National RADIO-TV NEWS

IN THIS ISSUE

April-May
1955

VOL. 16
No. 8

Stick-- and You'll Win!

"How can *I* make a success?" is a question often asked the successful man. The simplest answer to that question is "finish whatever you start."

"But suppose I change my mind, discover I made a mistake, that the thing I started on isn't going to be what I thought it was at all?" is the usual come-back. Right there is where the most vital point of all is overlooked: that until success *is* attained the individual tasks confronting you are relatively unimportant in themselves; that the really important thing is their effect upon you, what you *learn* from them, the *practice in succeeding* that you acquire in accomplishing them. Most of the jobs given you or that you wish on yourself probably aren't worth a stack of hayseeds—but *you are.*

Sure, we can always find plenty of reasons for quitting, more reasons than for going ahead. But what do you accomplish, what do you learn, by quitting? Only how to quit; more about how to fail.

No truer words were ever spoken than "there is no such thing as failure; there is only the ceasing of effort." Obviously if success in any undertaking is dependent upon effort (and we all agree that it is) then the more effort we make, the greater our success. This does not mean that you can trace the success present in every effort but it is there just the same. It's a case of cause and effect; you cannot have one without the other, but if you have one you've *got* to have the other, whether you can find it or not. You don't attain success all at once, in one jump. You succeed by degrees and the degree of success is in exact proportion to the degree of effort expended.

"Nothing succeeds like success." Think about this age-old saying for a moment. What does it mean? Simply that each success paves the way for further success. How? Why, only because the habit of succeeding has been unalterably fixed; because he who succeeds is determined to finish everything given him to do and will not quit until he does finish. He can't fail because failure is merely a "ceasing of effort" and he just won't quit trying until he's won.

The successful man is not a success primarily because of what he has *done* but because of what he *is*. And he is what he has made of himself by pushing through to success whatever jobs were given him. It is not the jobs in themselves that made him; it's what he did with them.

J. E. Smith,
President

Analyzing an AC-Operated Superheterodyne Receiver

By J. B. STRAUGHN
Chief, NRI Consultation Service

J. B. Straughn

General Description

THE Viking Model 53-132 described in this article is an ac powered superheterodyne receiver, with built-in loop and phonograph pre-amplifier, employing six tubes: a 6X5 rectifier, a 6BE6 frequency converter, a 6BA6 i-f amplifier, a 6AV6 second detector—avc and audio amplifier, a 6V6 power output amplifier and a 6SC7 phonograph pre-amplifier. The circuit shown in Fig. 1 is conventional in most respects.

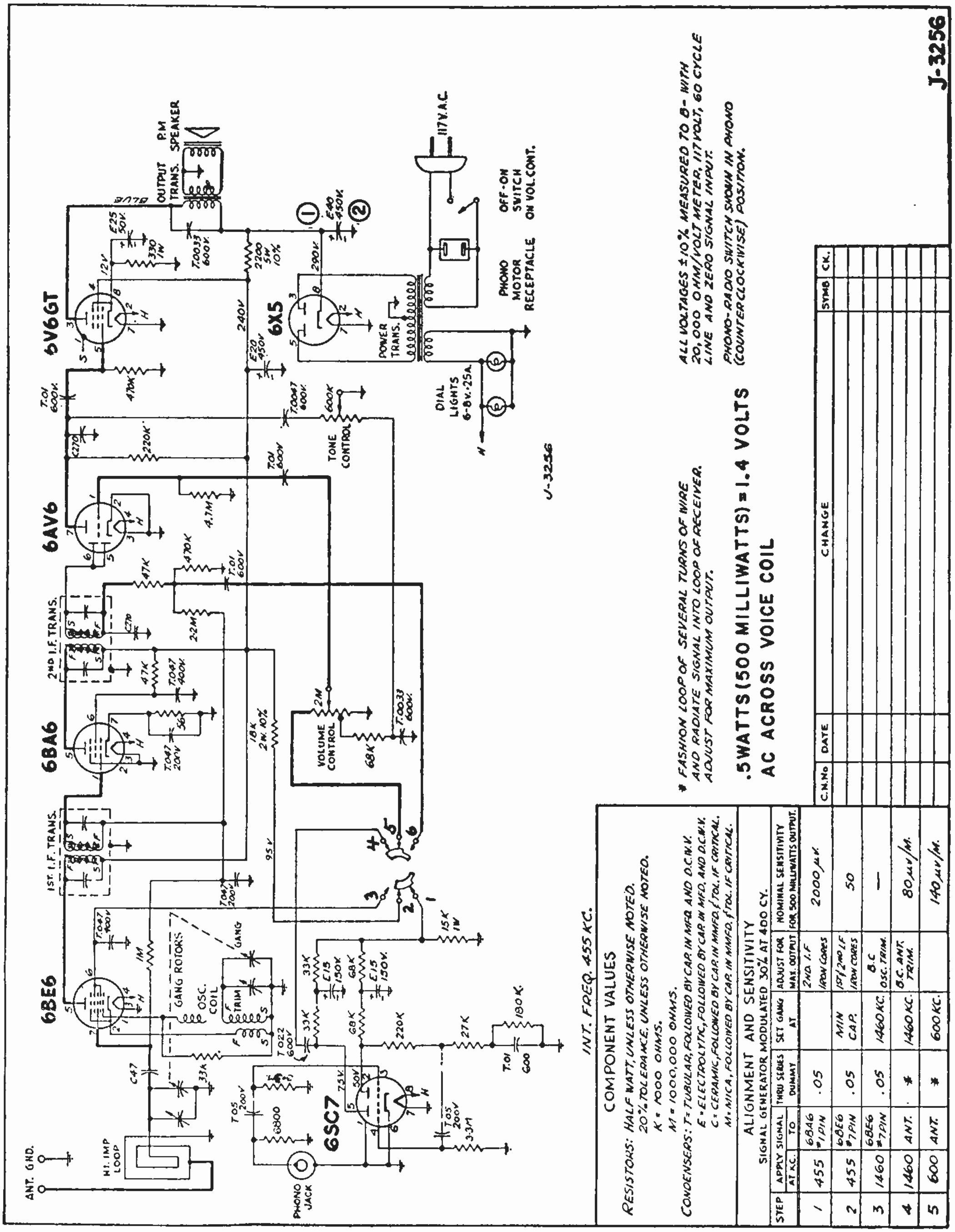
Tracing Signal Circuits

In analyzing the receiver we will trace the signal from the phonograph pickup, through the pre-amplifier and audio system of the receiver to the loudspeaker. This will be done first since the radio-phono switch is shown in the phono position. Next we will trace the radio signals from the antenna to the input of the audio amplifier for its operation will be the same as that previously described for phonograph signals.

Pre-Amplifier

The signals from the phonograph pickup are fed through a cable into the phono jack. One of the pickup leads connects to the receiver chassis while the other connects to the inner of the two concentric circles which make up the phonograph jack schematic symbol. Thus the phono signals are impressed across the 6800 ohm resistor and also appear across the 3.3 meg. resistor connected between control grille pin 3 and cathode pin 6 of the 6SC7. The right-hand section of this dual triode tube amplifies the signal and it appears across the 68,000 ohm plate load resistor and the 15 mfd electrolytic condenser used for decoupling purposes in the plate supply circuit. This same voltage is also across the network connected between the plate (pin 2) of this tube and ground. This network has frequency discrimination properties because of the presence of the .01 mfd condenser shunting the 180,000 ohm resistor. The reactance of this condenser increases as the frequency decreases so that there is more signal at the low frequencies available for transfer to the next stage. Only that signal between ground and the junction of the 220,000 ohm and 27,000 ohm resistors is transferred to the left-hand side of the 6SC7 tube. That portion of the signal dropped across the 220,000 ohm resistor is not transferred. Due to the presence of the .01 mfd condenser in the circuit the higher frequencies suffer more attenuation across the 220,000 ohm resistor than do the lower frequencies.

Those signals which are available for transfer appear across the 3.3 meg resistor connected between grid pin 4 and the grounded cathode. The left-hand section of the tube now amplifies the signal which appears across the 33,000 ohm plate load resistor. The junction of the two 33,000 ohm resistors in the plate supply circuit of the tube are at ground potential as far as the signals are concerned. Note that the plate of the tube is coupled to the radio-phono switch through a .022 mfd, tubular 600 volt coupling condenser. In the position shown, switch contacts 4 and 5 are connected together and the signal also appears across the volume control. Notice the 68,000 ohm resistor and the .0033 mfd condenser connected between the tap on the volume control and the chassis.



Courtesy T. Eaton Co., Ltd.

Fig. 1. Schematic of Viking Model 53-132 AC receiver.

These parts provide automatic bass compensation and the condenser is also a part of the tone control network as will be explained later.

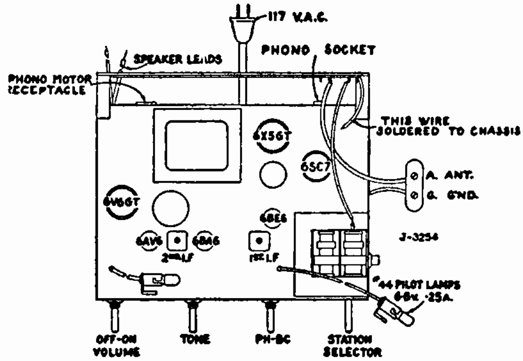
By setting the volume control to the desired level any amount of the available signal across the control may be applied through the .01 mfd coupling condenser across the 4.7 megohm grid resistor of the 6AV6. This tube amplifies the signal which then appears across its 220,000 ohm plate load resistor. The 270 mmf plate by-pass condenser has no appreciable effect on the audio signals. Note, however, the tone control which consists of the 600,000 ohm potentiometer and the .0047 mfd condenser connected between the plate of the 6AV6 and the chassis. As the slider is turned toward the .0047 mfd condenser, more and more of the high frequencies are by-passed.

At the same time that portion of the control shunting the .0033 mfd condenser in the automatic bass compensation network increases and the condenser becomes more effective in boosting the bass response. Thus we have two factors which tend to increase the bass when the tone control is turned as just described. When the slider on the tone control is moved in the other direction toward the .0033 mfd condenser in the automatic bass compensation network, this condenser becomes less effective in boosting the bass and the .0047 mfd condenser which connects to the plate of the 6AV6 is less effective as a by-pass of the higher audio frequencies. As a result, the percentage of high frequency signals across the plate load resistor increases and we have a higher treble response.

The signal available at the plate of the 6AV6 is transferred in the usual manner through the .01 mfd coupling condenser and appears across the 470,000 ohm grid resistor of the 6V6 tube. This tube amplifies the signal and we have a flow of signal current through the primary of the output transformer. The voltage induced into the secondary causes a flow of current through the speaker voice coil with consequent movement of the voice coil and the attached cone. The cone forces the air into vibration and produces sound waves.

To change over to radio reception the radio phono switch is rotated to the right in a clockwise direction. This closes terminals 5 and 6 as well as 2 and 3. Terminals 1 and 4 are no longer connected. When this is done, any signals fed into the 6SC7 will not be amplified because plate voltage has been removed by opening terminal 1 and the radio signals available at terminal 6 (described later) will be fed to the volume control which connects to terminal 5. The connection of terminals 2 and 3 applies screen voltage to the 6BE6 and this tube stage becomes alive.

The diagram shows that a loop antenna is used. This is called a high impedance antenna which



CHASSIS LAYOUT CHART

Courtesy T. Eaton Co., Ltd.

Fig. 2

means that it has a high Q. Notice that it is tapped for an antenna connection. If an antenna is connected to the antenna binding post it becomes part of the loop resonant circuit, and the loop acts as an auto transformer, the flow of signals from the tapped point to the chassis causing a voltage to be induced into the rest of the loop.

Any signals in the loop may be selected by the tuning condenser gang. At resonance a large signal voltage appears across the tuning condenser, much larger than any of the other signals flowing in the loop circuit. These signals are transferred through the 47 mmf condenser and are applied to mixer grid 7 of the 6BE6 tube. They are also applied through the chassis and the primary (cathode coil) of the oscillator transformer to cathode pin 2 of the 6BE6 tube. Thus we have the plate current varying at the frequency of the selected signal.

At the same time the 6BE6 tube functions as an oscillator. Variations in cathode current induce a voltage into the secondary of the oscillator transformer which is tuned to resonance by a section of the condenser gang. The voltage across the secondary is capacitively coupled to oscillator grid (pin 1) of the 6BE6 tube. This coupling is through the small coil (gimmick) shown connected to the grid, which serves as a condenser rather than an inductance. The changes in oscillator grid voltage due to the signal coupled to the oscillator grid cause further variations in the cathode current and in this way oscillation is maintained. The screen grid (pin 6) acts as the oscillator plate, being kept at ground potential by means of the .047 mfd screen by-pass condenser. Thus we have an ordinary tuned grid type oscillator. The 33,000 ohm resistor connected between the oscillator grid and ground serves to bias the oscillator section of the tube.

We now have the plate current of the 6BE6 tube varying at the oscillator frequency and also at the frequency of the incoming signal. The two signals mix in the tube and produce the i-f frequency of 455 kc. The i-f transformer, being tuned to this frequency, provides a high impedance load and a large signal at the i-f frequency appears across the primary of the transformer. The load at other frequencies is negligible and practically no voltage at undesired frequencies appears. The primary signal is induced into the secondary and is applied to the grid-cathode of the 6BA6, the cathode connection being through the .047 mfd avc filter condenser.

The 6BA6 tube amplifies the signal and a larger signal voltage appears across the primary of the second i-f transformer which is also tuned to the i-f frequency. The voltage induced into the secondary is applied directly to the diode plates of the 6AV6 tube and through the 270 mmf by-pass condenser to the grounded cathode. When the signals make the diode plates positive, electrons flow from the cathode, to the diode plates, through the secondary of the second i-f transformer, through the 47,000 ohm resistor and through the 470,000 ohm diode load resistor. When the signal reverses, making the diode plates of the 6AV6 negative, no current flows. Thus we have detection of the i-f signal. Across the 470,000 ohm diode plate resistor we have the audio modulation on the i-f signal, as well as a dc component. The modulation (audio signal) is fed through the .01 mfd coupling condenser to pin 6 of the radio-phono switch. Since the switch is in the radio position, pin 6 connects to pin 5 and the signal is applied across the volume control. From here to the loudspeaker the action of the audio amplifier is the same as that previously described for the phono signals. During radio reception the audio signal does not pass through the 6SC7 phono pre-amplifier.

Power Supply Circuit

A full wave type 6X5 rectifier tube is used in the power supply. Note that its filament is connected in parallel with the filaments of the other tubes and that the full dc supply potential exists between the cathode of the rectifier and its filament. Thus the 6X5 is a tube designed with excellent insulation between its cathode and filament.

A filter choke is not used, the less expensive 2200 ohm, 5 watt resistor serving as the choke and being connected between pin 8 of the rectifier and the plates and screens of the other tubes with the exception of the plate of the 6V6 which is supplied directly from the cathode of the rectifier. However, the 120 cycle ripple voltage at this point is not great enough to cause variations in the 6V6 plate current and therefore no hum signal reaches the speaker because of variations in the 6V6 plate supply voltage. Since the dc voltage is available across the 40 mfd input filter condenser we can consider this as the voltage source. The positive terminal of the condenser has been labeled 1 while the negative lead which connects to the chassis has been labeled 2. These points will be used in tracing the supply circuits.

Notice first, however, that the tube filaments are all connected in parallel and across the 6.3 volt winding on the power transformer secondary. One lead of this winding is grounded to the chassis as is one filament socket terminal of each tube. Thus it is necessary to run only a single wire from the ungrounded side of the 6.3 volt filament winding to one side of each tube filament. The two pilot lamps are also connected across the 6.3 volt filament winding.

Tracing Supply Circuits

Those tube electrodes supplied with a positive potential will all trace to point 1 on the input filter condenser. Let us take the circuits one at a time and trace the path for each.

Starting with plate pin 5 of the 6SC7 tube, trace through the two 33,000 ohm resistors in the plate supply circuit, switch contacts 1 and 2, the 18,000 ohm 2 watt resistor, the 2200 ohm 5 watt filter resistor to point 1. Plate pin 2 follows the same path with the exception that it traces through the two 68,000 ohm resistors to terminal 1 on the radio-phono switch. Notice the 15,000 ohm 1 watt resistor connected from switch terminal 1 to the chassis. This serves to stabilize the supply voltage for the 6SC7 tube. The 33,000 ohm and 68,000 ohm resistors connected to radio-phono switch terminal 1 act, with the 15 mfd electrolytic filter condensers, to decouple any signals in the plate circuits of the tubes from the power supply. Failure to include these parts could result in motorboating. Also, hum signals which might otherwise reach the plates of the 6SC7 tube are adequately filtered by the RC network in each plate supply circuit.

The screen, pin 6 of the 6BE6 tube, traces through radio-phono switch terminals 2 and 3, through the 18,000 ohm 2 watt resistor and the 2200 ohm 5 watt filter resistor to point 1. The plate of the 6BE6, pin 5, traces through the primary of the first i-f transformer and the 2200 ohm 5 watt filter resistor to point 1.

Plate pin 5 of the 6BA6 traces through the primary of the second i-f transformer and the 2200 ohm filter resistor to point 1 while the screen of this tube, pin 6, traces through the 47,000 ohm screen supply resistor and the 2200 ohm 5 watt filter resistor to point 1.

The path for the plate (pin 7) of the 6AV6 tube is through the 220,000 ohm plate supply resistor and the 2200 ohm filter resistor to point 1. The screen of the 6V6 traces directly through the filter resistor to point 1 while the path for the plate (pin 3) is through the primary of the output transformer to point 1.

The cathodes of the 6SC7 and the 6AV6 tubes connect directly to ground and hence to point 2 on the input filter condenser. The cathode connection for the 6BE6 tube is through the primary of the oscillator transformer to the chassis while the cathodes of the 6BA6 and 6V6 tubes trace to the chassis through their respective bias resistors.

The control grids of all tubes trace to the chassis as you will see by examining the schematic diagram.

The control grid, pin 7 of the 6BE6, traces through the 1 meg resistor in the avc network, the 2.2 meg resistor and the 470,000 ohm diode load resistor to point 2. All other grids may be traced in a similar manner to the chassis of the receiver.

Bias Voltage Supply

We have already stated that the cathodes of the 6SC7 and 6AV6 tubes connect directly to the chassis. The control grid returns of these tubes also connect to the chassis so the bias voltage is developed across the high ohmic value resistors between each control grid and the chassis. Some of the electrons which might otherwise reach the plate, hit the grid wires, are trapped there and flow from the grids through their respective resistors to the chassis. The source of this current flow is the voltage between the electron cloud in the tube and the cathode. The voltage divides between the cloud and grid and between the grid and cathode. That part of the voltage across the grid resistors serves to bias the tubes.

When signals are picked up the dc component of the rectified voltage appearing across the diode load resistor is fed through the 2.2 meg avc filter resistor and the secondary of the first i-f transformer to the control grid of the 6BA6. The same voltage is also applied through the 1 meg grid resistor to the mixer grid of the 6BE6 tube.

Additional voltage is available for the control grid of the 6BA6 tube by virtue of the small voltage drop which occurs across the 56 ohm cathode bias resistor.

The oscillator grid of the 6BE6 is biased by means of the voltage drop which occurs across the 33,000 ohm resistor connected from oscillator pin 1 to the chassis. When the control grid of the oscillator is driven positive, it collects electrons and these charge the "gimmick" capacitor. The charge on this condenser biases the oscillator grid.

The 6V6 tube is self-biased by means of the 330 ohm 1 watt cathode resistor. Electrons flowing from B—pass through the resistor to the cathode of the tube "producing" the required bias voltage.

Voltage Measurements

Many, but not all, of the voltages which will be measured in the receiver are marked on the wiring diagram. Note that the plate voltages for the 6SC7 tubes are given near their plate leads. The diagram shows that 240 volts are available across the output filter condenser and this is applied directly to the screen (pin 4) of the 6V6 tube. Essentially the same voltage is applied to the plates of the 6BE6 and 6BA6 type tubes. Considerably less voltage will be applied to the plate of the 6AV6 tube but this is not indicated in the diagram. Depending upon the type of voltmeter used, you might measure between 25 and 75 volts on the plate of this tube.

Following the connection between radio-phono switch terminal 2 and the 18,000 ohm 2 watt resistor you will see that 95 volts are available on this lead and when the switch is thrown to the radio position, 95 volts are applied to the screen (pin 6) of the 6BE6 tube. The screen voltage of the 6BA6 type tube is not shown and will depend considerably upon the condition of the tube. Normally you would expect about 100 volts to be present at pin 6 of this tube.

Notice that the cathode voltage of the 6V6 tube is shown as being 12 volts. This is actually the bias voltage available between the control grid and the cathode of the tube.

Alignment

The equipment required is a serviceman's signal generator (oscillator) and some type of output meter. (See Fig. 1 for alignment data.)

To align the receiver, first connect the output indicator. The connection will vary with the type used. A low range (0-7.5 volts) ac voltmeter could be connected *across the voice coil.* A high range (0-75 volts) ac voltmeter with a series blocking condenser could be connected *from the plate of the 6V6 tube to the chassis.*

A high resistance dc voltmeter or a vacuum tube voltmeter could be connected *across the 470,000 ohm diode load resistor* with the positive meter lead connecting to the chassis. You would not use all of these connections at one time—just any one of them. All adjustments on the receiver are to be made for maximum reading on the particular output meter which is used.

For all i-f adjustments, the ground lead of the signal generator is to be connected to the receiver chassis, which may or may not have a direct connection to ground via a cold water pipe or whatever you use for a ground in your shop.

In the alignment instructions you will note that the ungrounded (hot) lead of the signal generator is to be connected to the points in question through a .05 mfd condenser. No damage to the receiver and no particular ill effects in the alignment procedure would be noted if this condenser were to be omitted. Many signal generators have a condenser built into the hot lead but if one is not provided in your instrument the connection may be made through a series .05 mfd condenser. The working voltage of the condenser is unimportant.

Tune the receiver to the low frequency end of the dial. If squealing is noted, due to a station beating with a signal generator, change the tuning dial setting slightly so only the modulated tone of the signal generator is heard.

The volume control (attenuator) of the signal generator is adjusted to give a noticeable deflection on the output indicator, and the receiver volume control is turned on full. (The receiver volume control setting won't affect the vacuum tube voltmeter or high resistance dc voltmeter readings and can be turned down if you don't want to hear the modulated tone of the signal generator during alignment.)

Since the i-f amplifier is to be adjusted, the hot lead of the signal generator is connected through the .05 mfd condenser to the control grid (pin 1) of the 6BA6 tube. The iron cores in the second i-f transformer are then adjusted for maximum output reading. The signal generator and the .05 mfd condenser are then moved back to pin 7 (the mixer grid) of the 6BE6 tube. The two iron cores of the first i-f transformer are then adjusted for maximum reading on your output meter. Normally you could feed the signal into pin 7 of the 6BE6 and adjust both i-f transformers consecutively, without going to the trouble of feeding the signal into the grid of the 6BA6. This would only be necessary where the i-f transformers had been badly misaligned and you could not force a signal through from the control grid of the 6BE6 tube.

With the signal generator still tuned to 455 kc and connected to the control grid of the 6BE6 tube you should tune the receiver to 1460 kc and the signal generator to the same frequency. The oscillator trimmer should then be adjusted for maximum output. This trimmer is mounted right on the condenser gang.

The signal generator leads are now disconnected from the chassis and the grid of the mixer. Two or three turns of wire are wrapped around the loop, in the same direction as the loop wires. The signal generator leads are clipped to the free ends of this wire and the receiver and signal generator are again tuned to 1460 kc. The antenna trimmer mounted on the other section of the gang is then adjusted for maximum reading on the output meter. This completes the alignment procedure.

Sensitivity Measurements

Notice that data is given in the alignment chart showing the input signal required at the various signal generator connection points to give a desired output. This information is of little value to the average serviceman since he does not have the required type of signal generator. However, in large shops, signal generators whose output may be adjusted to give a desired signal voltage in microvolts (μv) may be available. The modulation percentage of such instruments may also be adjusted from 0 to 100% modulation. The normal modulating frequency is 400 cycles.

Sensitivity measurements may be made when aligning the receiver to see that the gain per stage is normal. When this is done, a low range ac voltmeter is connected across the voice coil as the output indicator and the receiver volume is turned on full. An output of 500 milliwatts will correspond to a measured ac voltage across the voice coil of approximately 1.4 volts. When you have peaked the cores of the second i-f transformer the calibrated attenuator of the signal generator should be adjusted until you obtain a reading of 1.4 volts ac across the voice coil. If the output of the signal generator is greater than 2000 microvolts, the sensitivity of the receiver between the i-f stage and speaker voice coil is below normal. If less than 2000 microvolts need to be fed to the input of the i-f amplifier, then the sensitivity is above normal.

In the same way only 50 microvolts need to be fed into the input of the 6BE6 at the i-f frequency to produce 1.4 volts ac across the voice coil.

80 microvolts are required to be fed into the test loop at 1460 kc to produce a 1.4 volt ac reading across the voice coil.

Note that in the fifth step, which is not an alignment step, both the signal generator and receiver are tuned to 600 kc. 140 microvolts output from the signal generator are then required to produce 1.4 volts ac across the voice coil. This fifth step is a check on the tracking of the receiver to see that the oscillator and antenna circuits have followed each other faithfully across the dial and are still separated by 455 kc.

You will note that in steps 4 and 5 more signal is required than when checking the i-f amplifier sensitivity in step 2. This would seem to indicate that there is no conversion gain in the 6BE6 tube. Actually this is not the case. There is a loss in signal through the loop you construct to couple the signal generator to the receiver loop. This has been taken into account by the manufacturer, however, in giving the signal generator output required in steps 4 and 5.

Expected Performance

This is an average receiver with respect to sensitivity and volume. Reasonably good fidelity is to be expected. An antenna 50 to 75 feet long is advisable in rural areas, but a short antenna or no antenna at all should do in metropolitan districts.

The presence of the frequency compensated phono pre-amplifier indicates that the audio system is excellent and that very good reproduction from phonograph records is to be expected.

Servicing Hints

Since this receiver is quite conventional in design, most of the defects are isolated by basic methods discussed in the regular course. A few hints may prove helpful.

If you find that the B supply voltage is extremely low you would naturally check for leaky or shorted electrolytic filter condensers. Remember, however, to also check for cathode-to-heater leakage in the 6X5 tube since this would place a low resistance across the input filter condenser and reduce the dc supply voltage.

Serious audio distortion, not due to gas in the 6V6 or to leakage in the .01 mfd coupling condenser feeding its control grid, may be due to an open in the 330 ohm cathode bias resistor. Normally you would expect this to remove all plate-to-cathode voltage but the 25 mfd 50 volt electrolytic condenser connected from the cathode of this tube to ground will serve as a current supply path. Due to its large leakage resistance (much greater than 330 ohm), a very high bias voltage will be developed and serious clipping of the signal will result with consequent distortion.

n r i

Federal Civil Defense Administrator Calls For Greater Use of Amateur Radio in Civil Defense Communications

Federal Civil Defense Administrator Val Peterson has called for greater use of amateur radio and more flexibility in civil defense communications.

"Ever more destructive weapons and the necessity for pre-attack evacuation" demands dispersal of radio control centers to points outside target areas and the use of more mobile radio units to increase flexibility, he said, speaking at the presentation ceremony of the 1954 Edison Radio Amateur Award sponsored by General Electric. Recipient of the award was Benjamin S. Hamilton, 35, La Mesa, Calif., who last year devoted 20 hours a week to providing San Diego County with an outstanding civil defense radio system.

Hamilton had conducted communications surveys in a county 70 miles long and 60 miles wide where terrain varying from seashore to mountains and desert presented difficult communications problems. He designed equipment, wrote specifications, and trained personnel to give his 750,000 neighbors in the county a crack emergency radio system.

"Excellent progress is being made by the radio amateur civil emergency service," Mr. Peterson said, noting "it is gratifying that the recipient of General Electric's award won his laurels as a member of a local civil defense organization."

n r i

A lawyer was always lecturing his office boy, whether he needed it or not. One day he heard this conversation between the boy and one employed next door:
"How much does he pay you?" asked the latter.
"I get five thousand dollars a year," replied the lawyer's boy; "$10 a week in cash and the rest in legal advice."

This Enthusiastic Group of NRI Men Operate Their Own Amateur Radio Stations

Thanks NRI Communications Course for Amateur "Extra" Class Liscense

"Just a note to let you know that I passed the F.C.C. examination for the amateur extra class license recently with all, and I do mean all, the credit going to NRI! It all came about when I accompanied a friend of mine down to New Orleans (as moral support) while he went up for his General Class (from novice).

"After we got there he began kidding me and trying to get me to try for the extra (I already had a general). Well to make a long story short I took the exam just for the heck of it and with no idea of passing it, and lo and behold I did pass! The honest truth is that I hadn't even cracked a book in preparation for the thing.

"My congratulations to NRI and its wonderful Communications course, because the knowledge I have absorbed from it—and nothing else—caused me to pass that exam."

E. B. CHARLTON
W5WQX
904 America St.
Baton Rouge 2, La.

——n r i——

——n r i——

Home-made CW Rig Makes Lots of Contacts

"This photo shows my amateur station W7WSE. It is strictly a low power rig, running about 30 watts on C.W., but has made a lot of contacts in the year or so that I have had my license. All equipment is homemade, and the workbench also handles part-time Radio servicing.

"Kent's Photo Shop, where I am employed as a technician, sells tape recorders. I do work on these as well as movie projectors.

"The helpfulness and consideration of the NRI Staff adds a lot to the value of the training. The personal touch, like a smile, is a small thing to give, but a great thing to receive. I can say that I thoroughly enjoyed my NRI course and cannot recommend it too highly."

GEORGE W. BRENNER
W7WSE
1203 Fifth Avenue, S.
Lewistown, Montana

"Ham Shack" Also Houses Spare-time Business

"Here is a recent photo taken of me in my Ham Shack where I performed my NRI experiments.

"When I started your course, I worked in a warehouse. The pay was low and as a laborer, the future was not very bright. Then, I started with NRI. Your course was so much easier to understand and the construction kits were so interesting that it did not seem like work to study. I do not imply that your course is a simple one, but that the texts and construction projects are so well written that they are plainly understood.

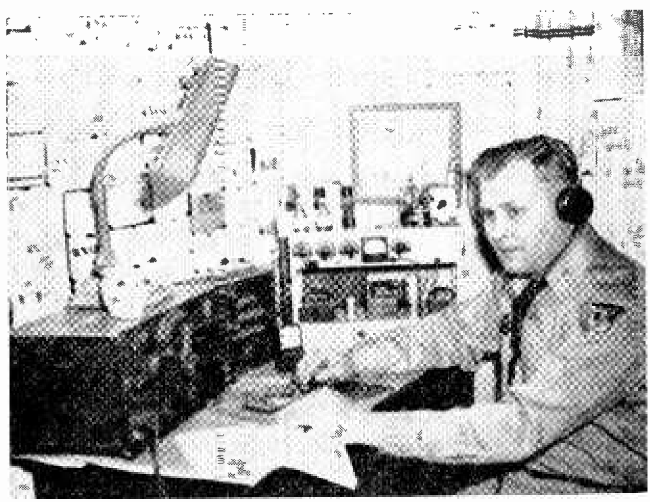
"I did not complete high school, but your course so inspired me that I went to night school and earned a diploma in order that I might continue further studies in this field.

"So all in all, a short time ago I was a laborer with no training and not much of a future. Now I have a good job and, best of all, opportunity for advancement. At present I am employed at $2.28 an hour plus extra money I receive repairing Radios and TV receivers evenings and weekends. I am going to continue my education so as to advance into engineering."

FREDERICK PRYZBYC
1114 Rutger St.
Utica, New York

n r i

Uses NRI Transmitter on Civil Air Patrol Band



"In December, 1953, I joined the Ham ranks and in August, 1954, passed my general class examination. Part of the time I am on two meters with a converted SCR 522 and on eighty meters with a converted BC 457.

"My favorite though is what I call my NRI composite rig, running 25 watts on eighty meters. My antenna is 18 feet high—half wave, center fed, 64 feet each side of center. My rig has been on the Civil Air Patrol band for one and one-half years since I completed it. I have talked on 'phone to North Carolina in the East and Oklahoma in the West. During 1954 I worked over 200 amateurs in twenty-four states and Canada with the NRI rig on C.W.—three California contacts. My goal is to work all states on eighty meters with the NRI transmitter unmodified.

"I would like to tell you that I really enjoy every issue of the NR-TV News. I am especially interested in the servicing articles. Also, as a suggestion, I would like to see an article devoted to the NRI transmitter."

CHARLES G. SHIVELY
W9CFE
P. O. Box 243
Vandalia, Illinois

Experiences of a Survey Engineer

Tom Carswell

By TOM CARSWELL

NRI Consultant

THE initial survey of a microwave relay system usually results in a series of rather unusual experiences. This is particularly true when making the survey in a foreign country or in one of our own mountainous areas. Some of the major requirements of the team itself include: the ability to climb mountain peaks that are practically inaccessible, being able to withstand wide extremes in temperatures, experience in handling a snow tractor, a rugged back in order to act as a human pack mule and finally, a communications engineer.

Although communications experience is desirable, it has been discovered in many cases that the behavior of microwave signals is vastly different than that of their lower frequency cousins. Some of these variations will be described in this article. The information obtained from these field surveys has proved extremely helpful in planning VHF and UHF TV installations, particularly in fringe areas.

In the past three years, I have made two field surveys of large microwave relay systems. One of these was in a sub-tropical country in the Far East. The other, in our own Rocky Mountain states. Such a wide variety of conditions were encountered that an unusually complete evaluation of the surveys could be made.

In the Far East project, arrangements had to be made with savage head hunter tribe chieftains in order to have safe escort to many of the sites chosen. This entailed diplomatic consultations with government bureau directors, negotiations from various embassies, and an armed military escort for the team. In the final analysis, perhaps the most important phase in the initial arrangements was the procurement of a variety of gifts for the tribal leaders. Such things as small pocket mirrors, snuff, chewing gum, tee shirts and toy music boxes were necessary to guarantee the safe return of the team. Also, a rather strong stomach was definitely an asset. When the roast dog was placed before you at a tribal feast, you ate it with gusto, or else!

Since most of the country was uncivilized, all equipment had to be carried in by water buffalo and by native pack bearers. With several of the survey sites being between 8,000 and 10,000 feet high, it can easily be seen that transport of the equipment was a major project. In fact, more time was consumed by this than by the actual tests themselves.

The Author's Background

Prior to his association with NRI, Mr. Tom Carswell spent a number of years with RCA as a field project engineer. Although several of the assignments were highly classified, some of them were on a general level similar to the microwave surveys. His work carried him all over the world and included personal contacts with many famous personalities.

In addition to project engineering, Mr. Carswell was associated for many years with a number of broadcast and TV stations in the southeastern United States. Included in this field were such diversified positions as station manager, program director, chief announcer, chief engineer and top assistant floor washer.

Among the highlights of his career, he credits the design and installation of the first Armed Forces entertainment broadcast station as the peak. This station officially went on the air December 15, 1942, in Casablanca.

Due to the excessive humidity, heavy rainfall, high wind velocity and tropical disturbances, specially constructed antenna systems had to be employed. These had to be exceptionally rigid in order to prevent the antennas being twisted more than about two degrees. A narrow beam width of about 8 degrees was employed in order to realize maximum gain from the system. It can easily be seen that very little horizontal twisting of the antenna system would cause a complete loss of signal at the receiving station.

During the monsoon season, the antenna structure had to be completely encased in a waterproof housing. Regardless of how tightly all wave guide connections were made, water would still manage to seep into the coupling system and cause severe attenuation.

The loading effect in the vertical plane was very pronounced. This is the effect caused by cancellation of the direct wave with an out of phase reflected wave. As a result, careful adjustment of the antenna tilt angle was always necessary. Incidentally, this same effect is present, to a lesser degree, in VHF and UHF systems. This should always be taken into consideration when making antenna installations.

At microwave frequencies, each drop of water during a rainstorm acts the same as the capacitive-inductive resonant circuit. This results in severe attenuation of the transmitted signal. If the signal to noise ratio is not sufficient, unreliable communications will result. To overcome this attenuation, the power of the transmitter was increased by adding another tube to the cavity resonator.

In most cases, radiated power at microwave frequencies is extremely small. In this equipment, a parallel cavity resonant circuit was employed using two light house tubes. The total estimated power output of .7-watts was obtained. The cavity was cast from brass obtained from several 75 millimeter shell casings. The casting was then accurately machined and heavily plated with silver. Incidentally, silver plating is a "must" at these frequencies. The finished product operated in the 2,000-mc. range. This frequency was chosen as an arbitrary figure that was representative of commercially available equipment.

Due to difficulties in access, automatic relay stations were tried at several sites. Each of these relays consisted of two transmitters, two receivers, and four antenna stations. The receivers were normally on at all times, while the transmitters were keyed automatically by a squelch circuit in the receivers. This is also a common practice on military and commercial types of automatic relay stations.

Since it was impractical in most cases to run special power lines many miles to the equipment, pairs of gasoline driven generators were installed at each station. Several of the natives were hired to run the generators on twelve hour schedules so that continuous power was available. These natives would fill the gasoline tanks each day, and once a month, more supplies would be packed in by water buffalo.

Defense Dept. Photo (Air Force-MATS)
In the background can be seen a 7800 foot peak that was used as an experimental site.

In the final evaluation of this Far East project, it was decided that the maximum distance between stations would be about twenty miles. Normally, this figure would be about thirty-five miles. This was necessary due to the attenuation factors mentioned earlier. Also, it was decided that the relay stations should operate from storage batteries that would be recharged on a regular monthly maintenance schedule by the operating team. This was the result of unreliable operations by the native workers.

Similar conditions were encountered throughout the ensuing months. However, the survey was finally completed and the final evaluation sent to the proper authorities. Then, with a great sigh of relief, a return trip to the United States was made.

After a few weeks vacation, a request was made for a similar survey in our own Rocky Mountain States. Due to the experience I had gained in the previous survey, this project was assigned to me. Again, other extremes of conditions were experienced that required some unique forethought in solving them. These included howling snow blizzards, the danger of being marooned on inaccessible mountain peaks during these storms, an attack by a huge black bear, and operational difficulties in the equipment due to 40 below zero temperatures.

Before actual commencement of the field survey, a complete set of contour maps was obtained

Defense Dept. Photo (Air Force-MATS)

Two ten foot antenna bases have been temporarily set up atop a mountain. Temperature 30° below zero.

from the local United States Geodetic Survey team. These maps show accurate elevations of all hills and mountains in desired areas, and provide a quick reference in determining the best sites for a proposed relay station. Incidentally, this is a free service, and will many times prove helpful when making fringe area TV installations.

After selecting the proposed sites, an accurate profile map should be plotted for the area. This is a form of graphs that indicate line of sight transmission in relationship to the curvature of the earth and the surrounding terrain. These profiles are invaluable when plotting proposed signal paths and in determining the height of the antenna supports.

At the completion of the preliminary paper work, investigation of access roads to the proposed sites were conducted. This was usually done first by air. If any access roads or trails were observed or if the terrain were not too rugged, the equipment was loaded on a snow tractor and an attempt was made to reach the site. However, in many cases, the equipment had to be back packed due to the extremely steep inclines at the final approach to the chosen sites.

In most of the field survey tests conducted in this area, no power lines were readily available. However, in all the sites chosen, power lines could be constructed without too much difficulty. This was one important point that prevented several geographically ideal sites from being used.

Although the normal distance between relay stations is seldom over 35 miles, some unusually long links were accomplished with the aid of the U. S. Geodetic survey team maps and the profile graphs. In one case, it was desired to establish contact with a station that was about 40 miles distant. However, a high range of mountains was directly between the two sites. By consulting the maps, it was ascertained that another high mountain was located a number of miles to one side of the intervening peaks. Also, a series of connecting valleys was located between this mountain and the distant station. Deeming it worth a try, we beamed the signal at the distant peak, which was about 30° different in azimuth from the direct line of sight between the stations. The wave was bounced off the mountain, traveled down the series of valleys, and was received with excellent results. The total estimated distance covered by the signal was about 170 miles.

The following incident will perhaps give a rough idea of the extremely rugged terrain encountered in the survey. We were attempting to reach a peak by driving the snow tractor up an incline of about 35°. There was about one half ton of equipment in the vehicle, in addition to three persons. About half-way up the incline, the snow tractor suddenly reared up and fell over backwards. In the process, all three persons were thrown clear, although not without injury. The snow tractor, along with every pound of our equipment, tumbled end over end, eventually going over the side of a 500-foot vertical cliff. Due to the complete inaccessibility of the final resting place of the vehicle, it was abandoned. Naturally, it was assumed that all the equipment was completely demolished. Although the temperature was about 30° below zero, and two of us had cracked ribs, we had to hike back down the mountain about eight miles to the nearest Indian Settlement. Upon reaching that point, it was discovered that the nearest telephone was about twenty miles away. The only access road that could be used by a truck was completely snowed in. As a result, the whole party had to remain at the settlement for five days until a search party was sent out.

This is not the end of this incident, however. Several months later, when weather conditions cleared, another attempt was made to reach the same peak. This time, more caution was observed and the mission was accomplished.

At another time, I had the rather dubious honor of being one of few persons to have their car actually attacked by a huge black bear. This is how it happened.

The weather was clear and cold. I was driving my car up an old mining road in order to reach the first level of operation where we had another snow tractor parked. The trail was about eight feet wide, with a sheer drop on one side of about 200 feet and a solid stone wall rising vertically

Defense Dept. Photo (Air Force-MATS)

The incline of a typical slope can be seen by comparison with the vertical growth of the trees.

on the other. About half-way up the trail, I encountered a huge black bear sitting squarely in the center of the trail. Since blowing my horn had little effect upon the Bruin, I decided to gently nudge him with the front bumper. This was a big mistake. On the second push, he suddenly reared up and slashed at my right front fender. Evidently liking the sound of ripping metal, he swung a second time, this time completely demolishing the fender. With a pleased glint in his eyes, he then turned and slowly ambled up the trail and disappeared.

Although this particular survey was conducted primarily as the basis for a microwave communications link, some of the same sites will probably be used in a proposed Northwest TV microwave system. This thought was always kept in mind when making the temporary installations.

Extreme difficulties were encountered due to the unusually low temperatures. Here is one example of the effect caused by exposing the human body to the elements.

I once walked into the wind for about fifty yards on one of the coldest days. Upon reaching shelter, I discovered that it was impossible to close my eyes. Believe it or not, they had both frozen open. However, no lasting effects were noticed.

Here is another very important point which is frequently overlooked by the average serviceman in making a VHF or UHF TV installation. This is particularly important in fringe areas. It is the declination in certain areas where there are heavy mineral ore deposits.

Declinination, by the way, means the number of degrees' difference between magnetic north as indicated by a compass and the actual true north. In some areas, it is surprising how large the difference is. As you can see, at UHF frequencies in particular, orientation of the antenna should never be made, even for a line of sight installation, by a magnetic compass alone. This information is always available at any Geodetic survey team office.

The excellent and unusual results obtained in this series of surveys would have been impossible without the wholehearted cooperation of the U. S. Geodetic survey teams. Remember, information from the U. S. Geodetic Survey is free and should be used to its fullest.

In closing, you can see that there are many similarities in propagation effects in the microwave range and the lower frequencies. However, these effects are more pronounced at the higher frequencies. Similar techniques can be employed in order to obtain a better signal to noise ratio in some areas where the signal previously was unsatisfactory. Remember, in fringe areas, a reflected wave can sometimes be more usable than the so-called direct wave. A complete and thorough analysis of the installation should be made before the project should be considered finished. It will save many headaches in the future and will promote customer satisfaction if this procedure is followed accurately.

———*n r i*———

The American Mother

The center of most families is the person who, when asked to give her occupation, hesitantly and not too happily writes down: "housewife."

Was ever a title so wildly inadequate? Homemaker, dietitian, economist, psychologist, pediatrician, machinist, accountant, hygienist, hair stylist, clothes designer, laundress, taxpayer, voter, civic worker, organizer of charities, keeper of consciences, transmitter of ideals, hearer of small prayers—the American mother is all these things—and more. Her freedom to be them is one of the most important freedoms we possess.

Knowing this, then, Americans have set aside a day for her. Behind the telegraphed roses, beneath the sentimentality of Mother's Day cards, runs a strong clear message of affection and gratitude.

"You are the mainspring," says that message, "you are the balance wheel. Without you all freedoms would be worthless."

AUGUST S. IGLEHEART in the *Woman's Home Companion.*

———*n r i*———

A man's real limitations are not the things he wants to do, but cannot; they are the things he ought to do, but does not.

—*The Kodiak Magazine*

Technical Ramblings

By B. VAN SUTPHIN
NRI Consultant

Problem: Servicing TV Sets with "No Raster"

MOST modern TV receivers use the "fly-back" type of high voltage supply. The horizontal retrace is stepped up and then rectified to produce the required high voltage (at low current). This means that the high voltage is dependent upon proper operation of the horizontal oscillator-output section of the receiver. If the horizontal sweep fails, the high voltage fails. In this way, should the horizontal sweep fail, damage to the picture tube is prevented.

Whenever you encounter the complaint of "NO RASTER," the first tests to determine whether the horizontal oscillator and the horizontal output stages are working can be carried out with the chassis still in the cabinet. To do this, hold a well-insulated screwdriver by the handle so that the metal tip is approximately one-quarter of an inch from the plate lead of the horizontal output tube. *Do not* ground the blade of the screwdriver. If an arc is obtained, it means that the horizontal oscillator and the horizontal output stages are operating. (In some cases you will not be able to draw an arc one-quarter of an inch long; a one-eighth inch arc is usually sufficient.) Therefore, the trouble is in the high voltage rectifier circuit.

Now check for an arc at the plate cap of the high voltage rectifier tube. The arc obtained at that point should be greater than the one obtained at the plate lead of the horizontal output tube. If an arc is obtained at the plate of the horizontal output tube, but not at the plate cap of the high voltage rectifier, the high voltage rectifier is being overloaded by undue current drain, or the section of the horizontal output transformer that feeds the rectifier is open.

Remove the high voltage lead from the picture tube, and again check for an arc at the plate of the high voltage rectifier. If one is obtained, the picture tube is drawing excessive current, or the high voltage rectifier tube is defective. Try a new tube in the circuit. If an arc is still not obtained when you remove the high voltage lead from the picture tube, the high voltage filter condenser is probably leaky or shorted.

If no arc was obtained at the plate of the horizontal output tube, there is a defect in the horizontal oscillator-amplifier circuit. (Occasionally it is caused by a short in the high voltage circuit.) If the horizontal oscillator-amplifier circuit is operating properly, there will be an arc at the plate of the horizontal output tube. Look for a fuse in the horizontal output circuit; if one is used, remove it from the set and check it with an ohmmeter. (Some sets do not use a fuse in this circuit.)

If the foregoing tests do not locate the defective component, you will have to remove the chassis from the cabinet. The next step is to determine whether the defect is in the horizontal output stage, or in the horizontal oscillator stage. Check the operating potentials on the horizontal output stage (do not attempt to measure plate voltage as the high voltage pulses normally present would damage your voltmeter). If they are correct, check the voltage across the grid resistor of that stage. Then briefly stop the horizontal oscillator by shorting its grid to cathode and again check. If voltage was available across the grid resistor, and the voltage disappeared when the horizontal oscillator was stopped, the oscillator is operating; if no voltage was available at first, and no change was noted when the oscillator grid was shorted to the cathode, the oscillator is not operating. If the oscillator is not operating, check all voltages in the circuit and the various components used. Check the tube by temporary substitution, if possible.

If the oscillator is operating, recheck your voltage tests on the output circuit and test, or, if possible, try a new tube. Be sure you have screen voltage on the horizontal output tube. Frequently, screen by-pass condensers short and remove the screen voltage.

Also measure the output voltage of the B supply. If the B voltage is low, the voltages applied to the horizontal sweep circuit will be low, and this occasionally produces the complaint "NO RASTER."

(Concluded on Page 23)

SCIENCE QUESTION BOX

By Scientists of the General Electric Company

Q: Is there any animal that can get along without water?

A: All animals require water in their bodies, but some can get it without actually drinking the liquid. For example, zoologists have found that the desert rat, which lives in the driest regions, such as the bare sand dunes of Death Valley, can get along indefinitely without water and with only dry barley seeds for food. In spite of this it maintains about 65 per cent of its body weight as water. Even dry seeds contain a very small amount of water, which it uses, but most of it is actually made in the animal's body. The food contains hydrogen, and the rat's digestive processes can extract this, and combine it with oxygen from the air, to make water which consists of these two elements.

Q. If men ever have to work in outer space in connection with building a space station or on an airless planet, why wouldn't their space suits explode with ordinary air pressure inside and none outside?

A: It is true that if men are ever able to travel through space, and they have to work on a planet without any atmosphere, or in space iself, they would need to wear some sort of pressure suit which would enclose them completely. Perhaps it would not be necessary to maintain inside it the normal atmospheric pressure of 15 pounds per square inch, for some lower pressure, like that on a high mountain, might suffice. If this were not balanced by outside air under similar pressure the suit would tend to burst. Therefore it would have to be made strong enough to withstand this outward pressure. Scientists who have studied this problem believe there would be no essential difficulty in making the suit sufficiently strong.

Q: Are all insects bugs?

A: No, the terms "bug" and "insect" are not synonymous. Technically, the true bug is a member of one particular family of insects, the Hemiptera, which includes over 55,000 known species and over 4,000 from North America alone. Most of them feed on plants, and have well-developed piercing and sucking mouth parts which are characteristic. Not all bugs have wings but if they do the wings overlap when they are folded to form a letter X on the back. Popularly, the term "bug" is used to include all insects, and even spiders and other animals which are not insects at all.

Q: How can I waterproof a poster which is to be outside for a considerable time?

A: A simple means is to use a solution of white shellac, which is brushed on the poster and allowed to dry. Also sprayed lacquer bombs are now available in hardware and department stores. With one of these you could spray a transparent lacquer on the poster, and when it dried it would give a waterproof finish.

Q: How far does the light of a candle extend, that is, enough to see an object in otherwise complete darkness, and how far does the light of the sun extend.

A: This cannot be answered very exactly, since the sensitivity of the eye varies so greatly. However, when fully dark adapted, the eye may just perceive objects with an illumination of a millionth of a foot candle. This would be given by a standard candle at about 1,000 feet, and by the sun at 12,000,000,000,000 miles, which is about half the distance to the nearest star. The illumination in a well-lighted room may be about 50 foot candles, and that out of doors at noon on a summer day about 10,000 foot candles.

Q: How does the saltiness of Great Salt Lake compare with that of the ocean?

A: A good average for the saltiness of seawater can be taken as 3.5 per cent, although in some isolated seas such as the Red Sea, where there is considerable evaporation, it may be as much as 4 per cent. The average saltiness of Great Salt Lake is 17 per cent, about five times as much as the ocean, though it does reach 23 per cent. The Dead Sea, in Israel, is even saltier, with a maximum of nearly 26 per cent. In all cases the dissolved salt is mainly sodium chloride, ordinary table salt.

Q: What is meant by a control experiment?

A: A good example might be in a pharmaceutical research to determine the effect of a new drug on animals. It is not sufficient merely to give the drug to animals to see what happens, as some other factor might complicate the effect. Therefore they would be divided into two groups. Both groups would be treated exactly the same, except that only one would be given the drug. The group not getting it is called the control, and it would set a standard against which the response of the second group, which did get it, could be checked.

Q: How are colored flames produced?

A: Various metal vapors, when present in a flame, generally produce the following colors: sodium, yellow; potassium, violet; calcium, orange; strontium, red; barium, green; and lithium, purple. If chemical salts (such as the chlorate or the nitrate) of these metals are sprinkled on a fire, the various colors appear as the metals are vaporized.

James J. Kelly

THE RADIO-TELEVISION SERVICEMAN IN THE ARMY

By JAMES J. KELLY

NRI Consultant

RECENTLY I completed serving two years as an enlisted man in the Army Signal Corps. During most of that time I worked at the "Signal Corps Engineering Laboratories," at Fort Monmouth, New Jersey. Being at the nerve center of the Army Signal Corps, I was able to get first-hand information about what happens to the men who are part of the Signal Corps. This information coupled with other material which I obtained from the War Department gives a comprehensive picture of what the civilian radioman who goes into the Army is likely to encounter.

Most young men who have not previously done so can expect to spend some time serving in the Armed Forces. Naturally, the man who is working in electronics or studying in preparation for an electronics career will want to do similar work in the Armed Forces. His knowledge of Electronics will be increased considerably by the diversified work he will do, and his experience will be a considerable help in obtaining a civilian job later.

The man who enlists can have his military career, to a large extent, mapped out for him before he enters the Service. If a man enlisting wishes to be in Electronic work, the Army will give him a written contract before he enters the Service stating that he will be assigned to that type of work.

However, many men prefer to be drafted and serve two years than to enlist and serve three or four years. To help the NRI men who expect to be inducted into the Army, we will discuss what they can expect to find in the Army, and in particular the various electronic jobs that are available to them. An advance knowledge of the Army policy toward electronic personnel will assist the NRI man in making decisions which will be most advantageous to him, and at the same time enable him to be of more service to the Army.

To an NRI man going into the Army, the big point is to GET INTO ELECTRONIC WORK. We hear stories about the cook who goes into the Army and is made a shoemaker, and the shoemaker who goes into the Army and is made a cook. These are true only to a very small extent. However, the Army must have men to fill various jobs. If there are no men who, in civilian life, did the sort of work needed, the Army must take the men who have the basic prerequisite for that job and put them in it, disregarding their civilian experience or their preferences.

The Army today utilizes a tremendous amount of electronic equipment. There is always a great demand for men to operate and maintain this equipment. Obviously, if a man has had civilian training in electronics, he would be a better man to train for the job than someone with no experience in it. So, even though the Army puts all of its electronic personnel through school, a man's chances for being selected for this type of work depends primarily on how much he knows about Electronics before being inducted.

Two Years in the Army

When a man is inducted into the Army, he first receives basic training for two to four months. If he has been selected for electronic work, he does not receive the four-month basic training given to Infantry soldiers, but after two months of basic training he is transferred to one of the Army's Electronic Schools.

The Army Electronic Schools emphasize practical work with only as much theory as necessary. Unlike most of the other Army technical schools whose courses last approximately eight weeks, the courses in the Army Electronic Schools last from four to ten months, depending on the particular course. Living conditions for the soldier while attending one of these Electronic schools are very good.

With graduation from the Electronic school, the training phase of the soldier's military career is over, and he is assigned to the job he will probably have for the rest of his time in the Army.

Induction. When a man is first inducted into the Army, he will take a battery of tests. For the man who is hoping to get into electronic work, these tests are very critical. It is the results of the tests he takes and an interview with a Personnel Specialist that will determine whether or not he will do electronic work.

The tests given at induction are I.Q. and Aptitude Tests. The results of these tests show a man's ability to learn and his basic knowledge of such subjects as mechanics, office work, electronics, etc. The tests given on radio and electricity are quite simple, but, needless to say, a man must get an extremely high grade on these tests if he hopes to be assigned to electronic work.

After these tests have been graded, the man has a brief interview with a Personnel Specialist. This interview is very important, determining what type of work he will be put in. How well he impresses this Personnel Specialist with his ability in electronics is an important factor in determining whether or not he will do that type of work. Of particular importance at this point is how much schooling and actual experience he has had in electronics.

Basic Training. The tests and interviews we have described are given to the inductee when he first arrives at the basic training center. After this initial processing is over, basic training is started. In the system used by the Army today, the basic training center a man is sent to is determined primarily by what part of the country he is from. The initial induction processing and basic training are both done at the same place.

Basic training, as the name implies, is the fundamental training as a soldier. It is here that the man is transformed from civilian to soldier. In most cases, this is the most difficult phase of a man's military career.

While a man is in basic training, the information about him will be evaluated and it will be decided whether or not he is to do electronic work.

After he has been in basic training for five or six weeks, it will be decided what work he is to do. At some time during the last few weeks of basic training, all of the men in the training company who have been selected for electronic work will be assembled, and an explanation will be given them of the various jobs in electronics available, such as field radio repair, radar, teletype equipment maintenance, etc. Each such job is known as an MOS (Military Occupational Specialty), and is designated by a number. For example, a field radio repairman has an MOS number of 1648.

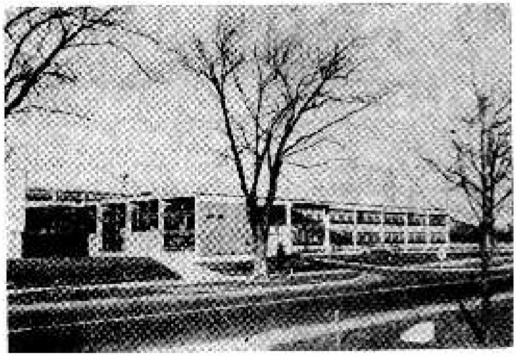
After the various MOS's available to the men are explained, the men indicate on their records the three they would most like to have. Of course, this does not mean a man will get the job he asks for, but his personal preference will be considered.

A number of factors are taken into account to determine what particular MOS a man will have. The first item is, of course, what jobs the Army most needs men for at that time. Each MOS has certain prerequisites. In most cases, the prerequisite is that the man must have certain grades on the tests given at induction.

Even though choosing an MOS does not necessarily mean a man will be given that job, the decision he makes is quite important to him. It will be very much to a man's advantage if he is schooled and works in the Army in the type of work he expects to go into in civilian life. Therefore, a man should carefully consider the various Electronic jobs available to him before selecting one.

"Tech" School. After completing two months of basic training, the men selected for electronics work will be sent to one of the Army Technical Schools. The Army has a number of small electronic schools located at camps throughout the country. The main electronic schools are at Fort Monmouth, New Jersey, and the Aberdeen Proving Ground in Maryland. (Radar, Fire Control, and other associated electronic Warfare devices are located at Aberdeen, Maryland.)

When the soldier arrives at the school to which he has been assigned, his MOS will already have been decided. The soldier will find a much more pleasant atmosphere prevailing than in basic training. Men in the electronics school have about six hours of classroom work each day, and about one hour of military training. The electronics schools have both civilian and military instructors. There is a separate course of study for each MOS. The more advanced courses dealing with communications equipment are given in the signal school at Fort Monmouth.



Main entrance to Myer Hall, Administrative offices of the Signal School, Fort Monmouth, N. J.

Let us consider some of the courses available. One of the courses is teletype repair. Actually, teletype equipment is primarily mechanical, and not electronic, but it is communications equipment. The course for teletype repairmen lasts for approximately 16 weeks.

When a man who has been taught teletype repair is discharged, he will have a highly skilled and well paying trade. On the other hand, since the amount of teletype equipment in use is not likely to increase appreciably in the future, there will not be as great a demand for men trained in this trade as for men trained in other more rapidly expanding electronic fields.

There are a number of jobs in the Army dealing with the various forms of telephone and telegraph equipment called "wire equipment." On all larger Army installations, both in the continental United States and abroad, the Army does not utilize civilian telephone equipment, but installs and maintains its own system. For this reason, the Army must train men to do all of the jobs required for a telephone system. Men who learn one of the phases of telephone work in a military technical school can get a good job in the telephone industry when they are released from active duty. The Army has the only military school that trains men to work on the installation and maintenance of central office equipment, which includes all of the equipment used in dial telephone systems. The Navy, Air Force, and Marine Corps all send their men to the Army school at Fort Monmouth to be taught this course.

The installation and maintenance of repeater equipment is also taught in the wire school. Repeaters are the audio amplifiers used in long-distance telephone lines. Although it appears rather simple at first, the transmission of audio signals over many miles of telephone wire is actually a complicated operation.

The Army wire school also teaches a very thorough course on carrier equipment. Civilian telephone companies use a great deal of this equipment on their long distance lines. By means of carrier equipment, any number of telephone or telegraph signals are fed into one single wire, and at the other end of this long distance wire, all of these jumbled signals, which are riding on the same wire, are separated, and each signal is put into its own separate circuit. For example, five telephone conversations can be transmitted simultaneously on one wire.

This system is also applied to radio. Army Communications systems must be very flexible. If for some reason a long-distance telephone line were to fail, mobile radio equipment could be rapidly set up to replace the telephone line. This system operates so efficiently, that a person talking over this Communications hookup would never know that his conversation is going through a radio link rather than through ordinary long-distance telephone lines. Of course, the wire technician must be completely familiar with the use of radio links.

Of primary interest to NRI men is the Radio Communications section of the Signal Corps. There are many jobs in the Army involving Radio, but we will discuss only the more important of them. The course which would have the greatest appeal to men with a background in Radio and Television repair is the Field Radio Repair Course. This six-month course starts with the basic fundamentals of Radio, and goes on to the operation and repair of a great variety of Radio equipment. The Field Radio Repairman must be well versed in frequency modulation. Since the end of World War II, the Army has converted most of its short range radio equipment to frequency modulation. The tiny handy-talkies and the very versatile AN/GRC 5 mounted in jeeps all operate with frequency modulation.

Instead of using a moderately high-powered AM transmitter for relatively long distance communications, the Army now uses a number of low-power FM transmitters as relay stations. Using these radio relay systems, FM signals are sent from one low-powered transmitting site to another about thirty or forty miles away. The second station then re-transmits the signal to a third station and so on. Radio Communication by this method is much more dependable than by one powerful AM Transmitter. These systems are used to supplement long-distance telephone lines. In more complex communication systems, microwave relays are used for this job.

Since the Army still uses a great deal of amplitude modulated equipment, the men who take the field radio repair course are also given a thorough knowledge in the operation and repair of AM equipment. Field Radio Repairmen in the

Army gain experience in working with equipment operating over a wide range of frequencies from the standard broadcast band on up to the 400-megacycle aircraft band. Unlike most civilian radio repairmen who work only with receivers, the field radio repairman in the Army must have a thorough knowledge of transmitters. He will be called on to repair transmitters as large as 600 watts. The Army radio repairman is also taught to install and repair aircraft radio equipment, and radiation detecting devices (Geiger counters).

Although he will not be called on to repair them, the Army radioman must be thoroughly familiar with the use and operation of various types of telephone equipment, because in the Army communications system, telephone and radio are used to supplement each other.

Obviously, the field radio repairman in the Army gains a great deal of knowledge and experience which is directly applicable to the civilian radio industry. This is the Army job that most closely compares to that of the civilian Radio and Television repairman.

The Army in the past few years has started to use a small amount of Television broadcasting equipment. Here, too, the Army trains its own technicians to operate and maintain the equipment. Some men who are already qualified as Field Radio Repairmen are sent to the Television section of the Signal School at Fort Monmouth. The fourteen-week course includes maintenance of studio equipment, cameras, receivers, and other associated devices.

Men who have a rating as a radio repairman in the Army may also be sent to the Crystal Grinding School. Here students are taught the art of grinding quartz crystals. The direct application of all of these jobs to the civilian electronic industry is obvious.

The Army has another school teaching men to operate and maintain the high-powered transmitters used in long-range communications. This course, like the Field Radio Course, begins with the very basic fundamentals of Radio and goes on to teach the operation and maintenance of broadcast transmitters and the various types of equipment used in broadcast studios. The man who plans to work in the broadcast industry, will find it to his advantage if he does this type of work in the Army.

The technical service schools also teach a course in medical equipment repair. The experience gained in this kind of work in the Service would also be of great use to the man who plans to work in that phase of civilian electronics. There are also many jobs in the Army involving microwave communications equipment. The courses on these subjects are also taught at Fort Monmouth.

The most complicated type of electronic devices used in the Armed Forces are the electronic warfare devices, such as Radar, counter-measure, and fire-control. The courses teaching the operation and maintenance of electronic warfare equipment are the longest and most difficult. The experience gained by a man in this work is not directly applicable to the civilian electronics industry, except for the men who intend to work in the civilian plants that manufacture and design this equipment, but the man who can work with the highly complicated circuits here will have no trouble with the simpler equipment in civilian life.

Modern Military Equipment

Military electronic equipment that is being produced today is a far cry from the equipment used during World War II. Modern equipment not only has the most advanced type of circuitry, but also it incorporates features which make it easy to service, rugged, and portable.

After wrestling with cumbersome and awkward TV chassis, the civilian television serviceman would be amazed to see the features built into modern military equipment to make servicing easy. The new type of military equipment is built into water-proof steel cases with large handles at convenient locations to enable easy handling of the equipment. If a particular set is so large that it would be awkward to handle, it is designed so that it is made up of a number of sub-units which are connected together by plug-in cables when the equipment is in operation. In this way, instead of having one very large piece of equipment to handle, there are a number of smaller pieces.

Not only does a complete technical manual come with each piece of equipment, but complete schematic diagrams are to be found in containers mounted on each chassis. If servicing a piece of equipment might require the use of some unusual tools, such as aligning tools, these tools in addition to tube pullers and other miscellaneous devices are mounted inside of the cabinet of each set.

To remove a set from its steel case for servicing, it is only necessary to loosen a few mounting bolts on the front of the cabinet, and the set will slide out on roller bearings. If the particular set has a meter mounted on its front panel for use in operation, arrangements will be made so that this meter can be used as a servicing voltmeter. A voltmeter probe will be found inside the cabinet of the set. Color-coded pin jacks are located about the chassis for voltage measurements. The technical manual for the piece of equipment will explain at which of these pin jacks various voltages in the set can be measured.

The chassis is actually made up of a large number of small sub-chassis. Each of these sub-chassis is held in place by clearly marked mounting bolts, and is connected to the main chassis by means of a Jones plug. If, for example, the i-f section of a receiver is found to be defective, the i-f sub-chassis can quickly be removed from the set and placed on the workbench so that it is easy to handle and all of the parts in it are accessible. Also mounted inside the steel case of the radio is a length of cable with a Jones plug at each end. By means of this cable, the sub-chassis that has been removed from the set can be connected electrically to the main chassis so that it can be serviced under operating conditions.

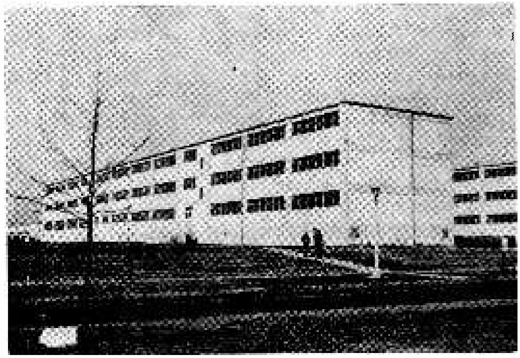
Of course, there is still a great deal of the old type of electronic equipment in use which does not have these innovations. It is not likely that such features will find their way into civilian equipment, since the cost is prohibitive.

The various resistors and condensers in military equipment are usually on plastic mounting strips. This feature, which is also too expensive for use in civilian equipment, makes the locating and replacement of the parts an easy matter. The compactness of military equipment is very surprising to the man who is used to working with civilian equipment. It is amazing to see how many parts can be crammed into a very small space, and yet be highly accessible for servicing.

The Modern Army School

Now, let us get back to the draftee who finds himself in one of the Army's electronic schools. If the man is to do high level repair work on communication equipment, he will probably find himself in the signal school at Fort Monmouth, New Jersey. During the past few years, in an effort to make a military career more appealing, the Army has tried a number of new ideas. A veteran of the second World War would never recognize the signal school at Fort Monmouth as part of the Army. The new signal school which was opened just last year is composed of many large white buildings. The modern architecture of these buildings makes them look more like a college campus. Fort Monmouth is an especially desirable post to be assigned to during the summer, since it is in the summer resort area on the New Jersey seashore forty miles south of New York City.

Since soldiers can expect to be in the electronics schools at Fort Monmouth anywhere from four to ten months, it is possible for married men to make arrangements to live with their families off post. This is true at all of the Army electronics schools.



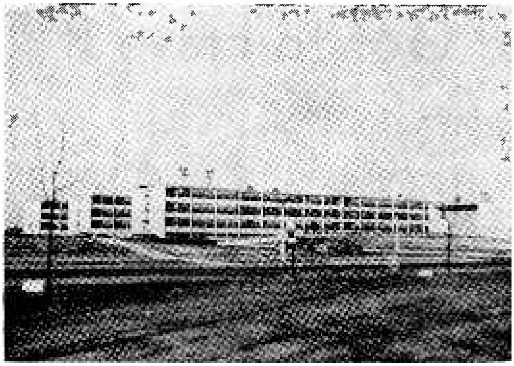
Barracks for Signal School Students, Fort Monmouth, N. J.

If a man is to be trained for high level repair work on electronic warfare equipment, he will go to school either at Fort Monmouth or at the Aberdeen Proving Grounds in Maryland. If he is to work with guided missiles, he will probably go to school in Oklahoma or Texas.

The Army also has an S and P rating (scientific and professional). This rating is usually available only to college graduates, but occasionally if a man with no college degree has done a great deal of work in a particular field of electronics where the Army has a great demand for personnel, he may be given an S and P rating. Men who are given an S and P MOS will probably not go to an Army Electronics school, but will be assigned to their jobs immediately upon completing two months of basic training. For example, men who have a college degree in electrical engineering and also have had experience working in industry will probably be assigned to the electronic research laboratories at Fort Monmouth.

Most larger military installations have a ham station. The new ham station (K2USA) at Fort Monmouth is one of the most elaborate ham stations in that part of the country. Any soldier holding a valid ham license can use the equipment there.

In the Army, there is always the possibility that a man who is interested in electronics will not be given that type of job. If a draftee is given an MOS in some other type of work, it is not likely that he will ever be able to get into electronics work officially. However, if a man in this circumstance keeps his eyes open, he might still be able to get into electronics work unofficially. For example, there was a civilian radioman who found himself a supply clerk in the Army. By keeping his eyes open he noticed that there was a signal repair shop on the installation where he was stationed. By getting to know the men who



One of the Signal School Buildings, Fort Monmouth, N. J.

worked in this repair shop, he found that they needed additional help. By talking to the right people, this man got himself assigned to the repair shop. In this way, he got a job that he wanted, and at the same time made himself more useful to the Army.

The Importance of Civilian Training

If an NRI student finds himself in the Army and not doing an electronic job, obviously he should continue studying the NRI course. By the time he gets out of the Army, he will have completed the course, and he will be ready to go to work in the civilian electronic industry. When discussing the Army electronics schools, we pointed out that these schools emphasize practical training in repair work with as little theory as possible. Therefore, if an NRI student is sent to one of the Army electronic schools, it is still important to his knowledge of electronics that he continue his course with NRI. His studies with NRI will give him the important theory that the Army overlooks because of the necessity of speed. NRI has many students at the present who are members of the Armed Forces.

Study Now

When a man who wants to enter the civilian radio industry is drafted, the importance of being assigned to electronic work is tremendous. There is only one factor in being assigned to electronic work in the Army that a man can control himself; that is, how much knowledge of electronics he has before he is inducted.

If a man expects to be called into the service, he should do all he can to learn Radio and Electronics before being inducted. NRI students who expect to go into the Service should double their efforts to complete their courses.

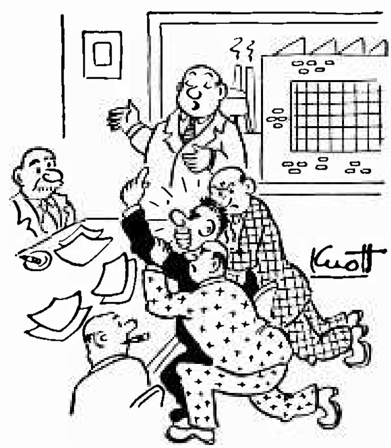
Technical Ramblings

(Continued from Page 16)

If your original tests indicate that high voltage is available for the picture tube second anode, the defect is probably in one of the supply circuits for the other electrodes of the picture tube. If service information is available, compare the voltages with those listed in the service data; if no service information is available make certain that the first anode (accelerator grid) is 200-300 volts positive with respect to the cathode and that the control grid is not excessively negative with respect to the cathode. If all the operating voltages on the picture tube are correct, check the setting of the ion trap. Rotate it and move it back and forth until the brightest raster is obtained.

This testing procedure probably sounds a bit complicated to you at this time. After you have performed the operation once, it will be much simpler, and after a few times, you will be able to carry out the tests in less time than it takes me to tell you about them.

———*n r i*———



"Then the motion is passed without a dissenting vote."

———*n r i*———

Every Man has two educations—that which is given to him, and that which he gives to himself. What we are merely taught seldom nourishes the mind like that which we teach ourselves.

—RICHTER

———*n r i*———

Cactus News: A girl isn't an artist just because she paints and chisels.

Will Power—You've Got to Have It

By L. L. MENNE, Executive Secretary

NRI Alumni Association

A GREAT deal is written and spoken about will power. Some try to leave the impression it is a mysterious, elusive force. Others wrap it up in all sorts of technical terms, hinting it is a God-given power.

But when we strip it of all these high sounding phrases and carefully analyze it we find, after all, there is really nothing magical about will power. It is simply a determination to complete every task you begin, in spite of all the obstacles and stumbling blocks in your path.

Will power is the force that drives a man on to accomplishment—the human dynamo that pushes a man on from smaller to bigger and bigger jobs. It is the vital force back of most successful men today. All about us we see its results—big jobs being done by men who have the will power to do them.

We see men physically handicapped as a result of sickness or accident who, by sheer will power, have forged to the very top of their professions. The late Charles Steinmetz who became the recognized electrical wizard of the day is a shining example. In our own field—Radio and Television—we, here at NRI, learn of lesser examples, but equally remarkable.

On file is a story about a young man who became an invalid before his eighteenth birthday, unable to walk. Being confined to bed he enrolled with NRI in order to occupy his time. Eventually, he was able to get out of bed and into a wheelchair. His story is tremendously inspiring. Today he has four trucks on the road doing Radio and TV servicing. In addition to himself, he has nine people in his establishment. A "long way from the fellow who took your course while flat on his back in bed," he says. He determined to study in spite of his handicap, to graduate, to establish a business and be successful in it. He has accomplished all of this through perseverance.

Another story on file comes from a man in West Virginia. At the age of nine years, he had the misfortune to lose his left hand. In due time he graduated from high school. He attended college. He taught two terms in county schools. He entered Teachers College and received an AB Degree. He became principal of City Graded Schools. He wanted a hobby. He enrolled with NRI, graduated and opened a part-time servicing business. And to make a long, interesting story short, he is now Chief Engineer at a West Virginia Radio-TV station. He says, "You see a man can, if he wants to. Where there is the will, there is always a way."

From Missouri, from North Carolina, from all parts of the country come inspiring stories, not only from men who overcame physical handicaps but others relating to the many problems of life which at times seem so difficult to meet and overcome.

Let's remember this: a man's chief asset is an undying, irresistible determination to win. The will to do—the will power to get ahead.

It's the fellow with will power enough to improve himself by work and study who gets first consideration when a job higher up is to be filled. It is only natural that he should. Employers are looking for men who can do a job better than the average and have the will power to keep behind a plan or idea until it is put across. Such men develop into executive material—because they have the ability to direct the work of others.

This desirable quality of will power cannot be acquired overnight. But it can be developed. Every new task is a challenge. To begin with you must immediately overcome the habit of putting off until tomorrow what you should do today. Admire men who are more successful than you. Try to follow in their footsteps. You must awaken—be alive to opportunity. You must believe in yourself. Your every action must show it. Soon people will see that you are above the average.

Yes, sir, you can develop a power which will not recognize the possibility of failure. Of course, you will not always succeed in everything but you will be sure you have given your best. And, man, when you get the habit of always giving your best—you are way ahead of the field.

"I'll find a way or make one." There's a slogan for you—that's will power.

N.R.I. ALUMNI NEWS

Thomas Hull .... President
F. Earl Oliver .... Vice Pres.
Louis E. Grossman .... Vice Pres.
Elmer E. Shue .... Vice Pres.
Herbert Garvin .... Vice Pres.
Louis L. Menne .... Executive Secretary

Chapter Chatter

A group of Phila-Camden Chapter members at the base of the skytower just before visiting WCAU transmitter. The young fellow in front is the son of chapter member, Clyde Meadows.

Philadelphia-Camden Chapter reports that their inventory showed they now have approximately $900 in Radio and Television testing instruments for the benefit of their members. This is, of course, one of our older chapters and this equipment was accumulated over a long period of time. The members benefit materially through the use of it.

At the last meeting it was announced that Financial Secretary Al Schwartz was in the hospital recovering from an operation. The report regarding his condition was good and all members want him to know he was missed and has the best wishes of everyone.

Mr. Henry Lapinski, Service Manager for the Motorola Corporation, who is, by the way, an honorary member of our chapter, gave a lecture on Color TV. It was very good of him to bring a color TV receiver for demonstration purposes. This talk continued for an hour and a half and was very interesting.

At another meeting Bill Heath, Westinghouse Service Supervisor, spoke to our group on Color Television, this time of course, referring to the Westinghouse Color TV set. Mr. Heath used equipment which he brought with him. He had a visualcast projector, a slide projector, and a color dot generator. After the talk Mr. Heath answered questions. It was a most interesting two-hour session.

In addition to this very informative talk, Mr. Heath supplied service bulletins and schematics

Officers of Phila-Camden Chapter, (left to right) Al Schwartz, Ken Smith, Jules Cohen, Chas. J. Fehn, John Perring, Harvey Morris and Fred Seganti.

Ted Rose, Lou Menne and a jovial chapter member seem to have "both feet in the trough" at Phila-Camden Chapter social meeting.

and also contributed some door prizes. A big thank you to both Mr. Lapinski and Mr. Heath for these very excellent talks.

Mr. Bernie Bycer, design engineer for Raymond Rosen and Company, RCA representatives, will talk on vertical output troubles at our next meeting. Mr. Bycer has been with us on many previous occasions and is very popular with our members. We are also trying to arrange for one of the Philco Engineers to speak to us at a near future meeting.

New members are Nicholas Capozio and Maurice Gilbert, both of Philadelphia.

We continue to meet on the second and fourth Monday of the month at the Knights of Columbus Hall, Tulip and Tyson Sts., in Philadelphia. Our hall has just been newly decorated. We invite students and graduates to visit with us. The Secretary is Jules Cohen, 7124 Souder St., Philadelphia.

New York Chapter, under the able leadership of Chairman Thomas Hull, who is also our national President, is as active as ever.

In a recent meeting Thomas Hull spoke on Power Supply Wave Forms, Phil Spampinato spoke on Test Instruments and also TV Signal Tracing, and Alex Remer spoke on Cause to Effect in TV Servicing.

On another occasion, Mr. Remer spoke on Simplified Servicing, Meyer Ferdinand spoke on Gadgeteering, Cres Gomez, on TV Field Experiences, David Spitzer on TV Trouble Shooting, Edward A. J. McAdams spoke on his Trade School Experiences and Thomas Hull conducted the Radio Clinic.

At other meetings, Meyer Ferdinand continued his talk on Gadgeteering, Ontie Crowe, spoke on Building Printed Circuit Test Equipment, William Fox, whose subject was Field Experiences, and again Thomas Hull conducted the Radio Clinic.

Meetings are held on the first and third Thursday of each month at St. Mark's Community Center, 12 St. Marks Place, between Second and Third Avenues, New York, N. Y.

Chicago Chapter members are finding informal discussions very beneficial. Members are invited to bring their problems to the meetings where they are discussed and analyzed by others who have had similar experiences. These sessions are very fruitful.

The chapter has some nice test instruments. Members have an opportunity to become familiar with the operation of these instruments.

The meetings are held on the thirty-third floor in the American Furniture Mart, 666 Lake Shore Drive. Please use West entrance. Meeting night is the second Wednesday of each month.

New Orleans Chapter continues with the planned program which is, in fact, a study course of Professional Television Servicing. Leaders in the group give blackboard demonstrations and then there is a general discussion.

Secretary Anthony H. Buckley, 2817 Burgundy St., will be glad to send notices of the meetings to any students or graduates in New Orleans or vicinity. Meetings are held in the spacious Recreation Room in the home of Chairman Louis E. Grossman, 2229 Napoleon Avenue.

Detroit Chapter has worked out an advanced schedule of meetings to cover the entire year of 1955. It is this advanced planning that insures a good program at every session. Meetings are held on the second and fourth Friday of each month. An exception is April 8 which is Good Friday, at which time there will be no chapter meeting.

(Left to right) Bert Bregenzer, Pres., Penna. Fed. Radio & TV Ser. Ass'n. congratulating NRI Chairman Frank Skolnik, Pittsburgh Chapter. Seated next to Mr. Skolnik is Vice Chairman, Wm. R. Elter, Sec'y, Wm. L. Roberts, Treas. Howard A. Tate, Exec. Comm. Member, Thomas Schnader. Back row, Program Comm. Herb Liebmann, Jos. La Manna. Entertainment Comm. Sylvester Steyer, Lawrence Steyer, Exec. Comm. Wm. J. Lundy and David C. Benes.

The annual Social Meeting is scheduled for June 24.

The officers are interested in suggestions from members for a more suitable meeting place where a permanent test bench can be set up. There may be an announcement in this connection very soon.

A representative from the Bell Telephone Company is scheduled to give a talk on transistors at a forthcoming meeting.

Mr. Kenneth Kacel was forced to relinquish the office of Secretary owing to a change in his working schedule. Mr. Jack Shupak was elected Recording Secretary and Mr. Ellsworth Umbreit was elected Assistant Recording Secretary.

Meetings will continue to be held at 431 E. Congress St. until further notice. The address of Secretary Jack Shupak is 4075 Tuxedo, Detroit.

Pittsburgh Chapter has had some exceedingly good programs. Mr. Bert Bregenzer, Director, RTSA and President of Pa. State Federation Radio & TV Service Association, gave a very interesting talk on unethical practices in TV industry. Mr. T. D. Schnader of our Chapter spoke on Trouble Shooting Procedures. After this meeting, there was an open forum during which Chairman Skolnik and Mr. Bergenzer reviewed the talks and offered suggestions on how to build customer goodwill.

A financial report by Treasurer Howard A. Tate was approved by the Auditing Committee. It shows the Chapter in excellent condition.

Some photographs of Pittsburgh officers and members are shown in this issue.

Meetings are held on the first Thursday of each month at 134 Market Place. Students and graduates in the Pittsburgh area are urged to attend the meetings. All are welcome.

Milwaukee Chapter members are pleased with their meeting place at the establishment of former chairman S. J. Petrich, 5901 West Vliet Street. Mr. Petrich operates a Radio and Television Servicing business at this address and he has provided suitable space for the chapter to hold meetings in his recreation room.

Considerable thought and discussion has been given to quoting of estimates and billing for servicing work done in the homes of customers.

Mr. Petrich presented a Television set with a very poor picture and led an open discussion among the members as to the cause of trouble in the set in which the brightness control had no effect on either position. Raster lines appeared across the screen at all times. Opinions were widely varied. Mr. Petrich proved finally and conclusively to the group that the picture tube was faulty. This was done with the use of test equipment.

Students and graduates in the Milwaukee area please get in touch with Wallace H. Smith, Secretary, 1710 E. Newport Avenue in Milwaukee.

Baltimore Chapter celebrated its twenty-first anniversary which was designated "Old Timers" night. Ernest Gosnell, who served the chapter as Chairman for a number of years and who is also a past National President, acted as Committee Chairman. He contacted a number of members of former years and we were delighted to have a number of them with us on this occasion.

Mr. W. W. Jensen, who was Chairman some twelve or fifteen years ago, was one who asserted the spirit of the "Old Timers" by coming to the meeting only a day or two after being released from a hospital. Mr. Jensen has a throat affliction that seriously impedes his speech but there were plenty of others who spoke in glowing terms of the work of the past and present officers and members. A vote of thanks to Mr. W. Geise, also an old timer, whom we were glad to see, and who took good care of Mr. Jensen to make it possible for both to be present.

Old-time movies were shown. Sandwiches and refreshments were served. A highlight was the original ledger showing the charter members which ledger was autographed by Mr. J. E. Smith more than twenty-one years ago.

Mr. L. L. Menne kept the audience in a state of continual laughter as he recalled some of the humorous incidents connected with early Chapter activities.

Mr. Straughn, another most welcome visitor from NRI, brought the chapter up-to-date with respect to new things NRI is planning for the future.

Our present meeting place is most inviting. Congratulations were extended to Mr. H. J. Rathbun, also a past National President, who arranged for this very nice meeting place.

A committee to be known as "For the Good of the Chapter" was established. It will consist of three members, Mr. E. Shue, National Vice-President, Mr. E. Gosnell and Mr. H. J. Rathbun, as previously mentioned, both past Presidents of the NRI Alumni Association. The job of this committee will be to receive, evaluate, edit, reconstruct, modify, and present for discussion any suggestions having an improvement potential. A suggestion box will be provided so that members can deposit their suggestions for consideration.

Meetings are held on the second and fourth Tuesday of each month at 100 N. Paca Street. All students, graduates in the Baltimore area, are invited to contact the Chairman, Joseph B. Dolivka, 717 N. Montford Ave., or Secretary Joseph M. Nardi, 4157 Eierman Avenue.

St. Paul-Minneapolis Chapter Officers are making plans for their first annual dinner meeting which will be held in May. One plan is to invite a guest speaker to address the members on the regular meeting night and then have a dinner party the following night for the important privilege of inviting wives and other members of the family. The program will be announced when plans have been completed.

Meetings are extremely interesting. Members have responded nicely by bringing Radio and TV receivers which gave them trouble of unusual nature or, as in some cases, for which they have not found the solution. These informal discussions are very popular with the members who, in this manner, have a good opportunity to become well acquainted.

The chapter has a unique prize arrangement. Everyone present at a meeting puts twenty-five cents in a kitty for which he is given an attendance slip. For each meeting he attends he is given a slip. Then at stated periods, a drawing is made for the prize. The more slips a man has in the box, the better chance, of course, he has to win the prize. He need not necessarily be present the night of the drawing to win. Mr. Harold Holtz was the lucky winner at the last drawing—a $35 credit on any piece of test equipment he may choose. The winner may make his own choice of equipment. Thus he is not compelled to take something which he already may have. It is a great idea, and it is working out nicely.

At our March 10 meeting, Mr. Mike Kushill was our guest speaker. Our thanks to Mr. Kushill and the Roycraft people for the helpful contributions by Mr. Kushill and for the three films on servicing Philco receivers.

Our April meeting will be a general educational meeting consisting mostly of TV alignment. It will be conducted by John Berka, Walt Burbee, and John Babcock. The Jackson and Triplett Sweep Generators will be demonstrated. All present will be given an opportunity to try out these instruments.

A surprise visitor and a most welcome one was Mr. Ray D. Thompson, who drove sixty miles from Amery, Wisconsin, to be with us. We hope he will come often.

The Chairman of St. Paul-Minneapolis Chapter is John Berka, 2833 42nd Avenue, So., Minneapolis. The Secretary is John I. Babcock, 3157 32nd Avenue, So., Minneapolis. Students and graduates in the Twin-City area are invited to get in touch with either Mr. Berka or Mr. Babcock for information regarding meetings.

Springfield, Mass., Chapter is making substantial gains each month. Chairman Howard B. Smith is a very able leader who is nicely assisted by Ray Nystrom, Vice-Chairman, Al Lyman Brown, Treasurer, and A. L. Brosseau, Secretary. Already plans are under way for a picnic to be held the latter part of June.

Mr. Brown gave one of his bang-up talks on the use of the vacuum tube voltmeter. At each meeting he holds his open forum which the members like very much. Mr. Nystrom, who specializes in the technical phases of Electronic Organs, gave a very interesting talk on that subject at one of our recent meetings. His talk pertained to the installation and operation of the Solovox Organ. At the present time, we have scheduled a series of talks on the General Electric line of equipment which talks will continue for the next month or two. Of course, Mr. L. Lyman Brown will conduct his usual answer periods at each meeting.

On February 18th, some thirty of our members visited Station WHYN-TV, and were shown around by Mr. Hal Schumacher, the Chief Engineer. At this station they originate live programs, film and pick off the networks. This is readied in the control room and transmitted by micro-wave to the transmitter at the top of Mt. Tom. Later, when the weather is better, we will visit the transmitter, going up the mountain in the usual way; that is, by four-wheel-drive trucks. This should provide a thrill for the members as the road is rough and very steep.

Chairman Howard B. Smith may be addressed at 53 Bangor Street, and Secretary A. L. Brosseau, 56 Gardner Street, both in Springfield. Meetings are held on the first and third Friday of each month, beginning at 7:30 P.M., at the U. S. Army Reserve Headquarters, 50 East Street, Springfield. All students and graduates in this area are cordinally invited. A special invitation is extended to NRI men in Hartford, Orange, and other points in this vicinity to join with us.

Hagerstown, Maryland, has some aggressive NRI Graduates who are interested in starting a local chapter in the Cumberland Valley: Several meetings have been held. Officers have been elected. Mr. Edwin M. Kemp, 618 Sunset Avenue, Hagerstown, is the Chairman. He is very anxious to hear from any students and graduates in the Hagerstown area who would like to sign the

(Concluded on Page 30)

A Fireplace Is Utilized For Unusual TV Installation

Dear Editor Menne:

"I am enclosing a picture of a recent job which Howard B. Smith, Chairman, of our Springfield Chapter, and I are very proud of. Our customer has been most gracious and cooperative by showing this installation to many friends who, in turn, are calling on us for similar work.

As the photo shows the entire end of a very spacious living room was utilized. The shelves on either side of a fireplace are used to display some very beautiful hand painted china. The set, a Sylvania 21-inch #518 Chassis, was inverted and extension shafts made to enable one to tune the set from a standup position. The knobs are on a 3-inch shelf, behind which rises a part of the mantel to the top shelf, which is 11-inches deep, to the base of the 4' x 5' mirror. Special brackets were made to mount the picture tube. Binaural twin speaker audio was added and the whole thing was matched to the painted portion of the room which was a very pleasing shade of Old Rose.

The thought of utilizing this fireplace, which was ornamental rather than useful, intrigues many who see the completed job. It might be of interest to others. I sure enjoy boasting of it, for I do not profess to be a cabinet maker nor painter but just a technician and engineer.

L. LYMAN BROWN,
Treasurer, Springfield Chapter,
69 Pasadena Street,
Springfield, Mass.

(*Continued from Page 29*)

application for a charter and thus become a charter member. Twenty-five signatures are required.

Meetings are held on the first Thursday of each month at the local YMCA, beginning at 8:00 P.M. The Secretary is Mr. L. D. Thomas, 300 Bryant Place, Hagerstown, Maryland.

Flint, Michigan, did not submit a report in time to be included in this issue. We hope to have interesting news regarding the activities of this Chapter for our next issue.

n r i

Nation's First Million-Watt Television Station Reports Vastly Improved Service Throughout Area

Camden, N. J.—The nation's first million-watt UHF television station, which went on the air December 31, 1954, as the world's most powerful broadcaster, is now delivering strong, clear pictures in numerous areas which heretofore had either no TV service or poor reception, it is reported by Station WBRE-TV, Wilkes Barre, Pa., and the Radio Corporation of America.

The improved service was made possible by a newly developed RCA super-power transmitter and a new super-power RCA UHF pylon antenna which enabled WBRE-TV to quadruple its effective radiated power from a previous 225,000 watts to the maximum of one million established by Federal Communications Commission regulations for UHF TV stations, according to A. R. Hopkins, Manager, Broadcast Equipment Marketing, RCA Engineering Products Division.

Initial spot checks showed the RCA million-watt equipment delivering strong signals over greater distances than anticipated, Mr. Baltimore, President and founder of the Channel 28 station reported. The increased power filled in certain areas with their first "snow free" TV reception. Clear, steady pictures were reported as far away as York, Pa., some 110 miles from the station transmitter.

RCA reported that a special test receiver, set up near its Camden, N. J., plant, was also receiving the station clearly over a distance of approximately 125 miles. Prior to the million-watt installation, the test receiver was unable to tune the Channel 28 station.

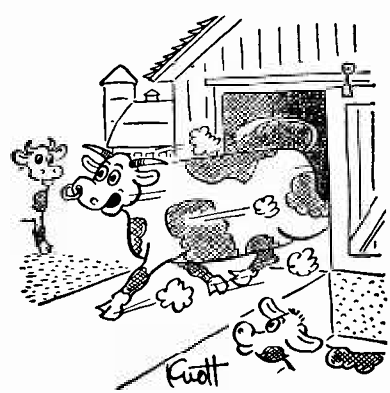
Our Cover Photo

NRI Graduate Harold E. Saylor, 3232 13th Street, N. W., Washington, D. C., poses with CBS camera equipment at Television Station WTOP-TV, Washington, D. C. Mr. Saylor has been a Staff Engineer with this network station for a number of years. Prior to TV, he served on the Radio technical staff of this same station.

Saylor's successful career in Radio-TV started quite a number of years ago, in 1927 to be exact, when he enrolled with NRI. On completing his studies, he readily passed the FCC exam and became a Radio operator, and later Chief Operator for the Police Department at Portsmouth, Ohio. He once visited the Police Departments in fifteen different cities to inspect Radio equipment, and found nine of them with at least one NRI man on the staff.

During World War II, Saylor served an important Federal Agency as a Radio Engineer, traveling to a number of foreign countries. At the close of the war he was for a time associated with an Engineering Research and Development firm, engaged primarily in Television research.

Our cover photograph is through the courtesy of CBS, and furnished with the cooperation of Mr. Saylor and Mr. Cody Van Pfanstiehl, Public Relations Director for Station WTOP-TV.



"It's a BOY—a 70 POUND BOY."

Here and There Among Alumni Members

An interesting letter from Floyd Zawake, of Scranton 5, Pennsylvania. During the past year his work has been repairing and testing servo and computer amplifiers used in radar. Of course Zawaki also has a spare-time TV servicing business.

———n r i———

Mr. Charles F. Amis of Newnan, Georgia has had his own shop for 18 years—Amis Radio and TV Service. Says his NRI training has paid him good dividends since he graduated in 1932. Mighty glad to hear from him.

———n r i———

J. R. Parent, an NRI graduate of 1946, is now an instructor in Radio at Montreal Technical School, in Montreal, Que., Canada.

———n r i———

Hugh W. Sparks, P. O., Box 811, Abilene, Texas, is interested in getting together with other graduates in his area. He owns and operates a Radio-TV rental, service and sales business.

———n r i———

Arthur Bressette, of South Britain, Conn., sells Stewart Warner and Zenith products in addition to his successful part-time service business.

———n r i———

Jerry Grillo of Brooklyn, N. Y., is starting his own TV service shop. Is also joining New York Chapter, where he will meet some fine fellows who will be glad to welcome him.

———n r i———

Bruce Durrell, of Knowlton, P. Q., Canada has hired two more men for his Radio-TV business. Grossed over $60,000 last year.

———n r i———

John H. Johnson of Boise City, Oklahoma has been appointed Service Technician for his area by United Motors, to service Autronic Eyes, Radios, etc.

———n r i———

Congratulations to William J. Wrobel, of Cleveland, Ohio, who is now an Electronics Sales Engineer for Main Line Cleveland, Inc., RCA Victor Distributor.

———n r i———

Henry A. Danmyer, of Parkton, Maryland has opened a shop for himself.

———n r i———

L. G. Hickok, of Baytown, Texas, now has his first-class radiotelephone license.

Kenneth R. Braik, of Miami, Florida, is getting along well in his own full-time service business. Braik gave up his profession of flying because of health.

———n r i———

Frank A. Gianetti, of Girard, Ohio, expresses his appreciation for NRI training. Says that because of his NRI training he was assigned, upon entering the Army, to the Signal Corps where he received additional training in Radar and Micro-Wave.

———n r i———

Hollis J. Carter, of Keyport, N. J. is now an Advanced Electronics Instructor at Fort Monmouth, New Jersey. Feels he has a good future in the Electronics field because of his NRI background.

———n r i———

Carl E. Bryant, of Philadelphia, Penna., now has his General Class amateur license.

———n r i———

Fred J. Miller, of Steubenville, Ohio is an instrument and fuel control maintenance man for the Weirton Steel Co. Also has a part-time Radio-TV Service business.

———n r i———

We enjoyed the friendly letter received from Roy C. Beale, of Newton Junction, N. H. Graduate Beale, who incidentally is 73 years old, has a spare time shop in his home and is a great NRI Booster.

———n r i———

Eddie E. Lowe, of Columbus, Ohio, is now a Customer Engineer for the International Business Machine Corp. Says NRI training has been of great help.

———n r i———

Cleone E. Young, of Cheyenne, Wyoming has been with the Cross Music Center for a number of years. In addition to Radio and TV, Young is one of two men in an eleven state area who are trained to service Baldwin Electronic Organs.

———n r i———

Speaking of Electronic Organs, Ray Nystrom, Vice Chairman of Springfield Chapter, is an expert on Solovox Electronic organs. It's his business. See Springfield Chapter Chatter, this issue.

———n r i———

Just received some very nice photos from Floyd W. Cox of Hollywood 46, Calif. Has a good Radio-TV business he built on the Golden Rule. We may have more of this inspiring story for our readers in a future issue of National Radio-TV News.

NATIONAL RADIO-TV NEWS

16th & U Sts., N.W. Washington 9, D. C.

Forwarding Postage Guaranteed

For:

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

4

National RADIO-TV NEWS

Vol. 16 April-May, 1955 No. 8

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.

L. L. MENNE, EDITOR
H. L. EMERSON, ASSOCIATE EDITOR
J. B. STRAUGHN, TECHNICAL EDITOR

Index

Printed in U.S.A.