

## IDEAS WANTED

There are several good ideas in this month's "Mailbag" and more to come in later issues. But we need your help.

Every fellow runs into peculiar little problems occasionally—has unusual questions asked by customers—fixes something in a set he's never run into before.

Maybe Mrs. Jones' new screen grid set had a funny kind of howl which you located in the "whosit." Tell us about it.

How did you do it; how was the difficulty overcome? Let's let the "gang" in on it. Some other Radio-Trician, some place else, may run into the same problem soon.

Just write it down on a piece of note paper, in detail, and mail the "dope" to the News, stating it's for "The Mailbag."

Four additional radio range beacons in operation.—Radio range beacons have been placed in continuous operation at Saugus, Calif.; Albany, N. Y.; Cincinnati, Ohio, and St. Louis, Mo.

*When George Beuchler, WABC staff announcer, takes time off between programs to have dinner, he takes his stop-watch with him. Mr. Beuchler has learned to calculate to a second how much time will be occupied by each dish. If you sit next to him at dinner, you hear him mumbling to himself, as he glances over the bill of fare:*

*"Soup, two and a half minutes; salad, three minutes; grilled steak, eleven minutes . . ."*

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THINK IT OVER—THEN  
PUT IT OVER!



The Office Pup says—

Don't simply see how you can "put in the day," but see how much you can put into the day.

The gate of opportunity won't open for the man who is too lazy to lift it.

Westinghouse very wisely stated, "When a child I got what I wanted by crying for it; when a man I secured it only by work."

## NEWS OF THE RADIO WORLD

(Continued from page 13)

As passed by the South Carolina legislature, the law placed a graduated tax of 50 cents to \$2 on the use of all radio receivers costing \$50 to \$500, the proceeds to go to the state tuberculosis hospital. The tax was fought largely on the grounds that radio waves are interstate in character and that the proposed state tax would have been an interference with the Federal Government's exclusive authority over interstate commerce.

N. R. I. congratulates WBT on its victory. WBT's program director, Donnel O'Connor, is an N. R. I. graduate.

25th Anniversary of  
DeForest Tube

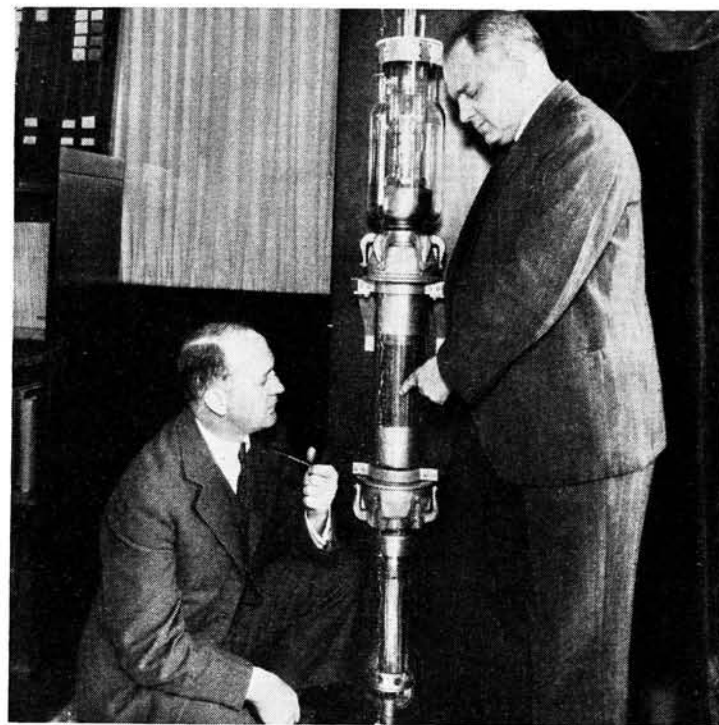
"January marked the 25-year anniversary of the invention of the three-electrode vacuum tube by Dr. Lee DeForest (in January, 1906)," according to "Electronics." "It was indisputably DeForest's triode or 'audion' which initiated the present widespread development and almost limitless possibilities of the electron tube. Surely an invention of such humanitarian importance distinguishes its author as one of humanity's benefactors."



VOL. 3—NO. 8

WASHINGTON, D. C.

MARCH, 1931



ONE OF KDKA'S NEW TUBES

for  
SUPER-POWER BROADCASTING

World Wide Photo



J. E. SMITH

## The PRESIDENT'S PAGE

"SOUND merchandising" will be the key-word of sales activities for the entire Radio industry during 1931, is the expressed opinion of M. F. Burns, Vice President and General Sales Manager of E. T. Cunningham, Inc., Radio tube company.

**Stability in Merchandising Field**

"The past decade of Radio development," Mr. Burns states in detail, "has seen the major share of attention concentrated on advancements along mechanical and scientific lines; in consequence, the development of sound manufacturing and general merchandising plans has frequently been overlooked in the enthusiasm generated for the laboratory product.

"An evolutionary process such as the foregoing is perhaps the necessary and logical process to which a new industry is invariably subjected. In our case, at least, we believe much of value has been gained. This is most aptly illustrated by the fact that types of receivers are now well standardized; costs have been brought into line with production; extreme changes in engineering design have been eliminated; and set values among various manufacturers' models have become well equalized.

"Thus, with the foregoing phases of design and production stabilized, the logical step appears to be in the direction of establishing equal stability in the jobbing and retail field. This is now evidenced, I believe, in the constructive and selective merchandising plans already being put into effect in major consumer centers throughout the country—plans which call for keener sales methods and more intensive follow-ups, the elimination of under-selling, the establishment of organized service departments, and the maintenance of established codes of quality."

A NEW microphone set-up has been developed by WABC engineers, which is expected to improve radio listeners' reception of orchestras and band concerts considerably. It has been tried successfully and will probably become a standard for studio broadcasts.

**Studio Acoustics**

The new set-up is based on the principle that sound waves have a tendency to move upward.

Heretofore microphones, during an orchestral concert have been placed immediately in front of the stringed instruments and only a few inches above them. The wood winds and brasses were located behind the violins, an arrangement which brought out the tones of the strings, but tended to over-emphasize them. To a sensitive ear, it failed to reproduce the orchestra in its true balance and volume.

At a rehearsal Frost and Stewart, WABC engineers, arranged their microphones about ten feet above the musicians' heads with excellent results. Full notes of the bass viol and tuba, which previously had been slurred, came through clearly.

Every Columbia leader who heard the tests immediately insisted that the set-up be applied to his orchestra. During one of the programs a cable was received from the British Broadcasting Company, whose engineers were listening in on short wave. They asked whether the particular orchestra had been enlarged. When informed that a new microphone set-up was responsible for the improved reception, the British Broadcasting Corporation immediately requested detailed information for its own use.

## GOOD MONEY IN PUBLIC ADDRESS WORK

### Graduate Nichols, Manages Live Concern

Combining good sound business principles with plenty of energy, and a thorough knowledge of Radio, N. R. I. graduate Fred A. Nichols of Eaton, Colorado, is on the high road to success in the Public Address System field.

Nichols operates his own firm, the Eaton Radio Co., and attributes a large

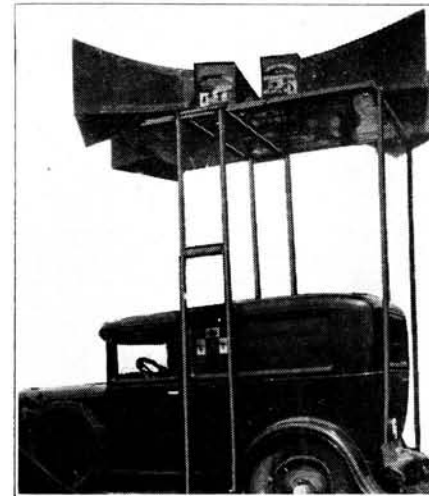
canvas and are then ready for a trip to wherever the truck may be needed next.

The Eaton Radio Company has recently obtained an exclusive agency for Sampson, Wright Decoster and Ellis equipment for the States of Colorado, Wyoming and New Mexico. They look forward to an increase of business and there is no doubt they will get it.

A number of contracts have already been received for rentals during the year of 1931 and to quote Mr. Nichols, "we are selling to theatres and amusement places, have a number of contracts for this year and altogether this public address field certainly looks promising.

"I am happy to say that I have added another N. R. I. man to our force this month. He is a fine fellow and a valuable man. As you know, my organization is one hundred per cent N. R. I."

Graduate Nichols is a charter member of the N. R. I. Alumni Association. We know that all of his fellow Alumni members are wishing him success and National Radio News wants to hear more from Graduate Nichols from time to time. We know his activities will be helpful in an inspirational way to all other N. R. I. students and graduates.

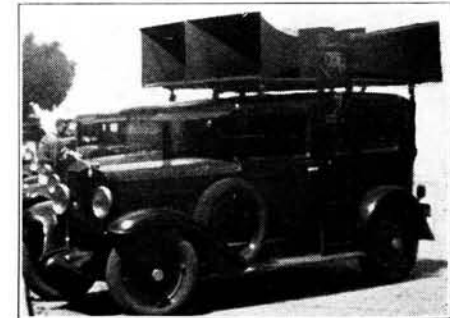


Nichols' truck showing position of loudspeakers when in operation.

measure of his success to his Radio training with the National Radio Institute.

On this page are shown pictures of their truck. It is interesting to notice the amount of forethought and effort which have gone into the building of this amplifier equipped automobile.

When in operation—either for purposes of demonstration or rental, the four loudspeakers on a specially constructed platform, are lifted high above the roof of the truck, giving them greater range. When the demonstration or rental is completed, they are lowered to the top of the truck, covered with a



Normal position of speakers when not in operation.



N. R. I. graduate, Fred A. Nichols, Manager of the Eaton Radio Co., Eaton, Colorado.

## National Radio News

Published monthly in the interest of its students and graduates, by the NATIONAL RADIO INSTITUTE  
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J. E. SMITH, Pres. E. R. HAAS, V. Pres. & Director.

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March, 1931

### BUSY PEOPLE

A peculiar fact is that busy people read and study most. A man who belongs to half a dozen organizations, who travels, plays cards, goes to the theatre, attends lectures, and occasionally dances, is usually more widely read than the man who has nothing to do outside of working hours. The latter says that he has no time to study—to read, but analyze his day. It will be found that he lacks inclination rather than time.

Far more reading is done today than ever before. The average adult spends 90 minutes a day in reading. Of adults, 95 per cent read newspapers, 75 per cent read magazines, and 50 per cent read books.

The better educated a man is, the more time he spends in reading. He is likely to read newspapers less and books more. A professional man devotes about twice as much time a day to reading as a clerk, and almost three times as much as a laborer.

The majority of non-readers suffer from the delusion that education ceases when one leaves school. Education should be extended through life, and it is obtained chiefly by reading.

Quite a few comments have been received lately from News readers, thanking us for the fine articles by Chief Dowie. You'll like the Chief's article—"The Stenode Radiostat," in this issue. Next month Mr. Dowie will write on "Automatic Line Voltage Control." Chief Dowie has articles in nearly every issue of the News. Watch for them.

## THE DIRECTOR

### TALKS ABOUT

## A BULLDOG

Did you ever study a bulldog? I don't mean these little play-toy things that ride in women's arms in limousines or are walked through parks by nursemaids, covered up in fancy blankets.

I mean the real old-time bulldog—ugly—bowllegged, teeth showing in front, a man's dog—and usually a "one-man" dog.

Once I saw one of them tackle a full-grown St. Bernard—a dog six times his size. He buried his teeth in that big dog's hide, and how that boy did hang on and rip and tear.

Four men with sticks and rakes tried to beat him off. Even hot water didn't do the trick. No, sir; he stayed right there—hung on till there was no fight left in the big St. Bernard.

When it was over the bull was weak—not from his fight, but from the beating he'd received from the men. But the little fellow was game. Panting, but

with hair bristling, he backed off a ways—ready to take on anything else that showed fight.

Let's take a lesson from that little bundle of dog flesh. If we'll sink our teeth into everything that stands in the way of our success, and hang on till it's licked—then rear up on our hind legs and challenge the next obstacle that dares turn up, we'll have a confidence that will take us to the goal we've set for ourselves, whatever it may be.

I have distributed some of the business cards which you sent me, and have had quite a few calls. I have made \$100 in two months.—E. W. Hicks, Pittsburgh, Pa.



E. R. HAAS  
Vice President and Director

# RADIO-TRICIAN SERVICE SHEET

REG. U. S. PAT. OFF.

COMPILED SOLELY FOR STUDENTS & GRADUATES

## ATWATER KENT MODELS 70, 74, 75 AND 76

(Chassis Type L and Type P)

The type L chassis has three stages of screen grid radio frequency amplification, plate detection, one stage of resistance coupled audio, and a stage of push-pull audio amplification. This chassis is used in models 70, 74 and 76 receivers.

Type P chassis is similar to type L but instead of a "local-distance" switch it has a "Radio-Phonograph" switch. This chassis is used in model 75.

### Synchronizing Condensers

When the variable condenser unit has been replaced or adjusted in any way, it is necessary to check the alignment as follows:

- (1) Loosen the pointer set-screws.
- (2) Move the rotor plates of the condenser so that they just barely mesh with the stator plates.
- (3) With the rotor in this position, adjust the pointer to the 1500 K.C. position and tighten the pointer set screws.
- (4) Note how far down on the 1500 K.C. mark the pointer comes, then turn

the condenser knob to the 550 K.C. mark. The pointer should come down on this mark approximately the same as on the 1500 K.C. mark. If it does not, it is an indication that the front panel is not centered.

(5) If the front panel is not centered, loosen the screw at each end of the bottom of the front panel and shift the panel one way or another as necessary. Tighten the panel screws and then reset the pointer accurately.

### Important Service Notes

In these receivers it is very important to arrange the three control-grid leads to the screen-grid tubes exactly parallel to each other. If these leads are not parallel, and two of them come close together, the dial readings will not be accurate, especially at the high-frequency end of the scale.

When replacing a flexible resistor, care must be taken to use a resistor having the same value. In the event of any uncertainty, make a continuity meter reading of a good resistor of the same type in a stock set, and then use a replacement resistor that gives the same reading on the continuity meter.

### VOLTAGE TABLE FOR TYPE L AND P CHASSIS

Set in operation. Volume control at maximum.  
Approx. Voltages, Using 120 V. Line.

Tube	Filament Voltage	Plate Voltage	Control-Grid Voltage	Screen Voltage
1st R.F.	2.4	180	5	85
2nd R.F.	2.35	180	4.5	86
3rd R.F.	2.35	180	4.5	86
Detector	2.35	110	14**	..
1st A.F.	2.35	70	2	..
2A	2.45	250	55*	..
2A a	2.45	250	55*	..
Rectifier	5.	...	...	..

\*Use 250-volt scale.

\*\*This is the voltage across the detector bias resistor; when measuring from grid to cathode, the voltage reading is only 2. All readings made from cathode in heater-type tubes, and from —F in plain-filament-type tubes.





# THE PRINCIPLE OF THE STENODE RADIOSTAT

♦♦

By J. A. DOWIE, Chief Instructor

A system of Radio reception designed to eliminate inter-station interference, such as heterodyne whistles and cross-talk was invented by Dr. James Robinson of London, England, former Chief of Radio Research Engineers of the British Royal Air Force.

Interference, which heretofore has been regarded as unavoidable, was shown to be non-existent in tests made under average conditions in this new receiving system, which is called the "Stenode" Radiostat—the term "Stenode" being derived from the Greek meaning "narrow path."

By applying a newly developed principle to present day receiver design Dr. Robinson showed by tests recently made in the U. S. A. that there still remain a great many open spaces in the present broadcasting spectrum. Not only does this invention point the way toward making more broadcasting channels available, but by narrowing the paths of Radio transmission, it makes way in the ether for television development, hitherto retarded by the limited number of Radio channels believed to be at man's command.

The Stenode Radiostat achieves its super-selectivity without in any way impairing fidelity of tone, an improvement which a good many Radio engineers universally have regarded as technically impossible.

The circuit used in the Robinson Stenode Radiostat receiver was a typical Super-heterodyne circuit which was just like any other Super-Het, except in regard to the last intermediate frequency amplifier circuit. Here instead of using a number of sharply tuned cascade circuits, a quartz crystal circuit is employed.

This circuit is shown in accompanying diagram. You will notice from this hook-up that the crystal is connected to a bridge arrangement of which the completing arm is the variable condenser C. This method of connection is necessary in this bridge circuit to insure that no voltages reach the last tuned circuit B, other than by the proper path through the crystal.

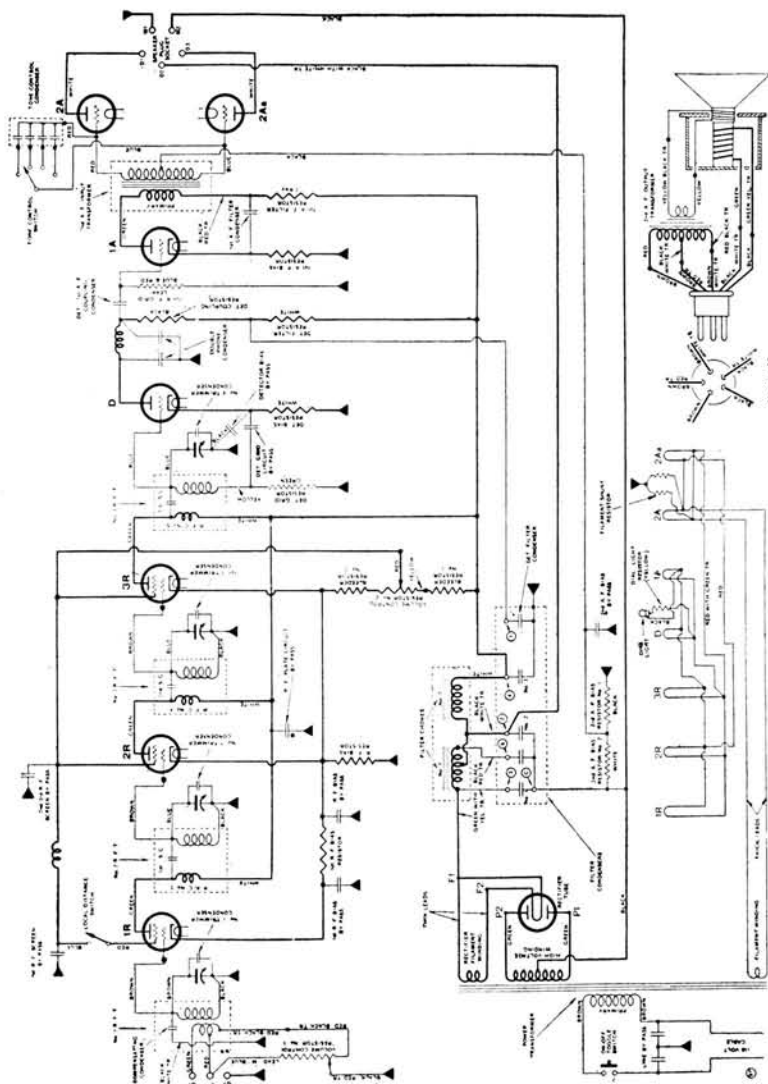
When the bridge circuit is properly balanced, the only currents affecting the tuned circuit B are those passing through the crystal proper. The band passed by this crystal circuit is only about 50 cycles; consequently any interference of a frequency different from the frequency of the desired station by more than 50

cycles should be completely eliminated. In other words, the selectivity of the crystal circuit for most practical purposes may be said to offer a low impedance to currents of its natural frequency and an infinite impedance to cur-

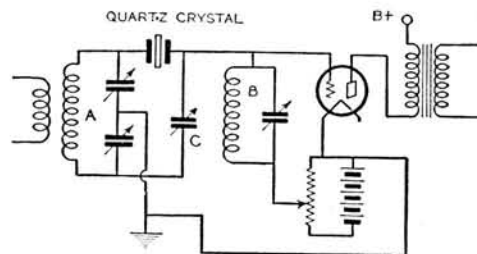
rents of frequencies of 50 cycles or more different from its natural frequency. All impedance then, which is of a different frequency from that of the desired station can be eliminated and with it the heterodyne whistles audible on all ordinary Radio receivers.

The Stenode Radiostat receiver has proved that it is not necessary to be bound by the accepted theory of side band transmission, which heretofore has prevented broadcasting channels from being closer than 10 kilocycles apart for the reproduction of all audio frequencies. A closer examination of the side band theory proves that it is possible, by the application of Stenode circuits, to accomplish a much closer separation.

This should open enormous sales and service of super-selective receivers.



Schematic Diagram of Atwater Kent Model L-2.



# ALL BRANCHES OF RADIO HONEYCOMBED WITH YOUTH

By MARTIN CODEL

(Special to National Radio News)

Probably no other industry of major consequence boasts as many young men in high positions.

The reason isn't hard to find; Radio itself is relatively young; for broadcasting sprang into being only ten years or so ago, and with its growing popularity there developed the receiving set and associated manufacturing industries. Then, too, Radio has drawn and is still drawing from the ranks of those youthful hobbyists known as amateurs for much of its man power.

Small wonder, then, that older heads in this and other businesses have frequently paraphrased Greeley's famous counsel and have advised: "Go into Radio, young man."

*Readers of National Radio News will remember Mr. Martin Codel, the author of this article, for his previous article, "Chain Broadcasting Now Possible on One Wavelength," published in the December issue of the News. This is the second of a series. Mr. Codel will appear again in the columns of the News shortly.*

David Sarnoff is probably the industry's outstanding example of young genius and success. A Russian immigrant boy when he came to this country in 1900, he had scarcely passed his 39th birthday last February when the directors of the Radio Corporation of America elevated him from the post of vice president and general manager, to which he had risen from office boy, to the presidency of that corporation.

But there are even younger men in the high places of the industry that was born of an idea fixed in the mind of the young experimenter, Guglielmo Marconi, some 33 years ago.

Ellery Stone, president of Kolster Radio Corporation, and A. H. Grebe are only about 35. William S. Paley, president of the Columbia Broadcasting System, has scarcely passed his 28th birthday; the vice president of Columbia, Sam Pickard, former member of the Federal Radio Commission, is 33, and Columbia's

brilliant Washington executive, Harry Butcher, is but 28.

McMurdo Silver, president of the Silver-Marshall Radio Company, is only 28. Nathan Chirelstein became president of the Sonatron Tube Company at 30. Herbert Hoover, Jr., is radio director of The Western Air Express at 28.

Though he looks much younger, M. H. Aylesworth, president of the National Broadcasting Company, is 44.

In the N. B. C., George F. McClelland, general manager, is 36; Mark Wood, its secretary, is 30, and G. W. Johnstone, in charge of press relations, is 30. All its vice presidents are in their thirties, John Elwood being 34, George Engels 39, Niles Trammel 36 and Frank Russell 34. Nor are there any graybeards on the technical or annuncerial staffs, where the ages run around 30 and under.

He may look older, but William S. Hedges, president of the National Association of Broadcasters, is merely 35. One of the broadcasting fraternity's real youngsters is Ralph Atlass, who heads WBBM, Chicago, at 26. Broadcasting stations throughout the country reveal a similar array of youthful talent in all classes of work.

In Washington, one of the brightest of the bright young men of the engineering staff of the Federal Radio Commission is Gerald C. Gross, who is only 28. Lieut. E. K. Jett, another assistant engineer, is 37. The chief engineer, Dr. C. B. Jolliffe, confesses to 36; V. Ford Greaves, assistant chief engineer, to 46, and Andrew D. Ring, assistant, to 31.

(Please turn to page 14)

# CHAMPIONS

By MILT PARSONS

Trapped! Behind was the ice-jammed Delaware River—the army of England in front—General Washington's Colonial Army was surrounded.

Across the river, at Trenton—a regiment of Hessians—drunk, out of all military order, secure in their knowledge that Washington could not emerge from the trap.

But Washington's army did cross. Ice—cold—the river, could not stop them. What happened to the Hessians is history. Washington's army—underfed, ragged, cold—but . . . . CHAMPIONS.

African pirates roved the seas, wrecked the shipping of the world, menaced lives of travelers. Countries the world over paid large sums to be immune from this early form of racketeering. It remained for the world's youngest nation, America, to declare, "Millions for Defense, but not one cent for tribute"—and as a result wipe out piracy and free the seas for world traffic. . . . CHAMPIONS.

A young prize fighter steps into the ring. Clean cut—healthy, perfectly trained, Champion of his class. Confi-

dently he awaits the gong. His opponent is a tough one. For a while he is hard put to weather the storm. The challenger's first burst sends the champ to the ropes, covered up. Leather flies, blows rain. Plenty of them land—good and hard. But the champ weathers the storm and emerges at the end still . . . CHAMPION.

\* \* \* \*

It's not the largest army nor the biggest man that wins. It's the fellow who can take it on the chin and grin—the fellow who can climb back to his feet after a knock-down—who is all man.



This is an age of competition, an age of "survival of the fittest." The weak-kneed fellow who has no confidence in himself—gives up at the first jolt has no place in modern business. I intended recommending that he get away from the business world of today and seek a job in an orphanage, mind-ing children, but even that requires patience, which is a form of

moral bravery, so he doesn't even fit there.

So there's no hope for him until he decides to fight back at the world and make it acknowledge him as a CHAMPION.

## About Old Adages

There's truth in the saying, "The field of opportunity will never be plowed by just turning it over in your mind." But to the uninitiated this might mean to act without thinking. To be of most value it should be used in conjunction with the old favorite, "Look before you leap," because most of us have seen the wisdom of "Fools dash in—where angels fear to tread."  
—Milt Parsons.

## Sowell Issues a Challenge

Made \$411.80 last month which I call good. Don't believe any of the other Grads did better.

I have my own shop and the National Radio Institute is entitled to the credit for putting me where I am.—James R. Sowell, Pulaski, Tennessee.

# CAPITAL

By J. E. MILLER

**N. R. I. Statistical Expert**  
Some fellows are interested in Radio as a means to get them started in a business of their own. These fellows want to work where they can be their own bosses—where their earnings will only depend upon their effort and business ability.



J. E. MILLER

The first question that arises is that of raising capital, organizing, and getting started.

In the January, 1931, issue of National Radio News, Mr. Gordon Birrel, in his article, "Protect Your Credit, You May Need It," made the statement: "Good credit is a necessary foundation for success."

This article can start at that point by saying that without good credit a person is not going very far in a business of his own. He will be forced to pay cash for everything. A very unhealthy condition for any business.

The ideal situation is that of being the sole owner of a business. Such an arrangement places all the responsibility in the hands of one person. Naturally there is no possibility of friction. Such an arrangement, however, is only practical or possible when one person is in possession of or has the means of securing the necessary capital for the establishment of the project.

Determine the amount of capital required to start your plan. Do not over-capitalize. A pretentious start may cause your business to be top heavy. Difficulties of over-capitalization are worse than those resulting from the lack of capital. Determine the scope of your business and capitalize accordingly.

Are you sure of your business ability? Can you sell your ideas? Your success will depend to a great extent upon your answers to these questions. You are now ready to use your selling ability upon those from whom capital may be obtained.

Modest amounts of money for business projects may be obtained by loans from

*The second of a series of articles of particular interest to Radio-Tricians contemplating starting a Radio business. The first article was by Mr. Gordon Birrel in the January, 1931, issue.—Editor.*

various sources. First is the bank. If you have established contact; are known as honest and capable, or if you can furnish collateral, funds may be borrowed. Second, industrial banks and small loan companies will loan amounts up to \$300.00 to men of good reputation and earning ability. Such loans are easy to obtain but have the disadvantage of carrying very high interest charges.

Third, if neither of the above two plans are possible, the only other sources of loans are from friends or relatives. Such transactions are personal. No general comments can be made regarding them.

If the plan is worth putting across, it is worth working hard for. Discouragement must not be felt at the first signs of failure to obtain the necessary cash. If a fellow is disheartened by failure to obtain money right at the outset, it is a mighty good indication that he had better stay out of the business altogether.

Often it is impossible for one person to swing the project. Lack of capital, lack of executive ability, or the demands of a larger business are the reasons that make it imperative to establish under the ownership of two or more persons. Joint ownerships may be set up either as a partnership or a corporation.

In a partnership two or more persons agree to go into business usually contributing equally to the capital and sharing equally in the profits. In many such cases one partner contributes his technical knowledge or business ability while the other partner (or partners) contribute the cash. All partners may be actively engaged in the business or the partners supplying the cash may be inactive or "silent."

In a partnership each partner is individually responsible for all the debts of the business.

(Please turn to page 13)

# RADIO-TRICIAN SERVICE SHEET

REG. U. S. PAT. OFF.

COMPILED SOLELY FOR STUDENTS & GRADUATES

## KENNEDY MODEL 20 SCREEN GRID CHASSIS BUSH & LANE MODEL 12

These receivers are tested at the factory with particular "peppy" screen grid tubes to prevent them from reaching the user in an unstable condition. In the event a set oscillates a number of methods are available for overcoming the trouble.

First with a one mfd. condenser and pair of short test leads, test across each section of the 10-section by-pass condenser for an open or defective capacity unit.

If set oscillates over entire dial range, it is possible that the detector output filter is defective, and a new one may be tried.

Lower screen voltages will stop oscillation. A tap on the voltage divider resistor is provided to lower all screen voltages.

The R.F. tubes have individual biasing resistors, and, by replacing one or more of these by resistors of higher resistance value the oscillation may be stopped. Under no circumstance must the detector biasing resistor be changed in value, however.

The wires at tops of coil shields (to control grids) may have pulled sufficiently to bend coil lugs and permit more than 3/4 inches of wire (from shield to start of clip) to be exposed. Extra length here tends to cause an unstable set.

Receivers will occasionally oscillate when upside down—or with bottom removed. When testing for stability have set right side up with bottom screwed on.

No change in resistors or wires should be made until it is certain that the trouble is not due to tubes or an unusually high line voltage. Some sets near oscillation point will be unstable without ground wire.

If receiver oscillates at just a small spot or two of dial range, it may frequently be corrected by pushing a piece of solid, bare copper wire between the grommet and coil shield (barely through) of the second R.F. coil shield, and twisting a few times around the wire leading up to the control grid of the second R.F. tube.

The volume control operates by varying the screen voltage, and so, operates as an oscillation control as well. Receivers that show a tendency to oscillate will usually do so only with volume turned full on.

### Resistors

The resistance values of the various colored biasing resistors employed are as follows:

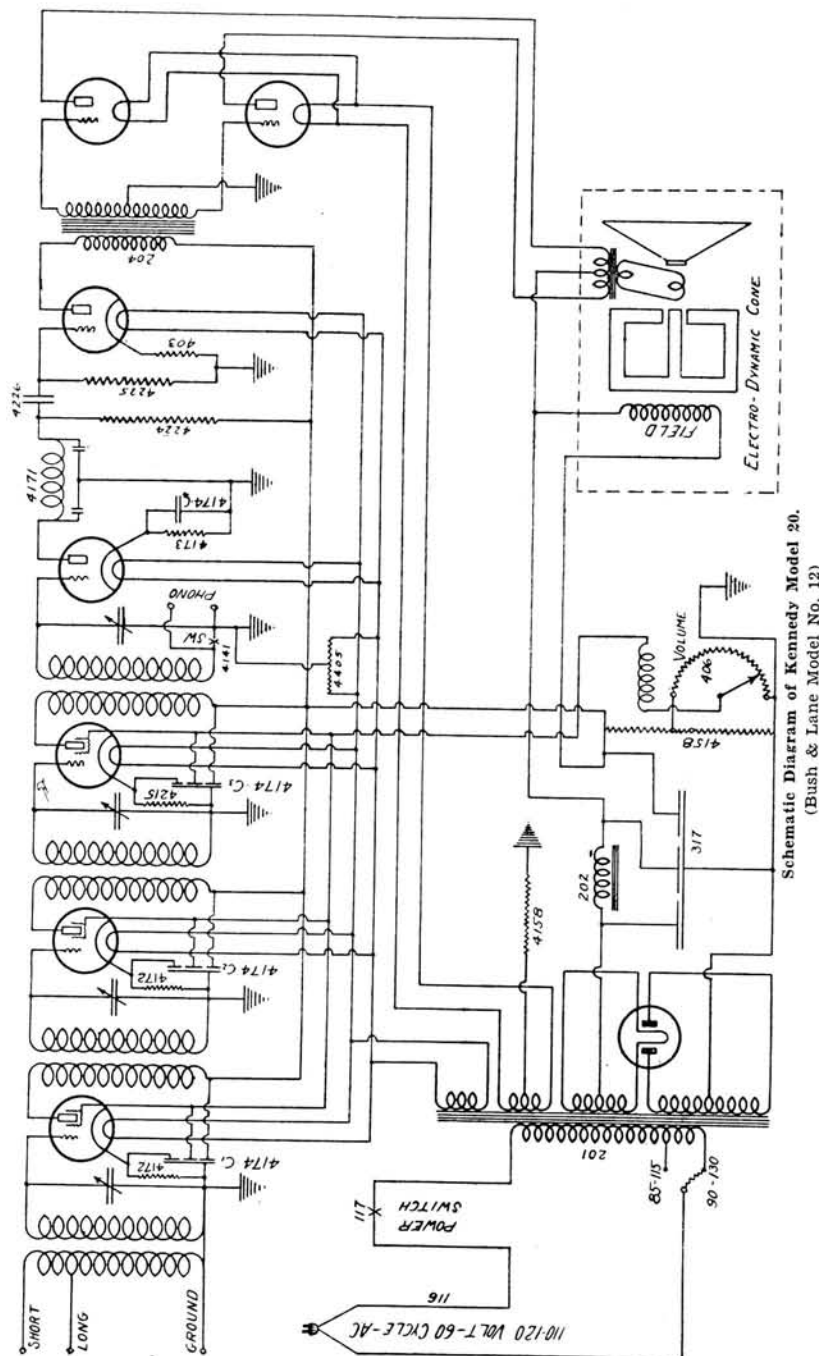
Green .....	3,000 ohms
Blue .....	5,000 ohms
Grey .....	10,000 ohms
Yellow .....	50,000 ohms
Brown .....	500,000 ohms
Red .....	1,500 ohms

### VOLTAGE READINGS

Voltage control on full. Line voltage 115 volts.

Tube	Filament	Plate	Bias	Screen
First R.F.	2.3	170	3.5	65
Second R.F.	2.3	170	3.5	65
Third R.F.	2.3	170	3.5	65
Detector	2.3	125	16	..
First A.F.	2.3	156	9	..
Power tubes	2.35	230	46	..
Rectifier	4.8	...	..	..





Schematic Diagram of Kennedy Model 20.  
(Bush & Lane Model No. 12)

## NEWS OF THE RADIO WORLD

### Motor Bus Radios

As in the case of radio aboard trains, foreign countries are showing the way to the United States in adopting radios for the entertainment of omnibus passengers. A Czechoslovakian concern is equipping all of its buses with radios. Only a handful of the more enterprising bus lines in this country have equipped their coaches with radio to relieve the monotony of long journeys. This is going to give some "wide-awake" Radio-Tricians an idea and before long more buses in America are going to be radio equipped. Who's going to be the first to write the "NEWS" and say he has a contract to equip a bus with Radio?

### Huge C. B. S. Contract

Old Gold has signed a new contract with the Columbia Broadcasting System, entailing an expenditure for time alone of \$561,704 during 1931. Starting Jan. 27th, it will use a network of 66 stations for two 15-minute broadcasts a week. Business is surely looking good for the broadcasters.

### Radio Tax Held Unconstitutional

South Carolina's proposed state tax on radio receiving sets has been declared unconstitutional by the state's own supreme court, thus ending the first effort in the short history of American broadcasting to levy fees on the listening public for the reception of radio programs. Station WBT, Charlotte, N. C., fought the case through the courts, backed by other broadcasters and the radio manufacturers.

(Please turn to page 16)

## CAPITAL

(Continued from page 10)

The corporation eliminates the disadvantages of the partnership. It consists of a group of people (not less than three) who purchase stock in the enterprise—the money thus raised being used as capital. The business is conducted by a board of directors, elected by the stockholders, who are entitled to votes proportionate to the stock they hold. In the corporate form of business the owners (stockholders) are liable for the debts of the corporation only to the extent of their corporate holdings.

### THIS MONTH'S COVER

One of the giant new tubes of KDKA used in their super power experiments. Standing six feet tall, and requiring tons of cooling water each hour to prevent overheating, these tubes represent another step in the forward stride of Radio Broadcasting, for which the Westinghouse station is famous. On good authority it is learned that KDKA's ultimate goal is 6 of these tubes in simultaneous operation, representing broadcasting power of 1,200,000 watts or the electrical equivalent of over 1600 horse power.

To organize a corporation, it is necessary to get permission from the State Government in the form of a charter obtained by application to the proper authorities and meeting certain conditions in accordance with the various state laws.

The sale of stock in a corporation may be general or may be limited to a small group of entrusted persons. The latter is most common in the case of small corporations organized for the

purpose of conducting a local business. In such a corporation the person or persons are often given stock in return for their participation in the affairs of the company. Such remuneration may or may not be supplemented by a fixed salary or other compensation.

Regardless of the form of a business project, its credit standing and its ultimate success must and will depend largely upon the character, ability, and industry of those men in whose hands the responsibility for its conduct rests.

"Old Phil Philosopher" says "There can be no triumph unless you have difficulties to triumph over."

## ALL BRANCHES OF RADIO HONEYCOMBED WITH YOUTH

(Continued from page 8)

Lieut. Comdr. T. A. M. Craven, U. S. N., who is almost invariably included in American delegations to international radio conferences, is 37. Col. Thad Brown, general counsel, is 43, but his three assistants, Ben E. Fisher, Paul D. P. Spearman and Duke M. Patrick, are 40, 32 and 30, respectively.

At the Bureau of Standards, Dr. J. H. Dellinger, radio chief, is 44. The chief of naval communications, Capt. S. C. Hooper, is 43. Maj. Gen. George O. Gibbs, chief of the Army Signal Corps, confesses to be "nearing the retiring age," which means he has been out of West Point about 30 years.

Dr. Alfred N. Goldsmith, who heads the engineering staff of the R.C.A., is only 41; John Hays Hammond, Jr., noted inventor, is 40, and Maj. Edward H. Armstrong is 38. John V. L. Hogan confesses to being "about 40," as does Lloyd Espenschied of the American Telephone & Telegraph Co., whose able conferee, Laurens Whittemore, is just 38. Harry Evans, Westinghouse's superintendent of broadcasting, is 32.

Louis G. Caldwell, former general counsel of the Federal Radio Commission and now chairman of the communications law committee of the American Bar Association, is only about 40. B. M. Webster, Jr., also a former counsel of the commission and now also in private practice, is just 30, a year or two younger than Paul M. Segal, his former assistant and present associate, and Phillip G. Loucks, counsel and prospective secretary of the National Association of Broadcasters.

It is youthful zeal, which makes many of the oldsters as keen about radio as a hobby or profession as any of the youngsters. Hiram Percy Maxim, the inventor, says he was 40 when he first began to learn the code; now he heads the American and world amateur radio organizations.

*Martin Codel is in a fine position to see the successes of young men in Radio. His work as journalist places him in close contact with the Radio Industry with a chance to see the opportunities and promotions to positions of great responsibility.*

*N. R. I. is proud of the fine record made by its graduates, many of them very young men. Pages could be filled telling the forward stride of youthful N. R. I. graduates and students.*

—Editor.



## RADIO IN FACTORIES

By DON B. LOONEY  
N. R. I. Technical Staff

Another outlet for Radio—another source of financial earnings for the men following the Radio Profession. Radio is going into factories.

To aid factory workers speed up production—to help relieve monotony, Radio loudspeakers are being installed, and the favorable results will cause an increased demand and consequently additional employment of Radio men.

It all started about two years ago. The employers of the Chair City Upholstering Co. of Garden City, Mass., asked their employees to work overtime. The workers consented, provided the employers would install loudspeakers so the presidential campaign speeches could be heard. So was born a branch of Radio which promises to flourish.

Reports have been received from a factory executive showing a production increase of 17½ per cent due to Radio installations in factories. The same executive states jazz is the best form of music to speed up work. Speeches slow up production as workers try to catch every word. Some employees say that classical selections are most beneficial due to a soothing influence on the nerves.

Cigar factories, especially those manufacturing hand-made cigars, long ago employed readers to keep the minds of workers off the dull routine of their work. They are rapidly turning to Radio.

Radio factories were prompt to see the advantage and adopt the idea. R. C. A.-Victor; R. C. A. Radiotron; CeCo and Philco were among the first to turn to this efficiency idea.

I look forward to factories in increasing numbers installing Radio systems for entertaining their workers and speeding up production. Consequently additional Radio men will obtain employment as a result.



*Graduate J. A. Flick of Charlotte Hall, Maryland, says that Radio business is good with him and has been right along. He is getting all the work that he can take care of.*

### A FAMILY AFFAIR

My husband thinks there isn't anything like the N. R. I. I study right with him. Only wish I could take the course. It sure is interesting.

As a result of those business cards, he has had enough service work to pay for a tester, and a real one, too.

Our two boys are crazy about Radio! When they get old enough they are going to be N. R. I. students, if I have to work by the day to pay for their courses.

My husband, when he is home, is either reading, reviewing, or doing experimental work and I am right with him. I love it. We both would very much like to see you personally.—Mrs. Walter Scott, Marion, Ind.

### GOOD IDEA—CLAIR

When the business cards came, everything changed. I had enough cards printed to place one in every house in town. Well, things started moving then.

I received my first job that day and ever since I have been getting work regularly. Just today one of the business men in town asked me to fix up his early model electric A. K. radio. It had not worked since last summer. The local repair man told him it was not worth repairing without looking at it.

*I have a five tube ECHOPHONE all electric mantel radio which I allow the Radio owner to use while I repair his set.*

I also have a spare time job selling for a local dealer.—Clair Musselman, New Holland, Pa.

### YOU'RE WELCOME, ED!

I appreciate the check you mailed me for the enrollment of a new student. It was something that I did not expect. I only did what I thought was right for him, because I know what the course did for me. I clear every month enough to pay my rent, clothes, pleasure, and during the holidays bought over \$35.00 worth of toys for the kiddies. My repair service, which is a nice little business, I've built through your Business Cards. Edward Twick, Chicago, Ill.

### BLAIS PLANS AHEAD

The year of 1930 has been a very profitable one for me in Radio and 1931 is starting out equally fine. In a few moments, when I finish writing this letter, I am going to install three Radio receivers which I sold this morning, two at \$230 each and one at \$223.

My program is quite elaborate for the coming year. It comprises several lectures on Radio, a series of articles on amateur work for a very

prominent Radio magazine. Also there are numerous experiments to be made. All this, besides selling and servicing Radios. In early May I will have ready for sale several short wave receivers which are now on my work bench going through final adjustment.—Alphy L. Blais, Theford Mines, Canada.

### WARNER'S IDEAS

I have been in Radio for the last six years. I have made mistakes—and I have corrected them, and I am going to give N. R. I. students and graduates the benefit of my experience. Below are listed seven important features, which I believe they will do well to bear them in mind at all times. They mean dollars in your pocket.

1. Be prompt on all service calls.
2. Don't keep a customer waiting too long for his set.
3. Do a job thoroughly; don't fix one trouble then stop. Test the set thoroughly—there may be some other troubles.
4. Convince the customer you know what you are doing. Invite him to your shop. It is good advertising.
5. Be honest—be frank.
6. Don't make promises you cannot fulfill.
7. Make a profit but don't overcharge.

—Walter I. Warner, Cambridge, Maryland.

### WITH R. C. A.-VICTOR

I received my Diploma and am mighty proud of it. I want to thank everyone at the N. R. I. for helping me get ahead in this great field of opportunity. Only for N. R. I. I would still be plugging away at my old job. I am now working at the R. C. A. Victor Plant in Camden, New Jersey, and building up a Radio business of my own in spare time.—Fred E. Wright, Philadelphia, Penna.

### BUSINESS IS GOOD

I want to thank every man in the N. R. I. organization for the service that students get from the Institute. I believe N. R. I. is the best organization of its kind in existence today.

Business has been fine—my partner and I are getting our share.—Adolph B. Dusek, Hallettsville, Texas.

*Student Frank Oremus of Long Beach, California, in a humorous vein, gives his impression of the Service Man on the job, in his cartoon below.*

