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# « THE » "TECHNICIAN"

SEPTEMBER, 1935

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AND

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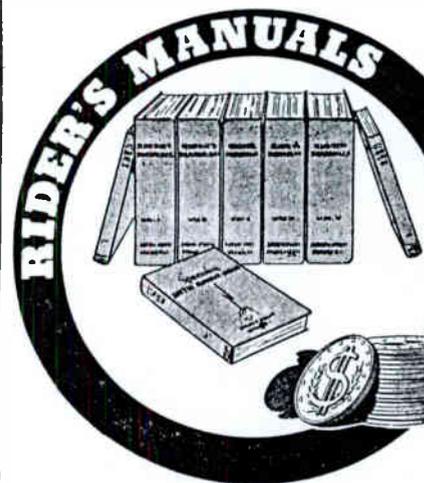
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# The "TECHNICIAN"

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September, 1935

No. 12

## ORGANIZATION

By The Editor

In President Roosevelt's recent radio speech to the young people of the United States, he said in effect that we should climb but we should not climb by pushing others backward. Let us consider ourselves for a moment fundamentally citizens of the United States and, more specifically, members of the radio fraternity.

Then, we can carry President Roosevelt's admonition and advice, as outlined in the above remark, a little further. We must bear in mind that we must push others who are ahead of us further forward in order to make room for ourselves on the next rung of the ladder. We might well observe the world-famous mountain climbers in the Swiss Alps and other mountain climbers, for that matter, who have made a name for themselves by scaling the highest peaks, overcoming almost impossible difficulties.

These apparently superhuman feats are nearly always accomplished by groups who link themselves together with ropes so that their ascent may be made simultaneously, each helping the other, or

others, one at a time, over the rough spots.

The members of the radio service profession need these ropes just as much as climbers in the Swiss Alps. By uniting their efforts and lending a helping hand in the general interest of all, with a secondary interest in the individual at certain necessary points, we may advance substantially towards the goal which we all have in sight.

These remarks, then, are on the behalf of organizations of service technicians, dealers and other groups whose common interests and aims allow them to unite. If you do not belong to an association, you should immediately do so. If your locality does not afford such an organization, get together with other leaders in your neighborhood and form one, but by all means make some effort to ally yourself with others whose purposes, aims and problems coincide with yours. Then, by well-planned, comprehensive and intelligent action push the entire radio industry forward, step up on the next rung of the ladder and help your fellows up with you.

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# THE ELIMINATION OF INTERFERENCE

(Reprinted by Special Permission from Aerovox Research Worker.)

The public calls all radio noises "static." Before opening our discussion of this subject, we should first define what is meant by natural atmospheric static and "man-made static."

Strictly speaking, static is caused by natural discharges only, such as thunderstorms and lightning. This type of interference cannot be eliminated at the present development of the radio art and we therefore are not concerned with it in this article. All other kinds of noises and interference are caused by electrical machinery, including the radio itself; it is not static and can be eliminated in most cases, if the source can be ascertained.

This interference, or noise, also called "man-made static," can be subdivided according to its source into noises originating in the receiver itself, noises caused by someone else's receiver, and noises due to electrical discharges or sparks in electrical wiring or appliances.

Noises originating in the receiver are generally due to bad connections, defective tubes, condensers, resistors or transformers. Such an interference is of the frying and sputtering kind. Sometimes it may be intermittent and the cause is then rather hard to locate. In general, whether the noise is in the receiver or not, can be determined by disconnecting the aerial and ground, short circuiting the antenna and ground connection and, using a line filter, and then trying the receiver. If the noise persists, it originates in the set. Removing the tubes one by one will often help to find the trouble. When the noise stops as a tube is removed, the noise starts in that stage or those ahead of it.

Squeals or howls may be due to an oscillating condition in your receiver or your neighbor's receiver. It may also be caused by acoustic feedback between the speaker and some part of the set.

By far the greatest difficulty is encountered with noises of the third type, or those caused by electrical machinery. The causes of it all are the electric motors, switches, etc., which make or break a current suddenly, giving rise to a dampened oscillatory discharge. A wave is then propagated along the power line as well as along any other wires or metal objects connected to the device. The energy is also being radiated by these conductors, so that it can be transmitted to the receiver by way of the antenna.

The part which follows the power line may be conveyed to the receiver by

way of the power cord and cause noise. However, the radiated energy is picked up by every conductor in the vicinity, including the antenna, ground, as well as neighboring pipes, wires, etc. The antenna itself will bring the noises to the set, but if the antenna did not pick up the noise direct, it is still possible that it is capacity coupled to some other wire and picks it up in that way.

Obviously, the most effective remedy is to check the noise at its source, by preventing the propagation and radiation by means of a capacity filter. Electric motors, or other noise making machinery should be supplied with a filter consisting of two condensers in series across the line with the centertap grounded. It is important in this case to place the filter as close as possible to the spark so that the wires between it and the filter are not long enough to be effective radiators. Also, the centertap must be grounded to the frame of the machine, not to an independent ground, for this would complete the r. f. circuit through considerable length of power wire which causes radiation.

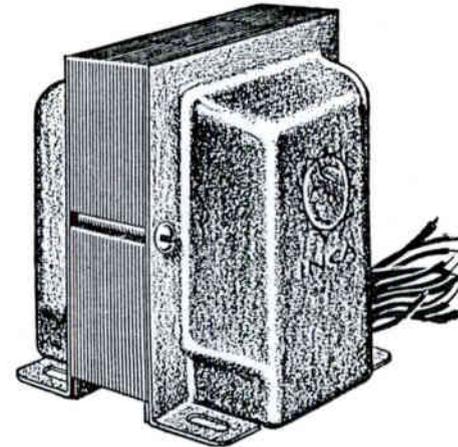
When more leads leave the interfering machine, they all should be filtered in the same way, with a filter placed on the machine and grounded to the frame.

A line filter used at the receiver can of course do only half a job, because some of the interference is coming by way of the antenna circuit. In order to eliminate this, too, it would be necessary to be sure that the antenna does not pick it up by placing the antenna far away from the interference source and to conduct the signal to the receiver by a lead-in which does not pick up anything. Good results can be obtained by a transposed or twisted lead-in.

It is also necessary to pay more attention to the ground. A gas pipe or steam pipe travels a long way before it finally reaches ground, and underway it can have disturbances induced in it, or it can even be connected to interfering machinery. It stands to reason that this type of noise will also enter the set. A very short lead to an independent ground would be the best remedy.

The small indoor antenna often picks up noise, for the reason that it is closely located among the sources of interference, and it works as an antenna coupling to neighboring conductors. All these conductors, however, may have noise induced in them as they are really a part of the antenna.

# INCA Transformers



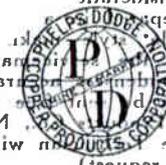
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## DOUBLET ANTENNA APPLICATION

By FRED H. COLE Jr., Engineer  
Electric Products Service

With the trend of the modern receiver toward multi-band reception, many of the manufacturers are designing their antenna coils to definitely operate upon a balanced type doublet antenna. It will be noticed that many of the new model 1936 receivers being announced are equipped definitely for this type of antenna input. It might be well to bring to mind the fact that many of these receivers are of a marked higher efficiency than some of the previous models but one must bear in mind that to gain this efficiency, more efficient voltage transfer throughout the receiver must be maintained.

Therefore, the heretofore neglected antenna circuit must not be overlooked to obtain the full efficiency for which the new receivers are designed. In designing receivers for balanced type antennas, manufacturers have had in mind many of the advantages that may be obtained by such a system. Probably the most important of all is the marked improvement in signal to noise ratio. Second, the advantage of being able to use an extremely long lead-in, without extreme noise pick-up, less actual signal voltage loss from the antenna to the receiver on a coupled doublet than would be encountered on a straight wire antenna using an unshielded lead-in, and of course a great deal more efficiency than would be obtainable with a single shielded lead-in. Also there is the increasing demand for multiple installations in apartment houses and large public buildings, where many receivers are required to operate off one antenna. A properly designed antenna and transmission line system has proven to be extremely efficient and very satisfactory.

It might be well to bring to mind at this time the fact that with an ordinary antenna, equipped with an extremely long lead-in only 10 to 35 per cent of the signal voltage in the antenna will be delivered to the receiver, and of course will be accompanied with a large amount of noise. Whereas with a properly installed doublet antenna, with suitable coupling unit, under the same conditions 90 per cent of the voltage at the antenna would be delivered to the receiver, with great improvement in signal to noise ratio. The aforementioned demand for large apartment house installations and large residence installations requiring many receivers on one antenna together with the manufacturers'

trend toward design of receivers for doublet antenna installations work hand in hand and with these facts in view the writer is preparing technical data and curves which will enable the technician to go after this type of large multiple installation which has been sadly neglected in this territory. (A further discussion of this important subject, accompanied by curves of actual measurements will appear next month).

### HELPFUL CONDENSER FOLDER OFFERED FREE

A new folder, "Facts You Should Know About Condensers" just issued by Sprague Products Co., makers of "600" Line Condensers, should prove both interesting and helpful to every serviceman and radio amateur. Not only does the information contained in this folder state the honest facts about condensers and condenser claims, but it likewise shows how you can distinguish between good and inferior condensers, thereby obtaining better value for your money.

Particular attention has been paid to determining the true quality of Dry Electrolytics through the four essential factors of (1) Power Factor; (2) Leakage; (3) Capacity and (4) Voltage. Actual tests are detailed showing how reductions in power factor will result in greater condenser efficiency than any reduction in leakage. This is due to the fact that high resistance electrolytics give high power factor which seriously affects filtering and produces heat due to ripple voltage. Tables and further tests demonstrate the inadvisability of attempting to judge condensers by quick leakage tests or without taking both power factor and leakage into full consideration.

The folder is prepared in a concise, easily understandable style making it readily possible for the serviceman or amateur to judge condensers accurately. A copy will gladly be sent free upon request to Sprague Products Co., North Adams, Mass. (The Technician will be glad to forward your request).

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**HOW TO OBTAIN FEDERAL HOUSING LOANS**

By Col. WM. H. EVANS

FHA Modernization Loans under Title I, may be secured by application direct to any FHA approved bank, building and loan association, department store, contractor or building supply house. The application form is short and simple. In most cases as no title search or escrow are involved, rapid service may be expected. Funds derived from Modernization Loans may be used to finance additions and alterations, and the purchase of household appliances.

Title II Loans are of a different character altogether. These funds are advanced by lending institutions for use in the purchase, construction and refinancing of one to four-family dwellings. The quickest and simplest method of getting a Title II Loan is to apply directly to your bank, building and loan association or mortgage company. When the application blanks are filled in, the applicant must also submit the following: (1) Four prints of one photo of front of property; four prints of one photo which shows adjoining neighborhood; (2) tax bill, also data concerning assessments, if any; (3) cashier's check, made payable to the FHA, at the rate of three dollars per thousand of loan amount; (4) in the case of new construction, three sets of plans, and three sets of specifications; (4-b) in the case of proposed alterations, three sets each of plans and specifications of contemplated changes. Upon the approval of the application the FHA will issue to the lending institution mortgage insurance under which the lender is fully insured against loss.

In these days of reconstruction it is interesting to note the progress made by the Federal Housing Administration as an important factor in the general aim toward economic security. A report dated August 17 shows that the Administration is making rapid progress on the road of real accomplishment. The figures given below seem to verify a report—for some time current in Washington circles—that Southern Californians are more progressive than some of their neighbors residing in the South and Middle West.

Figures under Title I (Modernization) are:

Loans made, 30,000.
Dollar value of Modernization Loans made.. \$11,400,000
Total Modernization work done..... 57,000,000

(Estimated on the basis of \$4.00 being spent for each \$1.00 borrowed)	
Average amount of Loan .....	370
Man days of labor created as a result of Title I work done.....	7,980,000
Figures for Title II (New Construction):	
Applications received (new construction)..	\$ 5,496,526
Existing construction..	7,382,847
Total .....	12,879,373
Average amount of Loan .....	4,122
Total Commitments issued .....	9,453,547

**MICA CONDENSER COLOR CODE**

By PAUL MacKNIGHT DEELEY  
Cornell-Dubilier Corp.

The value of small mica condensers, in micromicrofarads (mmf.), is given by three dots of any of these colors: black, 0; brown, 1; red, 2; orange, 3; yellow, 4; green, 5; blue, 6; violet, 7; grey, 8; white, 9. The method of reading the capacity is as follows:

The first dot corresponds to the first numeral in the value, the second dot to the second numeral, and the third dot to the number of zeros after the second numeral. For example, suppose the dots are brown, black and brown. Since brown corresponds to 1 and black to 0, the first part of the capacity figure is 10; the final brown means there is one zero at the end, so the capacity is 100 mmf. If the colors were brown, black red, the capacity would be 1000 mmf.

Radio service men accustomed to handling color coded resistors will have no trouble reading condenser values, as the ten colors have the same meaning in connection with resistance value except that the result is expressed in ohms instead of in million-millionths of a farad.

**MICHAEL GOES NORTH**

Claude Michael, West Coast Sales Manager for the M. W. Dunton Company, manufacturers of Nokorode Products, left September 1 for an extended sales trip through Oregon and Washington. Mr. Michael is well known to the radio trade throughout the west and we know his many friends up the Coast will be glad to see him and that his local friends wish him a pleasant and profitable trip.

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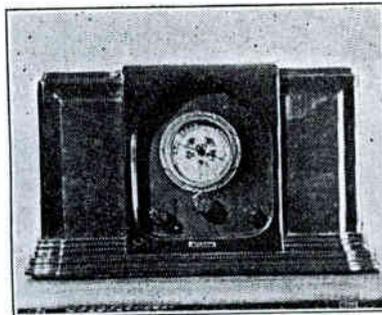
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MODEL 34D—4-Tube TRF.....	14.95	\$17.45
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MODEL 45—5-Tube Super.....	19.95	22.95
Walnut Cabinet—Full Vision Dial		

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## BOOK REVIEWS

Protecting and Selling Inventions Without Patents—Inventors' Service Bureau, Division of the Donley Publishing Company, 1931 University Ave., St. Paul, Minn. . . . . 50c

This is Volume 3 of the Library of Inventors' Manuals and is a very useful and informative manual, giving information on protection of ideas without patents. The Patent Law of the United States is very poorly understood, particularly by those who need the knowledge most, namely, inventors. Therefore it is of utmost importance for all persons who are interested in the development of ideas and devices to obtain knowledge as to how the fruits of their efforts may be protected against infringement. It is impossible in this space to give a clear idea of the contents of this valuable book. However, the chapter heads, which give an indication as to the information contained therein are as follows: Protecting and Selling Inventions Without Patents; What is a Patent? The Protection of Unpatented Ideas; Another Important Step; What Price to Place on Unpatented Ideas; Contracts with Manufacturers; The Kind of Ideas That Sell Best; How to Write to Manufacturers.

Practical Radio Communication—Arthur N. Nilson and G. N. Hornung, McGraw-Hill Book Company, 330 W. 42nd St., New York City . . . . . \$5.00

These well-known writers with a recognized ability for presenting theoretical information in a practical and easily understood manner, bring the radio fraternity a new volume especially planned for home study and as a help in studying to pass all classes of examinations for radio operators' licenses. It is a book for the experienced operator, station technician, or man just entering the field, who wants to review or increase his knowledge of essential information in preparation for a license in any branch of practical radio operating. It contains a full treatment of radio and electrical background and goes rather deeply into alternating current theory. Particular attention is paid to broadcasting equipment, including transmitters, control room and studio equipment, studio acoustics, etc. Explanation is facilitated by the use of many illustrations and diagrams. It covers the fields of broadcast, ultra short wave, police, radio-telegraphic and radio-telephonic, aviation radio, direction-finding equipment, testing and maintenance, marine medium-frequency equipment, high-frequency

(Continued on Page 25)



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## SERVICE KINKS AND PET EQUIPMENT

**EDITOR'S NOTE:** Through the kindness and courtesy of Mr. H. K. Bradford, President of the Capitol Radio Research Laboratories, we are able to publish the following material taken from the manual, **CASE RECORDS OF BROADCAST RECEIVER REPAIRS.**

### ATWATER KENT MODELS 55, 60—MOTORBOATING

A continuity test of all choke coils of the r-f system is advised. A difference of two ohms in the resistance from the correct value will cause this trouble. The construction of these chokes will sometimes permit a short of this kind.

### BOSCH MODELS 242, 243—IMPROVING TONE AND VOLUME

Remove the audio coupling condenser (.05 mfd.) between the detector plate and first audio grid. Also remove the 1 meg. resistor in the plate circuit of the 56 type detector. Connect the open lead on the volume control to the 56 tube plate and the job will be completed.

### CROSLY MODEL 130—WEAK; OSCILLATION; HUM

Check for a defect in the 4 mfd. section of the dual cardboard type condenser (300 volt dry electrolytic type). Also check for an open in this condenser. The use of a 450 volt unit of the same capacity value is recommended for replacement.

### EVEREADY MODELS 30, 40—HIGH VOLUME OSCILLATION

Check the line voltage, making sure that it is not over 110 volts. Adjust the variometer for no oscillation by loosening the mounting screws on the end of the condenser gang shaft and turning its stator.

### FORD MODEL 1935—IGNITION INTERFERENCE

It has been found that a 1 mfd. condenser connected from the hot terminal of the storage battery to ground at the gasoline gauge is essential. Other proven remedies not of the usual nature consist of the following: Complete shielding of the hot "A" lead, and the use of a shielded wire from the resistor connection on the instrument panel to the distributor. Remove the old wire and ground the shield to cowl, engine and body.

### MAJESTIC MODELS 15, 55—OSCILLATION

It is a good plan to replace the detector coupling condenser (.05 mfd., 400 volt), located behind the resistor board rear wall. This will solve most oscillation cases in these receivers.

### MAJESTIC MODEL 50—NO CONTROL OF VOLUME

If it is found impossible to reduce the volume on this receiver, place a 10,000 ohm resistor from the centertap of the front section of the control to the white lead on the rear of the control. This has been found quite satisfactory as a permanent repair.

### MAJESTIC MODEL 90—TUNABLE HUM

In many cases the antenna choke connected from the antenna post to ground will give trouble. This is true when the antenna has been accidentally given a high voltage charge such as lightning, etc. Replace this choke to remedy the difficulty. An ohmmeter test will not disclose the trouble in every case.

### MAJESTIC MODEL 90B—DEAD; NO PLATE VOLTAGE

Disconnect the set leads from the power pack and turn the set on for about 45 seconds. This usually effects a permanent cure of the trouble.

### MAJESTIC 400-A SERIES—LIQUID HUM

Choose the best of several 6D7 detector tubes. If a mechanical jar causes intermittent reception it is probably due to loose filament in the 46A or 46B ballast tube—replace.

### PHILCO MODEL 18—INTERMITTENT FADING

This is most usually due to the primary of the first i-f transformer opening up. The i-f is 260 kc.

### PHILCO MODELS 19, 89—OSCILLATOR DEAD

An open in the by-pass condenser across the oscillator bias resistor will very often cause this trouble. Use a .0007 mfd. condenser for replacement. In the later model using the type 77 detector-oscillator, the value of this condenser has been increased to .0014 mfd.

### PHILCO MODEL 54—DEAD

Check for an opening in the oscillator coil winding connected to the anode grid of the 6A7 tube.

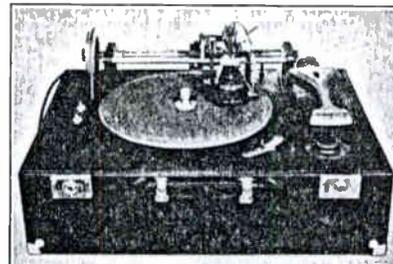
## AUTO-INTERFERENCE SUPPRESSOR-CONDENSERS

A line of auto interference-suppressor condensers designed to reduce background noises to a minimum and thereby permit modern auto-radio sets to operate at maximum sensitivity and volume, is announced by Aerovox Corporation, Brooklyn, N. Y. These units have been specifically designed for auto-radio use. Because of extreme temperatures and severe vibration encountered in such service, the units are extra ruggedly built, housed in heavy casings and thoroughly sealed and impregnated. Among the units available are generator condensers with side bracket and special curved bracket for Ford generators, ammeter condensers, dome light filters, oil-filled vibrator condensers, oil-impregnated paper tubular vibrator condensers, and a wide assortment of exact duplicate replacements for the auto-radio set itself. Special bulletin describing the line may be obtained by writing the manufacturer direct.

## TROY MOVES

The Troy Radio Manufacturing Co. moved its headquarters to 1142-1144 So. Olive Street on the third of September. There they will have greater facilities for manufacturing and distributing their complete line of equipment and rendering prompt and efficient service. The new location is central with free, easy parking and away from congestion. A full line of Troy radio receivers, AC, AC-DC, battery and auto models, 4 to 12 tubes, will be available through the complete stock at the new address. Also, a complete stock of radio parts and supplies, radio test equipment, power amplifiers and public address systems will be available. Troy radios are being distributed on the West Coast from Canada to Mexico, including Salt Lake City, Utah and Phoenix, Arizona. Also, through their export division, Frazar & Company, of San Francisco, eighty foreign countries are supplied with Troy merchandise. We compliment the Troy firm on their new headquarters and wish them success.

# Radiotone Recording Equipment



Model A-78

Radiotone  
Acetate  
Discs

Write for Catalogue

Radiotone Recording Co.

6103 Melrose Ave.

GRanite 6972

Hollywood

## THE HOUSE THAT RADIO BUILT

(Reprinted by Special Permission from July Coyne School News.)

(We gratefully acknowledge our indebtedness to National Broadcasting Company, Inc., for all technical data appearing in this article.)

So many of our readers have expressed an interest in the construction and operation of the broadcasting studios in the world-famous Radio City, that we recently communicated with the National Broadcasting Company who kindly supplied us with a very interesting description which we take pleasure in reprinting in part in this issue of The News.

We know, of course, that radio has progressed a long way since the days of the handful of amateurs with their crude transmitting and receiving equipment. This fact is brought home to us with even greater emphasis when we think back to the birth of KDKA in a garage at Pittsburgh, in 1920, and then com-

pare its humble birthplace with the breath-taking massiveness of Radio City.

No description in the limited space provided in these columns could do adequate justice to the wonders of this imposing structure. We, therefore, confine this article to a brief description of some unusual features of the greatest broadcasting studios in the world.

On November 11, 1933, the new studios of the National Broadcasting Company were officially opened in the RCA Building. Towering 836 feet above street level, the central structure of Radio City contains 2,113,000 square feet in its seventy floors. Seventy-four high-speed signal-controlled elevators, twelve of which are reserved exclusively for the use of the NBC, serve tenants of the building.

### Largest Broadcasting Studio

On the eighth floor is located the mammoth Auditorium Studio, the largest broadcasting studio ever built, measuring 78 feet deep, 132 feet wide and 30 feet high. About 1,200 seats can be placed on the main floor and the balcony accommodates over 200 guests. The stage is made in two sections so that the front and rear sections telescope, permitting expansion and reduction of stage size. A

public address system enables guests in the rear of the studio and in the balcony to hear without difficulty. The problem of properly air conditioning a studio of this size can be readily appreciated when it is pointed out that 309,000 cubic feet of air is necessary to serve the 1,500 seating capacity on the basis of a complete change of air approximately every ten minutes.

### Broadcast Equipment

The master control desk is really the "Nerve Center" of broadcast activities at Radio City. It is twenty-seven feet long and has approximately 3,700 lamps and keys mounted on its face. The desk consists of a middle supervisory section and left and right sections which are duplicates.

The system that this desk controls consists basically of fourteen channels or circuits to which a program may be fed. For example, one channel always feeds WEAf and another always feeds WJZ; another feeds the Red network and still another the Blue network. A program is correctly routed by means of relay switch banks, of which there are sixteen in all, eight each for left and right sections. As the switching time arrives, the announcer in the studio to go "off" pushes a release button which drops all channels and immediately thereafter the announcer in the studio to go "on" receives a green light. He, thereupon, presses a set-up button which automatically picks up through the particular switchbank that has been selected, the channels required.

The middle portion of the master control desk is set aside for the supervision of outgoing and incoming programs by the control supervisor, who may check by means of push-buttons, indicating lights and loudspeakers, any program leaving or entering the Radio City unit. He also has at his disposal a small telephone keyboard with direct telephone lines to important locations.

### Main Equipment Room

Studio visitors rarely are shown the equipment room located directly behind the master control desk. This room, however, contains many marvels of compact, powerful engineering developments. These are a total of 188 amplifiers, 140 of which are D. C. and 48 A. C. operated. Most of the latter are used to feed studio loudspeakers. Each of these A. C. amplifiers is remotely controlled by buttons on the particular studio control room console to which the amplifier is wired. There are 10 so-called headset monitoring amplifiers which feed a system throughout the studios whereby the announcer may listen to a program by means of a telephone headset, to determine when to switch and when to make announcements.

### The Power Room

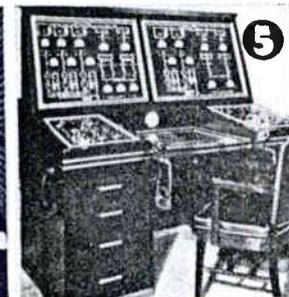
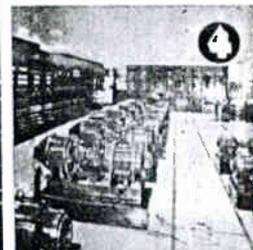
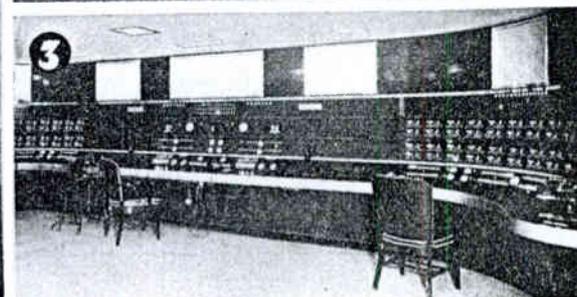
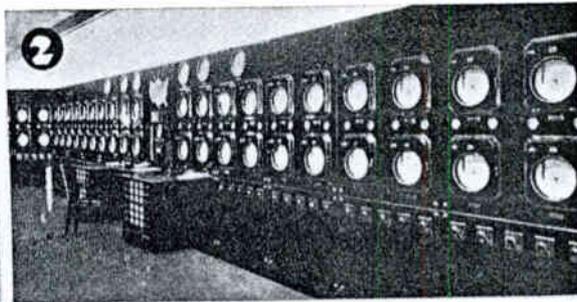
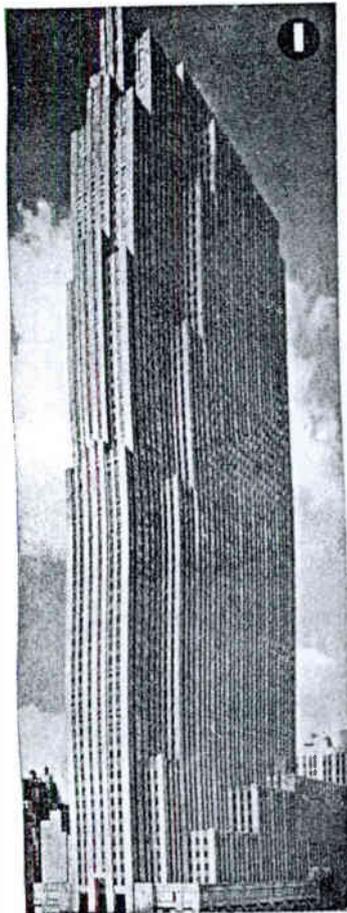
Located on the fifth floor is the power room, which is the distribution point for all broadcast power in the Radio City Plant. The power control desk has miniature supervisory equipment by means of which the operator on duty can observe at a glance the current and voltage values, which machines are on the line, and which lines are alive. In the battery room are two main "A" batteries, each with a capacity of 1,000 amperes for 8 hours, two main "B" batteries, each with a capacity of 15 amperes for 8 hours, two other batteries; one service "A" and one service "B" (with 8-hour capacities of 300 amperes and 3 amperes, respectively), and finally two other small batteries used for special purposes.

### Studio and Control Room Equipment

The equipment in the control room consists of a control console where the microphone output is regulated, amplifier banks with one amplifier for each microphone fader position on the console and a high quality loudspeaker.

The announcer's control equipment is mounted on the studio wall at one side of the window in the control room. The facilities allow the announcer by depressing the proper buttons, to connect or disconnect the studio to or from whatever program channels have been pre-set at the master control desk. He may make

(Continued on page 21)



1. A striking view of Radio City.
2. Control board of air conditioning system
3. Master broadcast control desk
4. A view of power room
5. Power control desk
6. A Studio control room

## GENERAL CONDENSER INFORMATION

By Eng. Staff Sprague Products Co.

### 1. How to connect condensers in parallel.

The equivalent capacity of condensers connected in parallel is the sum of 2 or more so connected.

$$C = C^1 + C^2 + C^3$$

Example: A 6 mfd. condenser is required in a filter circuit and having only a 2 and a 4 mfd. condenser on hand we combine the two in parallel to give us the required 6 mfd.

$$C = C^1 + C^2$$

$$C = 6 \text{ mfd.}$$

2. Do not connect condensers in series if you can avoid it. Practically impossible to equalize voltage on each condenser when connected in series. Danger of overloads on smaller capacity.

3. Mount electrolytic condensers as far away as possible from sources of heat such as rectifier tubes; power transformers and high voltage resistors.

4. Do not use acid flux when connecting condensers in circuit. Use pure rosin core solder to prevent corrosion. All connections should be hot soldered joints.

5. Proper sealing, low leakage and low power factor just as important as correct capacity and correct voltage.

Capacity Conversion Chart			
Microfarads To Micromicrofarads		Mmfd. To Mfd.	
Farads	Mmfd.	Mfd.	Mmfd.
1,000,000	Mmfd.	1,000,000	Mmfd.
Mmfd. = Mfd. × 1,000,000			
Mfd.	Mmfd.	Mfd.	Mmfd.
10 =	10,000,000	.006 =	6,000
8 =	8,000,000	.005 =	5,000
6 =	6,000,000	.004 =	4,000
4 =	4,000,000	.003 =	3,000
2 =	2,000,000	.002 =	2,000
1 =	1,000,000	.001 =	1,000
.75 =	750,000	.0005 =	500
.5 =	500,000	.0004 =	400
.25 =	250,000	.00025 =	250
.1 =	100,000	.0001 =	100
.08 =	80,000		
.06 =	60,000		
.05 =	50,000		
.02 =	20,000		
.01 =	10,000		

To be home owners, actually, rather than theoretically, conditionally, haz- ardously, is one of the worthiest ambi- tions of any person, and the realization thereof is the surest safeguard of National Government.

## CRTA CLEANS HOUSE

During several special sessions of the Board of Directors of the Certified Radio Technicians Association many drastic steps were taken to promote the general welfare of the organization and its progressive members.

Among other important actions taken by the Board of Directors at this time was the striking off the membership list of more than one hundred names because of their failure in one or more ways to meet, or strict adherence to, qualifications demanded by this organiza- tion.

The final plan provides for meetings to be held every other Wednesday night, beginning with the second Wednesday of September in the Turn-Verein Germania at 936 W. Washington Blvd. This is a well-known hall offering excellent facilities for meeting and for dining, when desired. Dr. John F. Blackburn, well-known consulting physicist and radio engineer, will alternate with Richard G. Leitner, eminent radio design engineer and lecturer, at these meetings. A technical committee has planned with Dr. Blackburn and Mr. Leitner a compre- hensive, intelligent course of valuable lectures. No organization could offer more to the progressive radio technician than the technical advice and lectures of these two outstanding authorities in the field of radio service and design engineering.

The membership will be strictly limited and all members of the radio industry who are interested in becoming affiliated with this organization are urged to establish their membership before the organization is closed to new members. All Certified Radio Technicians now in good standing and others having proper qual- ifications, who join in the immediate fu- ture, will be considered charter members of the revised organization. As a definite maximum membership limitation is being set, be sure to secure your position as a member. For the immediate present no initiation fee will be charged. However, very shortly, a substantial fee of this type will be required.

This organization, its officers and Board of Directors are to be heartedly commended for having the courage and belief in the strength of their own convictions to the extent of taking the many drastic steps that were taken. The wisdom of their action is already apparent in that many men who represent the "cream of the crop," so to speak, of radio techni- cians in Southern California have indicat- ed their interest and desire to join the new group.

# Two Triumph Sensations

MODEL 500 "COMPONENT ANALYSER"  
THE TEST METHOD OF THE FUTURE AND  
MODEL 400 TUBE TESTER  
ANSWERING THE "ALL METAL" TUBE PROBLEM



The new Triumph Model 400 Tube Tester tests all new Octal Tubes without adapters. TRIUMPH SCOOPS THE MARKET with a Brand New Kind of Instrument—The "Model 500 Con- denser—Bridge—Analyser." It tests Coils—Con- densers—Resistors right in the set—Radically dif- ferent in conception and purpose—So simple it will change all present test routine—Eliminates crude "cut and try" and "parts substitution" methods—Cannot be "out dated" by radio develop- ments—analyses component parts before replace- ment—Checks directly on the source and cause of trouble in circuits.—Measures resistance from five ohms to two megohms—Capacity from .00005 mfd. to 20 mfd.—inductance from 50 microhenries to 20 millihenries. ALL DIRECT READING.

Model 110 Signal Generator—A. C. operated—Directly calibrated—Genuine T. pad attenuator—400 cycle audio and 100 K. C. to 30 M. C. calibration—\$31.20 on West Coast.

Model 150 Signal Generator—Battery operated—Directly calibrated 100 K. C. to 30 M. C. —400 cycle audio output—Long life, heavy duty batteries—Complete including tubes, batteries, shielded output cable and plug—\$31.20 on West Coast.

Model 300 Multirange Meter—A. C. and D. C. volts to 1000—Resistance can be read from 1/2 ohm to 10 Megs. D. C. Milliamps to 500 Ma.—No binding posts—Only one switch—Complete with cords and polarized test prods—\$20.65 on West Coast.

Model 400 Tube Tester—Counter or portable type—Tests Dynamic Conductance—Emission—High Sensitivity Leakage—English Reading—Tests all tubes including NEW METAL TUBES—\$36.20 on West Coast.

Model 500 Condenser—Bridge—Analyser—Takes the "cut and try" out of your work—Exposes hidden service failures in Resistors—Condensers—Coils—No Meter—No delicate adjustments—Complete in genuine walnut cabinet with accessories—\$20.95 on West Coast

See These Distributors for Demonstration

RADIO SPECIALTIES COMPANY

M. D. EALY J. L. MAHON

PACIFIC RADIO EXCHANGE  
DISTRIBUTORS, INC.

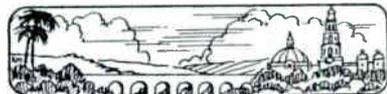
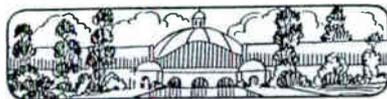
ELECTRIC PRODUCTS SERVICE ZACK RADIO SUPPLY CO.

WESTERN RADIO & ELECTRIC CO., San Diego

COAST ELECTRIC CO., San Diego

California Representative:

NORMAN B. NEELY, 1656 North Serrano Street, Los Angeles



## RADIO TECHNICIANS OF SAN DIEGO

Our news from the Radio Technicians of San Diego is somewhat slim this month due to the fact that the San Diego correspondent, Mr. Duane Siebert, was forced to be out of town until after this issue had gone to press. However, your editor, having made several trips to San Diego in the past month, has been rather closely in touch with this group and wishes to report that their activities have been very interesting and that it is an association of which the state of California can well be proud.

These men are very alert and hold

dinner meetings monthly, where they conduct official business and present one or more technical speakers.

An item of major interest to San Diego readers of the Technician is the absorption of the Southern California Music Company's San Diego store by the Thearle Music Company.

Best wishes to all members of the RTSD and our other San Diego readers and wishing you lots of success and plenty of fall business until next month when your correspondent will be back with us again.

### NEW CLOUGH-BREngle EQUIPMENT

Electric Products Service, local distributors and factory service for Clough-Brengle equipment, advise us that the Clough-Brengle Company has announced a new Model 79 beat-note audio oscillator, calibrated directly from 50 to 10,000 cycles. The unit is equipped with built-in power supply and delivers a uniform output over the entire range with low distortion and an output of 27 volts. This unit is reasonably priced and should find great favor with service technicians and public address operators.

This company also announces a new Model 81 fixed-sweep modulator for use with any standard type of oscillator without any alterations to the oscillator. This unit used in conjunction with the standard oscillator, heterodynes the output of the oscillator to a fixed-sweep frequency modulated oscillator giving plus or minus 15 k.c. sweep for use with the ordinary standard oscilloscope. This unit will enable service men to use their present oscillators and oscillographs for making direct selectivity curves on any type of receiver. Electric Products Service invite all readers of the Technician to inspect these new units.

### NEW CLIPPER POPULAR

Charlie Sexton one of the busiest men in town (between golfing tournaments and trying to supply the demand for his new "Clipper" radios) announces that his stock is now more complete than ever before and invites the readers of the Technician to drop in and let him prove it. Charlie's new location is cool and spacious and parking facilities are adequate.

### SOLAR CAPACITOR ANALYZER

As an invaluable aid for the service man in detecting leaky, shorted, open, off capacity and intermittent defects in capacitors, the Solar Mfg. Corporation announces a scientific analyzer, using the Wien Bridge Laboratory method of capacity measurement. It is housed in an attractive, compact case, so that the user has a regular carry-about unit. The capacity range, which extends from .00002 to 70 microfarads, is read directly, after visible balance of the bridge circuit is obtained by the indication of a thermionically controlled neon glow tube. The use of this precision analyzer for testing the dielectric resistance of cables, insulators, between transformer windings and power factor indication is also stressed by the manufacturer.

## THE HOUSE THAT RADIO BUILT

(Continued from Page 17)

local announcements at switching time; he may depress a button which automatically sends the familiar "chimes" signal to the network; and finally, he may monitor any one of twelve so-called headset monitoring channels by means of a telephone headset, and thus follow what is going on in the studio immediately preceding him on the air.

### The Clock System That Shows Split Seconds

The requirement of smooth, continuous program flow demands accurate time. At Radio City the clock system consists of 275 synchronous clocks operated from the 60-cycle alternating current supply of the local public utility company.

The system is divided into four parts serving: (a) the studios, (b) the studio control rooms, (c) miscellaneous rooms in the studio section, and finally, (d) the office section. This arrangement assures continuity of time service.

### Air Conditioning

The three million cubic feet of air in the special studio section is conditioned by what is regarded as the most intricate air conditioning plant ever constructed. Outside windows were omitted because of sound insulation requirements and thus air conditioning became a necessity so that proper temperature and humidity conditions could be maintained within the otherwise tightly sealed sound insulated rooms.

This brief story of the experience and research which went into the building and equipment of the "House That Radio Built," shows the phenomenal progress made in the field of radio within the short space of fifteen years. Glancing back at this record, it requires no great stretch of imagination to conjure up a vision of what the next decade holds for this astounding industry. Here is a magical field of opportunity that should serve to enthuse and inspire the many ambitious readers who have selected the radio profession as a worthwhile career to follow.

The new professional recording machine of the Universal Microphone Co. at Inglewood, Calif., is now in use in CJGX and CKRC, Winnipeg, Canada, and also at WHB, Kansas City, Mo. It is being used for audition purposes, check of air programs, for reference and sundry other professional usage.

## Genuine RCA Replacement Parts

RCA 6 and 20-watt Portable P. A. Systems

Universal Amplifiers

RCA Victor Phonograph Equipment

for Standard

Installations

RCA Test Equipment

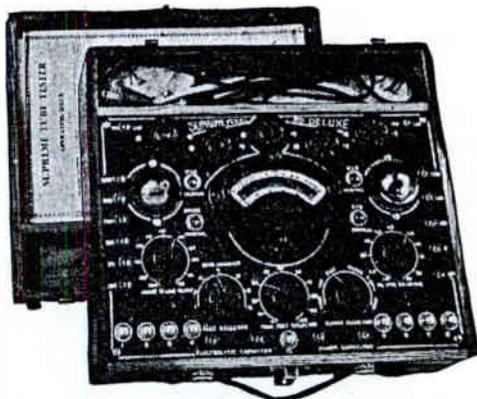
We respectfully solicit your patronage

Leo J. Meyberg Company, Inc.

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Los Angeles  
PRospect 9255

# HERE in stock NOW

## For OCTAL Tubes



Model 89—De Luxe Tube Tester

New 1936

## SUPREME

### INSTRUMENTS

Equipped with selector switch which converts instrument to (1) English Reading tube tester, (2) neon tube leakage tester, (3) Neon Electro-static condenser tester, (4) English Reading Electrolytic condenser analyzer, (5) Multi-range voltmeter, (6) Multi-range ohmmeter, and (7) a double range megohmmeter. Megohmmeter has SELF-CONTAINED power pack. Tester equipped with 5-in. fan type meter, 1000 ohms per volt sensitivity.

— Meter Repair Service —

# Electric Products Service

Test Equipment Headquarters

1358 South Grand

Los Angeles

PRospect 3681

## TRANSCRIPTION CENTER

Hollywood as a production center for transcribed programs for radio stations seems to be growing by leaps and bounds. The latest move is the removal of headquarters of the Radio Transcription Company of America from Chicago to Hollywood. The firm, however, will continue with New York and Chicago branches. C. C. Pyle is the president and G. Y. Clements and associates have purchased the interests of Freeman Lang. The new quarters are at 1509 North Vine Street, where the company was established some five years ago. It is estimated that fully 85 per cent of transcriptions in the country today are made in Hollywood because of the abundance of talent, and the low cost of technical operation. The cost of the various technical operations alone are 30 per cent lower than similar services in New York and other eastern cities.

Transco held its annual sales convention in Hollywood the last week of August with territory managers present including Frank Zambrino, Midwest; J. M. Hayes, East; Jim Carpenter, South; Ben Crose and H. D. Ainslee, Coast.

## MILLER PRE-SELECTOR

For use ahead of a short wave receiver to raise weak DX signals, a high gain, two-stage radio frequency amplifier has been designed by engineers of the J. W. Miller Company of Los Angeles. The model 302 pre-selector is available completely wired and housed in a metal cabinet with black crackle finish. There is also available a kit which includes antenna coil, r.f. coil, r.f. choke coil, switch and three dual trimmer condensers. In addition to increasing signal strength, the Miller pre-selector reduces both atmospheric disturbances and tube noises. The chassis layout has provisions for a self-contained power supply, relieving the receiver from the extra load and provision is also made to switch the antenna from the pre-selector to the receiver without disconnecting the antenna leads.

The coils are designed to cover the full range of the high frequency bands from 12 to 200 meters, and provision is made on the band switch to facilitate the incorporation of broadcast or long wave coils if desired. The last position on the switch is the "antenna through" position, in which the antenna is coupled directly to the receiver.

— WHOLESALE —

## RADIO SPECIALTIES CO.

1816 WEST EIGHTH STREET

LOS ANGELES

Phone FEderal 6633

# BAY CITIES RADIO TECHNICIAN'S ASSOCIATION

JIM HESTER, President HENRY JAMES, Vice-Pres. ROBT. L. SPEERY, Sec.-Treas.

The series of lectures sponsored by the National Union Radio Corporation have been well accepted by members of the Bay Cities Radio Technician's Ass'n. and they look forward to many more weeks of instructive meetings which will be of value to all those who are privileged to be present. The series of lectures by Richard G. Leitner follows a comprehensive, logical predetermined course in the underlying principles of practical radio engineering, their application and general service problems. All radio technicians in the Santa Monica Bay district who are not members of this organization should investigate the possibilities and advantages

of such membership by contacting the officers of this group.

Jim Hester, President of the Bay Cities Radio Technicians Ass'n., has just returned from a vacation trip which included a visit to the San Diego Fair. He reports a most enjoyable time and is all set for a lot of heavy business for the rest of the year.

While on the subject of vacations, we must mention that Jack Harvey has also just returned from a ten-days' vacation trip to Sequoia National Park and is now attending Frank Wiggins Trade School, taking the night school radio course.

## LEITNER GOES EAST

Richard G. Leitner, formerly chief engineer for Packard-Bell and well known in the radio industry as an outstanding engineer of unusual ability, left Los Angeles September 5 for an extended sojourn in New York City. While there, Mr. Leitner will investigate conditions and technical developments of the electronic arts on the east coast. We know we speak for many friends when we wish him a pleasant, successful trip and hasten to add that we will be glad to see him back among us again.

## TUBE CHECKERS

— and —

## SET ANALYZERS

Repaired or Rebuilt—

All types of instruments  
Repaired or Calibrated  
Shunts or Multipliers made up  
for any instrument

PROMPT — ACCURATE  
RELIABLE SERVICE

Authorized Service Laboratory  
for Weston Electrical  
Instrument Corp.

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Tel. TRinity 5981

812 S. San Pedro Los Angeles

## ASK NOKORODE

Mr. Michael, West Coast Sales Manager of the M. W. Dunton Company, manufacturers of Nokorode products, and Mr. Frank Chapman, president of the company, offer their assistance on all problems connected with soldering to readers of the Technician. These gentlemen, who have made the manufacture and use of soldering and allied products their life work, are most qualified to offer worthwhile, valuable time and labor-saving information regarding the proper and most efficient methods of doing all types of soldering jobs. If the answer to any specific question is desired, these gentlemen will be glad to receive the question in writing, addressed to either of them at the Glendale address of the M. W. Dunton Company, or your letter will be forwarded by the Technician.

## SUCCESSFUL SERVICING VALUABLE

The monthly house organ published by John F. Rider, Publisher of Rider's Manuals and other technical radio publications, is becoming more and more popular as more and more service technicians and engineers realize what a valuable source of information it is. All readers of the Technician may be placed on the subscription list of this outstanding publication free of charge by submitting a request in writing to John F. Rider, Publisher, 1440 Broadway, New York City. The Technician will be glad to forward your request if you desire. In any event, do not fail to avail yourself of this rare opportunity to secure regular technical information of such worth.

## BOOK REVIEW

(Continued from Page 13)

quency transmitters and receivers, Coast Guard low-power transmitters, direction finders and, in fact, all types of equipment in commercial use. Power-supply apparatus, rectifiers, generators, batteries, etc., are given liberal treatment.

**Radio Design Practice—First Edition—**  
Edited and published by James Millen, Inc., Malden, Mass. . . . \$1.00

This is a sizeable manual bound in the new, convenient spiral type of binding for use by engineers, construction technicians and others whose business it is to design and build various types of electrical equipment. The material presented was collected through the courtesy and with the cooperation of leading radio concerns who have established and maintained designs and methods over such a period of time that their persistence, which is the essence of standardization, constitutes a working basis for designers of radio equipment. The usefulness of this book is extended by special examples of apparatus design, which is illustrated by equipment presenting original and outstanding features. The intention of the editor and publisher is to establish Radio Design Practice as a standard handbook, bringing out yearly editions, containing up-to-date data, which will consist of physical and electrical specifications which will be of use in general to constructors and engineers.

The manual is highly recommended to all those engaged in the technical side of radio as a useful reference and source of information on the size and various other specifications of standard radio equipment and information as to standard practice of construction and design.

## SPACE-SAVER DRY ELECTROLYTIC CONDENSERS

Without sacrificing working voltage, full capacity value or service life, yet taking full advantage of a new development in the treatment of the aluminum foil, Aerovox engineers announce a startling reduction in the bulk of dry electrolytic condensers. Known as "Midget" electrolytics, these units are available in 200-volt and 450-volt ratings, and in capacities of 2 to 16 mfd. They average approximately half the bulk of the ultra-compact units heretofore available. The 8 mfd. 450-volt unit, for example, measures but 2-7/16x1-1/8x11/16 in.

These units are proving popular in new assemblies where space is at a premium, and again in the replacing of worn-out condensers with units of greater capacity or higher working voltage. Midget electrolytics are described and listed in a bulletin dealing with a number of recently added items, available to anyone addressing Aerovox Corporation, Brooklyn, N. Y.

## MODERNIZING TRIUMPH 400

The Triumph Manufacturing Company of Chicago announces through its local representative that data will be furnished free of charge to all owners of Triumph Model 400 Tube Testers to bring them up to date with the installation of an eight-prong socket. This tester, which was designed definitely bearing in mind future developments such as a series of eight-prong tubes, is very easily rewired for the new tubes, as the change consists mainly of the substitution of sockets and the addition of a few jumper connections on the master selector switch. Requests for detailed rewiring information to make these changes may be addressed to the Triumph Manufacturing Company, Chicago, or to the local representative.

**THE YAXLEY 1936**

**REPLACEMENT VOLUME  
CONTROL MANUAL**



YAXLEY  
COMPLETELY  
OVERSHADOWS  
THE FIRST EDITION...  
and that was heralded  
as the greatest manual  
ever published

Five radio service engineers worked on it twenty-four months. Lists more set models than any others. Complete—authoritative—up-to-date—and free! Write today! Mention jobber's name.

YAXLEY MANUFACTURING DIVISION  
of P. R. Mallory & Co., Inc., Indianapolis, Indiana

## TRAVELING THE TERRITORY WITH MILTON

Well, folks, here it is September, 1935; just another one of those months where in Friday the 13th makes its undue and unwarranted appearance. Vass you biten, Sharlie?

The Traveler, a true exponent of the Winchell school, bids all to know that by the time this edition will have gone to press, one Maurie Motley, who keeps the customers contented at The Radio Shop on Santa Monica Blvd., will be enjoying the comforts of wedded bliss. Lots of luck to you, Mauriel

The word comes to us from somewhere that Fred Cole, the chief meter manipulator of Electric Products Service on South Grand Avenue, is still trying to find out how they say "weenie-bake" in Spanish. International complications!

It is with deep regret that we announce the passing of Sincere Floussfish, better known as "Fluey" to his many friends. Fluey was one of the real old-timers in the radio business, with considerable experience in the wholesale field to his credit before opening the trim little retail store on South La Brea. The Traveler joins the rest of the staff of the Technician in expressing his sincere sympathy to Mrs. Fluey and family.

Bills to the right of us and Bills to the left of us; but when both Bills have the same cognomen, one is sometimes apt to run into complications. Speaking of Manning's Radio Service in Santa Monica, where both the boys are Named William Manning, or just plain Bill to you.

The Traveler has just learned that Lew Brothers, that dapper little service man who formerly kept the customers satisfied at Forer Tire Co., is now doing all the service for Trambitas Radio Co., on Melrose Avenue. Keep up the good work, Lew!

Complicated jobs are simply all in the day's work for Arne Gulbrand, who nonchalantly fixes 'em so that they stay fixed for Radio Specialties on North Fairfax Avenue. Attaboy, Arnel!

What a system, what a system! A certain Ray Southstone, of Ray's Radio Service in Inglewood, spends three weeks on a vacation jaunt through Oregon, and then goes to Catalina on a vacation to recover from the effects of the Oregon sojourn. You boys emit your own ejaculations to this one!

We sure are glad to be able to let you boys know that Les Shaffer, of the Redondo Music Co., in Redondo, is now on the road to recovery from the automobile accident that almost placed Les on another planet. You just can't keep a good man down, you can't, you can't.

The Gieszl family is still holding down the service department at Mil Zillgitt's radio emporium in Inglewood. Even though Ray left for the East a year ago, Brother Cliff is still maintaining the high standard of service characteristic of the institution; and, from the looks of things, it appears that Cliff will be still fixing 'em for a few more years to come in the same old spot. That's the stuff, Cliff!

Of all the radio old-timers who are old-timers there isn't anyone with whom the Traveler would rather shake hands than with his old friend, Red Estep, of the Sparton Radio Shop in Hermosa.

We all say "Welcome Home" to Mr. and Mrs. Kenneth Landgraf, who have been wandering around the country quite aimlessly on a well-earned vacation. Yeah man, the B-T Radio Shop on Melrose Avenue is wide open for business.

All of the boys who remember Phil Vanderburg in Long Beach will be glad to know that he is now in San Pedro, where he can be found daily solving the service problems at Forster's Radio Shop.

And those of the radio fraternity who have been wondering what has happened to Earl Stowell can find him at Wilmington Hdwe. Co., in Wilmington, where he has been placed in charge of the radio department of the above firm.

And now that Labor Day is just a memory and Hallowe'en is just around the corner, remember not to let the goblins get hold of you. Hasta luego, muchachos!

## MILLER LINE FILTER CHOKE

Elimination of high frequency disturbances from power supply lines is accomplished by a new line filter choke developed by the J. W. Miller Company, of Los Angeles, for use with receivers, transmitters or any source of interference. Duo-lateral wound for minimum distributed capacity, the newly designed choke is available in various wire sizes of 2, 5, 10 and 20-ampere carrying capacity.

In general, the filter choke is used for radio receivers, transmitters, vibrating and rotating machinery, mercury arc, mercury rectifiers and wherever it is desired to eliminate interference from either a. c. or d. c. supply lines.

## NEW C-D XMTR CONDENSERS

A new line of porcelain-encased mica transmitting condensers, designed for amateur, police and small broadcast transmitters, has been brought out by the Cornell-Dubilier Corporation, of New York. Designated as the Type 86, the line includes thirteen sizes ranging from .00005 mf. to .1 mf., in voltage ratings from 2000 to 12,500 volts. These new condensers are especially recommended for plate blocking, grid and tank applications. Their power factor is extremely low and they will carry their full rated load over long periods without heating up. The mica condenser elements are hermetically sealed in heavy glazed porcelain containers, which are provided with mounting feet and screw terminals. These ceramic cases are not subject to absorption effects when placed near the powerful fields of tank inductors, and they therefore eliminate the appreciable loss that occurs when metal cased capacitors are used in a crowded transmitter.

## IRC INSULATED RESISTORS

Unique modern resistors specifically designed for exacting radio requirements of the present day and known as IRC Type "B" Metallized Resistors have just been announced by the International Resistance Company. These new units have complete high voltage insulation protection and are constructed without metal ends. They can contact other parts without danger of shorting. Utilizing an improved metallized resistance element, they have very low noise level and their accuracy, permanency of resistance value and durability under all operating conditions are excellent. In the New Type "B" Insulated Resistors a sturdy casing of insulating compound is moulded completely around the metallized resistance element, sealing it against moisture and protecting it from shorting on other parts. Like Bakelite, this insulating material will not crack or deteriorate. For almost a year prior to this introduction to the radio service and amateur trades, these new resistors have been supplied to leading radio manufacturers, who, up to the present time, have taken the entire output. Greatly increased manufacturing facilities now enable IRC to supply the new units through jobbing channels. A new catalog containing full details will be sent, on request to the International Resistance Co. (The "Technician" will forward your request.)

## CHARLIE NICHOLS ADVANCES

Charlie Nichols, well known to the radio trade, formerly engineer with Jackson-Bell and Mission Bell, is now service manager in complete charge of the service and auto radio installation departments of the Packard-Bell Company. Mr. Nichols stepped into his new position the first of September and is reorganizing the entire department. Charlie, CRTA member, invites all readers of the "Technician" to contact his department for any assistance in connection with the servicing of Packard-Bell equipment. Their auto radio department is complete, fast and economical. Charlie promises efficient, rapid and dependable service under his "eagle eye" supervision. We know we speak for all his friends when we wish Charlie the best of success in his new capacity.

## SPECIAL HIGH RESISTANCE METERS

Electric Products Service announce a high resistance meter assembly using the Triplett five-inch instrument having available the following ranges:  $\frac{1}{4}$  volt to 1,000 volts D.C., at a resistance of 5,000 ohms per volt, covered in 10 ranges; milliamperere ranges starting at 250 microamperes to 1 ampere in 10 ranges. The ohm scale runs from 1,000 ohms, full scale, to 10 megs, full scale, in 5 ranges. The ohmmeter is entirely battery operated, requiring only one  $7\frac{1}{2}$ -volt and one small  $22\frac{1}{2}$ -volt battery for complete operation, including 10 megs range. The unit is mounted in a portable walnut case, making it easily portable. To our knowledge no such unit has heretofore been available covering such ranges in a compact portable form.

Nikola Tesla, famous Yugoslavian inventor, has just announced his newest invention as being the passage of a continuous flow of direct current with a varying flux through a circuit without the use of a commutator. This has been believed impossible since the time of Faraday. Dr. Tesla said that practical applications of his invention had yet to be worked out, but that he believed it would be valuable in supplying electric power to automobiles, trucks and even airplanes.

**MISTAKES WILL HAPPEN**

The last-minute rush of going to press in August resulted in a regrettable error in the advertisements of two well-known Southern California recording machine makers—Universal Microphone Co. and Radiotone Recording Co. Inadvertently the photographs were switched and the microphone firm's recorder appeared in the advertisement of the recording company, and vice versa. The illustration for the Radiotone group should have shown that organization's portable recorder, while that for Universal should have depicted the non-portable machine. Our apologies to both firms and thanks for the sympathetic attitude of both with regard to the error.

**NEW ELECTRAD VOLUME CONTROL GUIDE**

Electrad, Inc., of New York offers a new 100-page Volume Control Guide free to bonafide radio and electrical service men, who will mail in the carton flap (showing specifications) from one of this company's new-type Carbon Volume Controls, together with business letter-head or business card.

This guide lists alphabetically all radio receivers, model numbers, makers' names, catalog numbers of proper Electrad replacement controls, resistance values and list prices. Such information should be of practical, time-saving value to busy service men.

The new 1936 Electrad General Catalog of resistors for all purposes is now off the press. A copy will be mailed free to anyone who will write for it to Electrad, Inc., 175 Varick Street, New York City.

**ALLOY CORE I.F. AND R.F. TRANSFORMERS**

Marked gains in i. f. and r. f. transformer and coil performance is claimed for a new core material just released by Henry L. Crowley & Co., West Orange, N. J. Known as Crolite Magicore, this material is said to increase selectivity two and one-quarter times over air-core coils, double the gain and cut power factor in half (doubling the Q). The material is highly satisfactory in the broadcast and short-wave ranges.

Magicore differs from other metallic i. f. and r. f. coil cores in that it is a magnesium alloy imbedded in a ceramic body, rather than a finely divided iron held in a binder mass. The new material is extruded and fired at high temperatures in accordance with long-established ceramic practice. Precise control over raw materials and processing makes for maximum uniformity of finished cores, while the entirely domestic nature of the raw materials and production makes for prompt and assured delivery at all times. Each piece has a smooth, shiny, metallic finish, and clean-cut ends and edges. It does not rust or corrode, nor otherwise alter its initial characteristics during long use.

The new core material, with its extremely high permeability and minimum hysteresis at radio and high frequencies, provides for a radically new standard of radio receiver performance, over that with air-core coils. It will permit far greater sensitivity and over-all gain with a given number of tubes, or the reduction in the number of tubes and a still more compact chassis. This development is of particular importance in auto radio sets where greater sensitivity and gain with a limited number of tubes, is the aim.

**Your New Book  
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Send for your free copy of Sylvania's New Volume of Service Hints . . . Service Men all over the country tell us they wouldn't be without it . . . Short cut solutions and inside dope on everyday problems.

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## ELECTRICITY FROM OCEAN TIDES

(Reprinted from Coyne Industrial Bulletin, August, 1935)

A few weeks ago, President Roosevelt announced his approval of the \$36,000,000 project for harnessing the tides of Passamaquoddy Bay, in Maine. In less than three years an age-old dream will become a reality. Generators, with a capacity of 200,000 horse-power, will spin in the trip of the world's tide, furnishing electric current for homes, farms and factories, tapping the vast, inexhaustible power of the sea.

Almost exactly half-way between the equator and the north pole, where the coast line of Maine puts farthest to the east, the work is already beginning. Great barricades of earth, armored with rock, will be reared by 14,000 men across the mouths of Cobscook Bay.

They will pour in 15,000,000 cubic yards of earth, 6,000,000 cubic yards of rock and 700,000 cubic yards of concrete to form the five huge dams of the project. Power will be produced only on the incoming tide. As this water surges into the Bay of Fundy and reaches Passamaquoddy Bay, its level will rise rapidly above that in the Cobscook basin. When there is a five-foot difference, draft tubes leading to the generators will be opened. Sea water, roaring down them, will spin the great turbines and pour out into the basin beyond.

High tension lines will carry electricity during peak production to a huge pumping station at Haycock Harbor, fifteen miles away. Here, pumps that are rated at 180,000 horse-power will force water from the ocean into a 13,000 acre reservoir, 130 feet above the level of the sea. When the tide-power generators are inactive and current is needed, this water will be permitted to rush back to the ocean to penstocks, whirling turbines and producing electricity. Through this simple procedure, electric power will be stored up as water power and turned back into electric power at will.

### LIGHTNING INVESTIGATION

During the year considerable progress has been made in the study of natural lightning and several new instruments were developed to assist in this study. By means of a special camera, detail pictures characteristic of natural lightning were taken. This camera has two lenses with prisms to deflect images of the light-

ning stroke to a photographic film running at a speed of 111 feet per second. In order to study the effects of high currents such as actually occur in natural lightning strokes, a high-current impulse generator was constructed which is capable of generating an impulse of 265,000 amp. at 150,000 volts—the equivalent of a section of an actual stroke of lightning. This sudden release of energy will reduce a block of wood to splinters, shatter a concrete beam, vaporize small sections of iron wire, leaving the ends white hot, or crumple an inch-wide metal strip into a round cross-section.

### ELECTRICAL ODDS AND ENDS

Electrified orchards are forecast by a French scientist. Attaching wires from a 40-volt battery to seedling trees, he found their growth markedly stimulated when the current passes upward through the stems and branches. Reversing the flow retarded their development. Similar results could be obtained, according to this experimenter, by fitting full-sized fruit trees with metal collars, connected to a suitable source of direct-current electricity. Thus a grower could retard the development of fruit to protect it against unseasonal frost, or hasten its ripening when conditions were favorable. To explain his observation, the scientist offers the theory that the electric current alters the rate at which the sap rises.

The photo-electric cell, that marvel of modern science which makes it possible to broadcast and receive television programs and which causes doors to open and close without the aid of human hands, may soon be making the lives of thousands of paralytics happier. Experiments carried out in New York City's Reconstruction Hospital have demonstrated the remarkable usefulness of the "electric eye." The first tests of an apparatus devised by an electrical engineer in connection with crippled patients were made in the room of a 14-year-old boy paralyzed from the neck down. The head of the boy's bed was fitted with a photo-electric cell and several beams of light were so focused that, when the boy moves his head from side to side, the light beams were interrupted and the "electric eye" was actuated to perform such minor miracles as turning on a radio, or shutting it off, turning the pages of a book placed on a rack before the patient, and ringing a bell to summon a nurse.

# ELECTRONIC

## Replacement Vibrators

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If you have not already done so, discover for yourself why Electronic Replacement Vibrators are in such universal use wherever auto radios are serviced. Of course your jobber can give you the facts, but what is even better, use Electronic Vibrators in your next replacement jobs. Then and only then will you actually know why Electronic superior quality vibrators have meant so much to servicemen everywhere in building a permanent, satisfied clientele. In addition, Electronic Vibrators cost less, are more universal, and permit greater profit than other makes. There is an Electronic Vibrator type that will replace as an exact duplicate or better in any make set. If for any reason your jobber cannot supply you, write us direct.

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This highly efficient power supply unit permits those living in rural communities and having 32 volt D. C. power plants to choose and enjoy any make radio, rather than be limited to one or two makes as has been the case in the past. Nothing complicated—just attach converter to any 110 A. C. radio and plug into a 32 volt D. C. circuit and you get round the world reception even better than in the city. Fully guaranteed. Write for complete details and prices.

### ELECTRONIC - HICKOK VIBRATOR TESTER

In order to intelligently and efficiently service automobile radios—every radio serviceman should be equipped with the new Improved Electronic-Hickok Tester. Designed by Electronic and made by Hickok—one of the world's foremost makers of precision electrical instruments—to test every make vibrator as to whether good or bad, or producing undue R.F. interference. Also tests buffer condensers. Portable, light in weight, and operates from 6 volt storage battery. No other instrument equals it in quality or price. Fully guaranteed. It's as necessary and vital to your success as a tube tester. Order today.

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