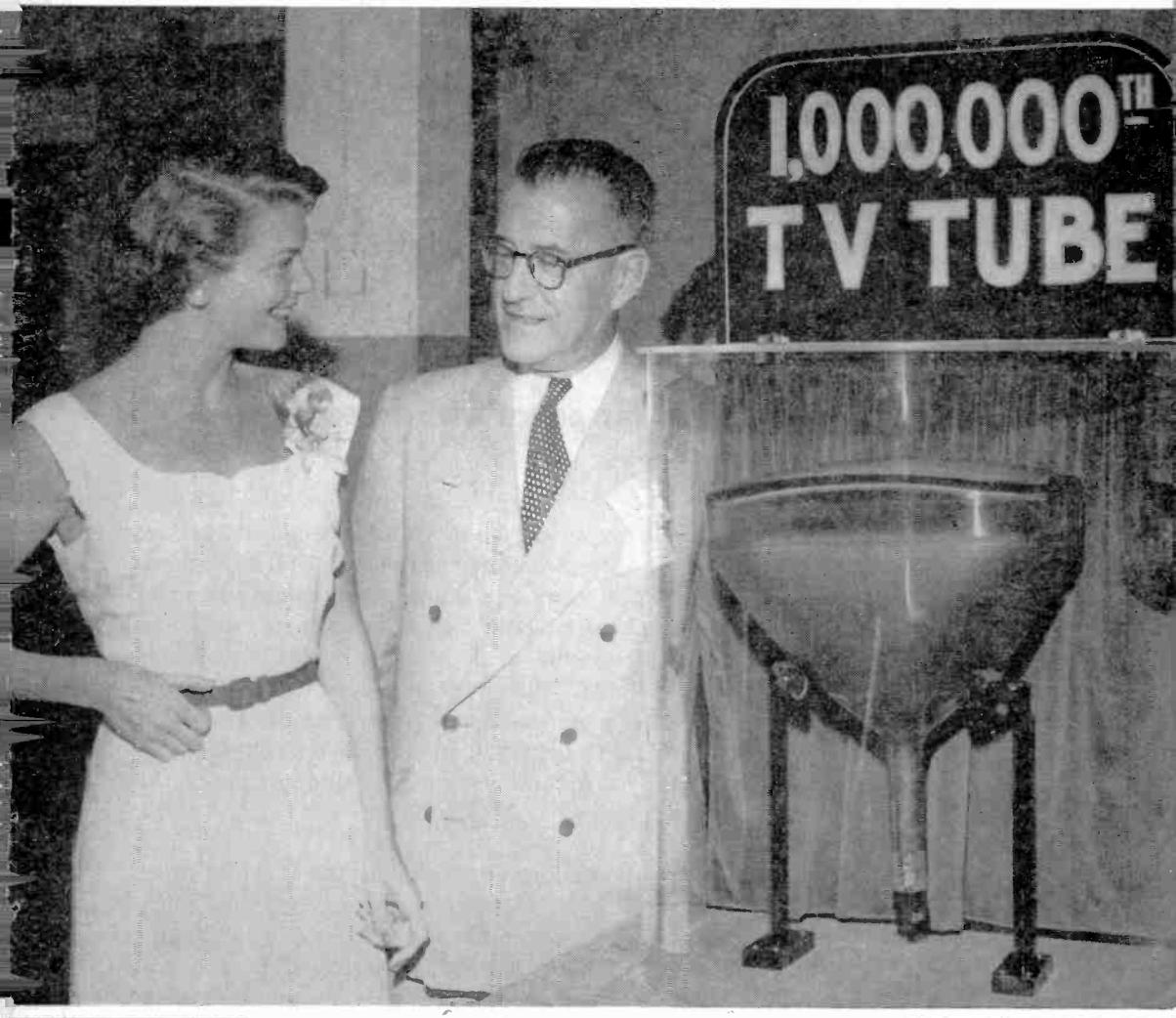
National RADIO-TV NEWS



IN THIS ISSUE

How to Service TV Receivers Without Expensive Test Equipment

Alumni Association News

Oct.-Nov. 1950

VOL. 14 No. 5

our best hope for peace with freedom

WHEN the church bells ring out on the morning of October 24, they will symbolize the hope of the world for peace—the United Nations.

One hundred and seventy-four years ago, another bell meant hope and freedom to Americans—the Liberty Bell, which proclaimed our independence. Now, beloved by Americans and visited as a shrine, it hangs in Independence Hall, Philadelphia. This month, the hope of freedom and peace will again be in the hearts of Americans. By arrangement with all religious faiths, millions of church bells will ring at eleven o'clock, Tuesday morning, October 24th, as Americans pray for the future of the United Nations.

The Korean invasion, with the nations uniting under the blue and white flag of the U.N. to resist aggression, highlights powerfully the primary function of the United Nations—to prevent world conflict. The ringing of the bells on United Nations Day, with their call for universal prayer, will bring this meaning home to every one of us. Wherever we may be, whatever we may be doing, let's say a prayer for the United Nations—our best hope for peace and freedom.

J. E. SMITH, *President.*

How to Service TV Receivers Without Expensive Test Equipment

By LOUIS E. GARNER, JR.

NRI Consultant

Louis E. Garner, Jr.

EXPENSIVE test equipment (cathode ray oscilloscopes, sweep and marker signal generators, vacuum tube voltmeters, etc.) is required for some TV servicing jobs, but the majority of defective sets can be repaired with little more than a multitester, a few spare tubes and parts, one or two simple "servicing aids" which you can make yourself, plus a large measure of "effect-to-cause" reasoning. Although a television receiver has more tubes and parts, and is more complicated than an AM or FM receiver, many servicemen consider it easier to service, due to the many "signposts" in the set which aid in isolating the trouble to a section or stage. Often, the correct analysis of the complaint will lead to section or stage isolation, before any tests are made. Then any one of a number of circuit and part isolation techniques may be applied.

Since the most important and most valuable technique you have at your disposal is your ability to apply "effect-to-cause" reasoning, you should thoroughly understand the operation of TV receivers. It is not generally necessary that you know how each individual circuit in a particular receiver performs as long as you know how the different sections work together. Of course, a detailed knowledge of the different circuits will aid in the final isolation of the defective part.

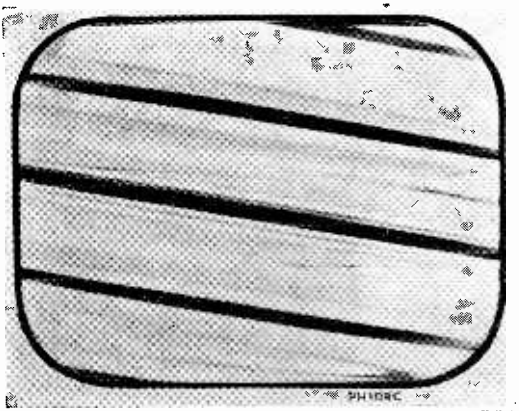
Analyzing the Complaint

Before attempting the service of a television receiver, make sure you know the customer's exact complaint and make sure that the set once operated normally. There may be some inherent interference condition in the neighborhood in which the receiver is located, or the customer may not be familiar with the proper operation of the set, or the installation may be at fault. To service a set which is in normal operating condition causes a considerable waste of time and effort.

There are times when receivers will come through from the factory with defects—either "bugs" which have not been corrected in the design, connections which have not been made securely, or defective parts. In such cases, the service technique is somewhat different from that employed in a set that one time operated properly. In general service work, the techniques are aimed at finding some part (or parts) that have become defective and have resulted in the complaint. In the case of factory defects, it must be remembered that the defect may actually be an error in wiring or in engineering.

However, don't attempt to redesign or re-engineer sets brought to you for repair. Where you have any doubts, refer to manufacturer's service notes. Where there are "bugs" either in the construction or design of a TV receiver, these defects will be discovered soon after a few of the sets are made. Most manufacturers then issue a service bulletin describing the defects and telling in which of their models the defect is found, together with instructions for correcting it.

When attempting to analyze a customer's complaint, not only find out whether the set ever operated properly, but interpret the customer's complaint in terms of what is actually wrong



Courtesy RCA

Figure 1. Appearance of a picture with no horizontal sync. May be caused by extreme misadjustment of the horizontal hold control or by a defect in the horizontal oscillator, AFC, or sync circuits.

with the set. The majority of customers call any condition in which a clear, sharp picture is not obtained "no picture." This holds true even if there is a picture that is simply out of sync.

To take a typical condition, assume that sound is present (that is, the audio portion of the television program can be received and heard), that a raster and picture is obtained, but that horizontal synchronization is lacking, resulting in a pattern somewhat as shown in figure 1. The serviceman, when checking such a set, would define the complaint as *"sound, picture, but no horizontal sync."* A customer, on the other hand, may call the same condition simply *"no picture."*

As another example, a condition where the audio portion of the program is present, but no picture is obtained, a raster still appearing on the screen, might be defined by a serviceman as a complaint of *"sound, raster, but no picture."* This condition indicates an entirely different source of trouble from the preceding condition—yet the average customer may also call this *"no picture."*

Thus, to properly analyze the complaint, there are several things you should do. First, find out if the set ever worked normally. Do this to avoid trying to service the set when the defect is not in the set and as a check to see whether the manufacturer's service notes should be referred to for "bugs" in the receiver. Secondly, have the customer explain exactly what he finds wrong with the set—preferably operate the set and show you what's wrong. Do this so you can correct the customer's actual complaint. Servicemen may be more critical of some things and less critical of others than the set owner. Your job is simply to correct the condition or defect causing the customer's complaint. Finally, on the basis of the set's operation and the customer's complaint, apply your own correct technical name, which will help you, as we shall see, to isolate the trouble.

TV service complaints fall into three general classes: *sound okay, defect of some sort in picture; picture okay, defect of some sort in sound; defect in both picture and sound.* There may be lack of sound or picture, distortion, lack of sync in picture, etc. Under each general class of complaint, there is a further breakdown.

Section or Stage Isolation from Complaint

In this article we will be concerned only with set defects, but you should always remember to check the installation.

Once the complaint is analyzed, it is generally a simple matter to perform a preliminary isolation of the trouble by applying "effect-to-cause" reasoning. To do this, we must first know how the signal travels through the television receiver. In figure 2 (see page 6) is given a "general" television receiver block diagram which may be applied to practically any television receiver manufactured, whether electrostatic or electromagnetic.

The TV signal picked up by the antenna is transferred through the transmission line to the tuner or "front-end." Here the signal is amplified and mixed with the signal from the local oscillator to produce the audio and video i.f.'s. At this point, the audio i.f. may be taken off and passed to the audio i.f. amplifier (path 1). In other sets, the audio and video i.f. signals are amplified together for a stage or two and then the audio i.f. is taken off (path 2). In intermodulation receivers, (sets using the 4.5 megacycle beat between the video and audio carriers as the "audio i.f.") the audio signal is not taken off until after the video second detector (path 3).

Following the video signal, additional amplification is given in the video i.f. strip, the signal is detected by the video second detector, the resulting video signal amplified by the video amplifier and applied to the cathode ray picture tube.

The sync pulses may be obtained either from the second detector or viedo amplifier (paths A or B). They are then amplified and separated by the sync amplifier and separator stages. Horizontal sync pulses are fed to the horizontal sweep oscillator and vertical sync pulses to the vertical sweep oscillator.

The signal obtained from the horizontal sweep oscillator is applied to the sweep output amplifier and then to the picture tube. Similarly, the signal obtained from the vertical sweep oscillator

is applied to the vertical sweep amplifier and to the picture tube.

A high voltage supply is provided to supply a high DC voltage for the second anode of the cathode ray picture tube. This may be a separate supply or may be part of the horizontal output amplifier, depending on the receiver.

Referring back to the sound channel, the audio i.f. signal is amplified by the audio i.f. stages, then detected by a discriminator or ratio detector (remember that television sound is FM). The resulting audio signal is amplified by the first audio amplifier and audio output amplifier stages and applied to the loudspeaker.

Now, let us take general complaints and see how we can apply "effect-to-cause" reasoning to isolate the trouble to a section or stage in our typical receiver. We will break down the three general classes listed above into definite complaints.

Sound Okay, Defect in Picture

Under this general class of complaints, we will consider that the television program sound is received normally and clearly. Hence, we can generally be sure that the entire sound channel, consisting of audio i.f., discriminator, first audio, audio output and loudspeaker, is operating normally. We can also further assume that any stages ahead of the sound take-off point are operating normally.

If the sound take-off is in the video amplifier stage (as in the case with inter-modulation sets) we can be reasonably sure that the trouble is not in the video second detector, video i.f., or tuner.

Similarly, if the sound take-off is in the video i.f. strip, we can be reasonably sure that the video i.f. stages ahead of the sound take-off point as well as the tuner are operating properly. Finally, if the sound take-off point is in the tuner stage or front-end, we can be reasonably sure that this unit is operating properly.

In any case, unless the nature of the defect in the picture indicates otherwise, if sound is normal, we can eliminate the sound channel and, in most instances, stages or sections common to both the sound and picture. Let us see how to further isolate the trouble from the nature of the complaint.

"Sound Okay, Raster, No Picture:" Since a raster is present, we know that the sweep oscillators, sweep amplifiers, and high voltage circuits are operating normally. We also know that the picture tube is in good condition. Hence, the trouble must be in one of the video circuits. We can immediately isolate the trouble to either the video amplifier, video second detector, or video i.f. section, depending on the sound take-off point. In an intermodulation set, where the sound take-off may be in the second detector or video amplifier stage, with this general complaint, we can immediately eliminate stages ahead of the sound take-off point. Thus, referring to figure 2, if the sound take-off point is path 3, then the trouble is somewhere in the video amplifier stage or between the video amplifier and the point of application of the video signal to the cathode ray picture tube. In an actual receiver, the trouble would be narrowed down to perhaps only a half dozen parts.

On the other hand, if the sound take-off point is in the video i.f. strip, then the defect might be anywhere after the sound take-off point and before the point of application of the video signal to the cathode ray picture tube. The general test technique here would be to isolate the trouble to either the video i.f. strip or the video amplifier by using an ordinary multimeter to check for DC or AC voltages across the video second detector load resistor. A DC or AC voltage here, on the order of from 1 to 5 volts (or more in some cases) indicates that the video i.f. strip and the second detector are operating normally—hence the trouble must be after the second detector. Referring to the schematic diagram for the RCA 630 TS Television receiver shown in figure 4, the check would be made across R137.

If the sound take-off point is in the front-end, we would apply the same technique—that of isolating the trouble either to the i.f. strip or to the video amplifier by checking for the presence of a DC or AC voltage across the video second detector load resistor.

By applying "effect-to-cause" reasoning to this particular complaint, we have isolated the trouble to a comparatively small portion of the receiver. We have done this without regard to the type of TV receiver except in a general way. Simply understanding how the TV receiver works and the nature of the complaint enables us to perform a preliminary isolation.

"Sound Okay, No Picture or Raster:" With this complaint, we can assume that a picture signal is present, but that no picture or raster appears on the screen of the cathode ray tube due to some defect in the cathode ray tube itself, in the DC operating voltages applied to the cathode ray tube, or in the high voltage supply. As a check, however, an AC voltmeter may be used to test for the presence of an AC signal at the picture tube. In some sets, the AC picture signal may be applied to the grid of the cathode ray tube and in other sets to the cathode.

In the set shown in Figure 4 (see page 8) the picture signal is applied to the grid of the cathode

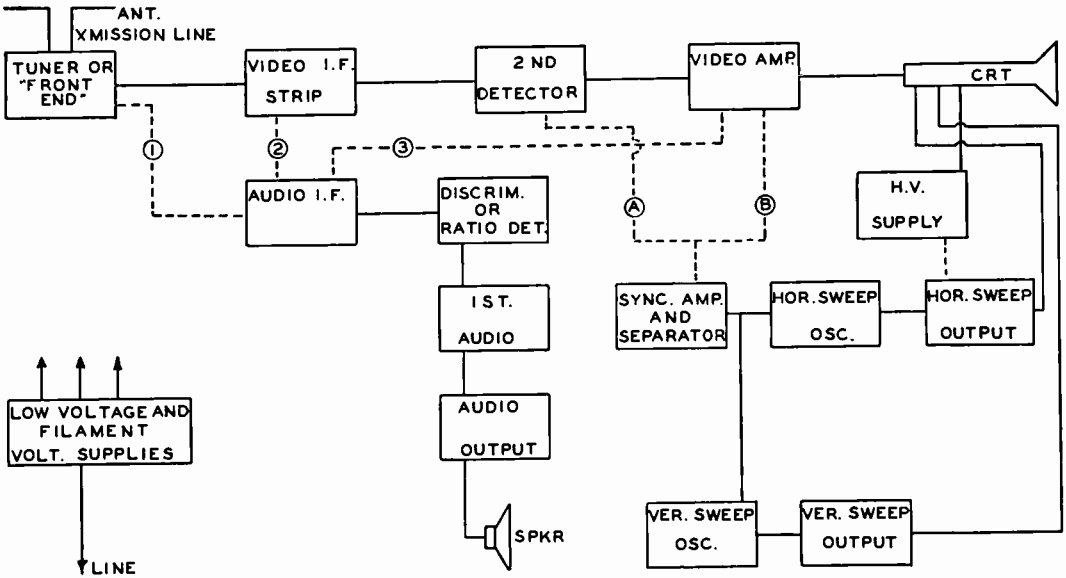


Figure 2. A block diagram that will apply to any TV receiver. "Conventional" sets employing a separate sound channel will have the sound channel connected over paths 1 or 2. Intercarrier (or intermodulation) sets will have the sound channel connected over path 3. The synchronizing pulses may be taken off either at the second detector (path A) or from the video amplifier or DC restorer (path B).

ray tube. To check for a picture signal here, an AC voltmeter (with a blocking condenser of about .5 mfd. connected in series with the multimeter) is connected between the grid of the picture tube and ground. An AC signal here, (which may be as high as 15 or 20 volts in some cases) indicates that all stages in the video signal circuit ahead of the cathode ray picture tube are operating normally. Therefore, since no raster or picture is obtained, we must assume that the defect is either in the cathode ray picture tube itself, in the circuits supplying DC operating voltages to this tube, or in the high voltage supply.

Your DC voltmeter may be used for checking the various operating voltages on the cathode ray picture tube. The picture tube itself may be checked by trying a replacement. The high voltage supply may be checked by using a high voltage multiplier probe (see figure 3) in conjunction with your multimeter. If there is no high voltage, a further check should be made of the high voltage supply circuit. Where the high voltage supply is an intimate part of some other circuit, such as the horizontal sweep output amplifier circuit, it is also necessary to make sure that this circuit is operating properly.

In figure 4, for example, it would be necessary to test not only the high voltage rectifier circuit, but also the horizontal output stage, and to make sure that proper signal drive is applied to the horizontal output stage. However, we immediately isolate the trouble to the cathode ray tube circuit, to the high voltage supply, and in some sets, must also include the horizontal sweep oscillator and horizontal sweep output stages (figure 2).

"Sound Okay—Picture Weak:" Here it is necessary to determine whether the picture is "weak" or whether it is simply light or faint due to lack of high voltage on the cathode ray picture tube or a defective cathode ray picture tube. Practice soon enables you to tell whether a faint picture is due to lack of contrast or lack of brightness in the picture tube. Assuming lack of brightness, then the defect is either in the picture tube itself, or in the high voltage supply (and circuits associated with the high voltage supply). Other improper operating voltages on the cathode ray picture tube may cause a similar condition and these should be checked.

If the picture lacks contrast, it indicates insufficient video signal applied to the cathode ray picture tube. With sound normal, we can generally assume that some stage after the sound take-off point is operating weakly. We check the same stages that would be checked in the case of the complaint of "sound okay, raster, but no picture," but for weak operation.

"Sound Okay, Picture Does not Sync:" Under

this general complaint, there are three conditions that may be encountered. The picture may lack horizontal sync, so that the picture tears horizontally; the picture may lack vertical sync, so that the picture rolls or moves vertically; or the picture may lack both horizontal and vertical sync. Generally, if the picture lacks horizontal sync only, we look for trouble in the horizontal sweep oscillator and frequently control circuits. Some sets use fairly complex horizontal automatic frequency control circuits and defects here may cause the picture to lose sync completely.

Before attempting to service the receiver for lack of sync, make sure that all "hold" controls are properly adjusted, including any special adjustments or controls for the particular set on which you are working (refer to the manufacturer's instructions).

If the picture lacks vertical sync, but the horizontal seems to hold, look for trouble in the vertical sweep oscillator or vertical sweep control circuits.

If the picture lacks both horizontal and vertical sync, look for trouble in sync circuits common to both the horizontal and vertical sweep oscillator. This will normally be the sync amplifier and separator circuits, and the sync take-off point (paths A or B in figure 2).

Exceptions to the above general conditions occur where a defect either in the video i.f. second detector or video amplifier causes these stages to operate so the sync pulses are lost.

As an example, if the low frequency response of the set should suffer, the vertical sync pulses may be partially or completely lost, resulting in a picture which moves vertically, even though the sync circuits and frequency control circuits are in good condition.

Similarly, an extreme loss of high frequencies may cause the horizontal sync pulses to be lost, again resulting in a picture that loses horizontal sync even though the sync amplifier and separator circuits as well as the frequency control circuits are in good condition. Such defects as the last two mentioned may be infrequently encountered, but are generally obscure and require checking in the video amplifier circuits to isolate.

"Sound Okay, Interference Overlay on Picture." Such conditions are illustrated in figure 5. Here, we can generally assume that all stages are operating normally but that some other signal is present along with the picture signal at the point of application to the cathode ray picture tube.

If the frequency of the undesired signal is below the frequency of the horizontal sweep (15,750 cycles per second), then entire lines will be

Figure 3. A high voltage multiplier probe that enables you to read voltages as high as 30,000 volts with the Model 45 NRI Professional Volt-Ohm-Mil-Ammeter. Such a probe may be obtained from the NRI Supply Division.

blanked out or made brighter at one time, resulting in horizontal bars or lines as shown in Figure 5(a). If, on the other hand, the interfering signal is higher in frequency than the horizontal sweep, then portions of the lines will be made lighter and darker, resulting in vertical or slanting lines or bars, as shown in figure 5(b). If the interfering signal is a random noise of some sort, it will appear somewhat as in figure 5(c). Special types of interference may cause unusual patterns (figure 5(d)).

In general, patterns as shown in 5b and 5d are caused by external interference conditions and not by defects in the set itself. A pattern such as that shown in figure 5a may be caused by part of the audio signal feeding over into the video portion of the set. This, in turn, may be caused by misalignment or misadjustment of the sound traps or by a defective electrolytic by-pass condenser in the audio circuits or in common power supply circuits. The condition shown in Figure 5c is generally caused by outside interference as indicated in the caption, but may also be caused by conditions of noise in the set, such as noisy switches (particularly in the front-end) and noisy controls.

Where horizontal or vertical bars or lines are present, the number of bars indicates approximately the frequency of the undesired signal. A low frequency signal such as hum will cause one or two heavy horizontal bars.

In any case, we can assume that the trouble is introduced somewhere in the picture signal channel. If an external interference, it must be eliminated by the use of traps, stubs, or by using other methods as outlined in your regular NRI lesson texts. If the pattern is the type that may be caused by a defect in the receiver, check any circuits where such an interference may be introduced. If the interference is a noise of some sort, check switches and controls, cleaning with carbon tetrachloride if necessary. If sound bars, check electrolytic condensers in the power supply, audio by-pass and filter condensers, alignment, and "touch-up" the sound "traps." If hum bars, check filters, check for heater-to-cathode

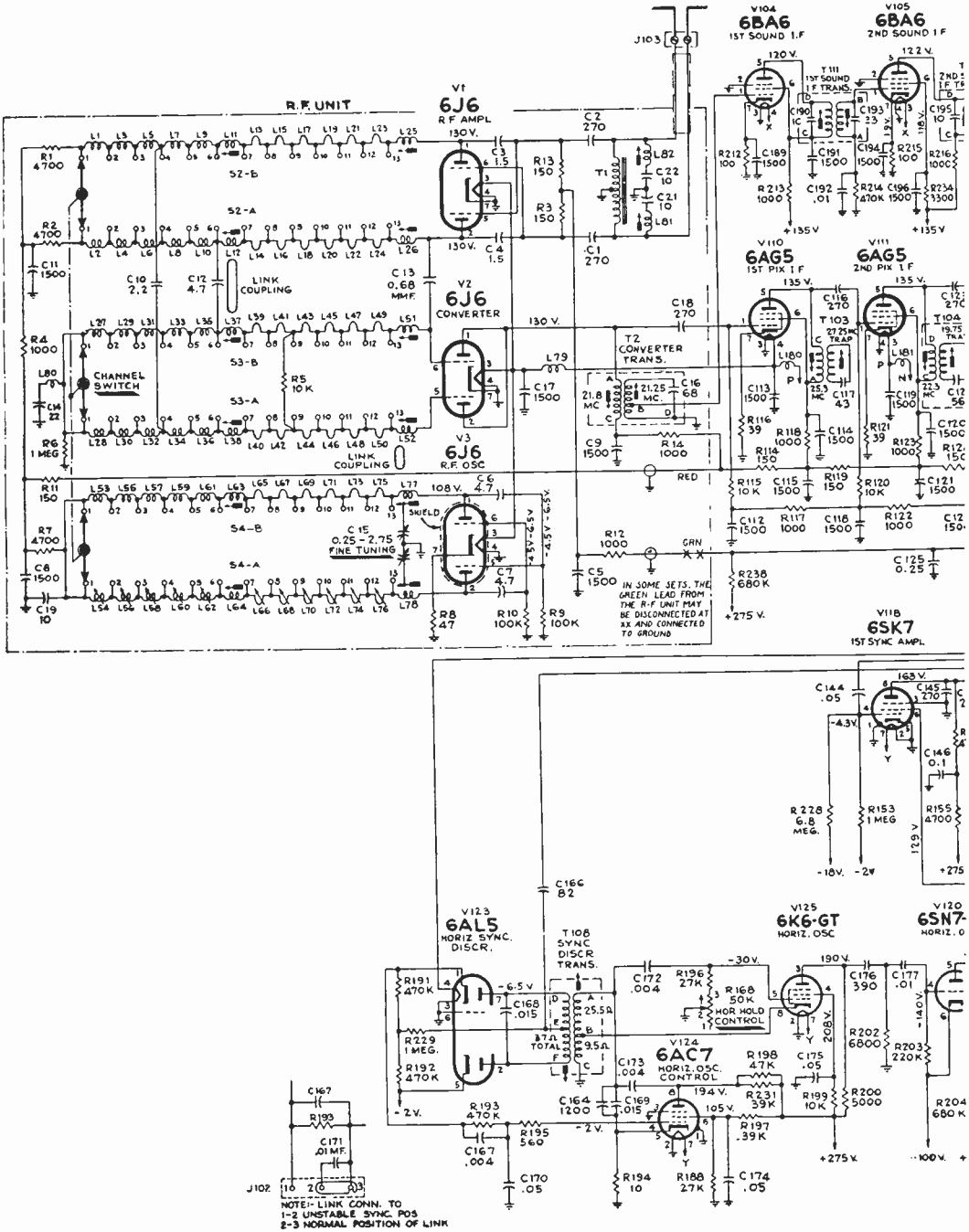
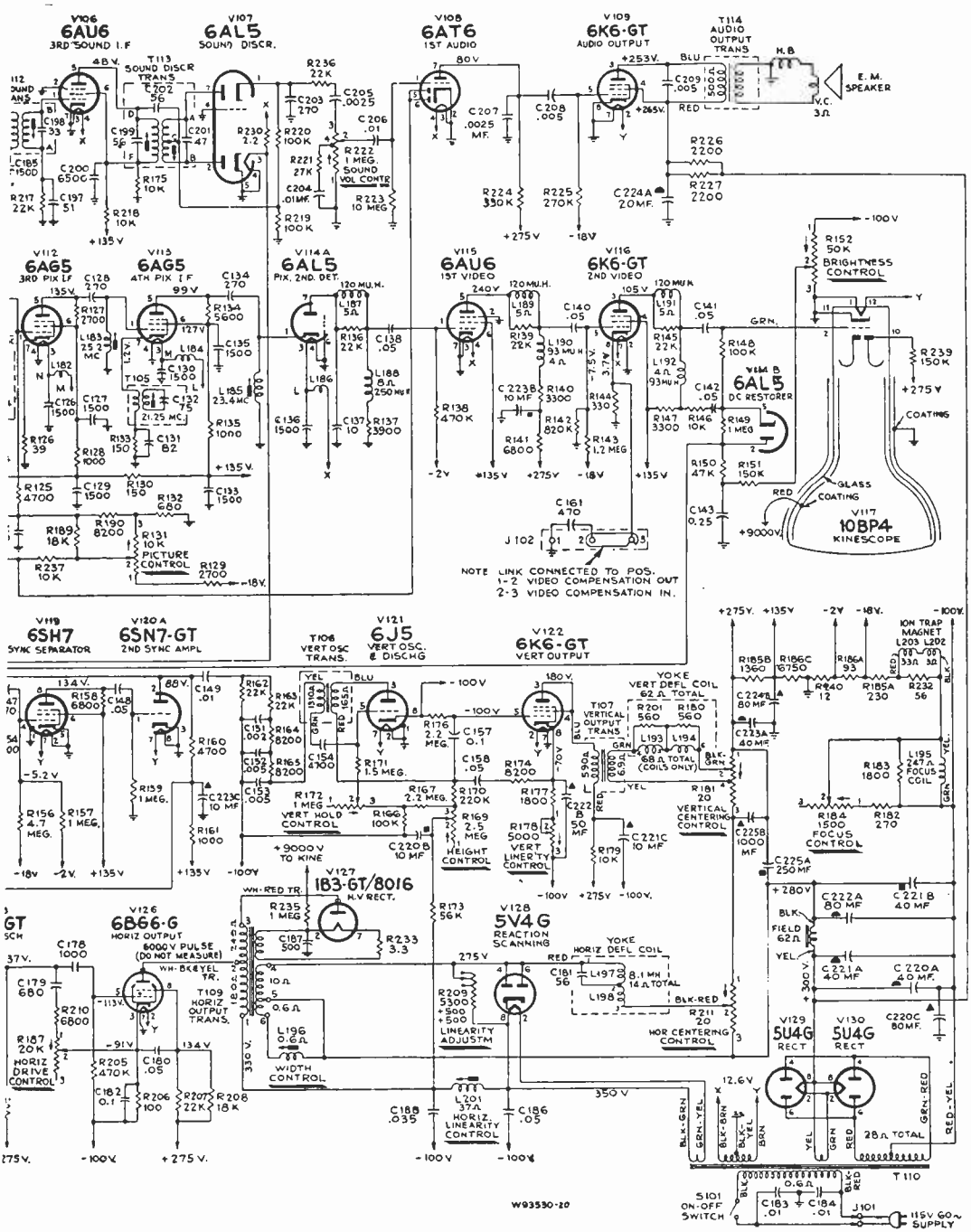


Figure 4. The RCA 630 TS television receiver. This diagram also applies to many



sets built by other manufacturers in the years 1946 to 1948.

Courtesy RCA

NRI TV Lab. Photo

Figure 5 (a). Sound bars resulting from a low frequency AM signal present along with the video signal at the picture tube.

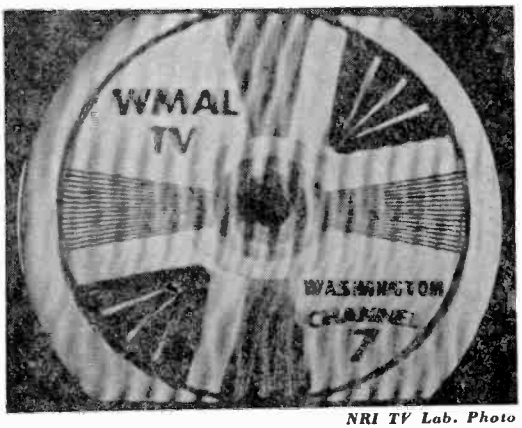


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Figure 5 (b). Slanting vertical lines caused by r.f. interference. The lines may be straight or wavy, may be up and down, or may slant in either direction. The number of lines will vary, depending upon the frequency of the interfering signal.

leakage in tubes, and check for open grid circuits.

"Sound Okay, Picture Too Small (Or Large):" Again, as in previous complaints mentioned, we have several conditions to consider. One in which the picture is too small horizontally, the extreme case of which is a thin vertical line; secondly, the case where the picture is too small vertically, the extreme case being a thin horizontal line; and, finally, the case where the picture is too small both horizontally and vertically, the extreme case being simply a dot or spot on the screen of the picture tube. In each case, check for trouble in the indicated circuit. If the picture is too small horizontally, or if only a vertical line is present, check the horizontal sweep oscillator and horizontal sweep output circuits, including the means for applying the sweep signal to the picture tube (deflection yoke or coupling condensers to the deflection plates). Similarly, if the picture is simply too small vertically, check the vertical sweep circuits and the parts used for applying the sweep signal to the picture tube.

Finally, if the picture is too small both horizontally and vertically or if only a dot appears on the screen of the picture tube, check both the horizontal and vertical sweep circuits, paying particular attention to power supply circuits common to both. Note that a lack of sync pulses, even though this is a common circuit, will not cause the size of the picture to be changed.

Thus, with this complaint, we can immediately isolate the trouble to the sweep circuits of the receiver (see figure 2).

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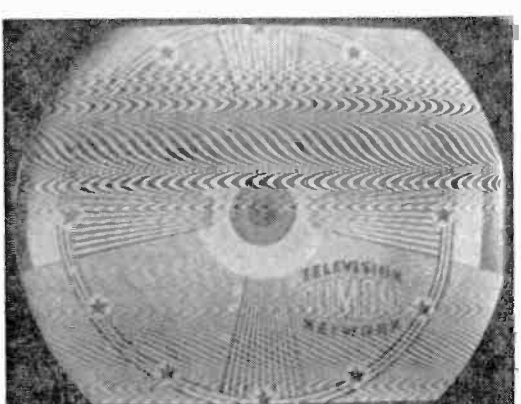
Figure 5 (c). Pattern obtained with random noise interference such as automobile ignition.



NRI TV Lab. Photo

Figure 5 (d). An unusual pattern resulting from diathermy interference.

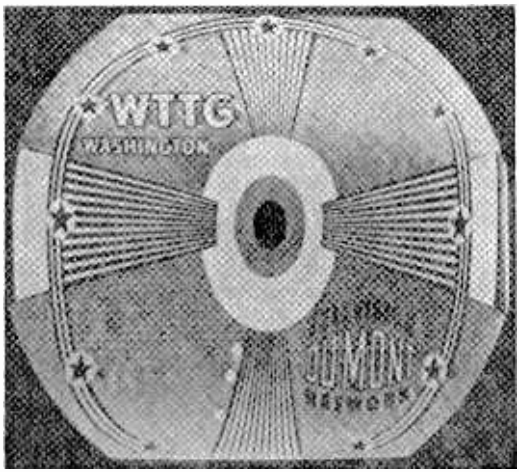


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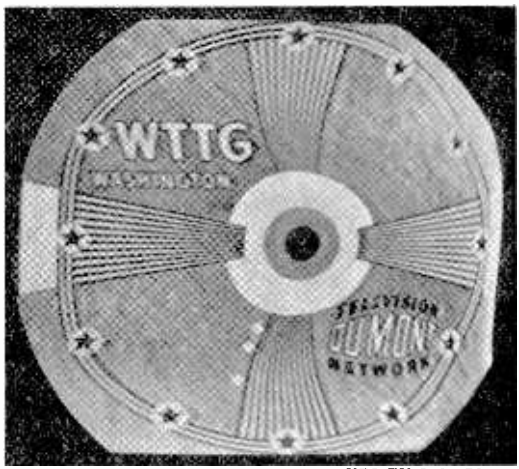
Figure 6 (a). Hum in the vertical sweep will produce a ripple that moves vertically through the picture. Here you see the effect produced for an instant by such a ripple. If the picture is distorted in this manner, but there is no moving ripple (pattern stationary), it is due to a non-linear vertical sweep.

Similar checks are made when the picture is too large, always remembering, in both cases, to check all adjustments and controls (size, linearity) before testing circuits for defects.

Sometimes, when the picture is both too large, and faint, it is due to insufficient high DC voltage—check the high voltage and filter circuits.

"Sound Okay, Picture Non-Linear Vertically:" With this complaint, we can generally isolate the trouble to the vertical sweep oscillator or vertical sweep output circuits. The picture will be distorted "up and down" in some manner. See figure 6(a). The top or bottom of the picture may be stretched compared to another portion of the picture or may be "squeezed together." There may actually be a "fold-over." In any case, where horizontal portions of the picture are distorted as far as size is concerned, or where there is a fold-over, look for trouble in the vertical sweep oscillator or vertical sweep output circuits.

"Sound Okay, Picture Non-Linear Horizontally:" With this complaint, a vertical portion of the picture will be stretched, squeezed, or folded over. The picture will be distorted towards the right or left in some manner. In this respect, the complaint is similar to that previously discussed except that we look for trouble in the horizontal sweep circuits (horizontal sweep oscillator, horizontal sweep output amplifier, and associated circuits.) Typical conditions that may occur are illustrated in figure 6(b) and 6(c).



NRI TV Lab. Photo

Figure 6 (b). Hum in the horizontal deflection circuit causes vertical portions of the picture to be out of proportion. Such a condition may also be caused by a non-linear horizontal sweep.

"Sound Okay, Picture Quality Bad:" With this general complaint, we can assume that the sweep circuits and sync circuits are operating normally but that the picture simply lacks good quality. There may be insufficient definition, or the picture may be smeared in some manner. Refer to figure 7(a) and 7(b).

Generally, such conditions may be caused either by misalignment of the i.f. strip or by a defect in the video amplifier circuit.

Thus, by applying "effect-to-cause" reasoning again, we can immediately isolate the trouble to either the video amplifier, second detector or video i.f. sections of the set. Lack of good definition is generally caused by misalignment whereas smearing and lack of low frequencies, figure 7(b), is generally caused by a defect in the video amplifier circuit, such as an open or partially open coupling condenser. However, it is possible for defects in any of these circuits to cause the picture quality to suffer.

In some cases, if the loss of low frequency signals is severe, the picture may lose vertical sync at the same time. Similarly, if the loss of high frequencies is extreme, then the picture may lose horizontal sync at the same time.

"Complaints Difficult to Describe:" Occasionally, the sound may be okay, but the defect in the picture may be difficult to describe. It may be sufficiently difficult to analyze that this prevents a preliminary isolation of the trouble. Often, complaints of this type are caused by an aggravated condition of one of the previous

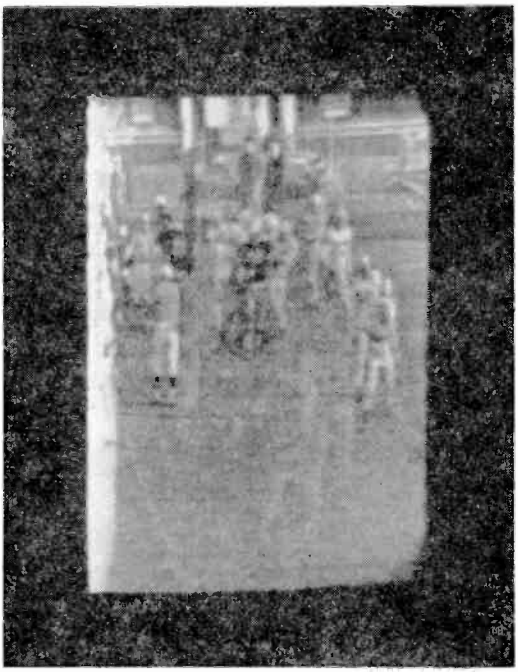


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Figure 6 (c). A fold-over in the picture due to a defective damper tube in the horizontal sweep. Note that a vertical portion of the picture is folded over.

complaints mentioned or by a combination of defects. As an example, extremely heavy hum might cause the picture to be twisted or distorted while, at the same time, causing hum bars to appear across the picture (figure 8(a)). I.F. oscillation may cause an interference pattern of some sort (figure 8(b)).

Such defects will soon be suspected once tests are made for more common complaints.

I.F. oscillation may be identified by the presence of a DC voltage (1 to 10 volts) across the video 2nd detector load which does not change as the antenna is connected and disconnected.

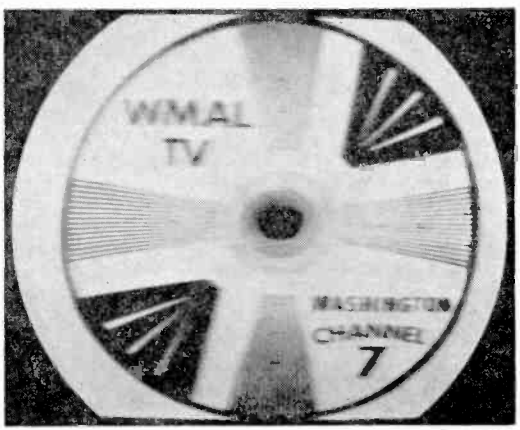
Picture Okay, Defect in Sound

Under the second class of complaints that may be encountered, we assume that picture quality is good, the picture is sharp and clear, and properly in sync, and the defect is somewhere in the sound circuit. The sound may be weak, distorted, or may be lost completely.

The isolation test employed where sound is lacking entirely is to turn up the volume control and touch the "hot" side of the control. In such a case, a loud buzz heard from the loud-speaker indicates that the audio amplifier section is operating properly and that the defect is either in the discriminator (or ratio detector) in the audio i.f. strip, or at the sound i.f. take-off point.

Where the sound is distorted, you should test for improper operating voltages, leaky coupling condensers, or defective tubes in the audio amplifier circuits (either first audio or audio output stages).

Where the sound is weak, check for misalignment, weak tubes, or improper operating voltages



NRI TV Lab. Photo

Figure 7 (a). Poor picture quality due to loss of high frequency signals. Note that the lines in the vertical wedges come together and blur before reaching the inner circle.

NRI TV Lab. Photo

Figure 7 (b). Poor picture quality due to loss of low frequency signals. Note how the picture is "smeared."

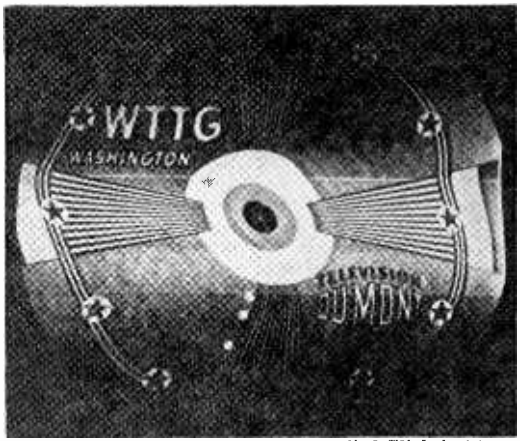


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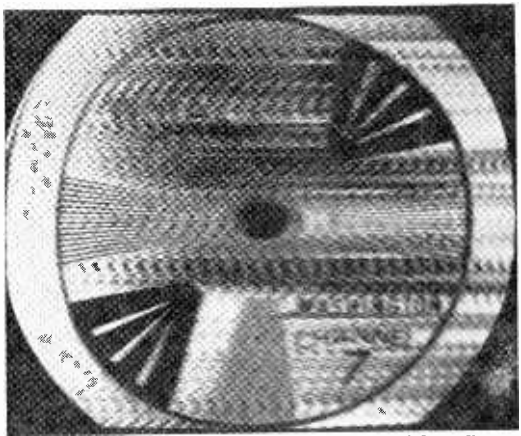
Figure 8 (a). Distortion in the picture due to extreme hum in the power supply. Note how the picture not only displays characteristic "hum bars" but is also twisted and distorted.



NRI TV Lab. Photo

Figure 8 (b). An interference pattern superimposed on the picture due to i.f. oscillation.

throughout the sound channel.

Thus, the same techniques are used for "trouble-shooting" defects in the sound channel of a television receiver as are employed in servicing ordinary A.M. and F.M. receivers.

Defect in Both Sound and Picture

Occasionally, there will be some defect that causes an over-all complaint. The picture received may not be satisfactory and, at the same time, the audio portion of the television program or the sound may be lacking, or may be weak or distorted.

In such cases, look for trouble in stages or sections common to both the sound and picture channels. The exception to this is where a defect in one channel may feedback through the power supply into other channels. As an example, oscillation in either the audio or video channels may be sufficiently strong to either couple through stray capacities to the other channel or to feed back through the power supply to the other channel. Oscillation in the audio channel might feed back through the power supply into other parts of the set, causing the picture to have bars or lines over-laid upon it, causing the picture to lose sync, etc.

"No Picture, No Sound." In this case, we will first assume that a raster is present. With a raster present, we know that the horizontal and vertical sweeps, high voltage supply, and low voltage supply are operating. Hence, the trouble must be in a signal carrying stage common to both the audio and video portions of the program.

In sets employing the intermodulation sound system, where the sound take-off point is along the path 3 in figure 2, the trouble may be in the video amplifier, video second detector, video i.f., or front-end (as well as the antenna and transmission line, of course). In sets where the sound take-off point is in the video i.f. section, look for trouble ahead of the sound take-off point. Finally, where the sound take-off point is in the front-end itself, look for trouble in this section of the receiver.

The second case is where there is no sound, no picture, and no raster. In this case, we consider the set to be completely "dead." It is necessary, therefore, to look for trouble in stages or sections common to all parts of the receiver. This is the low voltage power supply and the filament supply for the tubes, as well as the line voltage circuits.

In sets using a power transformer, look for trouble in the low voltage supply circuit or in the primary circuit of the power transformer (interlock switch, line cord, on-off switch, line fuse, etc.) It is unlikely for the filament winding of the power transformer to open, but this is a possibility that should be checked.

In sets using a transformerless type of power supply, look for trouble in the low voltage supply. In sets using transformerless supplies, filament strings are quite common. In such a case, one or more open tubes in the filament string may cause a portion of the string or the entire string to go out. Remember, also, that the power supply may consist of a number of rectifier circuits. Voltage doublers, voltage triplers, and half-wave rectifiers may all be used in one supply. A portion of the power supply may become de-

fective, and there still may be B voltage supplied to some tubes in the set.

"Picture and Sound Weak:" About the same defects that may cause the picture and sound to be lacking may also cause them to be weak. In this case, however, the presence of a raster and a picture of some sort indicates that most stages are working. Therefore, check for improper operating voltages, weak tubes, and misalignment. Check for these defects in stages common to both the sound and picture channels.

"Picture and Sound Distorted:" This is a rather unusual trouble but may occur if d.c. operating voltages in the set are improper or if there is a condition of oscillation which feeds in both sound and picture channels. This condition may also occur if filter or by-pass condensers open allowing common coupling between different stages in the television receiver.

"Hum:" Generally caused by defective filter condensers. If the hum is present in both sound and picture, it may be due also to heater-to-cathode leakage or to an open grid circuit in one of the stages common to both video and audio channels.

Often, a number of decoupling filters are used in addition to the regular power supply filters in a television receiver, and it is possible for hum to be introduced in the power supply circuit that is subsequently removed in decoupling filter circuits. In this case, the hum may show up only in the picture or in the sound (or in the sweeps) and not in other circuits. Hence, wherever hum is present in a television receiver, whether in sound, picture, sweeps, or in the entire set, check for the usual causes of hum in any receiver—defective filter condensers, heater to cathode leakage, open grid circuits, etc.

"Interference with Both Sound and Picture:" This may be caused by hum or oscillation, as mentioned previously, and by external interference. If the interference is external to the set, wave-traps, transmission line stubs, re-orienting the antenna, and similar techniques are employed to eliminate the interference. If occurring within the set due to oscillation, by-pass condensers should be checked for opens and the alignment of the receiver should be checked.

Isolation Techniques

As we have seen, a preliminary isolation of the defect to a section or stage in the receiver may be made by a careful consideration of the complaint. Once the defect has been isolated to a section of the receiver in this manner, it is still necessary to isolate the defective part causing the trouble.

Often, visual observation may indicate the source of the trouble. You may see that a resistor is burnt, that a tube is not lighting, or that a wire or lead is broken or loose. In such cases, a quick repair can be made. Where a resistor or coil has been burnt open, check condensers and tubes in the circuit associated with the defective part. A resistor or a coil will not burn out unless excessive current is passed through it. Hence, some other defect may be present, generally a leaky or shorted condenser or a gassy or shorted tube.

In isolating the trouble to a stage, first isolate large sections of the receiver. As an example, if servicing a receiver using intermodulation sound, and the complaint is *no sound or picture,* but there is a raster, you can be reasonably sure that the trouble is either in the (1) video amplifier, (2) video second detector, (3) video i.f. strip, or (4) the front-end.

This involves four major sections, and there may be as many as eleven stages to be considered. In such a case, a preliminary isolation test would be a check for DC or AC voltage at the second detector (as outlined earlier). No DC voltage or signal voltage here indicates that no signal is being delivered to the detector stage from previous stages. Thus, the video amplifier stages (and DC restorer, if used) can be eliminated and you should check for trouble ahead of the second detector.

Similarly, with a complaint of *"picture okay, no sound,"* we know, from the analysis of the complaint, to look for trouble in the audio channel. The audio channel, however, consists of the loudspeaker, audio output stage, first audio amplifier stage, discriminator or ratio detector stage, and perhaps one or two audio i.f. stages (as many as three in some sets).

Although we immediately isolate the trouble to a section of the set from the nature of the complaint, it is still necessary to isolate the trouble to one stage in as many as six. The preliminary isolation test is to turn up the volume control and to touch the "hot" side of the control, noting whether a hum or noise is heard from the loudspeaker. If the hum or noise is not heard, we know that the defect is somewhere after the volume control—either the first audio, audio output, or loudspeaker. If a loud buzz or hum can be heard, we know the trouble is ahead of the volume control. This will generally be either the discriminator (or ratio detector) or the audio i.f. stages.

Thus, a good preliminary service technique is to "break down" the receiver into smaller sections by checking for a signal at the second detector—either the video second detector or the discriminator output, depending on whether the sound or video channels are considered.

Once the defect is isolated to two or three stages of the set, it is necessary to check these individ-

ual stages. Two excellent techniques for doing this are "signal tracing" and "signal injection."

Although test equipment (such as a signal generator, oscilloscope, or signal tracer) is quite valuable for carrying out these techniques, they are not required in all cases. Often, an AC voltmeter may be used as "signal tracer," provided a DC blocking condenser is used in series with the "hot" lead. By checking for AC voltage in succeeding stages, you can tell whether the signal is being passed from stage to stage.

Another handy device which may be used either for signal tracing or signal injection is shown in figure 9. This consists simply of a blocking condenser and a shielded lead. The condenser has a value of .01 to .05 mfd., voltage rating 600 volts. The blocking condenser can be mounted in a probe as shown in the illustration.

To use this instrument for signal tracing, connect the shielded lead to the set ground or chassis. The central or "hot" lead is connected to the "hot" side of the volume control. One of the audio i.f. tubes is then removed to "kill" the audio channel.

With the probe connected in this manner, the audio amplifier in the television receiver can be used as an audible signal tracer. The audio amplifier must be in operating condition, of course. If preferred, a separate high-gain audio amplifier or the model 34 NRI Professional Signal Tracer may be used.

The signal tracing probe is used to "listen to" the video signal from the output of the video second detector right up to the point of application to the cathode ray picture tube. A characteristic video "buzz" will be heard in the loudspeaker. The intensity of the buzz can be varied by adjusting the volume control. In general, the buzz should become louder as you move toward the picture tube. This is a rough indication that gain is being obtained in each stage.

The probe may be used for isolating such defects as open coupling condensers. As an example, referring to figure 4, if you should touch the probe to the plate of the first video amplifier and hear a strong video buzz in the loudspeaker, but should fail to hear the buzz or if the buzz becomes extremely weak when you touch the probe to the grid of the second video amplifier, you know that the coupling condenser C140 is open.

This probe may also be used for following the signal through the sync amplifier and separator stages and for listening to the low frequency buzz obtained from the vertical sweep circuits. In general, it cannot be used for signal tracing in the horizontal sweep circuits, because the high frequency of this sweep signal will not generally

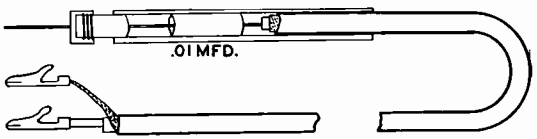


Figure 9. A simple signal tracing probe you can make yourself. The condenser may be from .01 to .05 mfd., 600 volts. Use the smallest (physical size) condenser you can obtain that will fit within your probe.

pass through the audio amplifiers used in most TV receivers, and because many individuals cannot hear such a high frequency signal.

In Fig. 10, the arrows indicate points at which this probe may be used for signal tracing. Fig. 10 shows a portion of the set in Fig. 4 in block diagram form.

The signal tracing probe may also be used for injecting an audio signal in the video circuits. To use the probe for signal injection in the video circuits, the audio i.f. tube is replaced so that the audio stages are operating normally. The "hot" lead of the probe is then connected to the plate of the audio output tube. The audio signal appearing here can then be impressed on the various video stages. Horizontal "sound" bars will then appear across the cathode ray picture tube. (If the audio signal consists of pure tone modulation, the bars will remain stationary. Moving horizontal bars may be expected with voice modulation.)

You may start a signal injection test by touching the probe first to the point of signal application to the cathode ray picture tube. This would be the grid of the tube shown in Figure 4. If "bars" appear on the screen when the probe is touched here, (an audio tone signal being received, of course), then the probe may be transferred back to the plate of the second video amplifier, checking C141. The probe may then be transferred back from stage to stage, checking each stage and coupling condenser back to the video second detector. As you check stages past the second video amplifier, going back, you may find it necessary to reduce the level of the injected audio signal (by adjusting the volume control) to prevent overloading the picture tube.

If the audio stages are not operating, these stages may, in turn, be checked by using the probe in a similar manner to "inject" the video signal in the various audio stages. The technique of application is the same except that the "hot" side of the probe is connected to the plate of the second video amplifier and the probe used to touch the plate and grid circuits of the various audio stages.

Once you have isolated the trouble to a stage,

D.C. operating voltages may be checked for a further isolation of the trouble to a specific part. The technique of voltage analysis is essentially the same as that employed in servicing ordinary AM and FM receivers.

Continuity tests may be made to check the condition of resistors, coils, transformers, and similar parts.

Often, the "voltage analysis" test may be used by itself. If you suspect trouble in a particular section of the receiver, check DC operating voltages on all stages in that section of the set. Incorrect operating voltages on one or more stages may indicate the trouble immediately. An open plate resistor, for example, causes the plate voltage to drop quite low or to be absent entirely. A leaky coupling condenser causes a positive voltage to appear on the grid of the succeeding stage.

In all cases, where the "voltage analysis" test technique is employed, be sure to check the voltages of the various electrodes in a tube with respect to its cathode. In some television sets, the plate may actually be grounded so if a check of plate voltage with respect to ground is made, a "zero" reading is obtained. The cathode of the tube is operating at a negative potential with respect to ground. Hence, the plate is still positive with respect to the cathode and a plate-to-cathode voltage check would indicate this.

The best technique to use for checking tubes in a television receiver is to try a replacement for any suspected tube. Since as many as thirty tubes (or more) may be used in a single television receiver, considerable time may be spent by simply testing the tubes. Most TV servicemen do not attempt to test all the tubes in a defective set. Rather, a preliminary isolation of the trouble to a section is made from the nature of the complaint, as outlined, and new tubes tried in those stages.

As an example, if we find that a thin horizontal line appears on the screen of the picture tube, but that normal sound is present, we suspect trouble in the vertical sweep circuit. Replacement tubes may be tried in the vertical oscillator and vertical output amplifier stages. If the tube replacement does not clear up the trouble, further voltage and continuity tests are made.

Substitution tests may also be made as far as filter and by-pass condensers are concerned. The technique to employ is the same as used in servicing ordinary AM and FM receivers.

If you suspect a particular condenser of being open or of having high power factor, try shunting that condenser with one known to be in good condition. If you find that the trouble clears up when this is done, you can be sure the suspected condenser is defective and should be replaced. This technique is valuable for checking by-pass condensers and filter condensers, not only in the power supply, but also in de-coupling circuits.

Sweep oscillators may be checked in television receivers in the same manner that an oscillator may be checked in an ordinary receiver—check for d.c. voltage across the grid resistor. As an example, if you suspect that the vertical sweep oscillator in the set shown in Figure 4 is not operating, check for d.c. voltage across R171.

Since the grids of most horizontal sweep amplifiers in electromagnetic sets are driven positive, a dc grid voltage will be developed across the grid resistor if drive is on the tube. Thus, to check for drive on the 6BG6 horizontal output tube in the circuit shown in Figure 4, simply check for dc voltage across R205.

Practical Hints to Speed Servicing

"Alignment:" Unless the TV receiver has been in use for some time or unless it is one of the few models on the market prone to "drift," the video or audio i.f.'s will seldom require realignment unless new tubes are installed or unless the alignment adjustments are deliberately misadjusted. Therefore, realignment of the receivers should not be attempted unless positively indicated from other tests.

If you find that the picture quality has deteriorated, yet a check on the tubes, operating voltages and other parts indicate that all parts are in good condition, it may then be a good idea to check the alignment.

However, do not try realigning the set simply because the definition is poor. More likely, the trouble is due to defective tubes (weak) to mistuning, or to some other defect.

Sometimes the operating frequency of the local oscillator in the front-end will change. The oscillator will tend to "drift." This is not an unusual trouble, and, in most sets, can be corrected by a slight "touching-up" of the local oscillator adjustment on each channel. This adjustment is usually either a trimmer or slug adjustment and, in most sets, is at an easily accessible point in the front-end. Refer to the manufacturer's instruction for the exact location of this adjustment.

"Most common causes of trouble." As in the case of AM and FM receivers, *tube failures are the most common cause of trouble.* Once you have isolated the trouble to a section of the set by "effect-to-cause" reasoning or by tests, first try replacement tubes in those sections. To do so may save considerable "hunting" for a defective part. Along with defective tubes must be included selenium rectifiers and crystal diodes,

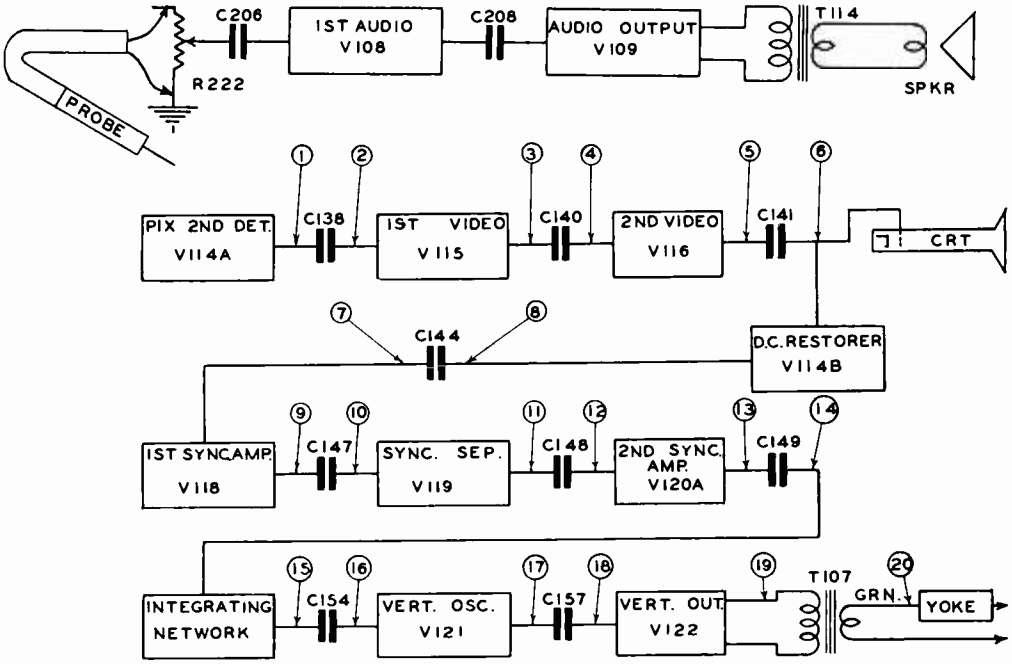


Figure 10. A block diagram of a portion of the TV receiver shown in figure 4. The point at which the probe, shown in figure 9, may be touched for signal tracing are indicated by arrows.

since these parts serve the function of tubes. The next most common cause of trouble is filter or by-pass condenser break-down. This may be an actual short, leakage, or the condenser may open. Where condensers become leaky or shorted, it may result in some other part becoming defective. A resistor, for example, may overheat and change value due to excessive current which passes through it when a condenser breaks down. In such cases, visual observation will pay off—once you spot the burnt resistor or coil, you know to check its associated circuit.

In the front-end, in addition to the problem of oscillator "drift" mentioned previously, there is also the problem of noise. This is generally caused by defective or dirty switch contacts on the selector switch, but may also be caused by loose connections or pressure type contacts not being electrically good. Refer to manufacturer's service note on the set which you are repairing for further hints along this line. Where noisy contacts are the trouble, try swabbing or spraying the contacts with carbon tetrachloride and then turning the switch back and forth so that the carbon tetrachloride works into the contacts and cleans them. Noise due to defective volume controls, contrast controls, and similar carbon controls can often be cleared up in the same manner.

Identifying Parts and Circuits In An Unfamiliar Receiver

Perhaps the best guide for identifying parts and circuits in a set is to first become familiar with the general appearance of major component parts, such as the horizontal output transformer, vertical output transformer, blocking oscillator and horizontal AFC transformers, i.f. transformers and coils, etc. A second valuable indication is given from the type of tubes employed.

In general, certain tubes are used for specific applications. R.F. pentodes such as the 6AG5, 6AU6, 6CB6, 6BA6, etc. are generally used for video and audio i.f. applications. The audio output tube and vertical sweep output tube are generally power amplifier tubes such as the 6K6, 6V6, 6F6, 6AQ5, etc. High voltage rectifiers are generally 1B3's, IV2's, or 1X2's.

In sets employing electromagnetic deflection, the deflection output tubes are generally power tubes such as the 6BG6 or 6BQ6. In sets employing electrostatic deflection, the deflection amplifier (both horizontal and vertical) are generally tubes such as the 12AU7, 6SN7, 6SL7, 12AT7, 12BH7. Twin diodes such as the 6AL5 and 6H6 are generally used for video second detectors and ratio detectors and discriminators. Ger-

manium diodes such as the 1N34 may also be used in this application.

Rectifiers employed for the low voltage power supply are the same as generally employed in AM and FM receivers, 5U4, 25Z5, 6X5, selenium rectifiers, etc. In sets employing electromagnetic tubes, the "damper" is generally a rectifier tube with a separate cathode such as the 5V4 or 6W4. Tubes such as the 6AV6, 6AT6, etc., are generally used as the first audio amplifier.

As you work with television receivers, you will soon get to know which tubes are most often used for certain applications. This knowledge will be invaluable when working on unfamiliar sets or on sets for which you do not have a schematic diagram. At the beginning, however, you should not attempt to repair the set unless you have a schematic diagram (unless the trouble is a comparatively simple one).

Precautions to Observe

Whenever servicing receivers, always follow basic safety precautions. Remember that the cathode ray tube should be carefully handled—should not be dropped, scratched, or bumped.

Remember, too, that high voltages can shock and injure. It is important that you remember this when using signal injection, signal tracing, or part substitution tests in a receiver. When using a shunt condenser, for example, do not touch either of the bare leads with your fingers as you hold it in place. Avoid the high-voltage circuits except when necessary to make tests in this section. Remember that, when you probe in the set, high voltage can arc and jump from one terminal to another. Keep your hands sufficiently far away from "hot" terminals so an arc cannot jump to your hand or to the probe or part which you are using.

SUMMARY

There is no need for an advanced NRI student or an NRI graduate who has faithfully studied his lessons to be "afraid" of servicing TV receivers. As in any servicing, experience pays off in time saved and in money earned. Become familiar with your instruments and acquire skill in applying service techniques by using them.

Often, a good service technician will "unconsciously" apply test techniques or procedures for isolating defects without actually "thinking" that such and such a technique should be used. It is an almost automatic reaction acquired through experience in using the different techniques. You, too, will acquire this knack.

The service techniques and methods which we have discussed in this article, together with "effect-to-cause" reasoning should enable you to service the majority of TV receivers which come to your attention. On the whole, probably 75 to 90% of the television receivers you will encounter can be serviced with nothing more than a multitester, high-voltage probe, and a stock of replacement tubes and substitution parts, and ordinary tools available to the technician. This excludes sets requiring realignment. Of course, such sets fall in the minority. Though the majority of sets can be serviced with a minimum of equipment and by using comparatively simple techniques, there are some obscure troubles which are difficult to isolate unless more advanced types of test equipment are available. In addition, proper test equipment will speed the isolation of a defect even though the defect can be isolated by other means. Therefore, a full-time serviceman will find it desirable to have adequate equipment of all necessary types—such equipment should include a multi-tester, ordinary signal generator, sweep signal generator and marker, cathode ray oscilloscope, and high voltage probe. Other equipment which may prove useful includes a resistor-condenser tester, a high-gain audio amplifier or signal tracer, and a cross-hatch or linearity pattern generator.

———*n r i*———

BUSINESS BRIEFS

from Radio-Electronics Business Letter

RCA voluntarily put in public domain four of its well known trade marks: "Iconoscope," "Kinescope," "Orthicon," and "Acorn." . . . After taking $68,000,000 worth of orders at recent distributor convention, Crosley Division of AVCO Mfg. Co. announced it will place TV sets, radios and major appliances on allocation. . . . CBS and Remington-Rand announced a cooperative agreement to produce color TV for commercial, government, military and similar use. . . . General Electric will demonstrate its color system this Fall. . . . Senate Finance Committee rejected plea of Dr. Allen B. Du Mont, representing the RTMA, to strike out 10% excise tax from proposed Tax Bill.

Decreasing unemployment claims indicates a tightening of the labor market. . . . A.T.&T. begins service on the new microwave relay system between New York and Chicago in September. Link will add one TV circuit in each direction to existing coax cable web, providing total of 4 westbound and 2 eastbound channels.

RTMA released copies of the Jordan report "Long Range Effect of TV and Other Factors on Sports Attendance." The report shows that over the long haul, TV builds rather than hurts sports events attendance. . . . A survey of TV set owners by John Meck Industries ranked the features they demand as (1) clarity of picture; (2) quality of sound; (3) manufacturer's reputation; (4) cabinet style; and (5) price.

How to Get Along With Others

DR. JAMES F. BENDER, PH.D.
The National Institute for Human Relations

IS it hard for you to look into people's eyes? If so, you have plenty of company. You see, a great many of us are shy. We avoid looking at others directly. We fear that they will see the shyness in our eyes. We sometimes fear also that they will dominate us with their glance.

Now it is very important for us to look directly at those with whom we talk. We get our messages across better. And we also can see how they are reacting to what we say. For "The eyes," someone has well said, "are the mirror of the soul."

When General Grant became President of the United States he learned to conquer his shyness when he conversed with ambassadors. He looked at the end of their noses. Noses, curiously enough, are easier to dominate than eyes, especially in the case of shy people. Why? The one at whose nose we gaze assumes that we look him squarely in the eye. For even at short range, he can't tell the difference. So, you may want to begin your new look by trying noses first. Then after you gain confidence, raise your glance a bit higher. *Look 'em square in the eye.*

You and I know those who look at things while they talk to people. A famous professor of philosophy invites his advanced students to meet in his New York home once a week. Whenever the professor talks he looks out of the window, and loses all the interest he might otherwise sustain. He ought to glance from one student to another as he converses. His is a bungling act. It betrays more interest in the scene outside his window than in his guests.

We also meet the man or woman who looks at only one when others are in the circle. People with good human relations say with their roving glance—that neglects no one—"I am grateful to each and every one of you for listening, and I am showing my appreciation by looking directly at you on my right, and you on my left, and you opposite me."

So, hold your group together with a direct gaze into every pair of eyes. Seek subtle meanings. Interpret expressions of the eyes, postures, gestures. Don't be a passive listener but listen with your eyes as well as your ears. Try it. Today. Now.

And you will find a new confidence. You will discover more freedom and composure. You will enjoy being with others and sharing their thoughts. You will overcome shyness. And you will agree that *the eyes have it.*

Work Bench Concealed in Apartment Kitchen

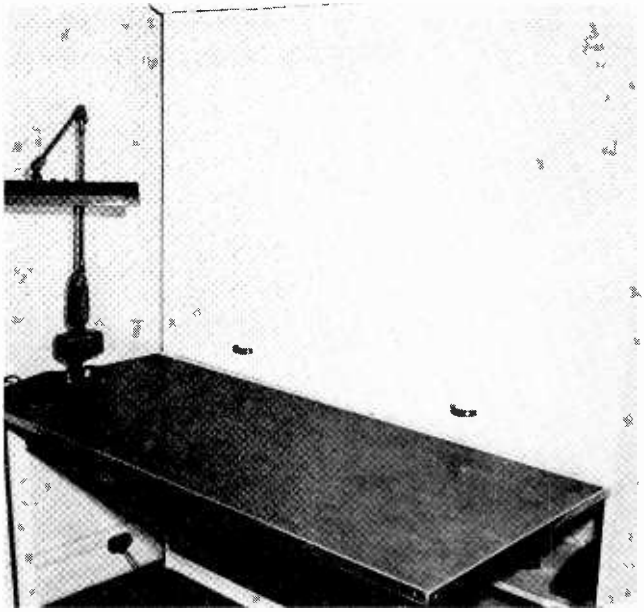
NRI Student Carroll D. Landvoight is shown above at his efficiently designed work bench. Faced with the problem of limited space, Landvoight solved this problem very effectively by constructing his work bench in the kitchen of his apartment. As the photo in the upper right-hand corner of page twenty-one reveals, his test bench can be disguised when not in use so that it has the appearance of a kitchen cabinet. Two detachable doors cover the upper section, concealing test equipment and supplies.

Dear Mr. Smith:

"Having completed my thirtieth lesson in Radio and Television Servicing, I am already doing part-time service work at home after working hours.

"Living in an apartment house, work space is limited. Therefore, my first work bench was either on the kitchen table or floor. After seeing articles written by a number of NRI Graduates in NATIONAL RADIO-TV NEWS, I decided to do something about my work bench problem.

"The first step was to make a rough sketch of the proposed work bench. The photographs accompanying this article are the result. The bench was constructed from three-fourths inch knotty pine, a piece of molding, and some plywood.



With detachable doors in place, the work bench at left can be readily disguised as a kitchen cabinet. The work surface can also be lowered, hiding the drawers in the bottom section.

"There are two sections to the bench. The section above the table leaf is separate from the section beneath the table leaf. In other words, the top half of the cabinet sits on the lower half. Constructing the work bench in this manner does away with much of the bulk, making it easy to move.

"The table leaf is connected to the lower section by four hinges. On each end of the front part of the table leaf are legs which fold in toward the center of the table leaf. This allows the leaf to drop down when not in use.

"The panels at left and right in the upper half of the bench are made in the form of drawers, constructed so that the space inside may be used for parts storage. Notice that the front of the left drawer also contains A.C. outlets. This panel also has an on-off switch with an indicator light and a plug-in receptacle. Next comes the fuse box, then four more receptacles. All wiring is in parallel. The fuse box carries a 10 ampere fuse, so that if any fuse is blown, it will not be the house fuse.

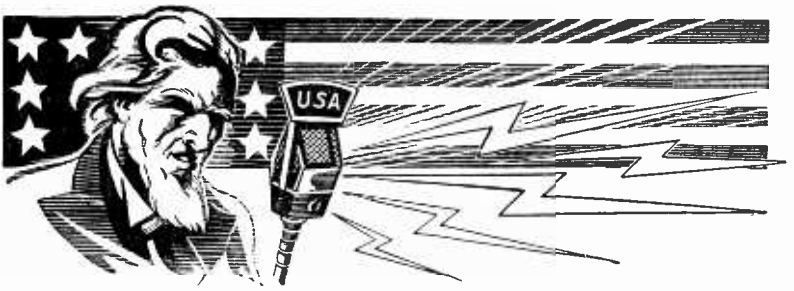
"The top of the table leaf is covered with linoleum which has been waxed. Chrome trimming is used around the edge of the table leaf. A test speaker has been installed in the upper section of the cabinet. Three boxes are also located on this shelf, used for screws, nuts, and other small parts. The top of the cabinet is used to store radios waiting to be repaired.

"After completing the work bench, I needed test instruments. I contacted the school and found out that the NRI test instruments met my approval. So on the bottom shelf, left to right, we have the NRI Signal Generator Model 88, NRI Signal Tracer Model 34 and the NRI Resistor-Condenser Tester Model 112. On the table, left to right, the NRI Model 45 Volt-Ohm-Mil-Ammeter. NRI Tester and the NRI Tube Tester. Right foreground we have the NRI tools and soldering iron.

"When I have completed a night's work, all I have to do is to replace the instruments, tools, etc., in their proper places, fold up the legs on the table leaf and drop it, slide in the two doors in the front of the cabinet, which completely closes it up, and then the bench looks just like any kitchen cabinet. I believe that my idea of this work bench will be welcomed by many students and graduates who live in apartments and have limited space to work in."

Sincerely,

Carroll D. Landvoigt,
7019 Georgia Ave., N.W.,
Washington, D. C.



THE VETERAN'S PAGE

Devoted to news items and information of special interest to veterans taking NRI courses under the GI Bill of Rights.

July 25, 1951, And The GI Student

The last issue of the News carried an announcement that GI courses could not be started after July 25, 1951 (unless the law or VA regulations are changed). This may have seemed unimportant to the NRI student since he is already enrolled, or to the graduate who has completed his course.

Students now taking their first course at NRI will want to finish just as soon as possible in order to:

1. Qualify for better jobs more quickly.
2. Take the other NRI course, if they're interested.
3. Take other training elsewhere if it is more to their advantage.

These are compelling reasons for every student to set up a schedule for himself to complete his present course by April or May, 1951 if it is at all possible for him to do so.

Whether the reader is a graduate or a student, he should do some planning. He should look ahead far enough to decide what additional training he may need in the next several years. If he is going to need greater skill or special schooling in 1952, the course must be started well in advance.

It is unimportant whether you propose to take a second course under the GI Bill at NRI or elsewhere. The important part is that you plan to enroll for the additional course *well in advance of July 25, 1951.*

If you are now studying under the GI Bill and plan on another course also under the GI Bill, set up and follow a schedule of study that will assure your *finishing* your present course by the end of April 1951. Allow *plenty* of time for obtaining VA certification for the new course. Quite possibly there will be a last-minute rush for certificates just before July 25, 1951. A little planning now will help to avoid disappointment then.

Graduates should obtain certificates of eligibility *now,* no matter when they expect to enroll. When a certificate has been received from the VA, it can be held until enrollment time. If *obtaining* the certificate is delayed until time for enrollment, the issuing delay may cause complications. Regional Offices may not be able to issue them as promptly as heretofore.

Students can't get another certificate until after they graduate from their present courses; the application for the new certificate must show the date of completion of present course.

The earlier a veteran completes his present training, the quicker he will capitalize on his education *and* the better his chances of being able to make use of remaining entitlement.

New Legislation: The Taft-Teague Bill

Public Law 610, generally known as the "Taft-Teague Bill," was signed into law by President Truman on July 13, 1950. Most of its provisions apply to the Veterans Administration itself, but a few apply to veterans and schools. These points are of special interest to veterans:

1. The law does not change the cut-off date of July 25, 1951 (for most veterans, the last date to begin a new course or resume a previously discontinued course is July 25, 1951).

2. A veteran who completed or discontinued a course may take another course, even in a

(Concluded on Page 23)

different general field, if he *has not previously* made a change from one field to another.

3. Even a course generally classified as vocational or recreational may be taken if "complete justification" is presented to show that the course will be used in present or future employment.

4. If a veteran *has* previously changed fields, he may still be able to secure VA approval of a second change by taking advisement and guidance tests.

5. When a veteran applies for approval to change courses, if he receives no decision in 45 days the change is deemed approved—providing the veteran appeared for advisement when told to and did not fail to cooperate with the VA.

6. Heretofore 25 hours of instruction a week in resident schools was the minimum which could be called full-time training. The new law makes some changes in this which apply only to veterans drawing subsistence.

FLASH—IF A GI STUDENT ENTERS MILITARY SERVICE

So far as NRI and the VA are concerned, a GI student NEED NOT stop his course merely because of enlistment, the draft, or call to active duty in the Reserve or National guard. There have been many inquiries as to whether training can be continued while in service, and the answer is—it depends entirely on the student.

1. If a GI student *expects* to enter service, he should make as much progress as possible up to time of actual entrance.

2. When a GI student actually enters service he should *not* interrupt his course until he has been assigned to duty; his assignment to a supply base might permit study (even more than when he was at home) and if so he should continue his training to qualify for a higher rating and earn his diploma.

3. If duty is such that study is impractical, the GI student can *then* withdraw. He should *be sure* to tell the school he interrupted because of military service.

Item 3 is particularly important. The VA has ruled that a veteran who interrupts training and is prevented from resuming his course before July 25, 1951 because of re-entrance into military service, will be permitted to resume after July 25, 1951 within a "reasonable time" after his discharge. Of course a person resuming under such circumstances would still be limited by his remainlng entitlement and by the ending dates for benefits under Public Law 16 and Public Law 346 (the GI Bill of Rights).

Our Cover Photo

Dr. W. R. G. Baker, General Electric Vice President, and Jackie Coleman, Buffalo TV Tube Queen, are shown with the millionth television picture tube to roll off the production lines. The photo was taken at ceremonies celebrating the Buffalo production achievement.

Dr. Baker predicted that nine million TV receivers will be in operation in the United States by the end of 1950. This is one receiver for every seventeen people in the U. S. He contrasted this with TV sets in the Soviet Union where an estimated 50,000 are in use, or one for every 4,228 people.

In a congratulatory talk to Buffalo employees, Dr. Baker pointed out that modern American production methods have reduced the cost of TV receivers to a point where they are, in terms of real wages, lower than were radio receivers during radio's comparable stage of development. He also said that television is still in the infant stage and that the future will see many uses in education, safety, protection, and in many types of remote control.

———*n r i*———

Take Time To Live

The Little Growl, Pinckneyville, Ill.

TAKE TIME to work—it is the price of success.

Take time to think—it is the source of power.

Take time to play—it is the secret of perennial youth.

Take time to read—it is the fountain of wisdom.

Take time to worship—it is the highway to reverence.

Take time to be friendly—it is the road to happiness.

Take time to dream—it is hitching your wagon to a star.

Take time to love and be loved—it is the privilege of the gods.

Take time to look around—it is too short a day to be selfish.

Take time to laugh—it is the music of the soul.

Take time to play with children—it is the joy of joys.

Take time to be courteous—it is the work of a gentleman.

———*n r i*———

Wife to Husband:

"One of the ducks you were shooting yesterday called and left her number."

—Retail Lumberman.

Master TV Antenna Systems Purchased For 3000-Unit Medium-Cost Apartment Projects

J. P. Lieberman, president of Kenilworth Gardens, Inc., Calls TV Antenna Systems a Must; Buys RCA Equipments for $20,000,000 Developments

Television took another long stride toward universal service with the announcement of contracts for the first installations of master TV antenna and amplifier systems in large-scale, medium-cost apartment projects. The contracts cover RCA Television Antenaplex Systems for eight suburban apartments in the New York metropolitan area, embracing a total of about 3,000 dwelling units and a total real estate investment of about $20,000,000.

These master antenna systems will each consist of a separately tuned antenna for each of the seven TV channels serving the New York area, signal amplifiers, and a low-loss distribution system to serve built-in outlets in each dwelling unit.

"These systems," said Mr. Lieberman, "are of the same type and make as systems which have been successfully providing high-quality television reception in some of the finest Park Avenue and Fifth Avenue apartment houses for some time. They will now make the same high-quality reception available to middle-income tenants of these large-scale housing developments." The master antenna systems are said to make available to each tenant a quality of television reception which he could equal only by installing seven individual antennas—one for each channel in use—for his own receiver.

Pointing out that television is now "a part of the American way of life," Mr. Lieberman predicted that by next year "tenants will expect television outlets in their apartments as confidently as they now expect plumbing and lighting facilities." He asserted that the inclusion of master television antenna facilities in the planning and construction of multiple-unit buildings has become a "must," and that their provision will be a telling factor in the rental market when it again becomes highly competitive.

"The eager and vigorous reception given television by the American people is ample proof," he said, "that it is a service that is needed and will continue to grow until just about every family can enjoy it. It has already demonstrated its power as a means of developing better citizenship and a more closely knit home life. Since the best reception in apartments can only be obtained through a central antenna system, incorporated in the building, it is a service the builder cannot afford to ignore."

Himself a veteran of 28 years in the radio business and former President of Air King Products Co., Inc., Mr. Lieberman said that his organization selected the RCA system after careful investigation of all available systems.

"We decided on this system because of its superior quality," he said, "and because RCA's development facilities and experience in the field of television insure the tenant of the highest quality of television reception. We also considered, of course, the fact that the reliability and permanency of this system safeguards the investment of the builder and the financial institutions involved by preserving the appearance of the buildings and reducing maintenance costs."

Syracuse, N. Y.—All City of New York ferries operating between Manhattan and Staten Island will be fully equipped with General Electric radar by the end of this year, it was announced here recently.

The Marine Electric Corporation of Brooklyn, G-E marine radar distributor, has received contracts for "double-ended" installations of X-band G-E navigators in the eight ferries now on the Staten Island run.

Each craft will have two radar consoles, with a scope in each pilot house. Work on the equipment has been started here at Electronics Park, and it is expected the first installation, aboard the Miss New York, will be made the first two weeks in October. Other ferries to be equipped are the Mary Murray, Gold Star Mother, American Legion, Dongan Hills, President Roosevelt, Knickerbocker and Tompkinsville.

Skippers of each ferry will receive training in the use of radar during their two-week installation layups.

Pat bet Mike that he could carry a hod of bricks to the top of a fifty foot building, with Mike sitting on top of the hod. When near the top, Pat made a misstep, and nearly dropped Mike to the stone walk below.

Arriving at the top, Pat said, "Begorra, I've won the bet."

"Yer have," said Mike sadly. "But whin ye shlipped, I was sure I had yez."

— — —

"And how much of that stack of hay did you steal, Pat?" the priest asked at confessional. "I might just as well confess to the whole stack, yer Riv'-rence; I'm goin' afther the rest of it tonight."

Safety For TV Set Servicemen

Servicemen who install or service television receivers have a great responsibility both to the public and to the industry, as well as a personal interest, in seeing to it that no accident due to carelessness or negligence will occur to arouse fear of this new instrument of home entertainment.

The television receiver, largely because of the presence of the picture tube, contains certain potential hazards that were not in the radio set. But these hazards need not cause anyone apprehension providing a few simple precautionary rules are observed by the serviceman. *The picture tube is not dangerous if properly handled.*

There are two ways in which injury can occur if a picture tube is carelessly handled either in a service shop or at a set owner's home. One is from the breakage of the picture tube possibly resulting in flying glass, and the other is from high voltage shock. Most trained servicemen know how to guard against shocks, but the breakage of picture tubes can result from carelessness regardless of the serviceman's experience.

Any serviceman can be sure that he will neither injure himself nor cause injury to someone else by following a few simple safety rules. These are:

1. Don't expose picture tube until you are ready to use it.
2. Always wear goggles when handling a naked tube.
3. Keep people away at a safe distance when a picture tube is exposed.
4. Place the used tube in the carton which contained the new tube and *take it away.*
5. Always keep the picture tube in the protective container whenever possible. Always place an exposed tube on some sort of clean soft padding when necessary to set it down.
6. Don't leave any picture tubes lying around. There are two safe ways of disposing of used tubes:
   (a) Place the old tube in a shipping carton properly sealed and then drive a crowbar or similar instrument through the closed top of the container.
   (b) An alternative method in the disposing of more than one tube, is to use a metal ash can with a plunger operated through the closed top.
7. Don't use regular picture tubes for displaying purposes. Contact your supplier for special display tubes.

Prepared by
RMA Cathode Ray Safety Committee

Your Future Needs Your Help Today

The most insistent sound in the world today comes not from the halls of government, not from the meeting rooms of diplomats, but from the hearts of the people, of the people of every country, of the people of all the world. This sound is a swelling voice asking, urging, demanding that we do not abandon the United Nations but strengthen it and make it the instrument by which nations may live together in peace and march together toward a better, healthier, safer future.

The attainment of lasting peace is, of course, the predominant goal of the United Nations. This goal is still far beyond the horizon, and the road to it is long, hard and hazardous. Long, hard and hazardous, but not hopeless. Nobody can say at this time whether or not the United Nations will achieve this goal. But it does seem that it is our only hope today, and as such that it deserves our fervent support. And while it has not yet succeeded in this field where all else has failed, it has brought to many other fields great accomplishments of united action.

The world, all the world, is a better place for children because of the United Nations. The forests of the world are being less wasted, and the soil of the world made richer because of the United Nations. The hunger of the world is being lessened, its food made more plentiful, because of the United Nations. Diseases that have destroyed peoples since the beginning of history are being brought under control by the United Nations. Understanding and enlightenment are marching forward with education under the banner of the United Nations. These are no small accomplishments for an organization that is only five years old this year.

Let not the defeats within the conference rooms, with all their drama and headlines blind us to the good that the United Nations has brought to the world and to the desirability of keeping both the organization and the good intact. We citizens of the United States should be particularly proud of the United Nations and particularly support it. We showed the way in the principle of union. We led the world in bringing together people of different interests and different places for the good of all. America brought to practical realization the phrase and the idea, "In Union there is Strength" and we have fought for it, fought for it hard. Let us now lead the way in the principle, "In Union there is Strength; in UN there is hope!"

We *must* support the United Nations—today's best hope for peace.

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No WINE tastes just right to everybody unless the price is known to be very high.

Are You Interested in Short Success Stories? Read What These NRI Graduates Say

Full Time Radio and Television Business

"I could not help writing you people at the National Radio Institute and praising you for offering such a wonderful course. I picked your course from several others because I had heard more good words about yours.

"I am now in business for myself, doing Radio, Television, and Electronic work full-time in my home town—and getting a lot of work from surrounding communities. NRI teaches Radio and Electronics thoroughly. I really like Radio work. It is play for me. And I've noticed that my NRI diploma takes the customers' eye, too."

Wayne A. Shingler,
Box 117,
McVeytown, Penna.

NRI Training Is Helpful In Army Career

"As a graduate of your course in Radio and Television Servicing, I thought I would write and tell you how I think NRI has helped me. I enlisted in the Army and was sent to Signal School. If I hadn't got a head start on that school by taking your course, I would never have passed it. My education has been very limited, but by taking the NRI course I have made up quite a bit. Also have work which I like.

"Came through Signal School with an excellent rating, thanks to your Course. Have recently received another promotion as a Radio repairman."

Archie Metcalf,
P. O. Box 123,
Phenix City, Ala.

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Owns Leading Radio and Television Repair Shop

"This is to let you know about myself since I finished your NRI Course. I am now owner of Fort Mill's leading Radio and Television Repair Shop, and am doing just fine. I do repair work for the Young & Young Furniture Co. here.

"Your training has put me where I am today. I have a nice income, new automobile, and most anything I want.

"Many thanks to you, Mr. Smith, to Chief Instructor Dowie, and to your staff for putting me in the Radio field."

George C. Tinker,
Box 112,
Fort Mill, South Carolina

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Earned Many Times the Price of the Course

"I handle installation and warranty work for Sears, Roebuck & Co. in this territory. In my interview with their Chicago service manager, I told him I was an NRI graduate and I know this helped me. Just recently I signed a contract with United Motors Service to handle their work in this territory. Looks like a nice account.

"Have been able to hire a part-time bookkeeper, and am doing very well with my servicing. Your texts have been used many times to diagnose radio troubles. I cannot praise your school too much. I certainly can say I have made a success of it. I have earned many times the price of the course."

Leon Latham,
616 North Sterling St.,
Streator, Illinois

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Electronics Intercom Systems Taxi and Police Radio

"Your Course has been a life-saver for me. After I was laid off at the shipyard, where I was working, I already had a job of my own in repairing. Without my Radio knowledge it would have been rough.

"My training was broad enough that I now take care of electronic equipment in our local glass factory; install and maintain intercom systems; and keep up local taxi and police two-way radios. I also have a staff sergeant rating in the local National Guard Unit, in the Radio section. I average around $75 per week. The one who learns all NRI has to offer need never back up on any job in this line."

C. B. Hendricks,
575 First Street,
Grenada, Miss.

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Made Over $1800 in Spare Time During First Year

"Now that I am established in business I can see what the National Radio Institute has done for me. Three months after starting your Course I was repairing small jobs on Radios. My first year, working part time, I made $1,806.75, and last year I made over $3,000.

"I am glad to be of assistance to anyone who may need advice. Feel free in giving my name to them.

"I cannot recommend too highly the extreme importance of following a complete Radio course, such as the one furnished through the National Radio Institute."

Roland D. LaMarche,
351 N. Front Street,
New Bedford, Mass.

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As space permits, from time to time, we plan to devote a page or two in NR-TV News to short success stories such as above. They are taken from testimonial letters we have on file. Photographs and letters of this kind are always greatly appreciated by us. We feel we should pass them on to our readers for the inspiration to be gained from a reading of them.

N.R.I. ALUMNI NEWS

Harvey W. Morris ..... President
F. Earl Oliver ..... Vice Pres.
Alexander M. Remer ..... Vice Pres.
Oliver B. Hill ..... Vice Pres.
Claude Longstreet ..... Vice Pres.
Louis L. Menne ..... Executive Secretary

H. J. Rathbun of Baltimore and Alex Remer of New York Are Candidates for President To Serve our Alumni Association during 1951

Mr. H. J. Rathbun, who was a candidate for President last year but who ran second in a two man race, has again been nominated. His opponent is Mr. Alex Remer of New York City, who is at present completing his first term as Vice-President.

Both of these candidates are well known to our Alumni Members. Mr. Rathbun served several terms as Vice-President and for a number of years was Chairman of Baltimore Chapter. He is one of the leading lights in that organization. Because of his ability as a lecturer on Radio and Television subjects, he is extremely popular in his vicinity.

Mr. Alex Remer likewise is a strong man in New York Chapter. To him is given credit for the fine corps of lecturers who have been developed in New York Chapter. This is chiefly due to the classes in Effective Speaking which have been conducted by Mr. Remer for the sole purpose of encouraging members to get on their feet and speak.

Rathbun or Remer—either one—we are assured of an excellent President for 1951.

For Vice-Presidents we have eight nominees. Please vote for four. The candidates are as follows: Lloyd C. Immel of Chicago, Floyd Buehler of Detroit, Oliver B. Hill of Burbank, Calif., Claude W. Longstreet of Westfield, New Jersey, F. Earl Oliver of Detroit, Norman Kraft of Perkasie, Pennsylvania, John B. Gough of Baltimore, and Louis J. Kunert of New York City.

Earl Oliver and Lou Kunert are well known. Both have served as Vice-President for a number of terms and both previously served as President. Lloyd C. Immel has been active in Chicago Chapter for many years. Floyd Buehler of Detroit has done outstanding work as a lecturer. He is a real authority on Radio and Television. Oliver B. Hill is strong on the West Coast. Claude W. Longstreet is concluding his first year as Vice-President and it is good to know that he has been re-nominated.

Norman Kraft of Perkasie, Pennsylvania is a power in Philadelphia-Camden Chapter and would be a real credit to our organization as a Vice-President. John B. Gough is a charter member of Baltimore Chapter who is always dependable.

The four candidates among these eight who receive the greatest total of votes will be declared elected Vice-Presidents.

We want to thank the many Alumni Members who voted in the primary campaign. Will you likewise cast your ballot for the election of your officers? Only members of the NRI Alumni Association are eligible to vote. The ballot will be found on page 29. The polls close at midnight on October 25, 1950. Don't wait. Please mail your ballot at once.

Chapter Chatter

The livest news comes from **Chicago** where Chapter activities are humming again. In fact, the members were so interested in the programs arranged by the officers that they held meetings right through the summer. Moreover, instead of meeting once a month as they had been doing for several years they decided to meet twice a month. That is a mighty good sign. . . . All credit to Chairman Andresen and Secretary Mead.

Some very capable speakers have been developed in Chicago Chapter. They are practical Radio men who are glad to help their fellow members. One member spoke on resistance measurements. . . . At another meeting a member presided at a step by step demonstration of finding the trouble and repairing a defective Radio. Then the test and repair procedure was clearly explained. . . . Members are urged to bring sick Radios to meetings. A fine chance to solve that knotty problem and get some real practical experience.

Chicago Chapter also held a picnic this summer, as in former years. Those of us who have attended these picnics know they are a lot of fun for all members of the family . . . sorry we did not receive some photos in time to show in this issue. Plenty of enthusiasm in Chicago Chapter . . . the new spirit and new type of program appeal strongly to the members . . . one member writes that he has benefited more in six meetings than he had in six previous years. That's a real compliment for the officers. Treasurer A. C. Adamson and Librarian Louis Brodhage also doing a very fine job. . . . The program of asking the members to bring in Radios to be repaired which permits the leaders to explain the practical application through demonstration, test equipment and schematic diagrams is just what the members want.

Chicago Chapter meets on the 2nd and 4th Wednesday of each month at 8:00 P.M., at 666 Lake Shore Drive, in the Tower space. This is in the American Furniture Mart Bldg. Enter building through the west door.

In **Philadelphia** the members are jubilant because Norman Kraft has been nominated for the office of Vice-President. . . . Meetings were held right through the summer. Attendance was good, but now that the fall season has started attendance will improve as it always has. . . . If you live in the Philadelphia area and have not joined the Phila-Camden Chapter we suggest you attend a meeting as a visitor. You will be most welcome. Meeting nights are the second and fourth Monday of each month, at 4510 Frankford Avenue, in Philadelphia.

New York and **Detroit** Chapters suspended meet-

(Page 30, please)

Election Ballot

"All NRI Alumni members are urged to fill in this ballot carefully. Mail your ballot to National Headquarters immediately.

FOR PRESIDENT. (Vote for one man)

- ☐ H. J. Rathbun, Baltimore, Md.
- ☐ Alex M. Remer, New York, N. Y.

FOR VICE PRESIDENTS (Vote for four men)

- ☐ F. Earl Oliver, Detroit, Mich.
- ☐ Norman Kraft, Perkasie, Penna.
- ☐ Lloyd C. Immel, Chicago, Ill.
- ☐ Oliver B. Hill, Burbank, Calif.
- ☐ Floyd Buehler, Detroit, Mich.
- ☐ Louis J. Kunert, New York, N. Y.
- ☐ John B. Gough, Baltimore, Md.
- ☐ Claude W. Longstreet, Westfield, N. J.

SIGN HERE:

Your Name .....

Your Address .....

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

Student Number .....

Polls close October 25, 1950. Mail Your Completed Ballot to:

C. ALEXANDER, BOOKKEEPER
NATIONAL RADIO INSTITUTE
16th and U Streets, N. W.
WASHINGTON 9, D. C.

(Continued from Page 29)

ings during the summer. However they are now back in full swing. . . . Detroit Chapter meets on the second and fourth Friday of each month at Electronics Institute, 21 Henry Street, at Woodward. . . . New York Chapter meets on the first and third Thursday of each month, at St. Marks Community Center, 12 St. Marks Place, between Second and Third Avenues, in New York City. Do not confuse this address with a similar named street in Brooklyn. The Chapter meets in New York City. Meetings start at 8:30 P.M.

Baltimore Chapter, like Chicago and Philadelphia, continued meetings right through the summer . . . plenty going on . . . our own Mr. C. Whitt gave a review of principles of a FM receiver. This was followed by a demonstration of FM alignment with the oscilloscope, using a Howard FM tuner brought in by Chairman Shue.

Mr. Whitt and Mr. Clark officiated at this demonstration. Very interesting and very ably done.

At another meeting Chairman Elmer Shue gave an interesting talk on Radio and TV problems he has encountered in his service work. These practical hints are very beneficial especially to the lesser experienced men. . . . A recent visitor was Charles Hachmeister, a Charter member, who may soon be able to meet with us regularly again.

Mr. H. J. Rathbun, at one of our meetings, gave us a very interesting and instructive discussion on condensers and their application in Radio and TV circuits. . . . Plans are being made for our semi-annual party to be held soon. Chairman Shue and Secretary Thomas B. Kelly are working hard for the Chapter. . . . Meetings are held on each Tuesday night of the month (except the first Tuesday of the month) at Redmen's Hall, 745 West Baltimore Street.

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Former Secretary Earl A. Merryman Is Back in the Armed Services

Wherever there is a real scrap it seems you will find Earl Merryman. News has just come to us that Earl has signed up for duty in Korea. This is the third war for Earl.

After the tough time he had in World War II and considering the long time he was hospitalized while recovering from that ordeal one would think that Earl had enough. However, Earl evidently likes the great adventure of doing duty for his country and here he is, right back in again.

Many of our Alumni members will remember Earl as the first secretary of the NRI Alumni Association. He was a charter member and attended the convention in November, 1929, at which time the Alumni Association was organized. By unanimous vote Earl was elected Secretary and he served in that capacity for some fifteen years. He was always very proud of that connection but as the Alumni Association grew in strength, year after year, it was no longer possible to fill the office of Secretary on a part time basis and those duties therefore were combined with the duties of the Executive Secretary.

We hope to hear from Earl Merryman from time to time. We know he has the best wishes of all of the members of our Alumni Association. His loyalty to our country is a shining example of the spirit of devotion that has and will keep this nation strong.

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Local Chapter Officers

Baltimore Chapter:
Elmer Shue, Chairman
Green Pasture Drive, Towson 4, Maryland
Thomas Kelly, Secretary
1414 Mt. Royal Avenue, Baltimore 17, Md.

Detroit Chapter:
Clarence McMaster, Chairman
Amherstburg, Ont., Canada.
Harry R. Stephens, Secretary
5910 Grayton, Detroit 24, Mich.

New York Chapter:
Bert Wappler, Chairman
27 W. 24th Street, New York, N. Y.
Louis J. Kunert, Secretary
539 Seaford Ave., Massapequa, N. Y.

Phila.-Camden Chapter:
Clifford N. Hill, Chairman
1317 N. Alden St., Phila. 31, Penna.
Robert L. Honnen, Secretary
132 S. 58th Street, Phila. 39, Penna.

Chicago Chapter:
Harry G. Andresen, Chairman
3317 N. Albany, Chicago 18, Ill.
Charles C. Mead, Secretary
666 N. Lake Shore Drive, Room 227,
Chicago 11, Ill.

Here And There Among Alumni Members

Alumnus J. F. Meline, who has been employed for several years at Television station WNBW, Washington, D. C., tells us that he has been assigned to an experimental RCA color camera. He operates the camera one hour each day.

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Norman P. Fornoff, W9EDY, Pekin, Illinois, is rebuilding his amateur radio transmitter. He's increasing power from 33 watts to 1,000 watts. Has had his class A amateur license since last November.

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We have a letter from alumni member Hazelton M. Yober of Topeka, Kansas in which he tells us he is a very sick man. Mr. Yober has been a member of the NRI Alumni Association since January 2, 1930 which means he joined within a few months after the Alumni Association was organized. We sincerely hope Mr. Yober's health will improve. He has the best wishes of all of our members, we are sure.

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In the August issue of ELECTRONICS *the outstanding McGraw-Hill Publication, are two articles by Ralph H. Baer, entitled "Voice-Switched Intercom" and "Time-Pulse Oscillator for Electronic Depilation." Mr. Baer is mentioned as Chief Engineer of Wappler Inc., New York. And who is Ralph Baer, you may ask! He is an NRI Graduate and a member of our New York Chapter, we proudly say, who has lectured to our members on many occasions. And who is Wappler, Inc.! Why, it is the firm headed by Bert Wappler, our up-and-at-'em chairman of New York Chapter. That's the kind of men who greet members at New York Chapter.*

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NRI Graduate Everest F. Schmidli, a member of the U. S. Air Force, visited NRI recently. He has just returned from a tour of duty overseas and is now stationed near Washington, D. C.

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Congratulations to Raymond D. Arnold, who is now employed at Station WEAN, Providence, R. I. Arnold tells us that he has just become an associate member of the Institute of Radio Engineers.

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Richard Miinch, of Keene, N. Hamp., visited NRI and met Chief Instructor Dowie. Miinch was in Washington on a visit.

———n r i———

Graduate Cleone Young tells us that he has moved to Keokuk, Iowa, and is now employed by Harley's Radio and Television Service. Enjoys his work very much, and says it is all due to NRI. A loyal booster.

We were sorry to hear of the loss suffered by Graduate Edwards Ross, of Detroit, Michigan. He owned the "Coastal" Radio Service Boat, but his boat and business have been completely destroyed by a fire.

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Although Alumnus Gaston Belanger, of Quebec, Canada, was unable to visit NRI personally this past summer, he sent his regards with friends of his, Mr. and Mrs. Cyrias Pare. Mr. Pare is an NRI student.

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Graduate J. P. Gillispie, of Portsmouth, Ohio, is now a Radio technician with the Chevrolet Division of General Motors.

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We appreciate the detailed letter received from L. Lyman Brown, of Springfield, Mass., telling us how he is able to obtain Television reception through his own antenna design at distances up to 150 miles. Brown is an ardent experimenter in high frequency work.

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Alumnus Ashley S. Arrowood, Jr., formerly a Communications Chief with the Air Borne Engineers, now living in Knoxville, Tennessee, writes to tell us that he has his first-class Radio telephone license. Says his Radio Servicing business is getting a lot better each month.

———n r i———

Richard P. Conley, of Falcon, Kentucky is now an engineer with station WSIP, in Paintsville, Kentucky.

———n r i———

Theodore Lincoln, of Winchester, Mass., has a new amateur license, call W1TBC.

———n r i———

One of our very oldest Alumni Members, Emerson G. Wolfe, who received his NRI Diploma some 33 years ago, has moved to Medford, Oregon, for a change of climate. We are glad to have such a staunch supporter pulling for NRI through all these years.

———n r i———

Alumnus Stanley W. Hall, of St. John, N.B., Canada, has a new full-time Radio job with the "New Way" Radio and Furniture Store. He is proud to be in full command of the Radio Service Department.

———n r i———

Graduate G. William Walker, of Schenectady, N. Y. now has his first-class radiotelephone license, and is ready for a job in a broadcasting station.

———n r i———

Mr. and Mrs. Robert H. Dohmen, of New Prague, Minn. are happy to report the arrival of the second boy in their family. Incidentally, the Dohmen Radio Service is going "great guns," having grossed over $14,000 so far in 1950, $9,500 of which was Radio and TV sales, the rest coming from repair work.

NATIONAL RADIO-TV NEWS
16th & U Sts., N.W. Washington 9, D. C.

For:

Mr. Francis H. Fingado 25236 4
611 17th St.
Denver 2, Colo.

National RADIO-TV NEWS

Vol. 14 October-November, 1950 No. 5

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

NATIONAL RADIO INSTITUTE
Washington 9, D. C.

The Official Organ of the N R I Alumni Association. Editorial and Business Office, 16th & You Sts., N. W., Washington 9, D. C.

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Index

Printed in U.S.A.