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The ORIGINAL Complete Line of Exact Duplicate Replacement Vibrators

Type 3320



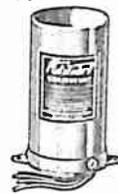
Philco Replacement

Type 3319



Chevrolet Replacement

Type 3315



RCA Replacement

And the Only Complete Line Licensed Under the Following U. S.

Patents: 1924082 — 1935568 — 1935569 — 1944487
1946563 — 1951614 — 1961058

By the end of this year there will be more than 1,500,000 automobile radio sets in use using vibrators. More than half of these have already been in service over a year. Everyone of them means an eventual vibrator replacement. Only with Radiart can you cash in on this business to the fullest extent. Only Radiart makes a COMPLETE line of exact duplicate replacement vibrators for these receivers. Radiart vibrators are known throughout the United States, Canada, and several nations of Europe. They have achieved an enviable record of excellent performance in the field under all sorts of operating conditions. More than 67% of the major manufacturers of automobile radios are today using Radiart vibrators as standard equipment. Follow the judgment of the engineers who originally designed the sets you are servicing and you will be sure of a satisfied customer and a constantly increasing repeat business.

Available at Most Good Jobbers — Write for Catalog

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East 133rd at Shaw Avenue

Cleveland, Ohio

C. R. STRASSNER, Representative
1341 South Hope St.

« THE » "TECHNICIAN"

MARCH, 1935

FACTORY AGENT DIRECTORY NUMBER

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AND

Radio Accessories

Exclusively for Dealers and Service Dealers

Radio-Television Supply Company

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Excellent Parking Facilities Away from the Congested Downtown Area

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THE NATIONAL UNION RADIO CORPORATION is helping thousands of Radio Service Dealers throughout the country to better their business by sending their dealers valuable information on how to properly merchandise their services. This is a very important part of your business and of any business.

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We want you to let us help

1. INCREASE YOUR BUSINESS.
2. INCREASE YOUR PROFITS.
3. INCREASE YOUR SATISFIED CUSTOMERS.

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Speaker Repairing

We are equipped to render REAL SERVICE on your speaker problems. Complete stock of replacement parts for any make, and for those "Hard to Get" auditorium type replacements we offer the best service on the coast.

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The original moulded cones recognized for their excellent frequency characteristics are featured and available for any speaker. Cones replaced—Field coils rewound—Voice coils repaired and rewound.

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Most Complete and Biggest Assortment of

RADIO PARTS

— In The West —

All The Nationally Known Makes of

REPLACEMENT PARTS

TEST EQUIPMENT

PUBLIC ADDRESS SYSTEMS

RECEIVERS AND TRANSMITTERS

WHOLESALE TO DEALERS AND SERVICEMEN ONLY

Radio Supply Co.

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Los Angeles, Calif.

Phones VAndike 3178 - 3179 3170

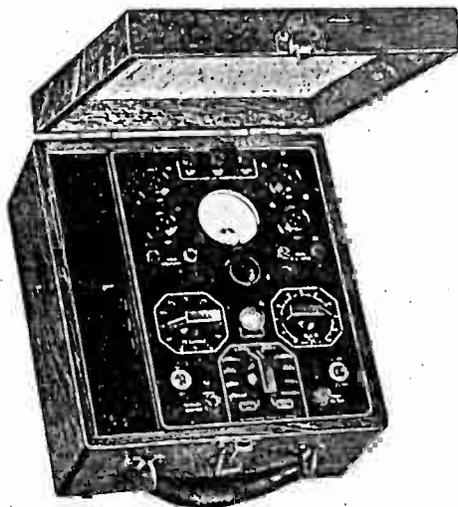
JACKSON

ELECTRICAL INSTRUMENTS

MODEL 427

Portable Tube Tester

WITH VOLT-OHMMETER RANGES



Case in hand finished quartered oak.
Dimensions approx. 11 in. x 10 in. x 5 in.

\$2950

(Net to Dealers and Servicemen)

(Slightly higher west of Rocky Mts.)

There Are Other Jackson Test Instruments Designed to Give Positive, Accurate Results in Radio Servicing. Write for Latest Bulletin or See Your Distributor

The Jackson Electrical Instrument Co.

DAYTON, OHIO

California Representative

B. M. FUHRMAN, 1121 S. Lucerne Blvd., Los Angeles

LEO J. MEYBERG CO., Distributor, 335 W. Washington—PR. 9255

Recommended and Sold by Leading Distributors Everywhere

Direct reading — tests every type of tube. Not an ordinary emission tester. Detects bad tubes on the basis of amplification ability.

Neon shorts test with sensitivity up to 500,000 ohms leakage detection. All shorts test made with tube heated. Has meter range for DC volts—milliamperes and ohms.

Specifications on Test Meter Ranges

Ohms Range— Dial Calibrated Direct . . . No chart required. Reads 0-20,000 ohms / 0-200,000 ohms. Readings as low as 10 ohms easily made. Compensator provided to correct for battery voltage errors.

D.C. Volts Ranges . . . Scales of 0-10, 0-100, 0-300 volts D.C. (200 ohms per volt).

D.C. Milliamperes . . . Scales of 0-10, 0-100, 0-300 D.C. M.A.

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

V. KARL HATFIELD, Secretary-Treasurer

NORMAN B. NEELY
Editor - Manager



1656 N. Serrano Street
Los Angeles, California

\$1.50 Per Year

15 Cents Per Copy

Vol. II

March, 1935

No. 7

EDITORIAL

By The Editor

"What Class of Customer"

Whenever a group of service technicians or radio dealers get together the conversation, besides technical discussion, usually includes much of personal experiences with chiselling customers.

This brings us to a question which undoubtedly should receive some deep consideration. What type of customer should we cultivate?, what type of customer is the most valuable?, what type of customer is the backbone of the radio business?

It is certainly not only unwise but foolish to allow personal tastes to influence your attitude or treatment of a customer. Regardless of whether John Jones likes Hillbilly music, crooners, jazz orchestras, religious fanatics, opera, symphony, political speeches, etc., every one of his dollars contains one-hundred cents and providing he is not too big a chiseller, his business should be cultivated.

However, let us consider briefly the experiment made by Radio Station KECA during the last year. This station has confined its programs almost entirely to classical music, cultural lectures, operas and news.

Glen Dolberg, program director of KECA—KFI, informs us that in a two-weeks' period, during which KECA has asked its listeners the direct question, "Shall KECA continue its fine music programs or shall it revert to the broadcasting of popular music, jazz and crooners?" 10,483 music lovers voted in favor of good music by cards, letters and telegrams to this station.

The purpose of this discussion is to point out that the cultivation of these listeners as customers is very worthwhile business, inasmuch as musicians, lovers of symphony, classical music and

opera are not satisfied with ordinary radio reception. For the most part they desire to purchase and properly maintain high-class radio receiving equipment capable of faithfully reproducing symphony music.

A large percentage of those listeners who demand and appreciate classical programs are not equipped with radio receiving equipment capable of reproducing the wide frequency range and excellent quality of KECA broadcasts.

Lending some serious thought to this problem and planning an intelligent and well prepared sales campaign whereby you can convince this class of listener that your service will put his receiving equipment in condition to more faithfully reproduce the type of music he loves and enjoys will undoubtedly pay excellent returns. Also, there is a vast field for the sale of high fidelity receivers to this class of listener by carefully pointing out and demonstrating the excellent programs of the type which he enjoys which are available over KECA. Mr. Dolberg ventures the opinion that only about 2 per cent of all radio listeners possess receiving equipment capable of reproducing faithfully the excellent quality and frequency range of KECA.

Therefore, in summary, be urged to realize that there are countless thousands of radio listeners who particularly desire and demand programs consisting of classical, opera, symphony music, cultural and educational lectures and news. These owners for the most part do not possess equipment which fulfills their desires. It does seem, then, most logical to concentrate upon this class of listener in offering high-class service and sales of high fidelity receivers.

DIRECTORY OF RADIO PARTS EQUIPMENT AND ACCESSORIES AND FACTORY AGENTS

At the request of many readers of the "Technician" in all branches of the radio industry in Southern California we have prepared an alphabetical directory of the leading lines of radio replacement parts, test equipment and accessories. This directory will list items by the brand name or manufacturer's name and following the item will be the name of the factory agent in California. A supplementary directory will alphabetically list all manufacturer's agents, their phone numbers and addresses.

It is perhaps very much in order to discuss in brief the purposes of this directory, just what part factory agents play in local merchandising and how readers may use this directory to greatest advantage.

Users of all types of electronic equipment very frequently are in need of technical information, which for various reasons may be difficult to obtain from printed matter at hand or from jobbers who handle several dozen lines. The factory agents may then be contacted to furnish or secure such information as may be desired.

Factory agents supervise the merchandising of their lines in their territories and arrange contacts between factories and wholesale firms. Factory agents do not sell directly to consumers except, of course, in the case of manufacturing plants using the component parts. This explanation is emphasized in order that readers will not expect to deal directly with the factory agent, but will only contact him for pertinent information, engineering specifications and other data as may be desired.

It is realized, of course, that this directory is not entirely complete. We have used every effort to obtain all the information possible and any additions to this list will be greatly welcomed by the editorial staff of the "Technician" and will be published in subsequent issues as supplements to this directory.

Where more than one agent is listed the first will be in Southern California and the following in Northern California. Also, we should be most happy to receive the opinions of readers on compiling and publishing directories under other classifications.

- | | |
|--|----------------------|
| A | |
| Aerovox Corporation..... | W. C. Hitt |
| Advance..... | C. F. Sexton |
| Alden Products Company..... | Marshank Sales Co. |
| American Transformer Company..... | C. R. Lynch |
| American Steel Package Company..... | W. Bert Knight, Inc. |
| Amperex Electronics Products, Inc..... | Conrad R. Strassner |
| Amperite Corporation..... | Don C. Wallace |
| Arcturus Radio Tubes..... | T. B. Pritchard |
| Ariston Laboratory..... | C. F. Sexton |
| Astatic Microphone Laboratory, Inc..... | Conrad R. Strassner |
| B | |
| Best Manufacturing Company..... | Don C. Wallace |
| Bliley Electric Company..... | Don C. Wallace |
| Bud Radio, Inc..... | S. H. Cohn |
| | Dick Huber |
| | V. T. Rupp |
| C | |
| Burgess Battery Company..... | |
| C. R. Cannon Company..... | J. T. Hill |
| Carron Mfg. Company..... | Don C. Wallace |
| Capitol Radio Engineering Institute..... | Edw. H. Guilford |
| Capitol Radio Research Laboratories..... | Norman B. Neely |
| Chicago Telephone Supply Company..... | Frank A. Emmet Co. |
| Claroat Manufacturing Company..... | J. J. Perlmuth |
| Clough-Brengle Company..... | W. Bert Knight, Inc. |
| Continental Carbon, Inc..... | J. J. Perlmuth |
| Continental Electric Company..... | W. Bert Knight, Inc. |
| Continental Tube Co..... | C. F. Sexton |
| Cornell-Dubilier Corporation..... | W. Bert Knight, Inc. |
| Creacent Insulated Wire & Cable Company..... | Henger-Seltzer Co. |
| Crowe Nameplate Manufacturing Company..... | W. Bert Knight, Inc. |
| Henry L. Crowley & Company..... | J. T. Hill |
| Curtis Condenser Corporation..... | J. J. Perlmuth |
| Corwico Wire..... | Marshank Sales Co. |

(Continued on page 9)

Guaranteed to Give Satisfaction!

This is the unqualified guarantee that we give to every user with every shipment of

Curtis Electrolytic CONDENSERS



Patent No. 1960362

Made in a variety of sizes, styles and shapes there is a Curtis Electrolytic Condenser that will meet your requirements.

Send for Bulletin showing styles, sizes and prices.

Your Jobber Can Supply You

CURTIS CONDENSER CORP.

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Curtis Electrolytic CONDENSERS

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FEDeral 6633

ORIGINATORS OF PRACTICAL RADIO ENGINEERING INSTRUCTION

Pretty Good ... is not good enough!

To be better than the requirements of your particular work . . . is the most important step toward a real future in Radio. TECHNICAL TRAINING coupled with your own experience will equip you to take advantage of every opportunity to improve yourself, and to handle your present work in a more proficient and economical manner—after all, you are working against "Time," and CREI training will show you how to do more and make more during your working hours.

CREI TRAINING FOR EVERY SERVICE TECHNICIAN

There's a particular course for you, written in your "own language" and covering every phase of radio engineering. Talk it over with Mr. Guilford or write for complete information and easy payment plan.

Write for Free 44-Page Catalog

Capitol Radio Engineering Institute

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Dept. T3

California Representative:

EDWARD H. GUILFORD
1656 North Serrano—GR. 0755

Mr. Guilford, member of CRTA, will be glad to be of assistance to you in answering inquiries and describing courses.

Directory of Radio Parts Equipment and Accessories and Factory Agents

(Continued from page 6)

D	
Dejur Amseo Corporation.....	Frank A. Emmet Co.
J. F. Distributing Company.....	Don C. Wallace
Drake Mfg. So.....	C. F. Sexton
E	
Eby Specialty Company.....	W. Bert Knight, Inc.
Hugh H. Eby, Inc.....	W. Bert Knight, Inc.
Eddie Mfg. Co.....	C. F. Sexton
Electrad, Inc.....	E. P. Demarest
Emerson Apparatus Company.....	Lewis E. Sperry
F	
A. M. Flechtheim & Company.....	Conrad R. Strasner
Federal Instruments Corp.....	Marshank Sales Co.
Federal Engineering Co.....	Harry Fox
Federated Solder Co.....	C. F. Sexton
G	
General Cement Mfg. Company.....	Lewis E. Sperry
General Communication Laboratory.....	C. R. Lynch
General Transformer Corporation.....	W. C. Hitt
Girard-Continental Condenser Corp.....	C. F. Sexton
Girard-Hopkins.....	Paul F. Wiley
G. M. Laboratories.....	C. R. Lynch
Goat Radio Tube Parts, Inc.....	Frank A. Emmet Co.
Guardian Electric Mfg. Company.....	Lewis E. Sperry
Edwin I. Guthman Company.....	Frank A. Emmet Co.
H	
Hammarlund Manufacturing Company.....	Henger-Seltzer Co.
Handy Scratch Remover.....	C. F. Sexton
Hawley Products Company.....	E. P. Demarest
Hygrade Sylvania Corporation.....	E. P. Demarest
August Hund Electrotherapy.....	Norman B. Neely
I	
Inca Transformers.....	Phelps Dodge Copper Products Corp.
I. R. C. Resistors.....	Marshank Sales Co.
J	
Jefferson Electric Company.....	Glenn A. Shaver
E. F. Johnson Company.....	Don C. Wallace
Jensen Spkrs.....	Marshank Sales Co.
K	
Ken Rad Corporation.....	W. Bert Knight, Inc.
Kennedy Nameplate Co.....	C. F. Sexton
Kentucky Electric Lamp Company.....	W. Bert Knight, Inc.
Kester Solder Company.....	Frank A. Emmet Co.
Kurz-Kasch Company.....	J. T. Hill
Kenyon Trans. Corp.....	Marshank Sales Co.
L	
Leichner Electric Company.....	Don C. Wallace
Lenz Electric Company.....	Frank A. Emmet Co.
Lifetime Corporation.....	Don C. Wallace
Arthur H. Lynch, Inc.....	E. P. Demarest
M	
Matchless Electric Company.....	W. Bert Knight, Inc.
Meissner Manufacturing Company.....	W. Bert Knight, Inc.
Micamold Radio Corporation.....	Frank A. Emmet Co.
Miller Coils.....	J. W. Miller Company
Morrill and Morrill.....	Don C. Wallace
M P C Transformers.....	Mr. Hadley
N	
National Company.....	E. P. Demarest
National Union Tubes.....	J. B. Marsh

(Continued on page 21)

CHARLIE NICHOLS AND WEDDING BELLS!

Weddings to the right of us, weddings to the left of us! Members of the radio profession seem to have suddenly become very matrimonial conscious.

Our old friend and loyal CRTA member, Charlie Nichols, formerly an engineer with Jackson Bell and Mission Bell, who besides many other experiences has done his trick as a commercial radio operator on board ship and a well-known ham, is now service engineer for the Beacon Electric Company.

Charlie, sometimes referred to as "the man from the South with the great big laugh," after fifteen months of very ardent wooing, as only these Southern sheiks are capable of, broke down all the defences and resistance of charming and attractive Myrtle Worsley.

The happy event took place at 4 o'clock Sunday, March 17, St. Patrick's Day, at the Trinity Methodist Church in Los Angeles. Immediately after the ceremony the couple left for a honeymoon trip to San Francisco and the Bay District. Charlie confided the fact that he was married on St. Patrick's Day so he would never get in dutch for forgetting his an-

niversary, which isn't such a bad idea, everything considered.

Although we can't help feeling a little bit sorry for any young lady who faces life with a radio man as a husband, we'll have to admit that there are some worse than Charlie, a little worse anyway, so we know we speak for the entire radio industry and Charlie's great host of friends when we wish him and Myrtle all the success, happiness and marital bliss possible on their matrimonial voyage "until death do them part."

RADIO SPECS IN SAN DIEGO

The Radio Specialties Company, well known and progressive radio parts jobber in Los Angeles, announces the establishment of a resident man in San Diego, covering the San Diego territory with a supply truck. In approximately sixty days this firm expects to have a first-class store in San Diego, carrying a complete stock of radio tubes, component and replacement parts, test equipment, wire and accessories. Mr. R. V. Weatherford, connected with Radio Specialties for a considerable time, will be in charge of operations in the border city.

More Profits in Service

SPEAKER CONES

For All Makes

IN LOCAL STOCK

Give That Repair Job Better Tone Quality—With a

NEW CONE

Get Our Complete Catalog

CARRON MFG. CO.

LOCAL DISTRIBUTORS

ELECTRIC PRODUCTS SERVICE

1358 SOUTH GRAND AVENUE

LOS ANGELES

PRospect 3681

BOOK REVIEW

Air Law—Howard S. LeRoy — Randolph Leigh Publishing Company, 725 E. 15th Street, Washington, D. C.—\$3.00.

This is an Outline and Guide to Air Law, including Radio, Aeronautics and Air Rights as related to reality. Its purpose has been to afford a concise and comprehensive survey of available legal material, showing a rapid world growth in this field. It covers municipal, radio law of the United States and foreign states, municipal and aeronautics law and air rights as related to real estate. This analytical and chronological guide outline will prove invaluable to the Bench and the Bar as a whole, as well as to research workers in radio and aeronautical law. It is recommended to all those whose work is concerned in any way with legal aspects of aeronautics and radio.

NEW PACKARD-BELL POPULAR

The new 5-tube Packard-Bell recently announced is surpassing in popularity even the fondest hopes of its manufacturers. It is a sensitive, modern and attractive table set at a nominal price.

SUPREME AUTOMATIC

Electric Products Service, authorized factory service for Supreme Instruments Corporation, offers a brief description of the new 385 "Automatic." In brief, it is a single instrument retaining every feature of both the 333 Deluxe Analyzer and 85 Portable Tube Tester plus many additions. These include 2 ohmmeters giving many ranges from 1/4 ohm to 20,000,000 ohms with a self-contained power supply. Added to that is an English-reading electrolytic condenser tester which reads the value of any condenser of any size directly in terms of "Good" or "Bad". This is in addition to the direct reading capacity ranges and neon leakage test for non-electrolytics.

NEW TRIUMPH

The Triumph Manufacturing Company of Chicago announces an improved Signal Generator. This instrument electrically and mechanically is essentially the same as the Model 100 but is equipped with an airplane dial, calibrated from 100 Kc. to 30 Megacycles. To facilitate routine testing the popular intermediate frequencies and common broadcast test frequencies are all spotted in red.

SERVICE KINKS AND PET EQUIPMENT

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

PHILCO ALL SETS—WIRING COLOR CODE

The standard wiring color code has been adopted by Philco and it is the R. M. A. standard. There are only a very few exceptions to this in Philco receivers.

Colors	Circuits
Red	Filaments and odd wires
Brown	Cathodes and grounds
White	B plus and screen of output pentodes

Black and white Plates
Green Grids and screen grids.

PHILCO 5—SCRATCHING NOISE WHEN TUNING

Tighten the main volume control nut in the chassis and be sure that it is well grounded.

STROMBERG CARLSON 38, 39, 40, 41 (2nd Type)—NOISY VOLUME CONTROL

Gas in the 55 tubes is responsible. Interchange and replace if necessary.

ZENITH 34—LOW VOLUME AND HUMS

A short in any of the type 27 from heater to cathode will cause hum. This trouble can most easily be checked by substituting new tubes known to be in good condition. Low volume may often be attributed to poor contact at the end brushing on the condenser gang. Cleaning of this item will clear up this trouble.

STEWART-WARNER 102-A—INTERMITTENT OPERATION, DIAL SLIPS

For the first trouble check the toggle switches. For the second remove the rubber drive wheel and wind one layer of tape on its shaft and replace.

MAJESTIC 90—INTERMITTENT RECEPTION

If this trouble is characterized by the signal dying down suddenly or slowly and returning suddenly replace both R. F. cathode resistor by-pass condensers located under the 27 tubes. These are .5 mfd. units in metal cases.

GENERAL ELECTRIC 34—DEAD

Most cases of this kind may be cleared up simply by replacing the 6A7 tube.

20,000 EARS DEMAND FINE MUSIC

GLEN DOLBERG, Program Director KECA—KFI

From March 3rd to 14th, inclusive, in response to KECA's direct question, "Shall KECA continue its fine music programs, or shall it revert to the roadcasting of popular music, jazz, and crooners?", ten thousand, four hundred eighty-three music lovers voted in favor of good music by cards, letters, and telegrams to KECA. The universal expression found in these letters is, "By all means KECA must continue its fine music programs. Give us more symphonies, operas, and good music of all kinds, and keep KECA free from jazz." Over 30% said that if it were not for KECA, they wouldn't own a radio set. Here are ten thousand, four hundred eighty-three people, mostly within the limits of Los Angeles County, who are sufficiently interested in listening to fine music on radio to sit down and write KECA a letter. Multiply this number by ten, if you will, for an approximate number of interested people who intended to write a letter but did not do so, and you will have a conservative estimate of KECA's audience which demands the finer things in music. Good music deserves good radio receivers. KECA transmits good quality and a wide frequency range. How many listeners actually hear this full quality and range on their sets? My guess would be about two per-cent; and I believe that this condition affords unlimited opportunities as a market for new radio receiving sets and servicing of present sets, because it is only reasonable that musicians and music lovers have a greater appreciation for quality of tone and higher fidelity than persons who listen principally to crooners and dance bands.

KECA broadcasts more fine music than any other station in the United States—approximately eight and a half hours daily. We inaugurated this fine music policy on KECA just a year ago, without publicity, and have carefully maintained it throughout the year. The overwhelming vote of confidence expressed in the ten thousand, four hundred eighty-three letters just received confirms our belief that large numbers do appreciate good music, and we are encouraged to do an even better job during the coming year.

KECA, the classic station, broadcasts not only symphonies and operas, but all forms of good music not to be termed "high-brow." In the interest of public service, KECA broadcasts three news periods daily, and cooperates wholeheartedly with educational institutions and civic enterprises in presenting cultural talks and dramas, language lessons, etc.

You may be interested to know that KECA also enforces a rigid commercial policy in direct keeping with its program standard, and, as a result, during the past year, KECA has refused many thousands of dollars worth of business because the type of product and type of advertising requested did not measure up to KECA's standards.

It seems to me that everyone of you can profitably afford to spread the news of KECA's success as a classic station. Make higher fidelity your talking point. Help KECA's listeners receive in their homes the true quality of the fine programs that we are transmitting. To make this story complete, I am buying a new all-wave receiving set immediately. Salesmen's line forms to the right!

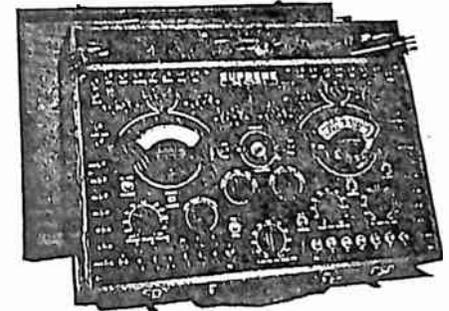
According to scientists long distance sound waves travel in the less resistant and rare air 50 to 60 miles high, rather than in the air close to the ground. These high sound waves gradually bend downwards toward the earth so that they travel in a vast bow-shaped curve.

7 SECOND ACTION
LONGER LIFE
GREATER VOLUME

ARCTURUS
A-C LONG LIFE TUBES

M. D. EALY
CONSIGNMENT AGENT
PRospect 9810
1214 Venice Blvd. Los Angeles

SUPREME PRESENTS



The 385 AUTOMATIC

Presenting the Supreme "385 Automatic" . . . marking another Supreme trail-blazing achievement . . . "UNI-CONSTRUCTION." Go to your jobber to see the "385 Automatic" and prepare yourself to expect not only a new standard of value made possible by uni-construction, but an instrument sure to revolutionize radio service procedure. Built on an entirely new principle the "385 Automatic" is the most complete, easiest handled, and the fastest instrument ever built—AUTOMATIC in its diagnosis.

In addition to retaining the many popular features of the famous DeLuxe Analyzers and 85 Tube Testers, the "385 Automatic" has PLUS features. In the analyzer, using the well known Free Reference Point System of Analysis, selector switches are used for connecting the meters as D.C. milliammeters 0.5-25-125-250-500-1250 milliamperes, D.C. or A.C. voltmeters 0.5-25-125-250-500-1250 D.C. or A.C. volts, direct reading capacity meter 0-0.05-.25-1.25-2.5-5.0-12.5 mfd. In ad-

dition there are neon tests for non-electrolytics indicating leakages, shorts and opens, and for the electrolytic types there is the first English reading condenser tester directly classifying condensers on the meter dial as "Good" or "Bad". Resistance ranges offer a complete coverage from the low range 0-200 ohms with the lowest division at 1/4 ohm, plus the intermediate ranges 0-2,000-20,000-200,000 ohms and high megohm ranges of 0-2 and 0-20 megs. All resistance ranges from self-contained power.

A separate English reading meter scale is used for the Improved "Quality" tests of all radio tubes. The new tube testing circuit includes the neon leakage test of all tube elements for which Supreme instruments have long been famous. Price complete \$77.95. For 98-125 volts, 60 cycle, A.C. operation.

Los Angeles Representative:
Mr. C. R. Lynch, 918 Chester
Williams Bldg., Los Angeles,
Calif.

San Francisco Representative:
Mr. James P. Hermans,
235 Ninth Street,
San Francisco, Calif.

**Immediate Delivery of
"385 Automatic" and
other Supreme Instru-
ments from your local
Jobbers.**

Supreme Instrument Corp.

522 SUPREME BLDG.

Export Dept. Associated Exporters Co., 1457 Broadway, New York City
Cable Address, LOPREH, New York

GREENWOOD, MISS.

ELECTRICAL MEASURING INSTRUMENTS

By C. CLIFFORD ADAMS, Laboratory Superintendent
Quality Electric Company

(Continued from last month)

THERMO COUPLE TYPE

The development of the present form of Weston Heating Elements is based on the principle that if a conducting strip of uniform cross-sectional area, which is carrying current, is cooled only by conduction through the body of the strip itself and not directly by the surrounding air, the difference in temperature between the center of the strip and the terminals will be proportional to the square of the current flowing, and inversely proportional to the thermal conductivity and specific resistance of the strip material. The temperature difference is therefore a measure of the root mean square of the current flowing.

If no heat is lost by connection to the air and the terminals have equal temperatures, the current can be measured by placing the hot end of a thermo couple at the center of the conducting strip and the cold ends of the thermo couple in thermal contact with the terminals, but electrically insulated from them.

In practice the terminals do not have equal temperatures and some of the heat is carried away by convection into the air. The convection loss is minimized by making the strip very short so that only a small proportion of the heat is lost directly from the strip into the air. Errors due to difference in the temperatures of the terminals are taken care of by means of compensating features.

The compensating feature as manufactured, consists of two strips, the ends of which are in thermal contact with, but electrically insulated from the terminals. The insulation consists of very thin mica plates which have relatively good thermal conductivity, and are of such size that the respective terminals and ends of the compensating strips have the same temperature at all times.

The compensating strips to which the cold ends of a thermo couple are connected are so proportioned that they are influenced by the temperature of the air and the difference in temperature of the terminals to the same amount as is the heating strip to which the hot end of the thermo couple is connected.

Consequently, the temperature relation between the hot and cold ends of the thermo couples depends solely upon the effect of the current to be measured and not upon disturbing influences.

The Weston thermal ammeter is intended for the measurement of alternating

currents of any frequency but more especially currents of very high frequencies such as are met with in radio and other oscillatory circuits. They are also used for measuring currents of an interrupted character such as are produced by magnetos and spark coils. The indications are not affected by poor wave form.

The heating elements have a safe overload capacity of 50 per cent. The full load drop is about 150 millivolts which is about 1/6 the drop on a hot wire expansion type instrument. Very little power is required for operation. The elements are used with indicating instruments of the D'Arsonval type. The combination of instruments and element is not affected by changes in room temperature or by the length of time the combination is in circuit.

RECTIFIER TYPE INSTRUMENTS

The rectifier type A.C. instrument consists of a copper oxide rectifier connected to a D'Arsonval movement. The A.C. is rectified and then measured by the ordinary D'Arsonval movement. This type of instrument makes possible a greater sensitivity than is possible in other types of A.C. instruments.

The rectifiers are made of copper plates oxidized on one side and held together under constant pressure. These rectifiers are usually assembled in such a way as to form a bridge circuit and give full wave rectification.

Rectifier type instruments have certain operating characteristics which make its application to A.C. measurements somewhat critical. These are as follows:

(1) The torque and deflection of the rectifier type instruments are proportional to the first power of the current. Therefore it measures the average value and not the effective value of the A.C. wave. The scale is, however, calibrated to read effective or R.M.S. values of a pure sine wave. Errors on other than sine wave forms can be compensated for in readings, provided the wave form is known from which a correction factor can be applied, or the instruments may be calibrated on the wave form with which it is used.

(2) The resistance of the rectifier type instrument is a function of the current flowing, decreasing with the increase of current flowing. Not only does the rectifier type M.A. affect the circuit conditions on account of its added resistance like any other resistance, but the effect

(Continued on Page 27)



Rider's Manual V ... Is Ready!

JUST AN IDEA
of how extensively Volume V covers
the field. This is a partial list of the
manufacturers in Volume V.

Name	Quantity of Models	Name	Quantity of Models
Acratest	9	Hudson Ross	5
Air King	5	Insuline	6
Allied	21	International	19
Ansley	5	Kingston	10
Atwater-Kent	36	Lafayette	26
Audiola	11	Lang	5
Autocrat	6	Larkin	3
Balket	7	Lewol	6
Belmont	16	Mission-Bell	6
Bosch	19	Montgomery-	
Colonial	16	Ward	13
Crosley	25	Nobilt-Sparks	11
Detroit	7	Philio	19
Dewald	24	Pilot	10
Echophone	6	Rndolek	13
Edison-Bell	7	RCA-Victor	63
Elec. Spec.	5	R.K. Labs	4
Export	5	Sears Roebuck	66
Emerson	13	Sentinel	26
Empiro	8	Spartan	16
Eria	12	Stewart Warner	38
Fairbanks-Morse	22	Supreme Inst.	9
Federated		Tatro	5
Purchaser	27	T.C.A.	12
Ford Motor	4	Webster	8
Fordson	7	Wells Gardner	12
General Electric	40	Westinghouse	11
Gillilan	13	Weston Inst.	20
Grunow	19	Wilcox Gay	13
Halsen	6	Wurlitzer	8
Horn	5	Zenith	21

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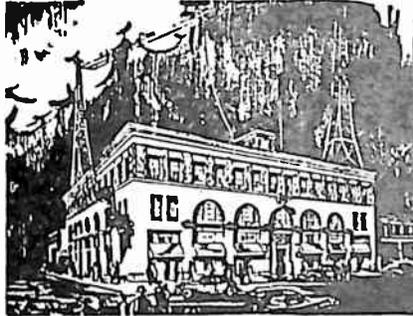
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RADIO TECHNICIANS OF SAN DIEGO

Radio Technicians of San Diego, organized a couple of years ago, are certainly making vast strides forward in accomplishing their aims and purposes. Their aim is to organize all service men in the San Diego territory into a centralized group and maintain a high standard of service, customer good will and cultivate and maintain a feeling of friendship among members of the radio service profession.

Membership is available to men twenty-one years of age or over, who have had at least two years experience in radio servicing or allied endeavor and whose major occupation is radio servicing. At the present time there are about fifty active members and the membership roll is steadily increasing. The officers of this progressive group are A. O. Hunt, President; I. E. Earnest, Secretary; J. D. Kilpatrick, Vice-President, and H. K. Watt, Treasurer.

Meetings are held the third Wednesday of each month, where the activities include an informal dinner, transaction of association business, presentation of guest speaker and door prize drawing. The door prize drawing, it is reported by Mr. Hunt, has created much interest among the members. It has been the custom of radio wholesale houses in San Diego to donate prizes such as test leads, balancing wrenches, etc., which are presented to members who draw the lucky numbers. In order to stimulate interest and steady attendance, only members attending two consecutive meetings are eligible for the prize drawing. The editorial staff of the "Technician" and the officers of the CRTA on behalf of all the members of the organization certainly wish to compliment this splendid group of energetic

men in and about San Diego, who with competent leadership, have made so much worthwhile progress in organization for the purpose of uplifting the radio service profession and improving conditions in the radio industry. It is to be sincerely hoped that the past progress is merely a foundation for greater things to come and that the RTSD and the CRTA may be able to cooperate for mutual benefit and present a united front in striving for a common goal.

NEW DAYRAD CATALOG

The Radio Products Company of Dayton, Ohio, manufacturers of "Dayrad" test equipment, have just issued a new catalog known as Bulletin 50. This company has specialized in the design and manufacture of radio servicing equipment for over eight years, during which time it has enjoyed substantial acceptance of its products by the trade. This new catalog lists several new tube testers, radio set analyzers, signal generators, universal meters and a neon output indicator. It is available from your jobber or the factory.

PACKARD WITH HORN

Mr. L. S. Packard, formerly with the Packard-Bell organization, is now connected with the Herbert H. Horn Company. Mr. Packard has just returned from a trip through Northern California and reports business exceptionally good. While on this trip Mr. Packard appointed E. J. and Jack Totten as San Francisco representatives of the Tiffany Tone line of radios.

A lake 115 miles in length having an area of 145,000 acres—the largest artificial reservoir in the world—will be formed behind Boulder Dam.

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Name

Address

TRAVELING THE TERRITORY WITH MILTON

Hello, all you boyses and girlsse, here we are again after wandering all over the territory, and we don't mean maybe. The old Traveler meets lots of people and sees lots of things, but they all fade into the dim dark beyond in the light of one particular event to which he was very much a witness. It came about in this way:

The Traveler in his usual rounds happened to drop in on Harry LeGoube, who has charge of the vibrators in the auto radio department at Washburn-Walker's. Noticing a certain tinge in Harry's voice as well as a gleam in his eye, the Traveler mentioned same to Harry, who, after talking about the high price of beefsteak in Siberia for a few moments, finally admitted it was a girl.

"What's the girl like?" queries the Traveler.

In reply comes forth the most ecstatic description of the "one and only" to which it has been one's privilege ever to listen.

"Well, then, why don't you marry the girl?" we ask ever so coyly.

"March 10th is the date for the wedding," is the quick reply.

"I don't believe it, Harry, you're just kidding us," answers the Traveler.

To which comes a retort that commences a discussion of momentous proportions concerning the veracity of Harry's declaration of intention to wed.

"Well," finally declares Harry, "just to show I mean business, I'll send you an invitation—not because I think you're worth while inviting, you understand, but merely as a vindication of my reputation."

"O. K.," shoots back the Traveler, "seeing is believing, but not before!"

To make a long story more palatable, a few days later said invitation arrives, but still the Traveler continues to be like doubting Thomas. So proceeding to call Harry on the phone, conversation begins thusly:

"Harry, I still think you're spoofing. But just the same are you going to have a church wedding?"

"Sure," replies Harry. "It begins at 8 P. M.; and if you're not there on time, the doors will be locked and you won't get in—invitation or no invitation."

"O. K.," meekly is the answer. "I'll be there."

Comes the dawn of March 10th. All through the day the Traveler ponders

and wonders, and then to change the routine, wonders and ponders. At 7:45 P. M. promptly arrives the Traveler at St. James Church, and, entering a pew, proceeds to make himself thoroughly as comfortable as his uneasy mind permits him. Comes 8 o'clock and no sign of the ceremony. 8:05 arrives and still no sign of said ceremony. At 8:10 the Traveler unconsciously starts looking for his rain check, and not finding any attached to his invitation is about to make a complaint when lo and behold—out walks the minister to the altar and the wedding procession commences.

The ushers, the best man, and finally the groom take their places. The groom, all tingling with anticipation and excitement, turns his gaze hopefully toward the door through which the bride is to pass. First come the bridesmaids all bedecked dazzlingly in gowns of blue, pink, and gold—and then a pause.

"Where's the bride?" everybody silently wonders while the groom nervously fidgets. A murmur escapes the congregation as the bride enters the portals and marches down the aisle to the side of her future life-partner. And the gaze between the bride and groom is so steady and tender that it causes a skip in the heart-beat of even a calloused old guy like the Traveler. All through the ceremony, too, the Traveler still has to pinch himself, just to make sure he isn't only dreaming that Harry LeGoube is unto himself taking a wife.

After the hostilities have ceased and the bride (the former Miss Joyce Claxton) has been duly and thoroughly kissed, the Traveler dons his overcoat and leaves the church still claiming that marriage is no good after all; since, in a wedding, the best man never gets the bride.

See you all in the next session, playmates. So long!

NEW AUTO SETS

Electric Products Service advise that they are continuing distribution of "Delco" (United Motors) and Philco, auto radio. The new models have many new features and circuit improvements which will make both lines even better than last year's models. Dealers and service men are invited to learn the details regarding these new models and advertising plan which accompanies them. Many dealers have found it very profitable to take advantage of the national advertising circulated by the manufacturers making sales easier.

Directory of Radio Parts Equipment and Accessories and Factory Agents

(Continued from Page 9)

O	
Oak Manufacturing Company.....	Frank A. Emmet Co.
Ohio Carbon Company.....	W. Bert Knight, Inc.
Ohmite Mfg. Company.....	Lewis E. Sperry
Oxford Speakers.....	C. F. Sexton
P	
Peak Products, Inc.....	Don C. Wallace
Peers Radio Cutters.....	C. F. Sexton
Perfex Controls Company.....	J. T. Hill
Pioneer Gen-E-Motor Corporation.....	Marshank Sales Co. Michael D. Henry
Polymet Mfg. Company.....	E. P. Demaree
Precise Products, Inc.....	J. J. Perlmuth
Premier Crystal Corporation.....	C. R. Lynch
P. R. Mallory & Company.....	Henger-Seltzer Co.
Precision Measuring Instruments.....	Howard M. Saul
R	
Radiart Corporation.....	Conrad R. Strassner
Radio Products Company.....	Frank A. Emmet
Raytheon Production Corporation.....	J. J. Perlmuth
RCA Mfg. Company, Inc.....	A. E. Jackson
Radiotone Recording Co.....	F. H. Brown
Reliance Condenser Co.....	C. F. Sexton
S	
Shallcross Mfg. Company.....	Don C. Wallace
Shure Bros. Company.....	W. Bert Knight, Inc.
Sound Systems, Inc.....	C. L. Lynch J. H. Southard
Sprague Products Company (Sprague "600" Line).....	R. J. Noel
Standard Transformers.....	Karl A. Stone
Supreme Instruments Corporation.....	C. R. Lynch
T	
Tartak Mfg. Co.....	C. F. Sexton
Taylor Tubes.....	C. R. Lynch
Thermionic Laboratories.....	Don C. Wallace
Thompson-Bremer & Company.....	W. Bert Knight, Inc.
Thordarson Electric Mfg. Company.....	J. J. Perlmuth
Triad Radio Tubes.....	Walter S. Sweet
Trimm Radio Mfg. Company.....	Don C. Wallace
Triumph Manufacturing Company.....	Norman B. Neely
Tung-Sol Lamp Works.....	Charles Silvey
Turner Company.....	Don C. Wallace
U	
United Sound Engineering Company.....	Frank A. Emmet
United Transformer Corporation.....	Conrad R. Strassner
Universal Microphone Company, Ltd.....	J. T. Hill
USL Battery Corporation.....	J. J. Perlmuth
V	
Vestalite Corporation.....	Conrad R. Strassner
W	
Earl Webber Company.....	J. T. Hill
Westinghouse Electric & Mfg. Co.....	C. R. Lynch
Weston Electrical Instruments Corporation.....	A. A. Barbera
Wireless Egert Engineering, Inc.....	Conrad R. Strassner
Wright Decoster, Inc.....	Frank A. Emmet Co.
Wunderlich Radio, Ltd.....	Conrad R. Strassner
Y	
Yaxley Manufacturing Company.....	Henger-Seltzer Co.

(Continued on page 26)

NAT'L SCHOOL LECTURES

February 25, 1935, Mr. Hobart Drake, Instructor in charge of Radio Service, and Mr. Frederick Swift, Instructor in charge of Radio Transmitters, both of the National Radio & Electrical School, began a series of technical lectures of unusual interest to servicemen. These lectures are presented every other Monday evening at meetings of the CRTA in the Third Floor Auditorium of the National School, 4006 South Figueroa Street, Los Angeles.

Mr. Drake is discussing features of modern radio receivers, giving dependable detailed information to service technicians as to repair and adjustment procedure. Printed diagrams of the receiver under discussion are furnished those in attendance. These diagrams together with notes on the lecture will provide servicemen with dependable service information. Preceding the lecture, Mr. Drake answers questions asked by members. Mr. Drake has promised to keep each questioner's name a deep, dark secret and consequently many of the gang are taking advantage of this opportunity to clear up bothersome problems.

Mr. Swift has undertaken a series of detailed lectures of the theory, construction, operation and use of the radio technician's and engineer's new toy, the cath-

ode ray oscilloscope. The explanation of the underlying theory is being done with the aid of some homely analogies, which, though they may seem far-fetched at first glance, drive home his points with unusual clearness. Mr. Swift has promised to include the necessary details of an oscilloscope of the cathode ray type, which can be built for a price not to exceed that of a good set analyzer.

This series of lectures is unusually educational and is very distinctive by reason of being entirely clear of unnecessary "hoey" and being completely filled with detailed, worthwhile, valuable and necessary information to service technicians who really have the desire, energy and underlying intelligence to progress.

NEW FACTORY

The Mission Bell Radio Mfg. Co., Inc., is now located in a spacious new factory at 833 Venice Blvd., approximately three blocks west of Figueroa. The new quarters provide for a complete and up-to-date auto radio installation department for the benefit of Mission Bell dealers. A complete line of new 1935 models of radio receivers is on display at the new address and all dealers are cordially invited to inspect the new factory and new merchandise.

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PERSONALS

John A. Orme, pioneer and active CRTA member, is now connected with the Technical Service Laboratories in Beverly Hills.

Reuben Horn has been appointed Chairman of the newly created welfare committee of the CRTA.

B. M. Fuhrman has recently received recognition from the RCA Manufacturing Company for having sold more RCA antenna kits than any one person in the United States.

Cash Swinney, who is still convalescing in Room 502 of Queen of the Angeles Hospital, is doing very nicely, although he will be confined to the hospital for some time to come. Visiting hours are from 2—5 and 7—9 P. M.

Murray Tweedy, well known by the trade, due to his many years' connection with the Parts Department of the Leo J. Meyberg Company, is convalescing at his home, having recently left the hospital after an operation for appendicitis.

NEW — 1935 ALL-WAVE SETS



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Vern's Speaker Repair, operated by Mr. Vernon Juergensen, announces new equipment and complete supplies to render voice coil, cone and field coil service for all loud speakers including auditorium types. Mr. Juergensen was shop foreman with the Lansing Manufacturing Company for eight years, during which time he was in charge of experimental and research work.

STARTLING EXPOSE

The April issue of the "Technician" will contain a startling expose of the vicious practices and deceitful methods employed by chain store merchandising concerns. This daring article laying bare the innermost secrets of the nefarious methods of chain store business will be written after extensive investigation by A. Paul, Jr., President of the Certified Radio Technicians Association and well known crusader in the radio industry of Southern California. Be sure to watch the April issue for this feature!

CURTIS SPECIALIZES

The Curtis Condenser Corporation specializes in the manufacture of electrolytic condensers of various shapes, sizes and voltages, cataloging approximately 250 different electrolytic condensers, not including the great variety of special condensers made for manufacturing purposes. Curtis manufactures condensers under its own patent No. 1950352. A little known fact is that Mr. J. T. Curtis was among the first in this country to start experimental work and research with electrolytic condensers and his present product is the result of years of laboratory work as well as actual experience in commercial manufacturing.

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(Continued from Page 21)

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F. H. Brown.....	735 Seward Street, Hollywood, Calif.—GRanite	6972
S. H. Cohn.....	2523 S. Hill St., Los Angeles, Calif.—PRospect	3515
E. P. Demarest.....	1127 Venice Blvd., Los Angeles, Calif.—FEDERAL	2115, 2116
Frank A. Emmet Co.....	1341 S. Hope St., Los Angeles, Calif.—RiChmond	6301
Henger-Seltzer Co.....	945 E. Pico St., Los Angeles, Calif.—PRospect	5258
Michael D. Henry.....	180 New Montgomery St., San Francisco, Calif.	1932
J. T. Hill.....	821 W. Tenth St., Los Angeles, Calif.—VAndike	6301
W. C. Hitt.....	1341 S. Hope St., Los Angeles, Calif.—RiChmond	5166
Phelps Dodge Copper Prdts. Corp.,	2375 E. 27th St., Los Angeles, Calif.—KiMball	5171
Dick Huber.....	30 Ninth Street, San Francisco, Calif.	5171
A. E. Jackson.....	1016 N. Sycamore Ave., Hollywood, Calif.—HiLLside	4131
W. Bert Knight, Inc.....	115 W. Venice Blvd., Los Angeles, Calif.—PRospect	5877
C. R. Lynch.....	620 Chester Williams Bldg., Los Angeles, Calif.—MUtual	5478
J. B. Marsh.....	810 S. Gramercy Place, Los Angeles, Calif.—EXposition	8078
Marshank Sales Co.....	224 E. 16th St., Los Angeles, Calif.—PRospect	4297
J. W. Miller Co.....	5917 S. Main St., Los Angeles, Calif.—ADams	0755
Norman B. Neely.....	1656 N. Serrano St., Los Angeles, Calif.—GRanite	5516
R. J. Noel.....	243 W. Adams Blvd., Los Angeles, Calif.—PRospect	8564
J. J. Perlmuth.....	225 E. Pico St., Los Angeles, Calif.—PRospect	9810
T. B. Pritchard.....	1214 Venice Blvd., Los Angeles, Calif.—VAndike	1932
V. T. Rupp.....	821 W. Tenth St., Los Angeles, Calif.—VAndike	4791
Howard M. Saul.....	1224 Wall St., Los Angeles, Calif.—PRospect	0490
C. F. Sexton.....	1314 S. Hill St., Los Angeles, Calif.—PRospect	3108
Glenn A. Shaver.....	1427 S. Hope St., Los Angeles, Calif.—PRospect	5957
Charles Silvey.....	1816 S. Flower St., Los Angeles, Calif.—PRospect	5957
J. H. Southard.....	420 Market St., San Francisco, Calif.	3828
Lewis E. Sperry.....	455 E. Third St., Los Angeles, Calif.—TUcker	3828
Conrad R. Strassner.....	1341 S. Hope St., Los Angeles, Calif.—RiChmond	6301
Walter S. Sweet.....	1426 Maple Ave., Los Angeles, Calif.—PRospect	3820
Don C. Wallace.....	4214 Country Club Dr., Long Beach, Calif.—484-58	
Paul F. Wiley.....	3422 Wellington Road, Los Angeles, Calif.—ROchester	8297
Harry Fox.....	1157 S. Hill St., Los Angeles—PR.	2830

MICA XMTR CONDENSERS

Departing from the conventional point-end design, Aeovox mica transmitting condensers permit of stacking while at the same time offering any combination of electrical connections. These bakelite molded units have flat tops and bottoms, permitting perfect stacking in minimum space. Mounting holes are to one side of main body, thoroughly insulated and independent of condenser terminals. Thus each unit may be mounted anywhere, even on a metal chassis, without involving the electrical connections. When stacked, the mounting screws or rods are slipped through aligned mounting holes, leaving terminal lugs free for any individual or group wiring. Terminals are of new design for soldered, permanent connections, without transferring harmful heat to the imbedded condenser section. Manufactured by the Aeovox Corporation of Brooklyn, N. Y., these mica transmitting condensers are available in wide range of capacities from .00005 to .04 mfd., and in 1000, 2500 and 5000 volt ratings.

NEW TEST FOR TUBES

Electric Products Service, local distributor for Triumph test equipment, calls attention to a new type of test being used in the Triumph Model 400 Tube Tester. The tester applies three distinct tests to each tube. A hot short test indicating leakages as high as 3 to 5 megohms, a mutual conductance test and an entirely new test which actually shows the remaining emission ability (or life) of the filament or the cathode coating within the tube. This clearly demonstrates to the customer on an English-reading dial how an old tube which has run its normal life but still tests "GOOD" under normal tests cannot perform properly in his radio unless by chance the filament or heater voltage is the required reading or above. It shows him convincingly how the tube would actually perform ("POOR") if the line voltage were slightly low as may be expected in residential districts. This firm advises that it will be pleased to explain and demonstrate the action of this new tube to those interested at any time.

ELECTRICAL MEASURING INSTRUMENTS

(Continued from page 14)

depends upon the actual current value passing. If the circuit resistance is relatively high, then this change will result in negligible effects. The instrument always correctly indicates the current passing through it, but this may depend upon the non-linear value of the instrument resistance.

(3) The readings may be expected to decrease about $\frac{1}{2}\%$ per K.C. up to 35 K.C. where different conditions occur. Due to capacity effects, this type of instrument is not recommended for R.F. measurements, but is reasonably accurate throughout the A.F. bands.

(4) The resistance of the copper oxide unit is a function of temperature, and the amount of change due to temperature depends on the amount of current passing. Due to the complex relation between current, temperature and resistance, a great deal of skill is required in designing a rectifier type instrument to prevent errors arising from temperature changes.

(5) As the rectifier is not 100% efficient the rectified current available for operating the instrument is about 80% of the A.C. current passing through the rectifier.

(6) Finally, the current efficiency ratio is affected to some extent by temperature and also by the absolute value of current flowing. This again results in a complex condition involving temperature, current and efficiency and a simultaneous study of all these variables is the only means by which temperature errors can be minimized.

Most of these errors can be minimized by careful design and taking advantage of the opposite effect of certain errors. It is important that the instrument be designed for use with a copper oxide rectifier.

MAINTENANCE

Although electrical instruments are rugged enough to withstand overloads and other abuse, every precaution should be made to prevent unnecessary abuse.

Instruments when not in use should be kept in a clean dry place as free from dust as possible. If carried in an automobile or on a street car, the instrument should be placed on cushion in a horizontal position to prevent undue stress on the pivots.

All instruments should be checked at regular intervals in an instrument laboratory, for accuracy. If they are damaged

in service, they should be sent to an instrument laboratory for repair and recalibration.

Instrument repairs and calibration are a specialized work and should only be done at qualified instrument laboratories where repair materials of the proper specifications are used. This is of the utmost importance if the accuracy of the instrument is maintained.

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NEW C-D CATALOGS

Three new 1935 catalogs are announced by the Cornell-Dubilier Corporation. Catalog No. 128, of 16 pages, is for use by radio parts distributors, dealers, service men and amateurs. It lists a wide variety of mica, paper and electrolytic condensers in many capacities, voltage ratings and sizes for general radio applications. Supplementing this, is Catalog No. 129, which contains a comprehensive listing of standard types of replacement condensers of both paper dielectric and electrolytic construction.

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TUBE CHECKERS

— and —
SET ANALYZERS

Repaired or Rebuilt—

All types of instruments
Repaired or Calibrated
Shunts or Multipliers made up

for any instrument
PROMPT — ACCURATE
RELIABLE SERVICE

Authorized Service Laboratory
for Weston Electrical
Instrument Corp.

Quality Electric Co.

Tel. TRinity 5981
812 S. San Pedro Los Angeles

Directory of Radio Parts Equipment and Accessories and Factory Agents

(Continued from Page 21)

FACTORY AGENT DIRECTORY

F. H. Brown.....	735 Seward Street, Hollywood, Calif.—GRanite	6972
S. H. Cohn.....	2523 S. Hill St., Los Angeles, Calif.—PRospect	3515
E. P. Demarest.....	1127 Venice Blvd., Los Angeles, Calif.—FEDERAL	2115, 2116
Frank A. Emmet Co.....	1341 S. Hope St., Los Angeles, Calif.—Richmond	6301
Henger-Seltzer Co.....	945 E. Pico St., Los Angeles, Calif.—PRospect	5258
Michael D. Henry.....	180 New Montgomery St., San Francisco, Calif.	
J. T. Hill.....	821 W. Tenth St., Los Angeles, Calif.—VAndike	1932
W. C. Hitt.....	1341 S. Hope St., Los Angeles, Calif.—Richmond	6301
Phelps Dodge Copper Prdts. Corp.,	2375 E. 27th St., Los Angeles, Calif.—Klmball	5166
Dick Huber.....	30 Ninth Street, San Francisco, Calif.	
A. E. Jackson.....	1016 N. Sycamore Ave., Hollywood, Calif.—Hllside	5171
W. Bert Knight, Inc.....	115 W. Venice Blvd., Los Angeles, Calif.—PRospect	4131
C. R. Lynch.....	620 Chester Williams Bldg., Los Angeles, Calif.—MlUual	5877
J. B. Marsh.....	810 S. Gramercy Place, Los Angeles, Calif.—EXposition	5478
Marshank Sales Co.....	224 E. 16th St., Los Angeles, Calif.—PRospect	8078
J. W. Miller Co.....	5917 S. Main St., Los Angeles, Calif.—ADams	4297
Norman B. Neely.....	1656 N. Serrano St., Los Angeles, Calif.—GRanite	0755
R. J. Noel.....	243 W. Adams Blvd., Los Angeles, Calif.—PRospect	5516
J. J. Perlmuth.....	225 E. Pico St., Los Angeles, Calif.—PRospect	8564
T. B. Pritchard.....	1214 Venice Blvd., Los Angeles, Calif.—PRospect	9810
V. T. Rupp.....	821 W. Tenth St., Los Angeles, Calif.—VAndike	1932
Howard M. Saul.....	1224 Wall St., Los Angeles, Calif.—PRospect	4791
C. F. Sexton.....	1314 S. Hill St., Los Angeles, Calif.—PRospect	0490
Glenn A. Shaver.....	1427 S. Hope St., Los Angeles, Calif.—PRospect	3108
Charles Silvey.....	1816 S. Flower St., Los Angeles, Calif.—PRospect	5957
J. H. Southard.....	420 Market St., San Francisco, Calif.	
Lewis E. Sperry.....	455 E. Third St., Los Angeles, Calif.—TUcker	3828
Conrad R. Strassner.....	1341 S. Hope St., Los Angeles, Calif.—Richmond	6301
Walter S. Sweet.....	1426 Maple Ave., Los Angeles, Calif.—PRospect	3820
Don C. Wallace.....	4214 Country Club Dr., Long Beach, Calif.—484-58	
Paul F. Wiley.....	3422 Wellington Road, Los Angeles, Calif.—ROchester	8297
Harry Fox.....	1157 S. Hill St., Los Angeles—PR.	2830

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HATFIELD RESIGNS

Due to increasing demands of business upon his time, V. K. Hatfield, secretary of the CRTA, was forced to tender his resignation for that office. Fred Knowlden, loyal and active member of the CRTA, was elected to fill the remainder of Mr. Hatfield's term. It is with sincere regret that we report this resignation and we know that all members of the CRTA regretted the necessity of accepting it. However, Mr. Hatfield has worked diligently, conscientiously and extensively in behalf of the organization and his labors are most sincerely appreciated. The CRTA was fortunate indeed that Mr. Knowlden accepted the post for the remainder of the term, inasmuch as he is most capable and has always shown his willingness to lend his support in any possible manner to the CRTA.

DUPLICATE REPLACEMENT CONDENSERS

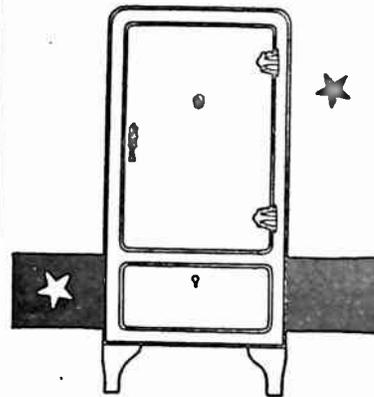
Constantly adding to its regular stock of exact duplicate replacement condensers for the more popular makes of sets in current use, the Aerovox Corporation of Brooklyn, N. Y., is issuing supplementary bulletins from time to time bringing the listings up to date. The latest bulletin just issued carries an impressive array of replacement units. New items are being added to the line as rapidly as the demand warrants an economical production schedule. Types not listed may be obtained by submitting samples of condensers which have failed in service together with data as to the sets in which they are used, capacity and voltage ratings. The exact duplicate replacement condenser bulletins are available on request.

**DAYRAD
Radio Service
Equipment**

Represented by
FRANK A. EMMETT CO.
1341 South Hope St.
Los Angeles, Calif.
Richmond 6301

Only **GRUNOW**
**HAS THE SUPER-SAFE
REFRIGERANT...**

Carrene



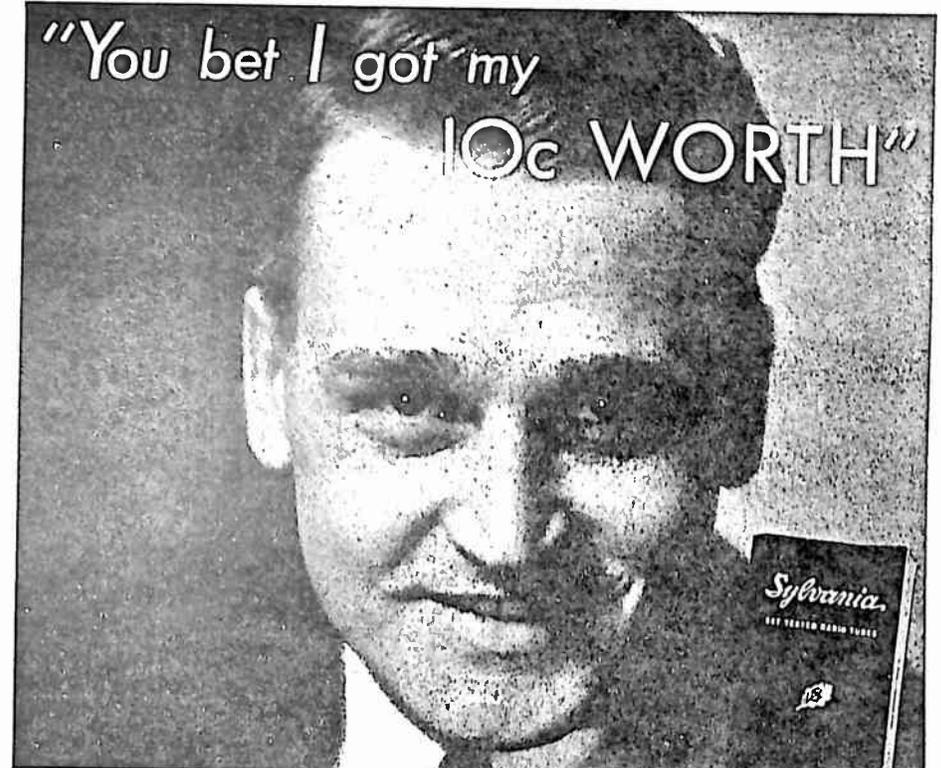
★ And only Grunow offers you such amazing beauty, such outstanding performance, and such a low price for this kind of quality in an electric refrigerator.

There are three sizes to select from—each economically priced

Grunow
ELECTRIC REFRIGERATOR

Distributed by
Watson & Wilson, Inc.
711 MITCHELL PLACE
Los Angeles

"You bet I got my
10c WORTH"



thousands of servicemen have sent for this valuable book... **GET YOUR COPY FOR 10c**

● "Yes, sir, this book has been worth money to me. It just cost me a dime, but that was sure 10c well spent! I never saw a book crammed with so much useful information for radio men."

Yes, and 34,000 other service men feel the same way. We wish you could read some of the letters we've received. Men in California, Texas, New York write in and tell us that this handy service manual has actually put money in their pockets.

It's got the latest data on all tubes, including types 15, 18, 255, 25YS, 2Z2, 4G131 and 1821. 104 pages filled with information that takes the guess work out of tube application!

Don't wait! Send for this pocket manual today. It will help you recognize tube and set troubles and most important, show you how to solve these problems. It's yours for 10c in stamps!

Sylvania
The Set-Tested Radio Tube

Makers of
Sylvania Tubes
Hygrade Lamps
Electronic
Products



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St. Mary's, Pa.
Emporium, Pa.
Salem, Mass.

10c TECHNICAL MANUAL 10c

HYGRADE SYLVANIA CORPORATION
Emporium, Pa.

Please send me the new Sylvania Technical Manual. I enclose 10c in stamps.

Name

Address

City..... State.....

NEW UNIVERSAL CATALOG

The spring catalog for the Universal Microphone Co., Inglewood, Cal., came off the press late in March in the form of a loose leaf supplement in standard binder size. It was issued in two sections with microphones in part one and recording apparatus in the second part.

The microphone section includes standard microphones, transformers, input stages and remote control panels. The recording section includes the new professional recorder, the new full frequency celluloid discs, needles, etc.

NEW MILLER ITEMS

The J. W. Miller Company, manufacturers of inductances, short wave, all wave, and pre-selector kits announces a number of new items and kits to the trade. Descriptive literature on these new items may be secured by writing the factory.

After studying the cosmic ray meter records of the Settle-Fordney stratosphere flight Doctors A. H. Compton and R. J. Stevenson of the University of Chicago concluded cosmic rays are charged particles rather than radiant ray super gamma rays.

WHOLESALE SERVICE FOR THE DEALER

RADIO REPAIRS

SPEAKER REPAIRS

PHONO PICKUP REPAIRS

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SPECIAL EQUIPMENT BUILT TO ORDER

ELECTRIC PRODUCTS SERVICE

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NEW FACTORY

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TELEPHONE PROSPECT 5333

To accommodate our constantly increasing business we have moved into a new spacious modern factory with 8000 sq. feet of floor space.

We have inaugurated the most modern automobile radio installation station in the West—for greater cooperation with our dealers.

MISSION BELL

RADIO MFG. CO., INC.

CAN YOU AFFORD To Deprive Your Business of TRIUMPH EQUIPMENT?

MODEL 400 Tube Tester

A searching "three way" test of tube performance. Tests Emission—dynamic mutual conductance—leakage. Separately tests diode and triode sections of multi-purpose tubes.

"HOT" NEON LEAKAGE TEST

Sensitive foreign broadcast receivers particularly MUST have quiet tubes. High resistance inter element leakage causes noise. The Triumph "neonized test" checks every tube element separately for leakages—even as high as five megohms.

GOOD OR BAD

Your customer can see immediately if his tubes should be replaced. The meter is plainly marked "Good" and "Bad," with no doubtful area. The neonized test is also clearly marked for customer's understanding.

UNPRECEDENTED

Never before has a dynamic mutual conductance tester, with so much appearance and tube sales ability, been offered at this low price.

California Counter or
Net Price **\$36.20** Portable

MODEL 110 Signal Generator

Direct reading vernier airplane dial. Calibrated from 100 K.C. to 30 Megacycles in two colors.

Individual alignment frequencies spotted in contrasting color.

Genuine, four step, T pad attenuator. Output power variable, zero to 500,000 microvolts, through reversible plug. Attenuator graduated in approximate microvolts.

Electrostatically and Electromagnetically shielded and filtered for attenuation to zero.

Self-compensated, electron coupled oscillator, modulator guarantees stability at all frequencies.

400 cycle audio for 40% modulation, also separately available for Audio or P.A. work, fully attenuated.

Unmodulated carrier at the snap of a switch for heterodyning, microphonics tests, etc.

Powered by 110 volt A.C.—No Batteries, No Hot Resistance Cords—consistently dependable output power.

No one but Triumph has thought of putting the common test frequencies in color for easy reference—but here they are—175 K.C.—262 K.C. 456 K.C. I.F. and 600 K.C.—1000 K.C. and 1400 K.C. at broadcast. All are specially marked for ready tuning and quick, or, lower cost repairs—a convenience you'll appreciate more, the more you use it.

California Net Price **\$31.25** Complete

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