

radio SERVICE dealer



In
This
Issue:

RADIO AND APPLIANCE ROUNDUP
"Party Line" For Customers Self-Tubes in Kits Branch Stores

June
1945
25c

Ask Your MALLORY Distributor... He Knows



WHAT types of replacement parts are available today? How much do they cost? How soon can you get them? What information do you need to install them properly?

If a particular type of replacement part is no longer made, what other product will serve as well—maybe even better? The man to answer questions like these is your Mallory Precision Products Distributor.

His experience covers not only radio but the whole wide field of electronics. He's earned the Mallory franchise because of his alertness and "know how." He's prepared not merely to supply facts, but to give you service—to *do things for you*.

Your Mallory Distributor was selected for qualities of leadership and helpfulness. Feel free to ask his assistance *anytime*.

Here's What He'll Do For You:

1

Offer you a complete line of Mallory replacement parts... many of them first developed by Mallory research... ALL of them guaranteed against premature failure by years of service in the field.

2

Meet the maximum number of your application needs with the minimum number of parts. His program of Mallory Standardization will reduce your investment, simplify replacement, speed up delivery.

3

Give you detailed information on prices, parts, catalog numbers... work his head off to get you the items you need when you need them... give you prompt, efficient service *always*.

4

Provide you with bulletins, booklets, catalogs, letters, giving complete data on what to use and where to use it... offer you special publications and new developments and technical service fundamentals.

5

Offer his own personal experience in helping you solve unusual or difficult problems... help you train sales and service personnel... give you the extra help you need to meet emergencies.

6

Provide you, if asked, with sound methods of keeping your business on the beam... give you special promotion materials to help you sell your story to the public.

The Part Your Mallory Distributor Plays Is Important TODAY—to YOU!

P. R. MALLORY & CO., Inc., INDIANAPOLIS 6, INDIANA



More than ever—
ALWAYS
INSIST ON

P. R. MALLORY & CO., Inc.
MALLORY
APPROVED
PRECISION PRODUCTS

VIBRATORS • VIBRAPACKS* • CONDENSERS
VOLUME CONTROLS • SWITCHES • RESISTORS
FILTERS • RECTIFIERS • POWER SUPPLIES

ALSO MALLORY "TROPICAL"™ DRY BATTERIES, ORIGINALLY DEVELOPED BY MALLORY FOR THE U. S. ARMY SIGNAL CORPS, NOT PRESENTLY AVAILABLE FOR CIVILIAN USE.

*Trademarks

Radio Dealers Wanted Now!

Sell Internationally-Famous Radio Line on a Direct Factory-to-Dealer Basis. Big Volume and Profit Opportunity. Exclusive Franchise.

Do you want the exclusive franchise in your community for an internationally-famous radio line?

Do you want to receive shipments of fine radios and radio-phonographs direct from the factory?

Do you want to be in a position to meet national chain store competition—at a profit?

Do you want to avoid a lot of the headaches connected with radio retailing?

THEN READ THIS—

In 1938—Sparton realized there was something wrong with the radio retailing business.

Field surveys showed glaring faults.

Too many handling charges—too many jobber-distributor splits—too many price-cutting deals!

But — it all added up to this: *The cost of distribution was too high.*

Unfair to the dealer! Unfair to the consumer! So—Sparton decided to do something about it.

And that's how the S.C.M.P. (Sparton Cooperative Merchandising Plan) was created.

Has the plan been successful?

Look at the record!

Hundreds of America's leading department stores, radio and appliance dealers have endorsed and adopted the S.C.M.P.

Keep your eyes and ears on Sparton

SOON WE HOPE Sparton will offer a complete new line of radios and radio-phonographs—some with FM!—designed and styled for the bright new world to come. These new and finer Spartons will take full advantage of wartime developments in radar, radio and electronics.

Here's what the S.C.M.P. can do for you

- 1 If you qualify as a Sparton Radio dealer, you will be given an *exclusive* franchise for your community.
- 2 All radio shipments will be made to you *direct from the factory*, at dealer-delivered prices.
- 3 You will be sure of a dependable source of supply.
- 4 You will be able to offer customers a full line of fine radios—consoles, table models and combinations—some with FM (Frequency Modulation)—at lower-than-usual prices.
- 5 You will be relieved of the necessity of offering special discounts to make sales.
- 6 And last—but not least—your selling effort will be backed up with seasonal promotional helps and a powerful campaign of national advertising.

Think of what a relief it would be, if you wiped away the headaches!

Think what it would mean to you in sales and profits, if you were able to offer top-quality nationally-accepted radios in direct competition with the biggest retail outlets!

Are you interested in the S.C.M.P.?

Then — here's what to do about it!

Additional dealer appointments are now being made. *But — only a few territories are open.*

So — act fast!

Wire or 'phone collect! Ask if the Sparton franchise is still available in your community.

Address: Ed. Bonia, Sales Manager,
Radio and Appliance Division

The Sparks-Withington Co., Jackson, Mich.

Sparton

RADIO'S RICHEST VOICE SINCE 1926

You can use the **NEW VOLTOHMYST** for checking **FM Discriminator Alignment**

(A ZERO-CENTER-INDICATOR IS INCORPORATED FOR THIS PURPOSE)

-and you can also use the **195-A Voltohmyst**



As an **ELECTRONIC D-C VOLTMETER**

Measures *d-c Voltage* to 1000 volts in six ranges—has high resistance input of 10 megohms constant on all ranges—plus isolation resistor in probe for dynamic socket voltage readings—polarity turnover switch eliminates confusion in reversing test leads—positive and negative indications are individually calibrated.

As an **ELECTRONIC OHMMETER**

Measures *Resistance* up to 1000 megohms with internal source of only 3 volts—six resistance ranges indicating from .1 ohm with shielded cable—zero resetting unnecessary with change of range—all ranges are indicated on "OHMS" scale.

As an **ELECTRONIC A-C VOLTMETER**

Measures *a-c Voltage* to 1000 volts r.m.s. in six ranges—with clear linear scale—Binding Jack with locking pin plug prevents accidental ground lead disconnection—meter protected against accidental burn-out.

As an **ELECTRONIC A-F VOLTMETER**

Measures *a-f and Supersonic Voltage* up to 100 volts with a range of 20 to 100,000 cycles—internal self-balancing diode—produces linear reading at any frequency.

As an **ELECTRONIC OUTPUTMETER**

Measures *Decibels* based on a-f voltage—calibrated in Volume Units for direct reading across 600 ohm audio circuits with standard zero level of 1 milliwatt.

The New Model Of The Famous RCA Junior Voltohmyst Incorporates Several New Features Including:

A diode for a-c measurements (flat 20 cycles to 100 kilocycles); linear a-c scale for all ranges; new plastic meter case

with one-piece crystal-clear transparent front (no glass to break or loosen); and a shielded a-c cable and probe.



Buy More
War Bonds

TEST AND MEASURING EQUIPMENT SECTION

Radio Corporation of America
Camden, N. J.

Name _____

Street Address _____

City & State _____

137A

RADIO CORPORATION OF AMERICA

RCA VICTOR DIVISION • CAMDEN, N. J.

In Canada, RCA VICTOR COMPANY LIMITED, Montreal

radio service dealer

Member Audit Bureau of Circulations

Covers all phases of radio,
phonograph, sound and elec-
trical appliance mer-
chandising and servicing

VOLUME 6 NUMBER 6

JUNE, 1945

CONTENTS

With the Publisher	7
In & Around the Trade	8
"Party-Line" for Customers	23
Sell Tubes in Kits	24
Radio & Appliance Roundup	26
"Lowdown" on Tubes	27
Prepares for Air Radio	30
Sells Guaranteed Appliances	31
Branch Stores	32
Competition — Yes!	33
Television Shows	34
Sound System Applications — II	36
Market for Sound	37
Electronic Voltmeters — I	40
"Getting Set" for Sets	44
Distributors Appointed	45
Technical Service Portfolio — L	46
Trade Products	54
All God's Chillun Got Licenses	56
Shop Notes	58

Cover: Walkie-Talkie Controls Traffic

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JUNE, 1945

10,000 PARTS

Ten thousand different radio and electronic parts
immediately available on priorities

EAST SERVICE

Trained expeditors select and ship same day
your order is received

SINCE 1922

Known since 1922 as reliable jobbers, wholesalers and
manufacturers of radio and electronic equipment

Radio Wire Television Inc.

World's Largest Radio Supply House
100 Sixth Ave. (Dept. S-6) New York 13, N. Y.
Boston, Mass. Newark, N. J.

Originators and Peacetime Marketers of the Celebrated

Lafayette Radio

Write today for our bargain flyers and special bulletins

Why Post Readers

THE SATURDAY EVENING POST

SURVEYS SHOW THE POWER OF POST PAGES

When people are asked, "In what one magazine do you pay most attention to the advertising?" surveys continually show that the great majority unhesitatingly name The Saturday Evening Post over all others.

are your Best Prospects

THE SATURDAY EVENING POST

Post readers represent the backbone of local purchasing power. Their incomes are well above average. They are well educated. They buy intelligently. They enjoy and can afford the better things in life.

POST HOMES ARE READY TO USE NEW RADIOS

96.9% of Post homes have electricity, compared to the U.S. average of 76.7%.

POST FAMILIES BUY MORE RADIOS

97.7% of Post homes have radios, compared to the U.S. average of 82.8%.

POST FAMILIES ARE READY AND ABLE TO BUY NEW RADIOS

In a recent national survey among Post families, about one in every three stated they expect to buy a new radio at an average price of \$150. These preferred customers look to the advertising pages of the Post as their authoritative buying guide.

The "Urge to Buy".... originates on the pages of

THE SATURDAY EVENING
POST

SYLVANIA NEWS

RADIO SERVICE EDITION

JUNE Published by SYLVANIA ELECTRIC PRODUCTS INC., Emporium, Pa. 1945

**SYLVANIA
SERVICEMAN
SERVICE**



by
FRANK FAX

NEW BOOKLET SUMMARIZES AND STIMULATES POSTWAR RADIO MARKET

Servicemen Can Obtain Helpful Information On National Radio Trends

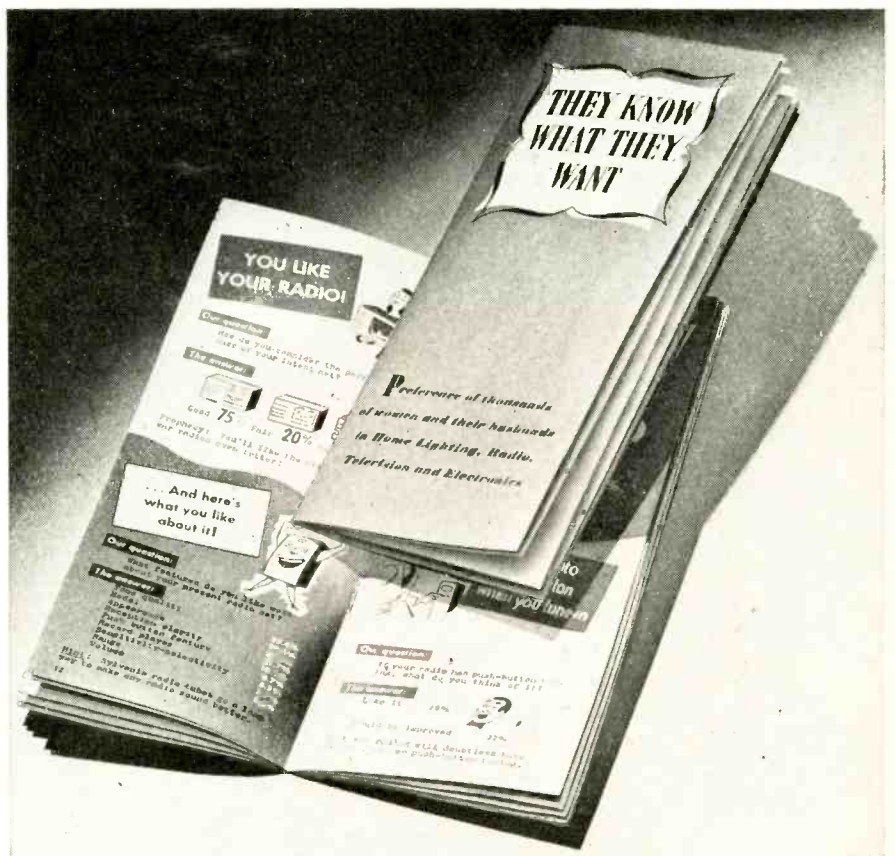
Here is a booklet that gives a handy summary of the public's postwar radio wants—a result of Sylvania's nationwide survey and questionnaire-type advertisements. Copies for servicemen are available on request—*Sylvania Electric Products Inc., Emporium, Pa.*

As another service to servicemen, and in further support of Sylvania's big advertising campaign designed to broaden the postwar radio market, Sylvania Electric is widely distributing to the public the new booklet "They Know What They Want."

In it the radio serviceman will find the answers to questions concerning Television, F.M., how many people are planning to buy new radios after the war, and many more — giving him a variety of pertinent facts that are bound to bear directly upon his future welfare.

In addition, "They Know What They Want" is being widely circulated to consumers in response to inquiries stimulated by the questionnaire-type advertisements appearing in national magazines — advertisements through which Sylvania Electric is continuing its study of public preferences in radio. This general distribution is expected to maintain popular interest in postwar radio sets — an interest that will gradually influence the number of sets that will need servicing in the postwar years to come.

Send for your copy now.



SYLVANIA ELECTRIC

Emporium, Pa.

MAKERS OF RADIO TUBES: CATHODE RAY TUBES: ELECTRONIC DEVICES: FLUORESCENT LAMPS, FIXTURES, ACCESSORIES: ELECTRIC LIGHT BULBS

RADIO SERVICE DEALER

with the publisher

Resumed Civilian Goods Production

ONE can not now state with certainty that on a given day in the near future WPB will authorize radio receiver manufacturers to resume production of radios for civilians. But we confidently feel that some home radios will be made this year . . . and sticking our necks w-a-y out . . . we won't be a bit surprised if production begins in mid-September or early October. We expect some dealers will have sets on display before Christmas, for order-taking purposes, with deliveries to homes being consummated shortly thereafter.

A prediction like the foregoing should be, and in this case is, most definitely based upon something more than mere wishful thinking. We do not infer that we have any "inside information". So, we will attempt an explanation. Study carefully WPB's practice of permitting industries to swing into civilian production, where such reconversion does not interfere with the war effort, and you find that a rather considerable number of electric irons, toasters, fans, vacuum cleaners and coffee brewers have already been made, without fan-fare.

The daily papers report increasing availability of steel for electric refrigerators and announce

divers production quota grants. The same is true of automobile manufacturing. Granted, the radio industry faces a far more serious reconversion problem than others because there is still a vast back-log of unfinished communications equipment on war order, and there are almost unsurmountable bottlenecks such as the acute shortage of tubes and transformers. But the trend is there, and the reasons behind the trend are sound. Basically, WPB knows that the public needs . . . and it badly needs radios.

Regarding WPB's reconversion policies, Chairman Krug has been outspoken. His latest report is admirable. It clearly defines objectives, which are: to permit maximum free enterprise, allow for expanded production and to maintain peak employment. Industry will be allowed all permissible license as long as the war effort is not jeopardized and as long as the flow of materials is not disrupted by unscrupulous diversion through favoritism and indiscriminate competitive or inflationary bidding.

Radio manufacturers have received cutbacks on some types of equipment and as the war progresses favorably for us in the PTO, other cutbacks will perforce permit the use of available facilities for civilian production.


Dealers' Prospects Are Bright

EVERY survey regarding sales potentials (when merchandise is again available) shows that radio-appliance dealers are approaching a boom era the like of which never existed before. WPB survey'd 4,500 families in forty states and the District of Columbia during April asking, "If the appliances were immediately available, what would you buy?" and estimated, from the replies received, that the demand for merchandise is running from 25 to 100 per cent higher than it did one year ago, at which time the figures were gargantuan. In addition, WPB points out that its survey was made before V-E Day and shows only the demand from households and doesn't include the needs of additional new apartments and housing.

There is no justification for getting excited about the optimistic outlook because it has a pessimistic side, too. To begin with, merchandise will merely trickle off of production lines, and it won't arrive in "satisfactory" quantities for many months. Sales will start slowly, building

up to a crescendo, and delivery of merchandise will follow that same pattern. Add to that the fact that there will be terrific increased competition and the normal, to-be-expected public reluctance to merely buy everything.

A customer needing a new radio, toaster, iron, refrigerator and washer may perchance buy all five items simultaneously upon entering a store. And yet, such a customer may decide to buy immediately but two of the items. Which one or two? The dealer can be an influencing factor. Good business and common-sense should play a part in guiding him as to the proper way to "work with" his customer. Knowledge and ability to handle time-payment sales in instances of this kind are factors . . . and finally, but most important, it is the dealer's obligation to sell merchandise that is dependable and worth the price demanded.



In & Around the Trade

Being a condensed digest of production, distribution and merchandising activities in the radio and appliance trade.



Newly formed Majestic Records, Inc., subsidiary of Majestic Radio & Television Corp., Chicago, gets James J. Walker (New York's former Mayor) as president. Watching the sign-up—right: Eugene A. Tracey, president of the parent company board; center, Eli Oberstein, executive vice president. Recordings of popular numbers are announced for early delivery to dealers.

Civilian Radios

Due to continued heavy military requirements for radio and electronic equipment in the Japanese war, re-conversion of the radio industry to civilian production will come gradually with no large volume of new home receivers on the market in prospect before early 1946, according to WPB advice to Radio Manufacturers Association.

Under present WPB plans, modification of L-265 to permit restricted production, but no home receivers, will be made immediately effective in July to set manufacturers to place orders for components and materials.

During the first stage of reconversion police, marine and aviation radio equipment may be produced after war orders drop 10 per cent or to \$190,000,000 a month. Production of components, including replacement tubes, will be limited only by the materials and plant capacity available. Home receivers may be produced when war production drops 25 per cent or to about \$160,000,000 a month.

WPB officials believe the severe shortage of tubes and other components, however, will retard reconversion even when limitation orders are

relaxed. Despite sharp cutbacks in certain types of radio tubes, overall military requirements are higher now than before V-E Day.

The WPB Radio Industry Advisory Committee, whose members have approved the WPB reconversion formula for the radio industry in principle, will meet in Washington early in June to consider the program in detail.

Proposed Standard Warranty On Parts

RMA parts and set manufacturers are considering a proposed standard warranty for parts manufacturers, designed for incorporation in future parts sales contracts with set companies. The proposed warranty has the unanimous approval of the RMA Parts Division's Executive Committee and Section Chairmen. It will be considered by the RMA Board of Directors at its meeting in Chicago in June, following approval or revision at a prior joint conference of the Set and Part Divisions. The main objective is a uniform sales warranty for parts manufacturers, to avoid multiplicity of individual contract provisions.

P. A. For Army Hospitals

Installation of public address systems in all Army general hospitals has been approved by the Surgeon General, Army Service Forces, according to information to RMA, and ASF programs are being prepared, both transcribed and script, for this new hospital service. For developing proper hospital P. A. equipment, technical and other information is being supplied to the Surgeon General's Office by the special RMA committee, under Chairman L. A. King of Chicago, which is promoting installations in schools and other educational institutions, of radio and sound systems.

Signal Corps said that 38 of the Army's 65 general hospitals in the United States will be equipped with a standard program distribution system by the end of 1945. The system consists of a central control point in each hospital which services either by direct amplifier or individual headphone units. Four programs can be handled simultaneously, and any type of program other than television can be rebroadcast. A pick-up extension for bedside interviews in any part of the hospital also is included.

The hospital sound installation approved by the Surgeon General will provide entertainment and education for injured soldiers, including programs covering such fields as music and entertainment, also military subjects, orientation, guidance, re-socialization of the soldier, religion, sports, and various special subjects.

[Continued on page 10]

PUSH RADIO PRICE STUDIES

In anticipation of a return to civilian production, OPA officials are gathering factual data on manufacturing costs of radio sets, cabinets and components and preparing to fix ceilings in accordance with the reconversion formula announced recently by OPA Administrator Chester A. Bowles.

OPA officials pointed out that the diversification of the radio parts industry raises unusual problems in the application of a price formula on an "industry-wide" basis.

Preliminary conferences have been held between OPA officials and set and cabinet makers, and the first meeting of the OPA Radio Parts Manufacturers Industry Advisory Committee since the transfer of parts control to the OPA Machinery Branch, under Reg. No. 136, revised, will be held in Washington June 6.

ONLY MECK HAS THE COURAGE TO KEEP TELLING
THIS STORY TO YOUR CUSTOMERS

"Buy Your New Radio
from Your Radio Dealer"

EVERY MECK NATIONAL ADVERTISING DOLLAR
SELLS THE PUBLIC
ON THE INDEPENDENT RADIO DEALER



Every month every John Meck Industries advertisement in national magazines tells one important story—"Buy your New Radio from your Radio Dealer."

Meck puts all its efforts behind the Dealer—to help the Dealer fight postwar competition. Tie in with the Meck Preferential Dealer plan. See your Meck distributor for full details on this worthwhile franchise.

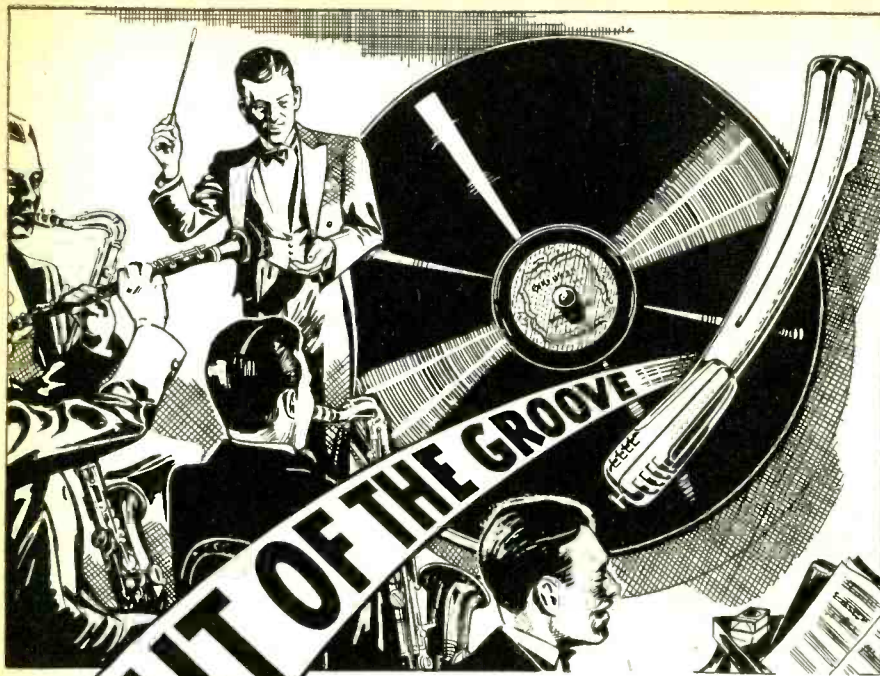
John Meck



MECK RADIOS

JOHN MECK INDUSTRIES, Inc., PLYMOUTH, IND., U. S. A.

AM • FM • TELEVISION • CONSOLE COMBINATIONS • PHONOGRAPHS



OUT OF THE GROOVE

SOUND is captured and imprisoned upon a phonograph record. Its release for entertaining, educational and commercial use has for years been made possible by The Astatic Corporation through Astatic Phonograph Pickups. Long favorites with most leading manufacturers and jobbers of phonographs and phonograph equipment, Astatic Pickups have supplied the highest degree of quality and fidelity to record reproduction. For the days ahead, Astatic promises even greater true-to-life tonal realism, improvements in pickup design, construction and operating efficiency that will contribute immeasurably to the clarity and beauty of reproduction from the new, fine-grain, noise-free, Vinylite recordings of tomorrow. Conversion to peacetime production, when such permission is given, will be prompt and Astatic's greatly increased manufacturing facilities will be ready to serve its great host of manufacturing and jobber customers.

**"You'll HEAR MORE
from Astatic"**

ASTATIC Crystal Devices
manufactured under Brush
Development Co. patents.

THE
Astatic
ASTATIC CORPORATION
CONNEAUT, OHIO
IN CANADA. CANADIAN ASTATIC LTD., TORONTO, ONTARIO

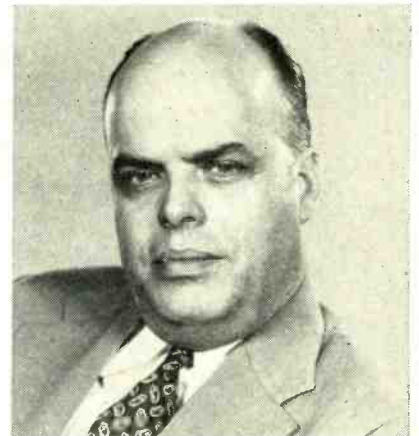
In Trade

[from page 8]

Meissner SM

Godfrey Wetterlow is Eastern sales manager of the radio-phonograph division of the Meissner Manufacturing Co., Mt. Carmel and Chicago, Illinois, announces Oden F. Jester, vice president of the company.

Mr. Wetterlow is a veteran merchandising executive. Formerly as-



Godfrey Wetterlow

sistant to the president of the Philharmonic Radio Corp., New York, he has been especially identified with organizational work in connection with radio distribution.

Mr. Wetterlow will make his headquarters in Greenwich, Connecticut, and will cover the entire Eastern seaboard for Meissner. Mr. Jester stated in his announcement.

Irons and Cleaners

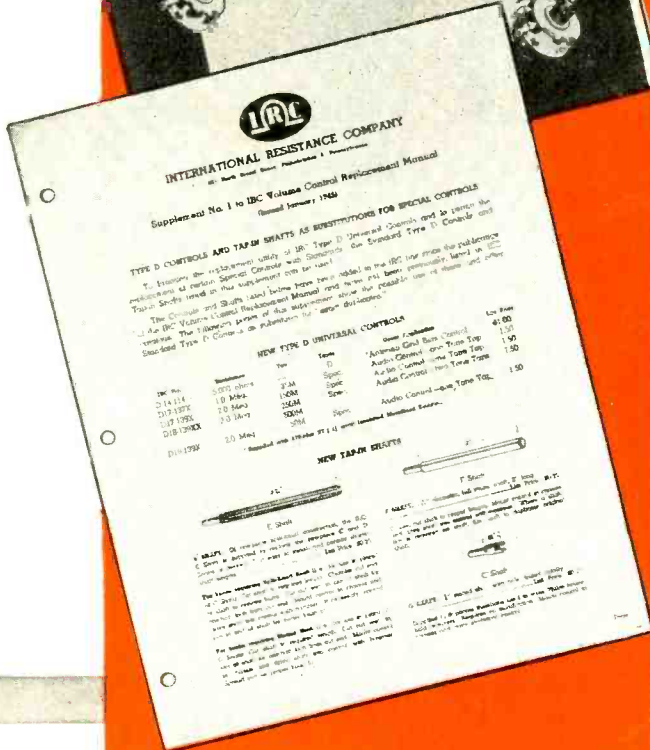
Electric irons of six manufacturers have been added to the schedule of Supplementary Regulation 14-J which permits modification of maximum prices established by the General Maximum Price Regulation. The firms are: Bayshore Specialties Company, Brightwater, L. I., New York; Bersted Manufacturing Company, Fostoria, Ohio; Dejur Electric Works, New York, N. Y.; Industrial Tool and Die Works, Inc., Minneapolis, Minn.; Nelson Machine and Manufacturing Company, Cleveland, Ohio; Stern-Brow Inc., Long Island City, New York.

The Apex vacuum cleaner has been inserted in the alphabetical list giving maximum prices of cleaners under MPR 294. Maximum wholesale price "as is" was set at \$15. Maximum re-

[Continued on page 12]

IT'S A HUNDRED TO ONE YOU'LL FIND THE RIGHT CONTROL

In IRC'S New CENTURY LINE



HERE'S WHY... In order to keep Servicemen supplied with the volume controls they require for a vast majority of their replacement needs, IRC recently introduced the "Century Line." Through concentration of manufacturing efforts on these carefully selected, one hundred controls you are assured sufficient quantities in a selection that will solve over 90% of your day-to-day service problems. All controls included in the "Century Line" are of the same high IRC quality for which the industry has always shown preference.

HERE'S HOW... To select the right control for the job at hand, look up the make and model of the set in the alphabetical listing in IRC's Volume Control Replacement Manual. Chances are you'll find the IRC control number listed right there. If however, an exact duplicate is called for, one further step is necessary. Look up the "J" number (exact duplicate) in Supplement No. 1. Directly opposite the duplicate part number you'll find the IRC "Century Line" number you can use for satisfactory replacement. It's as easy as that!

If you do not have an IRC Volume Control Replacement Manual or a copy of Supplement No. 1 you can readily obtain one from your IRC Distributor—or by writing direct to Dept. 22-F.



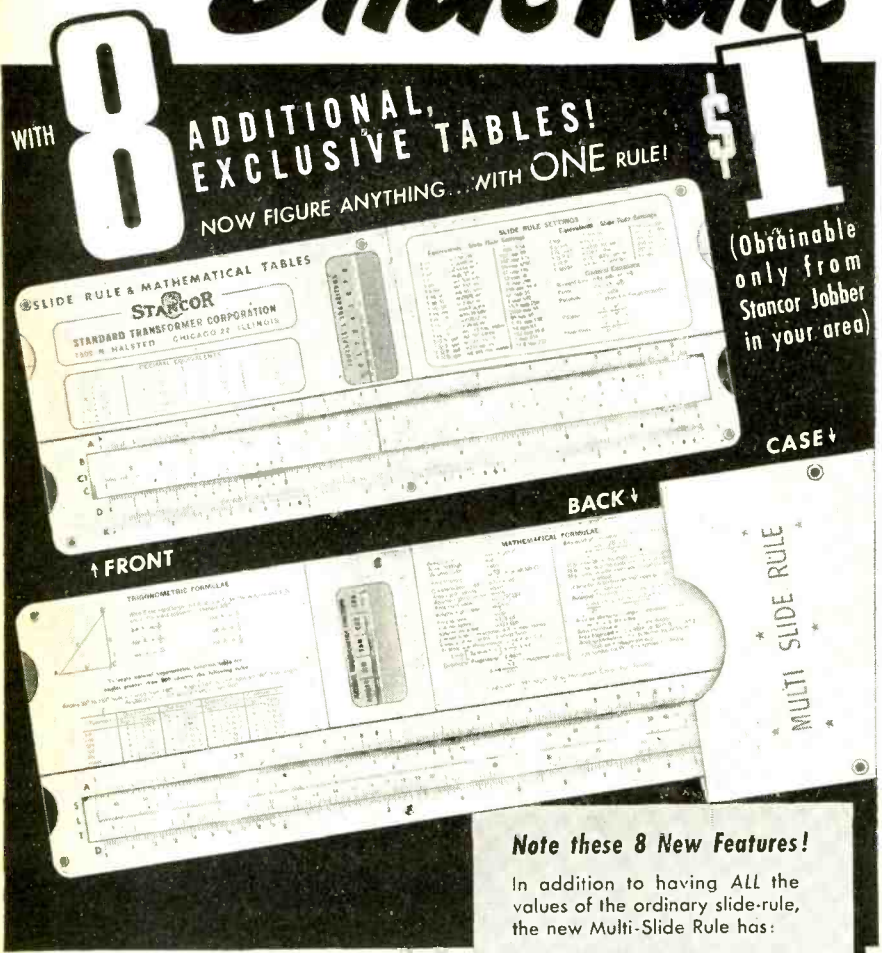
INTERNATIONAL RESISTANCE CO.
401 N. BROAD STREET • PHILADELPHIA 8, PA.

IRC makes more types of resistor units, in more shapes, for more applications than any other manufacturer in the world.

ENGINEERS! DRAFTSMEN! ACCOUNTANTS! STUDENTS!

ORDER TODAY! Sensational NEW

MULTI Slide Rule



Clear, legible print . . . Tough, durable for long wear . . . Size 10" x 4" . . . Fits 3-ring binder . . . In case . . . Full instructions . . . TRANSPARENT PLASTIC INDICATOR . . .

STANCOR now offers the entire electronic industry the new Multi-Slide Rule. First developed for our own use, it is today made available to all . . . Greatly simplifies calculation of unlimited range of problems . . . A genuine professional rule—not a toy. This rule is obtainable ONLY THROUGH STANCOR JOBBERS. PLEASE DO NOT ORDER DIRECT. See your local directory for the name of the Stancor jobber in your city or, write for his name. Price of Stancor Multi-Slide Rule: One Dollar!—America's biggest slide-rule bargain—a service to the trade by Stancor.

STANDARD TRANSFORMER CORPORATION
1500 N. HALSTED ST. CHICAGO 22, ILL.

Note these 8 New Features!

In addition to having ALL the values of the ordinary slide-rule, the new Multi-Slide Rule has:

- 1 Four-place LOGARITHM TABLE
- 2 SIGNS and LIMITS of VALUE assumed by trigonometric functions
- 3 Table of NATURAL TRIGONOMETRIC FUNCTIONS
- 4 Table of TRIGONOMETRIC FORMULAE
- 5 Table of SLIDE-RULE SETTINGS
- 6 Table of GENERAL EQUATIONS
- 7 Long list of common MATHEMATICAL FORMULAE
- 8 DECIMAL equivalents of a fraction

OFFERED AS A SERVICE TO THE TRADE BY

STANCOR

ORDER FROM YOUR JOBBER

In Trade

[from page 10]

tail price rebuilt and guaranteed is \$40.

The purpose of this amendment to the regulation is to establish maximum prices for a cleaner which was not specifically listed originally. The prices are in line with maximum prices of comparable models since they were arrived at in accordance with "established" methods.



Wallace C. Johnson

Johnson Appointed

Ross D. Siragusa, president Admiral Corporation, announces appointment of Wallace C. Johnson as manager of field activities for the entire United States on all company products. Mr. Johnson was formerly the firm's mid-west regional manager.

Hytron Plans Expansion

Lloyd H. Coffin, President of Hytron Corporation, the oldest manufacturer specializing on radio receiving tubes, announces the intention to double Hytrons working capital to prepare for its participation in a greatly expanded postwar radio market. Hytron has plants employing 2600 men and women at Salem, Newburyport, Beverly, and Lawrence, Massachusetts. It has been making quality radio tubes since 1921. During its twenty-four years the company has originated among many new products the BATAM GT; another first was its BANAM JR., the first sub-miniature tube for wearable hearing aids and portable receivers.

Since the beginning, Hytron management has been by a brother team. Bruce A. Coffin, Treasurer and General Manager, made the original Hytron tube by hand, and is still actively

[Continued on page 14]

RADIO SERVICE DEALER

HYTRON TUBES ARE GOOD - SO WHAT?

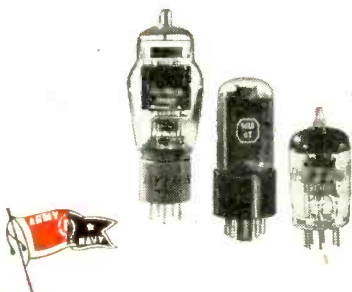


Sure, Hytron tubes are good — so what! All tubes made for Uncle Sam are good. They have to be, or he wouldn't accept them.

But Hytron goes further. Not satisfied just to meet Uncle Sam's JAN-1A specifications, it always sets factory testing specifications to tighter tolerances than the Services require. In this way, Hytron assures top quality despite

slight meter inaccuracies and the human element. When more uniform adherence to specifications can be attained, tests simulating actual equipment performance are added.

This same insistence on the best will continue after the war. Then, too, we shall say, "Hytron tubes are good — so what! They have to be good to be good enough for you."



OLDEST EXCLUSIVE MANUFACTURER OF RADIO RECEIVING TUBES

HYTRON

CORPORATION ELECTRONIC AND RADIO TUBES

SALEM AND NEWBURYPORT, MASS.



BUY ANOTHER WAR BOND

PRODUCERS of:

- Variable Resistors
- Selector Switches
- Ceramic Capacitors, Fixed and Variable
- Steatite Insulators
- Silver Mica Capacitors

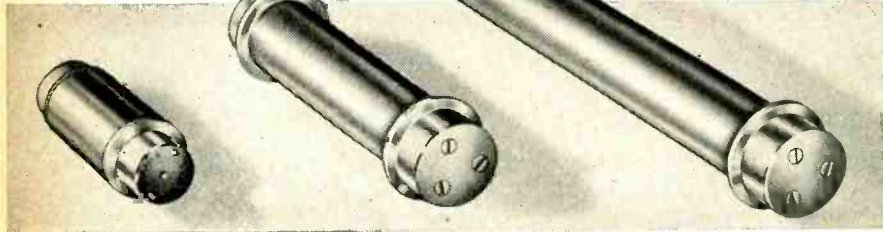
Centralab

Division of GLOBE-UNION INC., Milwaukee

ALL THE

Stability

THE NAME IMPLIES



WESTON TUBULAR RESISTORS

WESTON tubular resistors . . . widely used since their introduction over a decade ago . . . furnish another outstanding example of sound engineering coupled with engineering foresight. For no new 'hurried' resistor design was needed in order to meet exacting military specifications that called for protection against tropical humidity, arctic and high working temperatures, and salt air. The WESTON tubular resistor met these new specifications . . . and in a rugged, non-fragile design tried and proved throughout the years. These resistors conform to and are approved under joint Army Navy Spec. JAN-R-29. Bulletin A-12 gives complete specifications. Send for your copy . . . Weston Electrical Instrument Corp., 605 Frelinghuysen Ave., Newark 5, N. J.

Weston Instruments

Albany • Atlanta • Boston • Buffalo • Chicago • Cincinnati • Cleveland • Dallas • Denver • Detroit • Jacksonville • Knoxville • Los Angeles • Meriden
Minneapolis • Newark • New Orleans • New York • Philadelphia • Phoenix • Pittsburgh • Rochester • San Francisco • Seattle • St. Louis • Syracuse
In Canada, Northern Electric Co., Ltd., Powerlite Devices, Ltd.

In Trade

[from page 12]

directing the development and production of millions of radar, radio, and electronic tubes for the Services. In appreciation of a fine war production job, Hytron was awarded on August 24, 1944, the Army-Navy "E". Post-war plans of the company include greatly expanded production of both receiving and special purpose electronic tubes.

Hays to OPA

Herman S. Hays, manager of field service engineering, Philco Radio and Television Corporation, Philadelphia, has been appointed a consultant to the Service Trades Price Branch, the Office of Price Administration announces. Mr. Hays, who will serve on a part time basis, will advise OPA's national office chiefly on matters relating to radio and household appliance repairs. His appointment is in line with OPA's policy of having available the advice of representative business men when price control matters arise affecting a particular industry.

Raytheon Office

The Radio Receiving Tube Division of the Raytheon Manufacturing Company announces that its New York offices formerly at 420 Lexington Avenue is now located in the Lincoln Building, 60 East 42nd Street.

More on FM

Cyrus T. Read, director of sales engineering for the Hallicrafters Company, Chicago, has been appointed a member of the joint committee of engineers of the Federal Communications Commission and the radio industry who will conduct additional tests this summer before final allocations of FM frequencies are made. Representatives of other government agencies, besides the FCC engineers, have been asked to participate.

Tools by Mail

A new mail service for those needing tools has been inaugurated by The Universal Tool Co., according to O. B. Dematteis, president of the Kansas City firm.

The company specializes in special pocket kits of midget tools for every mechanical trade as well as radio, electronic and electrical technicians. The company is currently advertising in more than 250 national trade magazines.

[Continued on page 52]



NEXT!



DETROLA RADIO

DIVISION OF INTERNATIONAL DETROLA CORPORATION

DETROIT 9, MICHIGAN

VITAMIN-Q

REG. U. S. PAT. OFF.



Ever Hear of It?

VITAMIN Q is an exclusive Sprague Electric Co. oil impregnant for capacitors that results in exceptional performance where thousands of volts and temperatures as high as 105° C. or as low as -40° C. are involved. Leakage resistance at room temperature is 20,000 megohms for one microfarad—or at least 5 times better than previous types!

This is only one of the many engineering and production achievements that have helped make Sprague a five-time winner of the coveted Army-Navy "E" award. And it is one that indicates plainer than mere words that, as always,

you can rely on Sprague for the finest, most modern engineering in ANY capacitor type for radio service, amateur or experimental work.

ATTENTION TRADING POST USERS!

Our free wartime advertising service, THE SPRAGUE TRADING POST, will be found on another page in this issue. It will continue as long as there is a need for this unique method of selling or buying hard-to-get radio things.

SPRAGUE PRODUCTS COMPANY
North Adams, Mass.

(Jobber Sales Organization for Products of the Sprague Electric Co.)



SPRAGUE



**EVERY NEEDED
SERVICE TYPE**

How to Build Reputation For Your Service Business After the War

RCA TUBE ADVANCES THAT MADE RADIO HISTORY



A-C Tubes...took radio out of the storage-battery stage...made home radio practical for millions more people.



Screen-Grid, Pentode, and Beam-Power Tubes...each helped make radios smaller, more powerful, more satisfying...thus increasing the market for radio sets.



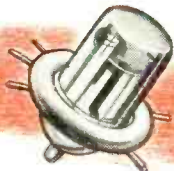
Kinescope and Iconoscope Tubes...made electronic television possible...helped bring the vast postwar television market years nearer.



Miniature Tubes...opened up tremendous new markets for portable radios and farm radios...for civilian walkie-talkies after the war.



Metal Tubes...improved performance, particularly in sets with high-gain circuits...eliminated need for tube shielding...made servicing easier, faster.



Acorn Tubes...helped bring FM and television nearer...helped immeasurably in uhf developments prior to the war.



Cathode-Ray Oscilloscope Tubes...made radio servicing more exact, faster, and more profitable, reducing the number of complaints received by servicemen.



Electron-Ray Tubes...the "Magic Eye" tuning indicators...added sales appeal to larger radio receivers, and helped the service-dealer "sell up."

Your reputation for servicing is built on two things...your ability to locate trouble and fix sets, and the prestige of the components you use.

Your ability comes first, of course...for your customer's first interest is in how well his set works. But don't forget how much the acceptance of the products you use...particularly the *tubes*...helps build your reputation for fine servicing.

Of all the replacement parts you use, tubes are the most familiar to your customer. If he looks at the set you've serviced, new tubes may be his only *visual* indication of the work you've done.

That's why it's important that the name on those tubes should inspire his confidence...should be immediately acceptable to him.

RCA tubes *are* accepted. Your customers know them, and rate them tops. Why? Because, year after year, the RCA name has been associated with leadership in tubes.

Since the early '20's, RCA has led the field in introducing major tube developments. Look at these examples...tube developments introduced and put across by hard-hitting RCA promotion and advertising...keys to major advances in the radio industry that have made your business become bigger and more profitable.

Developments like these brought prestige to RCA. And RCA, in turn, brings this prestige *to you* every time you display the RCA seal...every time you put an RCA tube in a customer's set. Give your servicing business every break you can after the war. Make the most of your chances with the *best-known name in tubes*.

The Fountainhead of Modern Tube Development is RCA



Listen to "THE MUSIC AMERICA LOVES BEST," Sundays, 4:30 P. M. EWT, NBC Network



62-6636-93

RADIO CORPORATION OF AMERICA

RCA VICTOR DIVISION • CAMDEN, NEW JERSEY

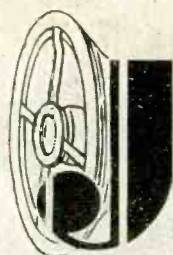
LEADS THE WAY... In Radio... Television... Tubes
Phonographs... Records... Electronics



one step
Nearer...

Smashing the Swastika does not mean total Victory. There is still the Rising Sun to be taken care of . . . But, the victory in Europe is one step nearer to conversion to peacetime pursuits.

Here at JENSEN total conversion will be merely a matter of continuing to produce outstanding, improved, high quality acoustic equipment. This is a continuing tradition at JENSEN . . . One example of advancement will be JENSEN Loud Speakers with *ALNICO 5*.



Jensen
SPEAKERS WITH

ALNICO 5

Specialists in Design and Manufacture of Acoustic Equipment

JENSEN RADIO MANUFACTURING COMPANY, 6601 SOUTH LARAMIE AVENUE, CHICAGO 38, ILLINOIS

GIVE THIS NEW BATTERY A REAL LOOK...



ACTUAL SIZE



No. 412

This is "Eveready" "Mini-Max" "B" Battery No. 412. It furnishes 22½ volts, weighs 1¼ ounces. Dimensions are 2" by 1 1/32" by 23/32". Compare its size with that of an ordinary wooden match box.

it's going to

REVOLUTIONIZE YOUR BUSINESS

MEET the new "Eveready" "Mini-Max" midget "B" Battery. Embodying National Carbon Company's exclusive construction, it crams 22½ volts into a space smaller than any battery ever before conceived — approximately 2½ times smaller.

Think what it will mean in your business to have a 22½ volt battery "no bigger than a minute" and handy as a match box. It means that the portable radio business — nipped by the war just as it was getting a good start — will return with an even brighter future. It also means that radios can be made for the personal use of an individual. Made small enough to fit snugly in a vest pocket or a lady's handbag.

In this connection, we're cordially inviting America's engineers and designers to consult

with us. Bring your special problems to our engineers and our laboratories. We should like to cooperate with you in every way possible in order to speed the development of brilliant new battery uses for the good of the industry, right after the war.

EVEREADY

TRADE-MARKS

MINI-MAX

RADIO "B" BATTERIES

NATIONAL CARBON COMPANY, INC.

Unit of Union Carbide and Carbon Corporation



General Offices: NEW YORK, N. Y.

The trade-marks "Eveready" and "Mini-Max" distinguish products of National Carbon Company, Inc.

KEN-RAD

METAL TUBES



Better Than Ever

In homes everywhere, Ken-Rad Metal Tubes serve by keeping alive radio's entertaining voice . . . These rugged, self-shielding tubes—now *better than ever* because of added great new facilities—tomorrow will help furnish greater enjoyment for listening millions . . . making the Ken-Rad franchise still more desirable and profitable.

Write for your copy of
"Essential Radio Ser-
vices" the most com-
plete digest of tube
information available.

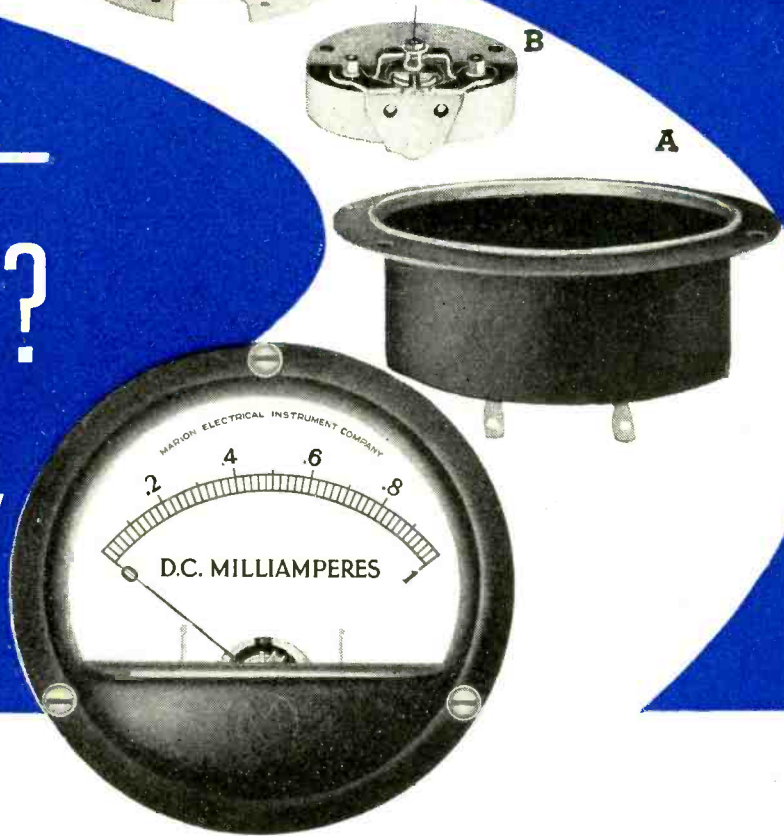
176-D3-EMBC

KEN-RAD

OWENSBORO, KENTUCKY

**SIMPLE—
ISN'T IT?**

*— yet, sealed
for all time!*



MARION

***Glass-to-Metal Truly Hermetically Sealed
2 1/2" and 3 1/2" Electrical Indicating Instruments***

A One-piece drawn steel cup-shaped case with high frequency induction soldered Kovar glass bead terminals. Black phosphate finished to meet 200 hour salt spray test.

B Marion Alnico magnet and moving system, with hardened beryllium copper instrument frame.

C Lithographed metal scale plate, individually printed.

D Double thickness glass window with Corning Glass Works metallized band on rim — high frequency induction soldered to steel case.

E Aluminum cover plate and flange, with anodic black satin finish.

"How is it done?" — this is the question on the tongues of hundreds of engineers from coast-to-coast. A simple basic design in conjunction with electronic production methods is the answer. And with it comes the final solution to the problem of completely tropicalizing electrical indicating instruments. There are no rubber gaskets and no cement seals. These instruments can be immersed in boiling brine or frozen in a cake of ice, for weeks, without deterioration of their seals or harm to their operating efficiency. And they are positively interchangeable: Type HM 2 with AWS Types MR 24 and 25 and Type HM 3 with AWS Types MR 34 and 35. Available in all DC ranges, for present or postwar applications. Write for additional information.

SPECIAL NOTE: Marion Glass-to-Metal Truly Hermetically Sealed Instruments cost no more than standard unsealed instruments.



MARION ELECTRICAL INSTRUMENT CO.
MANCHESTER, NEW HAMPSHIRE

BACK AGAIN...
and popular as ever!



MALLORY VIBRATORS

MALLORY vibrators have always had an enviable record for dependable, trouble-free performance. That's why, before the war, most leading manufacturers of automobile radios selected them as standard equipment.

Small wonder that, when the Japs attacked, these famous vibrators were pressed into military service. Since then the roster of Mallory customers has included the U. S. Army and Signal Corps, the U. S. Navy and Coast Guard, the Marine Corps—not to mention the fighting forces of the United Nations.

Naturally military demands could not be met

without restricting civilian production. In spite of what this has meant to service engineers, we are glad to say that shortages have been understood and accepted.

But now Mallory vibrators are back again—and standards of quality are high as ever. Mallory, moreover, has further standardized its line so that selection and replacement are considerably easier. Ask your Mallory distributor about this line. Learn how 65 Mallory vibrators now replace 101 different types . . . how 90% of your replacement needs can be met with only 12 vibrators!

P. R. MALLORY & CO., Inc., INDIANAPOLIS 6, INDIANA



*More than ever—
 ALWAYS
 INSIST ON*

P. R. MALLORY & CO. Inc.
MALLORY
 APPROVED
 PRECISION PRODUCTS

VIBRATORS • VIBRAPACKS* • CONDENSERS
 VOLUME CONTROLS • SWITCHES • RESISTORS
 FILTERS • RECTIFIERS • POWER SUPPLIES

ALSO MALLORY "TROPICAL"® DRY BATTERIES, ORIGINALLY DEVELOPED BY MALLORY FOR THE U. S. ARMY SIGNAL CORPS, NOT PRESENTLY AVAILABLE FOR CIVILIAN USE.

*Trademarks

"Party-Line"

FOR CUSTOMERS

by E. A. DENCH

Good-will parties, regardless of the form they take in 194X, will do much to "reconvert" any hard feelings created among customers in vexing wartime years.

MANY a dealer will have to consider the need of re-wooing customers who were offended (unintentionally) by the severe strain of wartime shortages, and their effect on radio and appliance servicing and repair. The mental "hangovers" of such customers will range from a mild attack of peevishness to a chronic case of vindictiveness.

Fortunately, in the dealer's favor is just plain friendliness—outstanding feature of American business — not only the sincere desire to be cordial, but the equal urge to be accommodating. Foreign business men here on visits have frequently commented on this pleasant basis for dealings between seller and buyer, not excepting the customer who buys from a dealer. Unfortunately, this has of necessity suffered severely during the war days.

Sampling Good-Will

The happy pre-war custom of Open House to celebrate some progressive feature, ranging from the first post-war radio and appliance models, to a remodeled store, can be adapted to break the ice in this seller-buyer relationship when wartime conditions pass into history.

The advertising of these hospitable "Let's forget the wartime past and be friends again" overtures call for the utmost tact. It is, for example,

very crude (and also suggestive of a bribe) to announce that the "refreshments are free," or that "you will not have to pay for the refreshments when you leave."

By way of contrast, there was, during the pre-war years, a business executive who had the knack of showing business hospitality in good taste. One of his Open House invitations was worded in this *casual* way: "We would like you to stop in and look over our remodeled building. You'll find a tray of delectable sandwiches as you enter. The young lady in charge will pour you a cup of coffee or tea."

Another business reminded the invited guest that "from the time you arrive and until you depart, your money is counterfeit." Furthermore, the invitation adhered to social custom with its "yourself and lady" reference—a graceful gesture, one to take into full account at this ticklish juncture, for if a hurt buyer REMAINS hurt, often Friend Wife will influence him to come over on the seller's side.

The printed folder enclosed with the invitation in question gave full details of the coming event, concluding with: "Know our hospitality — you'll find it contagious. To enable us to assure comfortable accommodations for all our business friends and their wives, kindly advise us, on or before the fifth, the exact hour you and lady

expect to arrive." Guests intending to go could not help but be favorably impressed by this consideration for their comfort and convenience.

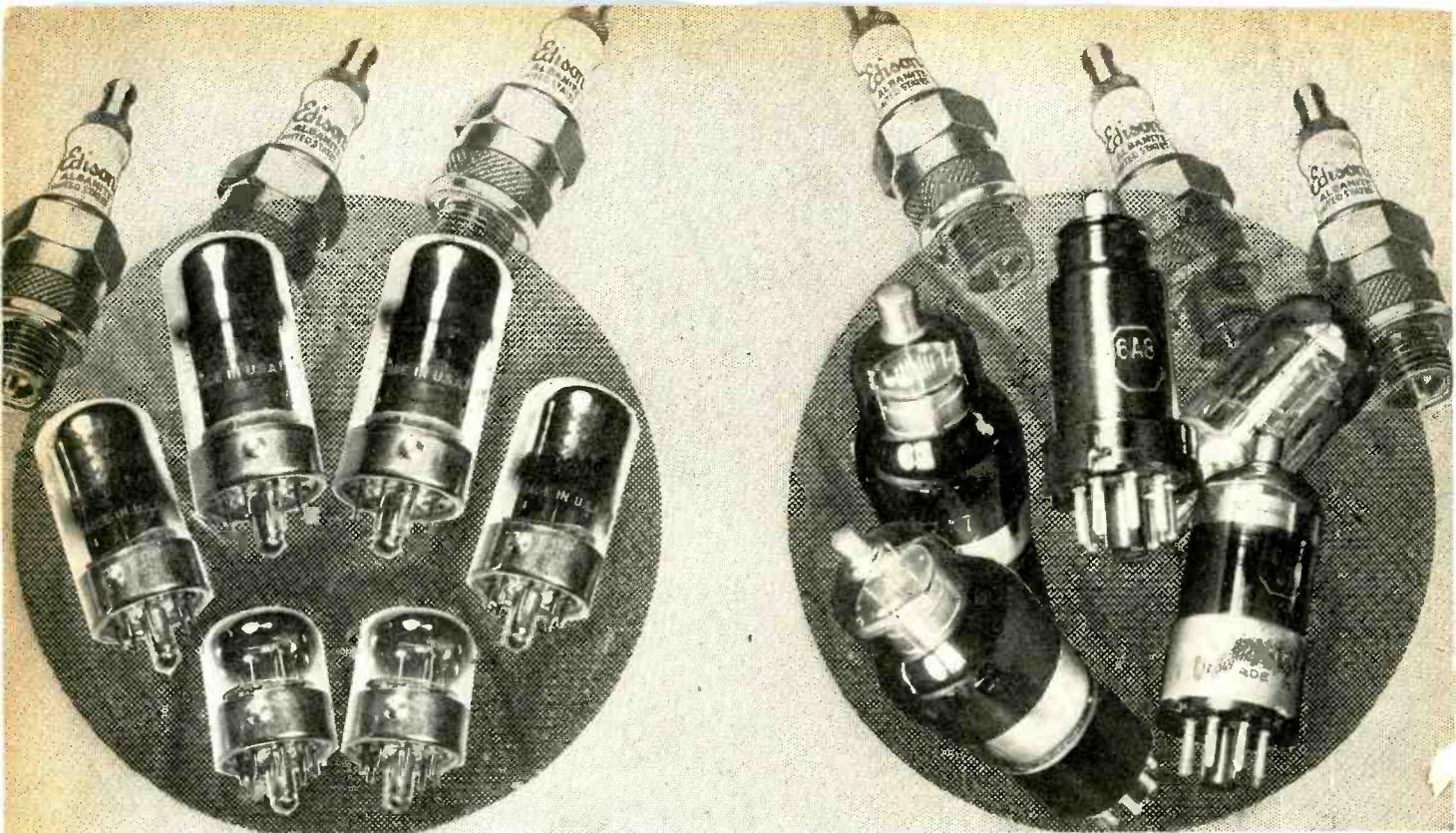
As indicated above, the Open House atmosphere should be social rather than business. Indirectly, it is true, the event is a bid for business—*future* business—but the only way to keep it on a social plane is to refrain from any direct sales solicitation.

The "Guest Game"

Men and women attending the Open House are no longer customers, clients or patrons—call them what one may. They are guests, while the seller and his employees are the hosts. Some guests are bound to feel ill at ease at first, suspecting a nigger in the woodpile—direct sales talk. Gracious manners will disarm such suspicion, in that the guests are made to *feel* that they are under no obligation whatsoever for hospitality received.

During the visit, the guest will be personally taken in tow by the radio dealer for a mellowing session. Over a well-made cocktail, the guest will wonder how he came to think wrongly of his host. He may drop a chance remark to this effect as he reaches for the second cocktail. If he does, it is the host's cue to chime in with—"Yes, Mr. Smith, I know exactly how you felt. I, too, carried a grudge against a supplier who badly let me down in 1944. It's all behind us now, isn't it? Here's to your post-war prosperity and happiness." "And to yours and your firm," the guest will probably respond.

The business organizations' anniversary will occur during the first post-war year. The celebration is often scheduled once every decade, or in multiples of 25 years: but a deviation from this arrangement is justified to celebrate the fruition of post-war plans.



Material for montage courtesy of Edison-Splittorf; Sylvania; Tungsol.

Tubes are the "spark plugs" of radio. Eliminating mixtures of "healthy" and "invalid" tubes will increase radio efficiency.

SELL TUBES IN KITS

Sell tubes like spark plugs are sold—in sets. Auto owners accept idea of buying complete plug replacement sets. Radio owners' post-war rush for service paves way for selling full tube kits when servicing. Result: better radio set operation.

by BOB ALMY*

WHILE the motorist has been riding on rubber tires that he has no prospect of replacing immediately, the radio set owner has been listening with tubes that also cannot be replaced. The motorist can still have his old tires recapped, but the radio listener has

no means of reconditioning cathodes when they are worn to the "fabric." Every radio serviceman knows that good reception depends on good radio tubes. Like tires, tubes wear out, gradually, with continued use.

**Manager Distributor Sales, Sylvania Electric Products Inc.*

Before the war the average set owner replaced tubes at the relatively slow rate of once in nine years, three-quarters of a tube per set per year. Practically speaking, he replaced tubes only when they failed. Because tubes were replaced gradually, the overall quality of set reception di-

minished gradually. The transition from good to poor listening was not marked, nor could it always be conclusively demonstrated by letting the set owner *hear* the difference.

Selling Up

Today there is a very different average set condition. Almost every set in service is operating far from top efficiency. All of its tubes are worn. When complete tube replacements are available after the war, it will be a simple matter to demonstrate the difference between a fresh set of tubes and the weary tube performance to which the radio listener has become accustomed. Then radio repairmen will merchandise complete sets of tubes for all old receivers by letting the set owner hear the difference.

The merchandising technique will be similar to that used before the war to promote group replacement of worn spark plugs. People were gradually educated to realize that car performance could be renewed, and should be renewed every 10,000 miles, by group replacement of plugs. By means of a simple visual method the car owner could *see* the difference. After the new set of plugs was installed he could *feel* the difference. The actual selling of the product, resulting in increased sales and increased profits, was done by the auto repairmen, who gave effective visual demonstrations and installed the plugs.

"Ear Appeal"

The postwar opportunity for group replacement of radio tubes will follow the same general pattern. The principal difference will be in the appeal to the customer's ears instead of his eyes. The end result will be the same. The customer will *feel* the difference.

The radio dealer who begins to plan now will sell many more replacement tubes than ever before. In addition to increasing his immediate postwar sales and profits, he will be building the foundation for increased service business. Customers will appreciate his effort to recondition their old sets inexpensively and effectively. They will have a pleasant and continual reminder as they feel the difference, listening day by day. They will remember him when they need future service for their new postwar receivers, many of which will be for FM and television.

Effective complete radio service will also tend to increase the number of sets in use. While many people will buy new postwar models, they will be reluctant to trade in old sets

in good working order. This tendency will increase the number of sets maintained by each family and consequently will increase the market for service.

Planning now for merchandising group tube replacements will resolve itself into three important steps. First, the repairman will survey his market to determine how many sets he should be able to recondition when replacement tubes are available. Second, he will approximate the number of tubes he will require, so that he can arrange his purchases to supply the demand. The third step is perhaps most important of all. He will create a sound plan for merchandising group tube replacements to all classes of customers.

The radio dealer's repair market can be surveyed simply and effectively. First he should estimate the number of radio homes in his territory. This information, by counties taken from the 1940 census, has been published by trade papers and further projected in a report by the National Association of Broadcasters. In some cities local newspapers or Chambers of Commerce have broken down the figures further or have made independent surveys.

Group Replacements

When the estimated number of radio homes is determined, it can be multiplied by 1.6, the national average number of sets per radio home, to find the approximate number of radio sets among this group. Then this figure should be discounted by 25%, to allow for the sets which will be discarded and replaced by new sets. Then this figure should be multiplied by 6.7, the average number of tubes per set, to determine the total number of tubes.

Of course the repairman cannot look for group replacement tube sales for all the sets in his territory. Some will be found in first class operating condition. Others will not be worthy of the cost of reconditioning. Some will not need complete new tube complements. But, assuming that nine out of ten sets could deliver much improved performance by the replacement of from one tube to an entire complement, the sales potential is startling.

Tubes in Stock

With these facts at hand, and on the basis of his own experience, the dealer will determine the number and types of tubes he should anticipate ordering to cover his postwar needs. How many he will need at one time, say each month, will, of course, de-

pend on the number of sets he will be able to service during the same period. It will also depend, to a very appreciable degree, upon his merchandising plan and his specific effort to get his share of the immediate postwar replacement tube business.

Merchandising plans should be worked out carefully in advance of the postwar demand. Since the effectiveness of his demonstration of a set of fresh tubes versus weak or run down tubes in the receiver will depend on an efficiently operating chassis, the repairman will in most cases carefully check and recondition all receivers before attempting to demonstrate a new set of tubes. He will also consider conditions for reception in his shop or wherever the demonstration takes place, to eliminate presentations of unnecessary background noise.

How To Do It

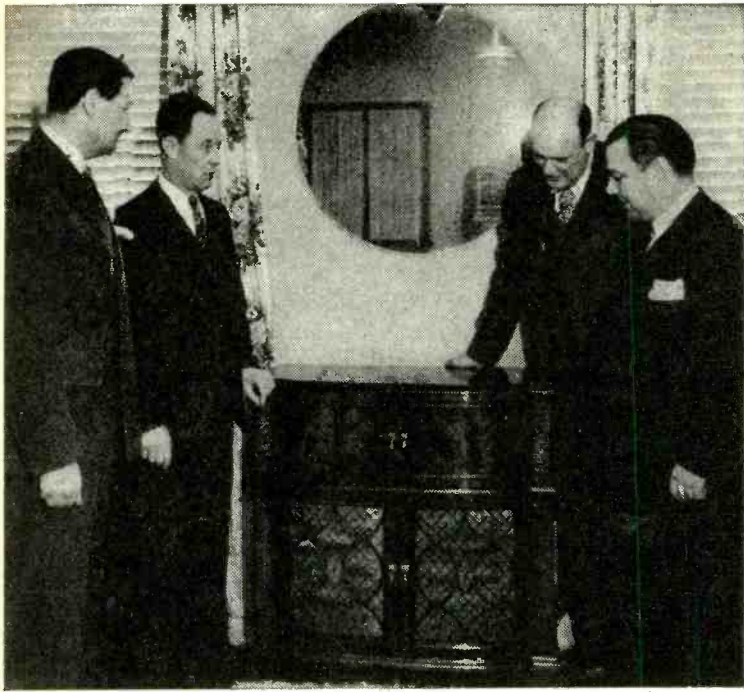
We have mentioned only those things which are a basic part of good radio servicing. The rest of the job concerns those extra sales and extra profits and will require a touch of showmanship. The dealer should work out a proper technique for presenting the demonstration of the new tubes.

The presentation should be introduced by a brief explanation of why tubes wear out and how most tubes used for a long time are badly worn. Perhaps the analogy between tube wear and tire and spark plug wear will serve to create interest. At any rate, a convincing story should be worked out to explain tube deterioration—why a tube that lights and even tests okay does not necessarily produce good clear programs.

Be sure to ask the customer to hear the difference. This is good practice, because most people like to hear for themselves, on their own set. By asking permission, you are unconsciously arousing customer interest and acceptance of the idea. You are also giving him a chance to tune his ears so that he *will* hear the difference.

After the new tubes are installed, the set should be quickly tuned to different stations, apparently at random, to demonstrate the improved reception in various types of programs.

This simple merchandising plan will be practiced by thousands of service dealers in the immediate postwar. It will assure increased sales and increased profits. Now is the time to plan your full share of the sales and profits from the 100,000,000 radio tubes which can be sold with service jobs in the immediate postwar period. *EDITOR'S NOTE: This is the first of a series of articles on tube merchandising.*



great difficulty in obtaining sufficient radio tubes. So receiver manufacturers and jobbers alike are worried about the potential tube shortage problem.

Of the 120 radio receiver manufacturers only 5 have a relatively secure tube supply source. By this is meant: of the 7 tube suppliers, 5 are "tied up" with receiver manufacturers through inter-ownership. Obviously tube manufacturers can, if no industry or governmental restrictions are imposed, select the customers with whom they may choose to cooperate—but they may have difficulty in providing all the tubes that will be needed by set manufacturers.

The 115 set manufacturers who have no tube supplier ownership tieup are worried as to whether or not their "big 5" competitors will obtain all of the initial tube production run from those 5 suppliers. In like manner, wholesalers fear that the bulk of

RADIO AND APPLIANCE

Answers to questions on what manufacturers, distributors and dealers can or will do, come RCPD — "Resumed Civilian Production Day" — straight from country-wide personal talks with industry leaders.

IT is agreed that the happenings of the first six-months' period immediately following the permitted resumption of civilian commodities will determine: 1) The success or failure of the many new-comers in the field, and, 2) What policies the old established firms must adopt to protect their industry position.

It is the general consensus that extremely hectic, competitively difficult times are ahead . . . tending towards eventual "survival of the fittest."

Radio receiver manufacturers (now 120 are committed to home radio models; 99 to AM-FM types and 67 to Television models) are aware that the competitive situation will be ex-

This report is based upon discussions with key manufacturers, distributors and dealers throughout the U. S. A. and Mexico during February and March, 1945. Copyright 1945 by S. R. Cowan. All rights reserved. No portion of this Report may be quoted or reproduced without written permission from the author.

tremely acute. Most opine that eventual success will be largely determined by a manufacturer's ability to swing into fast reconversion to civilian production *and quick delivery* to distributors and retail outlets.

All set manufacturers agree that while the old-timers stand the best chance of survival there are several newcomers who will undoubtedly enjoy tremendous success, becoming prime factors eventually.

Most firms know now what they would like to do RCPD*, but executives frankly appreciate that many variables or unforeseen developments may force a last-minute complete revision of plans. They are attempting to provide now, along with their "prime plan" a workable "emergent substitute."

TUBE SUPPLY

Primary perturbing fact is the vast number of new manufacturers of radio and electronic devices of all types. Next is the fact that there may be

initial tube production may be diverted exclusively to set manufacturers' orders.

This subject is "delicate," so we closely questioned *all* tube manufacturers, with this result: All tube makers insist that they will be "as fair as possible" to all parties concerned. They hope to find a way of rationing initial tube output so that a certain percentage of tubes will go to:

1. their own set manufacturing affiliate
2. their jobbing outlets
3. their competitive set manufacturer customers

The average wholesaler and the 115 "independent" set manufacturers hope that an Industry Planning Board, under RMA, can be established now to lay the foundation whereby the

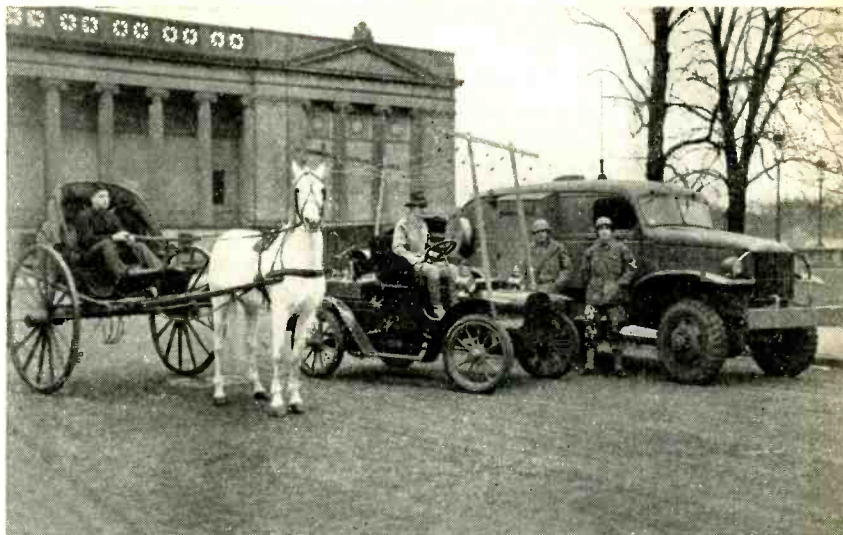
**The expression RCPD appears frequently herein and means—Resumed Civilian Production Day—or, that period when restrictions on manufacturing non-military equipment will be lifted.*

proper system of determining rationing should be effected, possibly under agreement with WPB.

It was the general opinion that a huge supply of excess Military tubes suitable for use in home radios exists and would be available if a new tube production bottleneck should occur. But there are no huge reserves of Military tubes, according to our findings. Less than 50 million such reserve stock tubes exist—(models suitable for home radio).

It was also believed by many that increased tube manufacturing capacity would eliminate a possible new tube bottleneck. Pre-war tube making capacity was about 110 million tubes a year. Present peak capacity, under rigid Military tolerances, approximates 145 million tubes per annum. Present peak capacity under normal tolerances for civilian use is estimated at 200 million tubes per year.

But, here is what industry feels is



Above: Radio development "roundup"—group symbolizes 82-year lifetime of U.S. Signal Corps. Horse-drawn 2-wheel telegraph cart of 1863; 1-cylinder 1907 model Cadillac with portable "wireless", and 1945 mobile radio unit (Hall-crafter-made SCR-299) used by Armed Forces. Exhibited in Chicago on U.S.S.C. birthday. Across: Typical of new radio sets for post-war selling is Sparton FM console shown to retailers by Ed Bonia, Sparks-Withington sales manager, left.

ROUNDUP

by **SANFORD R. COWAN,**
Publisher

required, in regard to tube output during the first year after RCPD—

For new sets, at least 15,000,000 will be made for U. S. A. sale—each set using an average of 7 tubes	105,000,000
Wholesalers and service dealers need for replacement in sets now not in operation	60,000,000
Amateurs and experimenters	5,000,000
PA and industrial applications	15,000,000

Total civilian requirements	185,000,000
Add to this Military requirements that may run as high as 75,000,000 tubes per annum for three years	75,000,000
Tubes for export purposes	20,000,000

So, any way one looks at it, the tube

situation looks "tight" for an indefinite period of time, even if the above mentioned quantity of Military reserve tubes usable in home radios can be made available.

COMPONENTS

Discussing conditions with manufacturers of radio components, one finds that they are worried about their sources of supply of raw materials. They believe WPB will continue some sort of rationing system to allocate purchase of materials . . . but they fear prices will go sky-high. Component parts makers would like to have an Industry representative who would start to work now with Government agencies to protect their position.

It is expected that the competitive situation will be acute as many new component suppliers are now established. Old-timers feel that their experience and established distribution outlets give them a big edge.

Parts jobbers are much less worried

about getting a fair supply of replacement parts needed as compared to tubes . . . and component suppliers assure us that they will have no difficulty in meeting all of their customers' requirements, both jobbers and set manufacturers, provided they get a fair break on raw material deliveries.

Radio receiver and industrial equipment manufacturers believe they will not have too much difficulty in obtaining needed components "because there are now so many sources of supply in all categories."

FRANCHISES

Most radio receiver and electrical appliance manufacturers have already decided upon the type of distribution they will employ. Many have already concluded their planning and some have stopped signing franchises.

But . . . practically all Distributors are not satisfied with their present franchise arrangements. They feel that they must protect themselves by having more than one source of supply in case they find eventually that they have signed up with a set or appliance manufacturer who happens to be slow in reconverting and making deliveries.

Distributors feel that if they are "left at the post" and fail to get merchandise, even as little as two weeks later than competitors, their position will be jeopardized.

Dealers have the same qualms . . . fearing that, unless they get merchandise for sale as quickly as their competitors, they may lose an edge that cannot be recovered. Manufacturers

appreciate this trend of thinking although some do not place much stock in it.

In regard to dealers and distributors who are doubling up on franchises, many sought, as their prime line, one that is complete and included both radios and traffic electrical appliances. But they confide that they may decide to abandon a "name" line if they find that a part of it is slow-moving. They will try to hold that part of the franchise that sells without resistance. In other words, merchandisers are now signing up for everything, literally speaking, but with the mental reservation that they will drop slow-moving items if better selling competitor lines can be obtained, even if, to accomplish this, they may have to sacrifice a good portion of a line. The trend is toward ultimate specialty selling of fast-moving lines and not toward the handling of a Name Brand Line that is complete with both radios and appliances.

SET STYLES AND TYPES

Dealers and distributors feel that during the first six months after resumed production avid buyers will absorb practically any type of receiver or appliance that looks fairly good, works reasonably well, and is priced at nominal levels . . . provided said items are styled in conventional manner. But dealers fear that some manufacturers will try to rush extremely outlandish designs into initial production, and that these "extreme units" will not get public acceptance.

Dealers are in favor of Period style radio cabinets rather than Modern. They claim that an inferior radio housed in a conventional cabinet has more saleability than a finer receiver housed in a very modern style cabinet or console. In contrast, dealers want ultra-modern styling in electrical appliance lines.

Dealers in the Midwest and East claim that between 85 per cent and 90 per cent of all sets after RCPD should be AM-FM combination models, while dealers in the extreme West and Southwest are less inclined toward FM models during the first six months after RCPD.

The demand for Television models is slight among dealers at this time, but most agree that eventually Television will catch the public fancy. They are not anxious to invest much in Television models just now.

All dealers want an immediate line of phonograph radio combinations in the popular price range. 69 per cent suggest that home-recorder types listing for about \$25 more will be very saleable. Many dealers want a line

of portable phonographs, both AC and battery operated, sans radio. Dealers say that pickups should not have fixed, built-in styli, unless the pickup head is of the low-price replaceable-head type.

SERVICING

Most dealers say they will continue to operate their own radio and electrical appliance service departments and they anticipate a huge and profitable volume of repair work for at least several years to come. Wholesalers believe that the small percentage of service shops who do not go in for retailing, RCPD, will become "service specialists" for furniture and department stores that will not attempt

to open and operate their own service departments.

Department and specialty stores realize that postwar radios will require proper technical installations, particularly FM models, and they believe that experienced independent radio service shops will be able to serve as their installation departments on a "confidential" basis for a nominal sum and with resulting mutual profits.

"HAM" & REPLACEMENT SALES

Parts jobbers look for a boom period for several years. They expect that many people who would like to buy a new radio at once, when they are again available, will hold back for

STRAIGHT SERVICE

One of the largest household appliance and radio service departments in the mid-west has just been installed by Buhl Sons Company, Detroit, Mich., distributors for The Crosley Corporation. The department is housed in a newly opened building operated solely for appliance servicing.



Radio technicians at streamlined service bench; below, shop for washer repairs.



six months until the market has become more stabilized and "new models" may be more likely to be the real postwar types about which so much is now heard. So, jobbers feel that a vast amount of radio servicing will be in demand. They expect tube and parts sales to break all past records. They also anticipate a large volume of test equipment business. Amateur radio apparatus, which most parts jobbers sell as regular retailers, will be a big factor in jobbing channels when "hams" can again work their rigs. There should be an ample supply of "ham" radio tubes and component parts, manufacturers assure us.

Having had experience in handling industrial sales during the war period, many jobbers are now aware of the postwar potential and plan to continue to plug this type of specialty selling. This is particularly true of public address equipment selling.

INDUSTRIAL AND SPECIALTY MARKETS

Radio-communications equipment manufacturers have become "specialty minded" in an effort to get away from the highly competitive situation that lies ahead. Several have decided to set up specialty sales divisions to concentrate on items like:

- Police radio
- Reference recorders
- Wire recorders
- Radio-telephony
- Aviation radio
- Radio-experimentation
- Remote control gadgets

Most of the "plans" seem to have excellent merit. For example, electronic reference recording equipment soon to be ready for marketing is quite superior to the old types of dictating equipment available before the war.

POLICE and law-authority 2 and 3-way communications networks will be established throughout the country as soon as apparatus is available. Such equipment is in great demand. At this writing, only a few communities are equipped with modern radio communications equipment. Specialists estimate that police radio equipment sales will run well over \$2,000,000 a year for at least five years RCPD.

AVIATION radio sales potentials are also considered very high by those who have specialized in studying the market . . . and while much of this market information is being kept confidential, several authorities expressed the view that within a few years over 3,500 airports will be operated in the U. S. A. and that as many as 50,000 radio-equipped airplanes will be in use. Radar and similar safety aids

will bring the annual dollar sales volume up to a high figure for radio-communications equipment manufacturers.

TAXI, trucking and transportation radio equipment markets are being studied by several leading communications equipment manufacturers . . . and it is said that they have been given very fine consideration by potential buyers. Do not confuse this new transportation radio development with the much publicized railroad type of radio-communications. The latter market seems to be a highly specialized and bitterly competitive one, albeit, with fine prospects for big sales limited to a very few big factors.

Radio telephony . . . a new field in which a limited number of firms are now laying plans . . . seems to offer much potential for the "long pull" of five to ten years postwar. A great deal will depend upon the findings of FCC after the so-called Unrestricted Civilian Radio Band (460-470 KC) has been given an opportunity to function. Wire services feel that a severe competitive threat lies here, and they are watching developments.

On the subject of civilian transceivers, most dealers believe this type of radio will win immediate popular acclaim and there are guesstimates that sales may run as high as 2,000,000 units a year following the first two-year experimentation period.

SCOPE OF MARKETS

In the Far Western part of the U. S. A., set manufacturers are not so keen on FM models in their immediate RCPD lines. But some will concentrate on battery-operated set models in the belief that many war-

plant workers now situated on the West Coast will go back to live in non-electrified areas soon after the war. The sales potential for rural type battery sets is now believed to be at least 1,000,000 units higher per annum than it was before the war, because of expected migratory changes.

Major West Coast radio manufacturers claim they do not expect to concentrate their efforts in the "eleven states west of the Rockies" postwar, but they may for the first six months RCPD. They will go after all the business they can get in all of the forty-eight states. And they will also attempt to exploit the export field, particularly Hawaii, China, and the Southwestern Pacific zone.

Of the 120 odd West Coast manufacturers we contacted, twenty or less expect to remain in the radio-electronics manufacturing field after their present military war orders are completed.

Eastern set manufacturers are anxious to exploit the export trade in Europe and South America. However, in Mexico and South America, the market consensus is that completely built American products, while acceptable immediately RCPD, will not be able to compete very long with "South of the Border" assembled sets. Speaking frankly, our Latin American neighbors want Latin American made (or assembled) merchandise, and American producers will have to work out a suitable semi-assembly or matched components kit arrangement for final construction in the country of final sale. Mexico is to be a prime funnel through which merchandise will flow, partially because of the easy air-freight communications networks already in operation.

THE "LOWDOWN" ON TUBES FOR RADIO SERVICING

Tube-hungry service dealers and their "civilian customers" MAY soon get some nourishment along those lines. According to H. W. Vantwistern, the War Production Board's presiding officer, the maintenance and repair of existing civilian radio sets would have priority on the first non-military production of tubes.

Around 4,000,000 tubes a month MAY be authorized for civilian replacement needs, as soon as production facilities are released from all-out war work. This announcement is based on the fact that fully 9 per cent of families in this country have radio sets that are not working because of a lack of tubes. "Unrated" orders for new sets would be set aside in order to provide the greatest number of

people with radio-receiving facilities at the earliest possible moment. Exactly when that moment would come IS NOT KNOWN, although military cutbacks on civilian tubes are beginning to come through.

Another factor which governed this (preliminary) decision is that with an initial production of say 1,000,000 tubes nearly 700,000 sets could be restored to operation (estimating one-and-a-half tubes average per home set). But the same number of tubes would only be sufficient to equip 200,000 brand new 5-tube sets.

Industry estimates (see figures on page 25 by Sanford R. Cowan, publisher of RADIO SERVICE DEALER) show that around 60,000,000 receiver tubes would be needed by wholesalers and dealers for replacement in home sets.



Sydney Nesbitt, sales manager, aircraft radio division Lear, Inc., sees 500,000 private planes 2 years postwar.

PREPARES for Air Radio

Florida radio specialty dealer promotes post-war civilian aviation radio business with help of cards distributed at airfields throughout state.

VIEWING with a deal of anticipation the possibilities in handling, selling and servicing private aviation radio installations which will open up to radio service dealers in many areas throughout the country, dealer M. K. Lock, owner of Lock Radio Company, Tampa, Fla., has been keeping the name of his organization alive with the personnel of local air fields since last Fall.

When the war situation permits, Lock expects aircraft radio and other electronic equipment to be his largest department, though he will also handle home radio sets. He will pioneer an organization which will offer initial standard or custom made radio equipment with installation and servicing facilities to private airmen or small independent aircraft operators.

The extent of growth in private flying in this country is estimated by Sydney Nesbitt, sales manager, aircraft radio division of Lear, Inc., in a recent statement. Forecasts of private planes in the air within two years after the end of the war range up to 500,000. "It is obvious," said Mr. Nesbitt, "that the war is building up a tremendous interest in flying which will spur John Citizen to fly when peace returns.

"History is repeating itself. Aviation is taking the place that the auto-

mobile industry took after World War I. At the close of the first War, a state as big as Indiana, for example, did not have a mile of concrete paved highway. We are in about that position now as regards airports.

"But we don't have to have concrete-paved runways on our airports. We want the 48 States to be dotted with all the airports that are practical, and we can do that easily by taking the level fields free of obstructions hazards on their approaches, and smoothing them down with a bulldozer.

"If every town and community in the United States would set about constructing a field for light planes and medium-powered planes which could be ready for private flying in the postwar years, it would open up the market for private planes because then there would be more places to go and the small plane could be really useful.

Dealer Lock is convinced — from personal observation — that private aircraft operation will depend for its growth upon radio equipment. His contribution to the "groundwork" without which any flying is impossible will consist of handling lines of radio communications equipment and electronic navigational aids, radio transmitter frequency measurement service, radio installations, repairs and adjustments and design of custom built units to meet special requirements.

AIRMEN ATTENTION!

WHEN THE AIRPORT LIGHTS GO ON FOR SPORTSMAN PILOTS

The Finest in Radio Communications Equipment & Electronic Navigational Aides

Will be Available Through LOCK RADIO COMPANY

ALSO

- RADIO TRANSMITTER FREQUENCY MEASUREMENT SERVICE
- RADIO INSTALLATIONS, REPAIRS & ADJUSTMENTS
- DESIGN OF CUSTOM BUILT UNITS TO MEET SPECIAL REQUIREMENTS

— IN SHORT —

A COMPLETE AIRCRAFT RADIO SERVICE

At last a much felt need of private plane owners, clubs and flying schools will be filled—Tampa and the Florida Gulf Coast will be served by —

AN ORGANIZATION SPECIALIZING IN AIRCRAFT RADIO

MacDILL AT BAY-TO-BAY,
PALMA CEIA



TEL. DAY H-1789
NITE W-4312

ELECTRONIC ENGINEERING SERVICE
TAMPA 6, FLORIDA
SEE OUR REPRESENTATIVE AT YOUR AIRPORT



SELLS GUARANTEED RECONDITIONED APPLIANCES

RAFFERTY Radio and Music Stores, Uniontown, Pa., operate one of the oldest and largest establishments in this territory, specializing in radio and electrical appliances and servicing. Side lines are musical instruments, photographic and sound recording equipment.

"For the past three years since merchandise has become scarce," observes Mr. Rafferty, "much time has been devoted to re-conditioning radios, vacuum cleaners and electrical appliances for resale. All such merchandise is priced reasonably and carries our unconditional guarantee.

"Due to buying up stocks of radios and tubes from other concerns going out of business for one reason or another, we have been able to maintain quite a large stock of sets and tubes during this critical period.

"Our slogan on all service is: 'We give results, not excuses'.

"Post-war plans include a new store location in central Uniontown, where we will enter into the sale (and servicing) of major appliances."

Accent on service and resale now; will resume lines of radios, appliances and sound recording equipment.

Above: Miss Morris handles incoming sets, customer tickets, keeps complete card index system on repair jobs for follow-up; also handles credit accounts. Below: Owner Rafferty (rear) operates tube checker; employee Tretinik at bench.



OPENS BRANCH STORES

Chicago dealer goes along with expected post-war population shifts — opens branch suburban stores. Modernizing program coming as “merchandising” step.

by **MITCHELL METZAREK**

THE master Electric & Radio Service Shop, 110 E. Northwest Highway, Mount Prospect, Ill., is conducting a profitable business in providing all around electrical service work for this new community. The proprietor, Kermit Bresser, established the shop last October and in that short time has built up a clientele that extends for a 10 mile radius.

Until pre-war the tendency of Chicagoans was to reside in the suburbs and this trend will be on the increase once building restrictions are lifted. More Chicagoans will move to suburban areas and since these homes will be equipped with radios and electrical appliances there will be need of serv-

ice shops to keep the equipment in working condition.

Grow With Community

The establishment of this shop in a growing community and its quick success is a vivid example of the possibilities that are open to radio service dealers in establishing themselves in small suburban towns outside metropolitan districts. Dealers now operating in large towns ought to take into consideration outlying areas for possible establishment of post-war branch shops. Returning radio technicians who contemplate opening their own radio shops and finding the field somewhat over-

Wartime “shop” front will give way to modern peacetime display store front. Lack of critical materials for modernizing keeps many dealers marking time.



crowded in well-populated towns should investigate the possibilities of establishing themselves in small communities.

Opening of a shop in such areas means that the operator will be in a position to garner all the service work from the town along with repair work from the surrounding area. He will be in a monopolistic position with little if any competition. If he takes care to run his business properly and deals fairly with his customers he will build a trade that will have a strong and permanent foundation. And the shop will grow with the growth of the community.

Dealer Bresser has recognized the value in the establishment of stores in recently built-up communities. Previous to opening the one at Mount Prospect he put another shop into operation at Barrington, Ill., in June of 1943. Along with these two suburban shops dealer Bresser operates a main store in metropolitan Chicago.

In opening branches in the suburbs this dealer has provided himself with three sales outlets for post-war radio and electrical appliances. He has increased his sales potential by a sizable percentage. Merchandise which may move slowly at his main store in the city owing to difficult competition will in all probability find quicker acceptance at his out-skirt outlets.

Less Price “Chiseling”

A fact that will be accepted by many experienced dealers is that in the operation of a sales and service shop in a suburban town there is little, or at least a minimum, of “price chiseling.” In the big city the exact opposite usually is true. In pre-war days just about every customer expected a cut from the list price. If he didn't receive it, the chances are he mentioned where he would be able to buy the merchandise more cheaply and if the dealer didn't want to pass up a transaction, he'd give in. Such practice was common and many dealers fear the same tendency will be seen once the demand for products can again be filled.

One reason for hardly any “price chiseling” among better class suburban dwellers when they go to buy an article from their local dealer is that they are in a higher income bracket. Contacts between customer and shop owner in suburban communities are more on a friendly, personal basis. Courtesy toward suburban customers is a prime requisite to the success of the shop. The same principles apply to a shop in the big city, but in the suburbs they can reach a higher level.

Servicing for Good-Will

Anne Louise Bresser, this dealer's wife, takes care of all customers at the Mount Prospect shop. She also attends to the necessary bookkeeping. Sets and appliances brought to the shop for repairs receive claim checks and the owners of the equipment are given an idea as to when they may expect their merchandise to be ready.

All work to be undertaken is first estimated and the price quoted for the owner's approval. No work is done without approval by the customer of the estimated charge. This applies only to radios. On other electrical items, such as lamps, irons, heating elements, etc. there is a flat charge.

Delivery and pick-ups of radios are usually done on Saturdays, and at other times when Bresser is in the vicinity of the call. A standard charge of \$1 is made for this service.

Will Modernize

For the promotion of business, cal-

endarers were distributed at the beginning of the year. The shop is listed in the community telephone directory and from this source many calls come in. But most of the work is received, especially from remoter points, through satisfied customers who had their sets repaired at Master Service Shop. Word-of-mouth, the owner claims, is his best business promotion. Outside of these sources sufficient sets come in for repairs to keep the operator pretty well occupied in these times. The shop's output runs approximately 200 radio sets and various appliances per month.

New Sprague Catalog

A new catalog featuring Sprague Koolohm Resistors for all radio and general service uses is issued by the Sprague Products Company, North Adams, Mass.

All resistors listed are the new Koolohm types having the "Tropicalized"

The servicing bench at this shop is out in the open at which incoming customers may see the operator at work. The technical apparatus mounted on the panel wall provides customers with confidence in entrusting their receivers to this dealer.

In opening suburban shops in addition to his city location, Bresser has his eye focused on doing a volume business come new "Merchandise Day." He is at present considering plans for modernizing his store fronts and interior, and will proceed with this basic "merchandising" program in a few months.

glazed outer protective shell and new type moisture-proof end seals which make them applicable for use under any climatic conditions. A copy of the new catalog which gives details on 5, 10, 25, 50 and 120 watt fixed as well as 10 watt adjustable types will gladly be sent on request.

COMPETITION - YES!

THE letter from W. E. Skelton, in your April issue, stating that Navy trained technicians will be no threat to "old hands" at radio servicing, appears from here to be about 180 degrees out of phase.

Students at the school to which I am attached are trained from blissful, boot camp ignorance, in a period of weeks, to repair civilian type radio receivers. The troubles, inserted by instructors, (who are themselves ex-"old hands") are made progressively more difficult to find, and after the student attains a thorough understanding of receivers of this type, his training is advanced to include complex, multi-band communication receivers.

At graduation from school, these men are competent to maintain equipment that is far more complicated than any radio receiver. Among the things at which these men are definitely ahead of civilian servicemen are U.H.F., F.M., and C.R.O. tube circuits that will be used in television.

I have been a radio serviceman for eleven years, and I have seen a lot of other "old hands" in action. Give those Navy trained boys six months in a radio service shop and competition will be hot.

L. H. Fleisher, SoM, 1c
West Coast Sound School, San Diego, Cal.

Skelton's letter in part: "The 'old hands' in radio can stop their worrying about the radio technicians in the armed forces, as they will not be able to offer any post-war competition. Their training will be utterly useless in business on civilian equipment. I have seen their best students cope with civilian radio sets. It was awful!"

We would like to express our approval of Mr. Fleisher's statements.

F.H. Wise, CRM. (Six years experience in radio service and supply firms. 13 years an amateur.)

Francis H. Wise
E.S. Colby, CRM. (Six years of servicing and retailing.)

E.C. South
E.C. South, SoM 1c. (Fifteen years of servicing and retailing.)

John B. Boyce
J.G. Boyce, SoM 1c. (Six years with RADIO SERVICE & SUPPLY CO. CARLSBAD, NEW MEXICO.)

W.J. Dopkowski
W.J. Dopkowski, SoM 1c. (Formerly Sound Motion Picture projector and amplifier repairman for JAM HANDY ORGANIZATION)

L. G. Lown
L.G. Lown, SoM 1c. (Five years of servicing and retailing.)

W.E. Clark
W.E. Clark, SoM 2c. (Formerly asst. production inspector for MAGNAFLUX CORP.)

H.S. Cooper
H.S. Cooper, SoM 1c. (Formerly Communications Engineer for R.C.A.)

W.B. Yerry
W.B. Yerry, SoM 1c. (Five and one-half years with Western Electric as a repairman.)

G.M. Stout
G.M. Stout, SoM 1c. (Two and one-half years with Engineering Dept., Minneapolis-Honeywell Regulator Co.)

R.O. Brudge
R.O. Brudge, SoM 1c. (Formerly Inspector at LOCKHEED AIRCRAFT. ASSAYER at DEL NORTE MINING CO.)

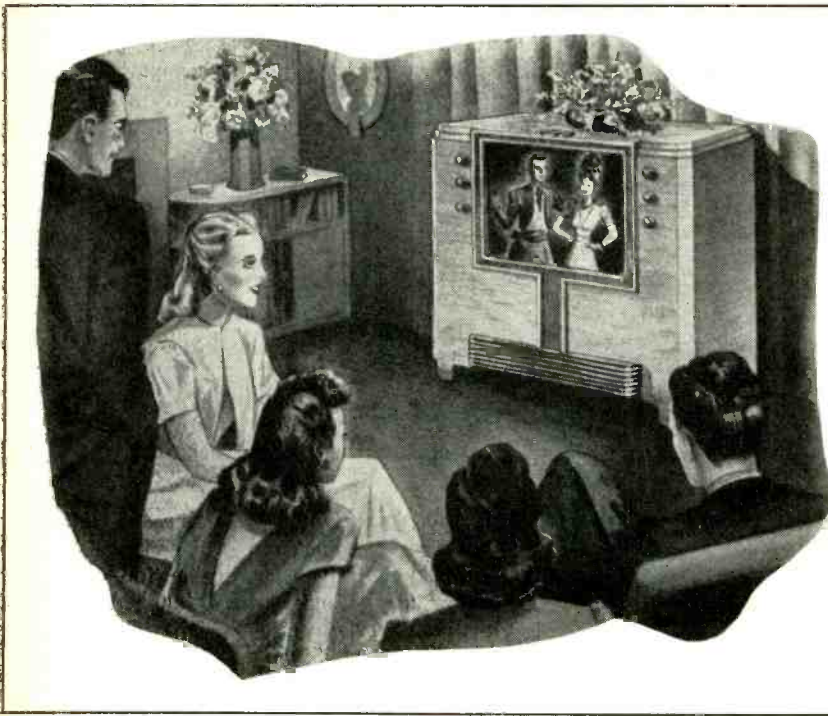
G.D. Patterson
G.D. Patterson, SoM 1c. (Formerly Radar and Radio Inspector, ARMY AIR CORPS.)

J. Wilder
J. Wilder, SoM 2c. (Formerly with Engineering Dept., Submarine Signal Co.)

V.L. Romig
V.L. Romig, SoM 1c. (Formerly aircraft radio technician and Radio Instructor with Civil Service.)

TELEVISION APPROACHES

According to Dan D. Halpin, television receiver sales specialist of RCA Victor, within five years after the commercialization of television it will develop into a billion dollar industry. By the end of another five years thereafter television service should be available to about 100,000,000 people in 23,700,000 wired homes, representing 82 percent of the nation's buying power. Such a service would provide the vendor of goods or services with the equivalent of 23,000,000 intimate "fireside" showrooms in which he could present simultaneous demonstrations under the most favorable conditions. "The use of television for local program testing should result in valuable 'know-how' for postwar merchandising," Mr. Halpin declared.



"Show" Sources for Television

Industry is fast learning techniques which will bring on - the - spot news, sports events, shorts, product demonstrations, scientific discoveries — scaled to meet needs of small home audiences.

by **LEWIS M. CLEMENT**,
Vice-President in Chg. Research and Engineering,
The Crosley Corporation

THE future of television is bright and television stations will be installed in many cities within the next several years. Time will be required to develop, build and install the equipment. Many surveys have been made which indicate without doubt the great interest in television by the public.

One survey made by RCA indicates that 15% of the people questioned would buy a television receiver if priced at \$300, 60% if priced at \$200, and 100% if priced at \$100. A small bank at Franklin Square, Long Island, established a post-war savings plan so that one could set aside weekly amounts for 100 weeks to purchase some post-war items, such as automobile, refrigerator, etc. More people are saving for a \$400 television receiver than any other item.

Chain television will gradually grow as the coaxial cable and radio repeater stations developed by the Telephone



Lewis M. Clement

Company are installed. The Telephone Company is installing many of these links, for example: The Boston-New York, Washington-Charlotte, Chicago-Terre Haute, St. Louis and Los Angeles-Phoenix links are scheduled to be completed in 1946. Similar links or radio relay stations may be used to relay television programs from city to city. Transcontinental circuits may be available by 1950.

"Variety" Shows

In the future, television, to be commercially successful, must provide a service to the public and revenue to station owners. It is admitted that ad-

vertising by television is many times more effective than by radio, as the merchandise can be shown and demonstrated without stopping the program to make a commercial announcement.

Automobiles can be shown and demonstrated under all conditions, on the road, over the proving ground course, etc. Electric stoves can be demonstrated in actual kitchens and clothing can be shown to great advantage in stores, hotels, theaters, etc.

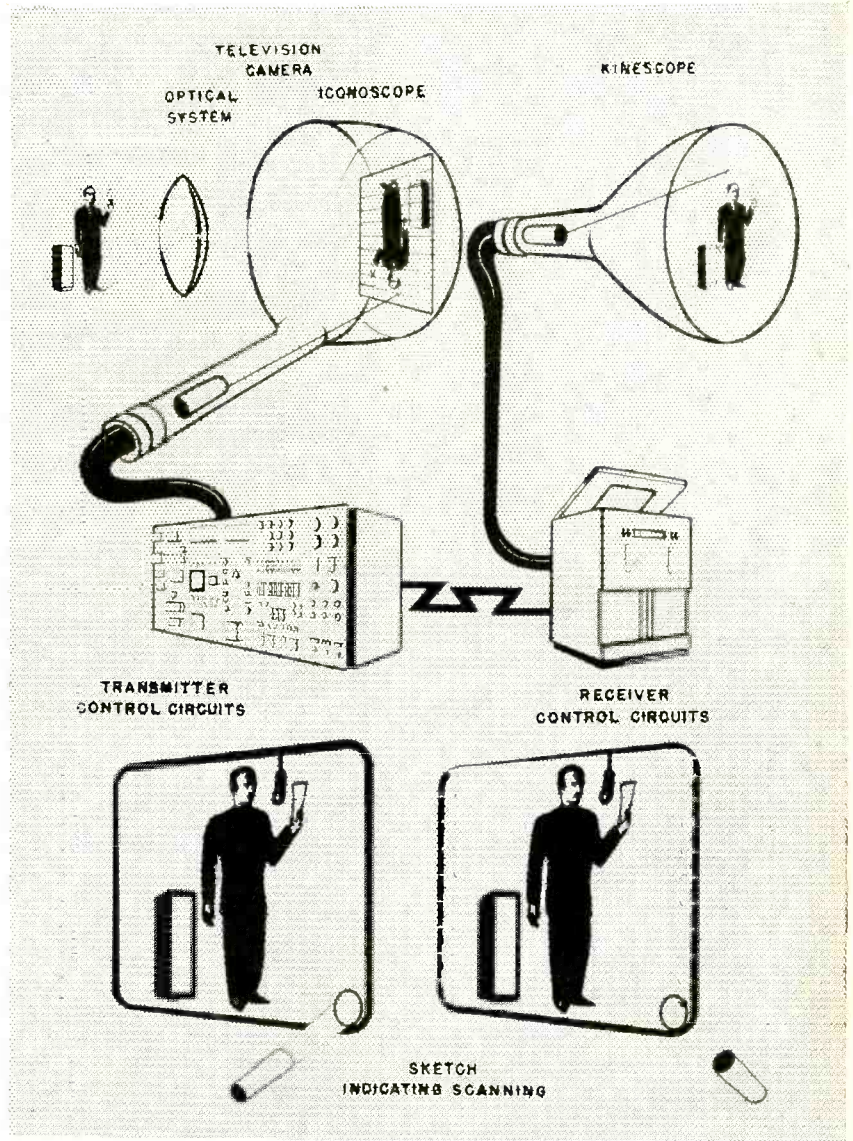
Some programs can be produced by live talent on live sets. By the use of background projection of scenes, which are readily available from the studio library, they can be more economically produced on motion picture film and can be used in the preparation of studio programs. The show can be pictured without the possibility of mistake, and can be available for multiple showings.

NBC program studies have indicated that bands, musicians, etc., do not make good program material. NBC found that viewing a violinist held the interest of the television audience for only a few seconds and after viewing several musicians, the interest is reduced to zero. It is believed that musical performances of bands, etc., will have little place on the television program except as a musical background to other programs.

Motion pictures prepared for release through theaters are not interesting when viewed at home because it is necessary for enjoyment to be in a theater where the reaction of others is transmitted to the listener. The motion picture people find it difficult to predict the public acceptance of a motion picture. Usually, the picture is shown to executives in a review room

VIDEO IN 50 MAJOR MARKETS

Applications for new commercial television stations pending before the Federal Communications Commission in Washington, D. C., now total 112, according to a survey made by the Television Broadcasters Association, Inc. These applications come from potential television broadcasters in 31 states and the District of Columbia and would provide service to millions of viewers in 50 major markets. The 112 applications are in addition to the nine operating television stations active in New York City, Schenectady, Philadelphia, Chicago and Los Angeles. Many addition applications are pending before the FCC for experimental television transmitters and video relay stations.



or small theater to just a few persons. In order to obtain a public reaction, new pictures are shown in selected places near Hollywood under different names. This is known as a "sneak preview." Here, public reaction is obtained and changes made in the film before final release. New techniques will have to be developed for television programs which will meet the needs of small home audiences in sharp contrast with the motion picture which was developed for theater or mass enjoyment.

Sports events, news, short programs and interesting advertising programs with non-obtrusive commercials seem ideally suited for television.

It is conceivable that an operator in a control room may be able to control a battery of lathes, punch presses or other machines. Floor men can be dispatched to load and unload machines at the direction of the dispatcher in the television control room.

Since the television eye can be placed in a furnace, in a cold room,

under water, or in fact, anywhere, television is likely to find application in processing, manufacturing and operating companies. It is possible to use television in the dispatching of trains, ships, aircraft, by placing the pickup eye at the desired location and the receiver at the dispatcher's office. junct to theaters. Sports events and events of national or local importance can be shown on theater screens. Theater television chains will obtain rights for important events and will provide ringside seats for the audience at an extra charge. Many of the future television programs are likely to provide a background in the living room more for effective advertising and education than radio.

Showing the Image

It is estimated that there are now approximately 7,200 receivers in the field, and the possible maximum viewing audience is of the order of 40,000

[Continued on page 61]

Sound System Applications

Industrial sound grows in five years from two uses to a total of twenty tested and proved applications.

PART 2.

Switching Controls

The operation of an industrial sound system involves controls which may be anything from a simple switch and knob to a setup more complicated than a telephone switchboard. The control elements are determined by the uses of the system, and the location and nature of its components. Simplicity of controls, as well as their concentration at a single point is desirable, but not always possible or practical.

In larger systems a means must be provided for input switching—connecting the sources to the preamplifier units. Switching or the preamplifiers to the lines running to power amplifiers is essential.

In sectional or area control, means must be provided so that a portion of the system can be disconnected from the whole and fed from an independent source.

Many of the switching controls can be made to operate through the use of electrical relays. One example of this is known as a Sequence Circuit. Control of the system is given to messages according to a predetermined schedule of importance. Operation is automatic and merely depends upon which input source is used. For instance, a priority sequence might be arranged so that in the following list, each item would have precedence over the succeeding ones:

- (1) Emergency alarm;
- (2) Fire alarm;
- (3) Guard headquarters;
- (4) Music;
- (5) General paging.

Intensity Control

Loudness of the transmitted sound at the listener's position is regulated by Volume Controls. The volume control on a power amplifier adjusts intensity

Based on a study sponsored by the Industry Advisory Committee for Industrial Sound Equipment and the Radio and Radar Division of the WPB.

in the battery of loudspeakers connected to it. It thus affords control over a large area. In practice this volume control is adjusted to the area noise conditions and left there permanently. The only exception is when the noise conditions vary, as might be caused by changes in machine operation or the

number of workers present.

In some cases it may be desirable to have a means of controlling intensities of individual loudspeakers, so that they can be more closely adjusted to conditions.

Volume controls on preamplifiers serve to regulate the intensities of the

THE SOUND OPPORTUNITY — II

Survey Shows Tremendous Immediate Potential Market

AN independent research agency made a survey recently of a typical industrial community for the purpose of determining how many plants in that community were equipped with Public Address Systems and what was the potential market for such systems. A middle western city of about 100,000, with an average variety of industries, was selected.

Personal interviews were obtained in 60 plants. Only top executives were interviewed. Of the 60 interviews, 9 were with company presidents, 25 with purchasing agents, the remainder with vice presidents, managers, plant engineers, superintendents.

Of the 60 plants interviewed: 57 had 100 or more employees; 10 were located on a single floor, 14 on two floors, 5 on three floors, the remainder on from 4 to 30 floors. Only 11 were equipped with Public Address systems.

The number of square feet in the 49 plants not equipped with sound systems totalled approximately 11,888,026. Estimating the cost of installing a Public Address System at 5¢ per square foot—

The market for Sound Equipment in this one city is \$583,764.00.

Of these 49 installations, only 4, or less than 1% would require equipment costing \$1000 or less. 15 of these installations, or almost 30% would require installations

costing from \$1500 to \$5000. 12 would require installations costing from \$5000 to \$10,000. 8 of the plants would need equipment costing from \$10,000 to \$20,000; 8 would need to spend from \$20,000 to \$30,000; and two would need to invest over \$50,000.

The kinds of products made by these companies in normal times include almost every field of industrial and consumer goods. These plants will be as busy after the war meeting the pent-up demands of our national economy as they have been in making the tools of war. And in order to meet competition, their need for maximum efficiency—and, therefore, for plant-wide sound equipment—will be greater than ever.

This survey (sponsored by John Meck Industries) reveals that there is a tremendous potential market for Sound Equipment—a vast, almost untapped market which, even though you cash in on only a small percentage of the potential in your territory, can give you sales worth working for, profits worth making.

The war gave Sound a chance and a challenge. Sound met the challenge—by saving time, by maintaining morale, by stepping up production. Today Sound Equipment is on the way to being standard equipment in plants, commercial establishments, institutions, etc.

signal being fed to the power amplifiers. These are the controls which are in most constant use, and should be placed for the convenience of the operator. It is not necessary that they be actually built into the preamplifier units. They can be made to operate remotely so that all controls and switches are often mounted on a single panel.

Volume controls which may be a part of phonograph units and radio tuners are best adjusted to a proper setting and then left alone. The control room will be fitted with a monitor speaker so that the operator can listen to all material being transmitted. A volume indicator is a desirable adjunct to the control room equipment. This is a meter which gives a visual indication of the electrical signal strength and is helpful in monitoring music programs.

Distortion

There are several different types of distortion, and they may be introduced into the system by any of its components. The term frequency distortion applies when a unit does not reproduce or amplify all frequencies in the same proportion. The most common deficiency of any sound system in this respect is its inability to handle the complete range of audio frequencies: 16 to 20,000 cycles per second.

In an amplifier which is flat from 60 to 8,000 c.p.s., amplification, or gain, is the same for all frequencies between the two points. Amplification is reduced or increased for frequencies outside the range. Microphones and loudspeakers have similar frequency response characteristics, in that the electrical voltages deviate from

the acoustic intensities.

So-called high fidelity systems will reproduce upwards of 10,000 cycles per second. A frequency range of 90 to 8,000 c.p.s. is necessary for the perfect reproduction of speech. For the perfect reproduction of music, this range must be extended from 40 to about 16,000 cycles per second.

The effect of reducing the frequency transmission can be seen in Chart 1. It shows the frequency band width necessary to achieve any given

percentage of definition. For 80% definition in music transmission a frequency range of 75 to 7800 c.p.s. is needed. For 80% definition of speech a band width of only 750 to 3800 c.p.s. is required.

Non-Linear Distortion results from harmonics which are not in the original sound, being generated by parts of the system. A certain amount is always present, but usually of such small magnitude it can be ignored. It is an important consideration in am-

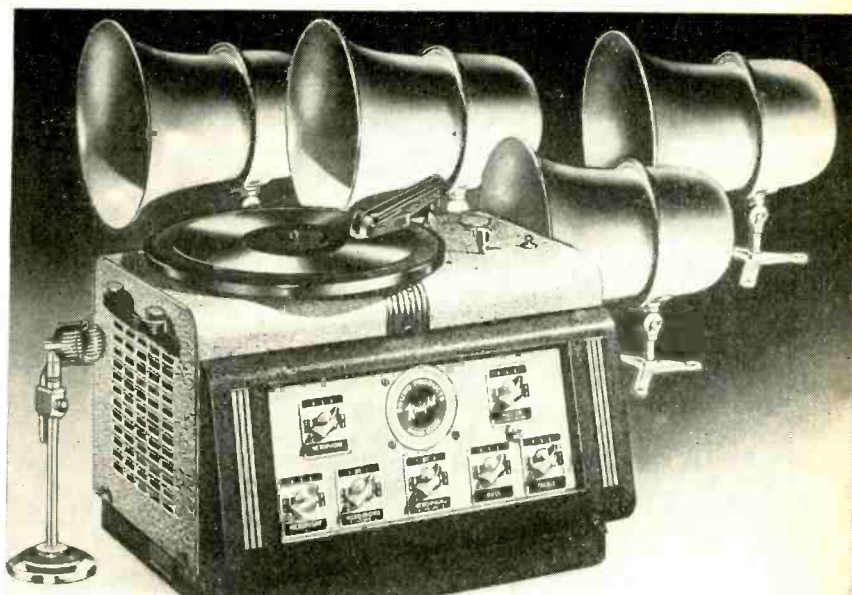


Photo from Allied Radio Corp.

Depending on priority ratings (see "WPB Rules on Sound" below) amplifying systems are now authorized for approval for war or essential civilian use. Amplifier pictured comes alone or with any complement of speakers and microphones, and with or without record player top. It is equipped with two individually controlled phono channels; four ditto mike channels; individual high and low frequency controls; universal output for matching speakers. Uses: paging and/or recordings for offices, railway depots and yards, bus and airport terminals; school stadiums; factories, etc.

WPB RULES ON SOUND

Noting that there has been a definite increase in the amount of sound equipment being delivered by manufacturers on orders bearing ratings for maintenance, repair and operating supplies, the War Production Board's Radio and Radar Division indicates that in Priorities Regulation No. 3, Interpretation 8, it is clearly stated that inter-communication systems and public address systems may not be sold on the basis of these ratings.

For an inter-communication system that was originally sold to accommodate more stations than were in service at the time of purchase, however, additional stations may be bought to build it up to its maximum

operation capacity by the extension of an MRO rating. Sound systems may not be installed by the use of an MRO rating under any conditions.

Amplifiers, however, may be replaced through the use of MRO ratings, but only if the amplifier has been damaged beyond repair, or made unusable in some other way, making replacement necessary. Other parts of sound systems, such as speakers, microphones, and input equipment, are subject to replacement by extending an MRO rating. Portable sound systems cannot be considered as legitimate MRO orders. The distributors and sales organizations all over the nation are ignoring the restrictions on the purchase of this equipment on an MRO basis, in many cases. The Radio and Radar Di-

vision said that sales outlets for this equipment should be thoroughly familiar with just what constitutes a legitimate MRO purchase.

In those cases where equipment is required and where it is not permissible to use MRO ratings a WPB-541 form should be completed and filed with the nearest local field office.

Officials expressed the hope that this reminder would preclude the necessity of turning over any of the more flagrant cases to the Compliance Division for attention. Sales organizations and manufacturers are urged to contact WPB in any case where there is a question as to just what constitutes MRO orders. Inquiries should be addressed to H. B. Esterly, Radio and Radar Division, WPB, Washington 25, D. C.

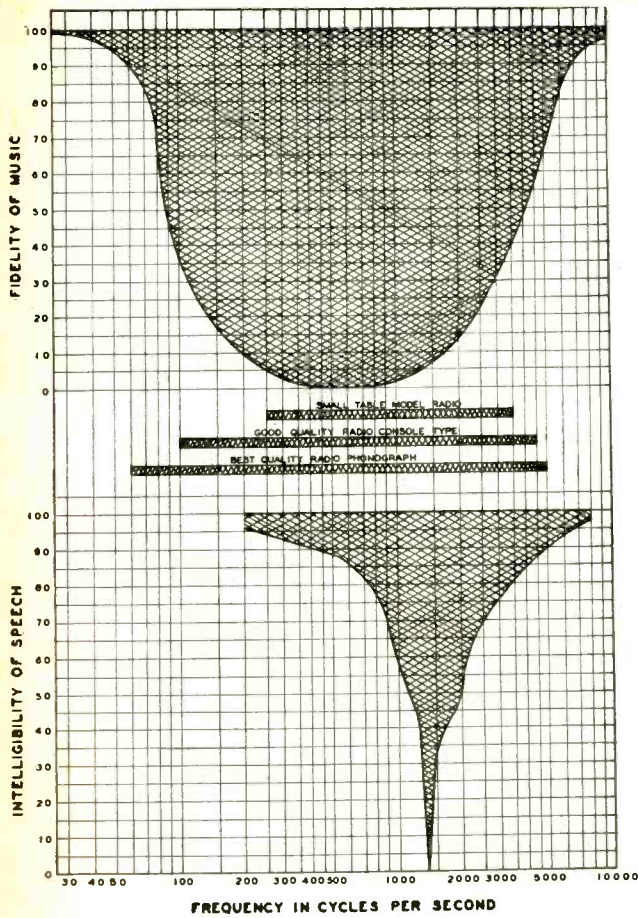


Chart 1.

Chart 1: Effect of reducing or increasing the frequency transmission; it shows frequency band widths for any desired percentages of speech or music definition. Table at right: Intensities of familiar sounds, both out-of-doors and indoors.

plifier operation, however, because there are many ways in which it can occur within the amplifier. For this reason amplifiers have a distortion rating included in their performance specifications. 5% distortion in an amplifier means that the output voltage caused by the induced harmonics is 5% of the total voltage output. This, when the amplifier is operating at full rated load.

A maximum allowable distortion of 5% should be considered for any system. The lower the distortion percentage, the better the quality of the reproduced sound. Above 5%, the reproduced sound becomes objectionable. Distortion increases as the load

on the amplifier is increased. Therefore, operating an amplifier at less than its rated load leads to improved sound quality.

Loudspeakers

Starting with plant noise levels, the size, type, number and locations of loudspeakers are determined.

Horns are generally used in particularly noisy areas because of their ability to concentrate the sound. On the other hand, frequency range is limited and sound distribution apt to be uneven.

Well baffled cone speakers generally can be used in areas where the noise level is around 90 decibels or less.

L to r: high-low frequency unit for extended range; long range, for outside or in high noise-level interiors; general purpose auditorium unit (Jensen Mfg. Co.)



Many of them have a reasonably good frequency response and can be arranged to give excellent distribution.

Unbaffled cone speakers have a very tinny sound and should be used only in a limited way for speech transmission.

Loudspeakers are usually connected to the line through matching transformers, to obtain the proper impedance relationship. If the matching is not correct, the power and frequency response will be affected.

Mounting loudspeakers to noisy machines is better practice than combating the noise from a distance. In the latter case the sound from the loudspeaker will be much too great in its immediate vicinity. In the former, the sound from the speaker and the noise from the machine are dispersed together. They undergo equivalent reduction with distance and area coverage can be made more uniform.

Networks—Special Circuits

In general, a *network* is an electrical

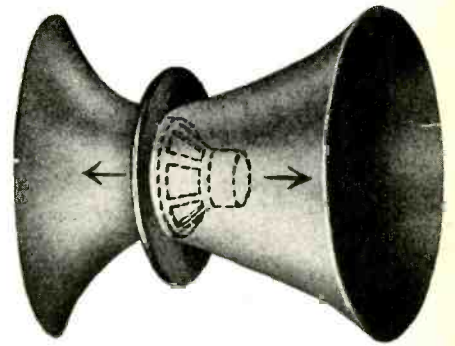
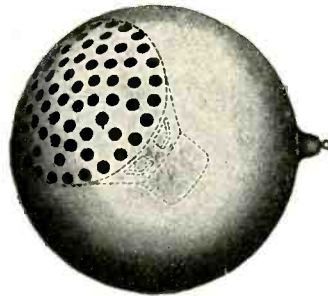
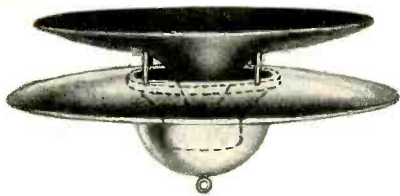
NOISE OUT-OF-DOORS	NOISE LEVEL	NOISE IN BUILDINGS
	DB	
	-30	THRESHOLD OF PAINFUL SOUND
AIRPLANE - 1500 RPM - 15 FT	-120	
TRUCKS	-110	BOILER FACTORY
WINDMILL - 15 FT	-100	TRAIN - LOCAL STATION WITH EXPOSED PASSAGE
ELEVATED TRAIN - 15 FT	-100	
WINDMILL SPIN AT WINDMILL FULL	-90	LIQUID ROAD - 200 YDS - 15 FT
VERY HEAVY STREET TRAFFIC	-80	VERY LOUD MUSIC IN HOME
AVERAGE MOTOR TRUCK - 15 FT	-80	HEARING OF 6 FACTORY LOCATIONS
AVERAGE AUTOMOBILE - 15 FT	-70	ORDINARY CONVERSATION - 1 FT
	-60	DEPARTMENT STORE - 100 FT OFFICE
QUIET RESIDENTIAL STREET - 15 FT	-60	HEARING OFFICE
WINDMILL STREET HOUSE - 150 FT	-50	QUIET OFFICE
WINDMILL STREET HOUSE - 50-100 FT	-40	AVERAGE RESIDENCE
QUIET BARBER - 100 FT	-30	QUIETTEST RESIDENCE HEARD
BUNDLE OF LEATHER IN A HEAVY BRUSH	-20	BUCKET WHISPER - 1 FT
OUT OF DOOR WINDMILL	-10	THRESHOLD OF HEARING OF STREET NOISE
REFERENCE LEVEL	0	THRESHOLD OF HEARING

*DB LEVEL = 10-15 WATTS PER SQUARE CENTIMETER

circuit that has a definite reaction upon the frequencies passed through it. Its location in the sound system depends upon the reason for its use and the nature of the circuit employed.

A low cut-off or *High-pass* filter is sometimes used in a sound system as a safety device. It has already been pointed out that a horn has a definite low frequency cut-off. To overcome the loss of bass there is a tendency for the operator to increase the signal to the driving unit. This results in increased diaphragm displacement (which is especially large at low frequencies) and might break it. The low cut-off filter removes these low frequencies from the signal, reducing the possibility of damage.

Those in general use for the purpose cut off below 250 c.p.s. This does not interfere with speech intelligibility. It does affect music, however, as can be seen by referring to Figure 1 (page 36, April issue). The music quality, or definition is reduced to 50%.



L to r: radial cone speaker, for low ceiling rooms; special use ball cone speaker for directional sound; 2-way cone dual-direction unit (Racon El. Co.).

High pass filters with other cut-off points are sometimes used to improve the intelligibility of paging calls made by female operators. They must not be used for music. Referring again to Figure 14, it can be seen that as the cut-off is raised, music definition goes down rapidly. At 600 cycle cut-off, the definition is down to 10%.

Giving additional amplification to frequencies in the neighborhood of 7000 cycles per second has been found helpful in the reproduction of male speech. It adds a certain crispness and clarity to the voice. This is accomplished by a special circuit which is usually built into the preamplifier. If the same preamplifier is to be used in connection with a music source, the circuit must be removed so that amplification again becomes flat. Control of the circuit can be maintained by a switch on the microphone stand.

Equalizers compensate for the combined effect of recording characteristic, disc material, and pickup response in reproducing records and transcriptions. These networks are usually lo-

cated in the turntable unit, but may be built into a preamplifier.

Sometimes resonance of the loudspeaker area interferes with the performance of a sound system. The condition can often be improved by reducing the same resonant frequencies in the sound system. It is accomplished by a network circuit, which is best placed in the power amplifier so that other areas will not be affected.

One other special circuit which might be built into a preamplifier is volume compression, or automatic volume control. The principle of operation is that as a signal going to the amplifier increases the amplification is reduced, and vice versa. Such a circuit proves helpful in maintaining music programs within certain limits of loudness—a necessary feature in industry.

Input Sources

The characteristics and uses of various microphones are pointed out on Table I. High impedance microphones must be used within a few feet of an

amplifier. If there is a need for a microphone located any distance away, a low impedance type must be chosen. *Close-talking* microphones are desirable for noisy locations to reduce the pick-up of machinery noise.

The turntable used for reproducing recorded material needs a heavy duty motor. It must be relatively free from speed fluctuation. In addition, the motor must have sufficient torque or driving force, so that the drag of the pick-up will not affect the speed. The drag has a much greater effect at the outer edge of the disc than toward the center.

Turntables used for transcriptions are weighted and dynamically balanced. Wows show up much more in a slow speed transcription than a phonograph record at 78 r.p.m.

Remember that record- or transcription-reproducing equipment must be ruggedly built and able to take a beating. Home phonographs are never subjected to the service that reproducing equipment undergoes in a factory.

[To be continued]

Table I: Seven types of microphones, their characteristics and industrial uses.

TYPE	OPERATION	ADVANTAGES	DISADVANTAGES	INDUSTRIAL USE
CARBON	Resistance change Current varies directly as pressure on diaphragm	High output Low impedance Semi-directional	Limited frequency and intensity response Unstable, noisy, battery or D.C. source is needed	Telephone instruments only
ELECTROSTATIC "CONDENSER"	Varying pressure varies electrostatic charge	Good stability Good frequency response Semi-directional	Low output High impedance, requiring built-in amplifier	Studio and laboratory only
MOVING COIL "DYNAMIC"	Magnetic voltage generator	Sturdy and stable Semi-directional Low impedance (30-250 ohms) can be used at distance from amplifier	Requires careful design on internal acoustic characteristics. Magnetic structure attracts iron dust	Generally useful
VELOCITY (RIBBON)	Magnetic voltage generator	Good fidelity Highly directional Can be used at distance from amplifier	Delicate Not good for close talking Magnetic structure attracts iron dust	Mostly useful for studio
CRYSTAL CELL TYPE	Piezo-electric effect	Excellent fidelity Non-directional Rugged	Must be used near amplifier Low output. Subject to break-down at high temperatures	Generally useful for single pick-up
CRYSTAL WITH DIAPHRAGM	Piezo-electric effect Amplitude is increased by diaphragm	High output Fair for close use Rugged	Must be used near amplifier Diaphragm resonance Quality not good enough for realism. Subject to break-down at high temperatures	Useful for paging
COMBINATION (CARDIOD)	Moving coil combined with velocity microphone, or two or more differently designed velocity microphones	Can be used at distance from amplifier. Controllable direction of pick-up Good frequency response	Some models very delicate Not good for close use	Useful for studio

Electronic Voltmeters

PART I.

A VACUUM tube voltmeter is defined in the "American Standard Definitions of Electrical Terms" of the A.I.E.E. as "a device utilizing the characteristics of a vacuum tube for measuring voltages." The term "Electronic-Voltmeter" is applied to a specialized form of vacuum tube voltmeter for the measurement of direct current voltages. It is the purpose of this article to explain the theory and operation of such apparatus so that the service dealer may better understand the use and maintenance of such equipment.

It is a fundamental fact of vacuum tube theory and operation that with a circuit as shown in Fig. 1A the current through the meter is a function not only of plate voltage and filament voltage but also a function of the magnitude and the polarity of the voltage of the battery "C". The curves of Fig. 1B illustrate the variation of the current through the meter with "B" 150 volts and 100 volts, and with "C" varied from minus 12 to zero volts with respect to the cathode. The tube for which the curves were made is a type 76.

With the switch of Fig. 1A on position 1 we have zero volts bias on the tube and the cathode current would be 16.5 ma, according to the curves in Fig. 1B. With the switch in position 2 and the battery "C" being 4.5 volts the meter would read 8 milliamperes. This would then be a device for measuring various battery voltages from 0 to 12 volts. Over that range of voltage in the grid circuit our cathode current would vary from .25 milliamperes to 16.5 milliamperes. The calibration of our meter in terms of voltage would follow the curve of Fig. 1B for plate voltage of 150 volts. A zero to 20 ma. meter could then be used and the drain imposed on the battery would be negligible, since the grid does not draw any appreciable current over the operating range of grid voltages applied.

If we had used the 20 ma. meter as

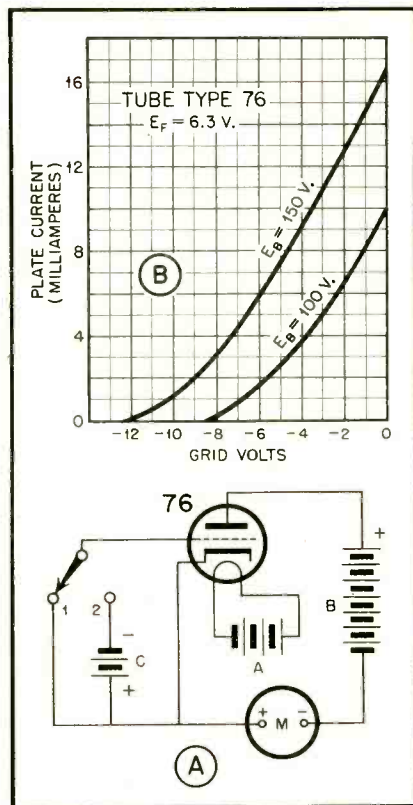


Fig. 1: "A"—Fundamental electronic voltmeter. "B"—transfer characteristic for type 76 tube.

a voltmeter it would have needed multiplier resistance values of 50 ohms per volt of required full scale deflection. Thus a 0 to 12 volt range would require a multiplier resistance of 600 ohms minus the meter resistance. The battery load would be 600 ohms, thus drawing 7.5 ma from a 4.5-volt battery measured, 20 ma from a 12-volt potential source measured.

Hence we can readily see the advantages of the electronic-voltmeter: It imposes a negligible current drain on the voltage source being measured,

and makes that measurement possible with a high current drain meter.

You will notice that the arrangement of Fig. 1A as outlined above indicates the highest voltage at the lowest current reading of the meter. This is contrary to the rule of reading value increases from left to right. By revising the circuit as shown in Fig. 2 the cathode of the tube is raised above zero potential. The magnitude of the current flowing through the meter with the switch in position 1 is determined by the voltage of battery "K". Under this condition the grid of the tube is negative with respect to the cathode by the amount of the voltage in "K".

With the switch in position 2 the grid is negative with respect to cathode by the magnitude of K—C. In other words, it is now less negative with respect to the cathode than formerly, by the magnitude of the voltage "C". The grid is still negative with respect to the cathode by virtue of voltage "K" being greater than voltage "C".

Plate Current

This decrease in the negative grid potential causes an increase in plate current. Increasing "C" with the switch in position 2 causes further increase in the plate current, indicated by the meter "M". We now have a circuit condition where an increasing voltage causes a higher deflection on our indicating meter.

We may modify the circuit further as shown in Fig. 3, and adjust the resistor R so that with the switch in position 1 the meter will read half scale deflection. That would represent zero voltage, and the scale can be so calibrated. In position 2 of the switch our meter would read at some

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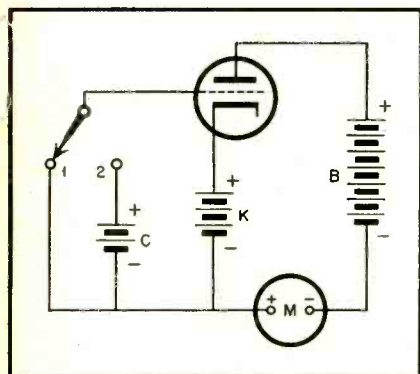


Fig. 2: Arrangement to increase current through meter by increasing voltage "C".

point beyond half scale deflection if battery "C" is so arranged that the positive terminal is connected to the grid. Reversal of the polarity of the battery would increase the negative grid bias with respect to cathode and our meter deflection would be less than half scale. With such an arrangement the polarity of the measured potential may be disregarded in making measurements. It is to be seen that we are operating our tube in the fashion of a class A amplifier.*

Increasing the negative grid voltage will eventually drive the tube to cut-off. When the tube approaches this cut-off point you may note from Fig. 1B that the curve becomes more non-linear. There are smaller increments of plate current change for the same increments of grid voltage change as on the higher portion of the curve. Thus the scale calibration crowds up and becomes very non-linear.

The calibration for the condition of applying the positive potential to the

*A thorough treatment of such amplifiers may be found in "Radio Service Dealer" for December, 1943.

grid is as linear as the characteristic curve, which is fairly linear up to the point where the grid would be allowed to become positive with respect to the cathode. Such an arrangement may be used limiting the meter calibration to the linear portion of the curve. To do this would, however, cause the meter to be utilized over perhaps only 80% of its available range for the circuit of Fig. 3. A calibration for a circuit such as Fig. 3 is shown in Fig. 4. This illustrates the non-linearity at the high values of negative voltage. This calibration is for a type 76 tube operated with constant plate voltage of 100 volts and using a 0 to 10 milliamper meter.

Plate Voltage

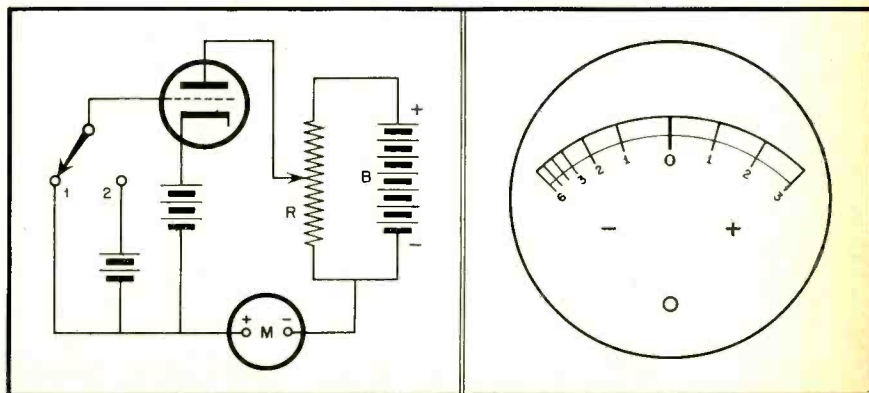
To use such a circuit operating from a power supply other than batteries, the problem of maintaining constant plate voltage is encountered. The plate battery shown in previous circuits is a source of constant potential over a wide range of current

drawn. A power supply, however, delivers a constant voltage but the voltage on the plate of a tube arranged as in Fig. 5 is the supply voltage minus the voltage drop across the variable resistor R. Thus the plate voltage on the tube varies with plate current through the tube. By revising circuit to that shown by dotted lines we may maintain a nearly constant plate voltage if the bleeder current is at all times many times greater than the tube current, and I_p is kept very low. We obtain bias by means of the IR drop across R_k . R_1 , R_2 , and R_3 provide grid return to ground at all times. The voltage to be measured is applied across $R_1 + R_2 + R_3$. Switch S is then adjusted so that some definite portion of the voltage to be measured is placed between grid and ground. That portion may be no larger than is required to cause full scale meter deflection.

Grid Voltage

Suppose we are permitted by the tube characteristics to vary the grid voltage plus or minus 5 volts around some value achieved by the bias resistor with no voltage being measured. We wish to measure 100 volts. The 100 volts is to be applied across $R_1 + R_2 + R_3$. Using R_3 as $1/20$ the total value of that summation will by simple Ohm's law apply 5 volts from grid to ground with 100 volts across the resistors in series. $R_1 + R_2 + R_3$ should be of such total magnitude that the load they offer to the potential source is negligible. If they total 10 megohms the current drain from a 100 volt source would be E/R or $100/10,000,000$, which is a current drain of 10 micro-amperes. The drain from a 5 volt source would be $1/2$ micro-ampere. For the 0 to 5 volt range switch S of Figs. 5A and 5B would be at point 1, and sensitivity would be 2 megohms per volt. This

Fig. 3: Circuit to allow adjustment of meter to half-scale with no voltage being measured. Fig. 4: Calibration for meter at left. Note non-linear negative input.



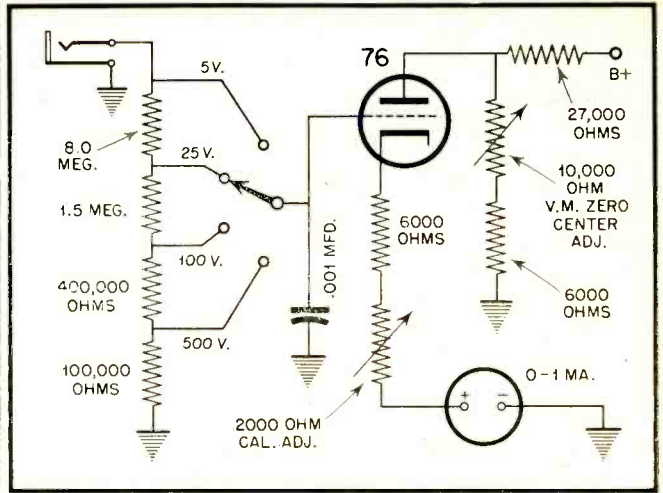
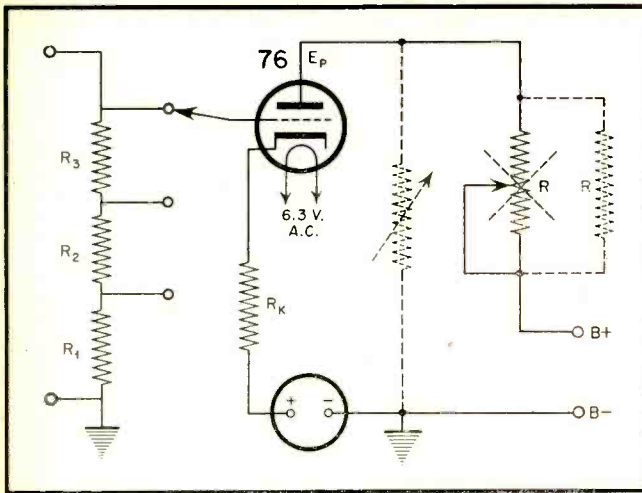


Fig. 5: AC operated electronic-volmeter circuit minus power supply. See text.
 Fig. 6: Electronic-volmeter of RCA-Rider Chanalyst. (1 megohm resistor in prod).

is quite an improvement over our 20,000-ohm-per-volt voltmeters.

As we have previously stated, bleeder current from our supply as in Fig. 5B must be many times greater than that tube plate current if a variation in that plate current is not to result in a large variation of plate voltage. This means that if a 10 milliamperemeter were to be used as mentioned above, a rather heavy-duty power supply would be needed to handle the required bleeder current. Use of a one milliamperemeter, or better, and arranging of circuit constants so as to operate the tube at very low values of plate current will simplify the required power supply.

Bleeder Circuit

In Fig. 6 is shown the electronic-volmeter circuit of the well-known RCA-Rider Chanalyst. Here the variable resistor R is a portion of the bleeder circuit which parallels the tube circuit. Resistor R1 is in series with the supply voltage so that both the tube plate current and the bleeder current flow through it. Voltages being measured will cause a variation of a maximum of 13.5 volts in the tube plate voltage, this being the added IR drop across the 22,000 ohms resistor R1 as the plate current changes from 1/2 milliamperemeter to 1 milliamperemeter. The plate voltage variation with measured voltage causes a slightly different plate current than would flow with constant value of plate voltage. It should be apparent that R1 of Fig. 6 acts as the load resistor for the tube. The voltage being measured is proportional to the change in voltage across R1 or the change in current through R1. The calibration of such a circuit can now be made experi-

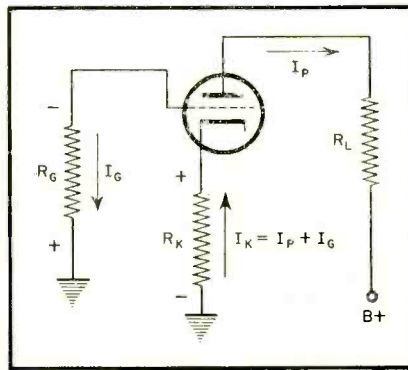


Fig. 7: Tube circuit showing currents making up cathode current.

mentally or can be predicted by reference to characteristic curves of the tube in question. The low value of plate current flowing in the above-mentioned circuit is a function of low applied plate voltage and of high self bias developed across the resistance of the cathode circuit.

Grid Current

Most of us have to date considered a vacuum tube operated as a class A amplifier as never drawing grid current if the grid is maintained negative with respect to the cathode. However, some electrons emitted from the cathode of a tube reach the grid and do not go on to the plate. Some remain in space to make up the "Space Charge" while others reach the grid and are held there. They accumulate there and return to the cathode. But they do not return to the cathode against the flow of electrons from cathode to plate. They return to the cathode through the external grid resistor. This is shown in Fig. 7. Thus with a 10 megohm grid resistance, a

grid current through that resistor to cathode of 1/10 of a micro-ampere results in an IR drop of 1 volt across resistor. This causes a higher negative grid bias and less plate current to flow.

The grid resistor, instead of placing the grid at ground potential, allows it to be 1 volt negative with respect to ground. This "grid" current is a function of the plate current. Thus if we decrease the plate current we decrease the grid current. A large value of cathode resistor results in a large self bias to reduce plate current and consequently grid current. The disadvantage of this grid current is primarily in the altered bias voltage that occurs. Thus if we vary the grid resistance, we vary the bias. This would require resetting of the zero adjustment of our electronic voltmeter for each scale. If we measure a voltage across a 1 megohm resistor, with the circuit of Fig. 6, the grid circuit of the tube in Fig. 6 becomes that of figure 8 in effect.

Our instrument would have been zero adjusted with 10 megohms in the grid circuit but when across 1 megohm the result due to the 1 megohm in the test prod and the one megohm across which the voltage is being measured would be 1.66 megohms. Thus if the grid current were 1/10 of a microampere we would have a voltage of 1 volt across the grid circuit for the zero adjust position. But when measuring voltage across the 1 megohm resistor it would become 1/6 of a volt as a function of grid current. The bias shift as a function of the bias would be 5/6 of a volt. Considerable error would be introduced in our measurement.

The input of the tube is between grid and cathode. Since the plate

current flows through the cathode resistor, it is apparent that the input circuit and output circuit have the cathode resistor in common. The output voltage rising with a positive grid voltage causes increased IR drop across RK thus reducing the tube gain in proportion to the added voltage developed across Rk. As shown by Maurice Apstein in "Radio Service Dealer" for April, 1940, the effective gain of a circuit as in Fig. 6 is:

$$\text{Eff. gain} = \frac{A}{1 + A \times F}$$

where: F is the feed back factor expressed as a fraction of the output voltage. A is the original gain with no output voltage in the cathode circuit.

Since the total output is developed across the 22,000 plate load and a nominal 7,000 ohm cathode resistance the feed back factor is for

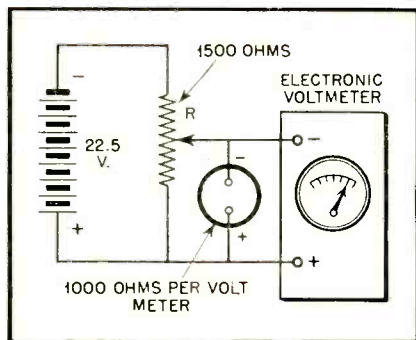


Fig. 10: Circuit for checking electronic voltmeter calibration on low voltage ranges.

this case 7/34ths. Original gain may be assumed as Mu. Then:

$$\text{Eff. gain} = \frac{13.8}{1 + 13.8 \times 7/34} = 3.8 \text{ times.}$$

Thus large values of grid voltage, (which is the voltage to be measured), are needed to cause some increment of plate current change. Under this condition, for Fig. 6 a grid voltage change of 5 volts causes a plate current change of only 1/2 milliampere. Grid current is kept negligibly small small plate current and is in the order 1/1000 of a micro-ampere.

The circuit of Fig. 6, with slight alterations and using the triode section of a 6SQ7, is found in the Hickok model 202 "Electronic-Volt-Ohm Milliammeter". The circuit of the electronic-voltmeter portion of that unit is shown together with values in Fig. 9. Here a 0 to .5 milliampere meter is used and the grid to ground resistance is limited to 8 megohms. A 3 megohm isolating resistor is used in the test prod. The effective gain of the tube

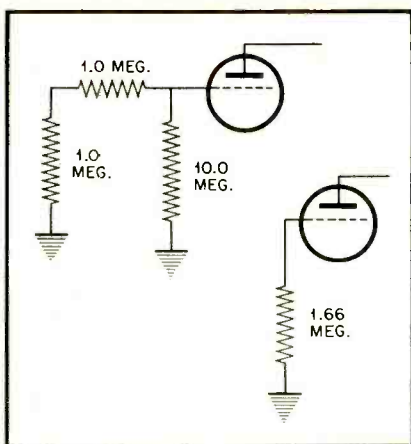


Fig. 8: Equivalent circuits of grid circuit of Fig. 6, using 5-volt scale.

in that circuit which has a Mu of 100 is:

$$\text{Eff. gain} = \frac{100}{1 + 100 \times 1/3} = 3 \text{ times.}$$

Plate Dissipation

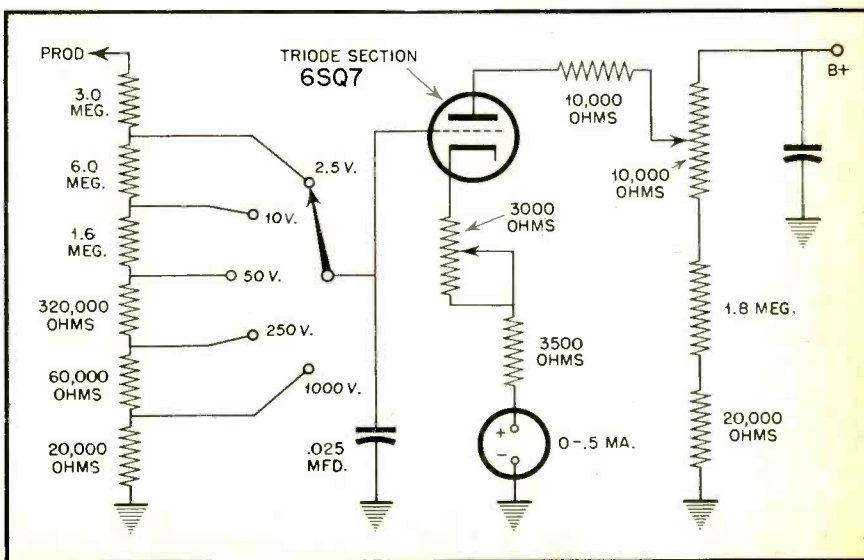
The circuits of Figs. 6 and 9 representing two popular electronic voltmeter circuits give very little trouble. Tubes are operated at extremely favorable conditions with negligible plate dissipation. Resistance variations in plate and cathode circuits are readily within the correction range of the variable resistors. Decrease of tube emission may be tolerated down to the very low amounts due to limited plate current operation.

Variation of resistance values in the grid circuit is, however, as important a factor as that of the multiplier resistance variations in a stan-

dard voltmeter circuit. (See the September, 1944 issue of "Radio Service Dealer" for information on such resistors). As may be seen from reference to Fig. 9, the 1,000 volt scale uses a grid to ground resistance of only 20,000 ohms. This is 1/400th of the resistance used for the 2.5 volt range. A plus or minus variation of 100% in value of this resistor will introduce a 1/4 of 1 percent error for the 2.5 volt range. It would cause a 1 percent error in the 10 volt range, a 5 percent error on the 50 volt range.

Since the total resistance is always across the source of measured potential, that total resistance is simply a voltage divider allowing us to apply a portion of that voltage between grid and ground. Resistors may be replaced and checked for accuracy by checking the electronic-voltmeter against a 1,000 ohm per volt meter and a source of voltage such as a power supply or a group of batteries. The summation value of the total divider resistance in the grid circuit is not too important as long as it approximates the desired high value. Accuracy is important in the subdivision of that total so that a proper portion of the total voltage is applied between grid and ground. That resistance portion is directly equal to the voltage portion desired. If the lowest scale is 0 to 5 volts and uses 8 megohms to ground then the 10 volt scale (to allow 1/2 of 10 volts or 5 volts to appear between grid and ground) must be 1/2 of 8 megohms or 4 megohms: For checking the ranges between 0 and 25 volts a circuit as shown in Fig. 10 may be used. Resistor R is adjusted for required

Fig. 9: Electronic-voltmeter circuit of Hickok Model 202.



voltage as measured on an ordinary multi-tester and the electronic-voltmeter checked against that. A low value of R is used so that the multi-tester does not load the battery by changing the effective resistance across it.

Replacing of resistors in the grid circuit should be done with precision resistors of proper value. However, emergency replacement may be made

with carbon resistors tailored to value and checked for value by the accuracy of the measurements made against a known voltage.

Another type of electronic-voltmeter using a "Bridge" circuit is quite common and will be covered thoroughly in the second part of this article, to appear in an early issue of "Radio Service Dealer."

Getting "Set" FOR SETS

"Radio manufacturers are today signing up distributors and dealers. These dealers will expect the earliest possible deliveries after reconversion. If anarchy prevails in the ordering of components and manufacturing of sets, chaos will surely prevail in retail sales."

RADIO set manufacturers, now scrambling to set up postwar production, may find themselves with thousands of speakers and no tubes or vice versa. In a rush to line up components, most of the set manufacturers are "pyramiding indefinite commitments" wherever and whenever they can place them. The result is no one knows how much has been ordered, how many can be paid for, manufactured or sold.

Some manufacturers have already noted the difficulties in this situation and have withdrawn or are withdrawing from the market. Others conclude that the demand during the first few years after the war will be so great that any set which is manufactured can be sold. Anticipating this immediate demand as well as the ferocious competition which may later exist, manufacturers see the necessity for getting out their products first. They feel that if they can get the edge on production and delivery they will make substantial sales as well as possibly capture a portion of the market which they may be able to hold.

The net result of the flight of fancy now going on is that the manufactur-

ers of components do not know the actual demand and the buyers of components cannot estimate their potential supply. Instead of firm orders, we are seeing a pyramiding of indefinite commitments, which can only give the components manufacturers a false picture of the actual demand. The Radio Manufacturers Association is urged to take constructive steps to clear up the situation:

1. Conduct a survey among parts manufacturers to find out:

- How many components are on order
- Component production capacity
- When and in what amounts components can be delivered.

2. Conduct a survey among set manufacturers to find out:

- The potential set manufacturing capacity
- The anticipated production figures for each manufacturer
- What components have been ordered and in what amounts.

Based on a communication to Radio Manufacturers Association by S. J. Norick, president, Electronic Corp. of America.

It will probably be found that these figures present an absolutely unrealistic picture. But on the basis of the surveys the Association should be able to:

1. Estimate, within reasonable limits up and down, the potential production of components.

2. Estimate, within reasonable limits up and down, the potential production of sets.

3. On the basis of the estimates obtained by the Association, each individual manufacturer should be able to plan intelligently. As matters stand, a manufacturer who has 100 thousand speakers on order may find himself with a totally inadequate supply of tubes, while another manufacturer has ordered 5 million tubes even though it is doubtful that he can use a half million. (The figure on the number of tubes already ordered must look like the national debt.)

4. Perhaps these government agencies could even develop a plan for organizing production and delivery so that components would be available in reasonably balanced proportions to the manufacturers who need them.

If the Association can get figures from component and sets manufacturers, it can determine if the figures balance. If they do not, the Association can inform the manufacturers so that production plans can be based on actual knowledge and schedules set up accordingly.

The publication of the results of the Association's surveys of its estimates should, of course, be made freely and publicly available to the trade, to the Department of Commerce, and the public generally. There would, of course, be no disclosure of the orders, deliveries, or prices of any individual manufacturer. It is further understood, of course, that the Association would not be making any recommendations to any member or non-member with respect to what such person, firm or corporation should do with respect to his or its own production or prices, the statistical information being disseminated as a service to the members of the Association to enable them to plan their own business operations intelligently.

Like a lot of things that go on in business, this situation will undoubtedly work itself out after a long enough time and perhaps after a lot of manufacturers have lost valuable time and money. But it seems more sensible to us to work out the problem in advance and not trust to luck or competition to settle it for us. By taking the leadership on this problem, the Radio Manufacturers Association may well set a pattern which other industries can profitably follow.



'Cross-country distribution high-spotted in these representative wholesale outlets (Meck-appointed). Left: sales floor, R. C. & L. F. Hall, Houston, Texas. Right: radio and washer parts counter, Radio Electric Service Co., Philadelphia, Pa. Below: Interstate Radio & Supply Co., Denver, Colo.

DISTRIBUTORS APPOINTED

JOHN MECK INDUSTRIES

John Meck, president of the John Meck Industries, Inc., Plymouth, Indiana, announced that the following list of additional jobbers have been granted exclusive Meck franchises and will handle the distribution of Meck radios and phonographs for retail outlets of radio service dealers.

Arvedon Electric Supply Co., Inc., 73 Portland St., Boston, Mass.; Pittsfield Radio Co., 44 West Street, Pittsfield, Mass.; Springfield Radio Co., 405 Dwight Street, Springfield, Mass.; Radio Electronic Sales Co., 46 Chandler St., Worcester, Mass.; Wedemeyer Electronic Supply, Ann Arbor, Michigan; Radio Electronic Supply Co., 1112 Warren Ave., W., Detroit, Mich.; Radio Electronic Supply Co., 443 S. Division Ave., Grand Rapids, Mich.; Ralph M. Ralston Co., 201 N. Park St., Kalamazoo, Mich.; Industrial Electric Supply Co., 1839 Peck St., Muskegon, Mich.; Kinde Distributing Co., Sebawaing, Mich.; Sterling Electric Co., 31-33 S. Fifth St., Minneapolis, Minn.; Radiolab, 1515 Grand Ave., Kansas City, Mo.; Harry Reed Radio & Supply Co., 833 Boonville Ave., Springfield, Mo.; Tom Brown Radio Co., 3924 Washington Blvd., St. Louis, Mo.; Radio Equipment Co., 523 E. Central Ave., Albuquerque, New Mexico; Aaron Lippman & Co., 246 Central Ave., Newark, New Jersey; Chanrose Radio Stores, Inc., 170-16 Jamaica Ave., Jamaica, New York; Masline Radio & Electronic Equip., 192-96 Clinton Ave., N., Rochester, New York; Southeastern Radio Supply Co., 11 E. Hargett St., Raleigh, N. C.; Burroughs Radio Co., 620 Tuscarawas St., W., Canton, Ohio; United Radio, Inc., 1314 Vine St., Cincinnati, Ohio; Goldhamer, Inc., 610 Huron Rd., Cleveland, Ohio; Hughes-Peters, Inc., 111-17 E. Long St., Columbus, Ohio; Joseph B. Smith Co., Edison Building, Toledo,

Ohio; Radio Supply, Inc., 724 N. Hudson St., Oklahoma City, Okla.; R & S Distributors, 214 E. Tenth St., Tulsa, Okla.; Bargelt Supply, 1131-35 S. W. Washington St., Portland, Ore.; Radio Elec. Service Co. of Penn., N. W. Cor. Seventh & Arch Sts., Philadelphia, Pa.; and Dixie Radio Supply Co., 1714 Main St., Columbia, S. C.

Mr. Meck stated, "Our distribution plan is well known to the radio industry. We have exclusive jobber franchises and plan to sell our radios through independent retail outlets. We are satisfied that we have covered important markets and that our distribution is such that Meck radios will be available to consumers all over the United States. Our jobbers have worked hard and have furnished us with a substantial backlog of orders. We have been surprised, and they have been, too, at how original expectations have been exceeded. Some of our jobbers have re-ordered as often as six times."

Mr. Meck added that he felt his factory could produce approximately 2,000 radios a day within 60 days of the resumption of unlimited civilian production.

STROMBERG-CARLSON

Clifford J. Hunt, manager of radio sales of the Stromberg-Carlson Company, announces the appointment as area distributors for the company's postwar radio, FM and television line, the firm of Clark & Jones of Birmingham, Alabama. The Alabama area, marketing authorities say, is expected



to offer one of the South's richest postwar trading areas. Mr. Hunt pointed out that the Alabama distributing firm named to represent the fifty-one year old communications firm has strong roots in the business life of the South.

The Kepfer Appliance Company of Cincinnati, Ohio, has been appointed area distributor. Although only recently incorporated, the firm is made up of officials with a twenty-five year background in major appliance merchandising, much of it in the Cincinnati territory in which they will operate. In addition to its Stromberg-Carlson representation, the company is also the franchised distributor for the Gibson refrigerator, Kookall electric range and home freezer, and the Filter Queen, the bagless vacuum cleaner.

The firm's sales organization is at present contacting dealers in the Cin-

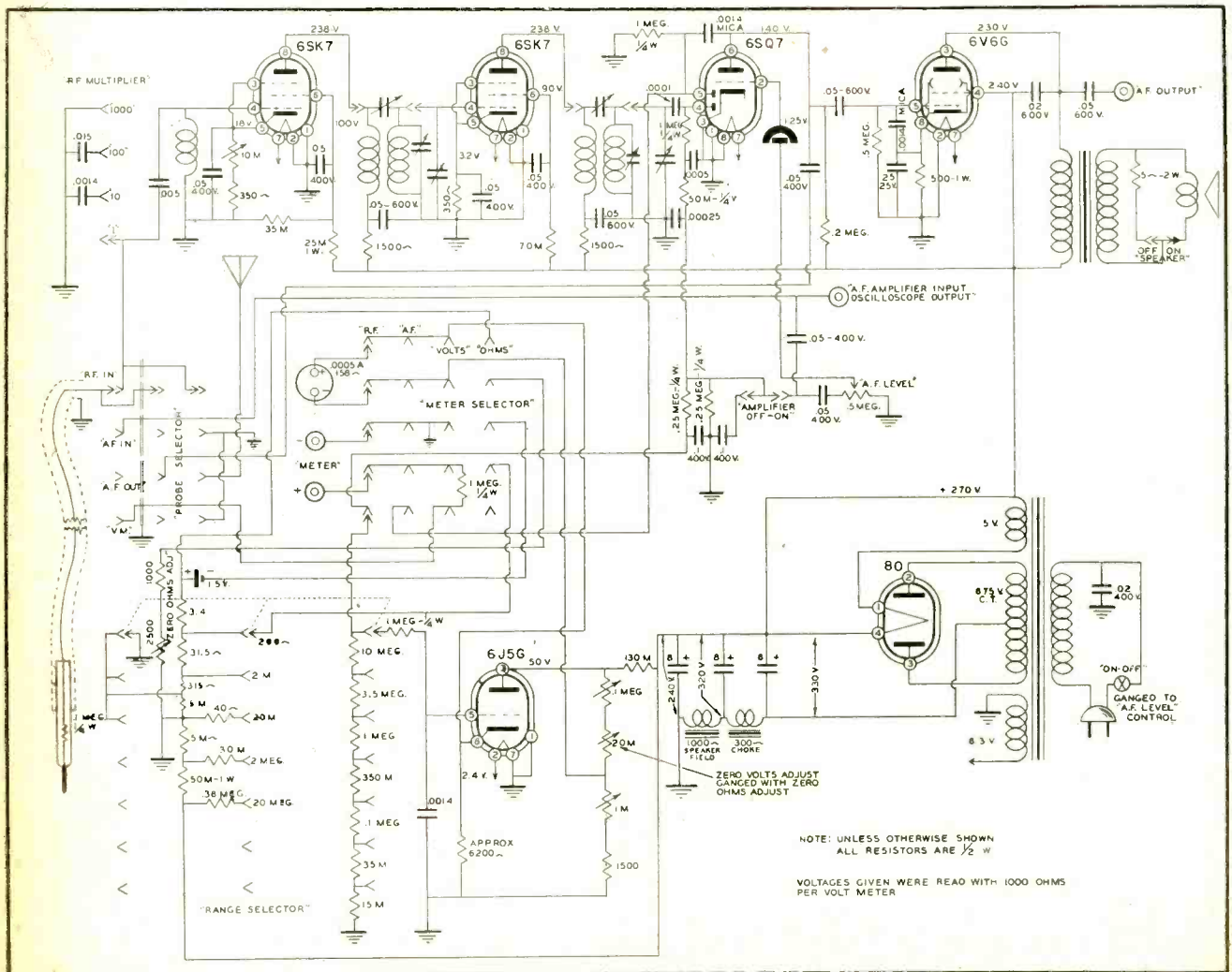
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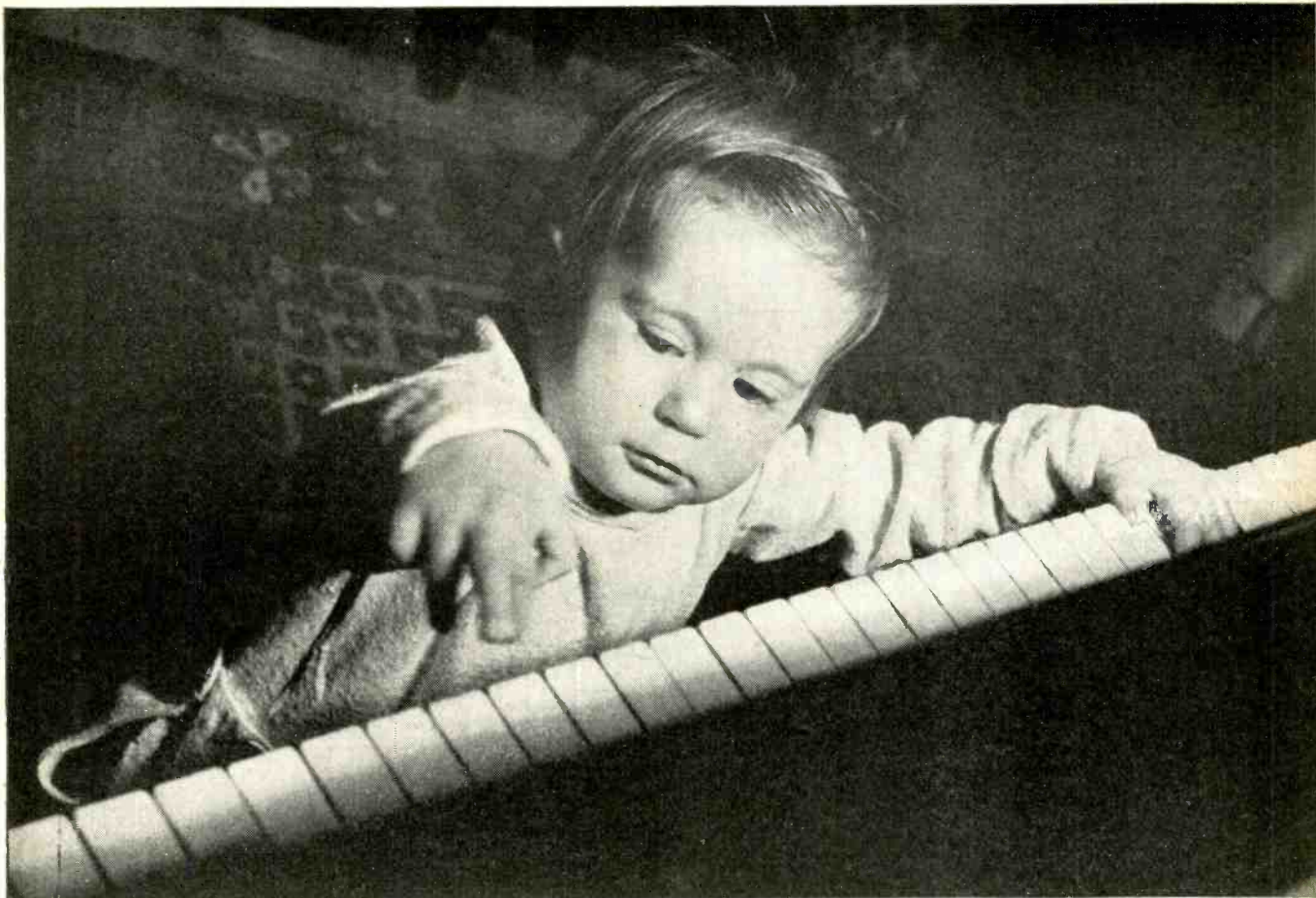
Technical Service Portfolio

Section L

TEST EQUIPMENT CIRCUITS—Part 10

Through the cooperation of test equipment manufacturers we are publishing a series of hitherto unavailable schematics of their instruments. The circuit diagrams will be published without technical comment in a series of "Portfolios" of which this is a part. Subscribers desiring publication of circuits for specific instruments should write to Editor, Radio Service Dealer, for issue priority.





We're Mighty Serious, too!



WAR is a grim business, even on the home front. And we here at Eastern are serious—mighty serious—about the job we are doing for Uncle Sam's fighting men.

Eastern equipment flies the sub-stratosphere gales over Tokyo in American Superfortresses—Eastern equipment rides the surging waves of the Pacific in those valiant little PT boats.

Eastern performance means Eastern leadership in the field of sound and electronic equipment. For we at Eastern are not new hands—we've been in the business since 1921—and some of us even longer

than that. With the coming of peace, Eastern will go further and further into the field of electronics—contributing — *still seriously* — to the development and growth of this, tomorrow's industry.

Our engineers are available for consultation on any amplification problem. Eastern will continue to apply its resources to designing and manufacturing war equipment until the day of Victory. Meanwhile, on request, we will send you the next of a series of articles on peacetime sound and electronic equipment, prepared by our engineering staff. Ask for Brochure 6C.

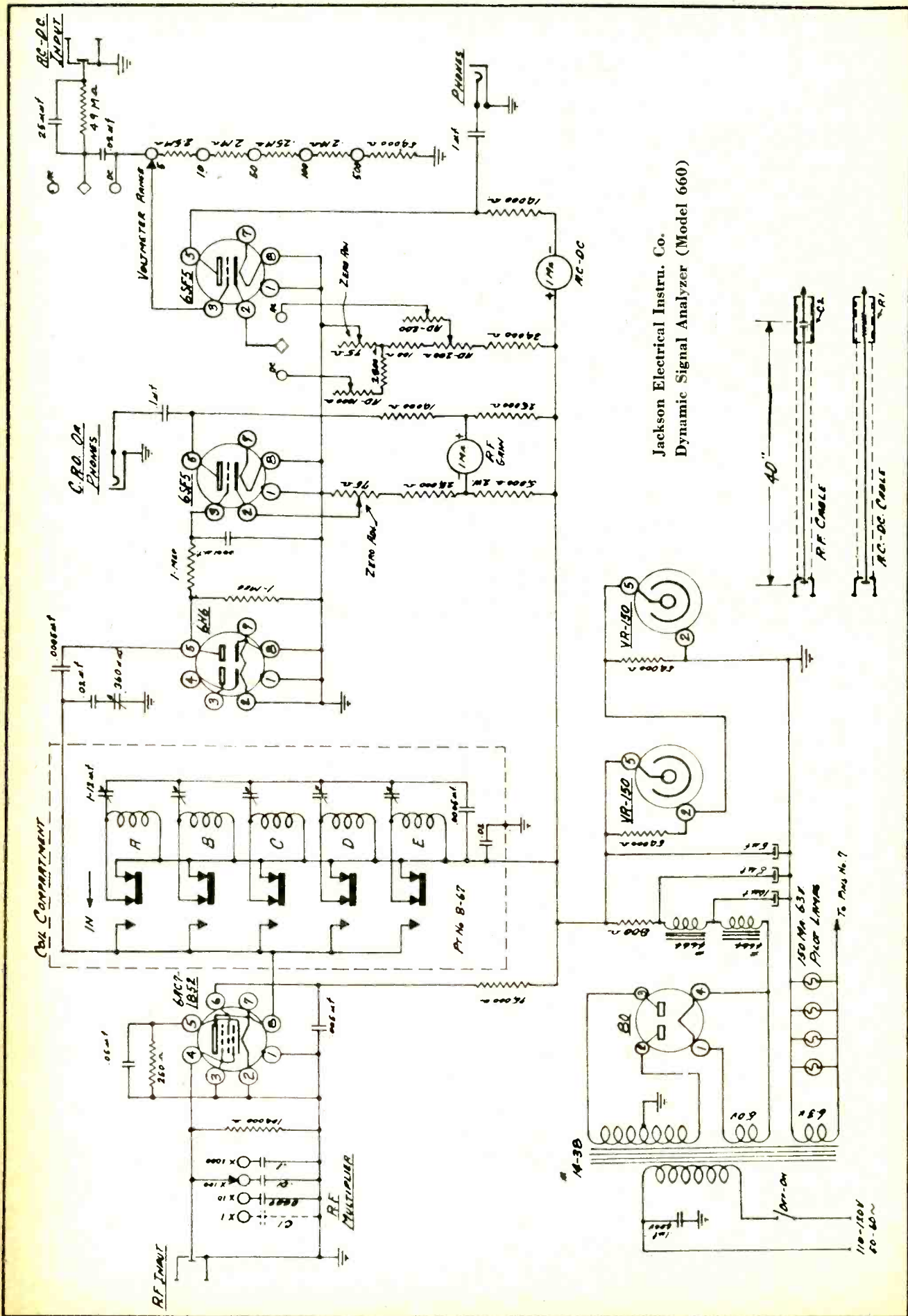
Buy MORE War Bonds



EASTERN AMPLIFIER
CORPORATION

U. S. Reg'n. Applied For

794 EAST 140th STREET • NEW YORK 54, N. Y.



Jackson Electrical Instru. Co.
Dynamic Signal Analyzer (Model 660)

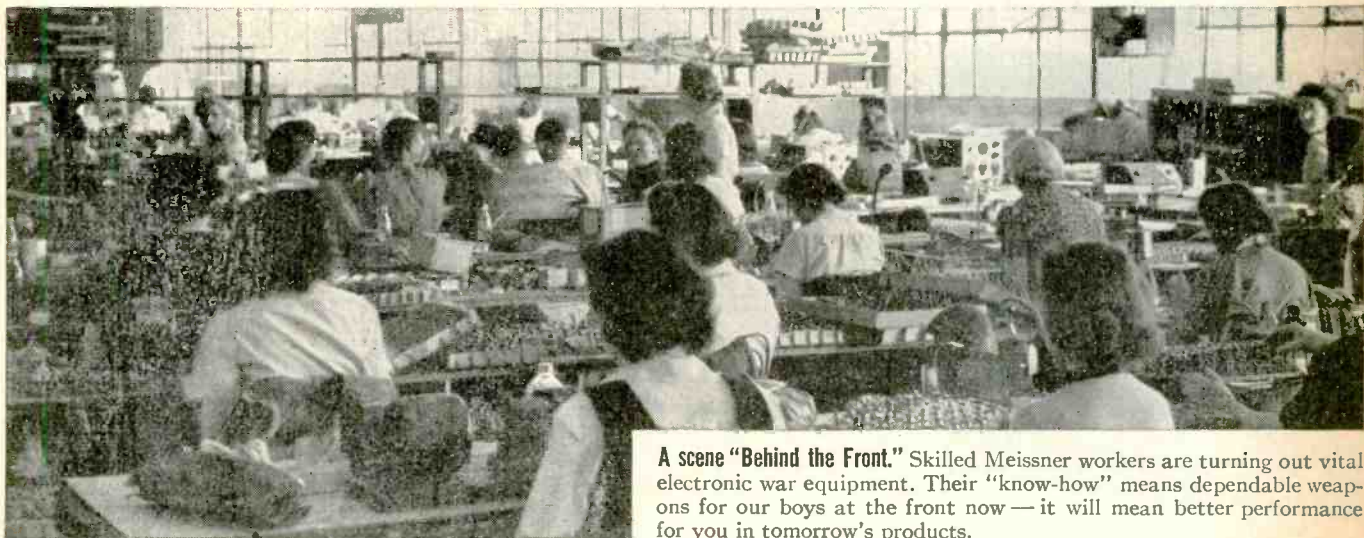




He has mastered his craft. Each movement of his sure, deft hands adds Meissner quality to the precision electronic equipment he builds. Dedicated to the armed forces today, tomorrow his skills will mean Meissner precision-built products for you.

MT. CARMEL HAS AN EYE TO THE FUTURE

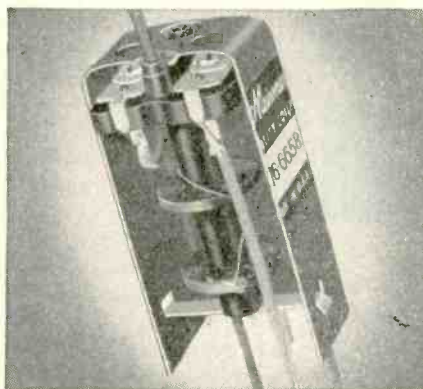
"Personnel" is an outmoded word in the little city of Mt. Carmel, Ill. Why? Because it has been replaced by "precision-el," a word that more aptly describes the men and women whose skills and enthusiasm produce Meissner precision-built products for a world at war and who will soon help rebuild a world at peace.



A scene "Behind the Front." Skilled Meissner workers are turning out vital electronic war equipment. Their "know-how" means dependable weapons for our boys at the front now — it will mean better performance for you in tomorrow's products.



They live in the future! Through their hands pass the work of Meissner's "precision-el," embodied in Meissner precision-built electronic equipment now going to our armed forces. Many of the parts they now handle as part of their daily routine will mean new comforts in postwar living.



"Step Up" Old Receivers!

These Meissner Ferrocart I. F. input and output transformers are getting top results in stepping up performance of old worn receivers. Special powdered iron core permits higher "Q" with a resultant increase in selectivity and gain, now available for frequency range 127-206. Ask for numbers 16-5728 input, 16-5730 output. List \$2.20 each.



MEISSNER

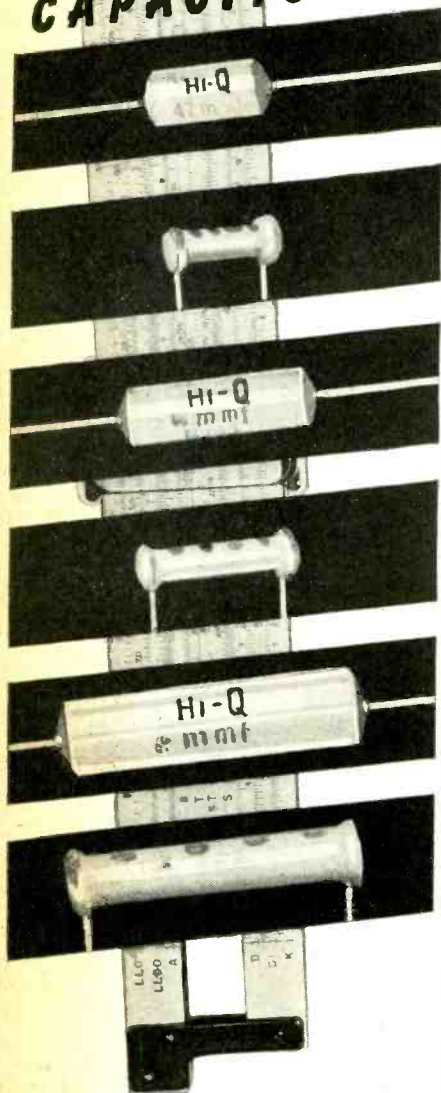
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ADVANCED ELECTRONIC RESEARCH AND MANUFACTURE
Export Division: 25 Warren St., New York; Cable: Simontrice

**ENGINEERED
TO THE
APPLICATION**

HI-Q

**CERAMIC
CAPACITORS**



**ELECTRICAL
REACTANCE
CORPORATION
FRANKLINVILLE, N. Y.**

RADIO service DEALER SURVEY

MORE LETTERS FROM READERS give views on the questions:

- 1. Shall Radio Servicemen and Technicians be required to undergo examinations as to their technical ability?**
- 2. Shall Radio Servicemen and Technicians be licensed or not?**

ALL GOD'S CHILLUN GOT LICENSES

by **H. W. SCHENDEL**

THE arguments pro and con on licensing of radio servicemen and technicians have been interesting and bring some added ideas to mind.

Before taking a strong stand in regard to licensing let us ask and answer ourselves fairly as to just what benefits will be ultimately derived and will the results be worth it in terms of liberty and freedom lost. To obtain a license for certain services there have been and still are cases where, regardless of education and skill, it is claimed several years of experience are necessary (this happens to be a state law) before a license can be issued. Much of that experience is gotten by way of serving as office boy, window washer, sweeper, and so forth (usually called apprenticeship) at an abnormally low wage.

Apparently the idea is to discourage applicants in every way possible and thereby lessen the number of license holders. Undoubtedly, this system excludes many would be competitors and, of course, allows the license holders to be very independent. Do we desire this type of system?

By pressing for and obtaining legislative regulations covering the licensing of radio services, and this covers a comparatively large group of men, we create a form of regimentation which eventually may include other groups of services. Do we want to be responsible for encouraging this form of regimentation and to give it a good boost?

If we convince government officials that the men repairing radio and other electronic devices should be examined and, if competent, licensed,

good logical reason follows that a man repairing any other single item should hold a license.

A license might be issued to cover the repairing or servicing of either one of the following: washing machine, refrigerator, vacuum cleaner, automobile, motorcycle, electric iron, camera, heating system, electric clock, painting, pair of shoes, or any one of quite a number of other articles—a separate license required for each!

Considering the customer's investment, at prewar prices a pair of good shoes sold at a higher price than some small midget radios. Therefore an incompetent repairman could damage any of the items enumerated to an extent fully equivalent to that possible on a radio set in a comparable price range. A careless act by an auto mechanic or gasoline station operator could cause damage to an auto far more costly to the customer than most

[Continued on page 54]

We would like to publish in full all of the many letters received from subscribers all over the country in response to our survey on the subject. But space permits printing portions of only a few examples which indicate a wide variety of viewpoints, and reveal again the will to eradicate many abuses in the field of radio servicing.

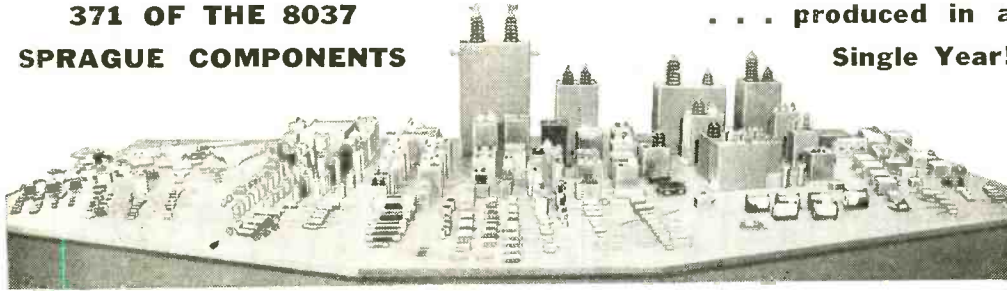
Numerous questionnaire returns are received daily. The returns will be tabulated and analyzed and the results published in one or more issues of RADIO service DEALER. Watch for future announcements.

SPRAGUE TRADING POST

A FREE Buy-Exchange-Sell Service for Radio Men



371 OF THE 8037
SPRAGUE COMPONENTS



... produced in a
Single Year!

Some idea of the extent of Sprague's war effort may be gained by the fact that it took only 365 days to produce 8037 types, sizes, and styles of Sprague Capacitors, Koolohm Resistors and other components such as those shown here. Many of

the types illustrated represent important engineering achievements which will mean still better, even more reliable capacitors and resistors for post war use. You can always count on Sprague for engineering leadership!

FOR SALE—V-0-M; neon condenser tester; 0-12 a-c voltmeter (blank face), headphones, and several new tubes, also 2-ampere tungar bulb \$60 for lot. Stanley J. Zuehora, 2748 Meade St., Detroit 12, Mich.

URGENTLY NEEDED—Midwest table radio, 11 or 16 tubes. D. C. Engberg SYC (ART) Barracks 9, N.A.T.T.C., Ward Island, Corpus Christi, Texas.

FOR SALE—Drake 60-watt soldering iron; Radio City 432 trouble shooter d-c V-0-M, 1000 ohms-per-volt, with instructions; Weston #267 surface mount 150v d-c meter; Franklin D-33-A set analyzer; ac-de V-0-M, analyzer and tube tester up to octal bases. Want oscillator. Brickley Electric Service, Farmland, Ind.

WANTED—Sig. gen. and Riders 6 to 13 also abridged manual 1-to-5. Daniel Grey, Kusssey, Iowa.

FOR SALE—EX326 Bogen amplifier, 40 watts, 110 v. a-c and 6v d-c. (auto battery) 2 mike—1 phono input built in turntable 33-78 rpm \$195; also RCP VTVM \$665 new \$100. Victory-Tryon Radio Service, 762 W. 181 st., New York 33, N. Y.

WILL TRADE—Sig. gen. multi-meter, meters, limited number of pre-war tubes; a-c turntable, used receivers. Want guns, power tools, cash or what have you? A. E. Hoagland, 2914 4th St., N., Arlington, Va.

WANTED—Late amplifier-turntable, about 20 watts, preferably mobile 110 a-c 6v d-c and accessories, 110 a-c amplifier and turntable with accessories or turntable and pickup. Neal H. Phelps, Springerville, Ariz.

WANTED—FM tuner and I.f. coils in good condition. H. H. Carfield, ART 1/c, Box 2, O.T.U. Radio, NAS Banana River, Fla.

FOR SALE OR TRADE—Supreme #85 tube tester and Master multimeter #410 Radio City Products—good condition. Want 35 mm camera equipment or high frequency equipment. S. Geller, 2521 W. Cold Spring Lane, Baltimore 15, Md.

URGENTLY NEEDED—Hallcrafters SX-24 or Sky Buddy S20R and Argus A2F 35 mm camera. Carl V. Seibert Jr. RM3/c (T) USNR; Radar Materiel School—Class 10-45 Fleet Service Schools; Norfolk 11, Va.

WANTED—Supreme #561, #582, or #582A sig. gen. or Supreme #529 frequency modulator. Also Sprague Tel-olmike. Leonard W. Jefferies, 1726 Prentiss ave. Portsmouth, Va.

WANTED—RCA station allocator #171 with or without tubes and batteries. A. D. Allison, Big Stone, Alberta, Canada.

FOR SALE—Oil-filled condensers, bath-tub and rectangular, all capacities & voltage ratings; 1, 2 and 3 deck switches, short shaft potentiometers & wire wound resistors; RCA 955 and 958 tubes, mica condensers and all sizes fixed resistors. Govt. inspected—new. Kurt Faehr, 3210 Arthington st., Chicago 24, Ill.

WANTED—#165R1 ballast tube and portable radio dry battery. Pfc. Walter Zambo 37586110, 806 T.D.E., Co. A., Co., Shelby, Miss.

WANTED—Billey LD2 crystal. John Phillips, Millarville, Alberta, Canada.

FOR SALE—Philo #80 tube checker with transformer adapted for 117v type tubes. \$40. Frank Bou, 3131 N. Percy st., Philadelphia 33, Pa.

FOR TRADE—110 v. a-c generator 500 watts. Want radio test equipment, P-M and television receiver, communications receiver amateur and aircraft transmitter and recorder-amplifier. K. H. Stello, 925 Monroe st., N.E. Washington 17, D.C.

FOR SALE—Triumph condenser-bridge analyzer #500, \$25. R. M. Booth, Lamar, Colo.

WANTED—Chassis for #6157 Silvertone with or without speaker and tubes. Fred W. Rosenberg, 19 Pearl ave., Oil City, Pa.

WANTED FOR CASH—Rider's #5 and 13. Davis Radio Service, 321 E. Maple st., Luverne, Minn.

FOR SALE OR TRADE—New electric welder complete with accessories and supplies. \$20. Want tubes, supplies or radios and phonos. M. Levegood, Palmyra, Pa.

WANTED—Superior channel analyzer; power transformer at 600 plate volts 6.3 filament & 2 amps. rectifier, 5v., 2 amps; and following tubes: 25L6, 6A8, 6K7, 6Q7, 6F6, 47 and cathode ray tuning unit for 6E5 or 6G5. Joseph F. Carter, Holcomb, N. Y.

FOR SALE—Radio-Photo Shop with 1945 test instruments, Triplett tube checker, Superior PB-200 multimeter, Cameras, movie projector, paper, films, etc. Kowell Sales and Service, 1640 Steiner ave., Birmingham 7, Ala.

WANTED—All-wave sig. gen.; single multi-purpose meter and emission tester with instructions; radio magazines, Feb. 1937 Service, 1933 Electronics and earlier. Wavie Marsh, 1315 Fifth ave., S., Decatur, Ala.

WANTED—Sig. gen. 100 k.c. to 30 m.c. to operate from self-contained battery. George Lane, Clarendon, Ark.

FOR SALE—Tubes, condensers, resistors, transformers, speakers, volume controls, etc. Standard parts at 40 to 70% discount. Write for catalog. Grey's Radio & Sound, Inc., P. O. Box 46, Bridge-water, Conn.

FOR SALE—All-wave sig. gen. Radio City Products #702. Want tube tester. Trade or cash. S. B. Leighton, Quinter, Kans.

WANTED—Vacuum tube volt-ohmmeter and tube tester. Stan Parker, 2125 W. Jefferson Blvd., Los Angeles 16, Calif.

FOR SALE—Clarion 28-watt amplifier using 6L6's \$80. Want radio for 1940 Ford. A. R. Dayes, 20 Charles st., Merrick, N. Y.

WANTED—Rider or Meissner channel analyzer equipment; all wave sig. gen. Philco 030 sig. tracer and tube checker. Edw. Vockeroth, 1746 N. Campbell ave., Chicago 47, Ill.

FOR SALE OR TRADE—30-watt P.A. system with Xtal mike and 8" PM speaker. New 9001, 9002, 897, 812 and 866 tubes, also SA7, 12SQ7, 50L6GT and other tubes for good multimeter and Triplett 0 to 1 ma. 3" meter. R. Voigt, 1721 Arizona ave., Flint 6, Mich.

WANTED—Sig. gen.; tube tester, traceo-meter; V-0-M or VTVM and Hallcrafters Sky-Buddy. E. H. Mauch, 813 Parker ave., Aurora, Ill.

FOR SALE—Tubes at O.P.A. ceiling. Send for list. Goodwin Radio Shop, Rankin, Ill.

WILL TRADE—Sonora and Emerson port-ables for meters, small communications receiver or what have you? Lt. Harold McLean, C.A.A.F., Childress, Texas.

WANTED—V-0-M, ac-de.; sig. gen.; tube tester and other test equipment. Dick Groux, Columbia Falls, Mont.

FOR SALE—Superior Channel analyzer with instructions and diagram, \$20. Staheor isolating transformer P-6160, \$6. R. D. Haskell, Youngstown, N. Y.

FOR SALE—Philo #014 station setter; #088 battery-operated sig. gen.; #055 Audio Oscillator and Supreme Audolyzer #562. R. R. Bowers, 126 E. 4th st., Frederick, Md.

WANTED—Set analyzer, full size or vest pocket Weston. What have you? Fred Krueger, 8116 Quincy ave., Cleveland 4, Ohio

WILL TRADE—Detrola Peewee for Echo-phone EC-1 communication receiver. Samuel Sanjora, 252 W. Maple st., Ambler, Pa.

FOR SALE—American #4102 tube and set tester with capacity checker and all multimeter checks. Also Supreme #89 tube checker. J. Kravetz, 4410 New York ave., Union City, N. J.

WANTED—25B8GT, 70L7GT and 2 six prong coils 100-570 meters. Norman G. Johnson, 13 Pleasant st., Proctor, Vt.

WILL TRADE—Supreme #400 tube and set tester with new tube chart, Triplett tester, oscillator, free point testing in-structograph Jr., special tubes, oscillator, & key, 50L6, 35L6, 25L6, 12SQ7, 12SK7, 80, 5Y3 tubes. Want outdoor motor and garage equipment. D. A. Carmack, 228 N. Balph ave., Pittsburgh 2, Pa.

SEND US YOUR OWN AD TODAY!

For almost three years now, the Sprague Trading Post has been helping radio men get the materials they need or dispose of radio materials they do not need. Literally thousands of transactions have been made through this service. Hundreds of servicemen have expressed their sincere appreciation of the help thus rendered.

Send your own ad to us today. Write **PLAINLY** — hold it to 40 words or less — confine it to radio materials. If acceptable, we'll gladly run it **FREE OF CHARGE** in the first available issue of one of the five radio magazines wherein the Trading Post appears every month.

HARRY KALKER, Sales Manager.

Dept. RSD-65, SPRAGUE PRODUCTS CO., North Adams, Mass.

Jobbing Distributing Organization of Products of the Sprague Electric Co.

SPRAGUE CONDENSERS KOOLOHM RESISTORS

TM, REGISTERED U. S. PATENT OFFICE

Obviously, Sprague cannot assume any responsibility, or guarantee goods, services, etc., which might be exchanged through the above advertisements

Design Counts



Remember the old flatiron? It did its job, of course; but just compare it with the modern electric iron which has been brought to its present high level of utility by careful application of design.

Here at THE WARD PRODUCTS CORPORATION, design is one of the most carefully considered factors in the manufacture of antennas. It is only through superior design that durability, styling and the benefits of superior production can be best brought to the user. For the finest antennas for all applications — for home and automobile use — look to WARD.

Back Again . . . Soon
WARD Aerials
"World's Finest for Car and Home"

WARD

Antennas

BUY WAR BONDS
THE WARD PRODUCTS CORPORATION
1523 EAST 45TH STREET • CLEVELAND, OHIO

In Trade

[from page 14]



G.E. Promotes Scaife

C. R. Pritchard, general sales manager, announces appointment of A. L. Scaife as advertising and sales promotion manager of the General Electric Company's appliance and merchandise department, Bridgeport, Conn.

Scaife will be responsible to Mr. Pritchard. He succeeds B. W. Bullock, who has resigned, and will continue to serve as merchandising

manager for the department. In his new capacity, Scaife will be in charge of all advertising, sales promotion and merchandising plans connected with the sale of G-E major appliances, traffic appliances and construction materials.

Scaife joined the General Electric Company 15 years ago in the advertising division of the former specialty appliance department at Nela Park, Cleveland. In 1936 he became advertising and sales promotion manager of that division. When specialty appliances were combined with the company's other appliance lines at Bridgeport in 1939, he was named merchandising manager of major appliances and subsequently of the entire appliance and merchandise department.

Promotions in Noblitt-Sparks

A. D. (Duke) Silva is director of the new Arvin Electronic Research Laboratory and Ben H. Irwin is promoted to replace him as chief engineer of the Arvin Radio Division, announces Q. G. Noblitt, president, Noblitt-Sparks Industries, Columbus, Indiana. Commenting on these advancements G. W. Thompson, vice-president and director of sales for

HATRY & YOUNG

announce

2 NEW STORES

IN WATERBURY and STAMFORD

HATRY & YOUNG SERVICE MAP
ELECTRONICS FOR ALL CONNECTICUT

Add two new stores to the four already established, and you have Hatry & Young's picture of ELECTRONICS FOR ALL CONNECTICUT, with every major trading area in the state now covered and serviced.

Electronics Specialists Consultants • Expeditors

Arvin Products, had this to say in part: "Noblitt-Sparks is preparing to enlarge its activities in the field of electronic research, particularly as it relates to frequency modulation and television. With Duke Silva directing those activities we have a man with a wealth of experience that goes back to the beginning of the radio industry—a man who is well-equipped to keep our radio and television engineering guided right."

"Newsfront" Started

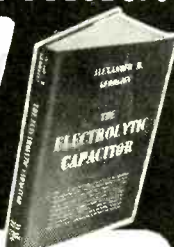
The first issue of Westinghouse NEWSFRONT, a new monthly publication by the Westinghouse Electric and Manufacturing Company, arrived in April. The four-page report, printed in two colors and illustrated with drawings and photographs, will contain short articles describing the latest achievements by the company in the fields of scientific research, engineering and production.

Requests to be placed on the mailing list should be addressed to the Editor, Westinghouse NEWSFRONT, 306 Fourth Avenue, Box 1017, Pittsburgh, Pennsylvania.

[Continued on page 60]

ALL THE FACTS ON A LITTLE KNOWN SUBJECT.

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"The ELECTROLYTIC CAPACITOR"

Don't buy, specify, use, or replace Capacitors blindfolded! Save time, save money, and increase your service efficiency by really knowing all about this vital subject! Actually, no Radio-Electronic component is more important or less understood than the Electrolytic Capacitor. Postwar equipment will employ more of them — and in new, improved types. This new book by Alexander M. Georgiev for more than 15 years a leader in Capacitor research and development, at last explains the entire subject. Answers all the many questions servicemen, engineers, and designers have been asking about capacitors for years.

ENDORSED by A. A. GHIRARDI

"I heartily recommend The Electrolytic Capacitor as 'must' reading for the man who really wants to forge ahead in post-war Radio-Electronics", states A. A. Ghirardi, internationally famous technical author. "It tells what types to use and where, and how to use them to best advantage — explains the advantages and disadvantages of each — how to make emergency repairs and a host of other subjects invaluable to the man who KNOWS it pays to KNOW." Contains over 200 pages and eighty illustrations. Price only \$3 (\$3.25 foreign).

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Saves You Time on 4 Jobs Out of 5

Don't confuse A. A. Ghirardi's 3rd Edition **RADIO TROUBLESHOOTER'S HANDBOOK** with books on servicing theory! It simply isn't that kind. You don't study the **HANDBOOK!** You just look up the Make, Model, and Trouble Symptom of the Radio to be repaired — and go to work! **TELLS EXACTLY WHAT TO DO!**

Clear instructions tell exactly what the trouble is likely to be — **EXACTLY** how to fix it. This big, 4 pound, 744-page manual brings you quick, specific repair data for every radio in use — over 4,800 models of Home and Auto Radio receivers and Automatic Record Changers of 202 manufacturers! Pays for itself the first time you use it. In

addition, there are hundreds of pages of repair charts, data on tuning alignment, transformer troubles, tube and parts substitutions, etc. etc. — all indexed for quick easy reference.

WE'LL PROVE IT

The **HANDBOOK** is the ideal book for training new helpers, repairing either cheap or expensive sets profitably, substituting tubes and parts accurately, eliminating useless test time and equipment. Because it helps you fix **TWO SETS IN THE TIME YOU'D NORMALLY TAKE FOR ONE** it's every bit as valuable as another helper in your shop — and we'll prove it! Send for the book now! Let it work for you for 5 full days. If not more than satisfied, return it and we'll refund every cent of your money. Take us up on this offer now!

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trouble checks; circuit and parts analysis; parts repair, replacement, substitution; obscure troubles; aligning and neutralizing; interference reduction — and **HUNDREDS** of other subjects including How to Start and Operate a Successful Radio-Electronic Service Business. 706 illustrations; 720 self-testing review questions. Only \$5 complete (\$5.50 foreign)

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Enclosed find \$1.00 for books checked; or [] send C.O.D. (in U.S.A. only) for this amount plus postage. If not fully satisfactory, I may return the books at the end of 5 days and receive my money back.

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Name

Address

City & Dis. No. State

(Please print or write plainly.)

SURVEY

[from page 50]

incompetent radio service. Even competent men do make serious mistakes which the customer has to pay for one way or another if the business is to continue.

Will licensing guarantee to the customer: That no mistakes will be made or, if made, their cost of correction will never be passed on to him or other customers to pay; that the licensee has that extremely hard to measure quality of skill and resourcefulness as well as good judgement on the other commonly accepted requirements; that there will be no incompetents; that the licensing arrangement will not be used as monopoly tools to gouge his pocketbooks.

A few services, such as electricians, plumbers, and horologists (usually only watch repairing) already have established licensing systems in some towns, cities, and states. Why not try to conduct some unbiased investigation of these systems on a basis that can be compared to radio service to ascertain if advantages to all con-

cerned outweigh costs and disadvantages? The much commented about article on watch repairing in "Reader's Digest" may not include a sufficient number of *licensed horologists* to give an accurate picture of the situation.

The past results of conditions concerning "screwdriver mechanics" (and incompetent servicemen) also have been such that most poorly done repair jobs eventually get to the competent serviceman, giving him extra work. Will licensing guarantee, that the customer will not attempt repairs himself or will not let some friend do the work for a favor in kind?

In prewar days most customers knew of good servicemen yet many would try someone else first. Will licensing reeducate the customer?

UN-AMERICAN . . .

I vote "no" on licensing radio servicemen and technicians. The screwdriver radio repairman, the shade-tree auto mechanic, the hammer-and-hatchet carpenter, and all such self-trained tradesmen and mechanics-in-the-making have their rightful place in the American way of life, and any infringement or attempt to eradicate such from

our midst is very un-American, and is uncalled for.

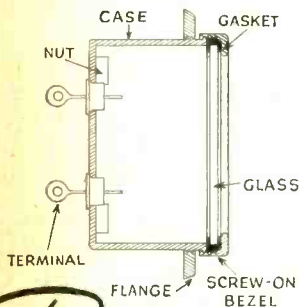
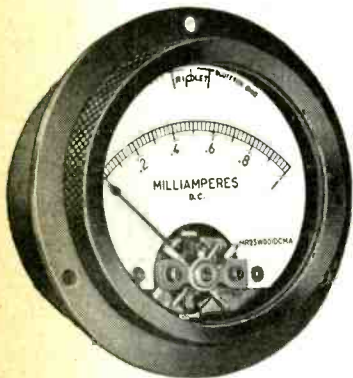
Our great advance in the sciences is the result of curiosity and untiring work among the young and uninitiated workers who really had no formal technical training and did their work at home, being referred to by their neighbors and friends as "screwdriver" mechanics . . . Did any of the following men need the aid of licensing? Edison, Ford, Whitney, McCormick, Goodyear—or thousands of others who have made great discoveries by their investigations in uncharted fields? I can see so many possible unfavorable results from licensing, and so few claimed advantages, that I am against it 100 per cent.

C. R. Truitt, Mo.

WILL NOT RAISE TRADE STANDARDS

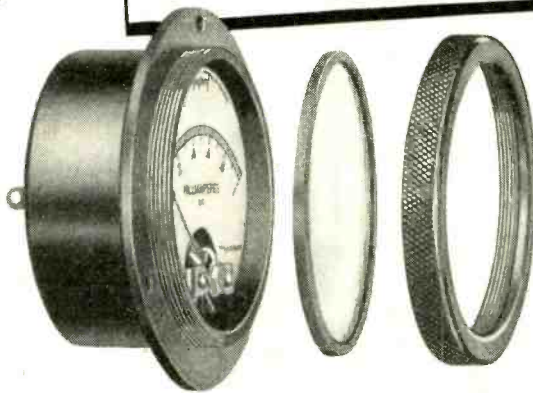
If licensing is controlled by state or city or county, it will become a racket. Anyone could get a license if he knew the "right" parties in power . . . It is the problem of a club, organization or association of radio dealers or Better Business Bureaus to root out the unethical fellows. I am a member of the National Radio Institute . . .

M. F. Giedeman, Pa.

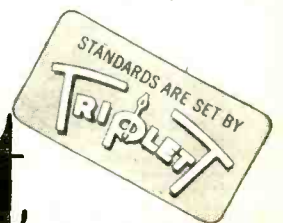


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...to last*

Introducing the NEW TRIPLETT LINE of HERMETICALLY SEALED INSTRUMENTS



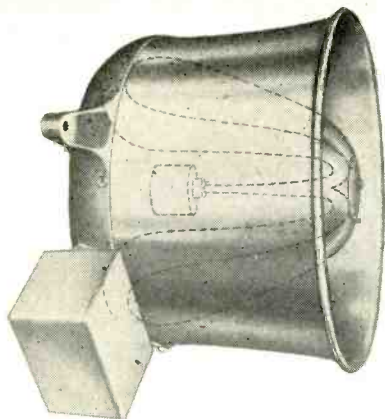
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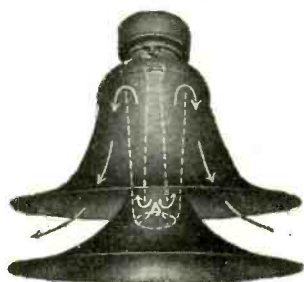
RADIO SERVICE DEALER



Left—MARINE SPEAKER; approved by the U. S. Coast Guard, for all emergency loudspeaker systems on ships. Re-entrant type horn. Models up to 100 watts. May be used as both speaker and microphone.



Right—RE-ENTRANT TRUMPET; available in 2½-3½-4½-6 ft. sizes. Compact. Delivers highly concentrated sound with great efficiency over long distances.



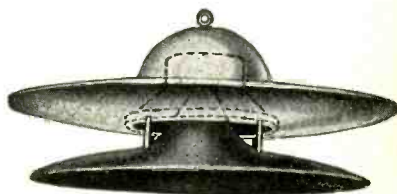
Left—RADIAL HORN SPEAKER; a 3½' re-entrant type horn. Projects sound over 360° area. Storm-proof. Made of RACON Acoustic Material to prevent resonant effects.



Right—AEROPLANE HORNS; super-powerful and efficient P. A. horns for extreme range projection. 9-4 and 2 unit Trumpets available.



Left—PAGING HORN; extremely efficient 2' trumpet speaker for use where highly concentrated sound is required to override high noise levels. Uses P.M. unit.



Right—RADIAL CONE SPEAKER; projects sound over 360° area. Cone speaker driven. Will blend with ceiling architecture. RACON Acoustic Material prevents resonant effects.

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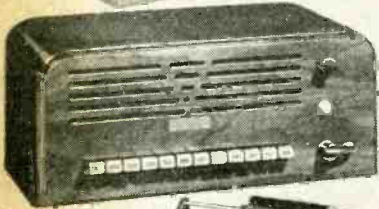
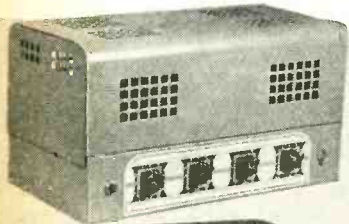
FOR EVERY PURPOSE

Concord's full line of Amplifiers range up to sizes covering 200,000 square feet indoors or 75,000 square feet outdoors. A complete line of speakers, microphones, and all essential equipment is also available.

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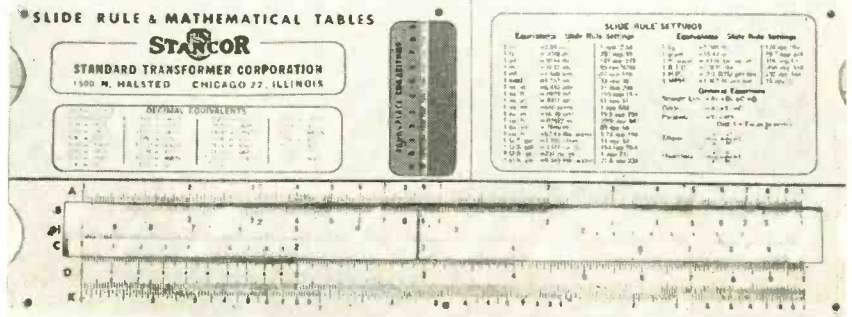
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TRADE PRODUCTS



Stancor Slide-Rule

Mathematical demands upon electronic designers and technicians at Standard Transformer Corporation were so endless that extreme need dictated a new, compact compendium of tables all in one rule. Now we have all the values of the regular slide rule plus 8 mathematical tables, thus practically dispensing with all need for book reference.

As a service to the trade the company will place the rule with its jobbers throughout the country for distribution. Orders should not be sent to Stancor direct. There is a nominal charge of \$1 for the Multi-Slide Rule and carrying case.

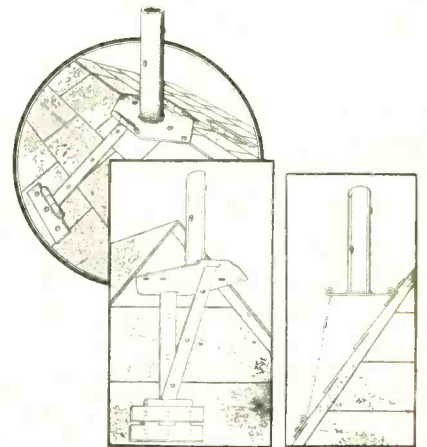
Portable Oscilloscope

E. E. Williams, sales manager, specialty division, General Electric Electronics Department, announces a new portable oscilloscope. Type CRO-3A is built for accurate and rapid maintenance work, and is designed especially for industrial and radio uses. It can be used for the study of wave shapes and transients, measurement of modulation adjustment of radio receivers and transmitters, the determination of peak voltages, and the tracing of electronic tube characteristics.

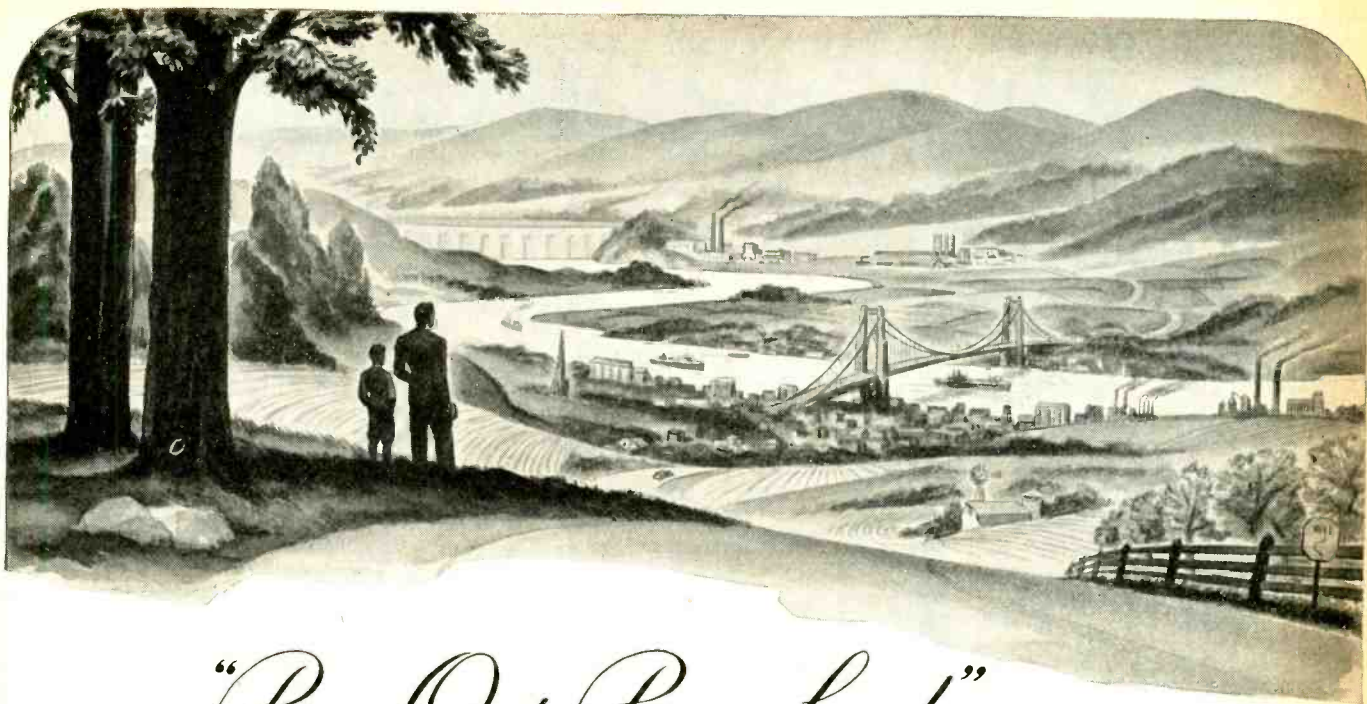
The unit is equipped with a 906-P1 cathode-ray tube which has a greenish screen that can be viewed in daylight. A unique special design removes the a-c ripple from the a-c transformer field and gives a sharper and more clearly defined signal picture. Moderately high-speed traces can also be photographed on this screen. It has a wide range sweep circuit featuring a linear amplifier. Sweep rates from 10 to 30,000 per second, adjustable by a 7-point vernier switch. A specifications sheet on the unit is available on request to the G-E Specialty Division, Schenectady, N. Y.

Antenna Installation

Anticipated FM and television receiver set sales warrant simplification and standardization of antenna installations for these sets. Time and the saving of time is a money-making factor to the radio serviceman. In prewar days, the installation of an FM and television antenna took many hours, and often a full day. Conditions found about a house make many an antenna installation almost an engineering problem in itself, taking more time than anticipated. Shur-Antenna-



Mount, Inc., Sea Cliff, N. Y., announce the development of a mount that is flexible, quick to install and substantial enough to support any domestic FM and television antenna. Experimental installations indicate that a standard dipole can be installed on a typical small home rooftop in around 20 minutes. This means that service dealers may be able to develop a standard antenna installation charge. These mounts (see illustration) will be adaptable to any size uprights, which can be anchored in the holder with three screws fitted 120 degrees apart and distributed evenly up the length of the sleeve.



“Ring Out, Brave Land”

...LET'S CREATE NEW MARKETS

Only by the creation of new markets, can we, as a nation, keep a high standard of living.

No longer is it sufficient to exploit only the existing markets, many of which are already worn thin. To create new markets should be the goal of all Industry—not only from a sense of duty to the peoples of this country, but from a plain common-sense dollars and cents viewpoint.

One of the best and surest ways to accomplish the most good for the nation—and more sales for the electric appliance industry—is the intensive development of our natural resources.

THE TVA PLAN HAS SHOWN THE WAY

It's hard to put TVA into words. It is not just the generation of electric power, nor flood control alone, or merely soil conservation. All these are a part of TVA—but basically it is the growth of a people and the growth of the soil they live on. It has metamorphosed a stunted region and backward people into a new economy—profitable both from a humane as well as a commercial standpoint.

Cheap electricity, a prime result of TVA, has been one of the important elements that have enabled the people of the TVA region to become prosperous and to lead a life more in keeping with the American way. And inevitably, it *created an entirely new market* for the sale of electrical appliances and machinery.

A market, for instance, that showed a 374% increase in the sale of electric ranges over the preceding year; water heaters by 774%, refrigerators by 329%! This, from a former undeveloped “poor market” area!

Every one of the electric farm machines, washers, refrigerators, ranges, radios and other appliances that went into the Tennessee Valley provided work and income for the dealers, distributors and service men who sold, installed and maintained them; jobs and profits for the workmen and manufacturers who produced them—Yes and for you and us.

ESTABLISH A MISSOURI VALLEY AUTHORITY

Now that TVA has shown the way, what is more logical than to follow up with an MVA? The Missouri River Basin, about one-sixth of the land area of the nation, has problems similar to the Tennessee Valley. It presents a definite challenge to a forward-looking nation. *And an unprecedented profit opportunity for the manufacturers of electric machinery and appliances!*

So let us urge Congress to set up a Missouri Valley Authority to develop all the resources of this vast region for the benefit of all the nation. Let us urge Congress to act immediately, so that when the war is over, the plans will have been made, and we can go forward. For further information, send for free booklet.

*First of a series of advertisements
designed to encourage the
creation of new markets*



**GENERAL TRANSFORMER
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Money Back Guarantee on this all-purpose

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Handles AC and DC Voltmeter, DC Milliammeter, High and Low range Ohmmeter. Size 5½x8x3¼. 3" meter with sturdy D'Aronsvall movement. Write for priority information.

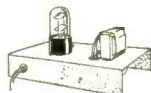
See Leo for WRL Radio Kits priority required



Model WRL 300 ONLY \$18.75 Less Leads



Phono Amplifier Kits Complete with tubes, instructions. **\$9.50** No. 1059...



Code Oscillator Kits Complete with tube, Size 3"x6". **\$4.95** No. 66-200

OUTPUT TRANSFORMERS

15 watt P.P. 6L6 output. To 4 ohm V.C. or 500 ohm line. Fully shielded. No. 9-649. **\$1.65**

FIL. TRANSFORMERS Fully Shielded

110 V. Tapped Primary. Secondary, 5 volt @ 3 amp. and 6.3 V.C.T. @ 4 amp. **\$2.25** No. 9-551

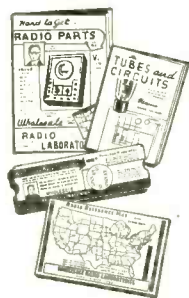
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Packed with hard-to-get items. Immediate delivery to radio repairmen. Usual priorities. Experimenters write Leo, W9GFQ, on how to get radio repair parts.

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- I want a Tube-Base calculator. 25c enclosed.
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I am an amateur; experimenter; service man.

QUICK SERVICE

Your order will receive my own personal attention. You'll get "same day" delivery service from the heart of the nation . . . on anything in radio.

Sincerely,
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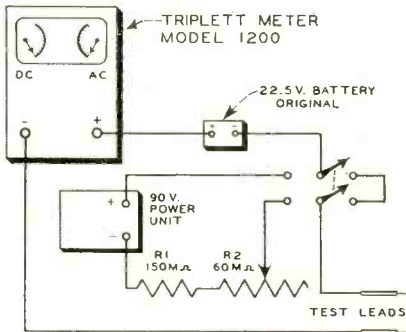


Figure 1

TO INCREASE OHMMETER READING

Those of you who are using Triplet Meter model 1200 can increase the reading to 15 megohms by following the diagram (Fig. 1). When the D.P.D.T. switch is in the 15 meg. position, short test leads together and adjust R2, until meter reads full scale. Note that ohms selector switch must be in the 0-3 position. To measure a resistor, multiply your reading by five and the answer will be the resistance of the unit under test.

Jim's Radio Shop, Kan.

1A7 TUBES

Weak 1A7 and 1A6 tubes may be made to oscillate satisfactorily by increasing the value of the screen resistor to about 75,000 ohms.

Spears Radio Service.

ALL RADIOS

Be on the lookout, on older models, for those that have the grid leads coming through the stator plates of the tuning condensers to the top of the tubes. The Apex 32 is an example, also the 7-A Gloritone.

I frequently find a high resistance between the ends of the stator plates on these and similar sets. This greatly reduces sensitivity and selectivity. The remedy: shunt the stator plates with a good piece of insulated hook-up wire. Before this is done, however, the leads should be disconnected and a high voltage (300 to 500 volts) connected to the gang-tuning condensers. Then rotate condensers back and forth to burn any oxide or scale that may have formed on the plates.

Jim's Radio Shop, Kan.

ZENITH 4-B-106 AND OTHER SETS USING TYPE 15 TUBES

If the Type 15 oscillator tube fails in these 6-volt radios replace with a Type 36 as follows: Remove dial lamp leads and connect directly to 6-volt supply. Use a No. 47 lamp in the Zenith model. Disconnect the high side of oscillator

tube heater and connect directly to 6-volt supply. Use a Type 36 tube in this socket. Change cathode resistor to one 4000 ohms or shunt the original one with a 7000-ohm resistor. This will take care of the oscillator changes. The Type 36 tubes give better performance than the Type 15 tubes in these sets.

The other Type 15 tube heater circuit should also be changed to operate from the 6-volt supply. To do this simply connect an 18-ohm, 1-watt wire-wound resistor in series with the heater in place of the original series heater resistor.

Jim's Radio Shop.

SILVERTONE MODEL R1181

This model has a .005 mfd. condenser connected across the high voltage secondary of the power transformer. This is unusual since it is not a vibrator-powered radio but operates from the 120-volt 60-cycle current. If the radio receives but has a continual frying sound, replace this condenser with a 1,600-volt unit or leave it out if none is available—as it does not seem to affect the operation of the set.

Ralph Hunter.

SERVICEMEN ATTENTION

50L6, 12SA7, 12SQ7, 25Z5, etc. Forget the shortage of above and similar tube types by availing yourself of our tube repair service. Tubes are fully tested after repairing in radios. Send no money. Repaired tubes returned C.O.D. Only 25c each or 20 tubes repaired for \$4.00. Ship us a boxful today and take advantage of our low price. Minimum order \$2.00.

RADIO REPAIR DEALERS avail yourself of our expert radio service. Radios repaired and on their way back to you usually within 48 hours after arrival. 30% discount to dealers.

FINEST RADIO SERVICE

307 Pipestone Benton Harbor, Mich.

WANTED Asst. Sales Manager

Must have jobber sales experience — radio and allied lines preferred but not necessary. Old line company doing \$6,000,000 per year. No reconversion problems. Sales organization already established. Management wishes to strengthen sales organization and our personnel all know of this ad. Write or wire immediately.

Radio Service Dealer. Box 514

MAY WAS IMPORTANT . . .

JUNE *decisive!*

JUNE
4th
MIDWAY
DAY

JUNE
6th
NORMANDY
DAY

JUNE
14th
FLAG
DAY

JUNE
17th
FATHER'S
DAY

JUNE
30th
OVER-THE-QUOTA
DAY

IN THE RETAILERS' 7th WAR BOND INVASION!

With May gone and only June to go, *it's now or never* in the Retailers' Bond Program. The 5 red letter days above are your battle calendar for victory in this mammoth drive to push up "E" Bond sales over the last drive by a terrific hard-to-make 60%! All can be made peak days for Bond sales!

So pull out all the stops, Retailers, and give her all you've got with

- ▶ More employee Bond buying. Each has his own personal quota to make in the 7th.
- ▶ More Bond advertising. This means fighting newspaper ads, punchy radio copy, hard-hitting window and interior displays, attractive Bond booths.
- ▶ More employee Bond selling. With a \$500 quota per employee, this is going to take briefing before each calendar objective, frequent rallies and contests—all to quicken the selling pace.

Yes, it's now or never. So let's make every minute of every hour of every day from now 'til June 30 fight for the success of the Retailers' 7th War Bond Invasion!

The Treasury Department acknowledges with appreciation the publication of this message by

Radio Service Dealer



Bendix Election

Ernest R. Breech announces the election of Raymond P. Lansing as a director of Bendix Aviation Corporation, following a meeting of the board. Mr. Lansing replaces G. A. Rent-

schler whose resignation was accepted at the meeting. He is a vice president, and group executive of the corporation, and a member of its administration and engineering policy committees, it was stated.

In Trade

[from page 53]

WPB on Tubes

The Radio and Radar Division has recommended to WPB's Committee for Period One—the period between the end of German resistance and the surrender of Japan—L-265 should be revised to permit unrestricted production of components, including tubes for replacement purposes and all electronic and equipment except broadcasting, receiving and reproducing equipment for entertainment purposes. During this period, rating assistance would be extended to the additional production authorized by the revision, except for replacement parts.

Under the Radio and Radar Division's plan, L-265 would be revoked when scheduled military requirements recede below 75 per cent of the delivery rate for the first quarter of 1945 and a two-band rating system would be continued to assure preference for military and highly essential civilian requirements over other civilian deliveries.

Because component production is completed two or three months in advance of end-equipment deliveries, the plan approved by the industry advisory committee calls for making the revision and the revocation effective three months in advance of the month in which military requirements are scheduled to reach stated reduced levels.

By the method of relaxation outlined above, the following purposes will be served, as reported by the National Electronic Distributors Association:

1. Practically unrestricted sale of such components as are needed for repair and replacement purposes.
2. The needed protection of military production will be accomplished.
3. Production and distribution of a very limited quantity of non-military end equipment will be channeled into the most essential uses.
4. The above results will be accomplished with a minimum of paper work.

In establishing the revision and revocation levels allowance has been made for an anticipated 10 per cent loss in productive capacity due to loss of wartime workers, less overtime, lowered morale and decreased efficiency due to shifting of contracts after V-E Day.

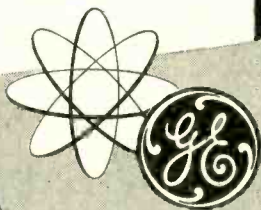
G-E TUBE CHECKER

Quick, easy, accurate tube checking which saves you time and trouble and keeps your customers happy—that's the job the TC-3P is built to do. Line Voltage and tube quality, or shorts, may all be checked on one selector switch. Individually operated switches permit placing the proper voltage on the proper pin of the tube. The G-E Tube Checker is available in either the Portable (TC-3P) or Counter Model (TC-3). Write: Electronics Department, General Electric, Schenectady, N. Y.

GENERAL ELECTRIC

177-01

Electronic Measuring
Instruments



TC-3P



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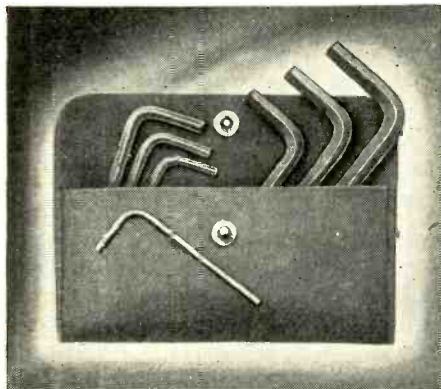


ALLEN Key Kits

Key Assortments to fit Hex-Socket Screws in the range of sizes the radio mechanic needs for everyday work.

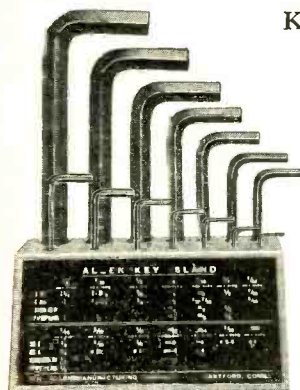


KEY SET No. 603: This canvas partitioned bag contains 11 short arm hexagonal keys which fit all screws from and including No. 10 up to and including 1 1/4" diameter set screws. List price \$1.75.



JUNIOR KEY KIT No. 604: Seven short-arm Allen Keys are included in this strong leatherette envelope. They fit the hex holes of sizes Nos. 8, 10, 1/4", 5/16", 3/8", 7/16" and 1/2" set screws and Nos. 4, 5, 6, 8, 10, also 1/4" and 5/16" cap screws. List price \$0.50.

KEY ISLAND



This handy key set contains 14 keys fitting all sizes of set screws up to and including 1 1/4"; cap screws up to 1"; shoulder screws to 1" and pipe plugs to 1". Container is plainly labeled to show the correct size key to use with each screw. No. 615; list price \$2.35.

Ask for complete listings of Allen Hollow Screw Assortments and Key Kits. Address inquiries and orders to Dep't. G.

**THE ALLEN MFG. CO.,
HARTFORD 1, CONN., U. S. A.**

Television *[from page 35]*

to 50,000 people. The stations and receivers are distributed as follows:

New York	3 stations	5000 receivers
Philadelphia	1 station	1200 receivers
Schenectady	1 station	450 receivers
Chicago	2 stations	250 receivers
Los Angeles	2 stations	250 receivers

These stations operate in the 50-78 mc bands and provide a 525-line picture in accordance with pre-war standards. A television band requires 6 megacycles band width as contrasted with .2 megacycles for frequency modulation and .01 megacycles for sound broadcasting.

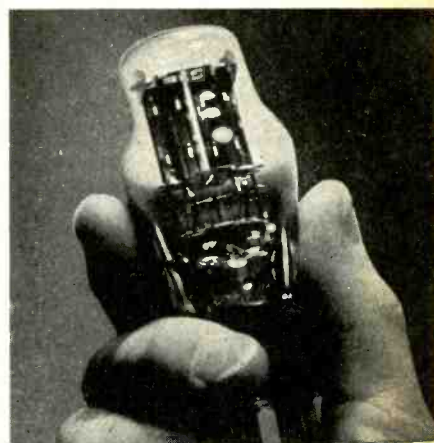
The television receivers in use at the present time are at least four or more years old and in most cases are operating with old and used tubes. Their present performance is poorer than their original performance. With present knowledge, it is possible to make better transmitting and receiving equipment which will provide brighter and larger pictures having more contrast.

These receivers will produce useful pictures in normally-lighted rooms. It will not, therefore, be necessary to sit in a dark room to enjoy a television program. Receivers for home use have been built which project the image on a screen and produce a picture 18" x 24". The brilliance is sufficient so that it is not necessary to turn off the floor lamps in a normal living room. It is generally believed that a 7" x 9" picture is the minimum size that will be satisfactory in the home, even in a table type set.

For a projection type of receiver in which the brilliant image on the end of a 5" tube is projected on a screen by means of a reflective optical system, a 15" x 20" or 18" x 24" is believed to be as large as will be required. Experience has shown that the proper viewing distance of a television or motion picture image is between 4 and 8 times the height of a picture. Thus, for a 7" picture, the viewing distance would be 2 1/2 to 5 feet; for an 18" picture, 6 to 12 feet, and for a normal motion picture screen of 15 feet in height, 60 to 120 feet.

The 7" picture produced by a table type television set is therefore satisfactory for a small family group. An 18" picture is about as large as is required for an ordinary living room. It is likely that television receivers of the table type eventually will be available for \$200 or less and of the console type with projection picture, for approximately \$350 or more.

DEALERS



STOP!
don't
throw it away!

Let **RTS** reprocess
your dead

RADIO TUBES

NEW Scientific Process

**REACTIVATES THORIUM
CONNECTS OPEN FILAMENTS
CLEARS SHORTS and
MICROPHONICS**

(NOT the old "flash" trick)

MINIMUM ORDER 6 TUBES

SEND NO CASH **50¢** EA.

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30-Day Guarantee

Every tube fully tested in checkers & sets before playing

Send itemized list with order

Make sure glass, base & prongs are intact... flashed, exploded or open cathodes **REJECTED and NOT RETURNED**

RTS RADIO TUBE SERVICE CO. INC.

6805 20th Avenue, Brooklyn 4, N.Y.

R. J. McNeely, sales manager for the Hoffman Radio Corp., Los Angeles, Cal., is in the Denver and Salt Lake City areas, where he will appoint franchised distributors.

EXPECTS RADIOS THIS FALL

Speaking "off the cuff", and in response to questions from the floor during a dealer conference held in New York recently by Sonora distributors Barth-Feinberg, Inc., Joseph Gerl, president Sonora Radio & Television Corp., made the following comments on set production and prices, dealer discounts and the kind of radio receivers that may be delivered to dealers in the initial post-war production period:

The War Production Board states that they will not allow any radio production until after cut-backs for 25% have been effected and we are down to \$160 million a month. It is my opinion that the purpose for that is that a stock pile is being built up so that our armed forces cannot be caught napping. It is also my opinion, as cut-backs are coming through, unemployment is becoming greater every day, and that as the pressure of this unemployment becomes stronger, the War Production Board will be forced to release radios sooner than they would like to. I think that production of radios will begin late in September or sometime early in October.

While it is obvious that manufacturing of radio receiving sets at the beginning will be a gradual matter, yet I feel that within three months from the beginning of production, most dealers will have enough radios for display and sales.

Should FCC decide to go ahead with the plan of allocation along the lines announced recently, it will mean the necessity for developing new tubes and new samples and will delay the completion of the engineering of these items for at least six months. Therefore, it is my belief that during the first six months of production most of the sets produced and sold will be amplitude modulation sets to be used in conjunction with our present type of broadcasting. Of course, these sets will be dolled up in new cabinets, with new dials and new gadgets.

Dealer Volume

My contention has been that from the standpoint of our industry and the contribution to employment after the war the introduction of television is more important than frequency modulation. Frequency modulation is only an improvement of our present amplitude modulation reception. It will compete with the present sets in the homes of the American public. Tele-



"Joe" Gerl, president of Sonora, shakes hands with "Hy" Feinberg, president of Barth-Feinberg, at N. Y. dealer conference.

vision is a new industry and will not only add to the volume that the dealers will sell, but will also add greatly to employment after the war.

For the purpose of recording, wire recording will indeed be a factor in home entertainment very soon. But from the standpoint of musical reproduction, that will depend on standardization and the availability of music reproducing magazines.

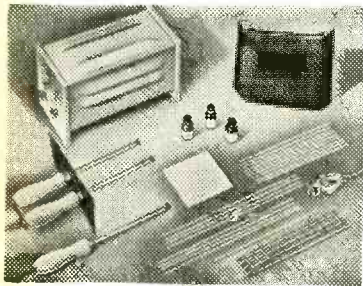
Dealer Discounts

In my opinion, the discounts immediately after the war will be the same as before the war. However, as the supply catches up with the demand and competition becomes keener, the discounts on table model amplitude modulation sets will become shorter, while the discounts on frequency modulation and television sets, which require special selling and servicing, will be as large as before the war, if not larger.

A few weeks ago, we radio manufacturers met with the Office of Price Administration, and they told us they would like to keep the net prices, as well as list prices, the same as March, 1942. They stated, in substance, that should any increases be necessary because of the higher cost of labor, some of it will have to be absorbed by the manufacturer and some by the distributor and dealer. This may upset any orderly system of pricing and discount which operates under the law of supply and demand.

Set Prices

While the labor costs in the radio industry have risen as high as 67%, yet I feel that due to additional skill gained by the old-time radio manu-



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For Shop, Farm and Home Repairs

Welds, brazes, silver-solders, all metals. Anyone can operate it. Repairs steel, cast iron, aluminum, brass, copper, bronze, etc. Complete with power unit, flame and metallic arc attachments. (Really two welders in one). Carbons, fluxes, rods, mask included. Just plug it into electric outlet. 110 volts AC or DC. For hobbyist or professional.

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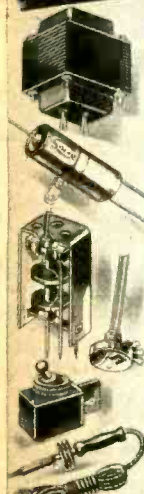
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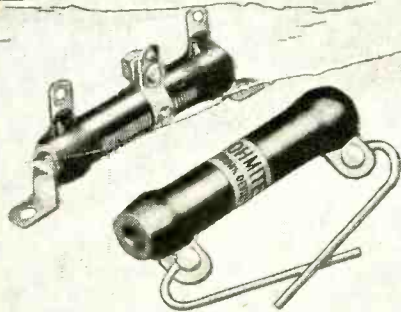
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RADIOS

[from page 62]

facturers and due to savings in administrative overheads the price level on the first post-war radio sets will not be any higher than 25% average. And as competition increases, the cost on amplitude modulation radios should not be any higher than 12% of the pre-war price. Some manufacturers may even go as far, because of their administrative savings, as to sell and merchandise eventually at the same as the pre-war price. Here again reservation must be made because of the position of the OPA. Before V-J Day, in order to keep down inflation, they may insist that most of the pre-war models should be shipped at pre-war prices.

DISTRIBUTORS

[from page 45]

cinnati trade territory, prior to franchising selected dealers. Backed by nationally known manufacturers, who have carried on their advertising through the war period to both the dealers and the consumer, the company officials are interested in dealers who have the future of the appliance business at heart. Closer cooperation with their franchised dealers on sales and advertising problems will be the firm's central aim. The company's offices are located in the Cincinnati Terminal Warehouse Building, 49 Central Avenue, Cincinnati, Ohio.

STEWART-WARNER

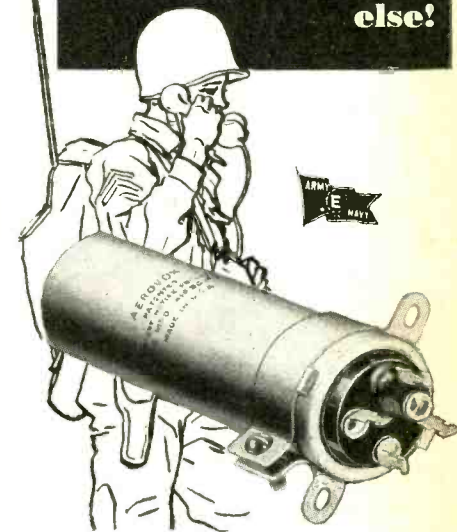
Appointment of Philadelphia Distributors, Philadelphia, as distributors of Stewart-Warner post-war home radios for eastern Pennsylvania, southern New Jersey and northern Delaware is announced by Stewart-Warner Corporation.

Al Hughes and Harry Ellis, owners of Philadelphia Distributors, now in their twenty-first year as wholesalers of major appliances, first became distributors of Stewart-Warner radios in 1935. Among their more than 500 active dealer accounts are many to whom they sold Stewart-Warner radios before the war, they report.

Appointment of Kile-Jacobs & Company, Wilkes-Barre, Pa., as distributors of post-war home radios for twelve counties in Pennsylvania is announced.

Our G.I.'s

are more important
than our G's, our I's,
our GL's-or anything
else!



• You'll agree that's the best policy — when we say that "Our G.I.'s come first". Of course we'd like to supply you with those metal-can electrolytics you prefer for servicing and initial-equipment needs. But so long as our armed forces require every metal-can electrolytic we can produce, we'll just have to keep supplying our trade with cardboard-tube types which will at least see us through on the home radio front until victory is achieved.

• See our jobber . . .

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Burstein-Applebee of Kansas City offers you this great convenience FREE. Easy to work. Solves many problems in a jiffy. FREE to radio men, electronic engineers and others in the business. Attach coupon to your letterhead.

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SPAGHETTI TUBING

Assorted colors and sizes!
Will stand 5000 volts! Insulates and protects bare wires, leads, resistors, etc., from other parts. Various colors provide easy tracing of circuits. Neater and quicker than tape for connecting, splicing, insulating. Olson's Spaghetti Tubing is very flexible and guaranteed not to crack even after aging.



FREE MONTHLY CATALOGS
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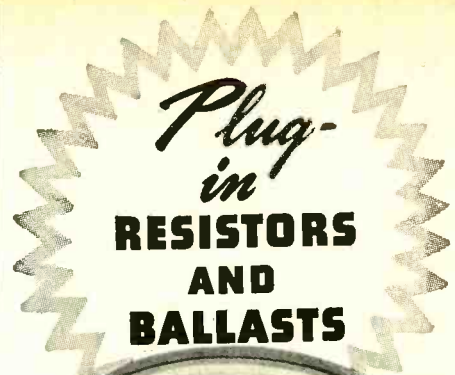
Olson Radio Warehouse
73-B Mill St., Akron, Ohio

I enclose 25c in coin. Please send me the 192" assortment of Spaghetti Tubing.

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Ad Index

Aerovox Corporation	63
Agency: Austin C. Lescarboura & Staff	
Allen Mfg. Company, The	61
Agency: Norris L. Bull, Advertising	
Astatic Corporation	10
Agency: Wearstler Adv., Inc.	
Burstein-Applebee Co.	64
Agency: Frank E. Whalen Co.	
Centralab	14
Agency: Gustav Marx Adv. Agency	
Clarostat Mfg. Company	64
Agency: Austin C. Lescarboura & Staff	
Concord Radio Corp.	56
Agency: E. H. Brown Adv.	
Curtis Publishing Co.	4, 5
Agency: MacFarland, Aveyard & Co.	
Detrola Corporation	15
Agency: Zimmer-Keller, Inc.	
Eastern Amplifier Corp.	47
Agency: Roberts & Reimers, Inc.	
Electrical Reactance Corp.	50
Agency: Scheel Advertising Agency	
Fawcett Publications, Inc.	3rd Cover
Agency: L. E. McGivena & Co., Inc.	
Finest Radio Service	58
General Cement Mfg. Co.	60
Agency: Turner Advertising Agency	
General Electric Co.	60
Agency: Maxon, Inc.	
General Transformer Corp.	57
Agency: O'Neil, Larson & McMahon	
Hatry & Young	52
Agency: The Randall Company	
Hickok Electrical Instrument Co.	58
Hytron Corp.	13
Agency: Henry A. Loudon Adv.	
International Resistance Co.	11
Agency: The Lavenson Bureau	
Jensen Radio Mfg. Co.	18
Agency: Burton Browne, Adv.	
Ken-Rad	20
Agency: Maxon, Inc.	
Mallory & Co., Inc., P. R.	2nd Cover, 22
Agency: Aitkin-Kynett Co.	
Marion Electrical Instrument Co.	21
Agency: Shoppe-Wilkes, Inc.	
McElroy Mfg. Corp.	64
Agency: Shoppe-Wilkes, Inc.	
Meck Industries, John	9
Agency: Aitkin-Kynett Co.	
Meissner Mfg. Co.	49
Agency: Gardner Advertising Co.	
Murray Hill Books, Inc.	53
Agency: The Harry P. Bridge Co.	
National Carbon Company, Inc.	19
Agency: J. M. Mathes, Inc., Adv.	
Ohmite Mfg. Company	63
Agency: Henry H. Teplitz, Adv.	
Olson Radio Warehouse	64
Agency: Jessop Advertising Co.	
Racon Electric Co.	55
Agency: Leon Allen Advertising	
Radio Corporation of America	2, 17
Agency: Kenyon & Eckhardt, Inc.	
Radio Tube Service Co.	61
Agency: Daniel de Koven Adv.	
Radio Wire Television, Inc.	3
Agency: Diamond Seidman Company	
Radionic Equipment Co.	63
Agency: Hirshon-Garfield, Inc.	
Radolek Company	62
Agency: Turner Advertising Agency	
Raytheon Mfg. Corporation	4th Cover
Agency: Burton Browne, Adv.	
Sparks-Withington Co., The	1
Agency: Brooke, Smith, French & Dor- rance, Inc.	
Sprague Products Co.	16, 51
Agency: The Harry P. Bridge Co.	
Standard Transformer Corp.	12
Agency: Burnet-Kuhn Adv. Co.	
Sylvania Electric Products, Inc.	6
Agency: Newell Emmett Co.	
Triplett Electrical Instrument Co.	54
Agency: Western Adv. Agency, Inc.	
U. S. Treasury Dept.	59
Universal Tool Co.	64
Agency: R. J. Potts, Calkins & Holden	
Valley Radio	64
Ward Products Corp.	52
Agency: Burton Browne, Adv.	
Welder Products Co.	62
Agency: Gunn-Mears Adv. Agency	
Weston Electrical Instrument Corp.	14
Agency: G. M. Basford Co.	
Wholesale Radio Lab.	58
Agency: Pfeiffer Advertising Agency	



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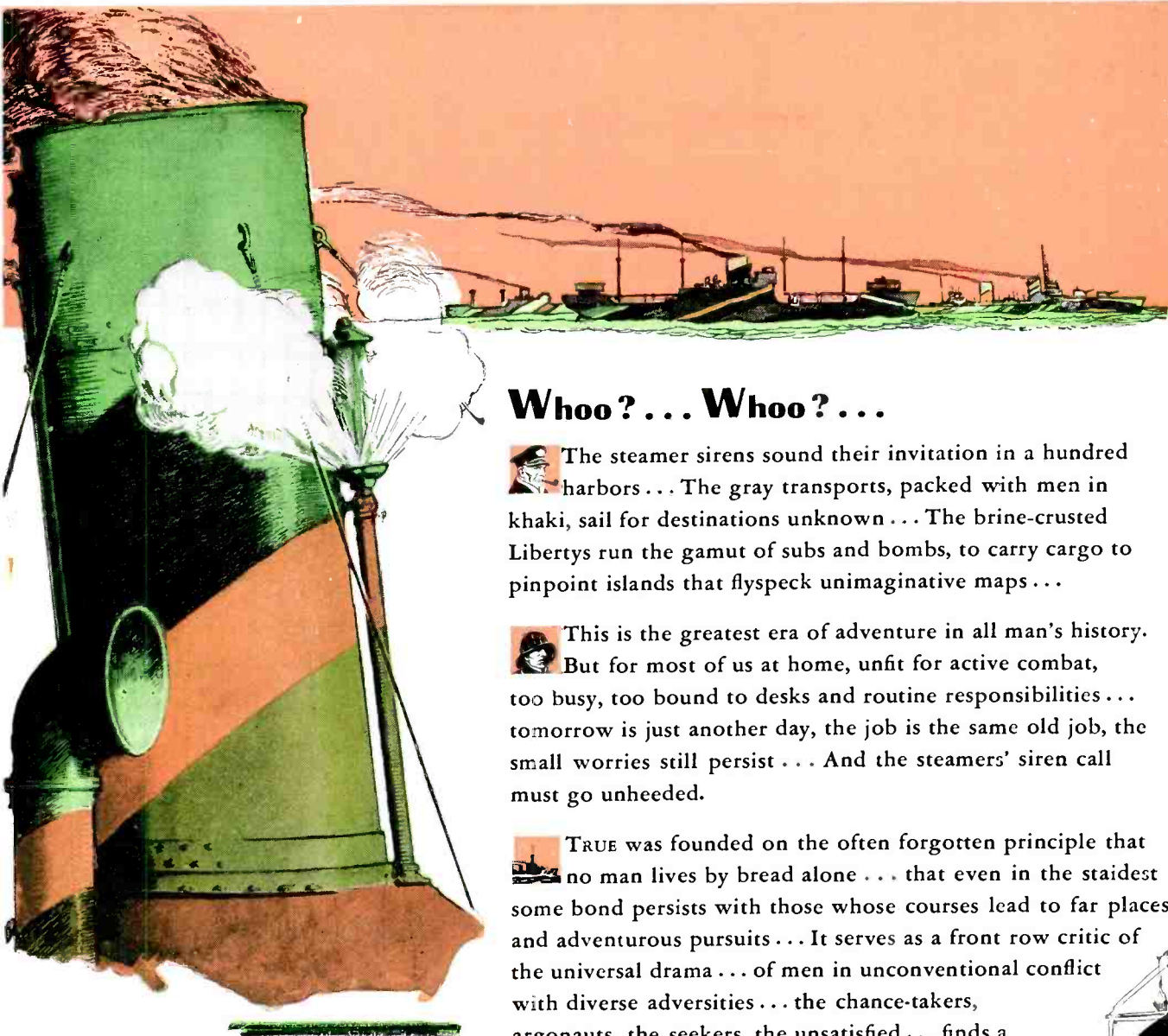
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Who? . . . Who? . . .



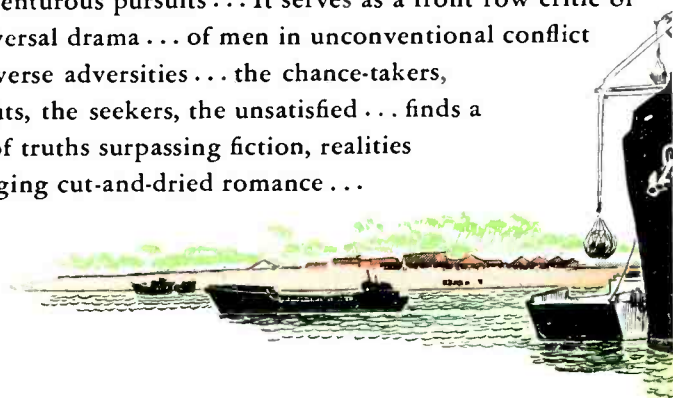
The steamer sirens sound their invitation in a hundred harbors . . . The gray transports, packed with men in khaki, sail for destinations unknown . . . The brine-crust Liberty's run the gamut of subs and bombs, to carry cargo to pinpoint islands that flyspeck unimaginative maps . . .



This is the greatest era of adventure in all man's history. But for most of us at home, unfit for active combat, too busy, too bound to desks and routine responsibilities . . . tomorrow is just another day, the job is the same old job, the small worries still persist . . . And the steamers' siren call must go unheeded.



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FOR POSTWAR

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Radio equipment for marine use must be able to take plenty of battering abuse, and Chris-Craft's recommendation of Raytheon Tubes is based on their splendid wartime performance under the most gruelling battle conditions on land, sea, and in the air.

The moral of this story for you, the radio service dealer, is that Raytheon Tubes, capable of absorbing the punishment of war, are the *best bet* for giving your customers the dependable, rich reception they rely on you to provide. Their consistent performance . . . plus a post-war Raytheon merchandising program that will revolutionize the radio service industry . . . are the two big reasons why you should feature Raytheon Tubes *now!*

Increased turnover and profits . . . easier stock control . . . better tubes at lower inventory cost . . . these are benefits which you may enjoy as a result of the Raytheon standardized tube type program, which is part of our continued planning for the future.

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