

radio service dealer

Gazette

SEEK NO O

Tube Situation Poor



In
This
Issue:

Is the OPA Tube Ceiling Fair?
★
Know Your Oscillograph

june, 1944
25c

RADIO SERVICE

There's No Profit in This Kind OF

REPEAT BUSINESS



WHEN you've spent a lot of time running down the trouble in a set and finally finishing the job, there's no profit in having the work to do over again because of replacement part failure.

Manpower is scarce...your time is precious, and so is your reputation. So don't take chances—use Mallory parts and rest assured

that your customers will be satisfied.

Standardize on Mallory volume controls, capacitors, vibrators, switches and resistors for replacement installations. Their dependability and reputation for proved performance is your assurance that when it leaves your shop, the job is right the first time . . . and every time.

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



MYE TECHNICAL MANUAL
—408 pages of complete data on capacitors, noise suppression, receiving tubes, loud speakers, vibrators, phono-radios, automatic tuning and other valuable information. Available from your Mallory distributor...Price, \$2.00.

4TH EDITION RADIO SERVICE ENCYCLOPEDIA . . . Complete information on repairing any make or model of receiver. Circuit references, original part numbers and recommended replacements. Available from your Mallory distributor . . . Price, 95 cents.

P. R. MALLORY & CO. Inc.

MALLORY

Approved Precision Products



Hasten Victory . . . Buy War Bonds

KITS

SYLVANIA SERVICEMAN SERVICE



by
FRANK FAX

If you need a good service kit, take a look at these. They are available at low cost because Sylvania orders them in quantity. Send for yours now while it is still in stock.



SERVICE KIT NO. 1 is sturdy in construction, has black leatherette covering, metal fittings, handy tool tray and neat professional appearance. Measures 10 x 17 x 7 inches. Makes service calls easier to handle. Price: \$3. Also Service Kit No. 1A. Same as Kit No. 1 except covered in black and white airplane cloth instead of black leatherette. Price: \$3.



SERVICE KIT NO. 2 has the same quality construction but is roomier. Measures 14 x 22 x 8 inches. Many servicemen put both kits to good use. While they last: \$5.

If your Sylvania distributor does not have service kits in stock, send your order to Frank Fax, Sylvania, Emporium, Pa.

SYLVANIA

ELECTRIC PRODUCTS INC.

RADIO DIVISION

June, 1944

radio service dealer

Covering all phases of radio, phonograph, sound and electrical appliance merchandising and servicing.

VOLUME 5, NUMBER 6

JUNE - 1944

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ELECTRICAL APPLIANCE RETAILING SECTION

News 28

SANFORD R. COWAN....Editor & Publisher KARL A. KOPETZKY.....Managing Editor
CHARLES H. FARRELL .Advertising Manager SYLVIA BORNKOFF.....Circulation

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COWAN PUBLISHING CORP.

Executive & Editorial Offices: 342 Madison Ave., New York 17, New York
Member of the Audit Bureau of Circulations.

RADIO SERVICE DEALER is published monthly at 34 North Crystal Street, East Stroudsburg, Pennsylvania, by the Cowan Publishing Corp., Executive & Editorial Offices: 342 Madison Avenue, New York City 17, New York. Subscription rates:—United States and Possessions \$2.00 for 1 year, \$3.00 for 2 years; elsewhere \$3.00 per year. Single copies: 25c. Printed in U. S. A. Entered as Second Class Matter October 3, 1941 at the Post Office at East Stroudsburg, Pa., under the Act of March 3, 1879. All subscribers should allow at least three weeks for change of address. Everything concerning subscriptions should be directed to Circulation Dept., 342 Madison Ave., New York 17, N. Y. Material submitted must contain a self-addressed stamped return envelope. While every effort will be made to handle articles with care, the publisher assumes no responsibility. Material accepted is subject to any revisions, including change to, or omission in "by-line" as well as author's name, which in the opinion of the publisher may be deemed necessary or expedient. Payment will include all photographs, sketches, diagrams as well as all of the author's right, title and interest in and to the material submitted. Material submitted will be considered to have been released by the person or persons shown or mentioned therein, and the authors agree to hold this publisher harmless from any manner of suit or damage resulting from the printing of said pictures or articles.

with the editor

Free Enterprise Restrained

SOMEONE IN WPB suggested that when civilian production of receivers can be resumed, it would be best to place such production on a quota basis. Any manufacturer's quota would be determined by his 1940 output.

We question whether any such civilian production quota regulation would be legal. Maury Maverick, Vice-Chairman of WPB and Chairman of the Smaller War Plants Corp., testifying before the Senate Smaller Business Committee, stated;

"Let me discuss something that is extremely dangerous to American economy . . . the 'Grandfather Clause', . . . which means that you must have had a certain business before Pearl Harbor in order to participate in the early resumption of non-military production. We are opposed to this 'Grandfather Clause' because we are for free enterprise . . . Besides, it is impossible to make quotas on the basis of what somebody did before Pearl Harbor. Many will never

go back, some can't go back to the business they did before the war."

The "Big 7" pre-war set manufacturers would benefit temporarily from such a V-Day allocation program. But we doubt if they support the promulgation of such quotas. The big timers play for high stakes, a long pull and consistent progress. So should dealers. Good merchandise at the right price is conducive to successful progress in business.

At this writing, 30 firms are post-war planning a line of home receivers. The public would probably buy 25,000,000 sets in the first year after the war if it were possible to produce that many. There will be more dealers than ever after V-Day. Give them sets and then let time be the master—the fight will be on — the fittest will survive, dealers and set makers alike.

OPA's New Price Schedule

OPA's NEW CEILINGS on tube prices and radio test fees became effective May 20th. The official OPA Bulletin, which should be prominently displayed by all service dealers, is bound into this issue. Read it carefully. Abide by the regulations. Violators are liable to stiff penalties.

Jobbers will shout with glee when they read the directive

while service dealers will groan. Frankly, several revisions in the regulation should be made at once and our proposals in this regard have already been sent to Mr. Chester Bowles, OPA Administrator. Further particulars regarding the new MPR will be found in an article on page 10 of this issue.

Birth of the Phonograph Era

PORTABLE HAND WINDING phonographs, supposed-ly of Swiss manufacture, are now being offered for sale by dealers at prices ranging from \$60-\$70. How and why these foreign made units happen to appear at this time while American products cannot be obtained is a story in itself.

Before the war portable phonographs of American manufacture, finer in quality and superior in performance, retailed for less than \$25. That foreign products

can now demand higher prices is simply due to a shortage of supply vs. great demand. But the public has become phonograph record conscious, and that's the point. The clever merchandising of record albums has favorably influenced the trend. Enterprising dealers will get aboard the phonograph and record bandwagon quickly.

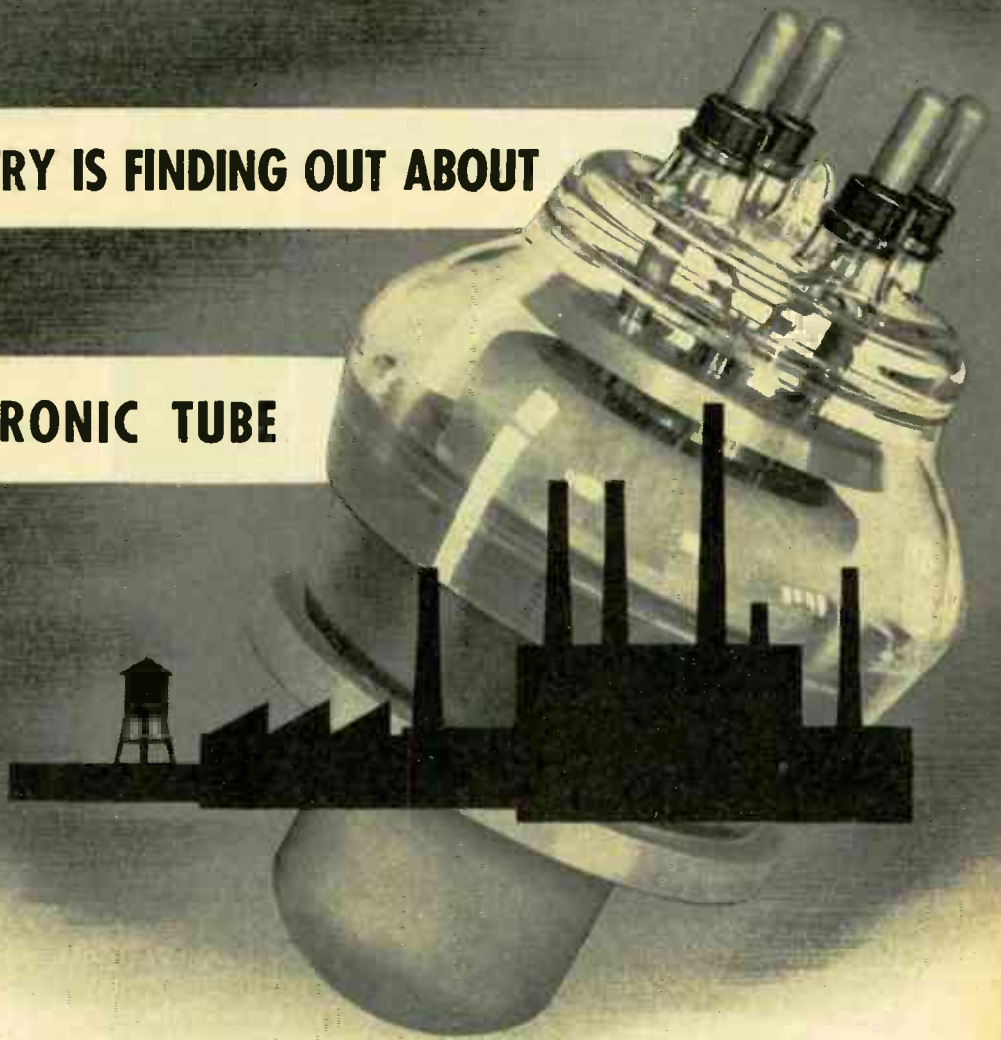
A survey recently made by *The American Home*, an excellent periodical, reports that 56% of

(Continued on page 38)

Radio Service Dealer

ALL INDUSTRY IS FINDING OUT ABOUT

THE ELECTRONIC TUBE



**A GREAT POST-WAR MARKET IS BEING BUILT
FOR YOU—NOW—AND GENERAL ELECTRIC
IS THE LEADER IN BUILDING IT**

GL 880—The 50-kw Electronic Tube used in FM Broadcasting and in High Frequency Heating.

The dependable G-E electronic tube is busy in many factories — counting, wrapping, sorting, inspecting, measuring, heating and doing a thousand and one other precision control jobs better than by any other means.

Each week, scores of additional factories are putting versatile G-E tubes to work. Practically every war industry in the country is producing *more* materials for war than ever before by electronic means . . . doing things better . . . faster . . . and with closer precision control than ever before. Post-war, *all* industry will investigate the electronic tube and how it may serve them. General Electric is helping to build this tremen-

dous post-war market for you right now . . . preparing for the day when you, the radio service man of today, will be the electronic maintenance man of tomorrow — serving both industry and the expanded radio receiver market.

Write for your copy of "How Electronic Tubes Work," a brochure that explains the uses of tubes in industry. . . . Address: *Electronics Department, General Electric, Schenectady, N. Y.*

• Tune In General Electric's "The World Today" and hear the news from the men who see it happen, every evening except Sunday at 6:45 E.W.T. over CBS. On Sunday evening listen to the G-E "All Girl Orchestra" at 10 E.W.T. over NBC.

THERE'S A G-E ELECTRONIC TUBE FOR EVERY PURPOSE

GENERAL  ELECTRIC

176-C3

In & Around the Trade

Being a condensed digest of some of the happenings in and around the radio trade as compiled by the Editors

To Get Cars—Beat Hitler First: WPB

Charles E. Wilson, Executive Vice Chairman of the War Production Board, told a session of the Automobile Labor Advisory Committee that all realistic industrial planning at present must be based on a recognition that only very limited civilian production will be possible until the defeat of Germany. When that happens, he said, 35 per cent of the productive capacity now tied up with war work will be available for peacetime production.

Mr. Wilson emphasized that "we need three plans, not just a post-war plan." The first and most critical plan, he said, is the plan for carrying out war production successfully by adjusting to the changing military requirements and manpower shortages. The second plan which is needed, he said, is "a method of carrying out essential civilian production coincidentally with war work" by using manpower and facilities freed after the successful invasion. The third plan required, he said, is a long-run post-war plan for full production and full employment—"but this is still a long way off," he added.

CAA Needs Radiomen in Alaska

Sixty good jobs are open for radio electricians on the 7,000 miles of civil airways in Alaska, Civil Aeronautics Administration officials announced recently.

A recent newspaper story describing jobs for man and wife teams as Aircraft Communicators in Alaska resulted in such a flood of applications that the CAA has cried "Uncle." But the radio electrician jobs, equally attractive, are still unfilled, and by July 1, the CAA hopes to sign up 60 applicants.

The jobs pay approximately \$3,475, which is made up of \$2,300 base pay, plus the 25% differential for foreign service, plus the usual 21% overtime now paid government employees on the 48-hour week.

For more highly skilled radio men, the CAA has jobs which pay up to \$4,600, and ten radio engineers are needed for which the annual salary is from \$3,700 to \$5,600.

Only draft exempt men can be considered, and applicants must have a release from their employer or from the War Manpower Commission, and a medical certificate. Men over 38 are acceptable, and discharged service men are given preference.

Applications should be sent to the Alaska Projects Depot, 224 Westlake Avenue North, Seattle, Washington, where transportation to Alaska is provided for accepted applicants.

Stancor Appoints Sales Executives

Expansion programs for Stancor Sales in which postwar plans will be importantly accented, have been delegated by Mr. J. J. Kahn, President of Standard Transformer Corporation, Chicago to Mr. Grant Shaffer and Mr. Norman A. Koetke.

Mr. Shaffer brings to Stancor a broad experience in engineering and electronics, and his activities have embraced such important posts as electrical engineer for



Stancor's Grant Schaffer

Underwriters Laboratories, Jefferson Electric Company and the City of Chicago. Mr. Shaffer becomes Stancor's Sales Manager in charge of the Jobber Division.

Mr. Koetke, as Merchandise Manager, will contribute his broad experience in



Stancor's Norman A. Koetke

selling and advertising to the development of national market policies.

M-H Appoints Crane

Ed. Crane has been appointed industrial sales engineer in the Buffalo area for the Brown Instrument Co., Philadelphia precision industrial instrument division of Minneapolis-Honeywell Regulator Co. Mr. Crane has been transferred from the New York City office. He will include the northwest section of New York State in his territory.



Hallicrafters SCR-299 mounted in an amphibious vehicle called a "duck"

Admiral Appoints Orgill Bros.

Admiral Corporation, Chicago, announces the appointment of Orgill Brothers of Memphis as distributors of Admiral Radios and Major Appliances for the Memphis, Tennessee and Jackson, Mississippi trading areas.

Roburn Takes on Supreme Publications

Roburn Agencies, Inc., 11 Warren Street, New York 7, N. Y., are now handling all Supreme Publications, 328 S. Jefferson St., Chicago, Illinois export sales and carry books for this purpose in stock at their warehouse.

First Surplus War Products Plan Has Been Made

W. L. Clayton, Surplus War Property Administrator, today announced a major price policy, designed to expedite the movement back into production of property left over from termination of war contracts.

Such property, already amounting to several hundred millions of dollars, and increasing daily, consists of raw materials, semi-finished goods, and scrap, coming to the Government from manufacturers whose war contracts are being terminated. Virtually all the materials to be disposed of are usable only for manufacturing purposes.

Mr. Clayton emphasized that the announced policy covers materials in some cases the property of the contractor, in other cases the property of the Government, but in all cases still on the premises of the contractor and not yet moved into government storage.

The policy is not designed to cover property declared as surplus by the procuring or owning agencies of the Government. Such property will be disposed of by the disposal agencies under regulations to be announced later.

Aggressive action is necessary to move this material back into war production or for civilian use. It is now accumulating faster than contracting officers can dispose of it.

The Government's paramount interest is the continuous use of this material in war production, or for essential civilian purposes, avoiding overburdening storage facilities, arresting inflationary trends, and reducing the volume of surpluses which will be hanging over the market after the war.

The basic policy which has been adopted by the Surplus War Property Administrator, with the advice of his Board, is designed to give contracting officers courage to act boldly in the sale of these materials, within the limits prescribed.

The policies established rest on the following basic principles:

1. Quick clearance of plants for resumption of war production or essential civilian production is imperative.

2. Sales to the contractor or other buy-

Radio Service Dealer



Meissner's own recreation center clearly illustrates two basic interests in Mt. Carmel life. Here a group of skilled electronics technicians from the Meissner plant is pictured in the midst of a gay Cole Porter hit.

MUSIC — AND ELECTRONICS

MAKE MT. CARMEL FAMOUS

"The Little City of Great Music" — that's how neighboring cities describe Mt. Carmel, Illinois. And to this honor, in recent years, Mt. Carmel has added a world-wide reputation for precision-built radio parts and vital electronics war equipment. These come from the busy Meissner Plant.



Hundreds like these workers form the famous Meissner "precision-el." Most of them have literally grown up in the business of making superb electronics equipment.



Few hands can match them! You can tell at a glance that this man knows his trade. He is one of many reasons why Meissner products are always dependable, always first choice with men who know.

June, 1944



Superior Performance

Good news! You can now obtain a quantity of the highly popular Meissner "Plastic" I. F. Transformers. Particularly suitable for small receivers — where space is at a premium, yet superior performance is required. Famous for stability, high gain, wide range and double tuning. Typical of Meissner precision building, they are only 1½" square x 2½", yet are not affected by temperature, humidity, vibration. Specially served Litz wire! One-piece molded plastic coil-form and trimmer base!



MEISSNER

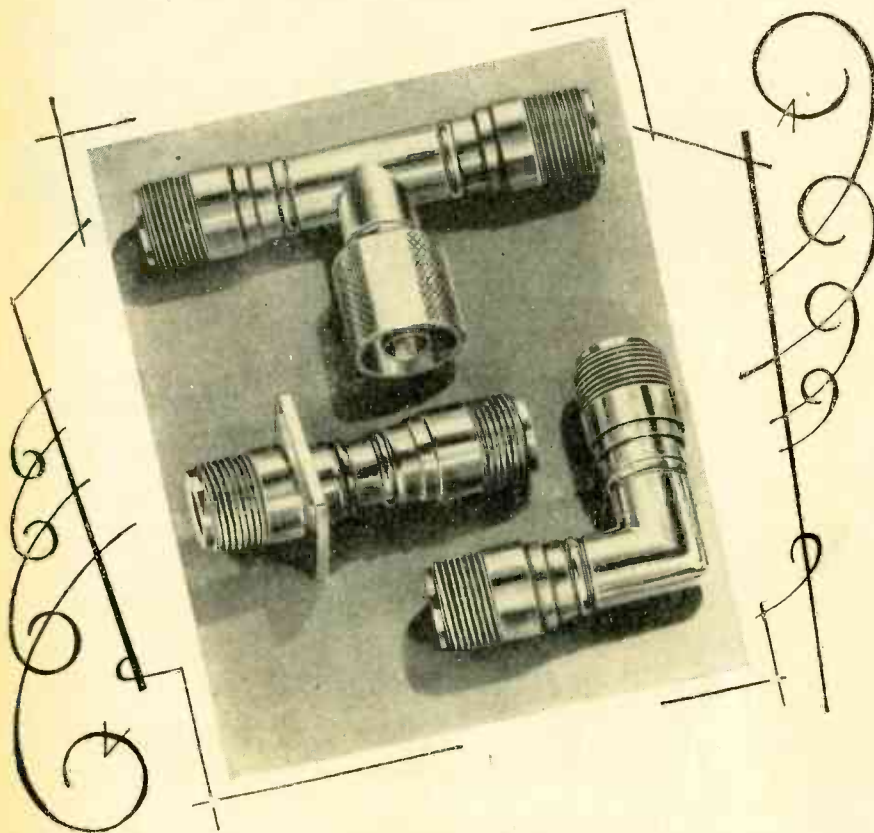
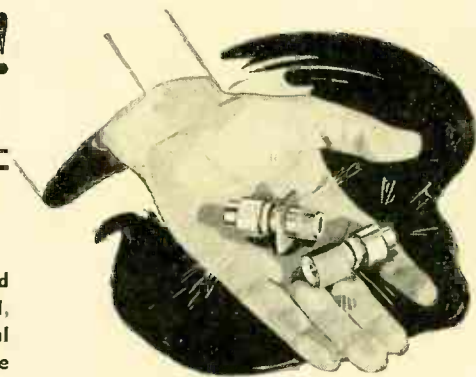
MANUFACTURING COMPANY • MT. CARMEL, ILL.

ADVANCED ELECTRONIC RESEARCH AND MANUFACTURE

More than Beauty

here!

YES, we'll agree, these and other carefully machined, silver plated Astatic Co-axial Radio Cable Connectors are beautiful . . . so beautiful that you want to hold them . . . and "caress" them . . . in your hands. But they're more than beautiful! Astatic Co-axial Cable Connectors are products of engineering skill, machining precision, assembly care and expert finishing . . . all important to the efficient functioning of wartime radio communications equipment. Measuring up to the most exacting government and equipment-manufacturer standards, Astatic Connectors provide sturdy, lock-tight, insulated connections for strenuous wartime service. Yes, they're tough as well as beautiful . . . and they're dependable. We, their manufacturers, are proud of them. They'll do a swell job for you. Use them.



ASTATIC

IN CANADA:
CANADIAN ASTATIC, LTD.
TORONTO, ONTARIO

THE ASTATIC CORPORATION
YOUNGSTOWN, OHIO

ers who will themselves consume the property in production are desirable.

3. Sales to speculators for holding or quick profits must be discouraged.

4. No goods must be sold without an adequate test of the market.



Hallicrafters' Chief Engineer Bob Samuelson demonstrates what may be one of the first Post-War units to come off the Hallicrafters lines for the amateur radioman, — a super with panoramic reception. This is only a model, but anyone knows that Bob (like all of us) can't wait for the war to be over; and to get back to peace-time production. Buying a mess of War Bonds will help do it!

Exchanges of Surplus Material

An investigation reveals that many electronic distributors have surplus materials on hand that they would gladly dispose of through regular channels. *NEDA* will, therefore, attempt to render a Bulletin Service to help market this merchandise.

Send this office complete information on your surpluses. Give specifications as completely as possible . . . especially the catalogue numbers if it is standard merchandise. The regular price-schedule, as well as your net selling price should be included. *NEDA* cannot handle the actual merchandise, but will act as a clearing house for information. Orders should be sent direct to the Distributor making the offer. Address: National Electronic Distributors' Ass'n., P. O. Box 2, Reading, Pa.

Walsco Opens Chicago Space

In order to give quicker and better delivery service to their nation-wide customers, the *Walter L. Schott Co.*, manufacturers of *Walsco Products*, announce they have discontinued their New York warehouse and have occupied large space in the Terminal Bldg., 537 South Dearborn Street, Chicago, Illinois.

Thus from now on the *Walter L. Schott Co.* will have a complete stock of all *Walsco Products* in Chicago, as well as in Beverly Hills, Calif. The *Walsco* line includes radio chemicals, cements, dial cables and cords and a complete line of radio hardware.

Winters Named S. M. of RCA's New East-Central Region

Harold M. Winters has been named manager of a newly-created sales region for the *RCA Victor Division* of the Radio Corporation of America, covering the eastern central states, with headquarters at Cleveland, Ohio, it was announced by Frank M. Folsom, vice president in charge of the *RCA Victor Division*.

The boundaries of the new region will

Radio Service Dealer

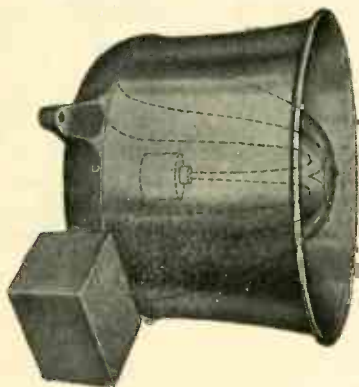
**THE ANSWER
TO TODAY'S
PROBLEM—**

RACON's...the leading speaker line...for all types of sound installation!

Most of the best industrial p. a. installations in use are RACON speaker equipped. They are the finest speakers made and there is a type for every conceivable application.

For Marine p. a. installations, too, RACON leads. Approved by the U. S. Coast Guard, RACON speakers are used aboard Army and Navy vessels. Only RACON can supply, when needed, patented Weather-proof, Stormproof Acoustic Material which is impervious to any weather condition and prevents resonant effects.

WPB will now accept applications for industrial war plant sound installations. Use WPB Form 617. Specify RACON's.



Left: MARINE HORN Speaker, approved by the U. S. Coast Guard. Several sizes available, Stormproofed, of the re-entrant type, suitable for indoor or outdoor use—may be used as both speaker and microphone. Right: RE-ENTRANT TRUMPET; available in 3½', 4½' and 6' sizes. Compact. Delivers highly concentrated sound with great efficiency over long distances.



RACON ELECTRIC CO. 52 EAST 19th ST. NEW YORK, N. Y.

NEW BOGEN DEVELOPMENTS



NEW TECHNIQUES . . . new ideas . . . new developments . . . there have been many which we of the David Bogen Company have applied in the production of inter-communication, detection and specialized sound equipment for the United States Army and Navy.

These new developments are now the property of our fighting men, and we are enjoying the satisfaction which comes from making a vital contribution to the war. The equipment we produce after Victory will reflect our greater knowledge and skill, and will incorporate many of the remarkable developments which are a product of our experiences today. To Bogen distributors that great new equipment will mean prestige and profit. Tomorrow's satisfaction will belong to Bogen purchasers . . . users of the finest sound equipment made.

OF IMMEDIATE IMPORTANCE TO BOGEN DISTRIBUTORS:

We are constantly striving to speed deliveries on our regular catalog equipment. We know that this equipment, too, is vital to the war program . . . and deliveries are improving daily.

Support the Fifth War Loan Drive

David Bogen Co. Inc.

663 BROADWAY NEW YORK 12, N. Y.



Bogen Sound Systems • Communo-Phones • Amplifiers • Electronic Equipment

include Ohio, Michigan, Kentucky, West Virginia and the western portion of Pennsylvania.

Adelman Is Solar Rep

Leon L. Adelman, well known former Sales Manager, has entered the representation field. Among other lines, he will



Solar's Si Wollin & Leon Adelman

represent *Solar Capacitor Sales Corp.* in the metropolitan New York area.

Sylvania Electric Planning To Buy Colonial Radio

The fact that negotiations are underway for the purchase of the capital stock of *Colonial Radio Corporation*, of Buffalo, by *Sylvania Electric Products, Inc.* was announced jointly today by *A. H. Gardner*, President of Colonial, and *Walter E. Poor*, President of Sylvania.

Since 1931, Colonial Radio Corporation has been a manufacturer of radio receivers principally for Sears, Roebuck & Company and leading automobile manufacturers. It is expected that they will continue to operate in these markets.



The Hallicrafters Fourth Award in the form of a Star is very prettily shown by these nice young ladies

"Muggs" Pugh Is Sprague Rep.

A recent announcement by Sales Manager Harry Kalker of the *Sprague Products Company*, North Adams, Mass., brings word of the appointment of C. L. Pugh, better known as "Muggs," as representative for Sprague Condensers in Ohio, West Virginia, and the Pittsburgh territory.

Radio Service Dealer



UNIVERSAL MICROPHONES IN MILITARY APPLICATION



Universal takes pride in producing these three types of Microphones at the request of the U. S. Army Signal Corps. These units represent but a small part of the skill and experience which has produced over 250 different types and models made available to our customers. From Submarine Detectors to High Altitude Acoustic units, Universal's Engineering experience has covered World War II.

These Microphones built without peace time glamour have every essential of military utility. When peace comes, Universal Microphones, with many innovations of design and accoutrements, will enter upon the post-war scene. Universal includes among its electronic communication components, in addition to microphones: Plugs, Jacks, Switches, and Cord Assemblies.



UNIVERSAL MICROPHONE COMPANY
INGLEWOOD, CALIFORNIA

IS THE OPA TUBE CEILING FAIR?

by

Sanford R. Cowan

Publisher

UNDoubtedly the new OPA Maximum Price Regulations were promulgated to stop the wide-spread black market in replacement tubes; also to prevent opportunist servicing organizations from imposing exorbitant service fees.

The Directive has some excellent points but, on the whole, needs certain revisions without which it will do more harm than good. For example, as it now may be interpreted, the MPR offers jobbers several loopholes which permit them liberties which border on the unscrupulous in trade practice.

In its effort to protect the public, the new Regulations impose unwarranted handicaps upon legitimate service-dealers that operate service departments, and most of them do. At the same time it favors jobbers. The Directive states, "Sales at retail are sales to an ultimate consumer. Sales to industrial, governmental or institutional users are sales at wholesale." Thus jobbers may consider dealers to be ultimate consumers, for they are not "industrial or governmental users." Dealers and service-men buying tubes are obviously not ultimate consumers, for their purchases are made with the intent of reselling the tubes to the real ultimate users, the set-owning public. Yet, as it now stands, a jobber can

The Editor discusses some of the obvious unfortunate results of the latest of the OPA tube, price ceilings

refuse a dealer his regular trade discount because the Order does not make the required distinction between jobbers, dealers and consumers.

Restricts Jobbers to Wholesaling

A regulation should be effected whereby radio establishments should be forced to declare whether they are Retailers or Wholesalers. No organization should be permitted to function as both a retail and wholesale establishment. Then, when a firm has been properly classified as either a jobber or as a retailer it should be forced to abide by the price regulations covering its particular category. Such a law is badly needed to protect dealers and service organizations from the present-day unfair jobber competition, from which they have no recourse except boycott.

Why do we consider jobbers to be unfairly competing with service-dealers? For the simple reason that a jobber has the right to determine who is to get any tube that he may have for sale. The jobber may sell the tube to any favored dealer—or

if the jobber operates his own service department, he has the right to put any tube into his own service shop rather than sell it to a dealer. Of course, where jobbers function in any territory a tube manufacturer will not sell a service-dealer direct so under a broad interpretation a certain amount of unfair competition or restraint of free enterprise actually takes place.

A glaring weakness in the present MPR Regulation is its assumption that dealers are getting all the tubes they need and want for resale. In actuality, service dealers simply cannot obtain tubes from jobbers. As stated before, most jobbers have established their own service departments since Pearl Harbor. These jobbers, when they obtain a quota of replacement tubes, naturally divert the tubes to their own service departments. By doing this the jobber can demand list price for the tubes from the ultimate consumer whereas if he were to sell the same tube to a service-dealer his profit would be less due to the trade discount. Bluntly, jobbers have been and are squeezing dealers out of business. This practice should be stopped by Governmental edict, since no other method seems to suffice. It's time that Washington took cognizance of what's going on in the radio industry.

In many communities, set owners have learned that while service-dealers have not had many types of replacement tubes for a year or more, jobbers have had such tubes and have been selling them to customers who brought sets into the jobbers' shops. Thus, thousands of service-dealers have seen their old, regular customers pass them by in favor of jobbers. After all, the public wants its tubes. Paying list price to a jobber for a tube at retail is not a black market transaction, especially when service dealers have no tubes for sale.



A command post communications center is set up by Signal Corps men—maybe former servicemen—in the Pacific area

SPRAGUE TRADING POST



A FREE Buy-Exchange-Sell Service for Radio Men

IMPORTANT NOTICE!

We discourage offers to buy or sell anything beyond the O.P.A. ceiling prices, and will not knowingly accept such ads for the Sprague Trading Post.

URGENTLY NEEDED—Tube checker, multimeter, and small V-O-M. Cash. Renard Oppenheimer, 18 Cooper St., Brooklyn 7, N. Y.

WANTED—by army veteran: A good signal generator and a V-O-M. James O. Thompson, 341 W. Vine St., Lima, Ohio.

FOR SALE—Two 15-watt P.A. systems complete with tubes & 12" speakers, \$30 ea. Also mikes and stands. Also Crosley 6-tube push-button radio, \$15. Philco F-M antenna, \$5; two Weston tube testers #682, \$10 ea. Elmer Showers, Jr., 114 Robinson St., Schenectady, N. Y.

WILL TRADE—Philco sig. generator #U30975, 5-band, battery good in both. #20 osc. 8 band, battery good in both. Want Solar QCA or BCQ condenser tester, or Superior channel analyzer. Have new Stewart-Warner portable radio and Elgin 7-jewel watch. Ray Parker, Kingman, Kansas.

WANTED—Test eqpt. and new or used radio parts for new repair shop. Cash. E. Holt Radio Repair, 229 N. Bright Ave., Whittier, Calif.

FOR SALE—Quantity of radio books in good condition. Write for list. Donald West, 536 Ryerson Crescent, Niagara Falls, Ont., Canada.

WANTED—Two speed phono motor with turntable, record changer, Seeburg or Webster preferred. Cash, or have 30-watt amplifier, 14" speaker, a few tubes and other items to trade. L. R. Benorden, Box 52, Llano, Texas.

WANTED FOR CASH—One portable electric drill. L. T. Bagan, 503 Columbia St., Covington, Louisiana.

WANTED—One power transformer, for Silvertone radio #7036-A, chassis 110-321-1, and one 3" oscillograph. Lawrence Gerrich, Kentland, Ind.

WILL TRADE the following tubes: 25L6G and 25B6G for 185, 115, 1T4, 354. All tubes meter-tested. No sales. C. J. Hobbs, 126 Spruce, Kansas City, Mo.

WANTED FOR CASH—0-1, 0-100 ma. (0-4, 0-75) a.c. voltmeter; pair of ear-phones; V-O-M tester and tube checker, or set analyzer. Walter L. Garner, Barack 114, Room 41, Hanford, Wash.

WANTED—Good signal generator of late design. C. E. Daniels, Rt. 2, Box 283, Bartow, Fla.

FOR TRADE—One power transformer 300-300 plate v., 2.5v filament, new. One ammeter 0-35 d.c. One magnetic pickup head—all in A-1 shape. Want power trans. 6.3v filaments 400-400 heavy duty; two 6F6 tubes; One 6S7; One 6SP5; One 6SC7; one 5Z4; three 16 mid. 450v condensers. Must be new. Glenn Ilsey, Woodward, Okla.

WANTED—One multimeter, std. make, with ohmmeter range of at least 10 meg., also want sig. generator of standard make. E. C. Brown, Box 122, Glendale, S. C.

FOR SALE OR TRADE—6-tube Westerm Elec. 4D receiver; also one tube regenerative W-E model X69 for loop antenna operation. Complete set of good tubes (type 215A) with each. Both in excel. condition, 1925 models. Valued as antiques. Want comm. receiver or your cash offer. Geo. Maxey, 174 Taurus Ave., Oakland 11, Calif.

WANTED—Tube tester and 5M V-O-M C. E. Edgar, Oceano, Calif.

WILL TRADE any of following tubes: XXD; 6B7; 35A5; 6A7; 6D7; 35Z3; 7C8; 7B7; 6SK7; and 78 (all new) for 128Q7. J. Pirka, 205 N. Horn St., W. Frankfort, Ill.

FOR SALE in sealed cartons: 3-6A4; 2-12A5; 1-1A4; 1-1C8; 1-6A6 1-1F4; 1-1A4; 1-1J6. Also have 1 Crosley Nercav in new condition compl. with accessories. French Radio Electric Store, 476 Main St., Stamford, Conn.

WANTED—Late issue of National Radio Inst. correspondence course or what have you? Cash. David Friedman, 1759 W. 7th St., Brooklyn 23, N. Y.

SELL OR TRADE—3-11H; 15-3Q5; 5-6L7; 15-6V6; 4-4B6; 2-7CT; 2-2B; 4-2T; 2-30. All in sealed cartons. Want V-O-M. Ray Speer, Freeport, Tex.

WANTED—Triumph oscilloscope #830. Arthur Benicvenga, 919 Terrace Blvd., New Hyde Park, N. Y.

WILL TRADE Hallcrafters Sky Buddy model 5T in very good condition for good tube tester or sig. generator, or will sell for good cash offer. V. A. Gerencser, c/o The Radio Shop, 67 Hillcrest Ave., Trenton 8, N. J.

WANTED—Small radios, any number. Condition not objectionable. All offers answered. G. Samkofskey, 527 Bedford Ave., Brooklyn, N. Y.

WANTED—One 1A7GT tube for overseas portable. Edward Pehm, Libertyville, Ill.

WANTED—Sig. generator and multi-meter or combination, also condenser tester. H. Iol, New Denver, B.C. Can.

FOR SALE—Model ABC L & L Electric Co. tube tester in 1st class condition with neon short checker. Benj. Satran, Wilson, Kans.

WANTED—Triplet pocket type V-O-M; also any Hallcrafters receiver with 2-stage RF, crystal phasing and "S" meter. Mosier Radio Service, Mamaronneck, N. Y.

WANTED FOR CASH—Modern F-M sig. generator, good tubes and other parts. Vincent A. Longo, 16151 Sussex Ave., Detroit 27, Mich.

WANTED—Rider's manuals 1 to 10 incl. and #12. Also need either Rider chalyner or Hickok traceometer. Cash. Hugh's Radio Service, 621 Main St., Boise, Idaho.

WANTED—Hickok or Clough-Brengle all-wave oscillator. Chester Zelaski, 371 1/2 Broad St., Newark 2, N. J.

FOR SALE OR SWAP—Type 5BP1 cathode ray tube, never used; also pair RCA 813 transmitting tubes. Want ham type S-W receiver. James Middleton, 25 Hartford St., Newark, N. J.

WANTED—National UM-35 var. condenser 35mmfd.; 2 Hammarlund MC-50-S var. condenser, 50mmfd. Have for trade Weston 301 0-15 d-c voltmeter; 1-3-gang 5-pos. switch. W. J. Ford, Forest St., Yarmouth, N. S., Canada.

FOR SALE—Janette rotary converter Type CB 12-KVA. 5-DC volts 115-speed 3600—DC amps. 6 60 cycle—110

AC volts 1 phase, AC amps. 4.2 Snapp Electric Shop, Chester, Ill.

WANTED—Late model tube and set tester. Must test center-pin tubes. Cash. Ray Jay, 207 Brown St., Milton, Ore.

WANTED—Tube checker such as Trip-let 1613 or 1612, V-O-M Readrite 860, also sig. generator. W. H. Rickis, Dixon, Mo.

WANTED—Portable tube tester for cash. C. H. Hickman, 1914 E. Brower, Springfield, Mo.

WANTED—Used radio testers, meters, etc. What have you? F. E. Wentz Radio Service, Millerstown, Pa.

WANTED FOR CASH—Obsolete pieces of Jewell and Weston test equipment. Want 199, 408, 409, 565, 566, 563 and others. What U got? W. S. Crooks, Box 94, Kent, Ohio.

COMPLETE SERVICE SHOP FOR SALE—Inc. 530 Hickok tube tester, #642 Jackson multimeter, #640 test oscillator, 5 Rider's manuals, compl. set of tools, 365 new tubes, good numbers; transformers, condensers, switches, controls, Type G6 Valley bat. charger, etc. A. A. Taylor, Doniphan, Mo.

URGENTLY NEEDED—Tubes: 12SA7; 12SK7; 12SQ7; 12SH7; 35Z5; 35L6. W. O'Brien, 609 W. 1st St., Fulton, N. Y.

WANTED—All-wave sig. generator, V-O-M, and tube tester. Will trade 12 ga. over-under Browning shotgun, also Swiss floating dial compass. R. L. Guidry, Rt. #2, Plaquemine, La.

FOR SALE—Hallcrafters receiver, Baldwin phones, Vibroplex oscillette, d-c power supply, cased power transformer, smoothing choke, swinging choke, transmitter. Write for list. Lyle Soray, 231 Langdon St., Toledo 9, Ohio.

FOR SALE—200 assorted tubes, write for list. Jonesboro Music Co., Jonesboro, Ark.

WANTED—1-41K24; 1-2" CR tube; 1 var. condenser Johnson #200ED30 200 mmf. per section; and 1 Stacon transformer P-8506 or P-8004. August C. Swensen, 1508 Main Ave., San Antonio, Texas.

FOR SALE—Weston 662 oscillator, \$15; Supreme tube tester with adapters, \$18. Need good condenser checker. Earl J. Musser, U. S. Route 322 R.D., State College, Pa.

FOR SALE—Precision E200 Sig. generator; Simpson 440 tube tester & V-O-M; Supreme 562 audolyzer. All A-1 condition. Cash only. H. E. Brownell, Hay Springs, Nebr.

"NOT A FAILURE IN A MILLION"

SPRAGUE "TC" TUBULARS

When there's a by-pass capacitor job to do, do it with famous Sprague TC Tubulars—and forget it. They will not let you down!

We'll appreciate it if you ask for them by name.

FOR SALE OR TRADE—Thord T-14R32 trans. and 913 tube and kit; 4-500 ohm line to vc. trans.; 2 Mallory 3C 6v bat. chargers; 1 Carron diaphragm for Itacon trumpet units; all new. Following used; but A-1: 2—Atlas 22" Parabolic horns; 2 Itacon R430M turret motors; 24" bell; 1—4 1/2" Itacon trumpet; 1—30 Simpson tester; 1—Supreme 550 tester; 1 battery charger 3 outputs; 1 DayFan motor generator 1 unit 110v AC input, 500v at 75 ma. and 7.5v at 2.8 amp. Leo L. Bowman, 615 W. Main St., Lewiston, Mont.

WANTED—Hickok 510X or 530 tube tester. Cash. Harry E. Slates, R.D. #1, Unionport, Ohio.

WANTED—Crystal pickup, also new or good used tubes: 26; 27; 37; 45; 80; 1R5; 1R5; 3S4; 1T4; 6C8G; 6J7; 6K7; 12SK7; 25L6; 25Z5; 45Z3, or what have you? Albert Ludwig, R.R. #2, Day Road, Mishawaka, Ind.

FOR SALE—Firestone auto vibrators, ditto latest complete set of push buttons, cable, auto & home vol. controls, switches, tone controls, many types of R-F coils, oscillator coils, Firestone AC-DC cases, misc. Firestone parts, tubes: 6N7; 1A47-12B7; 7B6; 7C7; 1T4; 1D8. Dick's Radio Service, 4914 Ross Ave., Dallas 6, Texas.

—YOUR OWN AD RUN FREE!

This is Sprague's special wartime advertising service to help radio men get needed parts and equipment, or dispose of radio materials they do not need. Send your ad today. Write PLAINLY or print—hold it to 40 words or less. Due to the large number received, ads may be delayed a month or two, but will be published as rapidly as possible. Remember that "Equipment for Sale" ads bring best results.

Different Trading Post ads appear monthly in Radio Retailing—Today, Radio Service-Dealer, Service, Radio News, and Radio-Craft. Sprague reserves the right to reject ads which do not fit in with the spirit of this service.

When buying Capacitors—please ask for Sprague's by name. We'll appreciate it!

HARRY KALKER, Sales Manager

SPRAGUE PRODUCTS CO., DEPT. RSD-64 North Adams, Mass.

SPRAGUE CONDENSERS KOOLOHM RESISTORS



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

OPTIC EXPECTORATION IS



NOW

SERVICE
DEALER

LOUSY LOGIC!

by

“The Old Timer”



The author believes this is what is being done by some radio servicemen

“Give this to the Editor,” was what our secretary told us the old, entirely ball-headed man had said when he fumed into our offices while we were out getting a bit to eat. With that he dropped a dirty, pencil-written sheaf of manuscript in her lap and left muttering imprecations to himself. We thought it so good that we herewith pass it on to you servicemen. Who the old guy was, or where he lives, we do not know; but if he should return, there is a nice fat check waiting for him for this rather good bit of sales philosophy. We urge all radio-men and dealers to read it with care . . . there are a lot of truths in this viterolic message. The Editor.

MANY a radio service man who is still with us; the lad who is doing all right for himself, is patting himself on the back and telling himself, “what a wonderful guy am I.” He is living in a *Fool’s Paradise* and anaesthetizing himself with the opium of self-admiration.

His memory is short. Completely obliterated from his mind are the days when the sledding was tough. If a customer should mention to him that advertisements had appeared in the paper, offering to look at, and diagnose the ailments of a radio receiver for the unheard of figure of 50c; his face would assume a look of utter bewilderment—his vocal cords would give out with an audible ‘recording’; “That must have been before the war!”

Those dear (and not *too* dead days) of 50c calls are due for a resurrection, Dear Reader.

Let’s not kid ourselves. Hitler and his porcine pals started something which—in spite of your well known shortcomings, has you sitting pretty. You may—if you are so inclined—

figuratively expectorate in the optic of a prospective customer. You may, if you’re in the habit of looking into a mirror and telling love stories to yourself, say, “I’m looking at the sharpest, smartest guy in the world, on ‘accounta’ I gathered myself over a hunderd and fifty simoleons last week.”

Or you may speculate on the well known whims and foibles of the human race. You may chuckle inwardly at the dumbness they display when you tell them—with a professional air—that the little \$11.95 receiver which is the subject of discussion, “has nine shorted condensers; two blown tubes; acute crapidopolis of the speaker; seven irresistible resistors and a bad dielectric bypass of the secondary thrombosis of the volume control; and we won’t guarantee that we can put it in perfect condition—but we will make it play and that will cost you twelve fifty and we can’t have it ready within two weeks. *C’est la guerre, y’know!*”

Yes, Pal, you may do these things. It’s all right with me if you do. It is likewise little or no concern of mine if you were to project your worthy carcass from the uppermost reaches of the Empire State Building. Or swallow down a quarter’s worth of tincture of iodine. The point I’m trying to make is that there are several ways of knocking yourself off. You may take the purely physical way of committing the Occidental version of hara-kiri—or you may get yourself so hopped up with a sense of self importance that you will sever your economic jugular with the sharp edge of your ego.

Have you held any heart to heart conversations lately with some of the recent graduates of WPA (*cum sum laude*)? I mean those “relicts” who

are now employed in what is euphemistically referred to as ‘defense’ work. Riding high they are! “How long has *this* been going on?” they ask. According to some of them, what this country needed in 1934-5 was a first class world war.

“Looka this bankroll! Hunnert-andeight bucks after them terrific taxes wuz took out! Give all the boys a drink—best in the house! Gimme a berlermaker! I an’t got no kids in the war—if it lasts another two years, I’ll have enough cabbage to buy a chicken farm and then me and the old lady can allus get enough food to live royally!”

Perhaps the foregoing does not express the attitude of today’s war-prosperous radio servicer. But according to my recent observations, it is a reasonable facsimile of the present day concept of many of the lads who are old enough to know better.

If you are indulging in any of the grandiose day dreams I have mentioned, it is time to come out of the miasma of self-satisfaction in which you are enveloped. Come the downfall of Germany and her satellites, the day of the ‘soft touch’ in the radio servicing business is *tout fini*, (finished—to you!)

Seller’s Markets are a wonderful thing for the service business,—just think of some of the folks engaged in the service trades. Pants pressers, window cleaners, floor polishers, electrical appliance repair men, shoe repair men and others in like callings have been having field day. They have been ‘giving the works’ to the public,—OPA or no OPA.

Yes . . . they’ve been enjoying their ‘day in the sun.’ But the sun has

Many a serviceman who is now having a field day at expense of his customers because this is a "sellers' market", may find himself getting the boot to oblivion when Victory changes all this into a "Buyers' Market"

an immutable habit of descending behind the horizon. And the economic sun in which some of our misguided friends have been basking, is slowly descending. Let us hope that the sunbathers will get into warm clothes before the chill of financial darkness descends upon them.

It is a considered opinion that the purveyors of services—in all lines—in these United States have scored against themselves in indelible pencil the short and ugly word; "Lousy." I feel that the public has acquired an antipathy toward the snide attitude which the "Newve independent" have acquired post-Pearl Harbor.

This "hard-to-get" attitude may possibly be good business procedure among the movie stars, but it does not belong in a legitimate business. The business man who puts his potential customer in the position of a suppliant is, to put it bluntly, merely asking the direction to the nearest exit. And by "exit," I mean quite definitely, "the way out of business."

It is not too late to "bail out" of the high flying plane in which many of you may have strapped yourselves. That thing you have been sitting on since the WPB prohibited the manufacture of new radio receivers is a

parachute. If you will take the trouble to look at it for a moment, you will see that it is labeled "Good Will." It isn't necessary, you know, to wait until the ship crashes to extricate yourself. You can bail out now and the aforesaid parachute will, more than likely, get you back safely to earth. That, Old Boy, is where you belong if you are one of that astigmatic group of servicers who have been figuratively thumbing noses at the safety device which is called "Good Will."

Psychologists, Sales Managers, Soothsayers and Seers all seem to be in agreement that the most important concomitant to sales success in what is known as a "Buyer's Market" is that rare and highly precious ingredient known as "Good Will."

I suppose that you are in thorough agreement with that philosophy. If you aren't—you would not have read this far.

Buyer's Market

If you have learned to care deeply for the "Seller's Market" in which you have been operating for the past two years or so, you may be a bit grieved at bidding it farewell. You may disagree with W. Shakespeare's definition of "Parting is such sweet sorrow . . ." But it is well that you tear yourself away from the lovely wench who bears the monicker "Seller's Market" before it is too late. Parting may be sweet or sour sorrow—but part you must. For inevitably, there is tomorrow.

And tomorrow's market will be tagged; "Buyer's Market."

What a difference! Almost overnight the cocky lads in the servicing industries will be swamped by an

avalanche of customers who will gleefully reverse the "optic expectation" procedure. These long suffering souls, all of their pent up libidos now rampant, will apply the screws to the formerly independent craftsmen who made "hey! hey!" while the sun was shining on their side of the fence. If they do not, it will be the birth of Utopia.

For, t'was ever thus. The possessor of a dollar which the tradesman wants badly enough can practically do business on his own terms. It's that simple! Let the demand for goods or services exceed the supply and the purveyors of the aforesaid goods or services become afflicted with exaggerated egos and hardening of the arteries. Invariably, they play "hard to get."

But when the supply of services (or goods) is in excess of the demand, the servicing fraternity is about as hard to get as a baby with a lollypop!

Undoubtedly we will have a "Buyer's Market" in the servicing of radio and electrical appliance fields. When it will come is anybody's guess. I do not pretend to be a soothsayer and I therefore am not qualified to call dates. This much I will say; that the date of the next "Buyer's Market" will be too soon for some of the shortsighted lads who cannot see further than the ends of their proboscies. "B. M. Day" will probably catch many a servicer with his trousers at half mast.

Future Competition

Estimates of the number of
(Continued on page 32)



After Victory this is what many a customer may do to the serviceman



SIMPLE METHODS BRING RESULTS

In spite of manpower shortage, Shearn of Watertown, N. Y.

has found a way to keep his shop going full blast by using a housewife and a high-school student as helpers

CURTIS SHEARN RADIO SERVICE of Watertown, New York, is not connected in any way with the music store of the same name in which it is located, but it does use the store basement as headquarters for its repair activities. It also does have some very unusual ideas for wartime radio repairing.

First of all it asks customers to leave and pick up sets only between the hours of 8 A.M. and 10 A.M., and from 4 P.M. to 6 P.M. During these four hours daily, a receptionist is on duty to handle the customers. This receptionist is a housewife whose home and child-care duties preclude her handling any fulltime work, but who can work a short shift.

This lady also keeps the shop shipshape and attends to all office correspondence between patrons. For good measure, she checks the tube and replacement part stock daily. She handles everything save actual

shop servicing. Curtis Shearn believes that instead of spending valuable time training service help, it is infinitely wiser to hire outside help for reception duty only.

Between 10 A.M. and 4 P.M., the serviceman works uninterrupted, unbothered by incoming trade, because shop doors are closed and the store help on the first floor keeps persistent patrons away.

From 6 P.M. through 8 P.M. is home-call and delivery time. Some customers simply can't lug the sets in, and they have no car available. There are also invalids and commercial cases where a personal visit on the part of the serviceman must be made.

Curtis Shearn Radio-Service charges time and a half on all night calls plus a fifty cent special service fee. If no one is at home when he calls, customers are billed for an hour's labor and the special costs fee, regardless. This procedure soon eliminates persons who are not at

home when this radioman makes the call.

The fifty cent service charge applies on all home pickups and deliveries, but includes both pickup and return. Those who desire such home service must give a fairly good reason before the serviceman adds them to the list of "home-call customers."

Curtis Shearn also has a "special service department" in charge of a high school student, who is located in the shop near its entrance. All customers must visit this department first; and sets brought in by the serviceman are brought here first. Here tubes are checked; a hunt for loose connections is made; aerial and ground connections are checked; loud speakers inspected and the electric cord thoroughly gone over. The set chassis is pulled out and gone over for any loose connections. All minor repairs are made here with a soldering iron.

If defective tubes show up or a loose connection is discovered, repairs are made and the serviceman himself never even sees the set. The same labor and parts charge is made, of course, but the chief advantage is that many sets never get to the bench because they can be repaired, without bothering the overworked radio serviceman.

Another high school pupil has charge of what is termed the "strictly commercial" department which handles P.A. requests, installations for dances, checking juke box amplifiers, troubleshooting department store and factory intercommunication outfits, etc.

This high school student has been specially trained by the radioman at night and he is usually slightly over sixteen and therefore has almost a full year before the draft gets him. The local high school physics instructor is always glad to recommend several such individuals. Incidentally girls or boys can be trained and so used to good advantage.

When a customer phones or personally enters the shop the receptionist refers him to the proper department, *i. e.* the special service or strictly commercial division. If it has to do with a set already on the bench or in the serviceman's hands, the receptionist personally handles the situation. In this way commercial business can be kept up because the high school helper can work from 4 P.M. to 10 P.M. nightly visiting business places, and restaurants where radio or juke box installations need a once over.

Curtis Shearn Radio Service maintains a flat one week service time period. When a set is brought in or picked up, an identification card is given the customer with model, type, and other pertinent information

(Continued on page 32)



Curtis Shearn at the test bench of his well-equipped shop

KNOW YOUR OSCILLOGRAPH!

Prepared by the

**ENGINEERING DEPT.
ALLEN B. DUMONT
LABORATORIES, INC.***

The oscillograph is the most useful unit on the test bench. It is also the least understood. The article explains it fully

PART I.



Using the DuMont oscillograph in test procedure

Oscillograph Power Supplies

REQUIREMENTS of power supplies for cathode-ray oscillographs are more stringent than for the majority of electronic applications. Since power supply ripple voltages might show up as spurious deflection or cause modulation of beam intensity, good filtering is essential.

Transformer

The cathode-ray tube is extremely sensitive to electric and magnetic fields, therefore it is essential that the power transformer has a low external magnetic field and in some cases it must be equipped with a magnetic shield. The transformer should be located as remotely as possible from the cathode-ray tube and must be oriented so that its external field has the least effect of spurious deflection. Furthermore, the transformer, being the heaviest single component, should be located in a position such that the oscillograph will have an even weight distribution to facilitate its handling. Usually, a compromise must be made between these two factors. In general, the power transformer (and power supply) should be located near the rear of the instrument.

Since the majority of cathode-ray oscillographs are portable, it is essential to keep the size and weight of the transformer at a minimum consistent with good design practice. In no case, however, should a sacrifice be made in transformer ratings in order to obtain small size and weight. The insulation must be acceptable for at least the sum of the

maximum positive and negative voltages.

The power supply transformer should have a lamination stack designed for at least the minimum operating frequency and preferably for a lower frequency in order to keep external magnetic fields at a minimum. A high turns-per-volt ratio is desirable even though it tends to increase the physical size of the transformer.

Primary

The primary windings should be completely surrounded by a grounded electrostatic shield to prevent capacitive coupling to the high voltage winding.

A safety switch of the momentary close type, connected in series with one side of the primary to the power line, is usually mounted on the rear of the chassis. Such a mounting is used so that the switch is closed only when the chassis is completely within its cabinet. This protection is important since dangerously high voltages are employed.

Secondary

The exact voltages and currents required of the secondary windings of the power transformer will, of course, depend upon the subsequent oscillograph circuit. In all cases, the cathode-ray tube filament winding must be a separate winding and must be insulated from ground for at least the full accelerating potential. It is customary to insulate the windings from the core for at least twice the rated operating voltage plus 1000 volts. The cathode-ray tube heater winding also must be surrounded by a ground electrostatic

shield to eliminate capacitive coupling of this winding to other windings, which would cause distortion of the pattern by intensity modulation of the beam at power-line frequency. It is, likewise, desirable to shield the heater windings of the power supply regulator tubes, and these windings should be separate from the amplifier windings.

Amplifier voltages are usually obtained from a center-tapped secondary winding, such as those found in conventional radio receiver transformers. Secondary voltages in the order of 400 r.m.s. volts on either side of the center tap, and current values from 20 to 200 milliamperes, depending upon the d-c load requirements, are common.

High voltage for the cathode-ray tube is usually obtained from an extension of one side of the secondary winding. Voltages from 800 to 1500 volts r.m.s. either side of center tap are the usual supply voltages for 3 and 5 inch oscillographs. Current requirements are small, being in the order of 2 or 3 milliamperes.

Figure 1 shows the schematic diagram of a typical oscillograph transformer.

Low Voltage Supplies

The oscillograph may have several low-voltage supplies for the amplifier and other circuits. All of them may often be derived from the same transformer winding. The supply will usually have positive and negative sections, either or both of which may be regulated or unregulated.

The voltage and current requirements for the deflection amplifier circuits are determined by the deflection factor of the cathode-ray tube

for an unbalanced amplifier having the same signal-voltage output.

Filtering and Regulation

The power supplies for any low-level stages of the deflection amplifier usually must have better filtering, stability, and regulation, not only because any spurious signals introduced into these stages are amplified by the final amplifier, but also because such stages are usually unbalanced, or single-ended. In general, the percentage of ripple content should not exceed 0.5% of the d-c supply voltage. Final deflection amplifiers, which sometimes require high voltages, seldom need a regulated supply. Furthermore, it is common practice to supply from a common source, several circuits within the oscillograph performing different functions. The tendency toward coupling through the common impedance of the power supply must be lessened by reducing that impedance. Reduction of this impedance is accomplished effectively by the use of voltage regulating devices.

The two types of voltage regulators in general use in oscillographic circuits are the gas tube regulator and the electronic degenerative regulator.

Gas-tube regulators make use of the fact that, within their operating range, the voltage between electrodes is constant for large variations in electrode current. Some neon tubes and the VR series of cold-cathode discharge tubes are examples of this type of voltage regulator. The VR tubes will maintain constant voltage within the range of electrode currents from 5 to 30 milliamperes.

An additional rectifier may be connected as indicated in Figure 2. To provide a half-wave low-voltage negative supply from the same winding used for the positive supply, a simple resistance-capacitance filter following the rectifier will often suffice. Figure 2 also shows the complete circuit using VR tubes to produce positive and negative regulated voltages. The resistances in series with the VR tubes are used to limit the current to values within their operating range.

The degenerative regulator makes use of a high-vacuum tube connected between the power supply and the load and operated as a variable resistance in such a manner as to give a constant voltage across the load despite changes in line voltage or load current. A complete circuit of such a regulator is given in Figure 3.

High Voltage Supplies

In almost all oscillographs the accelerating electrode is operated at ground potential and the cathode at a negative potential. This potential may range from 1000 volts to 6000

volts or more. In oscillographs equipped with intensified-type cathode-ray tubes, the total accelerating potential is divided, so that part of it is applied between the cathode and the accelerating electrode, and the remainder between the accelerating electrode and the intensifier. The potential between the accelerating electrode and the intensifier should not exceed 50% of the total accelerating potential. Therefore, with the accelerating electrode at ground potential, the cathode will be negative and the intensifier positive. This somewhat simplifies the filter and transformer requirements for any individual electrode with respect to ground, although the total voltage is still the same. Insulation for the transformer must be based on the total accelerating potential.

The average potential of the deflection plates should be at or near the accelerating electrode potential to prevent acceleration of the beam by the deflection plates with resultant defocusing and change in deflection sensitivity. Simpler deflection plate coupling schemes may be used when the accelerating electrode is operated at ground potential since the hazard and complication of high voltages are eliminated.

While the voltages necessary to operate the cathode-ray tube are high, the currents required are small. Half-wave rectification and resistance-capacitance filtering is ample. Insufficient filtering, however, may cause spurious intensity modulation of the beam or modulation of deflection sensitivity in accordance with the residual power supply ripple. When circuits are provided for intensity modulation, better filtering of the high-voltage supply is necessary than for oscillographs in which this provision is not made.

Amplifier Design

The functions of the various amplifiers used in a cathode-ray oscillograph impose rigid requirements upon their design. Cathode-ray tube deflection elements necessarily operate at high signal potentials. Therefore, to provide an instrument suitable for wide application, it is necessary to provide amplification of the signals it is desired to study. These amplifiers should preferably be incorporated within the instrument itself. Although it is customary to refer to the voltage or power gain of an amplifier as a measure of its performance, actually, for oscillographic applications, these terms do not have any particular significance since a given amplifier will produce entirely different results with different cathode-ray tubes, and even with the same cathode-tube if the accelerating potential is changed. Also, most conventional amplifier ratings refer

(Continued on page 37)

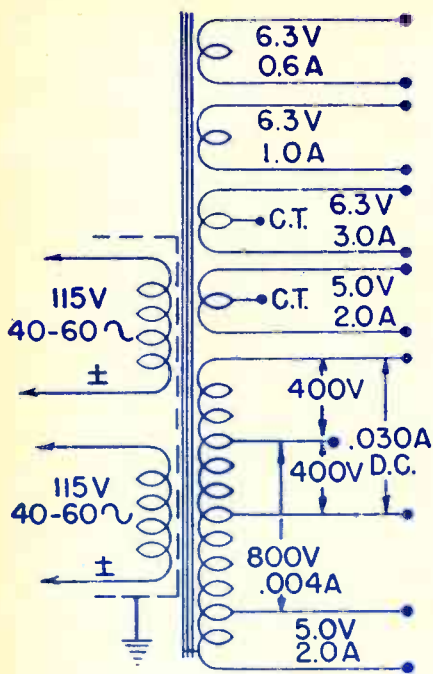


Figure 1

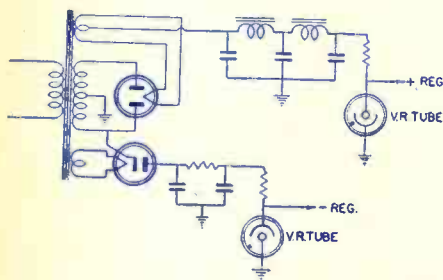


Figure 2

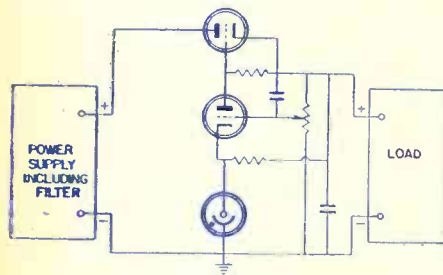


Figure 3

for the accelerating potential at which the tube will be operated, the type of amplifier circuits, the frequency response range, and other factors which may depend upon particular operating conditions.

When balanced deflection circuits are used, as is true in more recent designs, the spurious deflections resulting from line-voltage changes and from residual hum tend to be cancelled out. A further advantage in the use of balanced deflection circuits is that the deflection-amplifier supply voltage need be only half that

DISCUSSION....

Odds 'n Ends by KAK

The Horn (H. James) has a respite from going into the Army and is in New York City's Astor Hotel . . . Another of the early N'Orleans hot shot musicians died suddenly at L. A.: *Jimmie Noone* . . . 4-effer Yours is *Matty Matlock* . . . *Betty Hutton*, the blonde flywheel, has been signed by *Capitol*, and her first is "The Hobby Horse Ran Away" . . . *Jackson Teagarden* (not the Tee of *RCA*) has hit the road for the Pacific Northwest . . . *Bob Crosby* has been cast as the lead in the "Singing Sheriff" by *Universal* . . . Hollywood is the End-of-the Road for a host of biggies in musicland: *Benny Carter*, *Paul Whiteman*, *Louis Armstrong*, *Ina Ray Hutton*, *Xavier Cugat*, *Cootie Williams*, *Eddie Dunham*, *Jimmie Lunceford*, *Jan Garber* and *Louie Jordan*. Looks like a veritable trek west for all that there is in hot music. Add to the list: *Jimmie Dorsey*, *Charlie Barnet*, *Fletcher Henderson*, as well as *Hal MacIntyre*. Wonder what would happen to the rest of the country if these various gentry were all to give out at the same time. Would New York rock, and would the seismograph in Chicago record an earthquake?

Dave Dexter of *Capitol* (he's an old *Down Beat* man) advises that the famous album of *American Jazz* (-3) will be out early in July. It will have eight sides and feature the great *Jack Tea*, *J. Sullivan*, *Bigard*, the late *Noone*, *Eddie Miller*, *Pete Johnson*, *A. Shapiro*, *Zutty* and a host of



Yvonne King (of the King Sisters) autographs the RCA-Victor hound

other men too numerous to mention (well you ought to for our money!). The chirpie that will floor you will be *Peggy Lee* . . . *Kay Kyser* has recovered sufficiently to do a dance in his current film at *Columbia* . . . *Artie Shaw* and the Press are still phhhhhht! (Excuse me, please *W. Winchell*) . . . The "Esquire Jazz Concert" may hit the Pan-Pacific Auditorium in Hollywood yet according to *Dave Smart* of the rag . . . *Bob Crosby* passed his physical and is just waiting . . . *Nappy Lamare* wishes *Unca Sam* would make up his mind about *Crosby* so that he, *Lamare*, can drop or go ahead with his plans for his own ork . . . *Nat Burton* is putting lyrics into a bunch of *Dave Rose* tunes . . . *Linda Barrie*, who got herself fame in the old Chicago *Three Deuces* with a small combo that could really raise your hair with their "Shadrack", put together a trio of singers which adopted her last name; and now *The Barries* are recording for *Capitol*. If it's anything like what we heard in the Windy City, it's out of this world.

Eddie Dunham is bringing his all girl band to L.A. to play some one nighters . . . *Charlie Barnet*, previously 4-F'ed twice, is up for another examination. *Charlie* wants to know if they are going to defer him finally or is he jest fascinating! . . . *Martha Tilton*, who rose to fame with *Benny Goodman's* band, is recording one for *Capitol* which should be a duzy: "Texas Polka", with *Paul Weston's* Ork. Thought that they did a 6-shooter dance in Texas, not any polka . . . *Martha Raye* is told to expect twins! She is married to *Nick Condos* who is currently featured in Chicago. If the twins are girls and look like *Marthy*, what a combo that would make . . . *Mitzi Mayfair* and *Charlie Henderson* have committed matrimony . . . *Cootie Williams* and *Ella Fitzgerald*, ditto the *Ink Spots* are all debut-ing in L.A. this month . . . *Zutty Singleton*, ace drummer boy, has joined *Happy Johnson's* band . . . *Nappy Lamare* had him for a while in his small combo . . . *Bob Hope's* new pix is in technicolor. Good thing he never pulls any "blue gags" because of the tint it would give his scenes . . . Oh, alright, so it isn't a good gag! But I got it right from *Bob Hope's* brother, *No Hope!* . . .

Anyone here know the brother of the "March of Time,"—Waste of Time? . . . *Gus Arnheim* is on the move in the Northwest . . . Newest addict of the skins, is *Cass Daley*. She used to lay them in the aisles at *Murray's* in Tuckahoe, N. Y., when this columnist was younger . . . OK, so it was not so long ago . . . The drum-beating of *La Daley* is for pix purposes only . . . Ask her about the time she whistled in the club's dressing room (taboo in the theatre anywhere's) in Tuckahoe during a convention there . . . *Horace Henderson* is banging the 88-box fer his bro . . . *Martha Tilton's* husband goes Navy soon. Hope he makes those Japs sing like anything! . . . *Dale Evans*, for-

merly of *NBC*, Chicago, is signed on to the *Jack Carson* show . . . The solid dew in L.A. has ended. Real summer out here now! . . . *Xavier Cugat* will pix it at *Metro* soon . . . *Dick Haymes* moves into another pix pronto. He finished his "When Irish Eyes, & etc." . . . *Jerry Colonna*, singer par excellence, is signed by *Capitol* and will pix it at *Republic* . . . *Anita O'Day*, who started up in that same *3-Deuces* mentioned so often in this column, is now with *Stan Kenton*. *O'Day* is the only gal we know who can sing counter-point . . . *Slick Jones*, former skin-beater with the late *Fats Waller*, has gone *Louie Jordan* . . . *Jess Stacy*, 88-er, will eventually go out on his own . . . *Edgar Bergen* gives way to a singing show when he takes leave for the summer . . .

Ginny Simms is in New York for her show at the *Capitol* . . . *Lena Horne*, sepialovely, will sing "Liza" with *Aving Long* in *Metro's* Ziegfeld Follies Pix . . . *Liz* (Martha's sister) *Tilton* is with *Jan Garber* . . . *The Voice* will start his 3rd pix soon at *Metro* . . . *The Merry Macs*, revised, went east for personal appearances . . . *Icky Morgan* holds down the banjo with *Spike Jones*, his predecessor having been drafted . . . *Jose* (pronounced Hosay) *Iturbi* will pix it at *MGM* . . . Ditto *Alec Templeton* . . . *Ferde* (Grand Canyon Suite) *Grofe* has clefted another, "Aviation Suite." . . . Suites us! (oh, oh, oh!)

From *RCA*: The man with the 3 first names, *John Charles Thomas*, has waxed an album (M-966) of his most popular songs . . . *Chubby* (300 pounds) *Silver* has gone with *Sammy Kaye* as sax-man . . . *Dinah Shore* encores it with "I'll Walk Alone" and "It Could Happen to You." . . . *Spike Jones* has more chirpies than musikers . . . *Vaughn Monroe* has added a quartet of voices to his ork . . . *Victor*



Honoring the late Fats Waller is the Victor Album P-151, released recently

has put out a new album of *Glenn Miller*-ana. It's No. P-148 and contains most of *Glenn Miller's* best tunes done the way they should be. . . . The *4 King Sisters* have opened a dress shop in the San Fernando Valley, Calif. . . . *Perry Como* (of whom it has been said that he sounds more like *Bing Crosby* than does *Bing*) will probably click in pix if the advance reports are any indication. . . . *Jose Iturbi* (see name pronunciation above) is now a major in the Civil Air Patrol. . . . They wear Army uniforms with the red tab on the shoulders. . . .

Macklin Marrow has been appointed Red Seal Music Director at *RCA-Victor*. . . . *Sammy Kaye* had a tank named after him by *Sgt. Ray Kincaid*. . . . *Artie Shaw's* Navy Band has been taken over by *Sam Donahue* and is entertaining troops of the Atlantic Area in England. . . . *Alvino Rey* got Navy. He's at Great Lakes. . . . Believe It Or Rip, but *Spike Jones'* original version of "Der Fuehrer's Face" brought over \$13,000 in war bonds at a war bond auction in San Bernardino, Calif. The money will be used to "pffhhht" right in der fuehrer's face, you may be sure! . . .

It's "Professor" *Ellington* now. He lectured before students at Boston and Harvard Universities recently. Other lecturer: *Igor Stravinsky*. . . . *Dinah Shore* wrote a letter to an Army private who was supposed to be stationed in Texas. The letter went half-way around the world, and was finally returned with this comment, "Ad-

dressee is now prisoner of war." . . . *Charlie Spivak* is 4-egger yours. . . . *Bob Hope* and *VP Wallace* broke more dishes than they washed the other PM in that Hollywood canteen. (That's what it says here—it does. But we don't believe it, and don't you, either. Any man who can juggle the politics of the country as does *VP Wallace*, or who can lay—and handle—the "eggs" that does *Bob Hope*, couldn't be guilty of such a thing. Or could they? . . .)

And of course you have heard the one about the chicken which had been run over by an *Austin* car. It got up, shook itself, and said, "My, what a rough rooster!" . . . With that we'll get up, shake ourselves and be seein' you next month. . . .

Record Reviews

Decca:

Black Label (23,000 Series) Release
23320: *Kitty Carlisle* with *Harry Sosnik's* Orch.—"I'll Get By"; "I'll Remember April." One of the biggest request songs in the country today is "I'll Get By" as it was done in the picture, "A Guy Named Joe." Here it is—a straightforward interpretation of the song with big-orchestra accompaniment. "I'll Remember April" was originally done in a picture, about three and a half years ago.

Black Label (18,000 Series) Release
18599: *Mills Brothers*. "You Always Hurt the One You Love"; "Till Then." The most important thing we can tell you



This is the well-known *Dinah Shore*; her records have delighted millions

about this record is that it is the *Mills Brothers'* first release since "Paper Doll" and it lokos as though it has the same possibilities as that great hit.

Blue Label (4,000 Series) Release
4441: *Dick Robertson* and *His Orchestra*. "I'd Like to Give My Dog to Uncle Sam"; "One Face Missing from the Picture." Here are two war-time sentimental songs with great appeal. The first has as a sub-title "The blind boy and his dog" and is a real tear-jerker. The coupling also is in the same vein. Both tunes are catching on and get big requests. They are played in fox-trot tempo.

Black Label (18,000 Series) Release
18600: *Helen Forrest*—Orch. directed by *Camarata*. "Time Waits For No One"; "In a Moment of Madness." This is *Helen Forrest's* first solo record for *Decca*. "Time Waits For No One" is the theme that is played throughout the *Warner Bros. Picture*, "Shine On Harvest Moon." Coupling is one that *Helen Forrest* introduces in the (as yet) unreleased picture, "Two Girls and a Sailor."

18601: *Charlie Barnet* and his *Orchestra*. "My Heart Isn't In It"; "Saltin' Away My Sweet Dreams" (Until my sugar comes home to me). *Charlie* and the boys provide an excellent background for their vocalist, *Gwen Tynes*. *Gwen* also takes the vocal on the reverse, singing a tune that makes its first appearance anywhere.

Blue Label (4,000 Series) Release
4442: *Hoosier Hot Shots*. "She Broke My Heart In Three Places"; "Don't Change Horses." This is the debut of the *Hoosier Hot Shots* and they start with two new tunes written by the writers of "Mairzy Doats." Note that "She Broke My Heart In Three Places" is subtitled, "Seattle, Chicago and New York." Both sides are in the *Hot Shots'* usual style, including passages for automobile horn, slide whistle and washboard.

RCA-Victor:

Gould: *Latin American Symphonette* (*Symphonette* No. 1) (Album DM-964); *Rochester Philharmonic Orchestra*, *Jose Iturbi*, Conductor.

The "Latin American Symphonette" of *Morton Gould*, transcribed on records by the *Rochester Philharmonic Orchestra* under the dynamic baton of *Jose Iturbi*, is a pulsating and brilliant work of four movements. It makes its disc debut as a *Victor* album release for June.

(Continued on page 30)

He "pffht" in der Fuehrer's Face to the Tune of \$13,000, did *Spike Jones* shown here





YESTERDAY *and* TODAY!

Before Pearl Harbor, the leading line of sectional and telescopic antennas used by manufacturers of automobiles, radios and portable radios carried the **WARD** trademark.

Of course, today, all production is going to further the war effort, and men in tanks, planes, command cars—in communication units of all kinds—are becoming familiar with the name of **WARD**. It appears on antennas used on communication equipment all over the fighting front.

The expertness of design and manufacture that made **WARD** the leader in the pre-war period and during wartime, is being supplemented by knowledge gained from the war effort. After the armistice is signed, there will be new and improved products. If the use or specifying of aerials is included in your post-war planning, or if you are a distributor, look to **WARD**!

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THE WARD PRODUCTS CORPORATION
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Technical Service

Portfolio

SECTION XXXIX

Audio phase inverters increase the reproduction fidelity. This section deals with their circuit and design

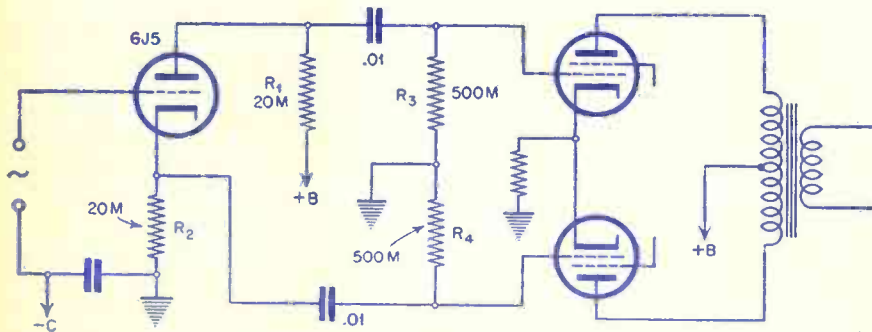


Figure 1

IN most audio amplifier circuits developed during the past eight years, the phase inverter has almost completely superseded the audio transformer formerly employed for interstage coupling. Because the sole elements of phase-inverter circuits are resistors and condensers which, in general, are not particularly critical in value, the phase inverter is economical both in cost and space requirements. The latter consideration is of special importance in the design of midget receivers. Further, with this type circuit, it is possible to obtain more uniform frequency response and higher voltage step-up—in some circuits—

than can be secured with low-priced audio transformers. While good audio transformers provide greater inherent stability, and are therefore more generally used in commercial communications work and in higher-priced receivers, for the average low-priced household receiver the phase inverter has worked out very satisfactorily. Because of the necessarily high values of resistance employed in the grid circuits following the phase inverter, transformer coupling is preferred in designs employing power tubes operated in Class A-prime, where grid current flows over a portion of the applied signal cycle. The purpose of the phase in-

verter is to couple a single-ended amplifier stage to a push-pull stage. In order to do this, the circuit is so arranged that output signals equal in magnitude but opposite in phase are produced. One of the simplest and most effective methods of accomplishing this is illustrated in the phase-inverter circuit of Figure 1. A simple triode, such as the 6J5, is used and the plate and cathode resistors are made equal in value. When a signal is applied to the grid of the 6J5, over the positive half-cycle the current in both resistors R1 and R2 increases. This increase in current causes an increase in the voltage drop across both R1 and R2. As a result, the potential at the plate of the 6J5 becomes more negative with respect to ground. But, in the cathode circuit, the increase in voltage drop across R2 causes the cathode to become more positive with respect to ground. When resistor R1 and R2 are equal in value, the peak negative voltage at the plate is equal to the peak positive voltage resulting at the cathode. Because these two peaks are opposite in polarity at the same instant, they are said to be 180° out of phase. Therefore, the signal voltages applied in the manner shown in Figure 1 to the grids of the output tubes which follow are in proper phase for correct push-pull.

(Continued on page 22)

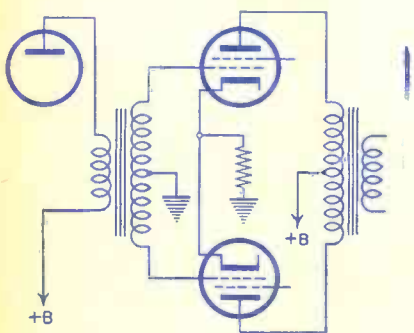


Figure 2

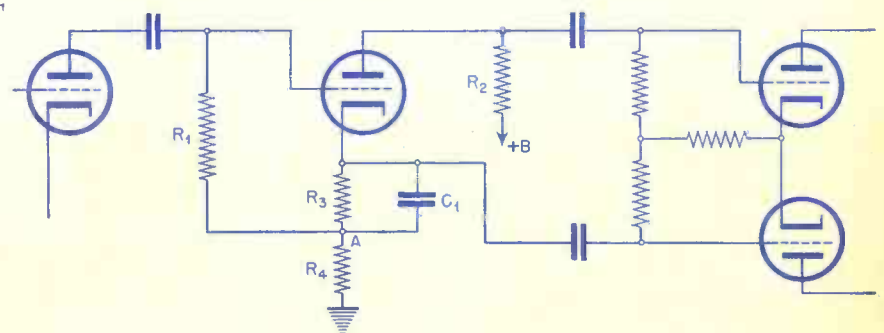


Figure 3



...air 150
of
miles of enemy-held coast has
been gained. * * *

Everest Topped by Flier's Find?

(At a U. S. Air Base) An American flier said today that while flying an uncharted route across part of China, he was surprised to find that his altitude of more than 30,000 feet left him still some 2,000 feet below the peak of a mysterious mountain which reared its cloud-shrouded heights alongside his course.

Mt. Everest, world's highest known peak is 29,141 feet high. Thus, it appeared that the new, unnamed mountain might prove to be a record-breaking height if later exploration corroborates the aviator's observations.

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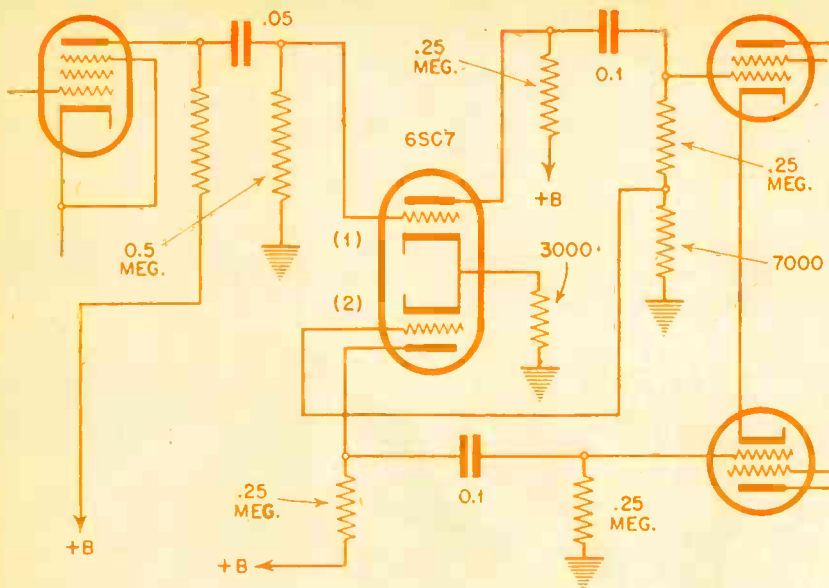
a new HIGH...

The war's end will bring the day when scientific expeditions may verify a new high on the world's roof. When that time comes, the world will also know a new high in the quality of electronic products . . . through radio and other electronic devices built by

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tion of the tubes which follow are realized.

Advantages of the circuit of *Figure 1* are its simplicity and independence of changes in tube characteristics. If the tube depreciates, the signal voltage across each

← Figure 4

resistor, R1 and R2, is reduced proportionately, but proper phase inversion action is still obtained and the signal voltages across each resistor remain the same. Further, since this is a cathode-follower circuit with considerable degeneration, distortion is reduced. Disadvantages are that a voltage divider is required to apply the proper C-bias voltage to the grid of the 6J5. Furthermore, the maximum output voltage delivered across the push-pull grids is only about 1.8 times the applied input signal voltage at the 6J5 grid. This is generally insufficient to drive any of

← Figure 6

the larger power tubes, such as the 6L6 or power triodes, to full output, though it is just adequate for the 25L6 and others requiring less than approximately 7.2 volts at the grid for full power output.

A modification of the circuit of *Figure 1*, which eliminates the need for a separate C bias and which provides much greater gain, is shown in *Figure 3*. Resistors R2 and R4 are made equal in value, as in *Figure 1*, but a cathode bias resistor R3, heavily by-passed by condenser C1, is employed to provide the proper bias voltage for the grid of the inverter tube. The grid return is then made to the junction of resistors R4 and R3. Because resistor R3 is by-passed, substantially no signal voltage is developed across it and, consequently, there is no degeneration. Thus a gain of the order of 14, as against 1.8 for the circuit of *Figure 1*, may be obtained. From an academic standpoint, the circuit of *Figure 3* is not quite as good insofar as proper phase inversion action is concerned because stray capacitances shunting resistor R4—which include that of the wiring of the output of the preceding tube—tend to cause a decrease in the signal voltage and consequent unbalance, at higher frequencies. From a practical standpoint, this effect is negligible in household receivers.

The type of circuit shown in *Figure 4* has achieved wide popularity in modern receivers because of the relatively high gain which

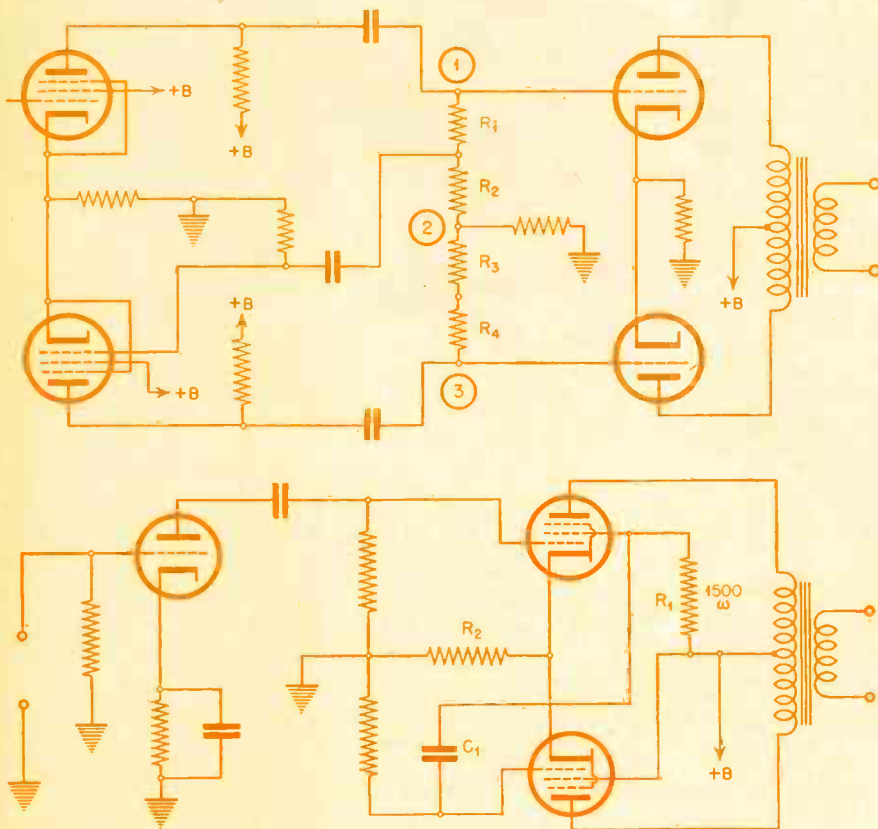


Figure 7

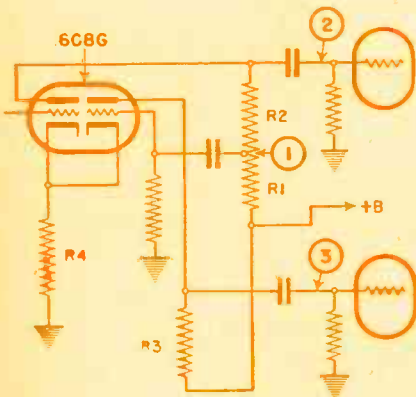


Figure 5

A standard push-pull interstage transformer circuit is shown for comparison in *Figure 2*. Here the secondary is center-tapped and connected to ground. The signal voltage developed across the secondary is thus equally divided between the two halves of the transformer secondary. At the instant the upper end of the transformer secondary develops a maximum positive signal-voltage peak, the lower end is at a maximum negative peak. Thus the conditions for push-pull opera-



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130,000,000 Americans are using their radios constantly to keep up with war news — are finding out what radio really can do — are having their appetites whetted for better radio equipment — can't get what they want now — are going to start to better themselves, radio-ly speaking, the minute the war is over.

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"Ma, we're going to have a real humdinger radio when the war is over"



treating 'em as pleasantly as your overworked nervous system will permit. Read trade publications and talk to Jobbers' representatives to keep wise on what's coming. Modernize your shop.

"I'm going to use an International Resistor Control in your set, Mr. Herold"



And remember that we radio-shop customers, for whom I speak, always get a glow out of knowing that you handle and use famous products in your shop. If you tell me, f'rinstance, that you use International Resistance Units, I know you know what's what.

Television sets may be almost as common as electric toasters not too long after the war.

So, hang on, brother. If you can "take it" these days, you'll reap richly in them days to come.

But there'll be lots of competition and you'll have to be plenty smart and ready. List your prospective customers right now, and keep your present customers by wrapping 'em in cotton and by

No. 5 in a series of special messages prepared by America's famous business writer, humorist and cartoonist, Don Herold . . . In sponsoring these Don Herold "broadcasts," IRC pays tribute to the thousands of Radio Service Men who, whenever possible, specify and use IRC resistance units in their work.



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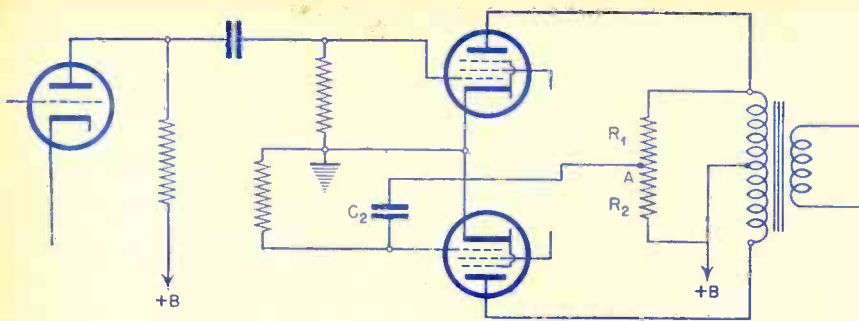


Figure 8

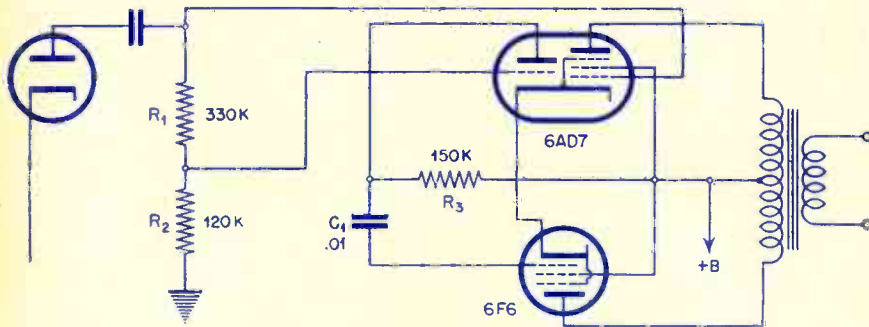


Figure 9

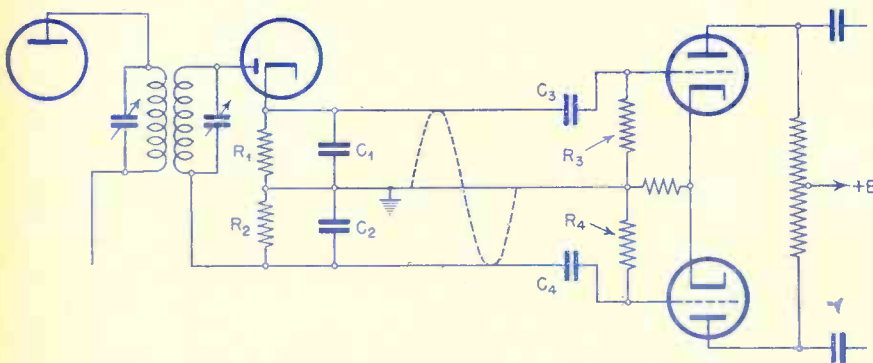


Figure 10

may be obtained from it, as well as its simplicity. Using the values of resistors shown, a gain of 36 (approximately) is obtained from each section of the 6SC7, or a total signal voltage output across the push-pull grids of about 72 times the input voltage. Because the maximum input signal voltage must be kept below 2 volts, as compared with about 8 volts for the circuits of Figures 1 and 3, the comparative possible output voltages are not quite as greatly in favor of this circuit as might at first appear. But the low signal input voltage required gives the circuit of Figure 4 an edge insofar as sensitivity is concerned.

In operation, a signal voltage applied to the grid of the first section of the 6SC7 at point (1) is amplified and the resulting output voltage is applied to the grid of the following (upper) tube and across the grid resistors of .25

megohms and 7000 ohms, in series. The signal voltage developed at the junction of these grid resistors is equal to 7000/257,000th of the total voltage across these resistors. This is equal to approximately 1/36th of the output voltage, and is in turn equal to the input voltage applied at point (1) of the upper section of the 6SC7, provided the gain of the tube and circuit is 36. This output signal voltage is opposite in phase to the input voltage. Consequently, when applied to the grid of the lower section of the 6SC7, point (2), it is equal in magnitude and opposite in phase to that at point (1). Because the plate load resistors of each section of the 6SC7 are equal, and because the grid resistors of the following power tubes are likewise substantially equal in value, the output voltages obtained are equal in magnitude and opposite in phase.

Another phase inverter circuit,

incorporating the 6C8G tube, is shown in Figure 5. The action is substantially the same as that described for the circuit of Figure 4, but the gain is somewhat less—about 24. When functioning properly, the output signal voltages from points (2) and (3) to ground should be equal in magnitude and opposite in phase, and the voltage at point (1) should be the same as that applied to the first section grid. It is good to know that the circuits of Figure 4 and 5 may be used interchangeably when procurement difficulties arise insofar as tube replacements are concerned. The fundamental difference between these two circuits lies in the fact that, in the circuit of Figure 5, the divider circuit is employed in the plate load of the tube, while in the circuit of Figure 4, the divider is in the grid circuit. There is some advantage in taking off the inverted signal voltage from the plate circuit in that any phase shift which may occur at low frequencies due to the grid coupling condenser is eliminated; this is not too serious.

In any of the circuits, such as those shown in Figures 4 and 5, where proper equalization of output voltages is dependent upon the gain of each tube (or of each tube section in twin-type tubes), being identical, it is occasionally necessary to select tubes to make certain balanced output voltages are obtained. Alternatively, a circuit which automatically compensates, in part, for variations in tube characteristics may be employed. Such a circuit (which is a modification of the circuit of Figure 4 and which is widely used), is shown in Figure 6. Here the modification consists of incorporating in the grid-return circuits of each of the output tubes, a resistor, R3. Thus, the total signal voltage developed across each output tube grid is composed of that which is developed across points (1) and (2), for the upper section, and points (2) and (3) for the lower section, but opposed by a bucking voltage which is developed across resistor R3. This occurs because the signal voltages from each grid return circuit have to pass through resistor R3. When considering the positive half-cycle of the signal voltage, it is necessary to realize that a portion of the negative half-cycle voltage is likewise being formed across resistor R3. The result is that any difference in output signal voltage from one section of the phase inverter is counter-

balanced by an increase or decrease, as the case may be, of the opposing voltage across resistor R3. Thus a degree of automatic balancing of the output voltages is obtained. Because this action is slightly degenerative, the gain is not quite as great as is realized with the simpler circuits of *Figures 4 and 5*, but improved performance results.

Methods have been devised for obtaining phase inversion in the output power tubes themselves, thus eliminating the need for intervening tubes and circuits. An example is shown in *Figure 7*. Here a resistor, R1, is inserted in series with the screen of one of the power output tubes and the signal voltage developed across it is fed back to the input control grid of the other power tube through condenser C1. The action is the same as for the circuits previously described.

Still another method, one of the earliest, is known in *Figure 8*. In this circuit, a voltage divider composed of the resistors R1 and R2 is shunted across one-half the output transformer primary. The voltage developed across resistor R2 is fed through condenser C2 to the grid of the second push-pull output tube. For proper balance, the voltage across resistor R2 must be equal to the input signal voltage applied to the upper tube grid. In order to obtain this, the ratio of the resistance of resistor R2 to resistor R1 plus resistor R2 must be the same as the ratio of the input signal voltage to the output signal voltage developed across one-half the output transformer primary. Thus, if the gain is 15—which is about right for a power pentode—resistor R1 could be 14,000 ohms and resistor R2, 1000 ohms, or each of these values could be multiplied by any desired number provided the proportions are maintained. In general, the total resistance should be of the order of 50,000 ohms. If it is made lower, appreciable loading of the transformer primary will take place. If higher, the balance at higher frequencies will be affected, due to stray capacitances. This circuit is a neat way of getting around shortages in replacements for standard phase-inverter tubes—and it saves space in remodeling sets.

Another circuit using the signal voltage developed in an output tube for phase-inversion purposes is

shown in *Figure 9*. The 6AD7 triode-pentode is employed. Because the pentode section of the 6AD7 is identical in characteristics to the 6F6, equality of output voltage and power may be obtained provided the input signal voltages are identical. This is obtained by employing the triode section of the 6AD7 as a phase inverter, the input signal voltage being applied through the grid-return voltage divider, resistors R1 and R2. These resistors are so proportioned that, when used with the plate load resistor R3, the signal voltage applied to the 6F6 is the same as that applied to the pentode section of the 6AD7, but reversed in phase.

In all the preceding circuits phase inversion has been obtained by using an amplifier tube in some fashion. It is also possible to do the job with a diode detector. Just how this is done is shown in *Figure 10*. In this circuit, resistors R1 and R2 are made equal in value (about 100,000 ohms each) and the junction is grounded. The output demodulated voltage wave across the two resistors then resembles that secured when a center-tapped transformer secondary in a push-pull coupled circuit is used. The output voltage is fed through condensers C3 and C4 to the respective grids of the push-pull amplifier tubes.

Because a strong signal is necessary to obtain sufficient demodu-

lated voltage to drive even the more sensitive power output tubes, this circuit application is generally limited to feeding push-pull inter-stage amplifier tubes. It is important, too, that resistors R3 and R4 be alike in ohmage. This is likewise the case in preceding circuits discussed where the grid resistors form a portion of the load circuit.

Trouble-shooting in phase inverter stages is simple when the push-pull tubes employ a common cathode resistor in the bias circuit. One method, suggested by *Reich*, is to connect a pair of phones across the cathode-bias resistor and adjust the resistors until the signal at the fundamental frequency is a minimum. There will be harmonics, of course, but they are readily identifiable by their higher pitch. A *Chanalyst* or other signal-tracing instrument can be similarly employed, using the audio channel, and adjusting for minimum indicated signal level. The cathode-ray oscillograph is an ideal instrument for the purpose because it indicates phase relations as well as the magnitude of the voltages. By connecting to grid and ground of each output tube in turn, the height of the resulting observed image will indicate relative magnitudes of the applied voltages. They should be identical. The phase relations are identified by noting the position of the positive

(Continued on page 37)



Electronic mine detector. Exploding coil (or plate) B passes over mine C causing meter A to indicate. Soldier carries equipment over shoulder

Letters to the Editor

Editor:

Regarding your article, in the April issue of the Service Dealer, on the conversion of automobile radios for use on a.c. (110 volt) lines. I have changed a number of auto sets for operation off the power lines, and have had no trouble with any type I have tried.

I have found that it is far more practical to install a small power transformer, which has a 6.3 volt filament winding which will supply enough current for the tubes used in the auto set, and a high voltage winding which will supply enough current for the tubes used, than it is to use an A-eliminator (which would probably be hard to find anyway), as you suggest in your article.

It usually takes no longer to install a power transformer in an auto set than it would take to install one in an A.C. set, and if the set uses a rectifier tube, is no more trouble. In sets using an oz4 rectifier, you can substitute a 6x5, if desired.

In sets using the self rectifying type vibrator, it is a simple operation to remove the vibrator socket (since the vibrator is not used anyway), and replace it with an octal socket for a 6x5 tube. Most servicemen can find small power transformers around the shop, from junked receivers,

etc., which are suitable. The rectifier filament winding can be disregarded.

As for the antenna, a short wire (usually 3 or 4 ft.) tacked inside the cabinet will work quite well. Ground each side of the power line to the chassis through a paper capacitor (.01 to .05 mfd.). If this is done the hum will be no worse than is found in the usual A.C. set.

I mention tacking the wire used as an antenna, inside the cabinet. Of course this is done only if the set is installed in a wooden cabinet. And don't forget to adjust the ant. trimmer after the job is completed.

Charles A. Dukes, Jr.
Arkansas

Editor:

I have been noticing during the past months the number of letters of "gripes" coming concerning certain wholesale houses who let out such a small number of tubes to their customers because they withhold them so that they may service sets themselves.

I believe in "Live and Let Live" among other things and include some sidetracking of tubes for this purpose, but when a distributor such as "Blank Co."* of Big City,* N. Y., not only lets no tubes out and lets absolutely nothing out anymore except at full retail price, but advertises "Why let inexperienced servicemen repair your set," etc. as they do constantly in the columns of the Big City* Democrat & Chronicle (daily AND Sunday) I think that it is going a little too far.

Any Serviceman in or around Big City*

can and will attest to this situation. Why should this outfit be permitted to retain a distributorship? And how can such unfair trade practice be circumvented?

R. S. Komp
New York

* Names withheld for obvious reasons.

Editor:

Your Journal, March, 1944, page 10, in regard to Formulas.

Must have them. The reason they, or some of them are not taken, and not used, is not the formula, but the combination of two things of basic fact.

(One) I'd guess that 98% of your readers know a little about formulas, like myself, but not enough to work them, fit them into their own problems. Ignorance is great stuff, loads of it, and those that may complain are in two classes, the one that don't know, and the one that knows the whole works.

(Two) Make the Formulas go over, meaning that each formula must have an example right with it, regardless of the simplicity of the formula. Unless one is working with figures all the time books have to be searched through to find an answer, or a makeshift cut and try gone through for an answer. So with all formulas the example (in complete detail must come with it), your Journal could lead on this one item, and repeat now and then, making the formula page or column so that it could be cut out and booked or put up in shop or wherever one desired to keep such valuable information.

Hammond Mathews
Colorado



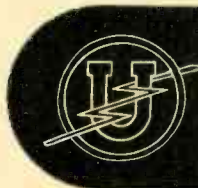
Available from local dealers
or by writing factory direct.

Yours for the asking!

Universal Stroboscope PHONOGRAPH AND RECORDER AID

This handy phonograph turntable speed indicator, complete with instructive folder, is now available gratis to all phonograph and recorder owners through their local dealers and jobbers. As a recorder aid the Universal Stroboscope will assist in maintaining pre-war quality of recording and reproducing equipment in true pitch and tempo.

Universal Microphone Co., pioneer manufacturers of microphones and home recording components as well as Professional Recording Studio Equipment, takes this means of rendering a service to the owners of phonograph and recording equipment. After victory is ours—dealer shelves will again stock the many new Universal recording components you have been waiting for.



UNIVERSAL MICROPHONE CO.

INGLEWOOD, CALIFORNIA

FIRST ON THE NORMANDY COAST

The Army's SCR-299's went ashore with the wave of Allied assault troops that split the 2nd front wide open. These mobile radio units rolled up on the beachhead early in the battle to serve as vitally important front line communications weapons to coordinate and direct the striking power of the land, sea and air forces. . . . In truck or duck, the Hallicrafters-built SCR-299's go anywhere and are sturdy enough to withstand front line action. Highly dependable and powerful, they "get the message through."

hallicrafters RADIO

THE HALLCRAFTERS CO., MANUFACTURERS OF RADIO
AND ELECTRONIC EQUIPMENT, CHICAGO 16, U. S. A.



BUY A WAR
BOND TODAY!



ELECTRICAL APPLIANCE

Retailing

Registered U. S.
Patent Office

Forecasts Electric Appliances Could Be Produced In Few Months

Barring a raw material bottleneck, "re-summption" models of electric home appliances will start to roll off the *Westinghouse Electric and Manufacture Company* assembly lines within a few months after the government authorizes production.

This prediction was made by *W. B. Montague*, application data manager of the Central District of Westinghouse recently.

"In order to fill a crying need for electric appliances which wartime restrictions have prevented civilians from buying, as soon as we are permitted we intend to get into production fast on essentially those appliances sold before the war," the speaker asserted.

Electric home appliance production by Westinghouse has been entirely sidetracked by the manufacture of binoculars, anti-tank shot, insecticide bombs and other war necessities, Mr. Montague told the Association. However, wartime manufacturing layouts in the appliance Divisions at Mansfield, Ohio, and East Springfield, Mass., were planned so that they could be re-shuffled quickly for mass production of home electric appliances.

The so-called "dream" appliances will come later, after it is certain the public wants them, the Westinghouse manager said. Undoubtedly, the broad strides made in research and engineering under the impetus of war requirements will bring many rapid and radical improvements in electrical equipment in the decade after the war which should further raise the American standard of living. Even now, today's electrical products are being studied critically to make tomorrow's better from

the angles of efficiency, utility and style. Revolutionary new developments will be brought along as quickly as they can be proved.

Crosley Appoints Montana Distributor

Great Falls Paper Company of Great Falls, Montana, has been appointed distributor in Montana for The Crosley Corporation, it was announced recently by *J. H. Rasmussen*, Crosley commercial manager.

The Great Falls Paper Company was established in 1913 and for a time was exclusively a paper concern. Later their lines were diversified under a department known as *The General Supply Company*. The Crosley line of products will be merchandised as soon as they are available through The General Supply Company.

Sylvania Fixtures Div. Opens New Lowell Plant

A new branch of *Sylvania Electric Products, Inc.*, at Lowell, Mass., is soon to go into production on fluorescent lamp fixture parts and special lighting products for the armed services, it was announced by *Lou S. Kimball*, manager of the company's fluorescent fixture plant at Ipswich, Mass.

Sylvania has leased a building containing 26,000 square feet of floor space, at 81-95 E. Merrimack Street, Lowell, and after extensive renovations, between 300 and 500 persons, the majority women, will be employed.

Stanley Brown, plant engineer of the company, estimated it would take almost a month to complete the improvements, which will include offices, rest rooms, a dispensary

with a nurse in attendance and other features assuring continuance of Sylvania's remarkable reputation for excellent working conditions. The majority of the work will be of the light assembly bench type, said Mr. Kimball, pointing out that starter switches and sockets will be among the products made.

Mr. Kimball announced that *Clem T. Baxter* will be project engineer in charge at Lowell.

Domestic Mechanical Refrigerator Industry

The industry service managers conference was held for the purpose of discussing the outlook for the repair and maintenance of existing domestic mechanical refrigerators this summer and the industry problems that may arise in preparing to meet hot weather demands.

Production of repair and maintenance parts for refrigerators is much higher now than it was a year ago, the industry members reported. The amount of material made available by WPB is adequate, they said, but shortages of manpower and facilities cause difficulties in the fabrication of the material. Facilities in the plants are used for war work to a large extent, and workers are being drafted in increasingly large numbers for service in the armed forces.

Besides the problem of obtaining manpower for production of refrigerator parts, the industry is faced with the problem of maintaining adequately staffed repair shops in the field. WPB officials, in reviewing the general manpower situation, said that deferments could not be expected for men under 26 years of age, and few, if any,

(Continued on page 35)



Sales Mgr. Louis C. Flaherty who has been appointed Crosley distributor


Part of the extensive campaign material of the Universal appliance scheme to get Post-War income for their distributors





It's CQ

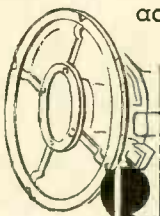
from the Battlefield Today!



You remember him, the kid next door who tinkered with short wave radio. Well, he's in uniform now, calling his CQ from foxholes in Italy and steaming Pacific jungles. Maybe, he's a radio operator on a bomber ... perhaps, he's an instructor. Whatever it is, you can be sure that his knowledge and experience are serving to help build a wartime communications system. Yes, from the hams came ready trained instructors, operators and engineers at a time when skilled technicians were vitally needed.

The radio amateur will be back one of these days, back to his much-loved tinkering. He'll want new equipment to add to his short wave rig. . . . He'll be looking for a JENSEN speaker because he wants highest fidelity in music, code and voice reproduction. There is no finer acoustic equipment than JENSEN reproducers.

*Manufacturers and Designers
of Fine Acoustic Equipment*



Jensen

RADIO MANUFACTURING COMPANY
6601 S. LARAMIE AVE., CHICAGO 38, U. S. A.

DISCUSSION

(Continued from page 18)

Reusner: Suite No. 1 (Album DM-969. Pachelbel: Canon (Included as final side in this album); The Arthur Fiedler Sinfonietta, Arthur Fiedler, Conductor.

The seventeenth century "Suite No. 1" by the lutenist Esajas Reusner, was revised in a piquant and tuneful arrangement by a contemporary, Johann Georg Stanley, for small orchestra. The Arthur Fiedler Sinfonietta, which has become the modern champion of small ensemble music, has recorded this delightful work under the direction of its distinguished founder and leader, Arthur Fiedler. It appears now as the third album on Victor's June list.

Kreisler: Allegretto in the Style of Boccherini (Record No. 10-1098). K. P. E. Bach: Solfeggietto. Rameau-Kreisler: Tambourin. William Primrose, Violist, with Joseph Kahn at the piano.

William Primrose, besides being one of the three great artists who have performed some of the choicest trio and instrumental masterpieces in the Victor chamber music series, is one of the foremost solo violists in the world. Mr. Primrose's skill was last displayed on records with Heifetz and Feuermann in the enthusiastically received Mozart "Divertimento in E Flat Major," and previously in the Bohmnyi "Serenade." He also was featured on records with Heifetz in the Mozart "Duo No. 2 in B Flat Major."

Now Victor is releasing several solo works by Mr. Primrose on a single Red Seal disc including the "Allegretto in the

style of Boccherini" by Kreisler, the "Solfeggietto" by K. P. E. Bach, arranged by the violist, and the Kreisler arrangement of "Tambourin" by Rameau.

Rachmaninoff: The Harvest of Sorrow. Op. 4, No. 5 (Record No. 11-8595). Gretchaninoff: Over the Steppe, Op. 5, No. 1. Alexander Kipnis, Bass, with Celius Dougherty at the piano.

The illustrious Russian basso Alexander Kipnis is represented in a new Victor Red Seal release singing the "Harvest of Sorrow" by Rachmaninoff, and "Over the Steppe" by Gretchaninoff.

These songs are expressive of the somber and moving sentiment of two of Russia's finest composers, and they are sung by one of the most talented singers to come from this country.

Decca

Black Label (18,000 Series) Release 18586—Bing Crosby with John Scott

Trotter & His Orchestra—"Poinciana," "San Fernando Valley."

"Poinciana" which you may have heard by now, is a new song with Spanish or Latin-American flavor. It's beginning to get around and seems to have solid hit possibilities. It is done here in bolero tempo by the incomparable Bing. As always, an excellent, apparently effortless performance. . . . Coupling is biggest in California where the San Fernando is. Song is popular all along the west coast, just starting to take hold further east.

Black Label (23,000 Series) Release

23297—Hildegard with Harry Sosnik & Orchestra—"Suddenly It's Spring," "Leave Us Face It."

The first title has been specially written for the picture, "Lady in The Dark," and is sung in the sophisticated style of Hildegard. . . . "Leave Us Face It" is the love song introduced on the hit radio show "Duffy's Tavern" starring Ed Gardner as "Archie."

Strauss: On the Beautiful Blue Danube (Waltz), Op. 314 (11-8580)

Arturo Toscanini and the NBC Symphony Orchestra

Complementing Victor's National Special Release of the Mignon Overture is this sparkling performance by Arturo Toscanini and the NBC Symphony Orchestra. The celebrated maestro has arranged it here in its completely uncut and original version which requires both sides of a twelve inch Red Seal record.

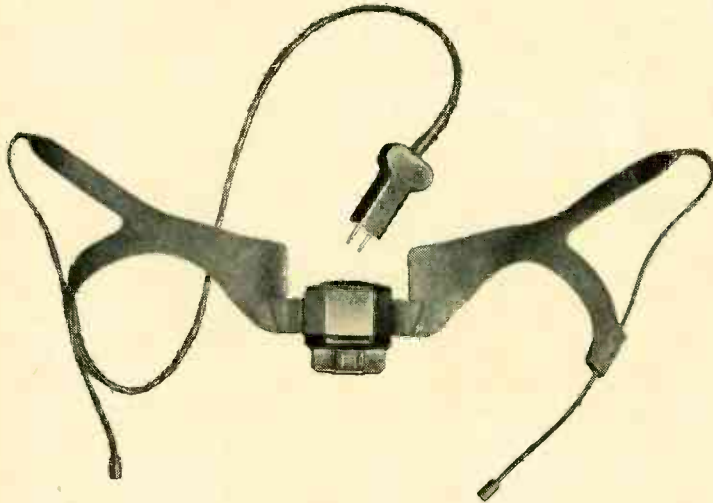
Sidelights on Plant Broadcasting

Psychologists note that the music programs played for war workers is creating a desire for classical music among people who never heard the works of the masters before. Various plants report employees requesting repeats of Beethoven, Bach, and Brahms. At one plant in the middle west an employee dropped a note in the request box asking the director to "play that Bronze Lullaby and Clair de Goon again."

The Universal Microphone Co., Inglewood, Cal., has re-issued the Stroboscope for bulk distribution to the trade. The firm published the device some years ago on a "cost price" base, but the present edition will be distributed gratis.

Printed on heavy stock with complete instructions, the set up will include individual folders in which to preserve and file the Stroboscope.

Distribution will be from the factory in



Electro-Voice DIFFERENTIAL MICROPHONE Model T-45 is its U.S. ARMY DESIGNATION

Developed by Electro-Voice engineers in collaboration with the Fort Monmouth Signal Laboratory, this Differential "Lip Mike" carries the voice clearly and distinctly above the roar of battle. Ambient sounds and reverberation are reduced to negligible levels.

- ◆ Frequency response substantially flat from 200-4000 cps.
- ◆ Low harmonic distortion
- ◆ Cancellation of ambient noise, but normal response to user's voice
- ◆ Self-supporting, to free both hands of the operator
- ◆ Uniform response in all positions
- ◆ Usable when gas mask, dust respirator or oxygen mask is required
- ◆ Unaffected by temperature cycles from -40° F. to +185° F.
- ◆ Ability to withstand complete immersion in water
- ◆ Physical strength to withstand 10,000 drops
- ◆ Weight, including harness, cord and plug, less than 2 ounces.

Electro-Voice MICROPHONES

Our full line includes Carbon, Dynamic and Velocity models . . . all at popular prices . . . for public address, industrial sound, sound recording and speech transmission applications. Consult your local radio parts jobber.



ELECTRO-VOICE MANUFACTURING CO., INC. • 1239 SOUTH BEND AVENUE • SOUTH BEND 24, INDIANA
Export Division: 13 East 40th Street, New York 16, N. Y. — U. S. A. Cables: ARLAB

Again Available

TO MEET MOST PRODUCTION SCHEDULES!



At WESTON, production finally has outstripped the overwhelming war demand for panel and other instruments . . . making WESTONS again obtainable on a basis to meet most war production schedules.

To experienced instrument users, this means they again can obtain the instruments whose design and manufacture incorporate the broadest instrument experience in surmounting the requirements of exacting applications. The instruments whose consistent, uniform performance simplifies their problems of inspection, handling and other burdensome procedure . . . and whose dependable, long-term accuracy assures better operating performance from the devices into which they're built.

Why not discuss your instrument schedules with WESTON, today . . . and be sure of obtaining the added product efficiency which authentic WESTONS provide.

Weston Electrical Instrument Corporation
618 Frelinghuysen Avenue, Newark 5, New Jersey

- Panel & Switchboard Instruments (DC, AC, and Thermo)
- Precision DC and AC Portables
- Instrument Transformers
- Specialized Test equipment
- Laboratory Standards
- Sensitive Relays
- Light Measurement Instruments
- Aircraft Instruments
- Electric Tachometers
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FOR OVER 55 YEARS LEADERS IN ELECTRICAL MEASURING INSTRUMENTS



FOR EVERY WAR PURPOSE NOW...
For you when possible!

TRANSMITTING
TUBES
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TUBES
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EXECUTIVE OFFICES

OWENSBORO · KENTUCKY

EXPORTS · 15 MOORE STREET · NEW YORK

RECEIVING
TUBES
INCANDESCENT
LAMPS
FLUORESCENT
LAMPS

Inglewood with sufficient space on each for trade imprint of individual firms. Universal's factory representatives may be contacted by jobbers, while dealers in turn can get their supply from wholesalers.

Although, in general, this procedure will result in speedy delivery of the giveaways, in instances where this routine is not practicable the trade can contact the factory direct.

Designed to work at 33½ or 78 RPM under a light of 25, 50 or 60 cycles, the Stroboscope is the generally accepted method of determining the exact turntable speed for high quality reproduction of phonograph records and transcriptions, thus enabling reproduction with true pitch and tempo.

Radio and recording studios, as well as individual owners of phonographs, radio-phonos and recorder combinations are the natural prospects for dealers to pass on the Stroboscope in building up a prospect or mailing list. (A stroboscopic disc was shown on the May, 1944, cover of RSD.—The Editors.)

Simple Methods

(Continued from page 14)

marked on card in indelible ink. It also has the date, marked in a full week later when the customer is to call. If set is repaired before that time, the receptionist will contact the customer, as a personal record is kept of the house phone number of all patrons.

Customers are urged, via the card, and personally by the receptionist, to call only during the four hour period daily and not to call until a full week has elapsed.

On all sets serviced a fully itemized bill including labor charges is handed the customer. A duplicate is kept in the shop files for serviceman's consultation purposes in determining just what repairs have been made previously, or in case of kickbacks.

Optic Expectoration

(Continued from page 13)

trained radio men (and women) in the armed forces run from 500,000 to 1,500,000. Possibly somewhere between the two extremes lies the true figure. The exact figure is not important. If only 200,000 potential radiotricians were to come out of the armed forces, well equipped by the best training in the World to give present services a tussle for the available radio repair business, it would be food for thought. And not very nourishing food at that.

Some years before Pearl Harbor, I listened to a learned dissertation on the subject of radio servicers. The speaker ventured the thought that the ratio of one radio serviceman to each 3,000 radio receivers in a given territory made for sound living conditions for the servicemen. It was his opinion that a ratio of one

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THE STANDBY OF SERVICEMEN

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**STANDARD TRANSFORMER
CORPORATION**

1500 NORTH HALSTED STREET · CHICAGO





Subscribe Now To radio service dealer

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(Remit by Check or Money Order. We cannot assume responsibility for cash sent thru mails)

COWAN PUBLISHING CORP.
342 Madison Ave., New York 17, N. Y.

Sirs: Here is my check (or money order) for \$..... Enter my subscription order for the next..... issues. The information given below is accurate. If my subscription is rejected I expect an immediate refund in full. Subscription Price: 12 issues \$2.—24 issues \$3. Canadian and Foreign subscription are \$3 annually.

Name (print carefully)

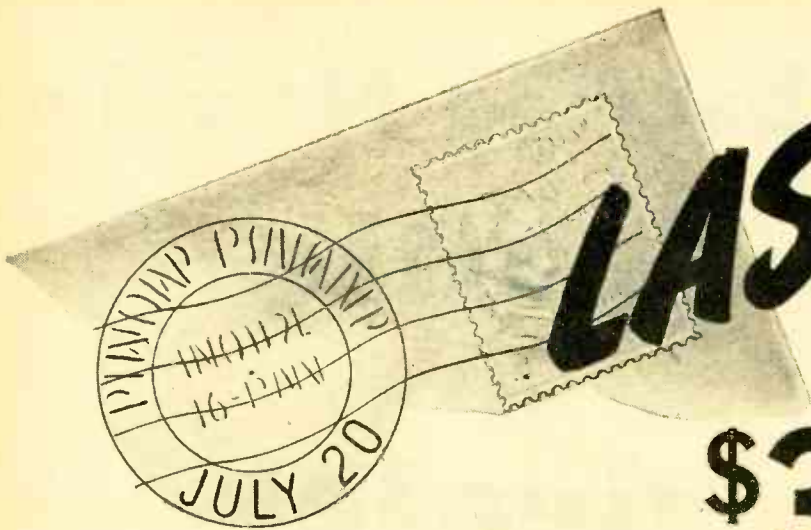
Address City State

Firm Name Year Est. 19.....

I am OWNER If some other classification or occupation, state it on the line below:
 DEP'T MGR.
 EMPLOYEE

Please check whether firm is

<input type="checkbox"/> Radio Dealer	<input type="checkbox"/> Radio Wholesaler	<input type="checkbox"/> Hardware Store
<input type="checkbox"/> Radio Service Organization	<input type="checkbox"/> Music Store	<input type="checkbox"/> Electrical Appliance Dealer
<input type="checkbox"/> Automotive Store	<input type="checkbox"/> Any other classification (State it)	



LAST CALL

WIN

\$3,000

in 5th WAR LOAN PRIZES

HURRY! HURRY!! HURRY!!!

All 5th War Loan Drive WINDOW DISPLAY CONTEST photographs must be in the mails not later than July 20. Address to: WAR BOND DISPLAY CONTEST, c/o The Display World, 1209 Sycamore Street, Cincinnati, Ohio.

This distinguished jury of five will judge this contest and all decisions will be final: Commander Edward J. Steichen, U.S. Navy, Washington; Walter K. Nield, V.P., Young & Rubicam, N.Y.C.; Lew Hahn, Gen. Mgr., NRDGA, N.Y.C.; Irma Ericsson, Adv. Mgr., Shulton, Inc., N.Y.C., and R. C. Kash, Editor of Display World, Cincinnati.

All contest photographs must be 8x10 and plainly marked on the face with the name of the store and city—as plans are now being made to prepare an exhibit of all contest photographs for public view in cities throughout the country. Later, this exhibit will become a part of the U.S. Treasury's archives in the history of the financing of World War II.

Remember! Get your entries in the mails by July 20. Win or lose, you've earned your Country's thanks. You've backed the attack—you've helped to sell more than before!

This is an official U. S. Treasury advertisement prepared under the auspices of Treasury Department and War Advertising Council. The Treasury Department acknowledges with appreciation the publication of this message by:

Radio Service Dealer

WINDOW CONTEST PHOTOGRAPHS

Here's the Contest Plan: SPONSORS—The National Association of Display Industries and The Display World. DATE—June 12 to July 8, inclusive.

PRIZES: A grand total of \$3,000 in 5th War Loan Bonds. Identical prizes for Group I, stores in cities of more than 100,000 population; Group II, for towns under 100,000.

- 1st PRIZE \$500
- 2nd PRIZE \$300
- 3rd PRIZE \$200
- 4th PRIZE \$100

AND 8 additional \$50 prizes

RULES: 1—Each display window must be devoted exclusively to a 5th War Loan display. 2—All photographs must be marked plainly on the back with the name of the one person selected by the store to receive the award, if any; and the exact date and length of time the display was in the window.



Radio Service Dealer

servicer per thousand receivers meant economic chaos for most radio repairmen.

While I do not state that his analysis was, or is correct, it gives an interesting basis for discussion of the post war radio servicing picture.

If the present estimated group of 14,000 radio servicers have their ranks augmented by 100,000 after the brawl is over; and if 80% of the estimated 40,000,000 wired homes have radios; and if post war receivers are much better than the pre-Pearl Harbor variety; will it be possible for the servicemen who is now snarling at the public—playing "hard-to-get"—to continue to conduct his business successfully?

The answer is obvious!

Give long suffering John Q. Public half a chance to do so, and he will pass up the exploiting servicer like a pay car passes a bum.

The customer who recently tried to have a volume control fixed and was told that it was necessary to run a response curve to determine the proper taper at a cost of \$7.50 before the replacement could be made is not likely to expose his bankroll to the not-so-tender mercies of that particular Jesse James again.

Let post-war competition produce a plethora of servicing establishments and it is a rather safe assumption that today's *Ill Will* builder will be tomorrow's business casualty.

The chap who stated that; "The only lesson we learn from history is that we never learn from history" must have had radio services in mind when he made that observation.

But hope springs eternal in the human breast and it is that elusive hope which prompted me to put these words on paper.

Electrical Appliance Retailing

(Continued from page 28)

for men between 26 and 30. For possible assistance in obtaining deferments for key workers, industry members were advised to see the Selective Service liaison men in the WPB regional offices.

The industry is voluntarily carrying out a program under which inoperative functional parts are exchanged for new ones and reconditioned by manufacturers. Other parts are salvaged by distributors or dealers. This program is proving highly successful, it was reported. In some instances as much as 90 per cent of the total amount of material originally allocated for the production of parts is being recovered.

It was pointed out that this practice had been followed, though on a limited scale, even before the war. Because of wartime shortages of materials, manpower, and facilities, the program has been expanded to apply to a longer list of refrigerator parts. In view of the continuing shortage of manpower, facilities, and materials, the industry group recommended that the present policy of exchanging functional parts be continued.

AC motor production is almost double what it was a year ago, industry members were told. About 85 per cent of total pro-

duction is going into combat equipment, but enough AC motors are expected to be available for most of the essential replacements for domestic mechanical refrigerators.

The freon situation is improving slowly, WPB officials said. All requests for freon for the re-operating of hermetically sealed units for household refrigerators are being granted by WPB.

Snappy Promotional Kit Gives Added Zest

A SNAPPY ten piece point-of-sale promotional kit designed to catch and retain the attention of the consumer is a dynamic "come on" to dealers to jump on the Universal band

wagon and make post-war selling more than wishful thinking.

Number one hit of the promotional package is the 40" x 28" blow-up of the colorful advertisement, "Make It More Than Wishful Thinking," which is guaranteed to catch attention and stimulate interest in the Universal's "U" Plan.

Vying for first place is the tri-colored banner 14" x 18", "Plan Now For the Things You'll Need After the War" which can be used as either a store or window banner.

Other display material which will add zip to dealers destitute departments includes peppy counter card in color illustration, "When I Set My Pi-

"THE HELP SITUATION" by Larlar



You too, can enjoy pay day—even if you are the boss.

Anyone enjoys getting his money's worth, and you can be sure to get it from your employees if you provide them with the equipment they need to work most efficiently. Like Rider Manuals.

A complete set of all thirteen volumes of these servicing aids on each of your benches will make diagnosis and repairs easier for your help, increase the speed of deliveries and improve the quality of your work.

Never have Rider Manuals been so widely used as today when speed in the tracing of circuits means not only additional profits, but the development and preservation of invaluable good will. Have all thirteen volumes of Rider Manual on each of your benches. Check the list to the right—order any missing volumes today.

Check, too, the list of Rider Books. They're chock-full of technical information that can further speed your repair work and enable you to make the most of your present opportunities to add to the volume and good will of your business.

HERE'S HELP THAT WILL INCREASE YOUR PAY

RIDER MANUALS (13 VOLUMES)

Volumes XIII to VII \$11.00 each volume
 Volumes VI to III 8.25 each volume
 Abridged Manuals I to V [1 volume] \$12.50
 Automatic Record Changers and Recorders 6.00

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 — accepted authority on subject \$3.00
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 Gives principles of FM radio 1.50
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 Basic Method of radio servicing 3.00
 The Meter at Work
 An elementary text on meters 1.50
 The Oscillator at Work
 How to use, test and repair 2.00
 Vacuum Tube Voltmeters
 Both theory and practice 2.00
 Automatic Frequency Control Systems
 — also automatic tuning systems 1.25
 A-C Calculation Charts
 Two to five times as fast as slide rule 7.50
 Hour-A-Day-with-Rider Series —
 On "Alternating Currents in Radio Receivers" —
 On "Resonance & Alignment" —
 On "Automatic Volume Control" —
 On "D-C Voltage Distribution" 90c each

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One wants radio and electronic components and equipment in dozen units—the other calls for hundreds. One needs help on priorities—the other has a ticklish technical problem. One can use non-critical parts—the other asks for made-to-order apparatus. Big or little, whatever the requirements, Lafayette Radio Corporation acts as a friendly cooperative agent. As leaders in the field, we have the confidence of leaders. We service industry, government agencies, the military forces, schools, laboratories, dealers, etc. Why don't you, too, get acquainted with the Lafayette Radio Corporation's method of doing business?

DON'T LET IT GO TO WASTE . . . SEND WASTEPAPER INTO THE FIGHT

Note! Write or wire for our new 8-page circular listing needed radio parts, available for immediate delivery . . . coils, controls, speakers, condensers, relays, switches, resistors, transformers, etc. All merchandise subject to prior sale.

Dept. K-6

Lafayette Radio Corp.

901 W. Jackson Blvd. 265 Peachtree Street
CHICAGO 7, ILLINOIS ATLANTA 3, GEORGIA

lot's Courses," patriotically starred and striped window card, 7" x 11" to be used in a window or counter display, and a two-colored shield Headquarters for "U" Plan for "V" Day.

This is only half of the variety of promotional material which can be obtained free from *Landers, Frary & Clark*, New Britain, Conn. In addition to this barrage of post-war selling dynamite, *Universal* has prepared a "miniature" 8 page plan book in striking red and black print, a passport to better living, which instructs the consumer how to use the "U" Plan for "V" Day; a series of up-to-the-minute newspaper mats which tie-in with the strong national advertising program launched in consumer magazines; a supply of handy check lists for use in setting up customer priorities or prospect system for "V" Day. These check sheets list the types of appliances and housewares manufactured in prewar days by *Landers, Frary & Clark*, together with the 1941 price range and a blank space where the consumer may fill in the approximate price she would like to pay for her postwar appliances.

Last but certainly not least is a bond folder in red and blue which contains four pockets where bonds can be placed for specific uses.

RECENT postponement by government and industry of the approximate date for commencing the change-over from the manufacture of war goods to civilian production probably will mean that reconversion, when it comes, will be less gradual than anticipated, it was asserted by *J. H. Rasmussen*, commercial manager, *The Crosley Corporation*, Cincinnati.

"The intensified second front program in Europe, the developments in the Italian campaign and the stepped-up tempo of the war with Japan are some of the factors that have altered former plans for an earlier resumption of civilian production.

"When the 'Lig Push'—the invasion of the continent—starts, it may be found that rapid production adjustments will be necessary and manufacturing capacity must be held available.

"The present gloomy outlook for resumption of civilian production in (appliance) industries could change with the next radio news flash," Rasmussen said.

"A portion of our civilian production must now go abroad to the areas that have been reconquered and to the larger areas that will be under our control before the year is over.

"At first, these items will include only the bare necessities of life, such as food, clothing and medicines. Later, when the rehabilitation program gets under way, it will mean the export of items such as hoes, plows, tools and some machinery, among the hundreds of items that are needed to alleviate the sufferings of a war-weary people."

Rasmussen urged the hardware dealers to remember, in making their post-

war plans, that the retail sales turnover on radios and household appliances is about three times the average for hardware stores.

"There is more profit, in dollars, from the sale of one refrigerator than from several hundred ten-cent to two-dollar sales that are made weekly in good hardware stores," he asserted.

"When you select your post-war radio and appliance lines, don't take the little-known ones," Rasmussen advised. "They are too hard and too expensive to sell. Don't penalize your efforts and profits with 'hard to sell' lines. In the past, poor selection of lines has been too often a characteristic of many hardware stores.

"Our opinion of what the future holds for the radio and major household appliance industries is clearly indicated by our own plans. We are now laying our plans for a still further expansion of our enlarged program, which was started in 1940, with a view to the larger markets which we believe will exist after the war.

"At Crosley, we have a young, vigorous, and ambitious organization. Our future program calls for adding a number of appliances that we have not had before. With the experience and facilities we now have available, you may expect interesting things from Crosley. In line with this enlarged program, important personnel additions will soon be announced by our sales division."

Think Out Loud With Your Banker

A national *Financial Advisory Committee* to provide advice and assistance to medium and small businessmen in meeting special problems of financing reconversion and postwar expansion was announced by *C. Scott Fletcher*, director of Field Development Division, *Committee for Economic Development*, in an address before the North Carolina Bankers Association. Chairman of this new C.E.D. committee is *Hugh K. McGee*, vice president of *Bankers Trust Company*, New York.

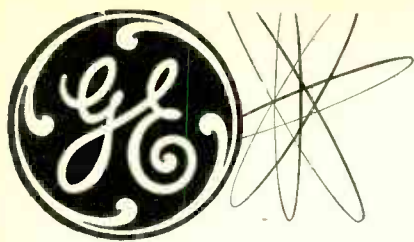
"Mr. McGee tells me," said Mr. Fletcher, "that his advice to all medium and small businessmen is, 'sit down and think out loud with your banker about your postwar financing problems, and do it now. Give him your full confidence and seek his, and you will be pursuing

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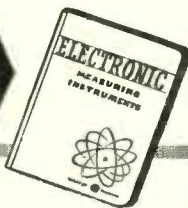
... PORTABLE TUBE CHECKER



THIS portable G-E Tube Checker contains sockets for all American tube types . . . provides practically a complete service shop of tube analyzing equipment. Equipped with the ingenious PMT Circuit Switch, this instrument is just one in the new General Electric line of SERVICE TESTING EQUIPMENT.

Among the other sturdy G-E units available for testing electronic circuits and component parts are: G-E uni-meters, audio oscillators, oscilloscopes, condenser resistance bridges, signal generators and other utility test instruments. For complete details about these accurate instruments, please fill out the coupon below. . . .

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DEPARTMENT
GENERAL ELECTRIC CO.
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Please send, without obligation to me, the General Electric Testing Instrument Catalog, U-4 (loose-leaf), for my information and files.

Name _____
Company _____
Address _____

GENERAL ELECTRIC
Electronic Measuring Instruments

the course best calculated to provide for you the credit necessary to carry out your peacetime plans."

The Committee for Economic Development fully realizes, Mr. Fletcher explained, that financing of business for expanded civilian production will be one of the crucial factors in the reconversion period. It has therefore enlisted outstanding bankers in various sections of the country to provide through this Financial Committee concrete assistance to the tens of thousands of businesses cooperating with C.E.D. committees in more than 1800 communities, and in general to businessmen everywhere in the country.

The new committee is preparing a handbook to help the businessman in laying his plans to finance his postwar production program. This will be ready for distribution soon.

Your Oscillograph

(Continued from page 16)

to electrical quantities only, whereas the indication on a cathode-ray tube is strictly visual. For this reason it is desirable to incorporate two new terms in stating amplifier performance. One is the sensitivity of the amplifier at its input terminals in terms of the visual effect produced by a certain electrical cause. The other term, involving the frequency response, will be discussed later.

(To be continued next month)

Service Portfolio

(Continued from page 25)

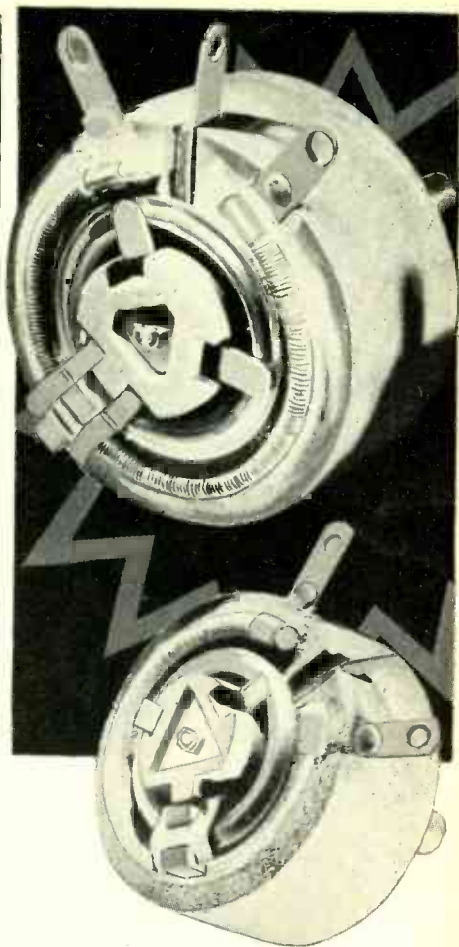
and negative peaks. When a maximum peak in one direction is obtained with the oscillograph connected from one grid to ground, a maximum peak in the opposite direction should appear on the cathode-ray tube screen when the input is connected to the other grid and ground.

Minor differences in unbalance are not serious in any push-pull circuit; they tend to be equalized, at a slight sacrifice in power output, in the output transformer and its circuits.

OPA Ceilings

(Continued from page 10)

The new MPR has a few other questionable clauses. For example, one prohibits a service-dealer from charging a fee for testing tubes brought in by a customer unless the tubes are still in the receiver, in which case a service fee of 50c may be charged, ostensibly for the labor involved in removing the tubes, not for making the tests. OPA's intentions were good, but apparently badly phrased. Any service dealer who



Tougher POWER RHEOSTATS

★ Our armed forces have first call on these tougher power rheostats. After the war, however, these and other extra-rugged Clarostat controls and resistors will again be available for your radio, electronic and industrial jobs. They're worth waiting for.

Many novel features are incorporated in these power rheostats. Notably the insulated metal core supporting resistance winding which is imbedded in cold-setting inorganic cement. Maximum heat conduction and radiation. Normal current rating may be exceeded by 50% at any setting up to 1/3 total rotation without damage or excessive temperature rise. 1 to 5,000 ohms (25-watt) and 1 to 10,000 ohms (50-watt).

★ Ask Our Jobber . . .

Ask him about Clarostat wartime replacements to take care of your regular radio servicing.



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wants to get around this silly regulation can do so by merely refusing to test tubes brought in unless the entire receiver is brought in with the tubes still in their sockets. The public would be the "goat" in cases such as this and all fair-minded men will agree that it would have been better for OPA merely to stipulate in effect that "no fee of more than 50c may be charged for testing a complement of tubes regardless of whether the tubes are loose or in a set; and if the tubes are in the type of receiver that requires technical skill and labor for their removal and inspection, then the maximum fee for testing should not exceed \$1.00.

With the Editor
(Continued from page 38)

American homes now have neither a phonograph nor radio-phonograph combination. Imagine what record sales can be made after the war when production of phonographs is resumed. Every leading radio receiver manufacturer will have several phono-radio combinations in his first post-war line. Incidentally, *The American Home* also reports that 66% of the phonographs and 20% of the radio - phonograph combinations now in use are more than 5 years old. Obsolescence has created a wondrous Postwar market for radio-music dealers!

Are Civilians Bright?

IF ONE CAN BELIEVE WPB publicity releases civilians must be considered of low intelligence. WPB keeps kidding the public, and in so doing is continually putting helpless dealers on the defensive while a misinformed public does the condemning.

The latest "blunder" is the announcement that authorization has been granted to 12 manufacturers to produce 395,000 electric flat irons, provided the makers have production facilities and available man-power. Only a few weeks ago WPB announced that 2,000,000 electric irons would be scheduled for production this year. Iron manufacturers are swamped by prime war contracts and labor shortages. They can't make civilian goods even if they want to. Remember that WPB

fairly tale about 4,000,000 replacement radio tubes for civilians per quarter? They never materialized because WPB's announcements about civilian goods production are nothing more than wishful thinking expressed in public print. The public digests the blarney and condemns dealers who can't make deliveries. WPB should wait until the goods are made and delivered before making rash statements.

S. R. Lowan

Time Opportune for Distributors and Dealers to Begin Post-War Building

Favorable reaction to the recent statements issued by Charles Robbins, vice president of *Emerson Radio and Phonograph Corporation*, New York City, on the radio distributors' and dealers' positions in the post-war era, has been widespread. Letters, telegrams and telephone calls have been pouring in to Mr. Robbins commending the equitable stand he has taken.

In response to many queries as to what should be done in the case of those distributors and dealers who closed their businesses because of lack of merchandise, or for innumerable other reasons, and drifted into other businesses and fields of endeavor, Robbins declared that they are confronted today with a made-to-order situation.

"With the scarcity of servicemen throughout the country, Mr. and Mrs. John Q. Public are troubled by the fact that they find it exceedingly difficult to have their present radio sets properly and promptly repaired. While, admittedly, some of this is due to lack of parts and tubes, I am firmly convinced that in many cases it can be attributed to the small number of repair shops that are available to the public."

Asserting that in his travels and contacts he was deeply impressed by the ingenuity of service shops in utilizing substitutes for scarce and unavailable parts, such as interchanging one type of tube for another, etc., Robbins pointed out that "by further practice of this ingenuity by more service organizations, I believe they would be instrumental in putting into operating condition a large number of the several million radio sets currently reported to be inoperative for lack of parts. And here is where distributors and dealers can perform an outstanding service for the public, and at the same time re-establish their customer contacts in anticipation of heavy post-war demand.

"An excellent opportunity exists today for distributors and dealers who have shut up shop for one reason or another, to reopen their establishments and develop service work and not only capitalize on the huge backlog of radio sets awaiting repairs but at the same time begin building a firm foundation for the large post-war radio potential. Such a set-up could be extremely flexible so that as the occasion required, additional personnel, space and facilities could be acquired.

"The re-entry of these distributors and dealers into the radio picture is only logical and desirable, for they help constitute the

resale framework that enabled the radio industry to market an all-time high of over 12,000,000 receivers in the last pre-war year. And they will be even more essential in post-war years to help merchandise a much greater number of sets.

"Seldom in one's business life has such an opportunity for rehabilitation presented itself. Those distributors and dealers with vision, seeking to get into the swim again, will at once recognize the tremendous current possibilities. And in addition to helping themselves, they will be rendering a sorely needed service that will be welcomed by numerous radio owners."

Surplus Newsletter Made Available by Gov't

Inauguration of a weekly Washington Newsletter on surplus U. S. Government war goods and property was announced to American business executives and corporations.

The Newsletter will give a weekly running account of the government's plans in offering surplus property and goods for sale. It will also report on the activities of surplus property units set up, or to be set up, in the Treasury Department, War Food Administration, Reconstruction Finance Corporation, Maritime Commission, War Shipping Administration, Office of Price Administration and War and Navy Departments. It will report official actions of the Surplus War Property Administration.

"The Newsletter will keep subscribers currently informed on all plans, policies, decisions and regulations bearing on the government's disposition of more than fifty billion of dollars worth of war goods," Mr. Callahan announced.

The aim of the Newsletter is to offer a service not only to persons or corporations interested in purchasing surplus goods, but also to manufacturers and others whose business will be affected when the government unloads nearly a million items ranging from thumb tacks to printing presses and airplanes.

"The Weekly Newsletters will provide practical and satisfactory answers to persons or corporations seeking to keep abreast of the rapidly changing picture on surplus war goods, thus being in a position to know what action they should take."

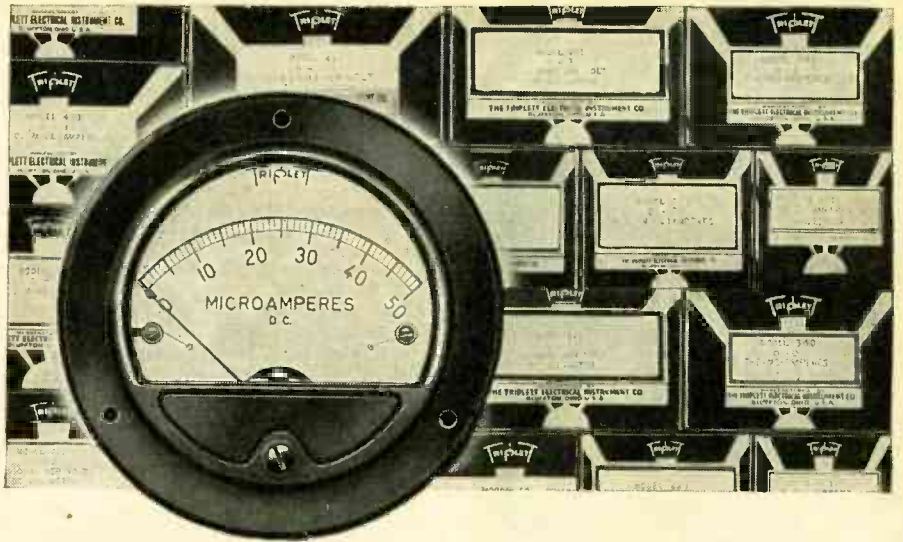
Questions concerning this should be addressed to: "Surplus War Property Newsletter," 1701 H Street, N.W., Washington 6, D. C.

WPM Policy on Relaxation of Restrictions

Further evidence that policies relating to resumption of civilian production will be formulated by giving first consideration to the public interest is seen in a memorandum issued by L. R. Boulware, Operations Vice Chairman to all WPB bureau and division directors within his supervision.

In the instructions Mr. Boulware stated the policy as to the effective date on which new manufactures or increased quantity of goods authorized for manufacture may be marketed. Except in some unusual type of case, the effective date of any order will not be delayed to permit disposal of wartime inventories. The manufacturer can produce the goods as soon as the materials are properly available and offer them for sale as soon as he wishes in accordance with the authorizations, provided, of course, that the changes in existing limitation or conservation orders necessary to permit this have been completed by that time.

In dealing with inquiries concerning the



INSTRUMENT DELIVERIES!

War work has expanded Triplet production far beyond previous capacities and, with the experience of more than forty years of instrument manufacturing, has bettered the Instruments coming off the production lines.

Now—better instruments are ready for general use. Place your orders, at once, with Triplet—headquarters for instruments made to one fine standard of engineering.

- D'Arsonval Moving Coil D.C. Instruments
- Double Iron Repulsion A.C. Instruments
- Electro-dynamometer A.C.-D.C.
- R.F. and Rectifier Types, Sizes 2" through 7"



TRIPLET ELECTRICAL INSTRUMENT CO.
BLUFFTON • OHIO



Still your best bet for replacements

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*Old Man Centralab

"Old Man" is right ... for he is a real "old timer". There is no substitute for experience, and the "Old Man" now, as in the past twenty-two years, is still your best bet.

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Division of GLOBE-UNION INC., Milwaukee





● Yes, even as the pinch of all-out war becomes felt in radio replacements as in other fields, Aerovox paper tubulars remain the safe bet. The following selected Victory numbers, used singly or in combination, can take care of over 90% of standard replacement needs.

D.C.W.V.	CAPACITY
600	.001 mfd.
600	.002 mfd.
600	.005 mfd.
600	.01 mfd.
600	.02 mfd.
600	.05 mfd.
600	.1 mfd.
600	.25 mfd.

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relaxation of restrictions, Mr. Boulware said members of the War Production Board should make "no predictions, either public or private, written or oral as to possible future developments." Mr. Boulware also cautioned officials to exercise care that "no assurances are given or inferred . . . that a given action will be

Emerson Radio Appoints New So. Cal. Distributor

Announcement has been made by Emerson Radio and Phonograph Corporation, New York City, of the appointment of Century Distributing Company, 935 East Pico Boulevard, Los Angeles, as distributor of Emerson Radio products in the Southern California and contiguous territory.

This new company is headed by Louis R. Swenson, well-known sales executive in that territory. "Lou," as he is popularly called by dealers throughout that area, has had twenty-three years of wholesaling experience in radio and appliances, and in that period has continually contacted the trade.

Mr. Swenson stated that even though no Emerson radios are presently available, due to the fact that the vast Emerson Radio facilities are devoted exclusively to war work, his organization has installed an attractive showroom in anticipation of the great day when radios will again be available.

Workers at 6 RCA Plants Donate 9,942 Pts. of Blood

War workers in six plants of the RCA Victor Division of the Radio Corporation of America have thus far contributed 9,942 pints of blood to the Red Cross since inception of drives conducted on the factories' premises during hours of employment.

This amount had been obtained from slightly more than 10,000 registrants of a total of about 30,000 men and women employees at Indianapolis, Ind., Harrison, N. J., Lancaster, Pa., Bloomington, Ind., Hollywood, Calif., and Camden, N. J.

A large percentage of blood donors gave blood twice and three times, some as many as four and five times. Blood donor appeals were brought directly to the workers through brief, dramatic announcements over each plant's internal broadcasting system.

Famous Designer to Assist Admiral in Store Modernization

Taking the position that the responsibility of the manufacturer to his distributors and dealers extends beyond providing merchandise to sell, Ross D. Siragusa, President of the Admiral Corporation, announces a new type of merchandising co-operation in the radio and household appliance field.

Negotiations are now under way with several nationally known designers, one of whom will be retained to develop a store modernization program which will be available to all radio and appliance dealers without charge. The primary objective of the enterprise is to stimulate business for retail merchants and at the same time develop distinctive characteristics of store appearance.

Details of the Admiral store modernization program have not been completely worked out, but it is known that it will be based upon a booklet of suggested plans which can be adapted to any shape or size of store. The work can be done by local builders and contractors.

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Write up any "kinks" or "tricks-of-the-trade in radio servicing that you have discovered. We will pay \$1 in Defense Stamps for such previously unpublished "SHOP NOTES" found acceptable. Send your data to "Shop Notes Editor," RADIO SERVICE DEALER, 342 Madison Ave., New York 17, N. Y. Unused manuscripts cannot be returned unless accompanied by stamped and addressed return envelope.



The Shortage That Means Future Profits

There's a shortage today on practically all types of tubes. But you hear a great deal more about certain types, such as the 12SA7, the 50L6GT and the 35Z5GT, than others.

Why?

Well, one important reason is that before the war, RCA's Preferred Type Tube Program concentrated tube production for many new receivers on a few RCA "Preferred" types. As a result, much of today's renewal demand is concentrated on these tubes.

This proves that RCA's Preferred Type Tube program really works. And that the effect, *after* the war, of RCA's continuing Preferred Type Tube program will again be to concentrate renewal tube demand on relatively few types.

What will that mean to RCA Tube Distributors and Retailers?
More profitable business!

When your tube shelf-stock can be largely confined to fewer type numbers, your turnover is faster; your clerical handling is simpler; bookkeeping costs are lower; stock-ordering is easier, quicker. And your customer relations are better because tube performance is more uniform when production can be concentrated on larger manufacturing runs of fewer types.

Remember this, too, for post-war: *The Magic Brain of all electronic equipment is a Tube...and the fountain-head of modern tube development is RCA!*

P. 5.—Listen to "THE MUSIC AMERICA LOVES BEST" on the RCA program every Saturday, 7:30 P. M., E. W. T., Blue Network

BUY MORE WAR BONDS



RADIO CORPORATION OF AMERICA

RCA VICTOR DIVISION • CAMDEN, N. J.

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



Bringing the "FUTURE" Closer!

• In the field of electronics, nothing stays new for very long. Since Pearl Harbor there has been a tremendous increase in Raytheon technical achievements and production techniques, keeping pace with the vast requirements of the military. Experience gained in wartime assures the leadership of Raytheon in the new postwar era of electronics.

Raytheon is proud of the trust the Armed Forces have placed in its engineering and large-scale manufacturing abilities. This wartime experience doubly protects manufacturers of post-war radios and industrial electronic equipment. Let's win the war first! Then look to Raytheon for the best engineered and precision-made electronic tubes for all applications.

Raytheon Production Corporation

Newton, Massachusetts; Los Angeles,
New York, Chicago, Atlanta



All Four Raytheon Divisions Have Been
Awarded Army-Navy "E"—Plus Stars

Devoted to Research and the Manufacture of Tubes for the New Era of Electronics



RAYTHEON

High Fidelity
RADIO AND ELECTRONIC TUBES