellars, haven't they? And it wasn't so difficult to dig them, was it? Well, I'm not figuring on digging a tunnel the length of Manhattan; I'm just figuring on digging a lot of cellars and connecting them together."

All of which was just MacDonald's way of repeating the old copy book philosophy about "One thing at a time and that done well, etc." That was a good rule in MacDonald's day; it is equally good in ours.

Take your Radio training for instance. You can't start out by designing a new type of Radio; building a broadcasting station, inventing a new television system. You can't tunnel under Manhattan. You learn the fundamentals, you study them from text books and experiment with practical work units to illustrate what you have read, and to give you practical experience. You are digging individual cellars which are your storehouses of Radio knowledge.

Then, as your building program goes forward you take up advanced, specialized training in either the Radio Servicing and Merchandising or the Communications branch of the Radio industry. You start doing Radio work in your spare time, the more simple jobs at first, and as you dig further and further, you find you are

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Subways and Cellars

(Continued from page 21)

able to do even the most advanced Radio work. By the time you have obtained your diploma you are a thoroughly trained Radio man, capable of going out and making a good living—assured of a bright future. You have joined your cellars together and have your completed job.

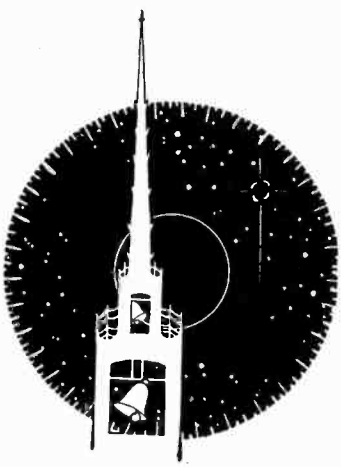
Yes, digging a tunnel under Manhattan was a big job. So is learning Radio. But considering the work in small units which can be knit together to form a completed whole does not seem nearly as difficult. Look upon your training in this way. Each lesson, each unit of work is a separate small job which, in a way, advances you to your goal. Think only in terms of those small assignments, let the end take care of itself.

Remember MacDonald. If you dig enough cellars they will give you the complete structure. Dig cellars—not tunnels!

Fair Bowlers Triumph

There is a weeping and gnashing of teeth at N. R. I. It is like this:

Eight members of the Institute Staff who comprise part of the N. R. I. men's bowling league accepted a challenge from the N. R. I. women's bowling team. The eight men, looking like the forward wall of Notre Dame's football squad, lined up against eight of the ladies, (whose total weight was about that of two dozen all-metal Radio tubes). To make a long story short, the fair ball rollers took everything but the pin boys' shoes.



They say there is another match in the making, but so far we haven't heard of any men who have volunteered to serve as targets for the female firing squad. Ah me—what hurts most is your Editor was among the vanquished.

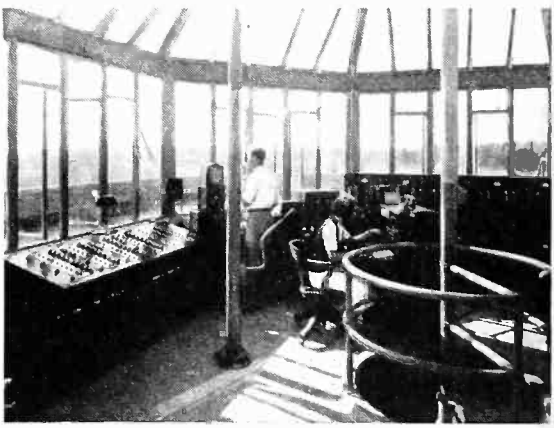
Have You Ever Wondered . . . ?

Time and again, in magazines, newspapers, etc., you've seen pictures of airports with planes landing, taking off, or loading. In the background there is a building, and atop this structure is a funny looking little glass enclosed tower.

We wanted to know how many people were acquainted with its purpose, so we asked a number of our friends. Here are some of the answers:

1. An observation tower.
2. A lunch room.
3. A bedroom for aviators off duty.
4. A recreation room for airport personnel.
5. Nothing, just a decoration.

Since these folks didn't know, we thought there might be a number of our readers who'd like to see inside one of these towers.



Photograph Courtesy Western Electric Co.

Of those five answers, the first is nearest correct. But notice, we say *nearest*—because it is more than an "observation tower." It is really a control tower, as the accompanying picture will prove.

Here we see the control tower at the Wayne County (Michigan) Airport. Both Radio and Public Address Systems are used to control aerial traffic and to make announcements over the field. The amplifier and control units in the Western Electric Public Address System may be seen in back of the telephone switchboard.

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When a firm, decisive spirit is recognized it is curious to see how the space clears around a man and leaves him room and freedom.—JOHN FOSTER.

he Service Forum (Continued from page 7)

the filter choke. A 1 megohm resistor from e screen to ground is necessary and the screen ould be by-passed to the chassis with a .5 icrofarad condenser. 35 type tubes can be sed in the R. F. stages without any circuit anges.

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OLSTER MODELS 1, 23, 24 and 25 — OSCILLATION

Replace the present grid suppressors if the set scillates after the installation of new tubes ith others having a higher value. Try 3,000 hms in the first R. F. stage and 2500 ohms in e other R. F. stages. The oscillation is due the higher mutual conductance of the new ubes.

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HILCO MODEL 5 — LOW VOLUME AND DISTORTION

Check the manual volume control for an open.

———n r i———

HILCO MODELS 38 and 60 — DIAL SLIPPING

This condition is often caused by too much nsion on the nut at the back of the drive haft. Loosening this nut slightly will allow he rotor to turn more freely and thus eliminate lipping of the drive.

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IOTOROLA MODEL 44 — MORE PEP

Decrease the bias on the 75 type tube by re- lacing the 500 ohm screen resistor connected rom the cathode of this tube to the chassis with he having a value of 250 ohms. A 2 watt resis- or may be employed. The later sets of this odel are originally wired in this manner.

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IOTOROLA MODEL 34 — DEAD OR DISTORTED

Carefully check the 42 type tube socket. If he prongs are corroded on the tube or if the ube socket prongs are corroded replace the ocket and clean the tube prongs.

———n r i———

IAJESTIC MODEL 90 — INTERMITTENT

Try a new .5 microfarad cathode to chassis y-pass condenser on the last R. F. tube.

MAJESTIC MODEL 66 — INSTALLATION HINTS

To greatly reduce motor noise pickup conducted to chassis by pilot light lead, make it easier to remove the set, permit the use of the set without the pilot light burning in daylight proceed as follows: Before making the installation remove the remote control pilot light feed wire from the chassis by unsoldering it inside or cutting if off just outside the case. When the remote control unit has been mounted connect the pilot lamp wire to the tail lamp post on the lighting switch by holding wire to each post and snapping switch through its various positions.

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MAJESTIC MODEL 15 — OSCILLATION

If the resistors, by-pass and filter condensers check okay use a new detector coupling condenser. This is located behind the resistor board at the rear wall of the chassis. A .05 microfarad 600 volt condenser should be used.

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BRUNSWICK MODEL S31 — DISTORTION

Use a new 1.5 megohm first A. F. grid resistor. This resistor connects from the grid of the first A. F. tube to the chassis. A test will not always show up the trouble.

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BOSCH MODELS 80 and 84 — IMPROVEMENT AND LOWERED BATTERY DRAIN

The heater voltage and detector cathode resistance must be changed. The cathode resistor should be changed to 500 ohms. Replace the detector with a 36 type tube and the R. F. stages with 39/44 type tubes. Use a 38 type tube in place of the 12A. The present output transformer need not be changed.

———n r i———

BOSCH MODEL 31 — INTERMITTENT RECEPTION

Try a new 300,000 ohm resistor in the I. F. stage.

———n r i———

RCA MODELS 48 and 42 — NOISY, WEAK OR DEAD

A screen to plate short in the R. F. tubes will allow excessive current to flow through the

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Institute Comptroller Honored

B. S. Lavins, M.C.S., in charge of the Accounting, Finance and Statistics of the National Radio Institute, has recently been appointed Assistant Instructor of Accountancy at Columbus University, Washington, D. C. He will accept this position, handling it in addition to his regular duties at the National Radio Institute.

Mr. Lavins, who has been with the National Radio Institute eleven years, is the author of a fine text book, "Radio Accounting and Records," which is a part of the National Radio Institute's course.

Due to his wide experience in home study school accounting, Mr. Lavins was recently selected by the President of the National Home Study Council to act as Chairman of a committee to standardize accounting methods for all home study schools which are members of the Council.

N. R. I. Staff Backing Safety Drive

Though we are far away from our readers, and due to this distance you may sometimes look upon us as just so many names and pictures, we are, nevertheless real, live people, just like you. And being *human beings*, we are interested in the same things you are. We have wives, mothers, sweethearts and children, and like you are interested in their welfare.

Now NATIONAL RADIO NEWS seldom does any electioneering for anything. We are not political minded. But this time we are electioneering for safety—yours—ours—and the loved ones of us all.

Too many people are being killed and maimed every year in automobile accidents. When a large Washington newspaper started a campaign for safe driving, Institute members pledged themselves 100% to safe and sane driving.

We want to ask our readers, the whole 30,000 of them, to be *safe drivers* also. Keep your car under control at all times—don't exceed speed limits—keep good brakes.

You may never have had a serious accident, but there's always a *first time*. And that first time may wreck the lives of a whole family. Picture yourself crippling a father who has a family to support—or a child, anyone. Would you ever forgive yourself? Or, picture *yourself* as maimed for life through your own recklessness. Would you like it?

Then drive safely—and induce others to do likewise!

I Know a Fellow

(Continued from page 8)

to non-technical men—men who know nothing in the world about public address equipment, except that it carries voice or music to a large number of people. They make the mistake of trying to sell these non-technical men with a lot of technical terms which are hard for the average fellow to understand. They talk in terms of 'one hundred watts of audio frequency,' and other similar phrases. That is not the way to sell these jobs. First I contact the right man, so that I will not waste my time and ammunition. Once I get in touch with this right man, I show him pictures and sketches of just what I will install. I explain the position of the equipment; talk about good tone quality and volume in non-technical terms. I use pictures of all of my equipment in selling, and I am prepared to quote my prospects prices for a certain number of hours for the equipment that I recommend. I usually come away with the signed order."

Back up your ambition with good training. Save your time and energy by finding out who the real buyer is. If that man is technically inclined, sell him on technicalities. Otherwise make the subject plain to him in non-technical language. Show him pictures and sketches of where and how the apparatus will be placed. Be prepared to quote prices which will be fair to him and allow you a profit. Do good work—give good service—and each job will bring in others.

All Metal Tubes

(Continued from page 4)

vantages of the new metal tubes:

(A) An increase in stability, especially on short wave, because of more efficient shielding, and lower inter-electrode capacity.

(B) Rugged construction.

(C) Vacuum sealed in metal with its improved gas removal from the elements insures normal operating characteristics for a longer period of time.

(D) Octal base which allows ease of installation and universal prong numbering.

(E) Efficient heat radiating shield which conducts heat away from interior of tube insuring long useful life.

volume control burning it out. If you find a defective control do not fail to check the condition of the R. F. tubes, the R. F. screen by-pass condensers and the control grid voltage on the R. F. tubes so that a recurrence of the difficulty will be impossible.

———n r i———

RCA MODEL 41 — DEAD, DISTORTED OR WEAK

These conditions accompanied by low B voltages indicate a change in value of the 5,000 ohm section of the voltage divider, or corroded high voltage connections on the socket power unit receptrad pack. There are two different packs used on this set, one made by the Radio Receptor Company and the other by the Sterling Transformer Company.

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RCA MODEL 41 — OSCILLATION AND POOR SENSITIVITY

Look for open grid suppressors in the second or third R. F. tubes or in both although the third one is generally the offender. A 1,000 ohm replacement resistor may be employed.

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RCA MODEL M-30 — IMPROPER MANUAL CONTROL

In this automobile set such a condition indicates difficulty in the automatic volume control circuit. Try new 37 type tubes in both the A. V. C. and second detector circuits. Test the batteries and replace any below normal.

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RCA MODEL 17 — HUM ON PHONOGRAPH

Install a 6,000 ohm resistor across the secondary of the phonograph input transformer.

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RCA MODEL R-8 — SLIPPING DIAL

Remove control knobs and four wood screws at back and slide out of cabinet. Then with a socket wrench loosen nuts holding speaker to sharp pointed screws. Take the cushions off the chassis and remove the four screws and nuts (2 on a side) which hold the bottom pan in place. Take off the bottom. Loosen the set screw on front of chassis which hold rubber roller in position. Push up so roller does not engage dial gear. Turn the condensers with finger. They should move easily. If not, put a few drops of oil on condenser bearings. Move rods, condensers, back and forth. If still tight unloosen screw and lock nut at end of condenser shaft to remove friction. Reassemble and if dial still slips, unloosen dial by means of 2 bolts between dial and chassis—being careful not to disturb relative position of dial and condensers. Pull out far enough to engage unworn part of rubber and reassemble.

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PHILCO MODEL 45 — DISTORTION ON 1300 kc.

Sounds as though speaker voice coil not centered or rattle in speaker. Place a 1 meg. resistor between the control grid lead and ground of the 75 tube. Increases the volume slightly and clears tone of receiver on this setting.

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Dear Mr. Straughn:

The following problem is submitted for your advice: Majestic Series 300 motorboats and squeals, with excessive hum on high frequencies. Will you be kind enough to discuss this in your department, "The Service Forum," in the next issue of NATIONAL RADIO NEWS?

REVEL A. MAXWELL, Brooklyn, N. Y.

Dear Mr. Maxwell:

These symptoms are typical of an open condenser, gassy AVC controlled tube, or excessive plate or screen voltages. Check each R. F. bypass condenser by shunting it with another of the same size known to be in good condition. Should the trouble stop when doing this, the condenser under test is open and must be replaced. Try new tubes in the R. F., first detector and I. F. stages. Check each section of the multiple wire-wound voltage divider, paying particular attention to the 20,000 ohm screen bleeder section. The difficulty will be found among the parts listed above, and it is my opinion that all other symptoms are due to the same defects.

J. B. STRAUGHN.

We hope that other readers will make inquiries through this department concerning problems of *general* interest. We do not want to discuss isolated or unusual cases in these columns but are anxious to cover problems which arise frequently in Radio servicing and which will, consequently, be of interest to all readers.

J. B. S.

N. R. I. ALUMNI News

Now a New and Enlarged Alumni Service

By R. B. MURRAY
Asst. Executive Secretary

N. R. I. Alumni members will be glad to learn that many improvements and new features which will benefit every individual member, will soon be included as a part of our regular service. National Headquarters has been working at a fast pace to test a number of these plans before having them included in our NEW service. Naturally, we want to please the men who form this Association, and we can only do this by having them state their approval before the plans are adopted.

For example, we recently mailed to our members a special issue of a little magazine published by the International Resistance Company. We asked their opinion of this service. Votes have been pouring into the ballot box—it looks as though the *technical data service* is going to be a regular feature.

Also hundreds of suggestions have been received from Alumni men following our request in the last issue of NATIONAL RADIO NEWS, under the heading of *Improvements*. You fellows have lots of good ideas and we are going to do everything within our power here at National Headquarters to see that you get the service you need.

We get a real "kick" out of serving our members because there is a lot of satisfaction in helping the other fellow. The N. R. I. Alumni Association was organized for just that purpose. In 1929 when the Association was first formed, little thought was given to the idea that it would reach such tremendous proportions. The overwhelming approval of the Association by N. R. I. men has made it an outstanding success.

Radio organizations and manufacturers are watching our activities with keen interest. Numerous letters have been received extending their best wishes for success, and requesting the opportunity to cooperate with the Alumni Association and members individually. Some of these Radio organizations have gone so far as to supply Radio speakers for a number of Alumni Chapter meetings, and we have received notices that they desire to continue this program during the winter season of 1935.

Getting back to our new service program, we are paying particular attention to building a KEEP UP-TO-DATE SERVICE in the form of textbooks, consultation service, job sheets, etc. The entire program is laid out so that a member will receive helpful technical information through periodical mailings made each year. This is a costly service, but we want to do everything within our power to keep Alumni men right up-to-the-minute with anything that is new in Radio.

Mr. J. E. Smith, President of the National Radio Institute, is cooperating heartily with this movement. He is honorary president of the Association and is behind the Alumni 100%. "J. E." has a warm spot in his heart for N. R. I. men and I have yet to see the time when he was not willing to get behind something which would work to the direct benefit of his men in the field.

You are going to hear a lot about this *new and enlarged Alumni service*—it is going to be mighty valuable to every Alumni member. There is considerable detail work to be done so that everything will run smoothly, but we'll do it and you'll profit as a result.

The members of the faculty and staff of the National Radio Institute join the officers of the N. R. I. Alumni Association in wishing you A Merry Christmas and A Happy New Year

Alumni Code of Ethics

Final arrangements are being made to have drafted a *code of ethics* for the Alumni Association; a code to which every N. R. I. graduate must subscribe before being admitted to membership. A committee of Alumni members has been appointed to help in writing this document. We want to set ourselves on record and make it plain to the Radio industry just what the N. R. I. Alumni Association represents.

As soon as the *code of ethics* is completed—it will be printed and available for men in the Association. We know the high ideals and business practices of the majority of the Alumni men, and we want to let others know about it too. It is going to help in building a bigger and finer Alumni Association, which we are endeavoring to do at all times, so that every member will share in the added prestige of this group of progressive Radio men.

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Directory of Chapters

N. R. I. students or Alumni members desiring further information regarding Local Chapter activities may obtain it by writing to the Chapters direct, addressing their letters according to the following list:

Baltimore—George Ruehl, Secretary, Charleston and Second Avenues, Lansdowne, Md.

Philadelphia—Clarence Stokes, Secretary, 2947 Rutledge St., Philadelphia, Pa.

New York—Allen Arndt, Membership Secretary, 68 Suffolk St., New York City.

Buffalo—T. J. Telaak, Chairman, 657 Broadway, Buffalo, N. Y.

Toronto — Ed. Witherstone, Secretary, 363 Nairn Ave., Toronto, Ont., Canada.

Chicago — Samuel Juricek, Secretary, 4223 North Oakley Ave., Chicago, Ill.

Pittsburgh—Albert Maas, Secretary, 9 S. Howard Ave., Bellevue, Pa.

Detroit—F. E. Oliver, Secretary, 218 Alter Rd., Detroit, Mich.

New Alumni Certificates

National Headquarters has just completed arrangements for an attractive new Alumni membership certificate. It is done in two colors—a black background with a red seal of the Alumni Association, instead of in one color as heretofore. You'll be mighty proud to have this certificate framed. We urge you to display it, as it is bound to build up your prestige. New and renewal members will receive the new certificate as a regular feature of their membership, starting immediately.

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Detroit Chapter

Election of Local officers was of major interest at the last meeting in club headquarters, located at 11305 Woodward Avenue, Detroit. Immediately after the elections Mr. J. E. Smith sent a letter of congratulation to each new officer, wishing him well on his new office.

The following is a list of the newly elected officers, and their correct addresses:

Chairman—Percy E. Barlow, 4416 Concord Ave.

Ass't. Chairman—Roy E. Davis, 16207 Stoepel Avenue.

Secretary—F. E. Oliver, 218 Alter Road.

Ass't. Secretary — Ralph S. Astwood, 4132 Wayburn Avenue.

Financial Committee — W. A. Fischer, 1549 Waterman Avenue, and H. S. Robertson, 11305 Woodward Avenue.

Librarian—C. H. Mills, 5458 15th Street.

An unusual round of activities is planned for the winter season. Individual talks by members, with blackboard sketches of Radio receivers and testing equipment, have been very popular, so this practice will be followed in the future. Al Kreuzer has given many interesting discussions on his *pet subject* "testing equipment." Let's have more of them "Al."

National Headquarters wants to thank former Chairman, C. H. Mills, for the fine work he has done with the Detroit Chapter. That goes for the rest of the officers and men too—all have contributed their share toward making the Detroit Chapter a successful institution!

Toronto Chapter

National headquarters has been informed the Toronto Chapter is another N. R. I. local unit planning to put on an extensive drive for new members. One thousand copies of "The Canadian Radio-Trician" have been printed for distribution in Canada. Mr. Witherstone, genial chairman of the Toronto Chapter says: "We are growing —and how, but we aren't as big as we want to be yet, and our winter program looks mighty good. There is no intent on our part to be outdone by other Local Chapters of the Association. Canadian men are a progressive group of fellows, and we intend to continue to increase our efforts to serve the N. R. I. Alumni Association in this country. Members have already enrolled from British Columbia and Newfoundland.

"N. R. I. graduates living in Canada who are interested in our 'membership-at-large,' which entitles them to attend meetings when they are here in Toronto, as well as to receive our monthly bulletin "The Canadian Radio-Trician," are invited to correspond with us. Here are some of the topics discussed in our last issue: Money-making Radio Plans; The New Selectivity Control; Westinghouse Notes; Ethics in the Radio Profession; Aligning Procedure; Ten Service Hints on Canadian Sets; Home Study Courses; Philco Receiver Diagrams with Testing Procedure, etc. We are endeavoring to keep our bulletin chuck full of technical information that can be used to advantage by Canadian men." Complete details regarding membership in this Local Chapter of the N. R. I. A. A., can be obtained from Mr. E. Witherstone, 363 Nairn Ave., Toronto, Ont., Canada.

The Toronto Chapter reports many new faces at each meeting, and we are proud to see the interest that is shown in their organization. These Canadian boys are going places. They are giving some of the United States Locals things to think about.

Various Radio companies have been cooperating with the Chapter, realizing the good it is doing the industry. We want, especially, to thank Philco Distributors, Ltd., Westinghouse, and the Radio College of Canada.

Technical Data Service

N. R. I. Alumni Association members were recently sent a special mailing—consisting of a sample copy of the "IRC Servicer" and a sample ½ watt resistor. This mailing was made with the cooperation of the International Resistance Company and Mr. Dan Fairbanks, Editor of the magazine.

On the front page a voting coupon was attached, to determine here at National Headquarters just how you N. R. I. men would respond to this type of service. That is, whether you desired National Headquarters to arrange other Radio products companies to send technical data of this kind, without charge. If favorable, we plan to bring our Alumni members many interesting booklets, magazines and bulletins to help them in their work. Votes already received indicate this special service will be very popular, but we want to be positive in our action.

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Philadelphia-Camden Chapter

The *"Philcam Key,"* monthly magazine of this Chapter, states that a special drive is under way to increase the membership by at least a hundred men. A cordial invitation is extended to N. R. I. men in the Philadelphia-Camden area to become a part of this energetic group. Full information regarding Chapter activities can be obtained from Mr. Clarence Stokes, Secretary, 2947 Rutledge Street, Philadelphia, Pa.

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Mr. H. B. Willett is to be congratulated on the fine work he has done on the *"Philcam Key."*

The Philadelphia-Camden Chapter is designed primarily to enable members to earn more money in the Radio profession. With such a progressive group of N. R. I. men, many benefits can be derived. The Chairman, Mr. Fehn, and the rest of the officers have given a great deal of time and energy to improving the Chapter. It has been hard work—but they are willing to do their share. Attend meetings regularly; cooperate with the officers; and get your share of the benefits.

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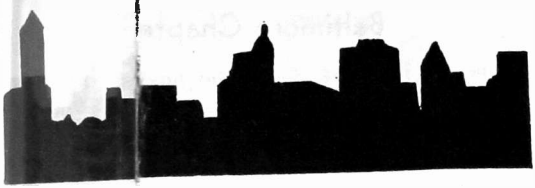

New York Metropolitan Area Chapter

Mr. John V. Rider, Publisher, gave an interesting talk on "The Business Idea of Servicing," at a regular Chapter meeting in the Hotel New Yorker, recently. Well known in the Radio servicing field for having done a great deal to elevate the standards of the profession, Mr. Rider is to be commended for cooperating wholeheartedly on many occasions with the special aims of the Association.

New and enlightening ideas, which will enable the Radio serviceman to earn more money, were brought up at this meeting. He pointed out quite clearly that the Radio servicing field not only requires a thorough technical Radio knowledge, but also demands some knowledge of business; that is, ways and means of getting your share of service calls.

There were eager listeners in this group—the large attendance was proof enough that R. I. Alumni men are ever alert to grasp new opportunities.

The remainder of the evening was devoted to discussion of regular business policies and plans for the future. The Hotel New Yorker has been headquarters for the New York Metropolitan Area over a year—reports to National Headquarters indicate they are well pleased with the arrangement. So if any of you Alumni men have occasion to go to New York on pleasure or business, you will be cooperating with the New York Chapter by making the Hotel New Yorker your headquarters while in the city.

Mr. James L. Kearns, Chairman of the New York Metropolitan Area Chapter is also quite a capable speaker when it comes to telling members how to "make money in Radio." He not only knows the plans that are successful, but has executed them in his own organization to prove that he does *know his business.* There is money to be made in Radio if a man has the knowledge and is willing to go out and get it.

The primary function of our Alumni Association is to make better Radio men out of good Radio men. And we're doing it.

Final Ballot for Election of National Officers for 1936

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—*n r i*—

You better live your best and act your best and think your best today; for today is the sure preparation for tomorrow and all the other tomorrows that follow.—HARRIET MARTINEAU.

Toronto Chapter

National headquarters has been informed the Toronto Chapter is another N. R. I. local unit planning to put on an extensive drive for new members. One thousand copies of "The Canadian Radio-Trician" have been printed for distribution in Canada. Mr. Witherstone, genial chairman of the Toronto Chapter says: "We are growing —and how, but we aren't as big as we want to be yet, and our winter program looks mighty good. There is no intent on our part to be outdone by other Local Chapters of the Association. Canadian men are a progressive group of fellows, and we intend to continue to increase our efforts to serve the N. R. I. Alumni Association in this country. Members have already enrolled from British Columbia and Newfoundland.

"N. R. I. graduates living in Canada who are interested in our 'membership-at-large,' which entitles them to attend meetings when they are here in Toronto, as well as to receive our monthly bulletin "The Canadian Radio-Trician," are invited to correspond with us. Here are some of the topics discussed in our last issue: Money-making Radio Plans; The New Selectivity Control; Westinghouse Notes; Ethics in the Radio Profession; Aligning Procedure; Ten Service Hints on Canadian Sets; Home Study Courses; Philco Receiver Diagrams with Testing Procedure, etc. We are endeavoring to keep our bulletin chuck full of technical information that can be used to advantage by Canadian men." Complete details regarding membership in this Local Chapter of the N. R. I. A. A., can be obtained from Mr. E. Witherstone, 363 Nairn Ave., Toronto, Ont., Canada.

The Toronto Chapter reports many new faces at each meeting, and we are proud to see the interest that is shown in their organization. These Canadian boys are going places. They are giving some of the United States Locals things to think about.

Various Radio companies have been cooperating with the Chapter, realizing the good it is doing the industry. We want, especially, to thank Philco Distributors, Ltd., Westinghouse, and the Radio College of Canada.

Technical Data Service

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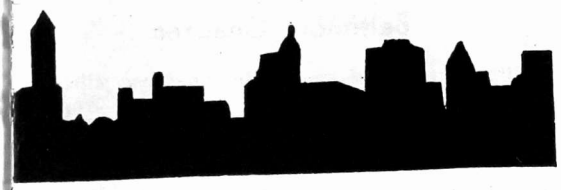

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Nomination Ballot

Fill in this ballot carefully, following instructions given on page 29. Mail your ballot to National Headquarters immediately.

FOR PRESIDENT—(Vote for one man)

☐ P. J. Dunn

☐ Allen Arndt

FOR VICE-PRESIDENT

(Vote for four men)

☐ L. J. Vanek

☐ Edward J. Meyer

☐ Earl Bennett

☐ Frank Parkins

☐ Clarence Stokes

☐ E. Witherstone

☐ W. Giese

☐ John Jacobs

FOR SECRETARY—(Vote for one man)

☐ Earl Merryman

☐ Samuel Juricek

FOR EXECUTIVE SECRETARY

(Vote for one man)

☐ R. B. Murray

☐ C. E. Lenhart

SIGN HERE:

Your Name .....

Your Address .....

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

Mail Your Completed Ballot To:

R. B. MURRAY, Asst. Executive Secretary,

N. R. I. ALUMNI ASSOCIATION,

16th & U STREETS, N. W.,

WASHINGTON, D. C.

TEAR CAREFULLY AND MAIL

Baltimore Chapter

"The outlook of the Radio business this season is decidedly on the upswing," reports George H. Ruehl, Secretary. "Our members have been getting a greater share of the Radio work here in Baltimore, which is very encouraging. N. R. I. men who have been attending our lectures during the past month have been particularly fortunate. An unusual number of good Radio speakers have visited the Chapter, bringing with them an abundance of workable ideas."

The Baltimore Chapter and the Maryland Radio Servicing Association combined meetings recently. Alumni and M. R. S. A. men attended from all sections of Maryland. There were door prizes galore. The combined meeting was under the sponsorship of the North Radio Company, known in Baltimore as "Norco." An excellent speaker was obtained for this meeting from the Radiart Company of Cleveland. "Auto-Radio Vibrators" were discussed. The speaker gave a practical demonstration of how vibrators work, as well as outlining the different circuits on the blackboard.

Mr. Rohrich of the N. R. I. Technical Staff followed this meeting a week or so later with a discussion of "Radio Receiver Troubles." A Philco Model 71 and an oscillograph were used for the practical demonstration. The Baltimore Chapter has not had the pleasure of hearing Mr. Rohrich for some time, but we know his vast experience of eighteen years in the Radio field has been of real practical value to members.

Baltimore Chapter's well-known editor, Mr. Wilmer Giese, does not seem to be able to keep out of the spot-light. He is getting a big hand from prominent Radio organizations on the work he is doing with the "Baltimore Bulletin."

P. J. Dunn is another Alumni booster who deserves a lot of credit. As Chairman at Baltimore and National President, "Pete" has made considerable personal sacrifice to lend a helping hand to Alumni activities. We learn from authentic sources that he is crossing his fingers regarding the 1936 Presidential elections. He has his "hat in the ring" all right, and you can just bet your bottom dollar the boys in Baltimore are pulling for him strong. "Pete" has done an excellent job of being Chairman at Baltimore for the past two years, as well as being National President for the year 1935.

———*n r i*———

We want this to be the biggest election the Alumni Association has ever held. Every alumni member SHOULD fill out and mail the ballot to the left.

The Mailbag

Hams

The following N. R. I. students and graduates have reported their "ham stations" to NATIONAL RADIO NEWS since last issue.

Leo Goudreau—VE1HW—Campbellton, N. B.
Charles T. Carroll—W4OV—Cleveland, Tenn.
Lyman T. Newell—W8DHH—Elmira, N. Y.
Don Armstrong—W9UQP—Cedar Rapids, Iowa.

If you operate an amateur station which has not been reported in the Mailbag—send us the information so we can tell other N. R. I students and graduates about it.

———*n r i*———

Signals from W4CYY, operated by N. R. I. student J. B. Smith, Mt. Holly, N. C., have been reported in England on 1760 K.C. Nice work, J. B.

———*n r i*———

Getting Off to a Good Start

"Last month I put out 1500 circulars in my neighborhood and had several sets to clean and a number of repairs to make as a result. I could write quite a bit about the various jobs that I did—but that would take a lot of space, and after all, the important and interesting part is that I made all these repairs—found all the trouble myself, without any outside aids. Before I started your Training I knew nothing whatsoever about Radio. I am now working on my twenty-second lesson."

J. H. SLOAN, *Birmingham, Ala.*

———*n r i*———

Thank You!

"This is my first trip to the 'Mailbag.' I am only a student, but hope to be a graduate soon.

"I think NATIONAL RADIO NEWS is the best magazine a Radio man can read. I sure am proud of it.

"I would like to hear from any N. R. I. students or graduates in my vicinity."

LESTER T. MYRICK, *Glen Allen, Mo.*

———*n r i*———

Philco 52

"In servicing a Philco 52, I found the cause of noise and extreme loss of sensitivity to be due to a lack of proper grounding of the volume control to chassis. Someone ahead of me had lubricated the volume control *too* thoroughly, so that lubricant ran when warmed up. Upon removal of lubricant, full volume and no noise was the result."

N. J. MANSFIELD, *Sackets Harbor, N. Y.*

———*n r i*———

It seems that a fine way to get a business or Radio problem settled is to bring it up for discussion in the Mailbag. A short time back Mr. F. X. Carteret, of Milwaukee, asked for "the best way to file 'Service Forum' notes." We have received dozens of replies, some of which could not be used because they involved changes in the set-up of NATIONAL RADIO NEWS which were not practical. But with the remainder we are sure Mr. Carteret's question will be answered, and the ideas will no doubt be helpful to other readers. Here they are:

PAUL BURNHAM, FLINT, MICH.—Clip and paste all notes on individual 3 x 5 index cards. File alphabetically, according to names of sets. If hints cannot be clipped due to material on the other side of the page, then copy it on a card. If a hint is worth keeping, it is worth copying. Cigar boxes are good for filing cases.

EMILE PELOQUIN, RUMFORD, ME.—I file all copies of NATIONAL RADIO NEWS. To find the notes I want, I keep an index book in which I record (on a separate page for each receiver), Model number, complaint, issue of NATIONAL RADIO NEWS in which the note appears, and the page.

HAROLD LAURIAN, KALAMAZOO, MICH.—Keep a note book, 9 x 11 inches, with loose-leaf pages. Have an indexed section for each letter of the alphabet. On these pages I paste or copy service notes I receive.

ALBERT KERN, NEWBURGH, N. Y.—I copy all notes on 3x5 index cards and file in a box I obtained at a local ten cent store. This keeps my copy of the news perfect, except for the data sheets, which I remove and file in a loose-leaf, alphabetically arranged binder. By the way, put some gummed stickers around the holes of these sheets when filing in a binder. It protects the data sheets from the rings.

(Next page, please)

The Mailbag

(Continued from page 22)

GEO. H. MILLER, MERRILL, WISC.—Use 3 x 5 index cards and paste or copy notes. Write name of set on top of card. File alphabetically. If information on a card pertains to other makes of receivers, cross index by noting on the other cards affected.

———*n r i*———

Graduate Harvey C. Messner, Tucson, Ariz., has written us a letter showing a different slant on this matter of filing. Read it:

"I am glad to describe my method of filing 'Service Forum' and other Service Information. Desiring to keep *all* of the NEWS articles for reference, I procured a small metal file box which keep the NEWS copies intact, except that I remove the 'Data Sheets' to file alphabetically in another similar file to carry with me on service calls. For reference purposes, I have 3 x 5 card index files. In one I file alphabetically, according to subject covered, all cards bearing titles of articles not pertaining directly to Radio service. In the other, the 'Service File,' are filed all cards bearing titles of 'Service Hints,' and of a nature to aid in my shop work. The latter are filed and headed with the important subject covered also in a kind of cross filing system; for instance, a service hint pertaining to 'Atwater Kent' receivers, 'Intermittent Reception,' due directly or indirectly to a Tube, Resistor, R. F., I. F., or A. F. Transformer or Power Transformer or other apparatus, would be filed under 'A' on a card headed Atwater Kent, with as complete an abbreviated description as could be written on a line below, of the model number, trouble and cause, giving units responsible, and then number of N. R. NEWS *issue*. (I always number my copies for convenience.) The above described line would also be written on cards, headed and filed as follows: 'T,' Tubes; 'R,' Resistor; 'R,' R. B., 'I,' I. F., 'A,' A. F. Transformer or 'P,' Power Transformer, and 'I,' Intermittent Reception.

"This may appear as considerable detail, but is really quite simply and easily done, and aids materially since the same troubles may be encountered in other makes of Radio. And information is of no value if difficult to locate when needed."

———*n r i*———

Correction

A typographical error appeared under the heading of "Police Radio News," on Page 23 of the October-November 1935 issue of NATIONAL RADIO NEWS.

In the last paragraph was a statement to the effect that the Augusta, Georgia, Radio Police System employed a 270 Watt transmitter. This should have been 250 Watt transmitter. NATIONAL RADIO NEWS regrets this error.

NATIONAL RADIO NEWS

FROM N.R.I. TRAINING HEADQUARTERS

Vol. 6—No. 11 December, 1935-January, 1936

Published every other month in the interest of the students and Alumni Association of the

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Washington, D. C.

The Official Organ of the N. R. I. Alumni Association

Editorial and Business Office, 16th & You Sts., N. W., Washington, D. C.

P. J. MURRAY, MANAGING EDITOR

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