

NATIONAL RADIO NEWS



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WASHINGTON, D. C.

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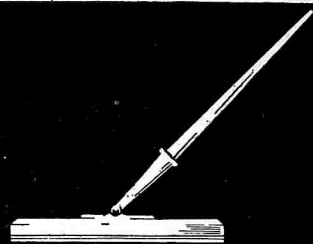
*"I will study
and prepare myself
and then some day
my chance will come!"*

— Abraham Lincoln

To LINCOLN,

a poor boy successful by self-education,
this issue is dedicated

My Own page



“Honest Abe”

HISTORY is filled with pages from the lives of poor boys who, without the advantage of school education, climbed the ladder of success.

However, it is doubtful if any of them underwent the reverses that were the lot of the sixteenth President of the United States, “Honest Abe” Lincoln, whose birthday we celebrate on the twelfth of this month.

Raised to farm work, with only one year’s actual school education he would have been ill-fitted for his battle with life had he not made use of his spare moments to study. He had small reason to believe that a big opportunity would ever present itself but his hopes are illustrated in his statement, “I will study and prepare myself and then some day my chance will come.”

At one time Lincoln went into partnership with another person and when it failed he assumed all the debts, and paid them, though it took him fifteen years. This may have been the origin of the title “Honest Abe,” but that title has a far different meaning to us. It means he was **Honest** with himself. He wanted success; he worked for it—he made sacrifices to gain it.

Gone are the days of weary struggle for education. Today, when regular school days are over—and we desire to go further to success—our home is our school room. Our postman brings our lessons. They are well regulated courses of study. Not texts, written by some ancient author, but modern, scientific works, by men who use the self-same principles, day by day, in their work.

Let’s be Honest with ourselves. By honest study we have the Radio Industry as our field and a big job as our goal.



The Radio Receiver Field

OUR government, through the Department of Commerce, has made a count of Radio Receivers in American homes. They found there were approximately 12,100,000 Radio sets in use in the country.

Of course these figures are increased by several millions by now, probably bringing the figure up close to 16,000,000 sets in use.

As there are 30,000,000 homes in the country and 16,000,000 already sold Radios, the open field is still 14,000,000 sets to be sold. Of this figure about 8,500,000 are homes wired for electricity and the other 6,500,000—unwired.

The service field is therefore sixteen million sets, 2,500,000 of which are battery operated, and this service field will continue to grow as sets are sold.

The fourteen million unsold homes offer a fruitful sales field, particularly as it will be greatly enlarged by replacement of new sets.

Every customer for service, if properly handled, if satisfied with the service he receives, can eventually be worked around to the point of replacing his old receiver with a new, up-to-date model.

And though I’ve said this before, I must repeat—don’t overlook the battery operated set field.

J. E. Smith

President.

What Price Do We Pay for Success

By J. G. Hollingsworth
N. R. I. Publicity Department



Frequently we hear of someone suddenly springing into the limelight of greatness and success. We call it luck—but is it?

We've only heard of the glory at the climax of their Success; of the years of study and striving against odds we hear little or nothing.

This month, February, recalls to memory two of the greatest men in American history—if not in the history of the World. They are shining examples of Success achieved by the unquenchable spirit of determination—the will to pay the price in study, concentration and perseverance.

Abraham Lincoln, studying law by the light of a log fire, had in his makeup that capacity for greatness, just as the majority of us have. And he had the foresight to see the necessity for preparation for the opportunities ahead. He also had the courage to overcome difficulties, to climb over obstacles as they presented themselves. Had he not possessed these qualifications he would probably have passed unknown in the history of the world.

In the hectic days of the Revolutionary War, what was it that placed George Washington at the head of our military forces—later at our government's head? Was it not that same something which sent Lincoln to success years later—was it not the same thing which has caused the rise of Carnegie, Edison, Schwab and others from obscurity to world-wide prominence? Who can guess what our country would be today, had there not been such men as these.

The history of any one of them shows an absolute lack of "success on a silver platter." It was study, work, striving, conquering not only the forces of competition but the forces within the man, conquering the man first and success later.

The man who becomes successful or great, might be described as one who makes his own way in the world; one who gains and holds the respect, confidence and affection of those with whom he works; one who learns to work hard, play hard, study hard—and fight hard—when fighting is necessary as it usually is in the struggle for success.

He is a good loser as well as a good winner; willing to take a chance. He puts more into his job than he takes out of it because he has learned that he is developing himself. He is never a coward nor a quitter.

This fellow who is fighting for success realizes the necessity for sacrifices. He is willing to forego some of the pleasures of life to gain his purpose. He will study while others play—in fact, study becomes play—his hobby—because it is his pathway to better things.

And as he goes about his everyday life he is careful of his personal appearance. He collects his debts; he pays his bills. He is a business man even in personal things.

He is usually well liked because he has developed his personality as a part of his plan for success. Though fighting for success, he'll always play fair. He's a man's man—just an ordinary man with an extraordinary amount of spunk and perseverance.

There is an old proverb which says: "Enjoy the little you have while the fool is hunting for more." The energetic man should turn this upside down to read, "While the fool is enjoying the little he has, I will hunt for more."



A Chat With the N. R. I. Director

DID you ever stop to consider just why some men become successful while others seem to drag along living from day to day on the ragged edge of existence?

These unsuccessful persons have an ever-ready stock of excuses for their inability to make good. "I have no luck—I have no pull," are about the poorest reasons, the rankest excuses for failure, that a man could offer. A close analysis will reveal that their real meaning is, "I'm licked and I know it. I've thrown down myself, my family; everyone who looks to me for a chance—everyone who wants me to be a success. I've given myself up as a bad job. I'm a quitter."

There are a few, who through physical inability or some other extreme misfortune may have a logical reason for their inability to go forward but luckily, few come under that classification.

The secret to success is within yourself. It is chiefly mental. You cannot succeed if you think failure. And if you think success, you'll study. Add to this formula, confidence, vigor and determination and you will have come mighty close to answering the question of "How to become successful."

The N. R. I. Alumni Association expected to have ready the figures on Radio sets in the United States for this issue. But due to some necessary rechecking they will not be available until the March issue.

We wish to call special attention to the article in the Alumni News Section this month by Mr. Straughn, of the N. R. I. staff. Mr. Straughn works out an actual service problem for you.

MORE USES FOR RADIO!

It seems that almost daily new Radio principles are applied to industry, linking and weaving Radio into the everyday life of mankind in the same manner as electricity and steam.

The latest device we've heard of is the use of the electric eye for painting.

Large lumber companies use this principle for applying a priming coat to lumber to prevent fungus growth and retard weather action.

And we also hear reports that the electric eye is used to great advantage for regulating the lighting in school rooms.

Clouds passing overhead and temporarily darkening the rooms no longer mean inadequate light and eye strain to these youngsters. The electric eye gives them light the moment it is needed.

From tests made in Alabama it is proven that in a class room under the watchful electric eye, children make better averages than in rooms not so equipped.

Be sure to watch out for the series of "Get Better Acquainted" articles to appear in National Radio News—starting next month. These articles are about the members of the faculty and staff of the Institute—your Instructors and the folks who are helping you learn Radio. We want you to know them better.

Radio City, in the heart of downtown New York, will have a plant capable of supplying all its own heat, light, and power.

RADIO-TRICIAN SERVICE SHEET

REG. U. S. PAT. OFF. COMPILLED SOLELY FOR STUDENTS & GRADUATES



Philco Models 50 and 50-A

Model 50 Receivers are for operation on 100-130 volt, 50-60 cycle AC lines
 Model 50-A Receivers are for operation on 100-130 volt, 25-60 cycle AC lines

*Table 1—Tube Socket Readings Taken with AC Set Tester AC Line—115 volts

Tube		Filament Volts	Plate Volts	Screen Grid Volts	Control Grid Volts	Cathode Volts	Plate Milli-amperes
Type	Circuit						
24	1st R.F.	2.4	245	90	2.5	3.0	4.5
24	2nd R.F.	2.4	250	90	2.5	3.0	5.5
24	Det.	2.4	100	42	8.0	8.0	0
47	Output	2.4	175*	190*	1.0*	...	2.7*
80	Rect.	5.0	...	...	...	...	30/

Note—Volume Control on full; Station Selector turned to Low Frequency End.

*These readings must be taken from the underside of the chassis, using test prods and leads unless the set checker is specially equipped for testing pentode tubes.

Table 2—Power Transformer Voltages

Terminals	A.C. Volts		Color
1-2	105 to 125	Primary	Black (Small Gauge)
3-5	2.5	Filament of 24 and 47	Black
6-7	5.	Filament of 80	Light Blue
8-10	700.	Plates of 80	Yellow
4	.....	Center Tap of 3-5	Black, Yellow Tracer
9	.....	Center Tap of 8-10	Yellow, Green Tracer

Table 3—Condenser Data

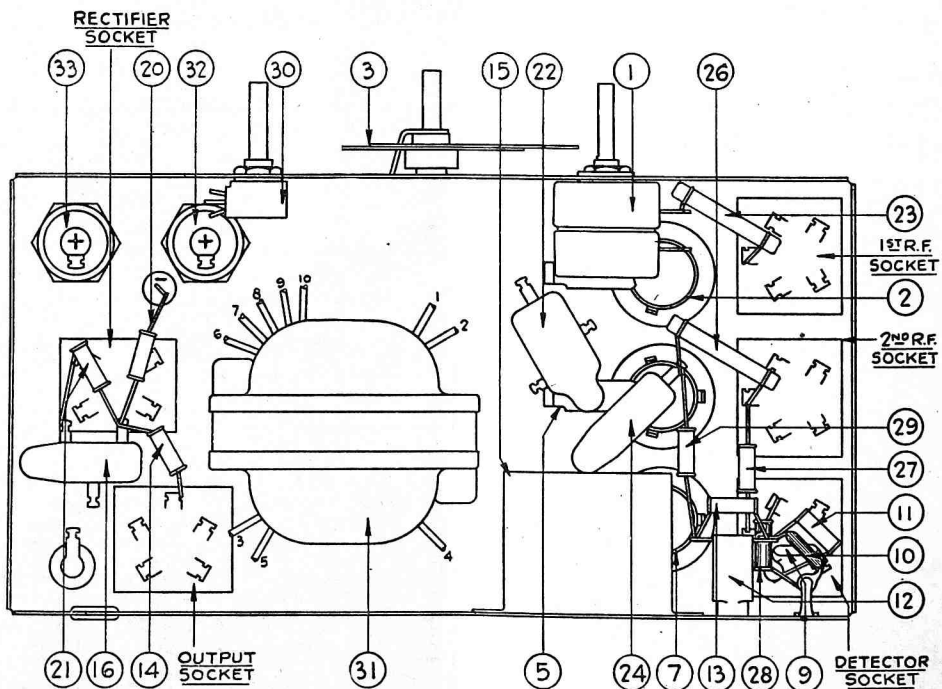
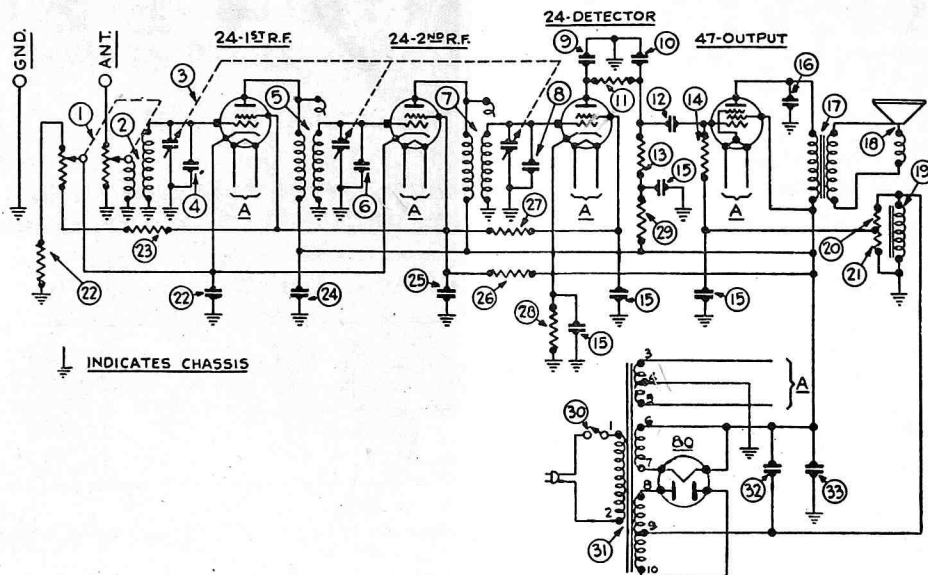
No. on Figs.	Capacity MFD	Container
⑨ ⑩	.00025	Yellow
⑫ ⑬	.01	Black Bakelite Container
⑮	.05	Black Bakelite Container
⑰	.05 and 150 Ohm resistor	Black Bakelite Container
⑱	.1, .15, .25, 2-5 (50-60 cycles)	Black Bakelite Container
⑲	.05, .15, .25, 2-5 (25-40 cycles)	Metal Container
⑳	.05	
㉑	(50 to 60 cycles) 6.	Electrolytic
㉒	(25 to 40 cycles) 10.	Electrolytic
㉓	6.	Electrolytic

Table 4—Resistor Data

No. on Figs.	Power (Watts)	Resistance	Color		
			Body	Tip	Dot
⑳	...	150 and .05 Mfd.	Black	Bakelite	Container
㉑	.5	10,000	Brown		Orange
㉒	1.	15,000	Brown		Orange
㉓	1.	25,000	Red		Orange
㉔	.5	32,000	Orange		Orange
㉕	.5	99,000	White		Orange
㉖	.5	160,000	Brown		Yellow
㉗	.5	240,000	Red		Yellow
㉘	.5	490,000	Yellow		Yellow

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PHILCO MODELS 50 AND 50-A



NATIONAL RADIO NEWS



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and Alumni Association of the
NATIONAL RADIO INSTITUTE
Washington, D. C.

J. E. SMITH, President. **E. R. HAAS, Director.**
The Official Organ of the N. R. I. Alumni Association

SOUND PROJECTION TROUBLES— THEIR LOCATION AND CORRECTION

Part I

As a special Service to those students and graduates who are in the sound projection field and those who are studying to specialize in that branch—the following article has been written... It will appear in two parts, Part I (Troubles With Sound on Film) in this issue and Part II (Troubles With Sound on Disc) in the March National Radio News.

TRoubles WITH SOUND-ON-FILM

If no sound is available at the loud speakers there are many possible causes for the trouble.

- (a) The switches and rheostats are not set correctly.
- (b) The exciter lamp has burned out and the remedy is to turn another exciter lamp into position.
- (c) The Film-disc switch may be set wrong.
- (d) The Fader lamp set for the wrong projector. Obviously the thing to do is to adjust the Fader for the projector which is to be used.
- (e) Possibly the sound gate aperture has become clogged with dust or dirt particles. This can be determined by an inspection of the aperture through the photocell housing.
- (f) A possible cause of the trouble would be a defective photocell and the thing to do is to try a new one.
- (g) The voltage amplifier would be the next piece of equipment to examine. Possibly a defective tube would be found, all tubes should be checked.
- (h) Following the voltage amplifier examine the power amplifier. If the fuses of the power amplifier are burned out replace them at once. If the plates of the rectifier tubes get red hot this indicates defective filter condensers, defective chokes or a shorted power transformer.

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Trade Notices

The trade notices are published only for the information of readers. No responsibility is assumed in passing this information along—and all transactions and correspondence must be with the firms direct.

MIDGET SUPERS

All N. R. I. graduates who are interested in an agency proposition, handling a 6-tube A.C. midget-super at a special price should get in touch with Graduate H. A. Mueller, 4521 Kimball Avenue, Chicago, Ill.

OVER THE SOLDERING IRON

The Kladag Radio Laboratories, Kent, Ohio, prepare an interesting booklet entitled "Over The Soldering Iron."

In addition to being a mail-order catalog, listing a great number of Radio items, we find the editorials interesting. Kladag will supply information upon request.

A PRIZE WINNING LETTER FROM CHINA

Royal Observatory Radio
Receiving Station
Kowloon, Hongkong, China

Mr. J. E. Smith, N. R. I.,
Washington, D. C., U. S. A.

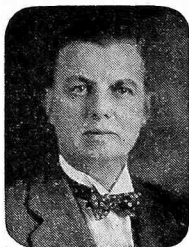
Dear Sir:

After I finished the course I was employed by the Hongkong Government as a watch-keeper in the wireless telegraph transmitting station at Cape D'Agullar where I found no difficulty to handle my job, though it was the first time I worked in a transmitting station.

After on eyear's service in D'Agullar I was transferred here as officer-in-charge of the Radio maintenance of this station. This station is not very big but it is a quite interesting place for Radio men. It has twenty-three long and short wave receivers. Troubles developed by these receivers are quite frequent, but I do not find them difficult to remedy. By using all that I got from the course I can handle them quite easily. I have good future prospects and I owe all my success to the N. R. I. course.

Yours truly,

HAN PENG JUAN.



The Meaning of Curve Diagrams

By J. A. Dowie, Chief Instructor

There are times when it is found a little difficult and in some cases nearly impossible to express or explain in words, ideas or facts in a way that can be easily grasped by a student or listener.

At such times, the use of even a rough sketch or picture which brings out the facts in what is known as a graphical representation, often proves to be very valuable.

For example if we wish to show plainly to somebody the difference between 5 inches and 8 inches we can best and quickest do so by drawing in two lines, one of 5 inches in length, the other of 8 inches. He will at once see the difference between the two. For some unknown reason, which may in part be attributable to lack of familiarity with the simple working principles of graph interpretation, some students have come to look upon graphs, curves or pictorial representations of statistical, mathematical and experimental facts as "deep stuff." Students who should know better have even been known to pass by any articles or study material in which graphs were included.

As a matter of fact a knowledge of the very simple rules which govern the reading and interpretation of such graphs make the study of electrical and radio principles much easier and more interesting than ever.

Graphs are now used more extensively than ever before in even the most elementary textbooks, magazines, and newspaper articles, to present, more clearly, information of all kinds. An understanding of the manner in which they are used is therefore as important as a knowledge of electrical and radio symbols and wiring diagrams.

A form of graph with which everyone is familiar is a map. We say that a certain town is so many miles north and so many miles west of Washington, D. C. The location of a ship at sea is given by the latitude and longitude, the location of a house in a city by the number of blocks north or south of a given street and by a number representing the distance from some other street at right angles to the first,

etc. Such a means of locating a point on a map is everyday knowledge.

A word description alone to give you this information instead of a map would often result in an incomplete or confused picture in your mind.

How Diagrams Are Made

When it is desired to illustrate the ratios existing between two variable quantities, when one depends on the other, so that the eyes can comprehend them at a glance, a graph is made by plotting the quantities on cross-sectional paper or "squared" paper. This paper is commonly called graph paper, it is ruled in various styles, of which the simplest is made by ruling parallel lines, vertical and horizontal, spaced equally apart.

In all styles of graph paper the distances measured on the vertical lines are called ordinates; and the distances measured on the horizontal lines are called abscissas.

Generally speaking, the ordinates and abscissas are called "co-ordinates" although this term is more accurately applied to the location of particular points.

Before going on to study a typical graph which is usually used in radio work, in which a variation in one characteristic of operation produces a variation in another characteristic, it is well to become familiar with the general working principles of graphs.

Certain additional standard terms are used in connection with graphs.

If we take two lines as shown in Fig. 1 so arranged at right angles to each other that they intersect at a point 0 (zero) we have the

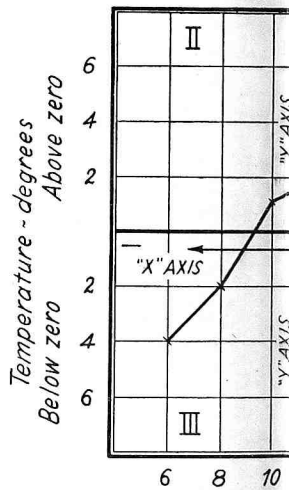
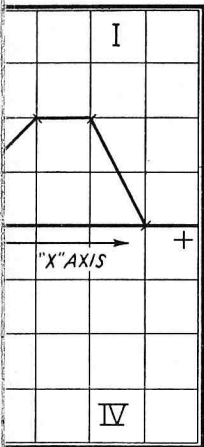


Fig. 1

basic formation by means of which we can draw (or plot as it is generally termed) the majority of graphs. The horizontal axis is called the "X" axis. The vertical axis is called the "Y" axis. These lines separate a plane into four parts, and these four parts are called quadrants. The upper right-hand portion of the graph—that is, the portion above the X axis (called abscissas) and to the right of the Y axis (called ordinates) is known as the first quadrant. That portion to the left of the Y axis and above the X axis is known as the second quadrant. That portion to the left of the Y axis and below the X axis is known as the third quadrant. That portion to the right of the Y axis and below the X axis is known as the fourth quadrant. The arrows pointing toward plus signs indicate positive values or increases while arrows pointing toward minus signs indicate negative values or decreases.



In some graphs, where both characteristics are positive, the first quadrant can be used to plot all the points. Where one characteristic is positive and another negative, it is possible to plot them in either quadrant II which has positive ordinates (along Y axis) and negative abscissas (along X axis) or in quadrant IV which has positive abscissas and negative ordinates.

If both characteristics are negative, they will have to be plotted in quadrant III. If one characteristic is positive and the other ranges from a negative to a positive quantity, it will be necessary to use two quadrants such as quadrants I and II, which have positive abscissas and positive and negative ordinates.

The four quadrants, either singly or in combination will satisfy any requirement calling for graphs showing the relationship of any factors when the value of one is dependent upon the value of the other. One of the simplest types of graphs showing the relation between two variable characteristics is shown in Fig. 1. This graph or curve was made from the experimental data obtained by taking the temperature readings every two hours between 6 A.M. and 6 P.M. on a certain winter day.

On the horizontal line we mark a number of equally distant points to represent the time of the reading. Above and below the zero line to the left we mark the temperatures. The temperature at any time is drawn in right above or below the zero line, using as many spaces in each case as there are degrees. If readings are taken every two hours, the temperature will change gradually; that is, it does not jump up to 4 degrees from the previous reading. The change took place in the time of two hours.

This means it was gradual. Instead of taking a separate reading for every minute between the two hours we come very close to the actual values by connecting all the indicated or "plotted" readings by as smooth and straight a line as possible. This line or curve represents closely the change in temperature during the entire day and it shows at a glance approximately the temperature at any time between the readings. You can readily see that if a table were used to give this information instead of a graph it would be quite tedious to follow up all the readings, because no doubt you would forget the first reading by the time you reached the last ones, and you have no proper means to compare what really took place during that winter day.

A graph similar to the one shown in Fig. 1 could just as easily represent the changes in current through a resistor with any given changes in the voltage applied across the re-

(Continued on page ten)

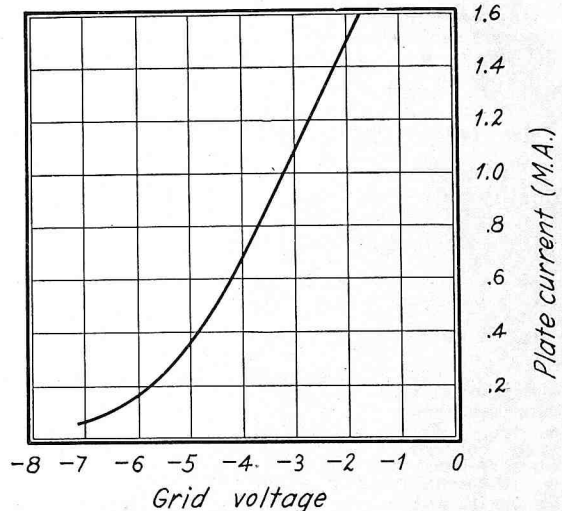


Fig. 2. Characteristic curve of a vacuum tube showing the manner in which the plate current varies with the grid voltage.

TROUBLES WITH SOUND-ON-FILM

(Continued from page seven)

(i) It is possible that the power amplifier A. C. supply circuit is defective. Check up on this with an A.C. voltmeter and if the amplifier is not receiving the proper line voltage replace the line fuses at once. Make sure that the converting equipment, if used, is functioning properly.

(j) The last of the possible causes of no sound with sound-on-film projection may be due to the loud speakers on the stage. Make sure they are plugged into the amplifier circuit, make sure that the field supply is O.K. and that the voice coil circuits are not open.

Low Volume With Sound-on-Film Projection

As in the previous chapter we shall list the possible causes of low volume and indicate the corrections as we go along.

(a) The exciter lamp filament current is not of the proper value. This may be corrected by proper adjustment of the exciter lamp rheostat.

(b) The storage battery which is used for lighting the filament of the exciter lamp is discharged. Replace the defective battery with one that is fully charged.

(c) Perhaps the exciter lamp is out of focus. This can be determined by placing a white card at the sound gate and focusing an image of the exciter lamp value on it. If this test does not give satisfactory results turn another exciter lamp in a position in the sound head.

(d) As in the case of no sound at all it is possible that the sound gate aperture is partially clogged with dust. This can be determined by an inspection of the sound head.

(e) A defective photocell may be the cause of the trouble. This would be indicated by low volume on one projector and normal volume on the other. If this proves to be the case substitute a new cell in the projector in which volume is weak.

(f) Defective tubes in a voltage amplifier or the power amplifier would be a possible cause for low volume in the theatre speakers. The thing to do is to test the tubes and make the proper replacements if any defective tubes are found.

Poor Quality With Sound-on-Film Projection

There are several possible causes of poor quality with sound-on-film projection. The correction for these causes may be understood with a discussion of the trouble.

(a) A poor sound film, that is a film that has been used a lot would cause this trouble.

(b) A dirty sound gate would cause poor quality.

(c) The film itself might be covered with dust or dirt particles which clog up the sound gate and introduce distortion.

(d) Particles of dust or dirt have gathered on the constant speed sprocket which is used to feed the film past the sound gate. This part of the equipment should be cleaned daily.

(e) One or more of the tubes in either the voltage amplifier or power amplifier do not light. The correc-

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THE MEANING OF CURVE DIAGRAMS

(Continued from page nine)

sistor when the resistance and other conditions in the circuit remain constant. The output characteristics of various power tubes, under different conditions of operation or the change in plate current in a vacuum tube with changes in the grid bias, when other conditions remain constant, etc., can be given in graphic form to give us information which is difficult to grasp in any other way.

In drawing some graphs, it is not necessary to show all four quadrants. It is sufficient to show just that portion in which the curve lies. Thus in Fig. 2, sections I, III and IV have been left out.

An example of a typical characteristic curve of a vacuum tube is shown in Fig. 2. The curve was obtained by plotting the plate current in milliamperes against various negative grid voltages applied to the tube for constant values of plate voltage. Since plate current and plate voltages possess only positive values and the grid voltages are negative values, only the second quadrant is necessary since no other quadrant is needed to complete the curve over the region the tube was studied. To obtain this curve the plate current was observed for every one volt on the grid from zero to -8 volts or to the point where the plate current was too small to read. The scales along the axes are marked off to suit the values of the co-ordinates obtained. In this example, the scale along the X axis is marked in grid volts, using the divisions on the paper for volts and the scale along the Y axis is marked in milliamperes, each division representing 0.2 milliamperes.

Inspection of this graph shows that when -6 grid volts are applied to the grid the plate current will be .2 milliamperes; at -4 grid volts the plate current will be .7 milliamperes, etc.

The importance of the graph for any kind of work is too great to be overlooked.

An understanding of the working principles of graphs such as those used in radio will prove of great value in grasping the essential information given in tube characteristic curves, frequency response curves, amplification and detection curves and the other innumerable applications where graphs are used to bring out information.

RADIO-TRICIAN SERVICE SHEET

REQ. U. S. PAT. OFF. COMPILED SOLELY FOR STUDENTS & GRADUATES



PHILCO MODELS 90 AND 90-A

(Above Serial No. 237,001)

Model 90 Receivers are for Operation on 100-130 volt, 50-60 cycle AC Lines.
Model 90-A Receivers are for Operation on 100-130 volt, 25-60 cycle AC Lines.

Table 1—Tube Socket Readings Taken with AC Set Tester, AC Line, 115 Volts

Tube		Filament Volts	Plate Volts	Screen Grid Volts	Control Grid Volts	Cathode Volts	Plate Milliamperes
Type	Circuit						
24	R. F.	2.0	255	60	.25	20	2.4
27	Osc.	2.0	65	...	.6	20	3.6
24	1st Det.	2.0	250	64	6.0	24	.25
24	I. F.	2.0	270	76	.25	18	.4
27	Det. Rect.	2.0	0	...	0	17	0
27	Det. Amp.	2.0	140	...	.4	18	2.0
27	1st A. F.	2.0	45	...	.4	20	1.8
47	Output	2.0	220*	240*	1.0*	..	32.*
80	Rectifier	4.5					

All readings taken with antenna disconnected and ground on. Volume Control on full.
*These readings must be taken from the underside of the chassis using test prods and leads unless the set checker is specially equipped for testing pentode tubes.

Table 2—Power Transformer Voltages

Terminals	A.C. Volts		Color
1-2	105 to 125	Primary	White
3-5	2.5	Heaters of 24 and 27 Tubes	Black
4	2.5	Center Tap of 3-5	Black with Yellow
6-8	2.5	Filament of 47 Tube	Dark Green
7	2.5	Center Tap of 6-8	Black with Green
9-10	5.0	Filament of 80 Tube	Light Blue
11-13	650.	Plates of 80 Tube	Yellow
12	...	Center Tap of 11-13	Yellow with Green

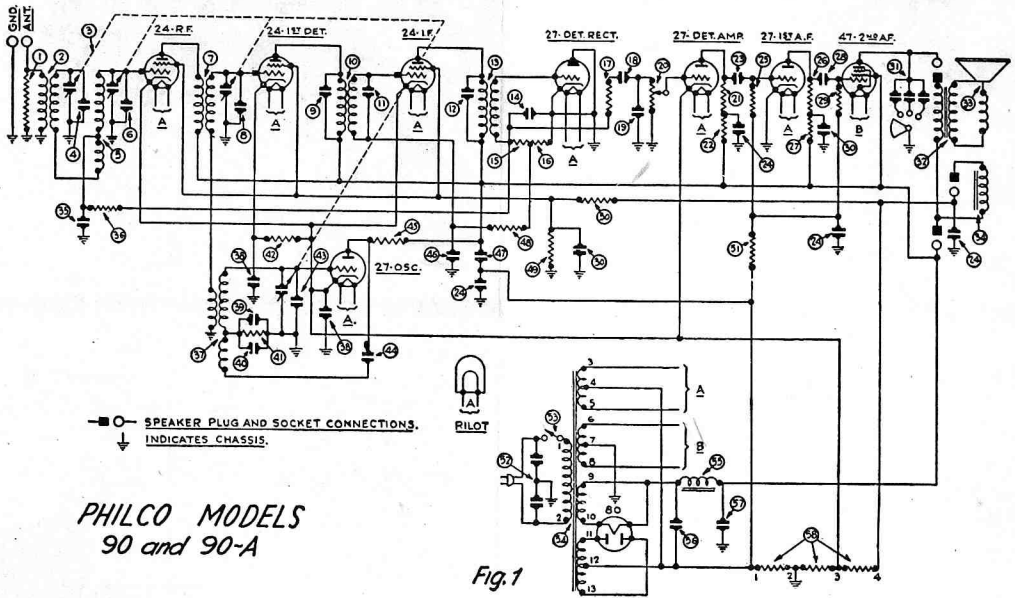
Table 3—Resistor Data

No. on Figs. 1 and 2	Terminal	Power (Watts)	Resistance (Ohms)	Color			
				Body	Tip	Dot	
25	{ 1-2 2-3 3-4 }	1.	130	(Long Tubular)			
			60				
			3,500				
			5,000				
26	1	.5	10,000	Green	Black	Red	
			5,000	Brown	Black	Orange	
27	1	1.0	25,000	Red	Green	Orange	
			25,000	Red	Green	Orange	
28	1	.5	51,000	Green	Brown	Orange	
			51,000	Green	Brown	Orange	
29	1	.5	70,000	Violet	Black	Orange	
			99,000	White	White	Orange	
30	1	.5	240,000	Red	Yellow	Yellow	
			240,000	Red	Yellow	Yellow	
31	1	.5	490,000	Yellow	White	Yellow	
			490,000	Yellow	White	Yellow	

Table 4—Condenser Data

No. on Figs. 1 and 2	Capacity	Color
14	.00011	Blue, Golden Yellow
15	.00025	Yellow
16	.01	Black Bakelite Container
17	.015	Black Bakelite Container
18	.05	Black Bakelite Container
19	.09	Black Bakelite Container
20	.1-13-25-1.	Metal Container
21	.25-1.	Metal Container
22	(50-60 Cycles) 6.	Electrolytic Type
23	(25-40 Cycles) 10.	Electrolytic Type

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



PHILCO MODELS
90 and 90-A

Fig. 1

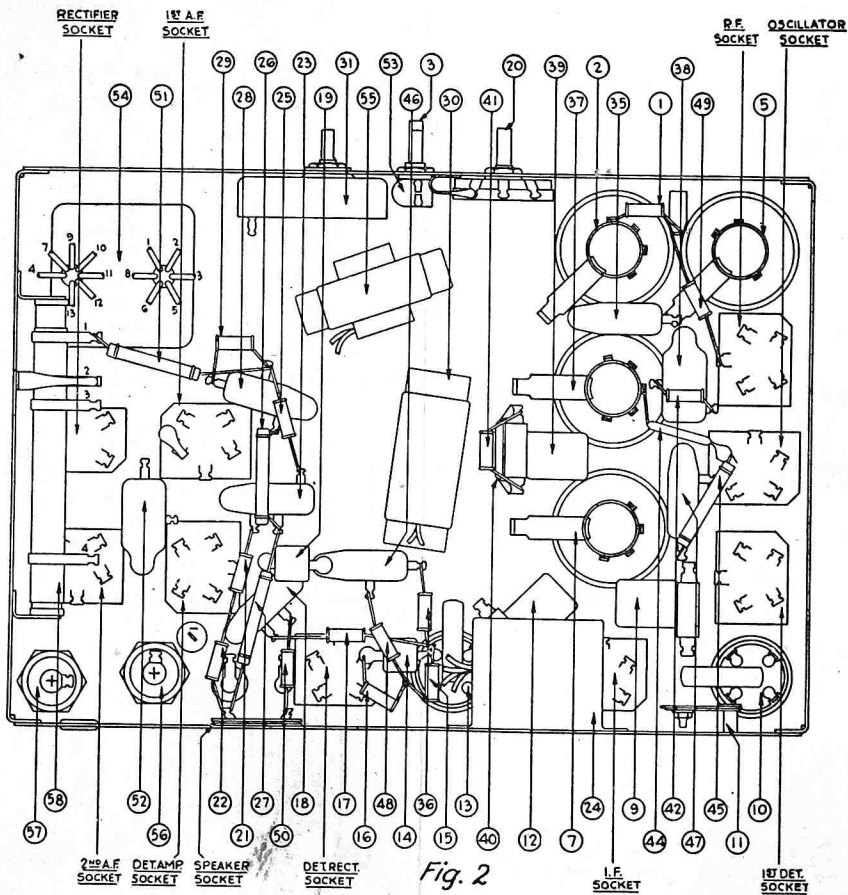


Fig. 2

N.R.I. ALUMNI News

WORKING OUT A SERVICE PROBLEM

By J. B. Straughn, N. R. I. Technical Staff

In servicing an A.K. 37, I found no plate voltage on any tube except the rectifier which was excessive, 60 ma per plate.

Continuity of all plus B leads from the plates of the tubes tested O.K. back to their sources also continuity between the filaments and ground (in the case of the '27, the cathode and ground) was established, proving the difficulty was not an open circuit. Testing from plate of the last audio to chassis gave almost a full reading indicating B+ circuits shorted to ground.

Cable connection panel was removed from power pack and continuity between last audio plate and ground again tested. The circuit was not grounded proving difficulty in the power supply.

Figure 1 shows the layout of parts in the power pack. Condensers, chokes, and transformers are imbedded in sealing compound. A continuity test from the 280 filament and ground showed a partial deflection of the meter needle. A test from +B second A.F. terminal showed a larger reading. A test be-

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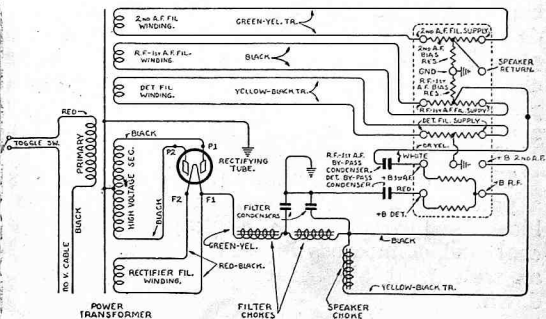


Fig. 1

Selling Personality



J. Matheson Bell,
President, Ozarka, Inc.



Mr. Bell, Manufacturer of the Ozarka line of Radio Receivers made the following statement to the Alumni Editor, when he sent in his article "Selling Personality:"

"I've read the Constitution and By-laws of the N. R. I. Alumni Association and I think the Institute's graduates are to be commended. I think the Association is a wise move and should prove helpful to all concerned."

A very wrong impression regarding selling seems to exist in the minds of a great many men. They think selling is a matter of talking—they get the idea that salesmen who sell merchandise must have a free gift of gab and just because they don't have such a gift, they can never become salesmen. This is not true by any means.

The first requirement in selling anything is to know the product you are selling. The fellow you are selling may not know anything about what you have to sell—but if you know everything possible about it, you will have little difficulty in thoroughly convincing him—in a very short time—that you know your business and are not bluffing.

When you go into a man's home—remember, you are selling him not merely a product, but a technical service—your training. You must sell your knowledge and you do this with your character, appearance, and every personal qualification you possess. You are not charging him for something that he can measure by a period of hours—any more than he could pay a doctor for several hours' work which saved his life.

You sell Radio not by mere words—not by a gift of gab—but by personality—by statements which prove that you know Radio—and these statements must be boiled down to language which the prospect can understand—even though he has no technical knowledge of the subject of Radio.

TROUBLES WITH SOUND-ON-FILM

(Continued from page ten)

tion is obvious. Check up on the tubes and insert new ones where needed.

(f) Perhaps one of the speaker units is out of adjustment. This can be determined by listening to each loudspeaker unit and cutting out the defective speaker by disconnecting its field supply.

The source of trouble in a sound-on-film projection system often arises in the form of "film breaks." Bear in mind that the picture film and the sound are always synchronized because the sound record is on the same film as the picture but at one side of it.

It would be well, therefore, to outline the procedure to follow when a film break occurs:

- (a) Close the dowser.
- (b) Stop the projector motor.
- (c) Throw the fader switch over to the side corresponding to the other projector.
- (d) Rethread the projector after the break in the film.
- (e) Start up the projector motor.
- (f) When the projector motor is running at normal speed we can open the dowser and fade in the sound by throwing the fader switch back to its previous position.

After the show it will be necessary to splice the break, and after this is done it should be coated with a solution of black lacquer. The reason for this is in order that the film will travel smoothly through the constant speed sprocket and sound gate after the break has been repaired.

Capacity never lacks opportunity. It cannot remain undiscovered, because it is sought by too many anxious to use it.—Bourke Cockran.

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WORKING OUT A SERVICE PROBLEM

(Continued from page thirteen)

tween the +B R. F. and ground gave a full reading.

From the continuity tests I knew that there was a broken down filter condenser, because the chokes and filament winding of the transformer cannot become grounded due to their construction. It was the one connected from the low potential end of the last filter choke to ground because the test showed less resistance between +B R. F. and ground than between the 280 filament and ground. If the reading had been approximately the same on both tests it would have been the first filter condenser.

The price of a new filter choke and condenser block is about \$13 but repairs were made at a cost of fifty cents for material.

The wires leading from the power supply were unsoldered and the terminal board and power pack removed.

With a heavy hammer the side of the case was struck sharply until the sealing compound became fractured. First the speaker choke was uncovered. Under it were the filter condensers. The filter chokes were on the left in a compartment by themselves. The speaker choke was removed and the wires leading to the four condensers were unsoldered one at a time and the condensers tested with a battery and voltmeter (between the unsoldered terminal and the case of the power supply). The defective one gave a steady reading on the meter. The wire to this condenser was soldered on to a new (uncased) condenser having a value of 1 mfd. and a working potential of 400 volts. The other lead from this condenser was soldered to the post which comes from the bottom.

The separator between the filter chokes and condensers was bent over towards the condenser compartment and the new condenser placed on top of the chokes. The speaker choke was resoldered to its connection and placed on top of the original condensers with a piece of insulating paper between them.

The sealing compound chips were melted in a pan over a gas flame, then poured into the block, sealing it. The block was allowed to cool and connected up. The set worked just as well as it did before the condenser broke down.

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THE MAILBAG



My position nets me from \$45 to \$60 a week, thanks to N. R. I. training. When half way through, it had more than paid for itself in spare time. Complicated sets became simple through your easy method of training, but without N. R. I., I would still be wondering what it was all about.—ALBERT HEDDEN, Hagerstown, Md.



My varied career includes the U. S. Coast Guard as Radio Operator, the Stewart Warner factory, and an appointment with the Government as relief operator in the Lighthouse Service. I only went as far as the eighth grade in school. My pay is equal to about \$55 a week.—HERMAN BARRETT, North Attleboro, Mass.

Graduate Henry H. Graef of Chicago, Ill., has been appointed Chairman of the Chicago section of the Institute of Radio Service Men.

I was called to service a set using a Mershon condenser of three sections of eight mfd. each. The set would develop a terrible hum when it warmed up. As an experiment I disconnected the leads from the condenser and turned it a third of the way around so that each lead was on a different post than it had been originally. This stopped the hum very effectually and my customer was well pleased when I told him I had saved him six or seven dollars.—J. B. LONGSWORTH.

A tip on Atwater Kent Model 37 power pack and other Atwater Kents using similar power packs. If the condenser block is defective, saw the bottom off it with a hack saw, and unsolder the ground lead beginning with the condenser near the center of the block, test for a circuit with this wire and the green wire with yellow traces on top of the block. If you obtain a reading unsolder the next one until the shorted condenser is found. Insulate the wire from the shorted condenser and solder the rest back in place.—W. C. HILLMAN, Kingsport, Tenn.

Luck is the Crossroad where Preparation and Opportunity meet.

I have taken charge of the Radio Department of Welden's General Store. As I had a reduction in my regular wages at the Westminster School here, my Radio training sure helped me out. What would I have done without my good old N. R. I., with a wife and four children to support? If I had to depend upon my unskilled labor for a living it would be just too bad for me. It means everything to me to have a good job.—M. BRIDGES, Wimsbury, Conn.



Since taking your Course I've made over \$4,000. I give N. R. I. credit for placing me in a position to accept and hold my first job. Among the hundreds of sets we service regularly are four belonging to Vincent Astor and one to Prince Obolensky. Thanks for the courteous, prompt and efficient service given me.—JACOB DuBOIS, Poughkeepsie, N. Y.

Life itself is a game and a very complex one. There is no room for the slacker and little tolerance for the untrained man. Poor houses are populated by good intentions, but the top of the success ladder is reached by action and study.—J. A. DOWIE (N. R. I. Chief Instructor).

Well, here I am once more boosting N. R. I., which I am very proud to do. I am with Montgomery Ward & Company here and getting along fine, working almost day and night. Thanks a thousand times to N. R. I. for my ability to hold such a good job and with one of the largest companies in the country.—RAYMOND SHOUP, Lansing, Mich.

Your Radio Course is great. I have more than paid for my Course already and have completed only twenty-five lessons. Sold two Philcos yesterday and had two service calls. I am going to college and doing Radio work over week-ends.—WALDEN H. RHEINSRANK.

Education—a debt due from present to future generations.—George Peabody.



I received my diploma the other day and thanks to everyone at N. R. I. for the courteous and fair treatment I received. I no longer think of the N. R. I. as a school, but as a large group of my very best and interested friends. While taking your Course, I made about \$3,000 in Radio work.—SOREN N. HANSEN, Cedar Falls, Iowa.

I'm Chief Radio-Trician for the Kindel Furniture Company, jobbers and dealers for a number of different Radios. My salary is \$50 a week the year round. I have accomplished this through the N. R. I. Course. It wasn't long after I got into the National Radio Institute before I started to be someone and make real money.—VAN EVERY, Denver, Colo.



Alumni Association Editor Digs Up An Old One

Digging through the files the other day your Alumni Editor ran across an heirloom. It was one of the very first issues of National Radio News.

The date was November, 1925, way back in the days when the old "bread board" Neutrodyne was considered the ultra modern—the last word in Radio Receivers. "The News" then was merely a little four-page pamphlet.

But apparently it got off "right foot first" because it's been going and growing ever since.

Here's a picture of the old copy. Comparison with the current issues will give a good idea of what persistence and stick-to-it-iveness will do—even for a magazine.

Page 3

NATIONAL RADIO NEWS

"FROM RADIO HEADQUARTERS"

PUBLISHED MONTHLY BY NATIONAL RADIO INSTITUTE

WASHINGTON, D. C., NOVEMBER, 1925

"Black Radio" May Open New Field if Developed

Early in the World War, a new means of practically secret signalling was developed by a number of American engineers and representatives of the Army and Navy. It was first termed Infra-Red Signalling, but later came to be known as "Dypraxitic."

It is not Radio, but operates through the medium of infra-red light waves, which are invisible to the eye. As a conventional vacuum-tube receiver is used for reception and amplification of signals, and because a telegraph key or telephonic apparatus is employed to control a light beam, the system of communication will be of interest to Radio fans.

In the fall of 1914 T. W. Case, of the Case Research Laboratories, discovered and reported upon the peculiar properties of lead acetate crystals, when the long red rays of the spectrum fell upon a crystal of this chemical. First, it was tried out to determine the approach of electric communication in New York City. In the first experiment, the tests showed results of a distance of about 700 feet. Experiments, however, with better lights, sizes and electrical apparatus, increased the range to about a mile. The Sperry people became interested and further tests followed under the observation of Army and Navy officers, who effected interest in connection with the possibility of secure signalling in battle.

Further experiments were conducted, both at night and in daylight, between the Sperry Building and the War Research Tower, and upon reports of success in 1917 General Squier, Chief Signal Officer of the Army, suggested a tentative test.

It was this more military trial which led to the desire for making the received signals audible and special vacuum tubes were developed. It was found that the signal of the received signal was varied in volume and phase when the intensity of the light was varied. This variation in distance, produced with this improved means was about eight miles.

England became interested and Lord Northcliffe witnessed a demonstration, following which he expressed a belief that it might serve as a first line receiver, as a means of secret signalling.

Later, further tests carried the range to eighteen miles or from Fort Hancock in New York Harbor to the War Research Building, and another test indicated good reception of signals from the above line vessel at sea.

The Navy Department in discussing the possibilities reported that it might serve

(Continued on page 2)

LOOK FOR BETTER N. R. I. NEWS OUT NEXT MONTH

Beginning next month with the December issue, we're going to make National Radio News a bigger and better magazine. Many new items of interest are going to be added.

We want to make National Radio News truly representative of the body of N. R. I. students and graduates it joins together. So the first step in improving the magazine will be to make it a clearing-house for all N. R. I. men. And by that we mean we intend to give you your place in it. We want to hear from you often, know what advancement you are making.

And each month we'll devote a separate section to student and graduate activity, where N. R. I. men can meet and exchange experiences with each other.

Then another student feature is going to be the photographic section. Every month we want to publish at the very least, three pictures of students and graduates out on the job—showing where they are and what they are doing.

For still more interesting photographs showing N. R. I. men in the places where they work, the "News" will pay \$2 each. No set number of photographs will be accepted each month, but for each one accepted we'll pay \$2, no matter if two dozen good ones are received.

So get out your camera and have a friend take a snap of you on the job. Then send it to "The News," and if you're taking snaps to get a good one.

It will be worth it to you. All Radio news published will continue to be updated in every month and there will be more of it. National Radio News is soon to grow considerably in size. For N. R. I. men find the "News" both interesting and useful, and we want to make it so.

At the time this issue of the "News" is going to press, the Student Officers' Contest is just coming to a conclusion. The

(Continued on page 1)

THE MAN WHO GETS PROMOTED

By Edgar A. Guet.

The ordinary fellow does an ordinary task. He's mighty fond of "good enough" and lets it go at that.

But the chap who gets promoted, or the one that is never promoted, has just something more than hair beneath his hat.

The ordinary fellow lives an ordinary day. With the ordinary fellow he is anxious to be quiet.

But the chap who draws attention and the larger weekly pay, has a vision for the future, and is working hard for it.

The ordinary fellow does precisely as he's told. But someone has to tell him what to do, and how and when.

But the chap who gets promoted his the job he has to hold.

With just a little something more than ordinary men.

From "The Pecking Order," copyright 1922. Reprinted by Special Permission of Mr. Greer's Publishers, Seattle, W. C. Chicago.

DUMB LUCK

Professor—What is ordinarily used as a substitute of electricity?
Student (all at once)—Why?
Professor—The open vein. How will he, what is the unit of electric power?
Student (all at once)—The watt, isn't it?
Professor—Exactly, the watt. Very good. That will do—Bye.

And after telling you the little story above about the old issue of National Radio News—a real old-timer here at N. R. I. went digging in his "war-bag" and showed us that National Radio News was originally published as "Dots and Dashes" and dates back to 1920.

WORKING OUT A SERVICE PROBLEM

(Continued from page fourteen)

If it is desired to replace more than one condenser the compound is broken out as described and the power supply put in a pan over a gas flame. When the compound gets soft, catch hold of the string, around the condensers with a pair of pliers or a wire with a hooked end, and lift them out. Then the defective ones may be replaced. This method may be used to get at the insides of any set employing similar sealing compound.

"Starting and Operating a Radio Business" starts in the March issue.

INDEX

Table with 2 columns: Article and Page. Includes items like 'Honest Abe', 'The Radio Receiver Field', 'What Price Do We Pay for Success?', etc.