

United Transformer Corp.

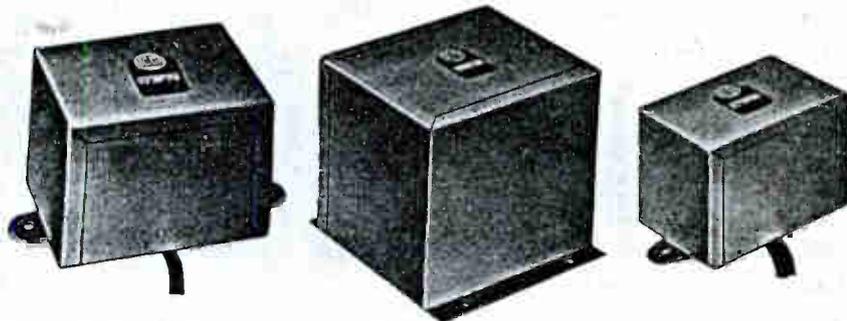
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NS-5 Single or double button mike to 1 grid.....	2.50	1.50
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(See inside back page for balance)

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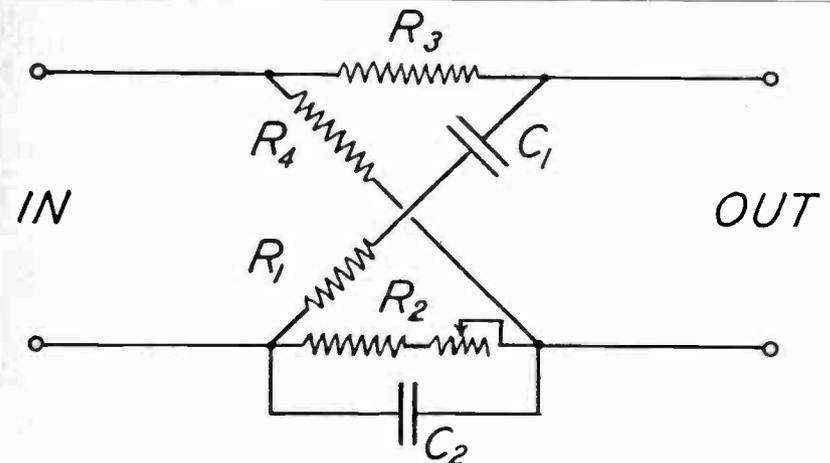
UNITED
TRANSFORMER CORP.



ANNIVERSARY ISSUE

« The » "TECHNICIAN"

SEPTEMBER, 1934



Checking Overload Point of A. F. Amplifier.—Page 7

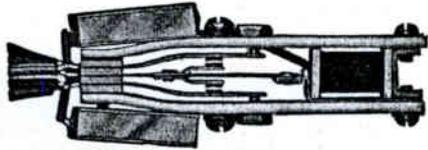
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The "TECHNICIAN"

Official Publication of the Certified Radio Technicians' Association, A Corporation
An Organization of Competent, Qualified and Trustworthy Radio Technicians for the
Purpose of Advancing the Radio Art and for the Protection of the Public.

A. PAUL, Jr., President

JOHN L. VINCENT, Vice-President

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NORMAN B. NEELY
Editor - Manager



1569 Munson Avenue
Los Angeles, California

\$1.50 Per Year

15 Cents Per Copy

Vol. II

SEPTEMBER, 1934

No. 1

EDITORIAL

By The Editor

"Progress--Cooperation"

Webster defines progress as "a moving or going forward; a proceeding onward; advance. Growth, development or the course of anything."

We may apply this definition to the radio industry as a whole either locally or nationally and generally or by groups in the form of a question. If we do, what is the answer? We have all bemoaned the deplorable conditions existing in the radio profession and we have cried on one another's shoulders for so long that we are blinded by our tears of pessimism and self-pity to such an extent that we cannot see beyond our noses.

If we may take Webster's definition seriously we must admit that the radio industry has very definitely progressed and to no small extent. Technically many new developments have taken place during the past few months.

The various divisions of the industry have organized and cleared away the tears so they might get a perspective of the future. To consider local conditions in particular we must recognize the growth of our associations. The Radio Manufacturers' Association of Southern California has taken many steps to improve conditions in the radio manufacturing industry. The Radio Parts Jobbers of Southern California have stepped forward and made definite progress in the matter of restricting illegitimate sales and indiscriminate price slashing without regard to quality or service.

The Certified Radio Technicians' Association has accomplished in one short year what no other service body has ever

been able to do in this part of the state! And it is moving rapidly and steadily forward. Its aims of raising the servicing profession to a higher level and of educating its members to be qualified to care for modern equipment of ever-increasing complication and intricacy are being realized day by day.

The psychological attitude of all of us is changing. We must realize our progress and have faith of greater progress to come if we are to endure in the new order of our modern civilization.

Webster defines cooperation thusly—

"A cooperating; concurrent effort or labor. The association, or collective action of persons for their common benefit, especially in an industry."

Unfortunately we cannot boast of answering this definition put as a question entirely in the affirmative. We have, in the past been inclined to "pass the buck" and all branches of the industry—even members of the same branch—have adopted and cultivated a "holier than thou" attitude.

However, the past few months have seen much progress in the way of cooperation between groups and individuals, locally at least. We have three outstanding organizations who have accomplished many worthwhile things in recent months. The CRTA can boast of being the first to "bury the hatchet" and combine individual effort and knowledge for common benefit.

Next came the Radio Manufacturers' Association of Southern California and

(Continued on page 6)

To facilitate ready contact with any member of the officers and directors of the Association, the following directory is published for your convenience:

Name	Office	Phone	In Charge of:
A. Paul, Jr.	President	OR. 2233	Public Relations
John L. Vincent	Vice-President	KE. 1640	Finance, Budget, Arbitration
V. Karl Hatfield	Secretary-Treasurer	OL. 5220—1762 North Vermont	
Norman B. Neely	Director	AL. 1628	Meetings, Papers, Publications
E. H. Darrow	Director	AN. 4509	
Geo. W. Ekelberry	Director	HL. 2788	Employment and Membership
Art Oodrys	Director	CA. 5542	Publicity
Charles E. Miller	Director	HE. 2697	Technical and Examining Boards
John A. Orme	Director	AT. 9504	
Richard G. Leitner	Director		Consultant

PROGRESS-COOPERATION
(Continued from page 5)

now the Radio Parts Jobbers Association of Southern California.

These three groups can, by proper cooperation and with the assistance of other members of the trade which will undoubtedly be forthcoming, cure many of the ills of our business.

Malicious rumors have been circulated by certain unscrupulous persons (not CRTA members we are happy to say) claiming that the CRTA is establishing a cooperative buying office. Naturally, any progressive group such as this would have investigated the possibilities of such a move in the past when the jobbing industry was not keeping its house clean.

With the advent of the new jobbers association formed of conscientious firms and their honest desire and endeavor to cooperate with other honest members of the trade the CRTA feels that it would be violating the very doctrines of its own structure were it to take any steps which would injure or even tend to injure the jobbing business. Wholesalers are a definite and necessary link in the chain of distribution and when they do not compete with the technician and dealer neither should they compete with the jobber.

With a new and healthy condition of understanding and a closer relationship and a more friendly feeling within the industry we are sure to progress by means of wholehearted, intelligent and well-directed cooperation.

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CHECKING OVERLOAD POINT ON AN AMPLIFIER

By DR. JOHN F. BLACKBURN, Consulting Physicist

Judging from what one hears both from radio sets and from public-address systems, most people don't seem to know that an amplifier has an overload point. It does, however, and if precautions were always taken not to exceed that point most of what we hear coming out of loud-speakers would be a whole lot easier to listen to. Probably the best and certainly the simplest apparatus for determining the overload point is a sensitive and properly trained ear, but since the ear is a notoriously unreliable piece of machinery at best it is a good idea to supplement it with a gadget or two—which gadgets also help to clutter up the test bench and make the lab. more impressive to the uninitiated.

First, let's figure out just what happens when an amplifier overloads. Assuming that it is properly designed and installed, as the input is increased the grid-voltage and plate current swings will increase, but at low levels all these swings are small compared with the straight portions of the characteristics. As we go to higher and higher inputs, however, at some point one of these swings will overshoot the straight portion of the characteristic, usually in the last stage. When this occurs the output wave is no longer a faithful copy of the input wave, and we have amplitude distortion. Incidentally, even if the tubes can carry the load we can very easily get bad amplitude distortion from an audio transformer or choke used at too high a level or with excessive d. c. in the windings.

So much for the cause of overloading. The remedy is obvious; don't turn up the volume control too high. But where is too high? That's where the gadgets come in.

By amplitude distortion we mean a change in the wave-form of whatever we feed into our amplifier. This change in waveform introduces harmonics of 2, 3, 4, . . . etc. times the original frequency

into the output wave, and if these harmonics have an appreciable amplitude they change the character of the sound, making it tinny or rattly. Now to detect overloading we take advantage of the fact that it introduces new frequencies, as follows. (See Figure 1).

The oscillator furnishes a pure sine-wave tone of frequency f , whose volume we can control as desired. Between the amplifier and the phones let us insert a filter which will cut out a band of frequencies around f , while letting other frequencies pass with little or no attenuation. Now as long as we have no amplitude distortion in the system we will hear nothing in the phones, since we are feeding only the frequency f into the amplifier and it can't get through the filter. Suppose, however, that we increase the volume until the amplifier overloads. Then, although, we are still feeding in only f , the amplifier is now manufacturing harmonics of frequency $2f$, $3f$, . . . etc., which get through the filter and into the phones. What happens in practice is that up to the overload point nothing, or only a very faint sound, is heard in the phones, but as the volume is increased beyond this point the intensity rises very rapidly and the note becomes shrill and strident in character. The overload point is the point at which the volume begins to increase rapidly.

So much for an ideal system. Most of us, however, can't lay our hands on fancy band-elimination filters and such, but there is one very simple and cheap piece of apparatus which will do the work in a perfectly satisfactory manner. It is the Wien Bridge, often used to measure capacity or frequency but also a very good band-elimination filter if you're not too proud about sharpness of cut-off and such. In this case it's just what the doctor ordered, and the prescription is as follows. (See Figure on cover).

(Continued on page 45)

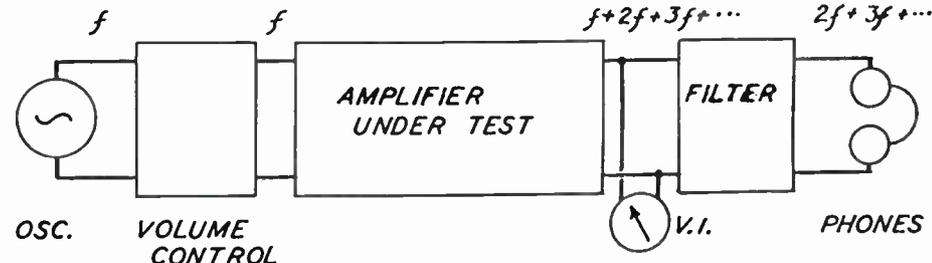


Figure 1

TUNG-SOL
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LOS ANGELES, CALIF.

**SOMETHING CAN BE DONE ABOUT
RADIO INTERFERENCE**

By FRED B. DOOLITTLE

Radio Engineer, Southern California Edison Co., Ltd.

In general, there are two possible means of mitigating interference with radio reception; one being the elimination of the cause at its source and the other being to prevent the disturbance from reaching the radio receiver. The choice of the method to be applied in any specific case should be one of over-all economies. For example, re-insulation of a transmission line causing interference with many receivers in an urban district might be justified, while the economical remedy for interference with one or two receivers, in rural territory, from the same cause, would probably involve the application of special antenna systems, filtering of service connections and use of shielded radio receivers.

The methods of eliminating certain causes of interference frequently encountered in power distribution systems are usually quite apparent when the sources are located. Under this classification are such causes as static discharges between pieces of pole line hardware separated by small air gaps; loose connections between bond wires and insulator pins or switch parts; poor contact in load carrying connections such as switch blades and clips, fuse holders, taps or connections; conductor grounds to trees, conduit, hardware, transformer cases, guys, wood poles or cross arms; leakage over dirty or broken insulators or bushings and leakage through deteriorated insulation in wires carried in conduit. All of these are corrected by simple and comparatively inexpensive maintenance or replacement and the public utilities are usually more than glad to find and correct the defects before more serious trouble develops.

Other radio interference, often carried considerable distances on power distribution systems, originates in consumer's equipment and the sources are therefore beyond the jurisdiction of the public utility to correct. The most frequently found sources of radio interference from domestic appliances may be classified under two general types, the series motor driven and the thermostatically controlled. The cause of interference in the series motor is poor commutation which may be inherent to the motor design or due to lack of maintenance. Cleaning and smoothing the commutator, replacing worn brushes and seeing that they are properly seated are the first steps to be

taken to reduce interference. If these measures prove insufficient the application of a filter is necessary. The simplest and cheapest filter consists of two one-tenth microfarad condensers in series connected across the brushes with the common point of the two condensers connected to the motor frame. This filter is quite effective in most cases and is convenient to apply if the condensers can be mounted in the motor base (as in a fan) or on the housing of the appliance. If this simple filter is not sufficiently effective it will be necessary to use one consisting of a combination of condensers across the line with the common point connected to the motor frame and radio frequency choke coils in series with each line wire on the line side of the condensers. There are several commercial filters available, both of the condenser type and the combination condenser and choke type.

Since some appliances such as juice extractors or food mixers are normally used in the vicinity of grounded water pipes and the operators hands may be wet, there is the possibility of the operator receiving a shock when filters are used which involve a connection to the motor frame. If the condensers in the filter do not exceed one-tenth microfarad this shock is not dangerous but might be felt and would probably discourage the use of the filter. A ground connection from the motor frame to the water pipes will avoid the possibility of shock but is somewhat inconvenient to apply and maintain.

Thermostatically controlled apparatus in homes usually consists of heating pads, room temperature controls, electric irons, some types of refrigerators, oven controls and electric water heater-controls. As in the case of the series motors, thermostats may cause interference inherently due to their design or because of lack of maintenance. It is usually impracticable to attempt to repair the thermostats in heating pads but the interference can usually be prevented from radiating by the use of a small capacitor-type filter across the line supplying the heating pad. In the other thermostat applications, they should be first put in good mechanical condition and the contacts smoothed or replaced and then if the interference still persists a one-tenth microfarad condenser may be connected across the contacts

(Continued on Page 33)

CHRIS O'MALLEYSON

By PARKER LORTTON

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PREFACE

The author of the following story humbly submits it to the reader trusting that he will receive a certain amount of amusement from it.

However, the author does wish to remind the reader that while much of it seems to be highly fantastic, all of the apparatus described is reasonably possible of practical application through the use of apparatus known to science today.

Be there any reader who has the inclination, knowledge, equipment and finances to develop any of the apparatus described the author wishes to encourage him to do so.

However the author wishes to retain the honor, if there be any, of having originated the ideas.—The Author.

Chapter One—THE SHIP

While conducting a series of experiments in my own laboratory I had come to a point where I was hampered by an inexcusable lack of knowledge of my chosen work.

I went to the library in search of a book that would give the information I wanted. Shelf after shelf of books were gone over. Occasionally I found one that looked promising only to find that it entirely skipped the subject in which I was interested, but I was too completely absorbed in thought to realize I was disgusted.

Just then I was rudely jolted back to earth by a regular old buck-Indian grunt. I looked up into the face of a man, tanned, tall and slender but not the sort you could call thin. The face was the most remarkable I have ever seen. In our association and friendship which was to follow this face as well as the man and the mind behind it became a source of endless study.

Following the grunt a hand, large and bronzed, but as slender and finely shaped as any woman's, reached over and took the book from me. He opened it to the title page and laying it down in front of me, he pointed to "Copyrighted 1926."

"Fool," he said, "you don't think they knew anything about Pentarays in those days, do you?" I started to stammer out something when he interrupted me saying, "Put that trash back on the shelf and come with me. I will show you how to make that Scentscope of yours work."

I was puzzled that he should know

what I was working on and the man did interest me, but I was a little dubious about accepting the invitation of a man whom I had never seen before and was hesitating to answer when he again spoke. "Oh, there is nothing occult or psychic about my knowing that. You see I have long ago read all of those books myself. Pentarays are about the only thing they don't mention and then I also know something about you and your work so I just made a wild guess and the dumbfounded look on your face tells me that I am right."

"However, I think I have found what I am looking for. You see very few people have ever heard of pentarays and it so happens that I need an assistant who knows something about them. Maybe you will do. Come! We will go down to the Club and talk it over."

I agreed and thus began for me the most interesting series of experiences which, I am confident, any man ever had.

Over a glass of wine he introduced himself, to which you may imagine my surprise, for the man, while hardly known to the general public, was justly famous among scientists and pseudo-scientists like myself. That he should choose me as his assistant, when there were dozens of men famous in their own right who would have been elated to become associated with him, was something which I was bashfully reluctant to accept. Do not credit me with being so foolish as to refuse however, for I did accept gladly.

That was how I came to meet Chris O'Malleyson. From his name one could never have guessed from whence came his ancestors and to know him only confounded ones thoughts the more. He seemed to have the attributes of half a dozen races of men. From his shock of blond hair one might have thought him to be a descendant of the Norseman. After I knew him better I saw many things to bear out that thought, yet he had all of the dogged determination of the German, to get the facts through research work. He had the cunning, and at times mysticism of the Oriental. He had the wit of the Irish and at times was as excitable as the French. At other times he was as stoical as the American Indian. Finally I decided that he was, like the most of us, just a product of the great American melting pot.

At my acceptance of his offer he shouted, "Hurrah! Bravo! Mi Amigo! smiling from ear to ear. "Me und you

(Continued on page 26)

FACTORS GOVERNING DESIGN AND CHOICE OF RADIO TRANSFORMERS

By I. A. MITCHELL, Chief Engineer United Transformer Corp.

Adverse Conditions in Export Countries

The actual functional control of radio receivers and amplifiers is greatly dependent on the transformers used. Power transformer failures in radio receivers form an unusually high percentage of receiver troubles, particularly in the export field. This is due to a number of factors, among which we can enumerate:

1. High humidities.
2. High ambient temperatures.
3. Quick and wide changes in temperature.
4. Wide variations from normal line voltage and frequency.

Power Transformer Details

To compensate for these conditions special care must be put into both the design and construction of power transformers. A transformer of good quality should have the following features:

1. Low temperature rise (heating).
2. Low losses (efficiency).
3. Good regulation.
4. High safety factor in insulation.
5. Rugged mechanical construction.
6. Provisions to reduce line noises.

All of these features can be obtained if proper consideration is given to the transformer design and structure. The silicon content of the electrical steel should be high, and the flux densities should not exceed 10,000 gauss. While

some transformers have been made to operate with much higher flux densities, the core is then very near the saturation point. If a high line voltage is encountered, this low safety factor will result in over-heating and short life for the transformer.

The use of good steel, proper magnetic density in the steel, and proper current density in the copper will result in a transformer having low temperature rise, high efficiency and good regulation. Proper placing of the windings is also an important factor in regulation.

Electrostatic Shielding

For best operation of a receiver it is essential that an electrostatic shield be placed between the primary and other windings. While some organizations have neglected this precaution, it has been due primarily to a lack of knowledge of the theoretical value of this shield. If a sensitive receiver, having an unshielded transformer, is tuned to a carrier, particularly that of a local station, a modulation hum of considerable magnitude may be obtained. A capacitive or static charge is carried electrostatically from the primary to the secondary winding through their mutual capacitance; this charge varying with the

(Continued on page 27)

RADIO-TELEVISION SETTLED IN NEW QUARTERS

Below is shown a picture of the new quarters of the Radio-Television Supply Co. Although the task of moving and re-assembling such a large and complete stock of radio supplies as is featured by this company is indeed a tremendous one the new quarters are well arranged and all are invited to pay a visit of inspection. This new



location, out of the downtown traffic area, offers greater display space than their former quarters and officials of the company announce that even a greater stock of standard and special parts will be featured including a bargain annex where salvage and job-lot items will be offered to those who may find use for them.

Radio Technicians...

This course can make money for you . . .

*And it starts paying for itself
after the first few lessons!*

The Capitol Radio Engineering Institute faculty is composed of men who have had years and years of actual experience in every branch of radio . . . that's why we are so well acquainted with the present-day problems of the radio men . . . and why the CREI Practical Engineering Course can "do things" for you, you never suspected.

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"Audio frequency Amplification—Public Address Systems", will be sent without obligation at your request. Write for Lesson No. 45.

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SEEING THE WORLD FAIR WITH THE EDITOR

By NORMAN B. NEELY

The second edition of the world fair is truly an eighth wonder of the world. There is really just too much for a mere mortal to see and comprehend in even a several day expedition. Officials of the fair state that if a spectator merely walked by the main entrance to every exhibit on the grounds he would walk over 84 miles.

One may see in epitome the great drama of man's struggle to lift himself in his weakness to the stars. The spectacle is enormous for it includes all the manifestations of man's restless energies—patient laborious researches of the cloistered scientist, exploration, adventure, war, the vast works of industry, the slow climb from the naked cave man to his descendant of today, the outbreak of the play spirit in luxury, in works of art, in music and in the insatiable curiosity for seeing new and strange things, for thrills, sensations and excitements.

The underlying aim of the Exposition is to show dependence of modern development on scientific research. This is truly and undeniably the century of scientific advancement.

Extravagant exhibits and displays are presented by all branches and subdivisions of science, art, travel, exploration, entertainment, and the many other pursuits of modern civilized mankind. The electrical and radio displays feature spectacular stunts with high voltage, remote control of the mighty carillon in the tower of the Hall of Science, television demonstrations, instantaneous recording, and many others. The medical, biological and genetics exhibits are of particular interest.

The transportation exhibits show every form of transportation from the early oxcart to the most modern streamlined trains and fastest transport planes.

However, there are many things of interest and beauty at the Century of Progress Exposition besides those of a scientific or progressive nature. The foreign villages give many a glimpse of old world color and atmosphere. Nowhere on earth has ever been assembled such a collection of picturesque villages from strange foreign lands and from long ago as are presented at the 1934 World Fair. There are the Spanish Village with its ancient castles, the winter Black Forest Village from Germany, the American Colonial Village, the Swiss village at the foot of the Alps, "The Bowery," the Mexican Village, the Midget Village, the Tunisian Village, the "Oasis," the Streets of Paris, the Streets of Shanghai, the Dutch Vil-

lage, the English Village of the time of Dr. Johnson and Boswell, the Italian Village with its leaning tower (and Sally Rand), and the Belgian Village. In addition to these there is the exact replica of old Fort Dearborn, the first house ever to be built in Chicago—a one room log cabin; the Lama Temple—the Golden Pavilion of Jehol—which is an exact reproduction of the original temple built for the Manchu emperors of China in 1767.

The attractions are really too much to describe in a general hodge podge of words and impressions and it is intended from time to time throughout the year to give more detailed accounts of the important points of greater interest. To begin this series a description of the most picturesque and thoroughly enjoyable village of the entire lot, the Belgian Village, will be given here.

The Belgian Village

In general, the village known as "La Belgique Pittoresque," consists of a grouping of the greatest attractions in Flemish towns in the mother country. Conveying a delightful sense of peace and rest, the many gables and towers as silhouetted against the sky form a lacework of beauty and charm. The architect, Alphonse De Rydt, went to Belgium and spent considerable time in selecting a number of buildings representative of the various types of architecture in that picturesque country. To create the architecture and constructional details faithful to the original, great moulds were made in Belgium directly from the original buildings. These moulds were then shipped to Chicago and in them were cast the buildings, fountains, sculpture, etc., which constitutes the village of "Picturesque Belgium."

One sees the famous gate of Ostend as it is in actuality, one of the city gates of mediaeval Bruges, many high gabled houses that date back to the Spanish rule and the old French-Gothic church of St. Nicholas at Antwerp. On the cobbled streets Belgian dogs pull milk carts with their old-time brass cans. In the shops the sabot maker carves wooden shoes from blocks of white willow and the old Koper Smid hammers at his anvil. White geese float in the water below the mill wheel and pigeons flutter from the bell tower. Glass blowers fashion delicate shapes of doves and swans and other objects of fragile beauty. The famous Belgian laces are made and explained.

(Continued on page 38)

**VALUABLE SERVICE
MANUALS FREE**

Two new and exceedingly useful and valuable service manuals are now available to technicians for the asking. The Radio Specialties Co. deserve the credit of bringing this matter to the attention of The "Technician" and has very kindly offered to cooperate in securing copies for every man desiring them.

The new Yaxley Replacement Volume Control Manual is a 120-page book crammed full of useful data for service men. It gives the history and theory of volume control circuits over a period of the past several years. Included in its pages are many charts, tables and circuits of interest and value to men in the servicing and engineering branches of radio. Besides all the general and theoretical information a cross index lists replacement controls by names of receivers and by value. The actual value in ohms of every standard replacement control for every standard set is given. Also there is a special list pertaining to auto radio equipment.

The makers of Mallory-Elkon products have prepared a large and complete service and replacement manual giving complete and detailed information for the repair, service, adjustment and use of every Mallory-Elkon product. Circuits are included with many helpful and hard-to-find bits of data and information regarding these eliminators and this type of equipment in general. This book is a large size manual of many pages containing a wealth of knowledge for every service technician and is also free for the asking.

The only way to procure these books is to apply directly to the factory. To make this easy for our readers and in line with their policy of offering every possible service to the trade, Radio Specialties has stated that they will be very glad to communicate your requests for copies of these manuals to the factory. Below is a coupon for your convenience. Fill it out and check which, or both, of the books you desire and give it to a representative of the Radio Specialties Co. or mail it to them at 1816 West Eighth street. They may also be given to the editor at any CRTA meeting who will turn them over to this company to be sent to the factory. A short perusal of these manuals will convince you that they are worth many dollars to any service technician. The Volume Control manual cost the Yaxley Company \$15,000 to compile and publish. The publishers of these manuals and Radio Specialties are to be complimented on their efforts in bringing this information to the service profession gratis.

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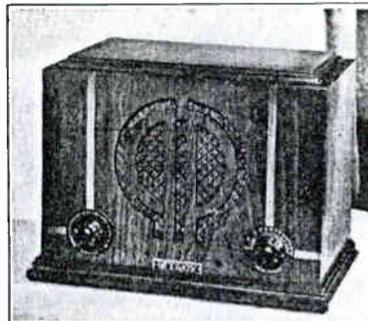
5234 MELROSE AVE.

HEmpstead 3491

If You Like Us and Our Service, Tell Your Friends,—
and If You Don't, Tell Us.

Mention The "Technician" when answering advertisements—It identifies you.

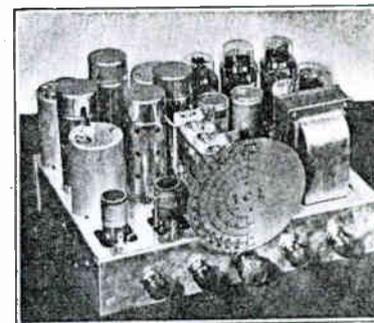
The Complete Radio Line for 1935—29 Models to Choose from
TROY QUALITY RADIO



MODEL 14A

Very sturdy construction and shielded throughout. Performance equal to that of many larger sets. Wave length 175-550 meters. Tubes, 1-57, 1-58, 1-2A5 and 1-280. Rola or Magnavox Dynamic Speaker. Coils are impregnated for protection. Amplification Class "A." This receiver is a dandy performer and a fine appearing instrument.

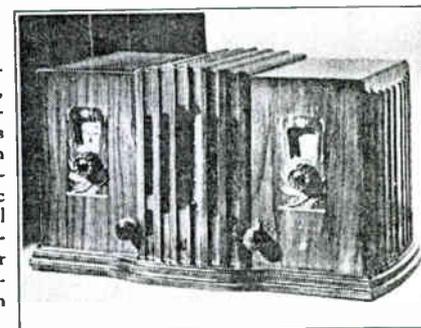
MODEL 84CH
All Wave Chassis
4 BANDS
15 to 550 METERS
8 TUBES
1-2A7, 2-58, 1-55,
1-53, 2-245 and
1-280 Tubes.



A most up-to-date all wave chassis for replacement purposes. All the latest features throughout, giving the greatest efficiency necessary for reproduction of fine tone and distance.

MODEL 54—ALL WAVE
4 BANDS—15 to 550 METERS

Modern, new design, rigid, efficient super-heterodyne using 1-2A7, 1-58, 1-2A6, 1-2A5 and 1-280 tubes. Vernier dial calibrated in kilocycles and megacycles. Bands in individual colors for convenience in tuning. Wave switch movement in corresponding colors. Illuminated. 6-in. dynamic speaker. Individual wave band coils. Full automatic volume control. Class "A" pentode amplification. Note: This receiver far exceeds the usual 7 and 8 tube performance. Model 54 Chassis available in either 84 Console.



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TROY RADIO MFG. CO.
Manufacturers and Distributors
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GRID-CONTROLLED MERCURY ARC RECTIFIERS

By S. R. DURAND, Allis-Chalmers Mfg. Co.

Most radio men in the United States are familiar with many kinds of rectifier tubes and circuits, but few of them have had any contact as yet with grid-controlled steel-tank mercury arc rectifiers.

A rectifier tube is generally thought of as containing only two elements, a hot-cathode filament and an anode plate. The electron current can flow in only one direction between these two elements, and the characteristic valve action thus produced is utilized to rectify alternating current power into high voltage direct current power required by radio transmitting and receiving tubes.

By inserting a grid-element between the cathode and anode of a rectifier, certain advantages are obtained in the same way as in a radio tube. In the first place, it is possible to vary the d. c. output voltage of a rectifier unit by means of grid-control. In the second place, it is possible to automatically cut off power by grid-control within a very small fraction of a second and at a much higher speed than can be accomplished by tripping a circuit breaker. In the third place, it is possible to invert some of the energy stored in a filter system of a radio transmitter back into the alternating current power supply system by means of grid-control in order to more quickly interrupt a short-circuit.

One of the most important advances in the radio art in the last two years has been the introduction of grid-controlled steel tank mercury arc rectifiers in radio service and almost all of the high power radio broadcasting stations in Europe are using this type of rectifier at the present time. The first installation made on the American Continent was put in service more than a year ago in radio broadcasting station XER, Villa Acuna, Mexico. The first installation in the United States for radio telegraph service was made in the Mackay Radio Company Station at Palo Alto, California, this year.

Each grid-controlled mercury arc rectifier is equipped with a grid rheostat for regulating the d. c. output voltage smoothly from zero to its maximum value. Voltage regulation is accomplished by controlling the relative instant at which each one of the rectifiers' six anodes is permitted to carry current. Each rectifier is also provided with an ultra-high speed grid-control protection circuit capable of automatically cutting-off power within one cycle (1/60 second) whenever a flash-over or overload occurs in a radio

transmitter. The grid control protection circuit can also automatically restore normal power (after clearing the short-circuit) within about two cycles, and the interruption of only three cycles (1/20 second) duration can rarely be noticed in a broadcast program. Without grid-control protection, short circuit flash-overs in radio tubes must be cleared by tripping the main circuit breaker to remove power, and interruptions of a half minute or so often result before the operator can reclose the circuit breaker to restore normal power to the transmitter. Sometimes during the time taken by even the highest speed oil circuit breakers to interrupt power, the short circuit flash-over current will damage the coating on the filament of a radio tube, and thus cause an even longer interruption for replacing the tube. In many cases the sponsor of a broadcast program claims that he loses his audience during an interruption of even half a minute, so that the radio station is forced to refund the money paid for the program. The importance of ultra-high speed automatic protection by means of grid-control can be readily appreciated for radio broadcasting stations.

A steel-tank radio rectifier unit consists of a cylinder in which a vacuum is maintained by a mercury vapor pump in conjunction with a rotary oil pump. At the base of the tank is the cathode consisting of a pool of mercury. Mounted on a cover plate above the cathode and insulated by porcelain bushings are the six main anodes, six grid elements, and two excitation anodes. Mercury seals are used to make the unit vacuum tight.

The rectifier cylinder of one of the large size steel-tank radio rectifier units is about five feet high and three feet in diameter and weighs more than one ton. The high vacuum mercury vapor pump is attached directly to the steel-tank. A single unit of this size is capable of supplying high voltage d. c. power to a 500 K. W. radio transmitter, but is also used to supply power to broadcasting transmitters of only 5 K. W. to 10 K. W., power output rating.

In place of a filament, a mercury arc rectifier employs a low voltage excitation arc. This arc is ignited before the rectifier is started up and is maintained during the time the unit is in operation. It provides the distinctive advantage that it

(Continued on page 18)

TEST SWITCHBOARD

City of Los Angeles Research Laboratory
By OTTO WIEMER

The test switchboard for the City of Los Angeles research laboratory with its auxiliary equipment of instruments and test apparatus is the foundation on which the new sales ordinance, number 73,700, is based. Without it, the requirement of laboratory tests for the approval of electrical appliances could not have been incorporated in the ordinance. Furthermore, had the switchboard not been available at the time the ordinance was drafted it is highly improbable, under present economic conditions, that the funds for purchasing one could have been appropriated. The story of how the City of Los Angeles happened to have this switchboard is a fitting introduction to its technical description.

The idea of having a laboratory switchboard had its inception a number of years ago, before the new city hall was built. A group of ambitious electrical inspectors, wishing to review mathematics as applied to electrical calculations, organized a sort of cooperative night school. The instructors were chosen from their own members and attendance was entirely voluntary. Feeling the need of laboratory methods of applying theory to practice, the class commenced to improvise a "homebrew" experimental switchboard out of discarded equipment and instruments that were loaned or donated by interested electrical contractors. In the course of time, a very creditable laboratory switchboard was the result.

With the knowledge and experience gained by the night class some of the "graduates" began to include electrical tests in their daily inspections whenever the occasion arose. Questionable equipment and materials were brought in from the field and submitted to laboratory tests. Overloaded equipment and circuits were tested for actual rather than estimated loads. Best of all, the Los Angeles Electrical Department had acquired some real engineers among its inspectors without having made any change in personnel.

Eventually the practical use of the switchboard attracted the attention and interest of some of the members of the Board of Public Works who suggested to the inspectors that they apply for an appropriation with which to build a new and better looking switchboard that would be in keeping with the new city hall. This was done and the appropriation was granted, although the amount asked for

was considerably discounted. The inspectors proceeded to design a new switchboard and draw up specifications for competitive bids, for by this time they knew exactly what they wanted. The board was finally built by a local manufacturer who thought enough of it to build one just like it for himself. Although not fully completed, additional appropriations during the prosperous years that followed made it possible to acquire a very complete equipment of instruments for the switchboard. Thus it happened that the vision of the inspectors was realized and when the new ordinance was contemplated an excellent switchboard was available for a research laboratory.

The switchboard has many interesting features. Some were borrowed from the switchboards of the public utilities and from those of the universities. Others were necessarily original in order to meet particular requirements. But, throughout the design three important principles were given primary consideration. These principles were safety, flexibility and simplicity.

Considerations of safety led to the adoption of a dead-front type of board even though the city ordinance did not make this type imperative for experimental laboratories. Also, a limitation of 600 volts was placed on all switchboard equipment in order that the board could be classified as low voltage but of course higher voltage may be obtained by series connections. High voltage testing is done with separate auxiliary equipment plugged into the main board as an additional precaution to insure safety. Magnetic contactors with start and stop buttons on the front of the board make it convenient to do all plugging on dead circuits. Pilot lights indicate whether or not the circuits are "hot".

Flexibility was obtained by adopting a plugging type of board and this feature was carried out even to the dial switches. In fact, every terminal and every tap from each piece of switchboard equipment terminates in a plugging receptacle most of which are in duplicate. This makes it possible to interconnect the equipment in every possible combination without any changes in permanent wiring. Phantom circuits painted on front of the panels show at a glance how all the receptacles are inter-connected and when the circuits

(Continued on page 42)

GRID-CONTROLLED MERCURY ARC RECTIFIERS

(Continued from page 16)

will not burn-out, so that the life of the rectifier is unlimited.

Six-phase rectification is accomplished with a single mercury arc rectifier cylinder. This is comparable to a tube-type rectifier unit employing six tubes. The efficiency of a mercury arc rectifier is not exceeded by any other type of converting unit of similar rating. The maintenance cost in comparison to a tube-type rectifier is negligible, and averages only about \$25.00 per year in even the largest units.

Because of its many advantages and outstanding features grid-controlled mercury arc rectifiers will undoubtedly be used in the near future in many of the high power radio broadcasting stations in the United States and will contribute an important service to the radio broadcasting industry.

DAY-RAD MOVES

The Radio Products Company, manufacturers of the "Day-Rad" line of test instruments, has recently moved.

For the past eight years the company has occupied quarters in the Beaver Power building, but recently moved to its new location at 125 Sunrise Place.

The company has been supplying radio service and testing instruments to companies in all parts of the world and only recently was awarded the United States government contract to supply the air corps with radio marker beacons for all government airplanes. This device is used for blind flying, an instrument that will safeguard and prevent accidents during fog and night flying.

David E. Johnson has been president of the Radio Products company for the past seven years, and S. Jaskulek, secretary and treasurer.

Robin Drake, their chief engineer, has developed a universal line of radio service instruments and has been largely responsible for radio developments used in this country.

— ADVANCE TUBES — RADIO PRODUCTS SALES CO.

ARCTURUS EXPORT OFFICE INTERNATIONAL HOUSE

Peeping into the office of A. L. Schleimer, export manager of the Arcturus Radio Tube Company, in Newark, N. J., during the last few weeks, would make one believe that it had been converted into another 'international house.' A constant stream of the company's foreign distributors has been responsible for this illusion.

Starting with its Uruguayan distributor, there followed in order distributors from France, Mexico, Ecuador, Belgium, Cuba and Spain.

"All of them," states Mr. Schleimer, "were highly optimistic over the possibilities of American radio sets and tubes in their respective countries. Our tube exports for 1934 so far are markedly ahead of all previously corresponding periods and indications already point to a record year in export sales."

CRTA MEMBERS GO IN FOR HIGHER EDUCATION

According to Mr. Edward H. Guilford, West Coast representative for the Capitol Radio Engineering Institute, many CRTA members have enrolled for the course in radio engineering. Recent enrollments of CRTA members include E. K. Snyder, Norman B. Neely, Arthur F. Guion, Chas. A. Primmer, Ray Ogborn and Arthur Oodrys. Mr. Guilford is an active CRTA associate member and faithfully attends all meetings.

UTC DATA SHEETS

The United Transformer Corp of New York is publishing a series of data and construction sheets for the use of technicians and engineers who wish to save the personal labor and trouble of designing their own equipment. These sheets describe the circuit and performance specifications for various types of audio amplifiers for all purposes and give detailed and valuable information for the construction of same. Copies may be obtained for the asking from your jobber or by writing the company.

ADVANCE Condensers

Sweeping the Town

A new addition to help all servicemen.

600 volt by-pass condensers

.1 mfd 600 volt, .25 mfd 600 volt, .5 mfd 600 volt

Also Sparton Condensers in all by-pass types.

Radio Products Sales Co.

PR. 0490

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Announcing a new Model 40 All Wave

Sensational Performance and Price

BEFORE SELECTING YOUR LINE FOR THE COMING
SEASON BE SURE AND SEE THESE REMARKABLE RADIOS

Midgets — Supers — Automobile
and All Wave Models

"THE SET YOU CAN BET ON"

Mission Bell Radio Mfg. Company

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EXposition 3837

Los Angeles

CONSIDERATIONS IN THE CHOICE OF REPLACEMENT TRANSFORMERS

By G. W. WEAVER, Transformer Engineer, Metal Products Co.

Perhaps no field is as competitive as is the radio manufacturing industry. As is true with many other industries, price has often been supreme before quality. The market has been literally flooded with merchandise that is as cheap in quality as it is in price. It thus becomes the duty of the service man, technician and engineer to be able to distinguish qualities as well as prices, because his reputation is no better than that of the product which he may use.

The importance of the safety of radios has led to the establishment of certain definite standards by the Board of Underwriters. The standards must be observed by all manufacturers receiving the approval of this board. While these standards have not been enforced in the replacement field they should, nevertheless, be a guide to all users of transformers. These requirements are in brief:

1. The transformer, with the exception of the opening for the leads, must be completely enclosed in a metal case.
2. The ambient temperature shall not rise above 90° C.
3. The transformer and its insulation must be capable of withstanding an applied primary voltage of triple its rated voltage at triple its rated frequency.

The theoretical limitations that are met in transformer design are:

- a. The flux density in the iron cannot rise too high without excessive heating of the iron due to hysteresis and eddy currents.
- b. The current density of the copper must be kept low enough to avoid excessive heat which will destroy the insulation of the wires.
- c. The amount of copper and iron used must be so balanced as to minimize the cost of the transformer.
- d. Ample allowance must be made for all of the losses when giving the rating of the transformer.

In the actual manufacture of transformers, the flux density is usually in the range of 75,000 to 85,000 lines per sq. inch. At densities higher than this the permeability of the iron drops rapidly and the losses of the transformer rise correspondingly.

Insulation in the transformer is secured by the use of enamel wire, layer wound with glassine paper. Varnished paper, varnished cambric and a fish paper are used between coils and for wrappers.

It was formerly the practice to impregnate the coils in wax, but experience has shown that where there is any temperature rise the wax is not effective. The process of impregnating with varnish in which the coils are dipped in varnish and baked insures protection against moisture and injury due to the heating of the coils.

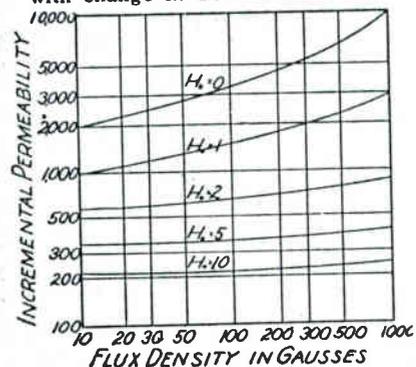
In the actual selection of a power transformer it is not only imperative to determine the ruggedness and high grade of the product, but it is also necessary to be sure that the transformer is rated correctly for the specific service. Improper line voltages, more than any other factor, are responsible for the majority of transformer failures.

The selection of audio components is a more difficult problem than is the selection of power transformers. The main factor which complicates the performance is the effect which the direct current in the windings has upon the effective permeability of the iron.

Figure 1 will show the great variation of permeability with an increase of the polarized magnetization caused by the direct current in the winding.

Where higher currents are encountered over saturation of the iron must be avoided by the use of proper air gaps in the magnetic circuit.

Variation of Incremental Permeability with change in D. C. Polarization



$$H = \frac{1.256 \text{ ni}}{L} \text{ Gilberts per centimeter.}$$

- N Turns in winding
- I Direct current in amperes.
- L Length of magnetic circuit in centimeters.

(Continued on page 42)



The World's Finest CONDENSERS

OIL
MICA
PAPER
ELECTROLYTIC



—for every conceivable radio and electrical purpose. Made with the experience of nearly a quarter-century of exclusive specialization. Now available to you, Mr. Service Man, at the most attractive prices from the nation's leading, most reliable distributors.

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JOBBER'S DIVISION

Cornell-Dubilier Corporation

4359 Bronx Blvd.

New York, N. Y.

WHAT THE CRTA HAS DONE IN THE PAST YEAR

By V. K. HATFIELD, Sec'y. CRTA

The aims of the CRTA have been mainly to develop a higher class of technician and to better business conditions for the industry.

The effort which the officers and directors have put toward these aims in the past year has been tremendous. Under the able and unselfish leadership of Mr. Paul, these officers have put all other considerations behind them in an effort to promote our Association. Much credit is also due those of the general membership who have done their part.

The lectures which we have had in the past year have been invaluable. Mr. Leitner's talks have given the technician many practice ideas and much valuable theory as well as a "look in" on the field of radio engineering. The sponsors of these talks should be highly commended for their interest in our behalf. Many talks by factory representatives were obtained and for the most part these talks were very informative.

Much publicity has been given the CRTA, but none has been so effective as the "Technician," edited by Mr. Neely. The "Technician" has not only been a means for the exchange of ideas but a common meeting place for the technician and the jobber. The "Technician" lends dignity to the organization and has been one of the greatest factors in keeping the CRTA intact.

The CRTA has grown so much in the past year that it was deemed necessary to incorporate the Association and to protect the name. Both of these factors will tend to bring the Certified Radio Technician before the public in a dignified and professional manner.

The Technical Board under the direction of Mr. Miller, has done invaluable work in compiling and giving the examinations. This Board is also the clearing house for the technical difficulties that the membership may encounter. No organization based upon the principles of the CRTA could hope to survive without this Board.

The employment committee under the direction of Mr. Ekleberry has done very well in making it possible for twenty-five CRTA members to have full or part time employment.

Much work has been done on the proposed ordinance by Mr. Oodrys. To "put over" such an affair takes a lot of work and not a little politics. This ordinance will mean much to the authentic techni-

cian as it will protect him from unfair business practices and will put him in the position of the professional man.

The future aims of the CRTA should be to carry on the good work of the past year. To do this every member should cooperate with one another and the officers of the Association.

KIND WORDS

Perry Demarest, of the Hygrade Sylvania Corporation, in a recent conversation with some of the old timers of the CRTA said: "We are certainly proud of the fact that we can number among our good tube dealers many members of the Certified Radio Technicians." In my opinion these men are all decidedly alert to new ideas as fast as they come along, not only from the technical standpoint but from merchandising angles as well. I find that few, if any of them, are interested in selling their service or equipment on a price basis and the sooner the trade in general follows such leadership the healthier radio sales and service work will be. Not only is Hygrade Sylvania keenly interested in the progress being made by the CRTA but also are our jobbers. I have learned that our distributors are very anxious to secure accounts that are members of your organization because of the aggressiveness and stability that seem to accompany them. Now that you fellows are branching out further and further, without doubt some of our jobbers outside Los Angeles will have the opportunity of coming in closer contact with you and I hope this will be the case as the connections we have had with CRTA members in and around the city have been most pleasant."

"On the occasion of the first anniversary of your magazine, The "TECHNICIAN," our jobbers wish to join me in offering our sincerest congratulations on your splendid work and many accomplishments during the past year."

Cook-Nichols Co., 482 S. Fair Oaks, Pasadena.

J. L. Mahon, 1358 S. Grand Avenue, Los Angeles

Standard Wholesale Elec. Co., 724 East Washington, Los Angeles

Radio Supply Co., 912 S. Broadway, Los Angeles

Coast Electric Co., 744 "G" Street, San Diego

E. M. Nelson, 5063 Edgewood Place, Los Angeles

Fred S. Dean Co., 400 American Ave., Long Beach

Frank A. Nelson Co., 6391 Palm Ave., Riverside

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In line with our policy of continually increasing our service to the dealer, the Leo J. Meyberg Co. is now distributor for the following products:

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Ohmite (Red Devil) Resistors Tobe Condensers
Tobe Filterettes Janette Converters
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Dayrad Test Equipment Tobe Test Equipment
Buss Fuses Eveready Batteries and Flashlights

Miscellaneous Items, including

Pilot Lights Wire Insulators Tape
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We Carry A Complete Stock of the Products Listed Above.

Place your orders with our salesmen or phone them directly to us for immediate shipment. We assure you that these orders will be given prompt attention.

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L. C. LANGE, Parts Department

TRAVELING THE TERRITORY WITH MILTON

(Herein referred to as the Traveler, among other things)

"Pottie" Boyd, who holds down the fort at Don's Radio Shop in Gardena, wishes it understood right here and now that the name of his fair city is not "Gardenia" but simply "Gardena." Nothing ritzy about this town, says Pottie.

Among the real old-timers in the radio business is Alex Alexander, who used to do his merchandising in and around Hermosa Beach. Right now Alex is in charge of the radio annex at the Star Furniture Co. in Torrance, where he rates even a separate building all to himself. What a man!

Anybody who steps into the Radio Service Co. of Redondo is most likely to see a human form all twisted into a knot trying to turn that blankety-blank bolt, yes sir, to turn it so that it will hold without falling into the chassis somewhere. Yowah, it's the one and only Dave Blausey.

We don't know offhand whether it's because he's a Certified Radio Technician or what, but anybody who can insert five six-prong tubes in their respective sockets without once looking for the holes is deserving of this week's door prize—and we don't mean maybe. Just speaking of Roy Tate, who solders and tapes 'em in the Inglewood territory.

All you lads and lassies of radioland who have romantic ideas about the South Seas would certainly enjoy meeting Wally Gee, who has the pleasure of being the proprietor of Pacific Radio & Sound Co. in Redondo. Wally was born and raised on one of the Fiji Islands, where his was the only white family on the island. If properly coaxed, Wally can sure give you quite an interesting birds eye view of one of the most romantic portions of the earth.

Without a doubt more orphan sets find their way into Bill Nichols' hands for repairing than happens to most perspiring servicemen. Down there in San Pedro where the cool breezes blow and where radio sets are mostly AC-DC, the Quality Radio Shop is doing its share to keep its contingent of radio listeners happy. Leave it to Bill, all right, all right.

If anybody was ever amplifier-conscious, that guy Less Shaffer at Thorpe Music in Redondo answers to that description. No sooner does the Traveler say hello than Less breaks out with what he's done to improve his pet re-broadcaster. Just look at my operation!

Is the Traveler smiling? or maybe he's just smiling. During El Centinela week in Inglewood Ray and Mrs. Southstone, (of Ray's Radio Shop) dressed up in old Spanish costumes to celebrate the festivities. The costume of Mrs. Ray was very becoming indeed; but as for Ray himself, we ask you with tears in our eyes, did you ever see, dream, or hear of a red-headed Spanish Don? From now on, Ray, please take a lesson from the lark.

Any motorist who wants to get a traffic ticket in Hermosa would do well to talk to Albert "Red" Estep, who modestly admits being the proprietor of the Sparton Radio Shop in that fair town. "Red" counsels thusly: park your car so as to straddle a fire plug, then gently turn in a fire alarm. According to "Red," the rest should be easy.

Ray Rusthoi, of the Manhattan Radio Shop in Manhattan Beach, ran across an interesting occurrence in the course of servicing an Echophone super. The set would not tune any station on the dial above KHJ until an ancient 24 tube (not 24A) was placed in the oscillator socket. Well, dynatron oscillators will insist on being dynatron oscillators.

Solomon undoubtedly was a wise old bird—and he still is, say Mr. and Mrs. Alison Kurth in chorus. Way down there in their radio shop in Wilmington sits their little pet canary (called Solomon for short) who has a habit of showing more intelligence than most humans. When the sun become slightly warm in Wilmington Solomon proceeds to cool himself by means of a self-inflicted shower bath, regardless of the irreverent gaze of any or all observers. If Solomon were educated and civilized, he'd probably wait until Saturday night to start his ablutions, but since he's supposed to be merely a dumb animal—oh well.

The Gieszl family still does the servicing for Mil Zillgitt in Inglewood, and you can quote us as authorities on this subject. Although Ray has decided to go elsewhere in search of fame and fortune,

(Continued on page 43)

SERVICE KINKS AND PET EQUIPMENT

Crosley
(All models with Crosley's own dynamic speaker) Rattling sound as if the tube is working at wrong c-bias may be caused by a loose voice coil winding. To cure, remove diaphragm assembly and dip voice coil winding in thinned shellac (good grade). Thin sufficiently so that shellac will penetrate into the bottom layer of winding. Allow to harden completely, then repeat for second coat.

Vincent J. Cortese, Jr.

Philco Model 20
A model 20 Philco tuned broad and oscillated with volume control on full. By-pass condensers were all checked O. K. The screws holding the variable condenser to the frame seemed tight, but a wire connected from the condenser gang to the chassis cleared the trouble.

—Leo Zimmerman.

Stewart Warner S. W. Converter
The S. W. converter may be found very insensitive even though all circuits and tubes check O. K. Converters of this type may be made to operate satisfactorily by "resoldering every soldered connection in the converter though they may seem O. K." A poorly soldered connection may have sufficient high resistance to materially affect performance on short waves, yet not high enough to show up on a simple continuity test.

—M. J. Planoosky.

Zenith 50 Series
A loud hum when all parts and tubes check O. K. can be cured by connecting a 250,000 ohm resistor across the grid of second A.F. 27 tubes, which are connected in push-pull.

Stanley C. Maegly.

A Service Note
Philco 19X and all other makes using bucking coils on speakers frequently reproduce hum just as the station is tuned to peak resonance. After much investigation we found it caused by the bucking coil leads crossing, thereby shorting out the effect of the coil and introducing the hum. These leads became shorted by handling of speaker when installed at the factory.

—A. E. Kuser.

Grebe S-K 4
Intermittent reception may be caused by broken pig-tail lead on first condenser of gang (in series with antenna). Gassy 24 type tubes will also cause this trouble.

—V. K. HATFIELD.

Sticky Tar
When handling hot tar from transformers or filter blocks, keep hands wet with water to prevent tar from sticking.
—V. K. HATFIELD.

In Sparton Equasonne sets it is not necessary to disassemble the r. f. amplifier to replace the r. f. by-pass condenser. Simply remove screw holding solder lug from top of the container. Then bend tab up against the side of the round condenser. Next, unscrew complete by-pass condenser from the chassis. The screw from underneath the chassis will not fall through because of a little lug on the underside. If there is any fear of its dropping through, hold it in with a knife or hack saw blade. Then reverse the procedure to install the new one.

C. PRIMMER.

To replace condensers in AK 37-38-40, etc., remove pack and you will find that the sealing compound is very brittle. Gently tapping container on the sides will cause the wax on top to buckle, crack and fall out. You can, with a little persistence, get even the individual condensers and wiring out intact. It takes only about three minutes to get down to the connections on the block and condensers. Do not ever try to chisel into the wax directly, as you may cut off some to the wires.

C. PRIMMER.

Dipping Red Devil resistors in hot resin will protect the insulation and keep the moisture out.

Philco Transitone No. 5
On this model Philco low volume and poor quality are often caused by open in manually operated volume control.

WHOLESALE RE-ORGANIZE-

The Radio Parts Jobbers Association of Southern California has re-organized and is anticipating a year of activity carefully planned to assist in raising the standards of the radio profession in general. Foremost among the aims of this group is to promote a closer understanding and feeling of cooperation between the jobbing and wholesaling firms and dealers and service technicians in Southern California.

The officers, Mr. Yale, of Yale Radio Electric Co., and Mr. Ferris, of Western Wholesale Radio Co., are men well-known in local industry and have pledged their utmost in bringing about the objectives of this association and in making the radio profession a more pleasant as well as more profitable pursuit.

CHRIS O'MALLEYSON

(Continued from page 10)

ve do dinks, eh? Comel" And he started for the door. I had to almost run to catch up with him. By the time I had done so he had hailed a cab. I clambered in after him as he called out, "Great American Airport," and settled back in the seat, silent. During the ride not a word was spoken, each of us engrossed in our own thoughts. I, too much so, in fact, to notice the heavy fog which had settled like a shroud in the night.

When we arrived at the airport I ventured to question, "Where do we go from here? Your laboratory isn't here, is it?"

Chris laughed. "Up," he said, "it's too foggy down here. I don't like it, but believe it or not, up above somewhere, there is a beautiful moon shining. I like beautiful things, don't you?"

I admitted that I did but suggested that there were other kinds of beauty than moonlight one should hunt for on a night like this. "Oh, sure, sure," he agreed, "but you see one has to choose a night like this to ride in the moonlight above the fog. It's beautiful, man, it's beautiful. But first, before we go up, I want you to have a good look at the ship. That is also a thing of beauty."

With some difficulty we found our way to the hanger. Chris flung open a small door and, stepping in, switched on the light. Startled, I stepped back almost aghast at the erie sight which confronted me.

The ship was a very low, high-wing monoplane. The wings, which were very thick next to the fusilage, sloped very gracefully throughout their comparatively short length to a very thin tip. The fusilage too was quite small and slender at the tail but at the nose it was all of eight feet in diameter and almost perfectly round. The entire ship was painted flat black with the exception of the two propellers, one on either side of the fusilage; the landing gear and struts, and a triangular shaped section on the nose of the fusilage, all of which were painted glossy white.

This triangular section was a raised section point down. The two lower sides were decidedly concave while the top side was convex conforming to the curve of the fusilage. It was this which gave it such an erie appearance, especially on a night like this. It was bad enough, as I often saw it later settling slowly, gracefully on the field in the sunlight looking like some frightful prehistoric monster in insect form.

Chris laughed at my astonishment so

good naturedly that I was soon in good spirits again. "That color scheme is just an expression of my sense of humor," he said, still laughing. "There are, however, a lot of things about her in which you are going to be really interested. After you have seen it all you are going to forget that first look and agree with me that she really is a beauty."

I must admit that later I did agree, wholeheartedly, about her beauty but I never have forgotten that first look. I did, however, learn to see the beauty in those weird, though asymmetrical lines.

As he spoke he inserted a key in an inconspicuous lock where the wing joined the nose. As he turned it a portion of the under side of the right wing and a section of the fusilage lowered, exposing an opening into the cabin of the ship. Chris motioned me in and followed me closing the opening after him by turning a knob on the instrument panel.

The cabin was very low, so low in fact, that small as I am I had to stoop. Chris was quick to explain, "You're not supposed to stand up in here. You're supposed to SIT DOWN," putting so much emphasis in the last two words that I felt commanded to take the seat to which he motioned.

To say that the cabin was fitted luxuriously would be saying little enough. The rear of the cabin was fitted with a semicircular seat just slightly separated into three sections. In the front were two single seats with a narrow aisle between. All were done in overstuffed gray velour and as comfortable as anyone's armchair at home.

The whole interior was covered with some kind of soft, watered finish cloth cut and sewed to form a very deceiving appearance of inlaid wood work. On either side were two windows just under the wing. There was also a window the full length of the cabin just over each wing.

The instrument panel, too, was a thing of beauty. There were none of the instruments or dials one would naturally expect to see. Instead there was, in front of each front seat, a ground glass plate about eight by fifteen inches in size. Above this were three groups, of three each, ground glass plates. Each of these was about one inch in width. The center one of each group was about six inches in height and the other two were about five inches.

In the center of the panel was a round white lense about ten inches in diameter.

(Continued on page 32)

Factors Governing Design and Choice of Radio Transformers

(Continued from page 11)

applied frequency. The charge while passing from the secondary winding to ground flows through the RF bias resistance. This results in a change in grid potential on the RF tubes, which modulates the incoming carrier.

Sealing and Impregnation

For power amplifiers in public address and similar work, larger transformers of more sturdy construction must be used. Units of this type have a formed metal case which not only serves as a mechanical protection, but also helps shield the stray flux of the power transformer from the other components. The cased type of power transformer is normally poured with a moisture-proof insulating compound. This helps protect the coil from adverse climatic conditions, and also helps to dissipate the heat due to the transformer losses over the large surface of the container. The choice of this sealing compound is very important as four factors must be considered: the coefficient of heat transfer, insulating properties, moisture-proof characteristics and melting point.

The choice of proper impregnating compounds is also quite important. While wax has been used extensively due to its high factor of penetration, the writer has found varnish a more suitable impregnating medium. As a wax impregnated coil expands due to changes in temperature, there is a slight tendency to suck in warm moist air into the coil; when the coil cools, the moisture condenses inside of the coil. This internal moisture is highly injurious to the coil insulation and may eventually result in complete breakdown. A coil properly vacuum-varnish impregnated will have sealed-in edges, such that moisture cannot be sucked into the coil, thus resulting in increased transformer life.

Where the very highest safety factors are required, as in broadcasting stations or laboratories, copper and iron densities are kept at very low values, and the voltage gradient or insulation stress is kept at about 50 volts per .001 inch thickness of insulation. The impregnation process for this type of transformer consists of a drying process—an initial vacuum-varnish treatment—a second drying—a second varnish treatment—and then a final varnish dip. The transformer assembly is then poured with a special compound in a cast housing of high permeability alloy.

(To be continued next month)

PRECISION TEST EQUIPMENT

It is the agreed opinion of leading authorities in the servicing and engineering branches of broadcast radio that the time is here when service technicians who hope to be able to cope with the problems arising from the servicing of modern radio equipment must possess engineering knowledge and be equipped with testing apparatus which approaches laboratory standard.

With this in mind a new company has been formed with the definite purpose of supplying this class of equipment at popular prices. This new company, the Triumph Manufacturing Co. of Chicago, is composed of the leaders of the well-known Transformer Corporation of America. The president, Mr. J. J. McCarthy was formerly vice-president of the TCA and E. J. Doyle formerly chief engineer of the old company occupies the same post with Triumph. R. D. MacGreggor, sales manager for Triumph was sales engineer and service manager for TCA.

The first unit is a signal generator which has many exceptional features. Almost a year had been spent in the development work of this generator before it was placed on the market. It is the only generator to date employing a true stepped ladder type attenuator priced substantially below \$100.00 and capable of providing comparative readings of sensitivity for the service engineer and manufacturer. The instrument has met the exacting test of all major Chicago radio manufacturers and is in use on the production lines of many of them.

The instruction booklet furnished with the unit is worth nearly as much as the generator itself as it gives detailed but condensed directions for performing all sorts of tests and checks that the service technician usually does not consider within the possibilities of the service shop.

Norman B. Neely has been appointed representative for the line which will consist of several other items to be announced later.

Dependable, Inexpensive, Efficient



"Western made for Western Reception"

MERCHANDISING WITH THE BUSINESS UPTURN

By GERALD B. MILLER
Radio Supply Co.

New hopes for the radio industry are just peeping through the clouds of the wall of depression. The manufacturers and wholesalers have succeeded in raising the retail volume of sales from \$196,000,000 in 1932 to \$212,000,000 in 1933, thus showing what can be accomplished by cooperation and by uniting efforts for a common cause. At a convention held in June this year in the city of Chicago the manufacturers and wholesalers united and adopted what is known as the "Five-Point Plan." Briefly this is a plan founded on five basic ways to promote radio through a bureau of advancement which will be backed by a tremendously large campaign, costing over \$1,000,000, to awaken public consciousness to the value and enjoyment of today's modern radio.

You will find the alert man, in the service field today using a higher grade of merchandise in his work and doing a higher grade of work. Why? He first has a greater satisfaction in letting out a job with first class material, secondly he builds up a following of satisfied customers and continued boosters, thirdly by putting into each job better material he makes more material profit in dollars and cents and last he eliminates waste in time and money by taking no chances with inferior merchandise, and costly follow-up service calls. The alert service man profits by dealing with leading houses who carry nationally known lines backed by fully engineered factories who are spending large sums of money annually to bring better products to the trade.

Mr. Radio Technician, don't wait for codes to put you on easy street. The codes will and have caused marked improvement but to build up your bank balance depends upon untiring efforts on the part of yourself and your organization. Some of the leading firms are doing suggestive selling, pushing short wave converters, auto "B" eliminators to replace the worn out batteries in auto sets, remote controls for the parlor radio newly developed filtered antennae, additional speakers for the breakfast nook or patio, a small set for the bedroom or one of the newly developed automatically controlled clocks for starting and stopping any electrical appliance in the home. Filterizers for the refrigerator or electric fan and many other valuable items which will net the dealer good and substantial

returns for his labors, are being featured by leading dealers.

Your tube manufacturer has complete plans for a well-rounded house-to-house canvass backed with national advertising, call-back cards, station logs, cutouts for the children, cooking recipes for the housewives, and numerous other trick ideas which will help you to make a successful and profitable canvass.

Now is the time to mobilize your forces, scan your neighborhood and in so doing keep your competitor on the fence while you climb on the wagon.

HIGH POWER 45 AMPLIFIER

Mr. A. J. Moser of the Technical Service Laboratories, has recently designed and built an exceptionally high-power audio amplifier using a single pair of 245 tubes for the output.

Mr. Moser's amplifier has very good tone quality and anyone doubting the ability of 45's to produce infinitely more than three watts of power should listen to this one.

RCA VICTOR

SERVICE MEETINGS

The first of a new series of service meetings to be held by the engineering division of the RCA Victor Co. under the auspices of Leo J. Meyberg Co., Inc. was held on the RCA Photophone Sound stage at 1016 N. Sycamore street, in Hollywood, Friday, August 31st.

This new group of meetings will be of the utmost interest to all service technicians as a great deal of technical information will be given by means of special lectures, slides and demonstrations. The new 1935 RCA Victor line will be shown and complete technical descriptions will accompany the demonstrations.

The first meeting was a great success—up to the high standard of the RCA meetings in the past—and we look forward to many interesting and educational meetings this fall and winter.

MISSION BELL DISTRIBUTORS

The Union Hardware Company which has been jobbing radio sets along with its other lines for a number of years, has just recently taken the Mission Bell Radio line of midgets to distribute. This new connection gives them a very complete radio line as they are distributors for Bosch in this territory. The new all-wave Mission Bell midget is a very remarkable set and will undoubtedly prove a valuable addition to the items handled by the Union Hardware Co.

Congratulations to The "Technician" on its
first anniversary.

PETER PAN

SINCE ITS ORIGIN HAS MAINTAINED
AND ALWAYS WILL MAINTAIN THE
HIGH STANDARD OF QUALITY FOR
WHICH IT HAS BEEN NOTED.

"Look For the Boy With The Flute"

JOHNSON & MACKAY
Exclusive Distributors
Los Angeles County

PETER PAN RADIO CO.
1487 West Adams
REpublic 6093

LET US PAY YOUR OVERHEAD !!

Since our Mr. Wismer's talk to the members of the Certified Radio Technicians several months ago at which time he briefly touched upon the dealer plan we have had many inquiries as to how this plan works. The plan to all who have come in with us has met with exceptional praise as we are actually giving 40% of our profits to our dealers for their good-will and cooperation. We receive many calls each day for changes of cycles on electric clocks from individuals as well as dealers. We do not want to be in both the wholesale and retail cycle changing business but would rather have it wholesale. When a call comes in we refer the customer to the dealer in his vicinity and give him 40% for handling the deal. All you have to do is bring the clock in or call us and we will have United Parcel pick up and deliver for you. You will be our authorized dealer in your vicinity. In exchange for our courtesies we expect you to place in a prominent place a poster reading "Electric Clocks Sold and Repaired. Cycles Changed. Authorized Dealer for the National Clock Co." Just call MUtual 1617, the National Clock Company, and we will be glad to explain more fully. A booster for you and a booster for us. You can't lose! Make your clock business pay your light bills, etc. Call Now. We will mail you a poster and put you on the roll. If you are a customer of ours now and have no poster, call or write us at once.

NATIONAL CLOCK CO.

340 East 4th Street

MUtual 1617

Los Angeles

NOISELESS ALL-WAVE ANTENNA SYSTEM

A single antenna with automatic frequency selector and impedance matching switch whereby ideal broadcast or ideal short-wave antenna circuit is provided for intercepted signals, with a positive minimum of background noise, is announced by the Technical Appliance Corp., 27-26 Jackson Ave., Long Island City. Known as the H-F (High-Fidelity) All-Wave Antenna System, the arrangement is available in complete kit form including wire and insulators, or as individual antenna and receiver units.

This noiseless all-wave antenna system is intended primarily for all-wave receivers. It provides the efficiency heretofore attained only through the use of separate broadcast and short-wave aerials, with the added feature of minimum background noise.

Two units comprise the heart of the system. The antenna unit, a compact aluminum-encased device with screw binding posts taking the ends of the aerial wire, is inserted at or near the center of a single-wire aerial. The unit automatically routes signals through the most desirable combination of aerial and downlead. The companion set unit mounted near the receiver, is provided with a switch for impedance selection whereby to obtain the most effective coupling between receiver and downlead. A twisted-pair cable for the downlead cancels out inductive interference or background noise, including the usual troublesome automotive ignition interference. The new system is licensed under the A. A. K. antenna system patents.

CHRIS O'MALLEYSON

(Continued from page 26)

Across the face of this lense were a number of horizontal black lines and a vertical column of figures down the center of it. Several small black knobs were located just below the lense. It was one of these that Chris had used to close the entrance to the cabin.

Instead of the usual stick for piloting the ship there was a wheel mounted very similar to the steering wheel in an automobile. This wheel had a very large hub in the center of which was mounted a lense very similar to the one in the center of the panel except that it was only about eight inches in diameter. It was this instrument which Chris explained to me first.

(To Be Continued)

PACKARD-BELL ENDS THEIR FIRST YEAR

The Packard-Bell Company, manufacturers of radio receivers, celebrates its first anniversary this month also. This company is formed of Mr. A. H. Bell, formerly president of the Jackson Bell Company, and Mr. L. S. Packard, who came here from Seattle and San Francisco where he had been in the radio industry for many years.

Located at 1318 South Grand, this company first opened its doors September 1, 1933, and has steadily increased its scope of activities ever since, until it now manufactures a complete line of radio receivers. This company also manufactures its own coils, chassis and cabinets. We congratulate them on their first birthday.

RADIO INTERFERENCE

(Continued from page 9)

which will usually be effective. If it is feared that the condenser might break down maintaining a water heater or other device in service which might cause damage, a small fuse which will blow on load current may be connected in series with the condenser.

Other sources of interference in household apparatus such as that from induction motors on washing machines and repulsion starting motors on refrigerators should be corrected by repairing the device as these should not cause interference when operating properly. Door bells, dial telephones, etc., may cause interference but of such an intermittent nature that filtering is hardly justified.

Electro-medical equipment, particularly the diathermy and violet-ray apparatus cause severe interference. Suitable filters using both series inductance and shunt capacity will prevent this type of interference from feeding back into the distribution lines but direct radiation of interference from the apparatus itself can only be prevented by operating it in a shielded enclosure. Fortunately class "A" buildings are inherently pretty well shielded by metal lath, etc., but in cases where the building construction provides insufficient shielding it can be provided by lining the room with fine mesh metal screen on the ceiling, walls and floor.

Electric sign flashers are sometimes a source of interference which can be prevented by suitable filters of the capacity and inductance type. If the leads from the flasher to the sign are long, it may be necessary to filter these as well as the power supply line.

Traffic signals of various types can cause interference and are easily filtered or repaired.

Elevator controls, street cars, large power applications to ventilating systems, refrigeration, etc., all may cause interference, especially when operated from direct current. Since such apparatus is quite predominate in dense business areas, suppression of all interference is usually impracticable and economically unsound. In these districts the use of special antenna systems or multiple antenna systems where many radio sets must be used in a building, are recommended when radio broadcast reception is required.

(To be continued next month)

THANKS TO ADVERTISERS

To all the advertisers and supporters of our magazine, The "Technician," I wish to take this opportunity to express my wholehearted gratitude and appreciation of your support and cooperation during the year of the origin of this venture. Your patronage has made possible the publication of this magazine and I realize that your faith in this new and never-before-successful undertaking in Southern California is not to be taken lightly. It has indeed been a tribute to the character of the men who have taken the responsibility of organizing an organization with the aims and covering the scope of the CRTA that you and your associates have seen fit to support us financially as well in as in act and spirit when the outcome might have been regarded as uncertain to say the least.

I feel, however, now that we have continually grown and enlarged our scope of activity for one complete and successful year that we have not proven unworthy of that trust and faith reposed in us by our many supporters.

Again I wish to express my sincere appreciation of your patronage and I can assure you that every effort will be made to make each succeeding year mutually more successful and The "Technician" ever more deserving of your support.

NORMAN B. NEELY, Editor.

ZENKER ADDRESSES CRTA

Mr. Herbert Zenker, of Leo J. Meyberg Company, addressed the members and guests of the CRTA at the August 27th meeting. His subject was Radio Merchandising and the points stressed were that every dealer and technician should remember to sell himself and his services to the customer. Nor does this "selling" end with the permission of the owner to service his equipment but must continue until the customer is "sold" on the finished job.

Mr. Zenker pointed out the fact that the customer must be impressed with the knowledge and fitness of the technician to be in the radio business before he can really be in a position to remember and recommend the firm with which he deals.

The talk was very valuable and stimulating to all present and Mr. Zenker is to be congratulated upon his choice of a subject and the manner of his treatment of it in presenting it to a group of technical men.

SKAGGS TRANSFORMER COMPANY

5894 S. Broadway, L. A. FREE DELIVERY ADams 7652
REWOUND ORIGINAL TRANSFORMERS
FOR IMMEDIATE EXCHANGE

"YOU CANNOT BEAT A GOOD REWOUND TRANSFORMER"

Good rewind transformers have had the manufacturers' mistakes corrected in the use of poor insulation and corrosive soldering fluxes. They have been put together the best way, not the way that takes the least amount of time.

Just Give Us A Ring And Have It Delivered

FILTER BLOCKS REBUILT

NEW SPEAKER FIELDS

PETER PAN ACTIVE

Mr. Shelley of the Peter Pan Radio Co., states that that concern is now operating its factory at full capacity producing a new line of receivers in view of the favorable indications which point to a very active fall and winter in the radio business, particularly as regards set sales. Peter Pan is a member of the RMA of So. Calif., and is doing its bit to better conditions in general locally. Look for the Golden Poppy on the chassis of every Peter Pan.

**RADIO EXCHANGE
ISSUES DISCOUNT CARDS**

In an effort to assist in the general campaign to eliminate illegitimate competition and the allowance of trade discounts to any and all indiscriminately the Pacific Radio Exchange has adopted the system of issuing discount cards. These cards are numbered and filled in with the name and classification of the customer who is required to show this card when demanding trade discounts. Cards are not issued until the company is satisfied as to the qualifications of the individual applying for such a card.

FALL CATALOGS

The Cornell-Dubilier Corporation, who manufacture all types of electrical condensers, announces two fall catalogs available to the trade for the asking. Catalog No. 125 is of particular interest to service technicians and catalog No. 126 is recommended for those interested in transmitters and allied equipment. Cornell-Dubilier invites your request for copies of these booklets and they will be sent free of charge.

A. PAUL, JR., CONVALESCES

Mr. A. Paul, Jr., President of the Certified Radio Technicians' Association, and head of the Technical Service Laboratories in Hollywood, has been confined to the hospital for several weeks.

Mr. Paul was forced to undergo a serious operation but is now well on the road to recovery and we know all his friends will welcome him back to the chair of the CRTA meetings and will be glad to see him back at his duties again.

\$6⁰⁰
List**\$6⁰⁰**
List

COMBINATION earphone-microphone designed especially for the new five-meter transmitters and the new five-meter transceivers, though it has a multiple of other uses among the ranks of amateurs.

CONSISTS of a high output microphone in conjunction with 2000 ohm lightweight receiver. Five-foot cord terminated in three phone-tip terminals . . . handle rubber covered . . . weighs but 9 ounces.

This is the latest Universal product. New catalogue shows entire list of transformers, microphones, recorders and other items.

Universal Microphone Co., Ltd.

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CALIFORNIA

**RADIO PARTS JOBBERS ASSOCIATION
OF SOUTHERN CALIFORNIA**

EXTENDS FULLEST CONGRATULATIONS TO THE
RADIO SERVICING PROFESSION AND THE STAFF OF
The "TECHNICIAN"

The Association looks forward to many more years of co-operation,
based on friendly service and high ideals.

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411 West 5th Street
Phone 1188 Santa Ana

YALE RADIO ELECTRIC CO.
709 South Main Street
TUcker 1105

PROGRESS!

The Radio Manufacturers' Association of Southern California has, and is endeavoring to improve conditions among the radio dealers and technicians in Southern California.

Inasmuch as we are composed of leading local firms, employing local labor, who have endeavored to establish and maintain honest price structures with conscientious consideration of the other members of the trade, we honestly believe that we merit the support and cooperation of other branches of local radio business.

It is a definite fact that conditions are improving locally as well as nationally, and we are proud of any influence we may have had in bringing about this change.

Radio Manufacturers' Association of So. Calif.

The Radio Manufacturers' Association of Southern California congratulates *The "Technician"*

on the event of its first anniversary. We offer sincerest wishes for continued success in maintaining a necessary service for the local radio industry.

CHANTICLEER RADIO CO.
EL REY RADIO MFG. CO.
GILFILLAN BROS., INC.
GOLDEN BEAR MFG. CO.
HORN RADIO MFG. CO.
MELBURN RADIO MFG. CO.
MISSION BELL RADIO MFG. CO.
PETER PAN RADIO CO.
REMINGTON RADIO & TELEVISION
PACKARD-BELL RADIO CO.
TROY RADIO CO.
WESTONE RADIO CORP.

SEEING THE WORLD FAIR

(Continued from page 13)

The Fountain of Pearls is a priceless exhibit showing pearls of every color and shade, every size, shape and form, all in the original shells from every water where pearls are found.

In the heart of the Village, surrounded on all sides by the quaint architectural charm of the middle ages, is a large open square on which front little shops, cafes and outdoor restaurants. Every hour native folk dances are danced by pretty Belgian maidens and husky peasant boys to strains of rhythmic and charming Belgian music.



MARY VERMULLEN
Native Dancer in the Belgian Village
(Market Square and City Hall in
background.)

The clatter of clumsy looking wooden shoes, a never ending chorus of song and laughter, and the happy carefree manner of the native dancers as they do their quaint dances instills in one a feeling of peace and happiness not common to this noisy, rushing, bustling stage of civilization in which we live. The highlight of

these hourly programs and never failing in its appeal to the audience is the "Kiss Dance."

To the strains of the appealing music the boys and girls dance about the market square in a circle, with one boy or girl alone in the center. The dancer in the center chooses a partner of the opposite sex from the outside ring, and the two then become the leaders of the dance. At certain breaks in the music, they kneel, and first the boy kisses the girl and then she kisses him. The other dancers follow suit. Now is the time for real fun, though. One of the peasant boys selects a girl at random from the audience and then she must become his partner in the center of the dance. When the dance is over the real climax comes as all the boys rush to the center of the circle and initiate the new participant with a volley of kisses. This, much to the embarrassment of the young lady and the merriment of the onlookers. The same dance is then repeated with a man from the audience and he gets initiated with the kisses of a dozen pretty girls—not so bad—not so bad!

It is hoped that readers who have not visited "A Century of Progress" will enjoy these word pictures. In the next issue we shall describe the sky ride and some of the exhibits in the Hall of Science.—Editor.

NEW—1935 ALL-WAVE SET



"Western made for Western Reception"

THE
RADIO PRODUCTS
COMPANY
Manufacturers of
Radio Service Equipment
DAYRAD

Represented by
FRANK A. EMMET CO.
741 South Burnside Avenue
Los Angeles, Calif.

LOOKING INTO THE FUTURE OF YOUR PROFESSION

By W. J. KANTENBERGER

Congratulations to the Certified Radio Technicians' Association on the first birthday edition of your publication. The stormy seas of the first year of your existence are behind you. It afforded you added knowledge. It created a better understanding, a better relationship between all you members of the CRTA. It has impressed you that your problems are similar. It has taught you the necessity of working together in order to bring about a satisfactory adjustment of the pitiful conditions that exist in the profession today, and it certainly has enlightened you toward the value of loyalty and cooperation. To those who have endeavored to make your publication possible, through their hard untiring efforts in keeping you posted of activities, great credit deserves to be given. The advertisers in your magazine are also worthy of mention and consideration. They help pay the cost of your publication, and in reciprocation they should be patronized.

You are started on the second year of your great magazine. The hardest year of your existence is behind you. You feel easier in knowing that nine organizations in your State are striving for the same principles that you are.

Your next year will be a hard year, as will selling the idea of the necessity of loyalty and cooperation to all your readers. Those who are sincere in their intentions toward the progress of your organization, will weld themselves into a stronger and finer organization. Those who are not sincere will drop from your roster.

During the next year the serviceman will be compelled to express himself as to

how he stands on organization. There cannot be a happy medium. Those of you who plan to make radio servicing your life work, those of you who make investments in time, efforts and equipment, must combine your efforts in paving a sound, secure road down which you must travel through the coming years. Your efforts next year will pave that road!

How good it will be paved depends on how solidly you keep your organization the next year.

Look down the road, gentlemen, before you travel on. If conditions in the profession are not adjusted the road will be rough, and so will your earning power through all the years you are called upon to travel it. You cannot spend years of study, years of effort, and a fairly good investment in apparatus in the profession and drop out so easily unless it is with bankruptcy and a broken heart.

Loyalty, cooperation and hard work are the only things that can pave the road, and every radio technician who plans to make radio servicing his life's work must do his part to pave that road. We trust that every serviceman in Los Angeles will come to this vital realization. God speed to you, Mr. Paul, and your associates.

LOCAL ENGINEER PREPARES TUBE TESTING ARTICLE

Mr. Frank Hernfeld, chief engineer in charge of the technical department of the Radio Products Sales Co., has prepared a very informative article concerning the theoretical and practical aspects of tube testing under modern conditions. This article describes a very practical method of tube testing which gives dependable results. Mr. Hernfeld is to be complimented on his choice and very able treatment of such a burning subject.

Oldest Established Radio Parts
Distributor in So. Calif.

YALE RADIO ELECTRIC COMPANY
WHOLESALE DISTRIBUTOR

RADIO REPLACEMENT PARTS — ACCESSORIES
TESTING AND SHOP EQUIPMENT
WIRE AND CORDS

Phones—TUcker 1105 — TUcker 1106
709 South Main Street Los Angeles, Calif.

DEALERS

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A SMALL, GOOD LOOKING RADIO, THAT HAD ILLUMINATED DIALS — HIGH SENSITIVITY — VERY SELECTIVE — WELL BUILT THROUGHOUT WITH GOOD PARTS — LOCALLY UNDERWRITTEN—LICENSED BY RCA AND AT A PRICE.

Packard-Bell Co.

PRospect 0151

1318-20 South Grand

Los Angeles

FULFILLED EACH REQUEST IN

THE NEW MODEL 35

5-TUBE SUPER

— AT —

\$10.95

DEALER COST

WHAT UNDERSTANDING AND COOPERATION CAN DO FOR THE RADIO SERVICEMAN

By JOHN L. VINCENT
Vice-President CRTA

There is little need to call your attention to the rapid strides made in Radio Engineering. The vast number of models released by an army of manufacturers is now in the neighborhood of 9000.

What becomes of old radios? Unlike old cars, old radios are reclaimed and operated by a multitude unable to purchase later and more improved models. Aside from the vast sales possibilities, think of the service on this equipment.

When research financed by organized business and spurred by competition brought forth advancements in the field, the skill of service and repair began to change and this change has been extremely rapid. Many of those men and boys capable of satisfying the requirements in early and simple equipment are now faced with the most intricate design of the foremost engineering skill. Achievement in tonal quality and refinements in audio amplifiers have educated our people to higher levels.

The advent of automatic volume control made greater noise level between stations and necessitated the "squelch circuit" to overcome this objection. Band pass tuning overcame selectivity problems of the engineer. These terms are not a figment of the advertising man's imagination! They are the reasons for the service technician's nightmares. Since these changes have taken place in technical advancement, is it not logical that there also must be a change in the type of men doing the service and maintenance of this complex equipment?

Organization is often misunderstood in its intent, when a group of progressive and thinking radio technicians gather or associate, don't be too hasty to condemn their motives. Since the industry must be purged of the Cheat, the Incompetent and the Careless, some standard of qualification must be established, education and examination must be given and consultation, advice and cooperation to those requiring it. These are some of the reasons for organization.

We are riding the tide of progress, unless we keep up our strength with knowledge, gain every advantage by cooperation, we shall soon be engulfed in the wake of the leaders and sink to oblivion.

Announcing

Longer Trade discounts effective August 1st on all power-transformer and speaker-field rewinds. Our same high standards of quality will prevail, allowing our customers to retain the same confidence in our work as before and still realize more profit on the job. Our free installation service and the guarantee of one year will hold under the new price schedule. New price-sheets will be mailed to all on our list. If you don't get yours, call us. There is still no substitute for a good rewind. We also wish to announce at this time a new and better chassis repair service now available to our customers at reasonable prices.

Filter Blocks

Speaker Fields

Special Audio Transformers

Transmitting power equipment

California Radio Laboratories

2523 South Hill Street

PRospect 3515

Nites THornwall 4777

TEST SWITCHBOARD

(Continued from page 17)

are plugged a complete connection diagram is in plain view.

Simplicity was achieved by following a systematic plan in laying out the plugging receptacles on the panel sections. Corresponding terminals are placed in the same horizontal and vertical lines, respectively. This symmetry of terminal locations, together with the sectional division of the panels, affords maximum simplicity in the operation of the board.

The plugging devices were designed with several interesting features. The plugging receptacles are reamed with tapered holes to insure good contact and to allow for wear. The "spade handle" plugs have split prongs with a uniform spacing of two inches. One of the prongs is arranged to "float" slightly in order to allow for inaccuracies in the spacing of the receptacles. The spacing of adjacent receptacles which would cause short-circuits if improperly plugged is purposely made greater or less than the two inch spacing of the plugs, thus reducing the chances of mistakes. The "spade handles" are used for standard connections and flexible plugging cords for the many possible special connections.

Space does not permit the description of all the features of the switchboard. To those who are particularly interested, any desired information will be freely given. However, a personal visit to the laboratory to inspect the switchboard and see the stunts it can perform would be better than any possible written description. It is therefore hoped that this article will inspire readers of the TECHNICIAN to visit the laboratory and let the switchboard speak for itself.

ELECTRAD INTRODUCES EXCEPTIONAL CONTROL

The new Electrad volume control line is a radical departure from conventional design. Outstanding among the many improvements is the method of tapering which reduces step effects between sections to a minimum. Also the contacts are of silver and provisions have been made to assure self-cleaning and self-aligning, and these controls have extremely low capacity. The many other points of interest concerning this new line may be learned by contacting Mr. Perry Demarest who is the Electrad Distributor.

Considerations In Choice Of Replacement Transformers

(Continued from page 20)

There was a time when there was little choice as to the tubes used in audio amplifiers. However, due to the multiplicity of tubes available for audio work, the choice of a transformer is no longer a simple problem. One must be sure not only that the winding ratio is correct, but also that the primary inductance at the given d. c. drain is sufficient to give satisfactory frequency response. In general the primary reactance should be at least three times the plate resistance plus the effective load resistance at the lowest frequency at which the curve is to be flat. Whenever possible transformers should be secured which have been pie-wound to reduce distributed capacitance and leakage reactance.

Many of the present tubes have been designed for "A" prime and Class "B" operation, and one must never make the error of using a Class "A" push-pull transformer for such service because of the saturation effects at peaks which do not occur in Class "A" operations.

The purpose of this article is to impress the reader with the importance of extreme care in purchasing, that he may be able to recognize quality versus price and to emphasize the many factors to be considered when purchasing transformers for specific needs.

THANKS TO BERT KNIGHT

The Officers and Board of Directors of the CRTA wish to take this opportunity, on behalf of the entire membership, to extend heartiest thanks to W. Bert Knight, Inc., Ken-Rad tube distributor, for his sponsorship of Mr. Leitner's lectures for the past several weeks. This support and evidence of a desire to cooperate with us in attaining our aims is sincerely appreciated by all who have been privileged to attend this series.

"DOC" TO ISSUE BULLETIN

Radio "Doc" announces the intention of publishing a new special bulletin to contain many items and suggestions of value to service technicians. All our readers are invited to have their names placed on the mailing list of this firm to receive these bulletins and other printed matter of interest which is mailed from time to time.

TRAVELING THE TERRITORY

(Continued from page 24)

his brother Cliff continues to uphold the traditions of the family in the same position. Attaboy, Cliff.

* * *

We somehow can't remember whether the name was "Anastasia" or "Anaesthesia" but down here in Santa Monica Max Smith called his pet possum one or the other. Max claims that his is the only radio service shop in the world that boasts of a possum for a mascot.

* * *

And while on the subject of Santa Monica the Traveler had one of those rare opportunities to enjoy an afternoon aboard the "Mischief," one of the neatest sailing crafts on Pacific waters. After the Santa Monica regatta was over, Skipper Bob Wilson invited a party on board, the Traveler traveling along more to act as ballast than for any other reason. Boy, oh boy! They call horseracing the sport of kings, but take it from an old timer—with a skipper on board like Bob Wilson, horse racing is just about as necessary to our existence as an old UV-199 tube is to an up-to-date all-wave super.

* * *

If anyone thinks that the younger generation is not radio-minded, all he has to do is to step into "Butch" Gruno's "Radio Curiosity Shop" in Long Beach, and said individual is due for a revelation.

* * *

And while on the subject of youngsters, Louis Seeman's Radio Den in Whittier seems to be the community center for all youngsters from 2 to 20 in that part of the country.

* * *

That little mass of fluff ambling about the floor of Clausing's Shop in Wilmington is none other than "Tiny," the little French griffon, which answers to the beckoning of his mistress, Margaret Clausing. Who said that dogs are dumb animals?

* * *

When in Rome, do as the Romans do. When in Ward Bros. in Long Beach, tell funny stories. A Ward to the wise is sufficient.

* * *

Although Merwin Greer does all his own service in his shop at Leimert Park Radio, he is most capably aided by his chief aide-de-camp, Richard Greer, aged 3. Richard is dextrous enough in his manipulation of screw drivers, pliers and the etceteras that papa Greer has to step fast to keep up with the rapid pace set by the younger generation.

To get a "rise" out of Oscar Waldenschmidt (operating out of Wally's Radio Service on South Vermont) just advise him not to smoke too many herring. Stand by for action!

* * *

This week's gadget prize goes to Al Goodyear of Expert Radio Service in San Pedro. Al's contribution this week consists of a full-fledged magnetic cone speaker measuring $1\frac{3}{4}$ inches in diameter, made from an old Baldwin head-phone unit. And it works, too.

* * *

While waiting for "Mitch" Salmonson to untwist himself from an auto radio, the Traveler espied a brother reporter and writer in the Wilmington Hdwe Co. A lot of you boys will remember L. M. Barcus, whose technical articles in "Radiocraft" have elicited considerable attention.

* * *

And now, you poor suffering readers, now's your chance to duck for a breath of fresh air until the next issue comes out. Au revoir, hasta la vista, auf wiedersehen, or what have you!

DR. HUND LABORATORY IS NOW ESTABLISHED

Dr. August Hund, the well-known German Physicist, especially noted for his work and publications dealing with radio frequency phenomena, has been occupied for the past several weeks in attending to the many details of establishing his consulting and experimental laboratory on Western Avenue.

Dr. Hund has not been able to complete the article scheduled for this issue of The "Technician" due to the tremendous demands upon his time in getting his laboratory ready for use. However, he has definitely promised to have an article of exceptional interest to all concerned with technical radio ready for publication in an early issue of The "Technician."

Approved by
Underwriters Laboratory



"Western made for Western Reception"

RADIO INTERFERENCE BUREAU

MR. W. F. GRIMES, Chief Engineer Radio Interference Engineering Bureau

(This column is a regular feature and each month will consist of a report of interesting cases and activities of the RADIO INTERFERENCE ENGINEERING BUREAU. To report interference Phone Trinity 1244).

REFRIGERATORS

During the summer months, the Bureau traces many causes of interference to electric refrigeration. In analysing refrigerator troubles which interfere with radio reception, they may be divided into three groups: static, thermo-static and defective wiring.

The most common cause is due to the accumulation of static charge on belt driven compressors in dry weather. On many refrigerator units the compressor and motor are mounted on spring supports or vibration absorbers in such a manner that the frames are not permanently grounded to the larger metal parts of the refrigerators. A simple remedy for this type of trouble is to bond the frame of the motor and compressor to the frame of the refrigerator or other large metal body in the immediate vicinity, with a flexible jumper. The jumper should be sufficiently flexible so as not to interfere in any way with the operation of the refrigerating unit.

Thermostats and their associated relays are a source of trouble when not in good operating condition. When the contacts of the thermostat or the relays are in need of cleaning or adjustment, a small arc is apt to be drawn while the unit is in operation. Troubles of this type sometimes become very severe from the standpoint of radio interference particularly when they are so mounted as to permit changing of the contact pressure by the vibration of the unit. When difficulties of this type are experienced, it is advisable to communicate with an established electrical refrigerator service organization since the performance of the refrigerator depends to a great extent on the proper operation of these necessary devices.

Occasionally defective wiring to the electric motor is encountered. This difficulty is usually occasioned by the vibration of the unit loosening up terminals, or chafing the insulation on the motor conductor wire. In order to clear some of these difficulties, it is necessary to call in a qualified electrician.

In general, radio interference experienced from refrigerators is very similar to natural static and usually does not affect

receivers remote from the refrigerator. It has been noted, however, that interference of this type is very noticeably increased in intensity due to the lack of adequate antenna and ground installation for the receiver being affected. It is also observed that a majority of the refrigerators which create radio interference, have been in operation for a long period of time, without expert maintenance.

SUMMER RECEPTION

During the month of August, 1934, the Bureau received 251 requests for investigation as compared with 140 for the month of August, 1933. This is of particular interest as it is an indication that radio receivers are being used to a greater extent than in the past and that a large number of receivers being used are old, obsolete or in need of repair. The Bureau's records indicate that there has not been an unusual amount of difficulty due to outside interference. It has been noted also, that there is a slight increase in calls having to do with short wave reception. Short wave reception during the latter part of July and the month of August, has not, when at its best, been satisfactory in so far as European or other stations at a great distance are concerned.

As yet the Bureau is not in a position to render any great amount of assistance to the short wave listeners in so far as outside disturbances are concerned. There is sufficient work to be done in the broadcast band, reception from local broadcast stations, to occupy the entire time of the Bureau's personnel. The Bureau is pleased to be of assistance whenever possible in the design and location of suitable short wave receiving antenna systems.

NEW CATALOG OF SETS

The Troy Radio Manufacturing Co. has recently issued a pamphlet completely describing the entire Troy line. The line is very complete including all types of house sets, both standard broadcast and all-wave, auto sets, air-cell receivers, short-wave sets, as well as public address amplifiers. Troy receivers are distributed by Radio "Doc" where demonstration will be cheerfully given.

A set of ten diagrams of the latest Troy sets, including short-wave, all-wave, auto sets and P. A. amplifiers will be given to all technicians who apply in person to Radio "Doc."

CHECKING OVERLOAD POINT ON AMPLIFIER

(Continued from page 7)
(The legend for Figure 2 is shown below)
 $R_2 = R_1 = 1000$ ohms
 $R_1 = 100$ ohms.
 $C_1 = 1.00$ microfarad.

f	R_1	C_1
50 cycles	101500 ohms	.999 mfd.
60 cycles	70400 ohms	.999 mfd.
400 cycles	1681 ohms	.941 mfd.
1000 cycles	353 ohms	.717 mfd.

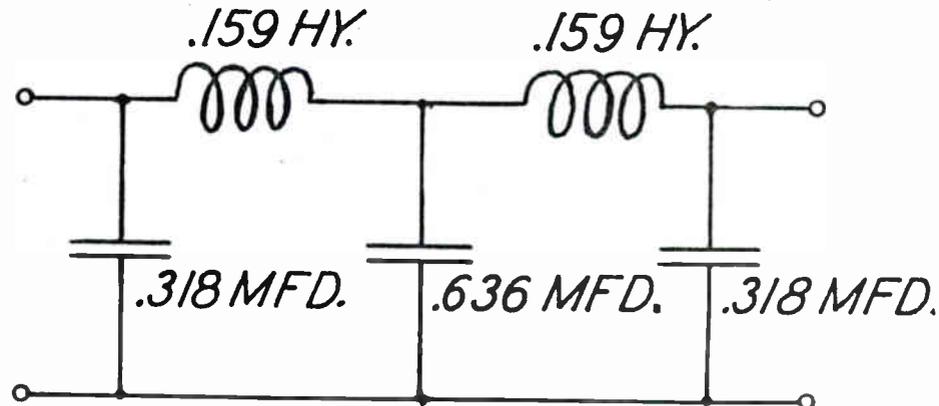
It's a good idea to make R_1 variable so that the bridge can be balanced to compensate for slight changes in frequency of the oscillator. Use a fixed resistor of say three quarters of the value given in the table for R_1 , in series with a rheostat of about half as much resistance, so that the normal balance position will be somewhere near mid-position of the arm. The resistors and condensers should be accurate to at least a couple of percent, preferably better. Care should be taken in wiring to avoid capacity coupling between input and output leads; they should be run in shielded pair and the other wiring can also be shielded if the leads aren't too long.

I have given values of R_1 and C_1 for a number of commonly used frequencies; if you want to set up a bridge for some frequency not given here, the formulas for these quantities are:

$$R_1 = 100 + \frac{253,000,000}{f} \text{ ohms;}$$

$$C_1 = 1 - \frac{100}{R_1} \text{ microfarads,}$$

when the other resistors and condensers have the values given in the figures.



500 ~ 1000 ~ L. P. FILTER

Figure 3

Now as to a source of a.c. The simplest scheme is of course to use the 50- (or 60-) cycle line current, and this is o.k. except that that you will probably have a lot of hum if the amplifier is a.c. operated, and the hum will naturally have the same frequencies as the harmonics you are looking for. Also both the phones and your ear are quite insensitive at such low frequencies, so you will probably have to replace them with an amplifier and V.-I.—which will not discriminate between the thing you're looking for and any other noise that may be present, though that isn't ordinarily serious.

Several descriptions of small audio oscillators have appeared in the Technician, and any of these can be used. Set the frequency with a piano or tuning fork, and then hook the bridge input directly to the oscillator and balance R_1 for minimum sound in the phones. Most phones, and most ears, are most sensitive at around 1000 cycles, so it's a good idea to make up the bridge for that frequency. Many test oscillators and signal generators have a provision for furnishing a 400-cycle tone, and if you have one you can make the bridge for that; the sensitivity will be almost as good as at 1000 cycles.

Whatever source you use must have a very low harmonic content or the overload point will be very hard to set to. Most oscillators are very poor in this respect, so you will probably have to add a low-pass filter to the set-up between the oscillator and the amplifier input. Such a filter is shown in Figure 3.

(Continued on page 49)

PHILCO SERVICE MEETING A HUGE SUCCESS

The Philco service meeting held in the auditorium of the National Radio and Electrical School on the evening of Sept. 13th, was a huge success. Much valuable information concerning the Philco line was passed along to technicians and a closer feeling of cooperation was established between the trade and the firm of Listenwalter & Gough, exclusive distributors of Philco Radio receivers and Philco replacement parts for all receivers.

The enjoyment of the evening was made complete by the serving of good beer and sandwiches. We are sure that all who were fortunate enough to be present will look forward with pleasant anticipation to another of these friendly and informative get-togethers.

NOTICE TO THE TRADE

Rumors and reports have been circulated by unauthorized parties to the effect that the CRTA and or its officers are actively supporting and are involved in a cooperative buying plan.

All interested persons are referred to a notice appearing on page 20 of the July "Technician" reporting the official opinion of the Board of Directors of the CRTA in the form of a regularly adopted resolution as not being in favor of any such action at the present time.

JOHN L. VINCENT,
Vice-President CRTA

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EXCLUSIVE PETER PAN DISTRIBUTORS

The firm of Johnson and Mackey, radio parts distributors, announces its status as exclusive Peter Pan radio set distributors for the entire County of Los Angeles. This company wishes to refute the claims of some unknown party who represents himself as being able to supply this line of sets in Los Angeles County.

GRUNOW FIRM NET \$600,000 IN SIX MONTHS

Net profits of the General Household Utilities Company for the six months ended July 31, were approximately \$600,000, according to officials of the Co.

Operations Seen as Satisfactory

In view of the expenses and losses of the first half, a small profit for the year ended July 31 is regarded by the management as a satisfactory outcome. The company has just closed its first full year of operations, having been formed by the merger of Grunow Corporation and United States Radio and Television Corporation on July 13, 1933.

Grunow Corporation was formed two years ago on August 1, 1932, and had its principle development in the household refrigeration field. The United States Radio and Television Corporation, in the complimentary radio field, was formed late in 1928 to succeed several established businesses, some of which dated back to 1911.

Sales of the corporation in the fiscal year just ended were \$12,231,000, of which \$8,618,000 were in the last six months.

Distribution Extended

During the year the company has enlarged its distributing organization about 20 per cent and now has 75 distributors and 6000 dealers, as compared with 5000 dealers a year ago, it was stated. Sales volume is fairly well divided between refrigerators and radios, with refrigerator volume for the last year slightly ahead of that of the radio division.

The company is now well started on its radio season. Approximately two months ago the company introduced a new popular-priced all-wave radio, equipped with its patented "signal beacon" station finder. The all-wave set is priced from \$75 up and other models are priced from \$27.50 to \$147.50.

Reprint—Chicago Journal of Commerce
August 13, 1934.

THANKS TO NATIONAL RADIO & ELEC. SCHOOL

During the first year of the existence and development of the Certified Radio Technicians Association the National Radio and Electrical School has very kindly granted the use of their large auditorium for our weekly meetings. In addition to this service other rooms have been made available to the examining board for the conduction of examinations and to the Board of Directors for private meetings.

It is the desire of the officers and the Board to express, on behalf of the membership, sincere thanks for this very great service which has been so kindly and freely extended.

HOWARD D. THOMAS PASSES AWAY

Mr. Howard D. Thomas who was known by most every one in the radio trade from Seattle to San Diego, passed away at his home Thursday night after about a month of illness.

Mr. Thomas, since the first of the year, has had the distribution of the Packard-Bell line of radios for San Francisco and the north. Before this he was salesmanager for the Jackson Bell Co. Many remember him as distributor for Perryman tubes.

Mr. Thomas leaves a wife and son, Howard D., Jr.

It is with sincere regrets that we note the passing of such a well-known and well-liked member of the radio industry in California.

NEW MEMBERS!

Don't forget the attractive prizes offered to the member who brings in the most new members during the summer months. The Radio Supply Co. is offering a Triplett Universal AC-DC 500 micro-ampere meter for first prize and the California Radio Laboratories will award the second prize winner \$5.00 worth of Transformer rewind service.

NEW INCA CATALOG

The Inca Bulletin No. L-4, a twenty-four page catalog, is now ready for distribution to the trade. This catalog lists in detail, giving necessary information to all users of transformers, a complete line of all types of audio and power components. Three pages are devoted to listing the leading and most popular receivers by model number and the proper INCA unit for power transformer replacement. Circuit data on transmitters is also featured.

MANY CONTRIBUTORS TO THE "TECHNICIAN"

At the end of our first year and the beginning of a second year of publication many thoughts and memories of the struggle and problems of keeping The "Technician" "going" and steadily growing for twelve issues come to mind. It was a tremendous task to endeavor to establish and develop a publication of this type during a period of so-called depression and published by an infant organization having no financial means to invest in getting started.

It is freely admitted that the outlook appeared a bit clouded at times but for the most part the success and growth of the "Technician" has been very smooth and marked by the whole-hearted cooperation of important members of the radio industry. Although our advertisers have made possible our growth by their financial support we would have had nothing of value to offer them for their money had we not been able to present worth-while and valuable articles by reliable and well-known authorities.

These men, who have given unselfishly of their time and knowledge, deserve a great and full vote of thanks for the part they have had in making our magazine a success. Among our contributors are numbered some of the most outstanding authorities in their respective fields in the entire United States.

I wish to take this opportunity to endeavor to express my sincere and deepest gratitude and appreciation of the support given by each and every one of our contributors during the past year, although mere words are a poor medium, indeed, to express this feeling. In consequence, I say simply "thank you sincerely" and trust that you will understand just how deep and genuine is the gratitude of the CRTA and myself.

NORMAN B. NEELY,

Editor.

A Model for Every Person, Location and Use



"Western made for Western Reception"

NEW PRODUCT

The newest product from the Inglewood, Calif. factory of Universal Microphone Co. is a combination earphone and microphone which is mounted similar to French phone handsets. It has been designed for five-meter transmitters, and also for use on the new five-meter transceivers. Since such equipment is extremely lightweight and compact it weighs but nine ounces.

The new product consists of a high output microphone in conjunction with a 2000 ohm lightweight receiver. There is a five foot cord terminated in three phone tip terminals which gives microphone and earphone connection with one common to both. The handle is rubber covered.

STRASSNER REPORTS UTC SUCCESS

According to C. R. Strassner, manufacturers' representative for the United Transformer Corporation of New York, the new and very complete line of UTC audio and power components is proving very popular with Southern California technicians and engineers. This line of equipment, designed and backed by a very capable and efficient staff of engineers, offers a wide selection of units in several price ranges.

The engineering staff also prepares engineering data sheets and circuit diagrams which may be obtained for the asking at UTC distributors or by writing the factory or Mr. Strassner.

NEW MPC TRANS. ENGINEER

The Metal Products Co. who has been manufacturing radio power and audio transformers for the past year, announces the appointment of G. W. Weaver as chief engineer in charge of transformer design. Mr. Weaver who has, among other things, done considerable work along aircraft radio lines with Herbert Hoover, Jr., is a very competent engineer and offers to be of assistance whenever possible in solving the technical problems of our readers.

Our Newest Product
— ADVANCE RESISTORS —
RADIO PRODUCTS SALES CO.

NEW LEAFLET

The Solar Manufacturing Corporation announces the issuance of a new catalog known as service leaflet No. 5-S. This bulletin features a number of new Solar Condenser developments of interest to all technicians. A copy of this booklet may be obtained from your distributor or by writing to the factory.

CHICAGO MFGRS. OPTIMISTIC

A recent survey of the activities of radio manufacturing in and about Chicago showed a very optimistic outlook for a busy fall and winter in the radio industry.

Nationally known as well as local manufacturers in that city were operating their factories at full capacity and it can safely be assumed that they are confident of ready markets for this large output of receivers and allied equipment.

GRUNOW DESCRIBED BY WATSON & WILSON ENG.

At the August 20th meeting of the CRTA, Mr. Shomler and Mr. Tisher, of Watson & Wilson, Inc., Grunow distributors, demonstrated the new Grunow all-wave set. After the general talk several questions were asked by the members and guests present and considerable interesting discussion followed.

ALL WAVE AND SKIP BAND SETS

There is a difference

The fall season promises to be a very profitable one for the radio dealers handling All-Wave and Skip-Band radios, but it should be clearly understood in the dealer's mind just what constitutes an All-Wave radio. Many manufacturers are selling the dealers Skip-Band sets which they represent as all-wave.

A radio is not all-wave and cannot be named all-wave unless it covers the complete range of 12 to 550 meters.

Skip-Band sets cover an important wave band and skip to another, leaving out the bands between. These sets are designated as Long Distance, World Wide, Round-the-World, etc. There is a definite market for this type of set but they are not true all-wave receivers and every dealer must understand the difference and so represent such receivers to his customers.

TECHNICAL QUESTION AND ANSWER DEPARTMENT

Conducted by C. E. MILLER

Q. I have a speaker that has an objectionable rattle at certain frequencies. The cone is in good shape and nothing is touching it. Where does the trouble lie?

A. Your trouble is probably due to loose turns on the voice coil. Remove the cone and apply a thick coating of clear lacquer.

Q. After replacing the dial cable on a Majestic 70 the tone is very bad and there is an increase in hum. What could have happened?

A. One of the pilot light leads has probably become grounded, shorting out the bias resistor of the 71's.

Q. A Victor home recording motor has developed a case of running erratically while recording, although I understand that the motor used is synchronous.

A. Make sure that the line voltage at the motor is normal. Check the speed reduction mechanism for slippage and see that it is in proper adjustment.

GLENDALE DEALERS HAVE GENTLEMAN'S AGREEMENT

Twenty-eight Glendale radio dealers and technicians have been profiting during the past year from a "gentlemen's agreement" plan. This group has meetings from time to time and decides on certain rules to be followed in conducting the radio service business in their city. So far none have broken this agreement and all have maintained a given price schedule of parts and labor and hours of staying open.

NEW FEATURE NEXT MONTH

Beginning with the October number of The "Technician" a very interesting feature will be started. This will consist of excerpts from the diary of the first Navy radio operator to circumnavigate the world on a merchant vessel. The narrator, the operator in person, is none other than our well-known vice-president, Mr. John L. Vincent, of Glendale.

— **ADVANCE SPEAKERS** —
RADIO PRODUCTS SALES CO.

CHECKING OVERLOAD POINT ON AMPLIFIER

(Continued from page 45)

The values given are for 1000 cycles and 500 ohms. For any other impedance, multiply all inductances and divide all capacities by the ratio of the desired impedance to 500 ohms; thus if you want a 1000-ohm filter, since $1000 \div 500 = 2$, use twice the inductance and half the capacity given. For other frequencies, divide both inductance and capacity by the frequency in kilocycles; thus for a 50-cycle filter, since 50 cycles is $1/20$ kc., multiply all inductances and capacities by 20.

This scheme works not only on amplifiers, but on any other system whatsoever that can be used to take in a single-frequency sine-wave input and give an electrical output. For testing receivers, hitch the oscillator to a signal generator; for recordings, patch the oscillator into the recording amplifier and then hook the bridge into the playback amplifier output, etc. It's a mighty useful scheme, and gives you a lot of information that's pretty expensive to come by in any other way.

—Blackie.

Congratulations CRTA

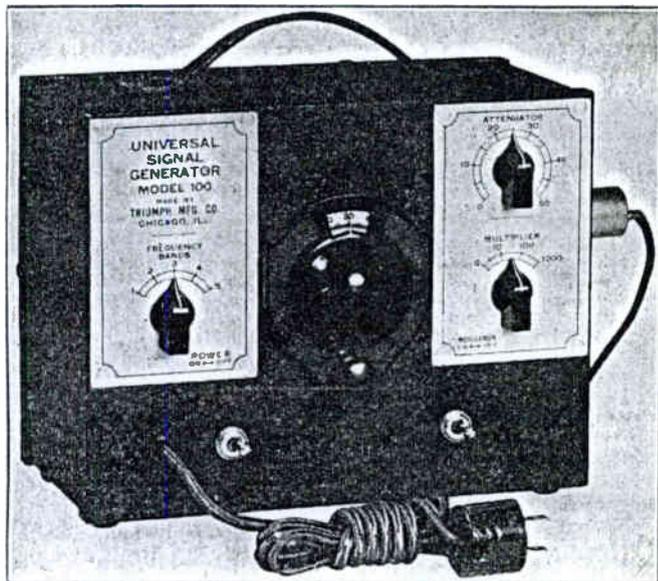
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It is an accepted fact that engineering knowledge plus test equipment which approaches laboratory precision is necessary to cope with modern radio servicing problems. To meet this need the Triumph Manufacturing Co. is producing a complete line of precision test equipment at popular prices, for the alert service and design engineer.

The first of this line is a new all-wave precision signal generator with new features and improvements not found in instruments at less than \$100.00

Compare These Features

1. Price—\$38.75 complete with tubes (F. O. B. Chicago).
2. Portable—A. C. Self-Powered.
3. 4 Step Ladder Attenuator allowing outputs of from practically zero to 50, 500, 5,000 or 50,000 microvolts.
4. Modulated or unmodulated R. F. Output continuously variable from 100 K. C. to 10,000 K. C. accurately charted.
5. 400 Cycle A. F. available on output leads through Attenuator.
6. Maximum output of ½ volt modulated or unmodulated R. F. and 400 cycle A. F. separately available.
7. Beautiful black Crystalline metal cabinet with frosted aluminum calibrated scales.

UNUSUALLY USEFUL BOOK OF INSTRUCTIONS FURNISHED.

"Frequency stability, dependability of calibration and operation of attenuator truly astounding in popular priced instrument."

—John L. Vincent.

"The new Triumph Generator fills a definite need in the servicing profession and is easy to use and dependable."

—A. J. Moser.

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A convenient 104-page Manual containing essential information users must have to get optimum performance from any device using vacuum tubes.

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	List	Dealers
NS-13 Push pull 250, 245, 59 triode or 71A plates to 8, 4, or 2 ohm voice coil	3.00	1.80
NS-14 Push pull 18, 20, 33, 41, 42, 47, 2A5, 59 pentode, 89 triode plates, to 8, 4, or 2 ohm voice coil.....	3.00	1.80
NS-15 Push pull 2A3 plates to 8, 4, or 2 ohm voice coil.....	3.00	1.80
NS-16 Push pull 48 plates to 8, 4, or 2 ohm voice coil.....	3.00	1.80
NS-17 Single 250, 245, 59 triode, 71A to 500, 8, 4, or 2 ohms.....	3.00	1.80
NS-19 Push pull 250, 245, 59 triode or 71A plates to 500, 8, 4, or 2 ohms	3.50	2.10
NS-20 Push pull 18, 20, 33, 41, 42, 2A5, 59 pentode, 89 triode plates to 500, 8, 4, or 2 ohms.....	3.50	2.10
NS-21 Push pull 2A3 plates to 500, 8, 4 or 2 ohms.....	3.50	2.10
NS-26 Single 26, 56, 27, 55, 77 triode or 864 plate to 500 or 200 ohms.....	3.00	1.80
NS-28 Line to speaker audio matching transformer. Input 4000 ohms and 500 ohms. Output 15, 8, 4 and 2 ohms. Will handle up to 15 watts	4.50	2.70

CLASS B INPUT TRANSFORMERS

NS-30 Driver 46 or 59 plate to 46 or 59 grids	2.75	1.65
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CLASS B OUTPUT TRANSFORMERS

NS-32 Push push 46 or 59 plates to 8, 4, or 2 ohms.....	3.25	1.95
NS-33 Push push 49, 53, 79 or 89 plates to 5000 or 3500 ohms.....	3.50	2.10
NS-36 Push push 46 or 59 plates to 500, 8, 4, or 2 ohms.....	3.75	2.25

FILTER AND AUDIO CHOKES, FILAMENT TRANSFORMERS

NS-38 Filter choke. 15 henrys 60 MA; resistance 240 ohms.....	2.00	1.20
NS-39 Filter choke. 20 henrys 90 MA; resistance 400 ohms.....	2.50	1.50
NS-40 Filter choke. 30 henrys 75 MA; resistance 350 ohms.....	3.00	1.80
NS-41 Filter choke. 10 henrys 150 MA; 95 ohms	3.00	1.80
NS-44 Detector plate shunt choke. Max. D.C. 3 MA.....	2.25	1.35
NS-50 Plate Transformer for small power tubes, Class A and B. Pri. 115 V.A.C., 60 cycles. Secondaries; 300-0-300 at 75 MA; 5 V.C.T. 3A., 6.3 VCT, 2½A., 2½ VCT. 6A	7.00	4.20
NS-51 Plate transformer for push pull power tubes Class A and B. Pri. 115 V.A.C. 60 cycles. Secondaries: 400-0-400 at 125 MA; 2½ V.C.T. 5A., 2½ V.C.T. 10 A., 5 V. C. T. 3A..	9.00	5.40

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