

SYLVANIA NEWS

TECHNICAL SECTION

Vol. 5

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No. 9

WITH OUR COMPLIMENTS

Here is the first edition of the Technical Section of Sylvania News. It is the answer to hundreds of requests and suggestions for more technical information, in a form more convenient for filing. It will enable us to present long technical articles by radio engineers, more practical information, circuit diagrams and other drawings, as well as some new departments to be introduced later.

We take great pride in the fact that servicemen have done so much to help us make Sylvania News interesting and helpful. We take this opportunity to thank all of you for your cooperation, and for the many kind things you have said and written. You are invited to make suggestions, to criticise, or to request features or information that will make Sylvania News even more helpful.

The main section of Sylvania News will continue to offer merchandising and sales promotion suggestions, news of the trade, and other information which is of interest to servicemen.

We hope that you will continue to read all of it. It is becoming more necessary every day for the serviceman who would be successful to learn how to sell his service, how to get new customers, and how to keep them. In Sylvania News we try to give you the psychology of merchandising, without the long words and the dry-as-dust sentence of the professors and the text books. Make no mistake—a radio serviceman must know how to understand people, and how to make the right impression on his customers. That is “practical psychology”, as we offer it.

Our faith in the future of the radio service industry becomes stronger every day, and we intend to offer every possible assistance to every serviceman who has faith in himself and pride in his profession.

Sincerely yours,

Hygrade Sylvania Corporation

J. M. DeVoe, Editor,

R. S. Merkle, Technical Editor

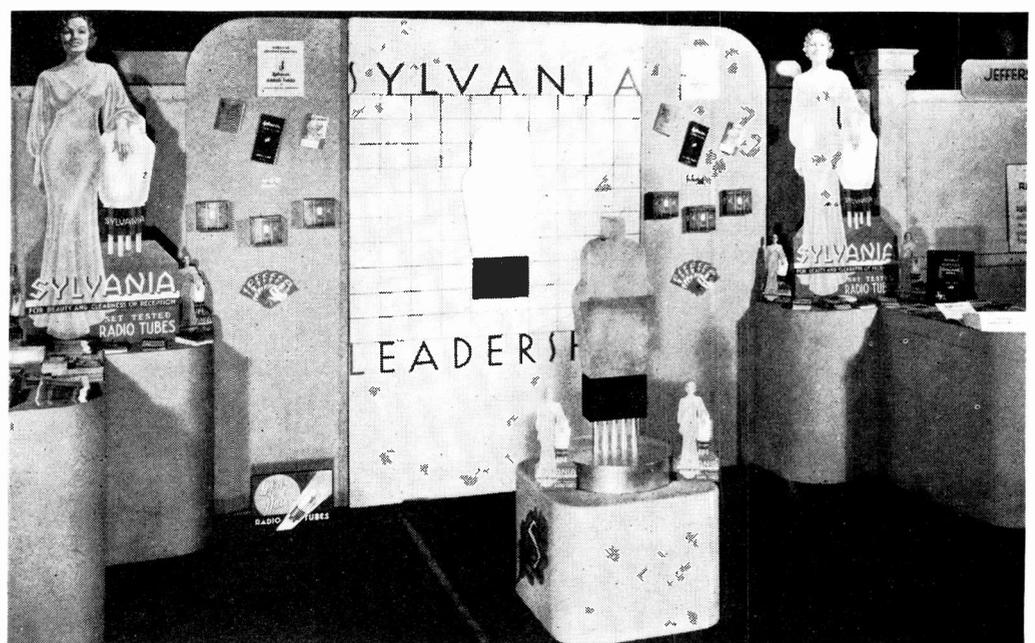
Convention of the Institute of Radio Servicemen

The National Convention of the Institute of Radio Servicemen, held at Hotel Sherman, Chicago, March 22, 23 and 24, brought out a fine representation from the service profession. Intelligent interest in talks and demonstrations, and a real attention to the business in hand, was notable.

Sylvania was represented by Walter R. Jones and R. S. Merkle, of the Commercial Engineering Department, Charles G. Pyle, Sales Supervisor, Paul S. Ellison, Radio Advertising Manager, W. C. Mahoney, Fred H. Strayer and C. E. Marshall of the Chicago office.

Mr. Jones spoke on Automatic Volume Control Circuits and Problems, and Mr. Pyle on Opportunities for the Serviceman. Both report large and appreciative audiences. Excerpts from Mr. Pyle's talk, on page 4 of the Main section of Sylvania News, will prove profitable reading for any serviceman intent on increasing his income.

Sylvania tubes and merchandising helps were displayed in the booth pictured at the right, which was visited by a large percentage of the servicemen attending the convention.



Sylvania Tube Display at I. R. S. M. National Convention in Chicago.

Slide-Back Vacuum Tube Voltmeter

By WALTER R. JONES

A vacuum tube voltmeter for use in service work should be as rugged as possible and do away with the necessity of calibration. Since the plate current of a vacuum tube depends upon the grid voltage, for a fixed voltage, the slide-back type of vacuum tube voltmeter shown on the accompanying sketch is especially suitable for service work in measuring voltages where the current drain of a load voltmeter would materially change the readings. The chief uses which a serviceman will find for this piece of equipment will be:

- (a) For measuring the d.c. voltages developed across the diode load resistor.
- (b) Measuring voltage at the plate of resistance coupled amplifier tubes.
- (c) Measuring voltage at the screen of amplifier tubes.
- (d) Measuring any d.c. voltage in the system where no current drain can be tolerated.
- (e) A.C. voltages such as filament voltage in AC-DC receivers.

The apparatus required consists of a universal five and six contact socket connected as shown on the attached wiring diagram; a 10 megohm resistor; a double-pole double-throw switch (which is connected as a reversing switch), a potentiometer whose resistance is suitable for the amount of voltage used in the grid circuit; and an on-off switch for that potentiometer. In addition, the necessary filament supply will have to be provided. A grid voltage is required whose value is considerably greater than the highest voltage to be measured. A plate voltage of 45 volts, which may be obtained from a B battery, and two meters will be required: first, a voltmeter which is calibrated in d.c. volts, possibly having two scales—0 to 10 and 0 to 100, depending upon the range of voltages used; and second, a milliammeter with a 0 to 10 milliamperere range. A power supply operated from the a.c. line may be incorporated, but is not shown as this will be given in a later issue of Sylvania News. Since most receivers on which these measurements will be made operate from a power line, there is no point in operating the equipment from batteries since line voltage variations will slightly change the sensitivity of the receiver under measurement. The universal socket is recommended so that a Type 57, 77, 6C6 or a 56, 76, 37, 27 may be used, depending upon the sensitivity required. To employ a Type 57, 77, or 6C6 in the six contact socket, the tubes should be connected as triodes by connecting the screen and suppressor grids to the plate terminal at the socket. As such, they will give an amplification factor of about 20. If less sensitivity is required, a Type 56 or 76 tube may be inserted in the five pin socket. With either of these tubes a voltage amplification factor of approximately 12 may be obtained. If less sensitivity is desired, a Type 27 or 37 may be used in the same socket. The purpose of the 10 megohm resistor is to make certain that the grid circuit is closed for d.c. at all times, so that the plate meter will not be driven off scale if the tube is lighted and the input circuit is not closed.

The operation of the device is as follows:

The proper tube is placed in its socket and with no voltage applied to the grid of the tube, the potentiometer supplying grid bias is adjusted so that the meter in the plate circuit reads at some predetermined point, for example: in the center of the scale. The d.c. voltage to be measured is then applied across the input terminals, and if that voltage has polarity such that the positive side is connected to the grid of the tube, the plate current flowing in the meter circuit will increase due to a decrease in bias. The potentiometer is then adjusted until the plate current is restored to its original value. The difference in voltmeter readings between the initial setting and the new setting is the value of d.c. voltage which was being supplied across the input terminals. If the polarity is in the opposite direction, then the plate current will decrease as voltage is applied to the input circuit and the potentiometer should be readjusted to

A CHAT WITH ROGER WISE



Chief Tube Engineer,
Hygrade Sylvania Corporation

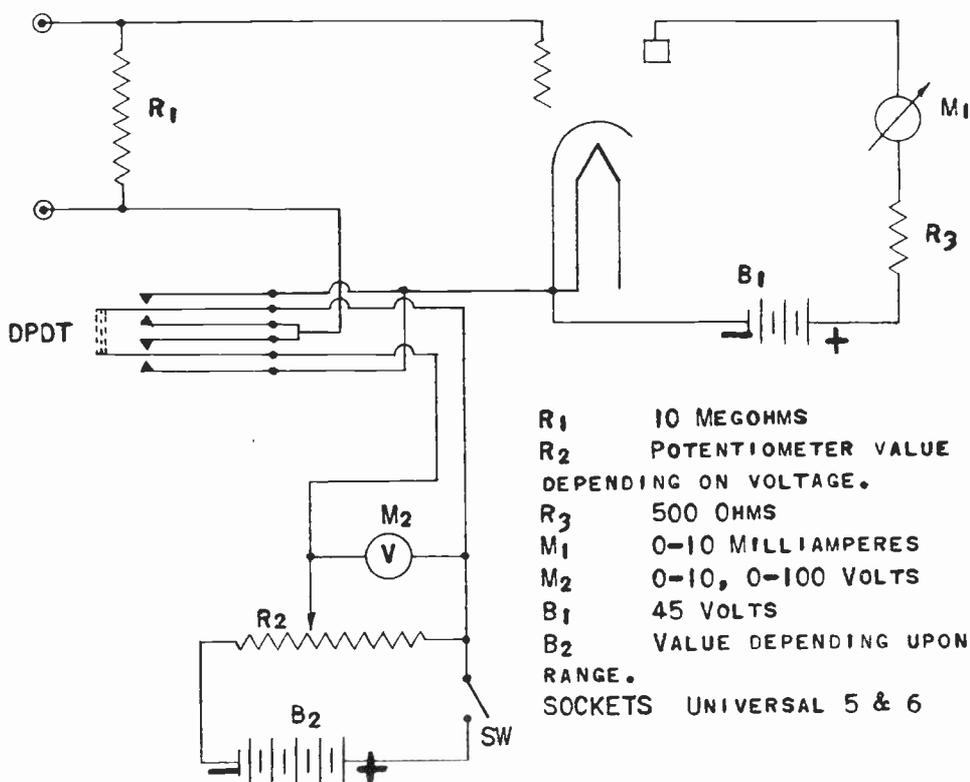
Many improvements have been made in the 2 volt tubes designed for battery operation since the introduction of the first of the present line—types 30, 31, and 32. The type 31 tube has been superseded by improved power output tubes such as 33 and 19, while Sylvania 30 and 32 are offered in non-microphonic construction, thus correcting one of the most annoying weaknesses of battery tubes.

The filament is supported in such a manner as to eliminate any tendency to vibrate so that even when the tube is tapped there is little or no ring heard from the loud speaker.

With improved battery receivers incorporating a.v.c., the demand for diode-triode combinations became more important and was met by the introduction of Sylvania 25S—a double diode triode. When first offered the diode section was mounted at the top of the structure, and it was possible to improve the design materially by moving the diodes down to the lower end of the filament. The uniformity of diode current is much better and there is less danger of a short occurring.

In the future Type 25S will also carry the designation 1B5, this number being selected in accordance with the RMA tube numbering system. To prevent any confusion, both numbers will appear, the branding being 1B5/25S, and the tube is interchangeable with the older types of 25S tubes.

Changes of the kind made in 25S help to keep the battery tube line up-to-date and make it possible to continue the progress being made by set designers in securing improved performance from the receivers designed around the 2 volt group.



restore the plate current reading to its original setting.

NOTE:—If voltages higher than 10 volts are to be measured, the negative terminal should always be connected to the grid to prevent burning out the plate meter. In this case, a reference set at maximum scale reading instead of center of scale would give greatest precision.

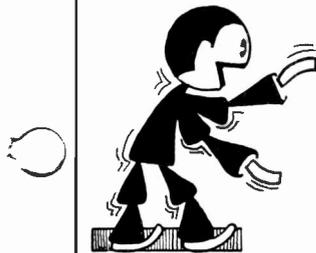
The use of this meter for reading a.c. voltages will be discussed in the next issue of Sylvania News. An amplifier circuit will follow, which may be used in conjunction with high frequency

voltage measurements, such as is necessary when one desires to find out whether signal voltage is appearing across the various input and output circuits of a receiver. The design of a power supply for both the amplifier and vacuum tube voltmeter will also be shown.

It will be noted that no specific values of voltage are given, since that depends upon the range of voltages which are to be measured. In general, the voltage across the potentiometer must be equal to the largest voltage it is expected to measure plus the bias which will be on the tube when no signal is being received.

THE SERVICE EXCHANGE

THE information presented in the Sylvania Service Exchange is contributed by servicemen as the result of practical experience. It is very carefully considered before being accepted, and we believe it to be correct and authentic. However, we assume no responsibility with respect to results. Each hint accepted entitles the writer to his choice of one Sylvania receiving tube. Please indicate preference when submitting hints. Don't send routine or generally known information. Good clear photographs of service benches or shops are also welcome.



Atwater Kent Model 37. Selectivity may be increased 100 per cent by mounting a three gang trimmer condenser on top the tuning gang and balancing. Care should be used to see that the rotor section is grounded well. This hint may be applied to other receivers having similar tuning arrangements.—M. & J. Radio Service, Shamokin, Pa.

Brunswick Models S-14, S-21, S-31, S-81, S-82. Intermittent reception or fading is usually caused by the .1 mfd., screen grid by-pass condenser in the detector circuit. One end of this condenser is riveted to the chassis. Make certain that condenser is satisfactory and that rivet connection is solid by soldering.—T. J. Dunne, Newark, N. J.

Clarion Model 470. If all parts check o. k. but choppy reception, distortion and low sensitivity persists, change the 2A6 tube bias resistor to 5000 ohms. The present value is 10,000 ohms.—A. H. Kohnert, Millbrook, N. Y.

Crosley Model 42, using 45 mil. Dynacoil Speaker. For poor volume and sensitivity replace large 6000 ohm carbon resistors with wire-wound 6000 ohm 10 watt resistor. In the first series of these sets these resistors were not heavy enough, and their value would change due to overload.—C. E. Peterson, Burlingame, Calif.

Edison Models R4, R5, C4. Hard on type 27 tubes, tone not "just right", plate voltages of 27's around 150 volts (should be approximately 115) and by-pass condensers have been breaking down in top chassis. Almost invariably starts with the open 10,000 ohm (8,000 in 25 cycle) loss resistor which is located in power pack. When this is inoperative the 27's and the by-pass condensers are subject to a severe strain which usually gives plenty of trouble. Inform your Edison owners to have this checked at least once each year, especially in damp locations.

Burns out Detector-Hum Adjusters. This is usually difficult to understand and has been a puzzler. It seems to be invariably a short between the primary of the power transformer and the 2.5 volt filament winding. If another power transformer is not immediately available you can keep the radio playing by disconnecting the detector hum adjuster entirely. If the set hums too much replace the detector tube with a late type 27.

Installation of Tone Control. Remove "on-off" switch and install control of approximately 15,000 ohms, (switch type). Connect one side of control to ground and other side through a 0.1 or 0.5 if less depth is desired to 1st audio plate. In this position it will reduce volume as much as if the conventional method is used in the grid circuits.—George N. Musil, Audubon, N. J.

Fada Model 25. Weak signals: Before making any adjustments on the receiver test by-pass condenser connected across the plate and the cathode of the detector (27) type tube. Weak signals will usually be caused by this condenser being defective. Replace with 0.001 mfd. condenser.—R. F. Lambert, Detroit, Mich.

Gloritone. Fast and efficient repair for Gloritone five tube set after tuning condensers and wipers are cleaned and the set still tends to oscillate on high frequencies; put two turns of wire around control grid lead of the tube not covered by shield can and ground to the frame.—E. H. Crawford, Hibbing, Minn.

Majestic Model 15 If this receiver refuses to work when all voltages and tubes test o. k. try a new Sylvania 24A in the oscillator tube socket. The tube used here is very critical but the Sylvania works as well as the original.—H. Daniels, Everett, Pa.

Majestic Model 70. Old Majestic sets can be greatly improved by changing the original dynamic speaker. The G-2 type speaker has a field resistance of 2730 ohms and a voice coil resistance of 20 ohms. A speaker having approximately the above characteristics should be used and astounding quality will be realized. If a good dynamic speaker is on hand with above field resistance but with a different voice coil resistance, it can be used if the voice coil is rewound so that it has a resistance of 20 ohms.—Vito Diadone, Newark, N. J.

Philco Transitone Model 5. Oscillation "birdies" in the older model 5 can generally be cured by pulling the 15,000 ohm resistor in the 2A7 circuit up towards the front of the set. Changing the 78 tube will cure a tendency towards "swish".—R. L. Daugherty, Philadelphia, Pa.

Philco Models 19, 89. When these sets become intermittent or fail to respond to stations on the high frequency end of dial (800 to 1500 K.C.) examine the mica between the plates of the high frequency oscillator trimmer. If small cracks are visible in mica, try a new piece of mica and all stations should now be audible.—Ray H. Mihlbauch, Brookfield, Ohio.

Radiola 80 Remodernization. The Radiola 80, the chassis of which is common to the Radiola 82 and 86, the General Electric H-31, H-51, and H-71, the Westinghouse WR-5, 6, 7, and the Graybar 700, 770, and 900, can be modernized at a moderate cost without impairing the qualities of the set. The changes consist in replacing the 24-A tubes in the r-f and i-f stages with tubes of the 35/51 type and the 2nd detector with a type 55 tube.

Remove the 18,000 ohm resistor (black and red) on the resistor panel in the receiver chassis and replace with a 10,000 ohm, 1 watt, resistor. Remove the volume control and solder the black lead directly to ground. This completes the change from the 24 type to 35/51 tubes.

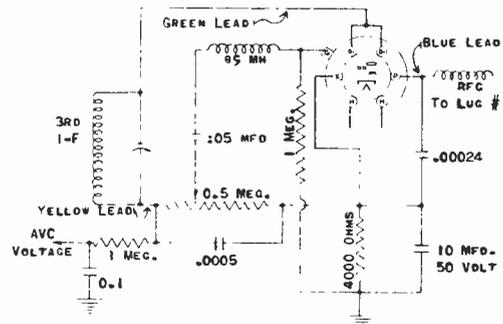
Separate the grounded end of the r-f grid coil from the common ground terminal of the r-f and link coil assembly and place it on a separate terminal mounted on the end of the coil form. This terminal is grounded through a .01 mfd. condenser and connected to the a-v-c voltage through a 100,000 ohm resistor.

Remove the Local-Distance switch and remove all leads that run to the switch with the exception of the yellow with green tracer that runs to the 1st i-f transformer. This lead is kept, the others are clipped off or removed

completely. The switch is replaced on the panel to preserve appearances.

Open the 1st i-f transformer can, remove the end of the grid coil which is soldered to the grounded lug and solder it to the terminal to which the yellow lead with green tracer is fastened. Bring the yellow lead with green tracer from the 1st i-f transformer and the yellow lead from the 2nd i-f transformer to an insulated lug mounted on the chassis between the volume control location and the 1.0 mfd. by-pass can. This lug is later connected to the a-v-c voltage. A lead is run from this lug, through the 100,000 ohm resistor previously mentioned to the 1st r-f grid return, the r-f return being made through the .01 mfd. condenser.

Remove the detector socket and replace with a 6 prong socket. Remove the lead from the 2nd detector cathode to the resistor panel and the lead from the 2nd detector cathode to the 1.0 mfd. by-pass condenser. Remove the connection between the 110,000 ohm resistor and the high voltage (red) lead on the resistor panel as this bleeder is no longer needed. Rewire the detector circuit in accordance with the diagram below.



The volume control is hooked up to give maximum volume in the full clockwise position, with the potentiometer lugs toward the bottom of the chassis as installed in the cabinet, the yellow lead from the 3rd i-f transformer goes to the lug nearest the station selector. The r-f-c in the grid lead of the triode section was mounted on the top of the chassis with the lead from the .05 mfd. condenser coming up through the hole used for the leads to the local-distance switch. The lead to the cap of the '55 can run direct to the grid through a hole in the back of the tube shield. This isolates the audio circuit and no shielding is necessary.

The 55 tube was chosen from the various types available because it gave all the audio amplification desired with a good match to the audio transformer. The cathode resistor of 4000 ohms is higher than that recommended but works very well. It serves to prevent overloading of the triode section before the push-pull audio stage and the lower plate current is desirable to keep the effective inductance of the transformer primary as high as possible. The set should be completely realigned after these changes are made. A tuning meter, while not a necessity, is very useful in obtaining exact resonance, for the set must be tuned accurately to obtain the best quality.

The changes as suggested improve the set considerably on both local and distant signals. Our local is WOAI San Antonio (50,000 watt) with its transmitter located 1/2 mile away.—Lt. Edmund C. Lynch, Randolph Field, Texas.

WANTED!

Service hints on Auto Radio Receivers, especially the later models, and methods of installation in 1934-35 automobiles. How are you solving the problem of antenna installation in all steel bodies? This information will be used in a new edition of the Auto Radio Service Booklet. One Sylvania tube for each tip accepted.

**COMPLETE LIST
OF CORRESPONDENTS**

We have had numerous requests for a reprint of the names of all servicemen who asked to be enrolled in the Correspondence Club. Starting with the June 1934 issue, and coming right up to date, here they are:

H. J. Hawkins, Care of Marlack Radio Service, 1763 Marne Avenue, Toledo, Ohio. Mr. Hawkins is particularly interested in D. C. receivers and repairs.

O. Ingmar Oleson, Ambrose Radio Service, Ambrose, N. Dakota—is interested in battery receiver repairs, use of type 30 tubes, etc.; promises to answer all letters.

Guillermo Q. Verasco, 3445 Watling St., E. Chicago, Indiana.

D. J. Brooks, Saybrook, Conn.

Stanley Revolinski, 1529 Avenue G, Council Bluffs, Iowa. (Service man and "ham.")

Barney's Radio Shop, 298 Rutherford Blvd., Passaic, N. J. (Barney didn't give us his last name).

J. B. Collins, Laurel, Montana.

Wm. C. Moyers, Monterey, Tenn.

Edward Szyper, 2636 Potomac Ave., Chicago, Ill. (Especially interested in short and ultra short wave reception and transmission.)

Steadman Fountain, Box 469, Woodland, Me.

Edward J. Reinholtz, 545-A. N. 28th St., Milwaukee, Wis.

Robert E. Fisher, Jr., 162 W. 13th St., New York, N. Y.

Paul Stefan, 4632 St. Aubin Street, Detroit, Mich.

Oliver F. Klein, 2235 N. 39th St., Milwaukee, Wis.

Harry L. Tucker, 15 Green St., Eastport, Me.

Vincent P. Barry, 416 Second St. Palisades Park, N. J. (Interested in Auto Radio only.)

Robert Halliday, 99. Waterloo St., Glasgow, C. 2, Scotland.

James H. Sledd, Haleyville, Ala.

John J. Stuckney, % Jackson Hardware Co., Eldon, Mo.

L. W. Embley, R. D. 1, Boonsboro, Maryland
Fertig Repair Service, 45 Bushnell St., Bradford, Pa.

C. W. Bourne, Box 32, Council Grove, Kansas.

Harvey C. Messner, R. F. D. No. 2, Box 354, Tucson, Arizona.

Kenneth R. Harding, R. R. 1, Shoals, Indiana
L. J. Parrish, 1267 Rathbone St., Grand Rapids, Mich.

Harry A. Rife, 17520 Maumee Blvd., Grosse Pointe, Mich.

Clarence V. Blalock, 353 R. R. St., Albemarle, N. C.

Charles J. Nalbene, 219 Miller St., Trenton, N. J.

Francis S. Logadzinski, 2842 S. Homan Ave., Chicago, Ill.

Godfrey Deuchler, Route 5, S. Omaha, Neb
Harold B. Cook, 700 Ellis, Ave. Wichita, Kan
Alfred Farnsworth, Jr., 105 N. Bend St., Pawtucket, R. I.

Ray H. Muhlbaugh, Box 104, Brookfield, O.
Lynn L. Nealley, Santa Rosa, Fla.

Joe Ruhland, Rockfield, Wis.
J. E. Duncan, Box 442, Monterey, Tenn.

H. P. Lawson, 246 Randolph St., Napa, Calif.
Walter Chapman, San Gabriel, Calif.

Nick J. Nunzing, Jr., 1147 Sutter Ave., Brooklyn, N. Y.

Harley C. Grant, Oxford, Wis.
Frank R. Kobusinski, 731 E. 13 St., Erie, Pa.
E. J. Brosswell, 1581 Melrose Dr., S. W., Atlanta, Ga.

Daniel Susko, 77 Crawford St., Canonsburg, Pa.

A. Hines, Newton, Miss.
Chas. Sovatsky, 169 W. Ridge St. Nanticoke, Pa.

Harry Stine, Walnut St., Carrollton, Ill.
Lawrence E. Victory, 1320 S. Oak Avenue, Memphis, Tenn.

YOUR QUESTIONS ANSWERED

Question 1—As I have a great many Majestic Model 200 receivers to service in my territory, I would like to know if there is any tube in the Sylvania line which will, or can be adapted to take the place of the G-2S tube which is used in these circuits.

Answer—We recommend the use of a Sylvania 2S/4S as a replacement tube for the G-2S in your receivers. The Sylvania 2S/4S is a tube intended for satisfactory replacement of the G-2, G-2S, G4 or G-4S. A complete line of Sylvania tubes is available for direct replacement use in all Majestic receivers. These tubes are available through your Sylvania jobber.

Question 2—I am of the opinion that a Type 78 may be installed in older receivers by using it as an untuned stage in the r-f circuit and resistance coupling it instead of transformer coupling it. Can you advise me further on this as to the practicability and the most suitable method of applying it to the circuit?

Answer—While it is possible to couple a Type 78 in the manner in which you have indicated, it is not recommended. The various input circuits in most receivers will vary so much that very little benefit will be obtained by the addition of the extra tube, since an untuned stage will not contribute much to begin with and, particularly in the case of local stations, cross modulation is likely to develop. Then, in addition, if it is desired to couple the 78 tube into the antenna coil, practically every receiver will require different treatment in order to obtain any step-up ratio in the antenna coil. Unless great care is taken, generally it will be found that the extra tube will actually decrease the amplification rather than increase it. Although your suggested arrangement is not generally recommended, you may experiment on such changes. It is possible for you to change over some receivers so that they will give satisfactory and improved performance with such changes.

Question 3—I understood that the PZH tube could be replaced by a Sylvania Type 2A5 but have found that it has a seven pin base while the 2A5 has only six pins. Can you set me right on this? Can you also recommend a tube that may be used to replace the BR rectifier tube in auto receivers?

Answer—The 2A5 tube is practically identical in characteristics with the Type PZH but cannot be used as a replacement tube unless a socket change is made. The suppressor grid of the PZH tube is brought out to an external pin on the base, while it is connected internally to the cathode in the Type 2A5 tube. If it is desired, the original socket of the PZH may be removed and a six contact socket put in its place. No other changes are necessary, the original wires being connected to the respective socket terminals.

By making a few changes in your auto receiver, a Sylvania IV tube may be used as a replacement tube for the BR rectifier. In order to use a Type IV it will be necessary to add filament voltage to the filament terminals of the rectifier socket by wiring 6.3 volts to those terminals. The original wires on those terminals should be moved to the small contact terminals of the socket. The wire from the transformer should be connected to the plate terminal and the B-plus wire should be connected to the

cathode terminal. With these changes the IV tube will work satisfactorily and will give you a rectifier that will deliver sufficient current for any auto receiver

Question 4—In a wiring diagram I noticed that the 12A7 tube operated directly on a 110 volt AC or DC source, yet your manual states that the filament should operate on a 6.3 or 12.6 volt source. Which arrangement is correct? Will you also advise me as to whether it is important for the A-plus on 2 volt tubes, such as Type 30, to be connected to a certain filament pin.

Answer—The 12A7 tube is designed for operation with either 6.3 or 12.6 volts applied to the filament circuit. For AC-DC service, the conventional method is to use 12.6 volts on the filament with a resistor connected in series with a 110 volt line to reduce the voltage applied to the filament to 12.6 volts. Such an arrangement requires a resistor of 324 ohms capable of carrying .3 of an ampere current or having a wattage rating of 30 watts. If you will look at the circuit which you mention, you no doubt will find that this resistor is incorporated therein.

It does not make any difference which terminal of a 2 volt tube is classed as "negative" or "positive". However it is conventional for the filament pin nearest to the grid to be considered negative and unless there is some reason why this cannot be done, it is recommended that this filament prong be considered negative, not from an operating standpoint but from the standpoint of wiring the tube in the circuit under conventional methods.

Question 5—When I hold a tube in my hand and tap it, I have found that vibration is heard, and am wondering whether or not this type of noise classifies a tube as defective. Will you please explain this to me?

Answer—Rattles such as you have heard in tubes can be classed in two groups: first, mica rattle; second, element rattle.

Mica rattle, generally, is caused by the fact that the dome of the tube is not exactly circular. Hence, if the ordinary form of mica support is used, this mica will fit loosely in one direction and tightly in the other direction. If such a tube is tapped, then the elements may vibrate so that the mica will slap against the glass walls of the dome. This has been corrected in Sylvania tubes by using special resilient mica pads or the use of metal wire clips.

The other type of rattle is classed as element rattle and, in many cases, is due to the fact that the diameter or size of the grid turns, particularly in the suppressor and screen grids, is so large that some of these turns vibrate with a natural period of their own. Generally, however, when this vibration occurs, it cannot be heard in a speaker, since it is not an electrical defect and will not produce an electrical effect unless the elements themselves move with respect to each other so that pulses of current are set up. It has been our experience that the noise heard when tapping a tube with the fingers has no correlation between that noise which occurs when a tube is tapped while in operation in a receiver. Noises which are heard when a tube is tapped while in operation are usually produced by leakage or other difficulties which are not at all apparent when the tube is not operating.

Henry Latko, 2104 North Damen, Chicago, Illinois.

B. L. Fisher, 808 Farmer St., Petersburg, Va.

Jim Kirk, 3919 Opal St., Oakland, Calif.

George Doncese, Box 104, Pageton, W. Va.

James H. Sledd, who originally suggested the Correspondence Club idea, wrote us some time ago that he received so many letters from service men all over the world that he had not had time

to answer them. To avoid putting too much of a burden on one or two, we suggest that each of you select one name from the list each week. This should establish some interesting contacts. Then send us the best letter you receive during the month, and from those we'll select one or two for Sylvania News. We'll also continue to publish new names for the list, as fast as we receive them.

SYLVANIA NEWS

TECHNICAL SECTION

Vol. 5

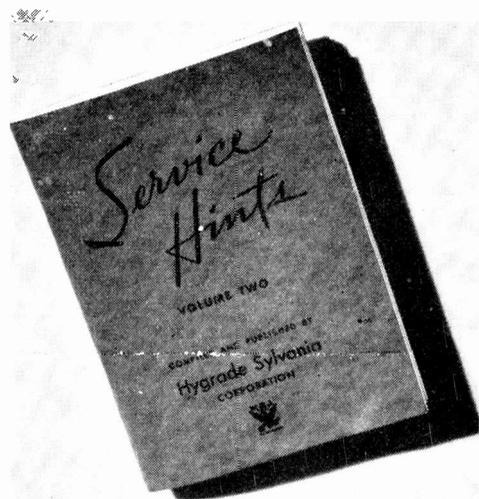
EMPORIUM, PENNA.

No. 10

SERVICE HINTS, VOLUME TWO, IS GOING TO PRESS

In a few days Volume Two of the Sylvania Service Hints Booklet will be ready for distribution. Most of you already own Volume One, and we believe that you will receive this new edition with cheers. Servicemen from all over the United States have contributed practical service hints, many of them for circuits that have been introduced very recently. You'll find pages of useful tables, and cross-indexing to make it easier to find the information you want. None of the material contained in Volume One has been duplicated in Volume Two.

We can't think of a better way to pass on to the service profession the accumulated experience of their fellow servicemen. Volume Two of the Service Hints Booklet is yours without charge. Please use the coupon on page 4 of the main section of this issue of Sylvania News.



THANKS, SERVICE MEN!

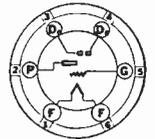
We started to answer personally all the letters you wrote about the new Technical Section, Sylvania's tube price policy, and the satisfactory results you have had with Sylvania tubes, but mail started piling up around us and sliding off our desks, and finally we had to give it up, if we were to find time to get out the next issue of Sylvania News.

So, if we didn't answer your letters, and even if we did, here's thanking all of you for the kind words. We appreciated them, and now they are preserved in our "kind words" file, where we can consult them if we ever feel that life isn't treating us right. Not just the editors, but the whole organization, get a lift out of your co-operation, and you'd be surprised to know how often your opinions are consulted and quoted when matters of policy are under discussion.

Sincerely yours,
Hygrade Sylvania Corporation,
J. M. DeVoe, Editor,
R. S. Merkle, Technical Editor



TYPE 1B5/25S
DOUBLE DIODE
TRIODE



For Battery Operation

At the present time there is a marked interest in the double diode triode Type 25S. This tube will now carry the type designation 1B5/25S but the characteristics will remain identical to those which have been published for Type 25S.

Type 1B5/25S is the only 2-volt tube incorporating the double diode triode design. The complete electrical characteristics and ratings are as follows:

CHARACTERISTICS

Filament Voltage DC	2.0 Volts.
Filament Current	0.06 Ampere
Maximum Overall Length	4 1/4"
Maximum Diameter	1 1/16"
Bulb	ST-12
Base	Small 6-pin

Operating Conditions and Characteristics:

Filament Voltage	2.0 Volts
Plate Voltage	135 Volts Max.
Grid Voltage	-3 Volts
Plate Current	0.8 Ma
Plate Resistance	35,000 Ohms
Mutual Conductance	575 Micromhos
Amplification Factor	20

Battery operated radios have been produced on a large scale during the past year. Their increasing popularity indicates a growing demand for this type of receiver. Except for the maximum output delivered, all-wave battery sets are now available which compare very favorably in performance with a-c operated receivers. A major factor responsible for the better receiver performance has been due to definite improvements in design of battery-type tubes. The latest advances in tube design have been incorporated to meet conditions created by increased receiver sensitivity. This has resulted in the production of battery tubes free from noise, microphonism, electrical leakage and mechanical defects.

Since the introduction of the 25S very desirable improvements have been made in its design. Originally the diode elements were situated above the triode unit and were supported by single support rods. This arrangement was unsatisfactory due to nonuniformity of diode currents, low diode currents and filament-diode shorts. In its present form the diodes are located below the triode. The diode plates are cylindrical in form, each one encircling an end of the coated filament. A resilient mount-support is provided for the dome. Special bottom mica spacers have also been introduced. These changes have greatly improved the quality and appearance of the tube.

CIRCUIT APPLICATION

Type 1B5/25S will find wide application as a combined diode detector and triode audio amplifier and for securing the required voltage for automatic volume control. The independence of operation of the two diodes, as well as the triode unit, permits flexibility in circuit design. For amplification, the triode may be employed in conventional circuit arrangements. This section should be resistance coupled to the diode, using an ordinary coupling condenser and a 1 megohm leak to minus C.

Continued on next page, Column Two

THE SERVICE EXCHANGE



THE information presented in the Sylvania Service Exchange is contributed by servicemen as the result of practical experience. It is very carefully considered before being accepted, and we believe it to be correct and authentic. However, we assume no responsibility with respect to results. Each hint accepted entitles the writer to his choice of one Sylvania receiving tube. Please indicate preference when submitting hints. Don't send routine or generally known information. Good clear photographs of service benches or shops are also welcome.

Atwater Kent Models 37, 38, 40, 42, 44, etc. These models have flat strip volume control. When the wire breaks and you haven't a new control take the old one out and solder the wire at the break and replace by bending the flat strip back in the opposite direction, so that the arm of the volume control rides on the opposite side. This will be as good as a new volume control strip, since the arm is riding on the side of the resistance where there has been no wear.—George F. Baptiste, P. O. Box 114, Howard, R. I.

Balancing With Soda Straws. Cut a soda straw to fit over one of the filament prongs, this will serve well as an adapter for neutralizing sets.—Elmer Schenback, 24 Rohr St., Buffalo, N. Y.



Belmont Model 71C. The 56 oscillator grid leak often increased to a high value which causes the circuit to become a self-modulated oscillator. The audio-frequency modulation can be heard at any point on the dial. (Sometimes it is tunable depending on the value to which the grid leak has changed.) Replace with the proper grid leak value and the set is O.K.—P. L. Kerley, Rt. 4 Box 330, Houston, Texas.

Colonial Model 36. If the set stops suddenly replace the 65,000 ohm wire resistor with a 2 watt carbon resistor in the screen circuit also change 350 ohm r-f cathode wire wound resistor with a 1 watt carbon resistor. If tone is bad change the two 450,000 ohm wire wound resistor across the 45 grids to 2 carbon resistors. I have made the changes in several of these models with much success.—Noel J. Groh, Universal Radio Service, 151 Bradley Street, Buffalo, N. Y.

Colored Dial Bulbs. There is a crying need among servicemen and dealers for colored dial lights. I have found a very satisfactory means of making these by which a few extra pennies have been obtained. The scheme is to color regular American made bulbs with finger nail polish of the color desired. For red bulbs use blood red polish and for other colors such as blue, green, etc. mix natural polish with the color being used. Colors other than red are too deep until mixed with natural polish. In painting the bulbs be sure that the polish is mixed well so that streaks will not be obtained. Many pleasing effects can be obtained by coloring a strip of celluloid different colors and slipping it between the dial lamp and dial. Beautiful solid or two tone effects can be made on the celluloid and the pieces used for demonstrations or for a permanent job.—Edward P. Waldo, 2604 University Street, St. Louis, Mo.

Emerson Models U6D Six Tube AC-DC Dual-Wave Superhet. A common complaint from this receiver is frequency drift necessitating constant retuning in order to hold any certain station on the Broadcast Range. On the Short Wave Range this trouble is not so noticeable. The peculiar problem is that when this receiver is removed to the bench and the chassis removed from the cabinet, all signs of drift or frequency change disappears. The trouble will be found in a small midget type compensating condenser in series with the Broadcast Oscillator Coil—this condenser being of a composition fibre and mica construction

will not hold calibration with changes in temperature. There are two possible remedies—one is to replace the condenser with a small air tuned walnut type. However, a much simpler method is to control the temperature change in the receiver by providing ventilation. This can be done by drilling several 5/8 inch holes in the cabinet base in the vicinity of the compensating condenser, making sure that one of the holes falls directly opposite the condenser. This not only provides ventilation but also affords an opening making this condenser accessible to adjustment without removing the chassis from the cabinet at some future time. The above procedure completely eliminates drift and frequency change, and also improves reception greatly since poor ventilation also has a tendency to throw the I. F. transformers out of line. The above trouble does not manifest itself on the S. W. band due to the fact that the compensating condenser controlling the oscillator coil, for S. W. is in parallel and therefore not as critical.—C. C. Richelieu, 1546 South 56th Street, West Milwaukee, Wis.

Freshman Model 400. A 56 with the grid tied to the-plate is used as a rectifier. The grid of this tube often shorts to the cathode thus shorting the autotransformer. This fault can be remedied by replacing the 56 with a Sylvania 84. The filament is disconnected from the 2 1/2 volt supply and is connected in parallel to the 6 volt supply of the 41 output. The two plates of the 84 should be connected together at the socket.—Stanley Baronowski, 44 E. 17th Street, Bayonne, N. J.

Gloritone Model 27. To increase sensitivity and volume on Gloritone model No. 27, remove the wire on the candohm resistor from the terminal next to the B plus or right hand end and resolder to the extreme end. This increases the plate voltage resulting in increased pick up and volume.

In all high gain receivers employing cathode bias volume control try connecting a 1 to 4 microfarad condenser from cathode to ground to end oscillation in the i-f and 1st detector stages.—John S. Dickey, 610 New Castle Street, Butler, Pa.

Hair Static. While driving my car I've noticed a roar that sounds like the old spark-gap whenever I comb my hair. So my suggestion is don't comb your hair when you want to listen to a certain program.—Freddie Pister, 5020 Anderson Pl., Cincinnati, Ohio.



Majestic Model 116 Car Radio. If this model has no volume with the set and tubes testing OK, remove the G-58-AS tube in the second i-f amplifier, replacing it with a Sylvania 78. Hook the radio to the car antenna and listen to it play. Another tribute to Sylvania.—Lester Nemeth, Lou's Radio Service, Unionville, Michigan.

Majestic Replacing 81 Tubes. Several articles have appeared in Sylvania Service Notes showing how to use an 83 or a 5Z3 rectifier in the Majestic 180 chassis to replace the 2-type 81 tubes. Here is the most successful way that I have found. Mount a 5 volt 3 ampere filament transformer over one socket in the power pack.

Replace the other socket with one having tight clips and capable of carrying the filament load. Rewire to this socket in the conventional manner and use a Sylvania 5Z3 tube.—W. W. Brackenridge, The Broadway Radio Mart, Harrison, Ohio

Radiola 80 Remodernization Correction. Here is a correction to the remodernization article appearing in the last issue of Sylvania News. I ran into difficulties with the arrangement as described and found it necessary to replace the 170 ohm resistor (brown and red) which furnishes the minimum bias for the r. f. and 1st i-f tubes. The system refused to work with the new resistor. An analysis showed that, due to the 4000 ohm resistor in the cathode circuit of the '55, I was applying about 20 volts plus to the grids of the controlled tubes with no carrier. The old resistor undoubtedly had a value much higher than normal and was providing enough negative bias to counteract the positive bias from the cathode circuit of the '55.

To correct this trouble I removed the cathode bias resistor and by-pass condenser, connecting the cathode of the '55 to ground. I broke the b lead from the receiver chassis that runs through the cable to the amplifier chassis and inserted a 1000 ohm "Truevolt" in series with the B return of the receiver. The grid resistor of the triode section of the '55 (R₃-1.0 meg.) was removed from ground and connected to the end of the resistor on the amplifier side, thus biasing the triode section with negative voltage on the grid. The slide on the resistor was adjusted for proper plate current in the '55 and has a value of about 750 ohms.—Edmund C. Lynch, Randolph Field, Texas.

RCA Model R. E. 45. An open secondary of the (untuned) r-f transformer feeding the 26 r-f into the 27 detector is a common fault in the Gulf Coast area. A permanent and novel remedy I have found is impedance coupling. The primary of the transformer (which is still good) is left connected to the 26 plate. The grid leak is connected from the 27 grid to ground (formerly through secondary of transformer.) The grid condenser is connected from the 26 plate to the 27 grid. This completes the untuned r-f circuit.—P. L. Kerley, Rt. 4 Box 330, Houston, Texas.

Service Hints File System. Listed below is an outline of a file card used in a file arrangement which overcomes the trouble of hunting through numerous issues of Sylvania News for a hint on a particular receiver. The file card may be any size desired. I have used this system with great success.—William J. Schultz, 119 Highland Avenue, Yonkers, New York.

PHILCO	
MODEL	ISSUE "SYLVANIA NEWS"
20	February, 1935
38	April, 1935
80	August, 1934
3*	April, 1935
	*Auto Set.

Soldering Iron Tinning. In order to keep your soldering iron always tinned flow a coat of silver solder on the iron tip. This can be done at the jewelers. Or if you are handy with a torch you can do it yourself. Silver solder may be bought at dental dealers for about 35 cents a quarter ounce and should be used with a flux. Roy Nakano, Isleton, California.

THE SERVICE EXCHANGE

Continued from Page Three

Improving Kellogg Model 523 and 524 Receivers. The Kellogg 523 is a high-grade nine-tube receiver which sold in 1929 for 250 dollars. The 524 employed push-pull type 50 out-put tubes and two half-wave 81 rectifier tubes, and sold for 295 dollars. Both of these receivers are of the tuned radio-frequency type, incorporating automatic volume control, and capable of giving fine tone quality. The tuner is well designed and has ample selectivity for present conditions. The performance of these sets can be materially improved by the proper use of certain recent types of tubes, and the change is well worth making.

An inspection of the circuit diagram shows that the AVC regulates the control-grid bias of the first two r-f tubes. The voltage chart indicates that a maximum bias voltage of 30 to 35 volts could be made available, since the plate voltage on the AVC tube is about 40 volts. Hence the first two r-f tubes should be replaced by type 35/51 variable-mu tubes. It is unnecessary to change the third r-f tube, since this tube operates with a fixed bias voltage. The antenna input control or "sensitivity control" should be disconnected, and the antenna lead connected directly to the high end of the primary coil on the first r-f transformer.

The AVC system must now be altered to provide sufficient bias voltage for the variable mu-r-f tubes. The 50,000- and the 100,000-ohm resistors in the plate circuit of the AVC tube should be removed and replaced by a single 500,000-ohm resistor. The grid-return lead from the second r-f tube should now be connected to the AVC tube plate. Thus both of the controlled r-f tubes will receive the full control voltage. The type 27 AVC tube should be replaced by a type 56. The higher amplification factor of the latter will produce a greater change in plate current for a given change in grid voltage.

The manual volume control, which consists of a potentiometer, intended to vary the bias on the grid of the AVC tube, should be removed from the front panel and mounted at a convenient point on the rear of the chassis. This device now becomes the sensitivity control, and should be so set that the signal from a strong nearby station will just load, but not overload, the output tubes of the receiver with the manual control in the full-on position. Once set, this control need not be disturbed, unless the AVC tube or one of the controlled 35 tubes is replaced.

For the manual volume control, a 500,000-ohm potentiometer should be installed on the front panel, and connected across the secondary of the first audio transformer (which is mounted on the tuner chassis). Its movable arm should be connected to the grid of the first a-f tube. This new control should replace the former sensitivity control on the front panel. The former manual volume control can be replaced on the front panel by a tone control variable resistor, or perhaps by a suitable phonograph switch. Either of these devices are connected in the well-known manner.—Albert R. Hodges, Ridgewood, N. J.

We Can't Send Your Tubes

Two service men are entitled to tubes for accepted service hints, but we can't get in touch with them because they forgot to give us their addresses. Perhaps they are on our mailing list, but we can't locate them, among the 50,000 in our files, unless we know the city.

Sol. Lifshitz is entitled to three tubes.
W. L. Linde, of Arcade Radio Service is entitled to three tubes. Please communicate.

CORRESPONDENTS

For names of new members of the Service Correspondence Club, see page two, Main Section.

CORRECTION

The tube type referred to in question 4 of the Question and Answer columns in the last Sylvania News Technical Section should have been 12A5 instead of 12A7. We call this correction to your attention and apologize for the error.

SELL AND SWAP

Sell and swap ads will be inserted in each issue of Sylvania News free. Inquiries to the ads appearing should be addressed directly to the advertiser and not to Sylvania News. The advertisers are requested to acknowledge all inquiries whether or not the advertised article may have been disposed of. The Editors of Sylvania News retain the right to edit or reject any ads considered unsuitable. All ads for publication should be addressed to Sylvania News, Dept. S. S.

Will Sell or Swap—R. C. A. Institute advanced Radio Course, Code Course and code machine with tapes for service or short wave equipment. Any reasonable offer accepted.—Ralph LeBrun, 225 High Street, Geneva, N. Y.

Wanted for Cash—Triplett Free-point set tester adapter to fit lid of Triplett Model 1178. Must be in good condition.—George Kochel, Jr., Chatteroy, W. Va.

Sell or Swap—New 333 Supreme Deluxe analyzer also all wave oscillator. Let's hear your offer.—R. B. Chase, Chase Radio Service, 1013 Main Street, Richmond, Ind.

Will Sell—Custom built five tube S. W. receiver with tubes and dynamic speaker. Bargain. Write for details.—Henry A. Bratcher, 501 Grand Avenue, Waxahachie, Texas.

For Sale—All Star short wave set, Brand new, cost forty-three dollars and fifteen cents wholesale to build, complete with tubes and speaker. Thirty dollars cash.—Leonard L. Farnsworth, 900 Parsons Avenue, Columbus, Ohio.

For Sale—Good as new National a-c, S. W. 3, short wave receiver, three pair coils, covering 13.5 to 70 meters, latest model. Best cash offer gets it.—Gilbert Lindstrom, 820 16th Street, Aurora, Neb.

For Sale—One 2 1/2 by 6 ft. Frigidaire electric sign. Large raised glass illuminated letters and border. Lifetime porcelain on metal finish. Never used. Cost one hundred and forty dollars. Sell for fifteen dollars.—Ray Hatch, Flora, Ind.

Recording Outfit—Consisting of heavy duty turn table driven by 1/15 hp a-c motor 78 rpm. Recording head equipped with diamond cutter. Together with playback pickup, microphone on floor stand, rack and panel amplifier, and speaker. Sell for forty-five dollars cash or will consider swap for small Graflex camera.—M. Jackson, % Chas. Gottlieb, 1248 Lexington Ave., New York, N. Y.

For Sale or Exchange—Readrite analyzer No. 710 in good condition. For What have you?—John Hemak, 2041 W. 21st Street, Chicago, Ill.

Sell or Swap—"Radio" 17 issues June, 1933 to October 1934. "Radio News" 42 issues July, 1930 to December 1934. "Radio Retailing" 24 issues January 1933 to December 1934. "Short Wave Craft" 24 issues, January 1933 to December 1934. "Radio World" 142 issues, January 10, 1931 to October 14, 1933. Want ohmmeter, output meter or what have you.—John Burik, Box 121, Derry, Pa.

Wanted—Defective auto power supplies (no filters) an 860 or 852 tube, filter condensers from 1 mfd. up, any voltage, a 3 foot telta spark coil, transformer and condenser, transformer steel. State quantity, description and price. Also quench spark gap.
Sell or trade-meter service, a good L. C. Smith Typewriter, S. W. radio, New tungar 6 amp, rect., solid walnut cabinets or cases made to order, with inlay work if wanted, prices on request. All letters answered.—V. E. Willey, Watts, Okla.

Sell or Swap—Slightly used Weston 682 portable tube tester twenty two dollars and fifty cents. National S. W. 3 ac-dc, tubes, band spread coils 20, 40, 80 and 160 and general coverage 20 and 40. Without a-c supply twenty two fifty, with supply twenty four fifty, or will trade for Rider's Manuals except No. 1, 866 tubes, meters or transmitting variable condensers, or 03A class B transformers. Make me an offer.—C. J. Webster (W9IK) Box 345, Aberdeen, S. Dakota.

For Trade—Set of books, "Electrical Engineering" by American Technical Society (eight volumes) will exchange for Rider's Manuals or Gernsback's Manuals or an all wave oscillator.—Tim W. Shaw, Box 448, Vernon, Texas.

Will Sell—Weston No. 590 Oscillator, complete for thirty-five dollars, or trade for a No. 617—No. 2 Weston Photometer.—John Vondrasek, 10709 St. Mark Ave., Cleveland, Ohio.

For Sale—Weston 677 tube checker eighteen dollars, Jewell 560 oscillator twenty-five dollars. Both guaranteed perfect condition. Will ship c. o. d. with privilege of examination.—R. S. Quigley, 807 6th Street, Harrisburg, Pa.

For Sale—Jewell Model 540 tube checker, twelve dollars and fifty cents. Write for details.—H. Drew, Olney, 309 Whittle Ave., Olney, Illinois.

Wanted—Motorgenerator 6 volts to 350 volts at 100 mls., also 1 screw-cutting metal working lathe of small size.—Leo L. Bowman, Lewistown, 319 Brassey St. Grass Range, Montana.

Position Wanted—Young man, 20 years old, married, graduate of Radio Training Association and American Technical Society, located in central Tenn., wants steady radio or electrical work anywhere in U. S. experienced in radio service work and house wiring. Have analyzer, tools, and service manuals. References given.—William C. Moyers, Monterey, Tenn.

Will Swap—A complete 16 MM motion picture outfit, camera and projector, for a complete radio tube tester. What have you to offer?—Mr. A. O'Leary, Mogull Brothers, 1944 Boston Road, New York, N. Y.

Will Swap—Jewell No. 94 current squared thermogalvanometer, Transmitting equipment, Power transformers, Chokes, Cardwell condensers, etc. Want Hickok SG 4600, Supreme 90 or 400B, Weston 566 or other old type analyzer, also old Tube tester.—Pat Daley, Beardstown, Illinois.

Will Swap—Westinghouse 2 1/2 inch, 0-80 Millimeter for short wave parts. Also have 3 brand new dry electrolytic condensers, 20 mfd., 500 volt; complete, Radio News 1927-28; Qst 1927-28-29.—Oliver F. Klein, 2235 N. 39th Street, Milwaukee, Wis.

Wanted—Good typewriter. Have complete drafting outfit with table and model 610 Crosley radio.—Durkot Radio Service, 1303 Clark Avenue, Cleveland, Ohio.

For Sale—Two DeForest 504-A transmitting tubes, never used, for twenty-five dollars each or will trade for all electric auto receivers.—P. Markwith, 2909 W. 21st St., Oklahoma City, Okla.

Will Swap—Philco oscillator, RCA 104 Speaker, Majestic G1—Jewel 0-150v a-c., 0-10 dc amp.; 250 power microscope for what have you to offer.—Allan Epstein, 119-07 Jamaica Ave., Richmond Hill, New York.

Sell or Swap—Weston Model 590 oscillator and Model 571 output meter; Jewell 199 set analyzer; Jewell 210 tube tester; over 100 Weston and Jewell a-c, d-c, r-f, and Universal meters of all ranges. All excellent condition.—Robert Henry, 211-15 N. Main Street, Butler, Mo.

Sell or Swap—2 amp. chargers, B eliminator; 1/4 KW 500-350-0-350-500v power transformer; 1/4 horse power motor, all 25 cycle. Baldwin phones; QST; Radio News and other magazines; Readrite 41C tube checker. Want crystal mike and IRE proceedings.—Donald Buck, 43 Hagen Ave. N. Tonawanda, N. Y.

For Trade—Volume 2 Riders Manual; 0-1 mill-meter; 1000 ohms per volt Weston; 12 volumes QST; hundreds of new and used radio parts for service men and amateurs. Desire United States or Foreign stamps in trade. United States stamps wanted in particular. Write for list of Radio supplies or send in your stamps for valuation.—Rod Hertel, Hertel's Radio Store, Clay Center, Neb.

For Sale—Readrite model 850 capacity meter still in original container. Cost sixteen dollars and fifty cents. Will sell for six dollars and fifty cents. Also will swap a thirty-five dollar Wyco type Universal Motor saw without motor for typewriter or field glasses.—Dexter Becker, 3354 N. 21st Street, Milwaukee, Wis.

For Sale—Owing to the fact that there was a Brunswick factory in Dubuque I have a large number of parts that are considered obsolete. If you have need for any such parts I will sell them reasonable.—Bill Barr, 805 Dodge Street, Dubuque, Iowa.

Sell or Swap—4 tube Pilot "Wasp" S. W. converter, 10 to 200 meters. Excellent condition. Desire good typewriter or service equipment.—A. Yeouze, 32 Mulberry St., Buffalo, N. Y.

Sell or Swap—Bodine motor-generator set, 225 watts, 110 volts DC to 110 volts AC. GE 24/1500 volt dynamotor with external shaft and pulley. Kelvinator refrigerator high side unit. 1/2 HP and 2 HP, DC motors. Also 12 ga. pump shot-gun. Want: Radio test equipment and motion picture camera or projector.—Hansen Radio Service, 227 Main Street, Niles, Mich.

Sell or Swap—Brand new Carter generator 32v. input, 180v. tapped output, RCA 104 speaker or parts. Also have neon sign transformer and several high voltage power transformers. Want generator with 350v. output or what have you?—E. S. Carter, 1328 Crane St., Schenectady, N. Y.

Wanted—One 43 plate 320 mmf. midget condenser, and one 400 ohm tapered potentiometer. Will swap for the above, one new Hammlund 140 mmf. midget variable condenser and one 20,000 ohm Carter potentiometer.—S. Lewis, 2408 S. 3rd Street, Philadelphia, Pa.

Will Swap—2 Green Flyer dual speed phonomotors, Temple Model (8-00, 8-61, 8-90) volume controls, pick up head's and tone arms for Rider's Manual or test equipment such as resistors, meters and switches.—Hank's Radio Service, 923 S. 25th Ave., Bellwood, Ill.

Will Sell or Swap—New Belrad 8 tube radio chassis and 2-8 inch Rola speakers with automatic volume control, four band spread, late 34 hook up, for P. A. System.—Robert Fisher, Jr., 405 E. 72nd St., New York, N. Y.

Will Swap—One Kato Converter, 32 volt DC to 110 AC, 100 Watts, used very little, cost fifty-two dollars wholesale, for up to date tube tester or oscillator. Also have Columbia phonograph Power transformer with ballast tube and resistor for what have you?—Radio Specialty Co., Loxley, Ala.

Sell or Swap—Corona portable typewriter, cost \$29.50 last year, will sell for \$15.00. Bacon tenor banjo, cost \$150.00, will sell for \$20.00. Also have Gernsback service manual. Want Rider Manuals No. 1, 2, 3, 4 and a good oscillator.—J. R. Price, Box No. 34, Hollyoak, Del.

SYLVANIA NEWS

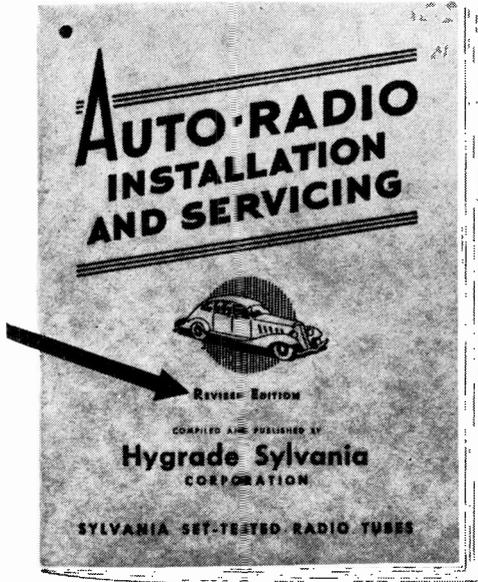
TECHNICAL SECTION

Vol. 5

EMPORIUM, PENNA.

No. 11

REVISED TECHNICAL HELPS



A revised edition of the Auto Radio Service Booklet is now ready for servicemen. It contains many new service hints dealing with new models of auto radio receivers and antenna installations for metal top cars. The service hints contained in the first edition are included and general information, tables, etc. have been brought up to date. A table of i-f Peak Frequencies of practically every standard auto radio receiver is a valuable new feature. The book is free on request to the Advertising Department, Hygrade Sylvania Corporation, Emporium, Pa.

Revision of the Tubes for Auto Radios will chart give tube complements for new as well as earlier models of auto sets.

New characteristic sheet shows complete characteristics on all new tubes, including metal tubes.

New Tube Base Chart shows base diagrams for latest types of glass tubes as well as the new metal tubes.

All charts free on request.

See page 4, Main Section for the new serviceman's Business Card.

SELL AND SWAP

Look on page 2 of the Main Section, and you'll understand why we contemplate changing the title to "Well, We're Swamped." We wouldn't have believed that so many servicemen had so many things to swap. We're glad to act as the medium of exchange, and we'll try to keep it up, unless we get buried in the correspondence. They're swell letters, too, and we want to thank all of you for the nice things you write about Sylvania News and Sylvania tubes.

TO KEEP YOUR TECHNICAL SECTIONS

Hundreds of service men have written to thank us for the new Technical Section, and a few have been a little crabby because it is difficult to clip one part without destroying something else that they wish to keep. Here's our answer:

Don't clip. Keep your Technical Sections all together in the binder that we have designed for the purpose. It is made of good strong cover stock, attractively printed. The back and front are separate, so that, as the number of inserts grows, the covers expand to hold them flat, without crowding. We'd like to give it to you free, but our budget has been stretched as far as it will go. So—it will cost you 10c, stamps or coin, and we think you'll find it worth a lot more, in convenience. If you wish, you can use the inside of the covers to make an index of articles that you want to refer to later.

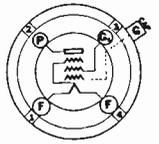
Please don't ask us for extra copies of the first two issues of the Technical Section. We've already given them all away.

New Glass Tubes

Four new Sylvania glass tubes have recently been developed in keeping with the demand for new tubes in receivers with improved features and designs. The four new tubes are types 1A4, 6A3, 6B5 and 6E6. Operating conditions and characteristics for these tubes are listed below.



TYPE 1A4 TETRODE AMPLIFIER



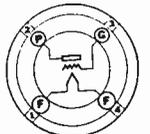
Type 1A4 is a medium cut-off screen grid amplifier tube for 2 volt battery receivers. The tube is somewhat similar to type 34 of the 2 volt group but the cut-off characteristics is less remote. The change provides a decrease in plate current drain together with increased mutual. The structural design is also similar to type 34 with the basing arrangement identical. The bulb of the 1A4 is of the ST-12C style making the tube considerably smaller than type 34 which is enclosed in the ST-14C bulb.

TENTATIVE CHARACTERISTICS

Filament Voltage.....	2.0 volts
Filament Current.....	0.060 Ampere
Maximum Overall Height.....	4 17/32"
Maximum Diameter.....	1 1/16"
Bulb.....	ST-12
Base.....	Small 4-prong
Operating Conditions and Characteristics:	
Plate Voltage.....	180 volts
Screen Voltage.....	67.5 volts
Grid Bias.....	-3 volts
Plate Current.....	2.3 ma.
Screen Current.....	0.7 ma.
Amplification Factor.....	720
Mutual Conductance.....	750 micromhos
Plate Resistance.....	960,000 ohms
Mutual Conductance at minus 15 volts grid bias.....	15 micromhos



TYPE 6A3 OUTPUT TRIODE



Sylvania 6A3 is a filament type power amplifier triode for use in the output stage of a-c operated receivers and public address systems. Except for the heater rating, which is 1.0 ampere at 6.3 volts, the electrical characteristics are similar to those for Type 2A3. Several improvements in design have been incorporated, which add to the efficiency and tube life.

The 6A3 may be employed either singly or in a push-pull circuit arrangement to deliver large amounts of power with low harmonic distortion. The base connections for Type 6A3 are the same as those for Type 2A3.

TENTATIVE CHARACTERISTICS

Filament Voltage AC or DC.....	6.3 volts
Filament Current.....	1.0 Ampere
Maximum Overall Length.....	5 3/8"
Maximum Diameter.....	2 1/16"
Bulb.....	ST-16
Base.....	Medium 4-Pin

Operating Conditions and Characteristics: Class A Amplifier (One Tube)

Filament Voltage.....	6.3 volts
Plate Voltage.....	250 volts max.

Continued on Page Two, Column Two

Power Unit for Slide-Back Vacuum Tube Voltmeter

BY WALTER JONES

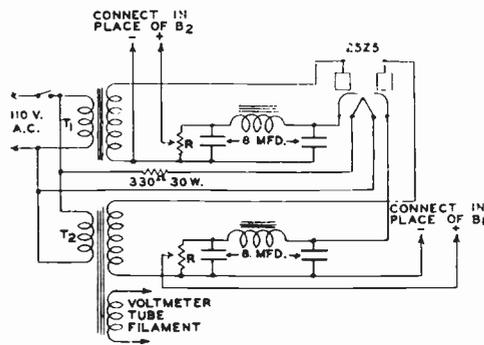
The power supply for the vacuum tube voltmeter described in the two last issues of "Sylvania News" is designed to be very flexible, so that all ranges of voltages may be obtained to accommodate the various voltages being measured.

It is extremely important that the voltage supply be entirely independent of grounds since often the voltages being measured will be grounded. This requires the use of transformers.

In order that the reversing switch for the "C" battery, which was shown in the first issue, may still be usable it is necessary that a rectifier tube having two separate cathodes be employed. The type 25Z5 tube has been chosen for this purpose. In addition to the rectifier tube itself, it will be necessary to have two separate transformers having high voltage secondaries; one at least having in addition a 2.5 or 6.3 volt winding for lighting the filament of the volt meter tube. The voltage depends, of course, upon the type of tube being used in the volt meter unit. Transformers most commonly available for this use will have a center tapped secondary. Only one-half of this secondary is to be used. The plate of the rectifier tube is to be connected to the center tap and the return circuit will be connected to one end of the transformer winding. Thus, one section of the tube will supply plate voltage while the other section will be used to supply grid bias. It will be necessary to include an inductance capacity filter, as shown on the diagram, which will consist of a small choke and two 8 microfarad units for each supply. The voltage rating of the condensers must be chosen so that they will be sufficient for the voltages employed. The filament of the 25Z5 tube will be lighted directly from the 110 volt power supply. In order to limit the current, it will be necessary to insert a 30 watt, 330 ohm resistor in series with the filament, as shown on the drawing. The value of the potentiometers "R" employed to vary the voltages applied to both plate and grid supply will be determined by the total voltage available. In any case, these potentiometers should be of the wire wound type.

This power supply is quite flexible and will permit the vacuum tube volt meter, as already built, to be used without any alterations except to connect the four power supply terminals to the meter unit in place of the B batteries and to plug the primaries of the transformer unit into a light socket.

It is to be noted that this type of supply is not suitable for use with DC line voltage. Most of the parts specified are standard parts and will probably be found in the work shop of every service man.



A CHAT WITH ROGER WISE



Chief Tube Engineer,
Hygrade Sylvania Corporation

The large amount of work involved in getting production under way on metal tubes has not been permitted to stop progress on glass tubes, as is evident when the list of new glass tube types is reviewed.

In the 2 volt battery group the new additions include: Type 1A4, a semi-remote cut-off r-f tetrode in the ST-12 bulb, and two ballast tubes for filament control—Type 1E1, rated at 480 ma. and 1G1, 420 ma.

Type 6B5, the so-called "Triple Twin" tube is being placed in production to meet the demand for an output triode suitable for use under special circuit conditions. The tube is a double triode, the input section being a small triode and the output tube a larger one. The special design problems encountered in this type of structure have been solved very satisfactorily by the construction developed in our laboratories.

The tuning indicator tube, Type 6E5, is now being developed and is expected to be available within a short time.

Much additional development work is being carried on, along with the extensive program on metal tubes, thus insuring continuation of the progress along all lines of radio tube engineering in accordance with the policy which has been successfully followed by Hygrade Sylvania for several years.

NEW GLASS TUBES

Continued from Page One

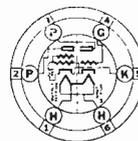
Grid Voltage.....	-45 volts
Plate Current.....	60 Ma.
Plate Resistance.....	800 ohms
Mutual Conductance.....	5250 micromhos
Amplification Factor.....	4.2
Load Resistance.....	2500 ohms
Power Output (with 5% 2nd Harmonic)	3.3 watts

Push-Pull Class A Amplifier (Two Tubes)

	Fixed Bias	Self Bias
Filament Voltage.....	6.3	6.3 volts
Plate Voltage.....	325	325 volts max.
Grid Voltage.....	-68	-68 volts
Plate Current Per Tube.....	35	35 ma.
Plate to Plate Load Resistance.....	3000	5000 ohms
Power Output.....	15	10 watts
Total Harmonic Distortion	2.5%	5%



TYPE 6B5 Power Output Amplifier



Sylvania 6B5 is a heater type output tube comprising two triode units mounted in an ST-14 bulb. The smaller or input section acts as a driver tube for the larger output unit and is directly coupled to it. No external bias is required for operation of the 6B5.

Type 6B5 may be employed in the output stage to deliver large amounts of power with low distortion. Two tubes may be used in a push-pull circuit if additional power is desired.

In general, the circuits designed for Type 6B5 will be somewhat simplified since the number of component parts required will be less than with other power amplifier tubes.

TENTATIVE CHARACTERISTICS

Heater Voltage AC or DC.....	6.3 volts
Heater Current.....	0.8 ampere
Maximum Overall Length.....	4 11/16"
Maximum Diameter.....	1 13/16"
Bulb.....	ST-14
Base.....	Medium 6-Pin

Operating Conditions and Characteristics:

Heater Voltage.....	6.3 volts
Plate Voltage (Output).....	300 volts
Plate Voltage (Input).....	300 volts
Grid Voltage.....	0 volts
Plate Current (Output).....	40 ma.
Plate Current (Input).....	8 ma.

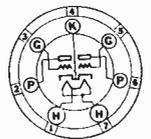
Plate Resistance.....	26,000 ohms
Mutual Conductance.....	2300 micromhos
Amplification Factor.....	60
Load Resistance.....	7000 ohms
Power Output*.....	4** watts

*Input Signal 15 Volts (RMS).

**Total Distortion 5 percent or less.



TYPE 6E6 Double Triode Power Amplifier



Sylvania 6E6 is a duplex triode power amplifier of the heater cathode type having a 6.3 volt, 0.6 ampere rating. It consists of two low-mu output triodes in one bulb. The triode units have separate external terminals for all electrodes except the cathodes and heaters, which permit operation either in parallel or push-pull.

Type 6E6 is designed for Class A service and is especially intended for use in automobile receivers having over-head speakers. This method of installation does not require as much power as is the case for sets mounted under the dash. This tube may also find application in some small a-c operated receivers where the power output required is not especially high.

TENTATIVE CHARACTERISTICS

Heater Voltage AC or DC.....	6.3 volts
Heater Current.....	0.6 ampere
Maximum Overall Length.....	4 11/16"
Maximum Diameter.....	1 13/16"
Bulb.....	ST-14
Base.....	Medium 7-Pin

Typical Operation:

Plate Voltage.....	180	250
Grid Voltage.....	-20	max. volts.
Plate Current.....	11.5	-27.5 volts
		18
		ma. per plate
Mutual Conductance.....	1400	1700
		Micromhos per triode
Amplification Factor.....	6.0	6.0
Plate Resistance.....	4300	3500
		ohms per plate
Load Resistance.....	15000	14000
		ohms plate to plate
Undistorted Power Output	0.75	1.6
		Watts per pair of triodes



THE SERVICE EXCHANGE



THE information presented in the Sylvania Service Exchange is contributed by servicemen as the result of practical experience. It is very carefully considered before being accepted, and we believe it to be correct and authentic. However, we assume no responsibility with respect to results. Each hint accepted entitles the writer to his choice of one Sylvania receiving tube. Please indicate preference when submitting hints. Don't send routine or generally known information. Good clear photographs of service benches or shops are also welcome.

Atwater Kent Models 37, 40, Etc. A one mfd. 600 volt condenser connected between the filament of the 80 and the chassis will increase all B voltages resulting in greater sensitivity and will also reduce the hum.—George Springmeir, Jr., Cincinnati, Ohio.

Atwater Kent Models 310, 510. These sets have a push pull audio system using two 2A5 output tubes which should match as closely as possible. If they are not closely matched audio oscillation may result. Some servicemen have no doubt remedied this by reducing the screen voltage, but they were at a loss because it resulted in lower volume and poor tone quality. Instead of reducing the screen voltage try two Sylvania 2A5's and you will be surprised at the results, as Sylvania 2A5's run closer in characteristics and at nearly all times require no matching.—George F. Baptiste, Howard, R. I.

Bosch Model 31. Fading in this model is occasionally caused by a defective 300,000 ohm resistance in the intermediate frequency stage.—George Springmeir, Jr., Cincinnati, Ohio.

Bosch Model 80, 84 Auto. This set uses one 12A and four 24A's. Change the heater voltage, and detector cathode resistance. The cathode resistance should be changed to 500 ohms. Replace the detector with a Sylvania Type 36 and the r-f stages with Sylvania Type 39/44. Change the output tube to a Sylvania 38. The output transformer already on the set will match the 38 well enough. This whole change will result in greater power and results in a great deal less drain on the batteries.—Contributor Unknown.

Courier Model 65. When this set oscillates and all remedies fail try a 0.1 mfd. condenser from contact of volume control (opposite the contact grounded,) to ground on chassis, this remedies the trouble.—Clarence Bierkamp, Jr., Youngstown, Ohio.

Crosley Model 95. Poor quality and weak reception is often caused by the speaker field coil leads being reversed due to the polarity of the car battery. Reversing these leads greatly improves the strength and quality.—A. S. Lewis, Los Angeles, Calif.

Majestic Model 90. Intermittent operation in this model is usually traced to the by pass condenser connected between cathode and ground of the last r-f stage.—Carl Flor, Milwaukee, Wis.

Mirror for Servicing. If there is a place in the radio set where it is hard to check for loose connections or to see the code of a resistor a dentists mirror makes a valuable tool for use in these places.—Al Burdir, Omaha, Neb.

Receiver Whistles. A considerable number of cheap radio sets of different models and makes that use a single type 43 output tube give trouble in the form of an audio whistle. If one looks over such a set he may find no resistor in the screen grid lead, the lead being connected directly with the plate supply of the 43 tube. By cutting the lead going to the screen grid

terminal and inserting a 1000 ohm resistor in series the trouble will be overcome. Also keep the plate lead from the 43 tube away from all other grid leads as far as possible.—George F. Baptiste, Howard, R. I.

Radiola Model 25 Remodernization. To change this set from the old peanut X199 and 120 to the type 30—31 tube of two volt line, no changes are necessary in wiring of chassis. It is necessary to rebalance the trimmer condensers on back of chassis Ballite Frame. A little care with the neutralizing trimmers on front of cabinet with separate station far better than with the 199 and 120. Don't turn the regeneration control as near full on as before. It is necessary to turn detector filament control nearly full on. The change to 2 volt series of tubes adds nearly 100 per cent to quality of tone, volume and selectivity. About 65 feet of aerial is correct for night time selectivity and in medium aerial socket.—Warren J. Daugherty, Kincaid, Kansas.

Radiola Models 44, 46, and 47. A fairly good "high fidelity" receiver can be made from these sets by changing them as follows:

- (1) Replace the 80 with a 5Z3.
- (2) Remove the .006 mfd. condenser, and the .25 megohm resistor in series with it, that is shunted across the impedance in the plate circuit of the 24-A detector. This change makes for much better high frequency response.
- (3) Remove the lead that runs from the detector cathode to terminal number six on the terminal board that is mounted on the amplifier-power supply chassis. Ground the detector cathode through a 10,000 ohm, one watt wire-wound resistor, and shunt this resistor with a four mfd. condenser, which will make the receiver practically humless.

As this receiver is a t.r.f. job, there is no attenuation of the higher frequencies due to too great a degree of selectivity, and if a good speaker is used, really excellent reproduction will be had.—Curtiss R. Schafer, Minneapolis, Minnesota.

Replacing Type 45 Tubes. In those instances where I have substituted 2A3's for '45's, the only change made has been the substitution of the one type of tube for the other, making sure first that the power transformer will stand the overload. At times I have substituted the output transformer to match the 2A3's, although in some instances the transformer for the '45's seems a better or as pleasing a match as putting in the correct one. I am referring to push-pull. The bias resistor remained the same. This resistor is usually about 750 for the '45's, and that takes care of the 2A3's. In all instances, whether the output transformer was changed or allowed to remain as is, the response in the bass register was increased quite a great deal, in fact, to the order that it was noticed by those not familiar with radio or the technical side of it. The added filament emission of the 2A3 seems to provide for a better response with no increased plate voltage, in fact, the plate voltage may drop due to the increased milliamper draw of the 2A3. However, the point to bear in mind in this is that the power transformer must be husky enough to stand the added draw, both in B current and filament current.—Martin C. Smith, Cleveland, Ohio.

Soldering Iron Holder. A good soldering Iron holder can be made from a piece of asbestos pipe covering such as is used on steam pipes, about a foot long, closed at one end, and supported under the edge of the bench (or on top if preferred). It enables you to keep the iron

where it can do no damage and will enable you to reduce the voltage with a saving in electricity.—R. C. Wyann, Medford, Mass.

Sparton Model 79A. In Sparton 79A models (also other Spartons) there are several .25 mfd tubular by-pass condensers in the r-f assembly. These are the condensers on top of the sub-panel between the tubes and are fastened to the sub panel with a set screw in the bottom of each condenser.

We have had these models in the shop afflicted with violent oscillations when the volume was reduced. The condensers have been found to be replacement condensers intended for Sparton receivers but when these particular condensers were replaced with non-inductive condensers the trouble was eliminated. In order to avoid trouble be careful when ordering replacements for these particular receivers and order not only a high grade condenser but specify that they should be of the "non-inductive" type.—Frye Radio Service, Modesto, Calif.

Sparton 930. The changes are 56 and 27 tubes in the r. f. and detector stages and two type 45 tubes in the push pull output stage.

First change to be made is in the push pull stage. These two sockets should be connected in series; that is, the filament should be connected in series to take the 45 tubes.

The 20,000 ohm resistor in series with the cathode in the detector should be changed to 50,000 ohms.

Disconnect the 1250 ohm resistor which furnishes the bias voltage for the two 182B and replace with a 1000 ohm 2 watt resistor. This completes the wiring; but, to make sure of trouble free operation for a long time, replace the .5 mfd condenser in the plate circuit of the r. f. tubes with a 400 .25 mfd. condenser. Also check the resistance of the 15,000 ohm bleeder resistor.

Now—place a '27 tube in the first r. f. socket, a '56 in the second, a '27 in the third, a '56 in the fourth, a '27 in the fifth, and a '56 in the detector stage. Two '45 tubes in the push pull sockets.

The first r. f. stage is the one in the rear left of the can when facing the radio. The second r. f. is in front, slightly to the right of the first. In other words, the three tubes in the rear of the can are first, third and fifth r. f. The three in front are the second, fourth and detector. When you have all the tubes in place turn the radio on and check the filament voltage on all the tubes. If this voltage is high, change the primary input switch on the power transformer to the 120-130 volt tap.

The total net cost of this job is not over \$6.50. The job can be done in 30 minutes.—Frank C. Palmer, Edgewater, Colorado.

SELL, BUY OR EXCHANGE POSITIONS WANTED

Continued from Page Two Main Section

To swap my services for a salary or salary and commission either as a radio service expert or in advertising, electricity, or a combination of these. I am 26, single, American, white, High School graduate. Have been a radio and electrical experimenter since I was thirteen. Am a member of R.M.S., and of O.R.S.M.A. I have rewired four AC sets for 240 volt DC operation. (240 volts straight, not 110 V. adapted to 240) Also have constructed a modern TRF six tube and a five tube set for operation on 240 volts DC. Have also constructed all my own test equipment. Have copied no circuits from manufacturers or other sources. Would like work in Pennsylvania.—Wilbert L. Misner, Vintondale, Pa.

Young man, 23 years old, single, graduate of National Radio Institute. Wants Radio repair work, anywhere in the United States or possessions. Experienced and can give references.—Peter Passera, 223 Crest St., Clairton, Pa.

METAL TUBES

In accordance with its established policy to manufacture promptly a complete line of standard receiving tubes, Hygrade Sylvania Corporation is manufacturing the new metal tubes. It goes without saying that the quality of Sylvania Metal Tubes will be consistent with the well-known uniform high quality of the present glass tubes.

The tubes are somewhat smaller than the present types of glass tubes. The bulb or shell diameter is one inch except at the base where the maximum diameter is one and five-sixteenths inches. The shell is all metal, and the lead wires are brought out through glass beads fused to eyelets in the "header," which is the metal disc that seals the shell at the bottom. The shell is connected to a base pin and operates at ground potential to eliminate any danger of electrical shocks. The overall length of the tube is reduced and a special octal base is provided.

The octal base has provisions for eight pins uniformly spaced. Where fewer than eight pins are required, they are omitted and the spacing of the remaining pins is unchanged. This arrangement differs from previous space designations so that it becomes possible to set up a universal pin numbering system. In this new system, numbers are assigned to each of the eight possible pin positions. Numbering begins at the shell connection, which is always the first pin to the left of the locating lug when the base is viewed from the bottom with

the lug toward the observer. The direction of numbering is clockwise on the basis of possible pin position. The new type of bases require special sockets, which are constructed with a key-way cut in the insulating material, which assists in locating the tube in the socket. The views below show diagrammatically the pin numbering and schematic arrangement of the present line of metal tubes.

Metal tube receivers will be offered to the public within a short time; and until that time, renewal tube sales and servicing will not be encountered. But when receivers are encountered using these new tubes, a few precautionary methods should be followed. Always remember that the tubes may be operating although the receiver appears to be dead and that precautions should be taken in removing or working around the tubes with bare hands as they develop considerable heat. Since it is impossible to see the internal elements of the tube, it is advisable always to check the tubes for shorts and remember that these tubes should not be misused just because the outer shell is of metal construction. If any receivers are encoun-

tered using wafer type sockets, the tubes should be carefully inserted, making sure that the locating key is not forced through the thin material, thereby cutting a new key-way in the socket. It is always best to instruct set owners not to remove tubes as they are liable to replace the tubes in the wrong sockets since the pin arrangement makes this error possible. In no case are standard glass tubes and metal tubes interchangeable.

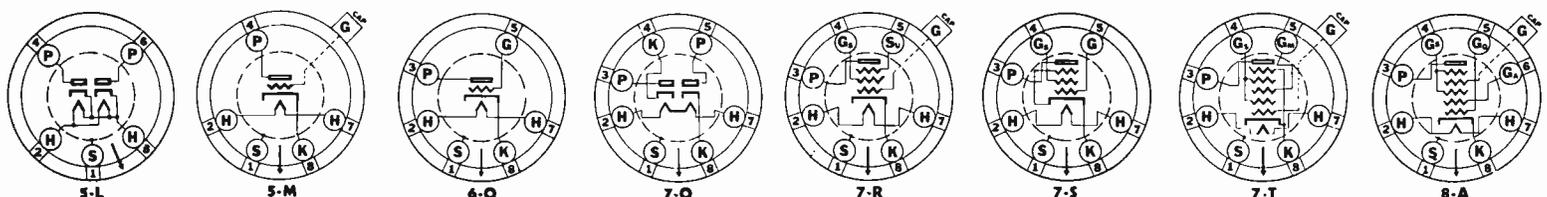
Characteristics and operating conditions for all Sylvania Metal Tubes are listed below. In general, the tube characteristics are very similar to the most popular 6.3 volt glass types. However, no duplex types, such as 6B7, 6F7, and 75, are contemplated. All the new Sylvania Metal Tubes are of the indirectly heated cathode design; and with the exception of type 5Z4 rectifier, the tubes have 6.3 volt heaters. The similar types of glass tubes are listed opposite the characteristics given below. Circuit applications for the glass tubes closely parallel those of the metal tube equivalents and may be followed for temporary reference.

TENTATIVE CHARACTERISTICS

TYPE	USE	Base	DIMENSIONS IN INCHES		FILAMENT RATING		Plate Volts	Negative Grid Volts	Screen Volts	Plate Current ma.	Screen Current ma.	Plate Resistance Ohms	Mutual Conductance Micromhos	Amplification Factor	Load Resistance Ohms	Milliwatts Undistorted Output	Similar Glass Type
			L.gth.	Dia.	Volts	Amps.											
5Z4	F. W. Rectifier	5-L	5 1/8	1 5/16	5.0	2.0	400	RMS V _o	125	.....	.....	.....	.....	.....	.....	.....	80
6A8	Converter	8-A	3 1/8	1 3/8	6.3	0.3	250	3.0	100	3.0	3.5	500,000	†650	.....	.....	.....	6A7
6C5	Amplifier	6-Q	2 5/8	1 3/8	6.3	0.3	250	8.0	.....	8.0	.....	10,000	2,000	20	.....	.....	76
6D5	Power Amplifier	6-Q	3 1/4	1 5/16	6.3	0.7	275	40.0	.....	31.0	.....	2,250	2,100	4.7	7,200	1,400	45
6F5	Amplifier	5-M	3 1/8	1 5/16	6.3	0.3	250	2.0	.....	0.9	.....	66,000	1,500	100	.....	.....	*
6F6	Power Amplifier	7-S	3 1/4	1 5/16	6.3	0.7	250	16.5	250	34.0	6.5	80,000	2,500	200	7,000	3,000	42
							†250	20.0	.....	31.0	.....	2,600	2,700	7	4,000	850	
6H6	Rectifier	7-Q	1 5/8	1 5/16	6.3	0.3	100	RMS V _o	2.0	Maximum	.....	.....	.....	.....	.....	.....	*
6J7	Detector, Amplifier	7-R	3 1/8	1 5/16	6.3	0.3	250	3.0	100	2.0	0.5	1,500,000	1,225	1,500	.....	.....	77
6K7	Amplifier	7-R	3 1/8	1 3/8	6.3	0.3	250	3.0	100	7.0	1.7	800,000	1,450	1,160	.....	.....	78
6L7	Mixer	7-T	3 1/8	1 5/16	6.3	0.3	250	6.0	150	3.5	8.0	2,000,000	†325	.....	.....	.....	None

†Conversion Conductance. *Type 6F5 is similar to the Triode Section of Type 75, and Type 6H6 is similar to the Diode Section of type 75. When used together they become equivalent to the 75. ‡Triode operation.

Bottom View of Bases



SYMBOLS—H-Heater; P-Plate; K-Cathode; S-Metal Shell; G-Control Grid; Gs-Screen; Ga-Anode Grid; Go-Oscillator Grid; Gm-Modulator Grid; Su-Suppressor Grid; □ Top Cap; —→ Locating Pin.

SYLVANIA NEWS

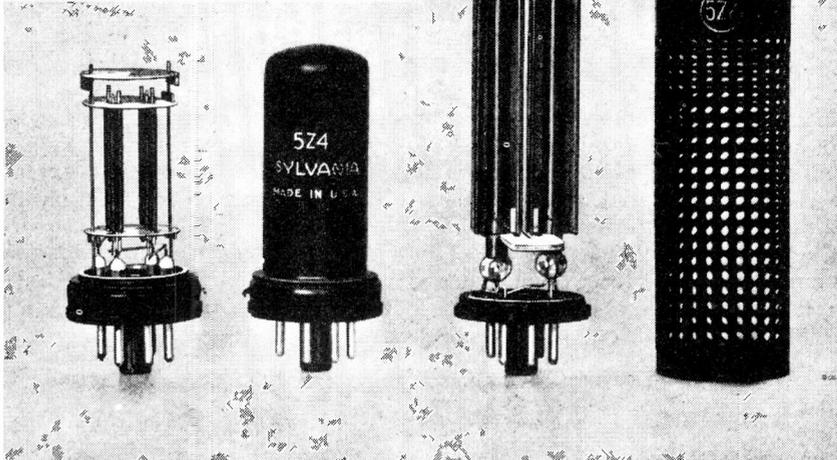
TECHNICAL SECTION

Vol. 5

EMPORIUM, PENNA.

No. 12

SYLVANIA DEVELOPS NEW SMALLER 5Z4



New Sylvania 5Z4

Original "Bird Cage" 5Z4

NEW TYPE 5Z4

Sylvania engineers, always alert in the field of tube development, have made available a newly designed metal rectifier tube, Type 5Z4. The design of the new tube is outstanding and a step forward in the progress of metal receiving tubes. The outstanding feature of the new Sylvania 5Z4 is that the physical size is in keeping with the other types of metal tubes. The reduction of size over the original 5Z4 was accomplished without loss in any of the electrical characteristics and several features were incorporated that improved the physical structure.

The internal elements of the new Sylvania 5Z4 are similar to those used in the construction of the 83V glass rectifier. The complete assembly is enclosed in the same size metal shell as used with the 6F6 power amplifier tube. The use of this type of metal shell reduces the height to 3- $\frac{1}{4}$ inches and the diameter to 1- $\frac{5}{16}$ inches.

The newly constructed 5Z4 insures more perfect shielding, compactness, ruggedness, uniform characteristics and efficiency during life. The filament current drain is now 1.5 amperes as compared to the 2.0 amperes drain of the original 5Z4. The decreased filament wattage results in lower operating temperatures, comparable with the operating temperatures

of other types of metal tubes. Through the efforts of Sylvania engineers, the maximum d-c output current rating was maintained at 125 milliamperes for operation at 400 a-c volts (RMS) per plate. This feature makes it possible to directly replace the original 5Z4 tubes now in use with the new Sylvania 5Z4. The new tube will also replace the glass rectifier tube incorporating the octal type of base, Type 5Y3.

The progress made by set engineers in designing receivers of improved performance is aided by development work of the kind carried on in connection with the Sylvania 5Z4. Engineering research and development of this kind in both metal and glass tubes is continually being carried on to maintain Sylvania tube quality and progress.

HERE'S YOUR TECHNICAL SECTION BINDER

Apologies are due some of you for the delay in shipping the binders you ordered. Our first supply went like hot cakes and left us with more orders than we had binders. If you haven't received yours, it will be along just as soon as we can get a new supply. We hope to have enough this time for everybody who wants one, but don't delay sending in your dime if you haven't done so, as it's a case of first come, first served.

The picture shows you what the binder looks like. It is printed on a good heavy green cover stock that will stand lots of handling. It comes to you complete with three metal clips long enough to hold several years' issues of the Technical Section.

The cover can be expanded to hold them without crowding, and is large enough to cover the edges completely. The dime doesn't quite cover the cost of the binder plus handling and mailing but it helps out on the budget. When ordering, wrap your dime securely, or, if you send stamps, don't stick them to the letter. And please write your name and address plainly, if you haven't a typewriter.



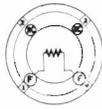
SWAP AND SELL— IMPORTANT NEWS

Fellows, the time has come when we'll have to do something about the Swap and Sell Department. We don't want to discontinue it, but we think you'll agree that it would be a mistake to let it crowd everything else out of Sylvania News.

We made the offer of free advertising in good faith, and for the present we're going to stick to it, with the following proviso: beginning immediately, the first 25 words will be printed free, but there will be a charge of 25 cents for any number of additional words up to a maximum of 50.

Advertisements received before September 30 will be run free, but will be edited to 50 words or less. That's being fair to everybody, and if you can't say it all in 25 words, you're still getting a whale of a lot of advertising for your two-bits. Sylvania News goes to 50,000 (approximately) radio dealers and servicemen, and we have plenty of reason to believe that they read it carefully.

NEW SYLVANIA BALLAST TUBES



There has been a steady increase in the use of ballast tubes in battery and AC-DC sets, the increasing popularity of these devices being especially noticeable this season.

The ballast tubes used are of two distinct types which are considerably different in their construction and regulating characteristics. The type used to control the filament current supplied to battery sets is a true ballast tube maintaining constant current over a considerable range of voltage variation. It is intended to permit the operation of 2 volt tubes from a battery source consisting of two banks of parallel dry cells, these two banks being connected in series. The operation voltage varies from 2.2 to 3.4 volts, being highest when the dry batteries are new. Ballast tubes designed for this purpose hold the variation in terminal voltage to a range of 1.8 to 2.2 volts. During the major part of the battery life the voltage is very close to the rated value of 2.0 volts, assuming the ballast tube is properly designed.

In AC-DC sets the voltage drop may range from 40 volts to over 200 volts and the most commonly used type of ballast tube has been the tungsten filament type. This ballast affords some regulating characteristics but does not have as flat characteristics as the type intended for battery use.

Fourteen types of ballast tubes were announced in the last issue of Sylvania News. Those intended for 2 volt sets carry a designation starting with the number "1", such as 1A1, 1C1, etc. The initial classifying number indicates the voltage drop across the tube. New ballast tubes of the type intended for AC-DC sets are numbered in the same manner; thus, in Type No. 46A1 the number 46 indicates the normal voltage drop. The above is in accordance with the RMA tube numbering system. Some of the older ballast tubes are designated by a single number and in this case the number has no relation to the voltage at which the tubes are operated. The use of the RMA numbering system is being extended to all new ballast tubes which will eventually eliminate any confusion in this group.

Due to the confusion in ballast tube type numbers there has been considerable misunderstanding as to the correct type of tube to be used for replacement purposes in receivers. When such a condition arises the correct type of ballast tube can easily be determined or the information can be obtained by writing, stating the make and model number of the receiver. All the ballast tubes listed below will replace any ballast tubes having like numbers. These ballast tubes will also replace any ballast tubes, regardless of designating type number, providing the filament current load is identical and the basing arrangement is the same. To determine the filament current load across a ballast tube it is necessary to include the total filament current drain of the receiver tubes plus the current drain of the dial light.

(Example: A set having 1 Type 19, 1 Type 30 and 3 Type 34 tubes has a filament current drain of 500 milliamperes. The original ballast tube for this set was Type 6AA. This original ballast tube can now be replaced by the Sylvania 500 Milliampere ballast tube. Type 1A1.)

Type	Use	Ma. Load Current	Average Voltage Drop*
1A1	Battery.....	500	1.0
1B1	Battery.....	360	1.0
1C1	Battery.....	745	1.0
1D1	Battery.....	240	1.0
1E1	Battery.....	480	1.0
1G1	Battery.....	420	1.0
2	DC or AC-DC.....	300	9.0

A CHAT WITH ROGER WISE



Chief Tube Engineer,
Hygrade Sylvania Corporation

Production of metal tubes at our Emporium factory has now reached the substantial figure of 15,000 finished tubes per day, and will be increased very rapidly during the coming month. Since July was the first month for production of these tubes (other than samples), the present volume represents a real achievement, particularly since only all-metal tubes are included in this figure and production is balanced among the nine types now in use, in accordance with the demand from our customers.

The use of metal tubes has increased more rapidly than the supply, and in spite of the speeding up of our manufacturing program over the original schedule—we are now three months ahead—we have barely been able to keep up with the demand from our customers. It seems probable that our supply of metal tubes will be adequate by the end of October and that an ample supply

of tubes will be available for the Christmas trade.

The question of tube quality has been a vital one with metal tubes and the biggest problem has not been that of producing the most metal tubes, but rather the best metal tubes. The time of most of the engineers assigned to this development has been devoted almost exclusively to the quality phases during the past three months and results obtained are pleasing, to say the least.

In general the quality has been fully satisfactory to our customers, a most gratifying condition considering the brief experience with metal tubes. It is not necessary to discuss the relative merits of glass and metal tubes here. We are manufacturing both and are equally interested in expanding our market for the two types.

3	DC or AC-DC.....	300	128.0
4	DC or AC-DC.....	400	115.0
5	DC or AC-DC.....	460	115.0
6	Battery.....	695	1.0
7	DC or AC-DC.....	300	176.0
8	DC or AC-DC.....	300	132.0
9	DC or AC-DC.....	300	50.0

*The Voltage drop shown is for average operation and may vary according to the supply voltage.

Three Reasons For Blue Glow

(Reprinted by Request)

Many inquiries are received relative to the blue glow which is present in a number of Sylvania Tubes. Most of these are based on the misunderstanding of the different types of glow that may be present in a tube. There are three different types of blue haze that may appear while tubes are in operation. They are classed as: Fluorescent glow; Mercury Vapor Haze; Gas.

The fluorescent glow is usually of violet color, and is noticeable around the inside surface of the glass bulb. This glow is a phenomenon caused by electronic bombardment taking place within the tube. This glow changes with the intensity of the signal and may at times become quite brilliant. Fluorescent glow has absolutely no effect on the operation of a receiver. In fact, tubes with this characteristic are particularly good as regards gas content.

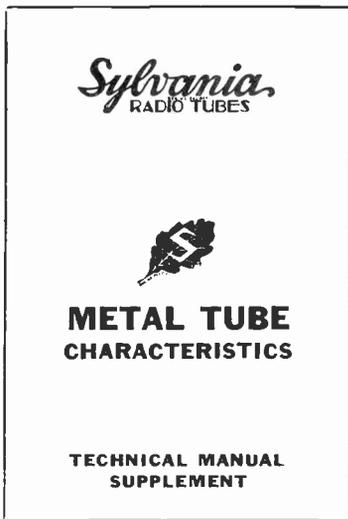
Mercury vapor haze is a blue glow which is noticeable between the plate and filament in types 82 and 83 rectifier tubes. These are the only types of Sylvania receiving tubes in which this type of haze appears. The perfect operation of types 82 and 83 is dependent upon a mercury vapor which comes from free mercury that has been placed in the bulb during the exhaust period. Therefore this type of blue haze is in no way detrimental to the operation of these tubes.

Gas is a blue haze which is usually confined to the vicinity of the plate and filament structure. Its presence, when of large content, affects the operation of a receiver to the extent that erratic performance is noticeable. Gassy tubes should always be replaced with new tubes.

Testing for the above conditions can be best accomplished by actual operation in a receiver. It is not necessary to test for the blue glow evident in types 82 and 83, since this is characteristic of these two tubes.

When in doubt as to the blue content of other types of tubes a sure test can be made by using a strong magnet next to the bulb. A gassy tube will not be affected in any way by the presence of the magnet, while the fluorescent glow, which has no effect on the performance of the tube, will shift about as the magnetic field is shifted.

Metal Tube Supplement To Technical Manual



No charge for this supplement to your Sylvania Technical Manual, which gives you characteristics, circuit applications, base diagrams, etc., on the nine types of metal tubes now being used in new receivers. There is a handy table for quick reference in the back. Sized the same as the Manual, it can be clipped inside the cover. Send requests to Hygrade Sylvania Corporation, Emporium, Pa.

WANTED, SELL AND SWAP DEPARTMENT

Continued from Page 2 Main Section

SELL—Continued

Dependable tube tester model 304. Tests all metal tubes without adapters, \$20. Perfect condition. Triplett perpetual tester Model 1177 with oscillator and universal meter, \$23. Good condition. Triplett free-point tester Model 1166. No case, \$8. Perfect condition. Make offers.—B.H.Pfab, Ben's Radio Service, 2116 W.16th St., Peru, Ill.

Books: Principles of Radio Communication—Morecroft; Radio Tel. and Tel.—Duncan & Drew; Radio Handbook Moyer & Wostrel; The Radio Manual—Sterling; Short Waves—Lentz & Gable; Photocells and their Application Zworykin & Wilson; Practical Electricity—Croft; Atoms, Molecules & Quanta—Ruack & Wrey. Last 4 years of Radio News, also Triplett model 1230, signal generator used not more than two hours. Make offer. All books in good condition, sell for half list price.—B. H. Blatchley, Calpine, Calif.

N.R.I. course in radio 50 lessons plus special tests, \$15.00.—Louis Fiedler, Jr., 3459 W. 63rd, Cleveland, Ohio.

1 KW Thordarson power transformer for \$12. 0-25 amperes thermocouple R.F. Ammeter Jewel 3 1/2 inch bakelite case for \$2.50. Write for list.—Arlo R. Eggensperger, W9LBI, 812-11th Ave. N., Fargo, N. Dak.

Complete transmitter C.C. using 47 crystal 800 buffer-doubler 203A R.F. Amp. 52 final 3-power supplies. Send stamp for photo and information.—Hosea E. Decker, 376 N. Sandusky St., Delaware, Ohio.

Slightly used Nation FB7A receiver complete with power supply, 8" Magnetic speaker, and coils from 14-26; 25-43; 41-72; 70-122; 120-204; and 201-422.3 meters. Cost \$120.00 Make offer.—John Magnus, 5454 So. Shore Drive, Chicago, Ill.

Weston A-C Model 476 voltmeter measuring 150-8.4 volts, bakelite case. Never used. Will sell for half price, \$7.50.—J. M. Braudvig, Gross, Nebr.

WANTED

Postage stamps, used or unused for collection. Trade radio equipment or pay cash. State condition.—R. N. Eubank, 2817 Montrose Ave., Richmond, Va.

Supreme 333 DeLuxe Analyzer or other good analyzer.—Sydney Rosen, Rosen Radio Service, 85 Bridge Street, Paterson, N. J.

For cash or swap, complete power supply delivering 1000 volts or much higher. Also one delivering 500 volts, or component parts suitable for same. Also 46 class B Modulator complete or parts, RK20 tube, meters, crystals, test equipment, etc. Will sell or swap drafting outfit, slide rule, complete electrical engineering course of 150 lessons, 10 years National Geographic Magazines, about 50 scientific and technical books on many topics, and over a thousand different government printing office pamphlets mostly on agricultural topics.—Samuel Freedman, Chatham Mass.

Few battery sets, five, six or more tubes, prefer single dial. Have new records by radio stars, B supply unit, charger.—J. L. Orysen, Kennen, Wisc.

Ma Meters 1000 ohms per volt. Must be in first class condition, state size, price, condition. Prefer Weston, Jewel, Beede or Triplett, and Multipliers or Meter separate.—H. L. Fornoff, 326 Watson St., Buffalo, N. Y.

Small metal lathe, 10-15 watt amp. Will sell or trade A.C. generators, or build transformer and gen. for cash or what have you? These generators are fine for car, truck, or portable operation of radios, P.A. systems or where a current is needed. Any size.—V. E. Willey, Watts, Okla.

Wattmeter, any type, ac voltmeter, Jewell or Watson ohm and capacity meters, 2" type moving coil, Jewell meters, also RCA Photophone type pickup or speakers, Rider manuals. Will pay cash or swap for transformers made to order. Write complete details.—George Makuh, 2095 West 15th St., Cleveland, Ohio.

Readrite 710 or 720 analyzer. Have one G.E. Tungar 2 Amp. A and B battery charger, 1 G.E. 110 volt A.C. 60 cycle induction phonograph motor with 1 1/2" turntable, 1-350 power Wollensak Microscope, 1-Man's 6 Jewel wrist watch with mesh strap, 1 man's white gold ring with a genuine floating opal. What do you want?—Albert Kirchoff, 605 Hamilton Ave., West New York, N. J.

50 watt socket, 1500 volt filter conds, 10 V. 3 amp. fil. trans. 2-.00025 Cardwell or National, 2-.0005 Cardwell or National variable conds., 1 mfd. 1000 volt cond. Trade any radio parts, have trans., tubes, conds. res. Hammarlund 120-B, etc.—L. R. Mitchell, 219 E. Oak St., Kewanee, Ill.

A 2-volt battery operated short wave converter, not an adapter. Either 2, 3 or 4 tubes and would prefer a range of 10 to 200 meters. Will pay cash but must be in good condition and cheap.—Paul Lund, Mansfield, Mo.

Auto amplifier equipment for sound truck. Must be in good condition and have a power output of at least 15 watts. State price and particulars.—Nat Colen, 1301 N. California Ave., Chicago, Ill.

Analyzer. Will pay cash and answer all letters.—Walter Leouchick, 2041 Lyndale St., Chicago, Ill.

566 Weston type 3 analyzer or 660. Supreme 222 multi-meter and Supreme analyzer section No. 77 to go with multi-meter 222 and oscillator and tube tester, also Rider No. 2 and No.3 manual or Gernsback manuals, same num-

bers. State your lowest price and condition of these items when writing.—Kennedy Radio Service, Box 186, Netcong, N. J.

Two used or new Silver Marshall Clough System audio transformers, numbers 225-226, first and second stage.—Geo. Giese, Montello, Wis.

Back issues of Radio Magazine, a west coast publication. 1934 and 1935 issues, books on radio transmitting equipment, etc. Have cash and plenty to swap.—Jack E. Bannon, 412 Seneca Street, Oil City, Pa.

Jewell 199 analyzer, Jewell or Weston 3 1/2" meters, voltmeters AC and DC 0-1 MA. 1000 ohms or more per volt, good oscillator.—Lesmeister's Radio-Electric Service, 820 Birch Ave., Harvey, N. Dak.

Plate transformer 600 volt to 900 volt secondary at 400 to 500 mls.—Killian Radio Service, 205 Main St., New York Mills, N. Y.

Rider Manuals, Gernsback, RCA. Have 5 different meters to trade—0-6V, 0-25, and 0-10v, 0-10 milliamperes, 0-150v, 0-1.2 amperes, all Jewell D.C. and are 2 1/2 inches across the glass. Also have readrite 700 analyzer. Make me an offer.—Oliver F. Klein, 2235 N. 39th St., Milwaukee, Wis.

Want National 5 meter converter and class B transformers for low power amateur phone. Have for sale 5 meter receiver and transmitter, QST 1927 to 1934 and old copies of Radio News. Also Crosley "Roamio" and Bosch auto radios.—E. Carter, 1328 Crane St., Schenectady, N. Y.

Supreme 333, AAA-1 etc., Hickock, Weston, Tripolett. All wave Osc. tools, 8" Hickock meter, condenser test box, filing cabinet, Rider Manuals Vols. 2, 3, 4, 5. Gernsback Manuals, crystal mike, 6" rack, rack panels. Pay cash or trade.—Empire Radio Service, Box 536, Forest City, N. C.

SWAP

Trade 1/2 KW 110 volt AC self excited generator with 12 volt DC winding for charging storage battery, 110 volt AC Majestic A eliminator; 2 Amp tungar battery charger with bulb, for 1/2 KW or larger 32 volt or 110 volt Delco. Powerlite or other Farm Plant generator and Gas engine; generator can have burnt out armature or 1 KW or larger 110 V. DC or AC generator with field rheo. and meters.—S. Cern, Dave's Radio Service, 4685 Montclair, Detroit, Michigan.

One oscillator, one tube S.W. set including 4 plug-in coils, box of 15 resistors, box of 10 tubular cond. 5 .1 plus 1, .0069, etc. for typewriter in good condition and with all letters and numbers. If above not desired, write what you want.—S. Lewis, 2408 So. 3rd St., Philadelphia, Pa.

Earl Leidermen Muscle building course with 10 cable exerciser for set analyzer, tube tester, multi-tester or service manuals.—Charles Royer, 401M N. 4th St., Allentown, Pa.

One 1-tube Twinplex Allwave Battery set complete; will pull loudspeaker, \$10.00. Also Indian relics, field glasses, microscope to trade. Want typewriter, guns, radios and electrical tools, dials, loudspeakers, headphones, wire, etc.—Royal Radio Shop, Roy Brown, Mgr., Madison, Ga.

One excellent B eliminator, one Perfect A eliminator, both for one 22 cal. rifle in good condition.—Charles Stevenson, 137 Bergen Ave., Ridgefield Park, N. J.

Transmitting equipment for Rider Service Manuals.—Vernon Madill, 1201 N. Walnut St., Muncie, Ind.

One N.R.I. Nacometer, oscillator, headphone, 3 tapes (6 combinations) for analyzer or other radio testing instruments.—E. Chadima, 702 12th Ave. S.E., Cedar Rapids, Iowa.

Set of Electrical books in 8 volumes, set of machine shop books in 6 volumes, set of accounting and business management books in 7 volumes; all leatherbound, by American Technical Society. Also No. 7 Remington typewriter. Want Gernsback or Rider Manuals, oscillator.—Wm. G. Scott, Davis, W. Va.

Alan Ace A.C. and D.C. 3 tube S.W. set 15-600 meters with Jensen speaker tubes and coils for an 0-1 Weston milliammeter, Rider manuals, or other test equipment.—Bob Rebsch, 745 Riverside Drive, New York City.

Gernsback's Manual No. 2 and Rider's trouble shooter's manual No. 2 for any Rider's Perpetual Manual except No. 2. Also have new Weston model 351 2 1/2" meter 0-10 amperes D.C. will trade for RCA or A.K. Service Manual or what have you. Readrite No. 700 tube tester and analyzer will swap for a good oscillator.—Oliver F. Klein, OK Radio Service, 2235 N. 39th St., Milwaukee, Wis.

Will exchange services in the repair and calibration of meters and equipment for other meters and equipment in any condition. Will also buy obsolete meters and equipment. State full particulars.—George Albert, 679 Ninth Ave., New York City.

IRE Proceedings, 1931 and 1932 complete, first 13 issues of Short Wave Craft, Radio News April, 1930 to June 1933. QST January 1932 to May 1932, 1933 complete; Principle of Radio by K. Henney, Principles of Radio Comm. and Experimental Radio Engineering, both by Morecroft. Radio Telegraphy and Telephony, Duncan & Drew, drafting outfit, for meters, analyzers, oscillator or service manuals. Will add cash if necessary.—Joseph M. Hill, 3682 E. 61st St., Cleveland, Ohio.

One complete RCA Institute Radio Service including sound and television, value \$110.00 for Supreme Model 333

Deluxe Analyzer or what have you in test equipment? Also have one Star duplex Massager and Vibrator for face and scalp treatment, value \$18.00. What have you?—L. D. Winchell, 1804 Dewey Ave., Rochester, N. Y.

Fine printing for National SW3 receiver using the type 58, 58 and 56 tubes (AC). I will also wind a set of 4 plug-in coils on tube base forms to tune either with a .001 or a .00014 mfd. variable tuning condenser, these coils either for the amateur bands (20, 40, 80, 160) or general short wave bands (16-30, 29-58, 54-105, 100-200), 35c. Atwater Kent "B" Eliminator, a Grigsby-Grunow "B" Eliminator which delivers 135 volts of pure DC, set of Silver-Marshall Plug-in coils that will tune from 10-20f meters; rectifier that will work fine in a field supply for the exciter of a dynamic speaker, for which will swap aluminum shield can (about 9x5x6 or thereabouts).—M. J. Feigenbaum, Feigenbaum Radio Service, 42 Jefferson St., Yonkers, N. Y.

One Hobart Bros. motor generator, 8 hour battery charges, 150 ampere at 7 1/2 volts, 110 volts AC-60 cycles, A-1 shape, battery tools and moulds of all sizes, battery tester, everything complete to start a battery shop, will trade for auto public address system of about 10 or 15 watts output or a good set tester or what have you?—Joe. J. Yowns, R.F.D. No. 1, Murrillsville, Pa.

200 Watt 120 D.C. to AC Converter, 120 volt universal electric drill, capacity bridge, resistance bridge, 25 radio books, 10 sets literature, electrical engineering books and course, photoelectric cells, high frequency apparatus. Want meters and test equipment or?—R. Denmark, 2816 Jerome Ave., Bronx, N. Y.

Silvertone A.C. Radio, small 32 volt Westinghouse Electric Motor, No. 2 folding pocket Brownie camera. Want small Graflex camera.—G. A. Fronheiser, R. 3, Box 146, Hamburg, Pa.

Hobart motor generator battery charger, will charge 15 batteries at once, 6 volts at 100 amperes, either for 110 or 220 volt supply at 60 cycles; Majestic model 70 receiver complete with dynamic speaker, power pack and tubes, will swap for a small double face neon radio sign, tube tester and service manuals, or what have you?—Russell M. Kendrick, 5216 Ivanhoe Ave., Baltimore, Md.

POSITIONS WANTED

Young man 25 years old, single, with correspondence training, who will take interest in his work desires position as assistant in Radio or Electricity to gain experience with opportunity for advancement. References given.—Raymond Tkac, Floresville, Texas.

Reliable young man 24, single, experienced in radio service and selling. Graduate of the Coyne Electric and Radio School. Has test equipment. Wants steady work with reliable firm. References given.—Corrin Mortenson, Iola, Wisconsin.

WANTED: An employer to give an ambitious young radio serviceman a chance to establish a permanent connection with a reliable company. Pay not immediately important. Will go anywhere. I am 25, single, intelligent, graduate of Coyne Radio School. Employed short time by Supreme Radio Shop, 6163 West Irving Park Blvd., Chicago, Ill. Have been running part-time service business since 1934. Character reference on request.—Lester R. Volz, Route 3, Snohomish, Wash.

Young man, single, high school education, graduate of the National Radio Institute of Washington, D. C., member of R.M.S. and several other servicemen's organizations. Wants steady work in radio repair work or sales department. Am a conscientious worker and willing to learn. Will go anywhere. Have some testing equipment. Have had experience in radio repair and sales work. References given.—C. W. Bourne, Box 32, Council Grove, Kansas.

Young man, 23 years old, high school graduate with five years experience in radio repairing and selling wants steady work anywhere in U.S. Have own testing equipment and will work for small salary. References given.—E. M. Diamond, Kenova, W. Va.

Radio serviceman, 30, married, with 8 years experience in all makes; member of I.R.S.M. and R.S.M., wants position anywhere, but prefers Chicago and vicinity. Prefer to work for large dealer or distributor.—Elwood S. Fauls, 325 Carpenter St., Oneida, N. Y.

I am 24 years old, white, single, American born of Scotch-Irish descent, and in good health. Have high school education; am graduate of National Radio Institute; hold Class "B" Amateur license; have been in broadcast radio since 1926; have equipment for servicing; have had sales experience; am interested in experimental, aircraft, police and amateur radio. Can go anywhere. References given.—J. A. McCombs, Granger, Ind

IMPORTANT

See Page 1, this section, for an important announcement about a necessary change in the "Sell and Swap" set-up.

SYLVANIA NEWS

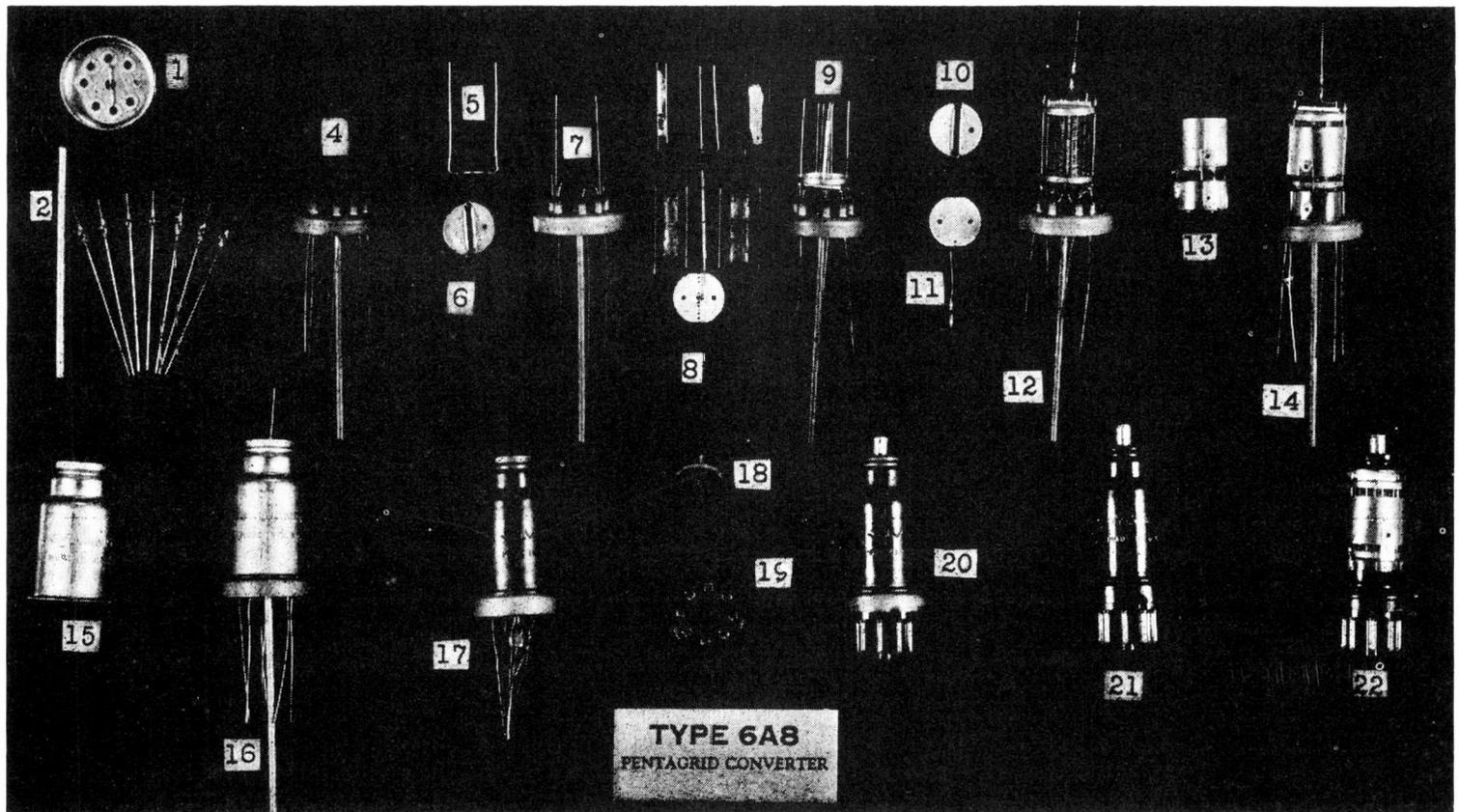
TECHNICAL SECTION

Vol. 6

EMPORIUM, PENNA.

No. 1

PROGRESSIVE CONSTRUCTION OF A METAL TUBE

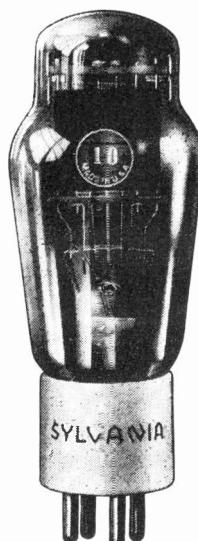


- | | | | |
|---|---|--|---------------------------------|
| 1. Stem head | 7. Stem with mount support | 12. Mount assembled less plate and getter shield | 17. Seald-in and exhausted tube |
| 2. Exhaust tube | 8. Group of 5 grids, cathode assembly and mica spacer | 13. Plate and getter shield assembly | 18. Top cap assembly |
| 3. Stem leads with glass insulating beads | 9. A progressive stage | 14. Complete mount | 19. Octal type base |
| 4. Completed stem | 10. Top Collar | 15. Metal bulb with top cap shell | 20. Completed tube (unpainted) |
| 5. Mount support | 11. Mica spacer, top cap lead with glass bead | 16. Metal bulb welded over complete mount | 21. Completed tube (painted) |
| 6. Bottom collar | | | 22. Cut-away view |

TYPE 10 WITH LOW-LOSS BASE

A large percentage of the type 10 tubes produced are being used by "Hams" in amateur transmitters. The rapid development of radio transmission is to a large extent due to the interest and the experimental work of amateurs, and it is logical to expect the "ham" to pioneer in the higher frequency spectrum.

Recognizing the need for tubes with extremely low losses in the base, Hygrade Sylvania Corporation has brought out a type 10 tube equipped with a ceramic base (a material usually referred to as Isolantite). The use of this base reduces r-f losses to a great extent. In order



to take full advantage of the low loss feature of this base it is desirable to use ceramic sockets affording the same low loss protection.

The new type 10 is equipped with ceramic spacers, filament tension springs and mica "dome pads" and is in all other details built exactly as the standard Sylvania type 10.

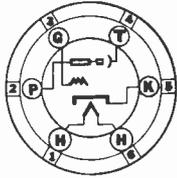
The list price of the ceramic base type 10 is \$2.75.

It is expected that this tube will be widely used by amateurs for oscillators and r-f amplifiers in all short wave "rigs".

The regular type 10, with bakelite base, is still available. When ordering Type 10, specify ceramic or standard base.



TYPE 6E5
Tuning Indicator
Tentative
Characteristics



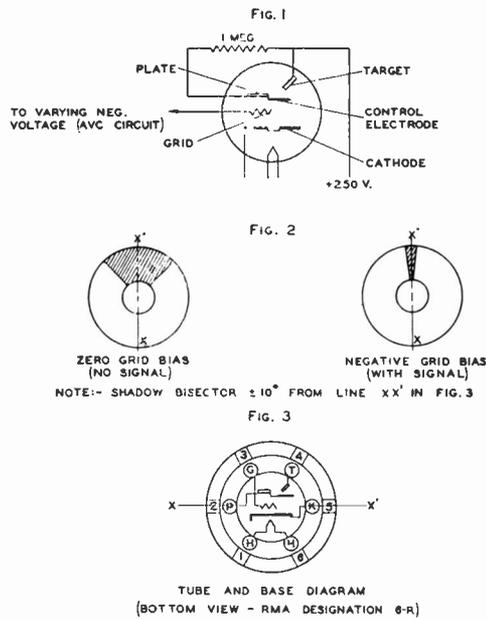
Heater Voltage AC or DC.....	6.3 Volts
Heater Current.....	0.3 Ampere
Maximum Overall Length.....	4-1/4 inches
Maximum Diameter.....	1-9/16 inches
Bulb.....	ST-12
Base.....	Small 6 pin

OPERATING CONDITIONS:

Plate Supply Voltage.....	200	250	Volts
Target Supply Voltage.....	200	250	Volts
Plate Current (Triode Unit)*.....	0.2	0.25	Ma.
Target Current (Approx.).....	4.0	4.5	Ma.
Grid Voltage (Triode Unit)**.....	0.0	0.0	Volts
Grid Voltage (Triode Unit)**.....	-6.5	-8.0	Volts
Triode Plate Resistor.....	1.0	1.0	Megohm

* With triode grid voltage of 0.0
 ** For shadow angle of approx. 90 degrees
 *** For shadow angle of approx. zero degrees

Sylvania Type 6E5 is designed primarily for use as a visible tuning indicator of the electron ray type. This tube has a round conical plate or "target" which fluoresces during operation, and is viewed through the top of the bulb. The visible indication is in the form of a fluorescent lighted sector covering about three-quarters of

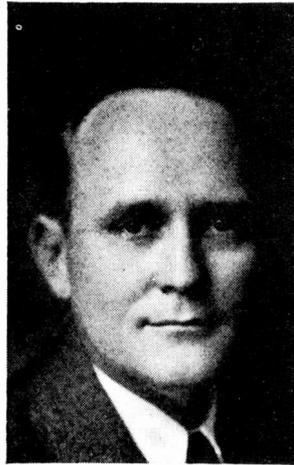


the area of the target when no voltage is applied to the control grid of the tube. When a negative voltage is applied to the control grid, the edges of the lighted portion close in over the previously unlighted or shaded 90° sector with a fan like movement, until the voltage is increased to a value such that the shaded portion is eliminated and the entire top surface of the target becomes uniformly illuminated.

Structurally this tube contains two parts: A triode which functions as a D-C amplifier as indicated by the circuit in Fig. 1, and the electron ray device. This latter consists of a portion of the heated cathode as a source of the electrons which are attracted to the target by the positive potential on it. The shaded or unlighted sector is produced by the shadow of a control electrode which is attached to the plate of the triode. An actual photograph is shown which clearly illustrates the structural design of the tube.

Referring to the circuit (Fig. 1) it can be seen that if the control grid of the triode is made

A CHAT WITH ROGER WISE



Chief Tube Engineer
Hygrade Sylvania Corporation

In the previous issue of Sylvania News you were advised that production of metal tubes had been stepped up rapidly and that the shortage which existed temporarily would be overcome by the end of October. As a matter of fact this was accomplished four weeks earlier than we expected, due largely to the reduction in "shrinkage", which enabled us to finish a much larger number of tubes without increasing our mount production.

We now carry an adequate stock of all types of metal tubes, and can devote our efforts to further improvements in production methods, resulting in better uniformity and quality. The quality of metal tubes is on a par with glass tubes at this time, a most satisfactory condition in view of the excellent record we have maintained during the years on these types.

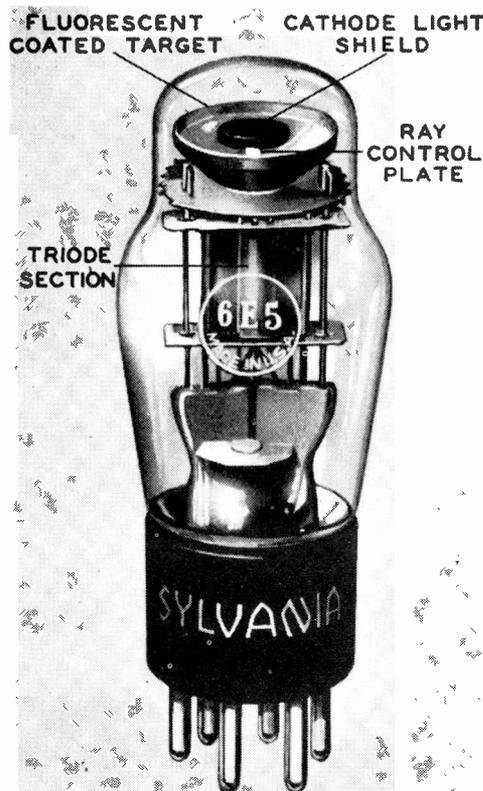
Additional types of metal tubes are under development and will be made available as needed by set manufacturers. In addition to a few types required for a-c receivers, a rectifier for automobile service may be offered, as considerable interest in the use of metal tubes in these sets has been aroused during the past few weeks. Some manufacturers prefer to furnish all-metal or all-glass tube complements with their receivers, while the practice of using as many metal tubes as possible, and filling in the gaps with standard types of glass tubes appeals to others and has numerous advantages at this time.

negative, the plate and therefore the electron ray-control electrode become more positive with respect to the cathode due to decreasing the voltage drop in the resistor "R". As this control element becomes more positive its shadow on the target is reduced and the edges of the lighted portion close in as mentioned above.

In actual circuit use the varying negative voltage for the grid of the triode section is obtained from some point in the A-V-C circuit, thus giving an indication of resonance when the unlighted portion of the target is at minimum. In some circuit applications better operation is obtained with a slight negative bias on the grid. This bias may be obtained by introducing a small resistor in series with the cathode.

IMPORTANT

We have had a great many comments, both pro and con, about the Swap and Sell Department. The amount of space it consumes is evidence enough of its popularity, and that same consumption of space makes it unpopular with servicemen who prefer more merchandising and technical information. We don't want to stop it entirely, but we'll have to do something to cut it down to reasonable proportions. The ruling made last month will hold for the next issue. Your advertisement will be run free, up to twenty-five words. Over twenty-five, and up to fifty words, it will cost you 25c. Any advertisement in which the copy, name and address cannot be easily read will be rejected. If you are writing about some other matter, put your ad on a separate piece of paper, and be sure that your name and address is on that sheet. We are holding several now because they have become detached from other parts of letters, and cannot be identified. We also reserve the right to reject any ad, or any part of one, if it seems unsuitable for use in Sylvania News. The "deadline" for ads to appear in the next issue will be December 7. Any received after that date will be held for the January issue. After a date to be announced in December, we will make a small charge for each ad run. That's fair enough, isn't it?



TUBE-ITUS

When I was young and full of hope,
 The diode tube was all the dope,
 Then came the triode and high-mu,
 The latest thing, I'm telling you.

Next came the tetrode with its screen,
 And then the pentode hit the scene.
 We thought they surely were the last,
 But from then on things happened fast.

Duo-diode, Pentode-triode,
 Pentagrid converter;
 Duplex-diode, detector triode,
 Pentagrid inverter;

New tubes arrived by every train,
 'Twas at this point I showed the strain.

Now I am old beyond my years,
 I've got gray hair above my ears,
 And to this world I tell my wrongs,
 Why do tubes have so many prongs?

(Editor's Note)— I. M. NERTS.

The author of this bit of verse
 Is in a padded cell.
 The metal tubes have made him worse,
 He isn't doing well.
 —The Radio Technician, Seattle, Wash.



THE SERVICE EXCHANGE



THE information presented in the Sylvania Service Exchange is contributed by servicemen as the result of practical experience. It is very carefully considered before being accepted, and we believe it to be correct and authentic. However, we assume no responsibility with respect to results. Each hint accepted entitles the writer to his choice of one Sylvania receiving tube, except the metal types. Please indicate preference when submitting hints. Don't send routine or generally known information.

AC-DC Receivers. Short tube life in some AC-DC combinations may be often traced to high supply line voltage. When the set has a KRI or IV tube as a rectifier the substitution of a Sylvania 12Z3 in the place of the KRI or IV will take up an additional 6 volts. The serviceman can then point out that "Sylvania" tubes gave the long life that should be expected.—J. Caleb Phipps, White Plains, N. Y.

File Index for Technical Sections. The most satisfactory system for keeping the Sylvania News Technical Sections intact and providing ready reference to the valuable technical data they contain is to place an "X" beside the model number of any receiver listed, in the Index of Rider's Manuals. I find it simplifies matters to make an alphabetical list of models noted in each technical section, paste this to the back of the file binder, and enter after the model number the volume number of the Technical Section in which the data is contained. I have as many as five hints on one model receiver, each of which is a real time-saver.

Permit me to add my hearty thanks for the untiring effort Sylvania has always made to be of service to the serviceman.—C. B. Heiberger, Norfolk, Va.

Freed NR95. Very low volume with all plate and grid voltages O.K. was found to be caused by the second audio input transformer. A high resistance short in the primary winding, which did not show on ohmmeter was the defect. A new transformer is required.—Harold J. Rosenstein, E. Orange, New Jersey.

Gloritone Model 26. Better all around performance of this set can be had by removing the black by-pass condenser which goes from the r-f assembly to ground on back of chassis. This will result in better quality and an increase in frequency range.—David Williams, Peabody, Mass.

Gloritone Model 26-26P. If the wire running from the aerial post to the volume control gets misplaced, the set will howl or whistle. This wire must run from the aerial post to the corner of the chassis and from this, directly to the next corner, then to the volume control. Be sure you get it under all other wires so it will lay directly on the metal chassis all the way around. This wire often gets misplaced when a new volume control is installed and you may look a long time for the trouble unless you know about it.—G. O. Zimmerman, Hagerstown, Md.

Kolster Model J. Weak—Microphonic—Remove third r-f grid resistor, 60 ohm. Add new set of Sylvania tubes to handle the resulting increased power. The new tubes will not oscillate nor will microphonic noise be present. But the Sylvania's are necessary to handle the added power.—Ted Love, Trenton, Mo.

Majestic No. 15. No signal is often traced to the bias resistor of the first Detector oscillator being high in value. It should be 10,000 ohms. Sometimes a new 24A tube will not oscillate over the complete band but can be remedied by putting a slightly lower value resistor in (about 8,000 seems right). Experimenting with different values in this circuit have quite a marked effect on the sensitivity of the set.—Kenneth W. Kean, Sheridan Terrace, Irwin, Pa.

Sparton Model 28. Check each section of the rotor for being loose on the shaft. If found the least bit loose drill and tap each section for a 6/32 set screw. I have cleared up inter-

mittent trouble in several radios this way. Be sure to clean all shavings out of set as they will cause trouble.—Ruple Radio Service, Flint, Mich.

Sparton 930-931. Howling, oscillation and motorboating in warming up may be due to an open secondary winding on one of the r-f transformers. These receivers have this tendency after being in service for several years. Upon advancing or decreasing the volume control, the set may also cut off sharply. After about three minutes of warming up the receiver seems to operate OK even with an open secondary in one of the r-f transformers, which is misleading.—D. R. Bitterman, Allentown.

Starck Models. These sets have a tendency to cut off during reception. This is often due to the voice coil on the speaker being shorted. For results replace with a new cone and coil.—William Borgiasz, Chicago, Ill.

Zenith Model 7 (Auto Receiver). Intermittent operation in this receiver can often be traced to a faulty voice coil on the dynamic speaker. The clearance of this coil is very small and extreme care must be used in replacing it or the same trouble will soon result.—Daniels Brothers, Everett, Penna.

Zenith Model 755. A trouble often found is that this set is dead and oscillator refuses to operate at all frequencies below about 850 KC. It is often found that the antenna coil has taken up moisture. The antenna coil should be removed and replaced or a new one made by winding approximately the same number of turns of fine wire on the form. Don't forget to dope it with good coil dope or the new coil will soon become defective.—Neil E. Handel, Summit Rd., Newark, Ohio.

When finishing up a service job put a small sticker* with your name and address and your "service message" in the back of the radio cabinet. The next time service is needed it will be a reminder to call you.—S. Lewis, Philadelphia, Pa.

*The Sylvania tube sticker would serve the purpose.

Improving Stromberg-Carlson 12 and 14 Receivers

The Stromberg-Carlson 12 is a 1930 receiver which sold for 355 dollars. The 14 is a radio-phonograph having the same chassis. These receivers employ 10 tubes, and have automatic volume control and a tuning meter. They are carefully designed TRF sets, capable of giving fine tone quality. Their performance can be materially improved by the proper use of certain newer type tubes, especially the performance of the automatic volume control.

An inspection of the circuit diagram shows that the AVC regulates the control-grid bias of the first two r-f tubes. The voltage chart indicates that a maximum bias voltage of 30 to 35 volts could be made available, since the plate voltage on the AVC tube is about 40 volts. Hence the first two r-f tubes should be

replaced by type 35 variable-mu tubes. It is necessary to change the third r-f tube, since this tube operates with a fixed bias voltage.

The AVC system itself must now be altered to provide sufficient bias voltage for the variable-mu r-f tubes. The two 100,000-ohm resistors in the plate circuit of the AVC tube should be removed and replaced by a single 500,000-ohm resistor. The grid—return lead from the 2nd r-f tube (having a 100,000-ohm filter resistor in series with it) should now be connected to the AVC tube plate. Thus both of the controlled r-f tubes will receive the full control voltage. The 27 AVC tube should be replaced by a type 56. The higher amplification factor of the latter will produce a greater change in plate current for a given change in grid voltage.

In order to compensate for differences in the characteristics of the new control tube, means should be provided to vary the initial d-c bias voltage which is applied to its grid. This is conveniently done by removing the 260- and 1210-ohm sections of the voltage divider and substituting for them a 1500-ohm wire-wound potentiometer, which should be mounted on the rear of the chassis. The cathode of the AVC tube should now be connected to the arm of the potentiometer. The setting of the arm should be such that the signal from a strong nearby station will just load, **but not overload**, the output tubes of the receiver, with the manual volume control in the full-on position, of course. Once set, this control need not be disturbed unless the AVC tube is changed, or perhaps if one of the 35 tubes is replaced.

A further improvement can be made in this receiver by replacing the 27 detector tube with a type 56, and changing the detector bias resistor to one of 50,000 ohms. The first a-f tube can also be changed to a type 56, and the bias resistor should preferably be made 3000 ohms. These changes improve the action of the AVC in an indirect manner, since the higher the gain in the detector and a-f stages, the lower need the automatically maintained level at the output of the r-f amplifier before a given output level.

A further minor change would be the substitution of single 5Z3 for the two type 80 tubes, which are operated in parallel. No improvement in results would follow this last change, of course, but it offers an outlet for tubes of this new type which may be in stock.—Albert R. Hodges, Ridgewood, N. J.

WANTED, SELL AND SWAP DEPARTMENT

Continued from Page 2 Main Section

SWAP

Continued

New type 331 Electronic Full B Wave power supply, six volts. Set of new Ward spark plug and spark coil suppressors for four cylinder car. Want S. W. Set or S. W. parts or what have you?—E. H. Lancaster, 9531 N. 34th Street, Omaha, Nebr. * * *

Na Old 950Xyla tube adapter, 25-35 Winchester Carbine Rifle (Lever Action), 32-20 Colt Revolver, 10 volumes Hawkins Electric Guides, complete Radio Course (N.R.I.), Elkon Dry "A" Eliminator Type, D, 1.75 Amp. Want Riders or Gernsback's Manuals or tools. What have you?—Log Cabin Station, Bayfield, Colo. * * *

Weston 0-20 Milliammeter, Jewell 0-8-80 160 voltmeter, Short Wave Craft Magazines, Electric Clocks, 6 Prong Coil Forms, Double Button Mike, Ganged .00035 Var. Condensers. What have you?—E. J. Reinholdt, 7% Ed's Radio Service, 545-A No. 28th St., Milwaukee, Wis. * * *

AC Motors, tube checker, analyzers, rochelle and quartz crystals, capacity bridge, resistance bridge, standard resistors, 70-220 volt AC-DC relay, E.E. Course and books, chemistry equipment, magnet wire for small AC radios, meters, test equipment, etc.—R. Denmark, 2876 Jerome Ave., Bronx, N. Y. * * *

RCA-852; RCA-955 Acorn; Duovac 242; National N-65 (865); ORS Photo cell; RCA-203; RCA-845; WE-205-D; WE-212-D; Bruno condenser mike and amplifier; "A" cut crystals all frequencies your specifications; 2 1/2 meter transmitter using 955 acorn; 1500-0-1500 power transformer; frost hand mike; various meters and transmitting parts; DB carbon mike; swap for Weston Jewell or Beede D'Arsonval movement meters all ranges and models; transmitting condensers both filter and variable; parts for superhet. Make offer giving description of your goods. All offers considered and acknowledged.—C. C. Richelieu, 1546 S. 50th St., W. Milwaukee, Wis. * * *

Camera with tripod takes 5x7 pictures; plate holder included, cost \$100.00 for small P. A. amplifier, 5 meter transceiver tube tester, manuals or make offer.—Huston Foster, Box 12, Forestburg, Texas. * * *

Conn long model cornet, factory reconditioned and plated for Supreme Deluxe "333" or similar analyzer, or make offer.—R. G. Elston, Marshall, Ill. * * *

710 Readrite analyzer practically new for Vols. 3, 4, 5, Gernsback Manuals in good condition.—R. O. Coble, Box 245, Roxboro, N. C. * * *

Thordarson power compact R171 and condenser bank with diagrams. What have you?—Calvin Geary, Box 94, Nelson, Ky. * * *

Dynamic speakers, AK32 and 35, Kodol 2-tube battery radios, Philco, Kuprox AB's, Majestic B, Rectigon 6 Amp. charger. Want bicycle, Rider's No. 5, Condensers, Resistors.—Shadyside Electric, 5508 Walnut St., Pittsburgh Pa. * * *

POSITIONS WANTED

Ambitious young man, 25 years old. College and Correspondence Radio Courses and Servicing experience. Desires part time work with view toward advancement, preferably in Radio Servicing store. References.—Charles W. Hahne, 7023 Michigan Ave., Chicago, Ill. * * *

Young man, seeking radio service experience, wants employment in radio shop in vicinity of Hibbing, Minn.—Frank Sterle, Jr. Wilpen, Minn. * * *

Young man 22 years old, single, having first class Radio-telephone license, would like work as an operator or technician in any type radiophone station.—Herbert W. Braun, 2347 N. Holton St., Milwaukee, Wis. * * *

Reliable, honest, no clock watcher and not afraid to get dirty. Age 27, N.R.I. grad. with one year special radio training, 15 years radio experience. Want STEADY job in some mechanical branch radio or electricity. Willing to start at bottom if there's a chance to work up.—Erwin H. Wendler, 175 Rathbone Ave., Mt. Clemens, Mich. * * *

Married man, 25, seven years diversified radio experience seeks employment where his intelligence, sales ability, adaptability and other assets will be recognized. Four years with a large New York radio retail store as technician, later assistant manager; two years with New York department store, one year in main office of a national wholesale radio mail order house. Location and remuneration not as important as possibilities for a future and reliability of the organization.—George Seldin, 2500 Frisby Ave., New York, N. Y. * * *

Public Address System announcing and oral ad writing for any saleable products. Radio station technique. Free. Christian, white, and 25. Almost a college grad.—Keen Winterbotton, 526 Broad St., Oxford, Pa. * * *

Young man, 21, single, neat appearing, high school education, radio and sound graduate Coyne Electrical School, musical talent, would like employment in Wisconsin.—John Van Thiel, R. 2, Kaukauna, Wisc. * * *

WANTED

Ommeter, long scale or large meter, not under 1000W to volt.—Thos. C. Williams, 8 E. Lexington St., Baltimore, Md. * * *

Oscillator, will swap new Willard A & B eliminator 180V B, or will pay difference.—Arthur R. Miller, 633 S. 16th St., Lafayette, Ind. * * *

Service equipment, testers, manuals, repair parts, etc. Describe and quote prices.—Bert Goff, Clarinda, Iowa. * * *

Rider Manuals and 200 milliammeter, have 2-12 P 3 gang switches, technical books, triplitt 1230 oscillator and Gernsback Manual No. 2.—Popma Radio Service, Orange City, Iowa. * * *

U. S. Stamps, used or unused, for collection album. Buy or swap radio equipment.—R. N. Eubank, 2817 Montrose Ave., Richmond, Va. * * *

Good test analyzer, will pay cash.—O. Bussert, Box 437, R. 3, Tulsa, Okla. * * *

Weston model 301, 0-1 milliammeter. Will pay cash. Must be in excellent condition.—Supreme Radio, 2408 S. 3rd St., Philadelphia, Pa. * * *

Output meter, not neon type.—Lande's Radio Service, Storden, Minn. * * *

For cash reasonable, one auto radio in good condition, suitable for Ford V-8.—Howard Wilson, Navesink, N. J. * * *

Phono. Pickup, high impedance, low price. Give make, model number; Audak preferred.—E. S. Hawthorne, Alamo, Texas. * * *

Riders Manuals, must be in good condition. Give prices.—Wm. H. Zink, 618 N. Chester St., Baltimore, Md. * * *

Silver-Marshall Chassis, the new CB-1, 13 tube, with auditorium 42 pound speaker. Microphone, Electric drill, piano accordion. State lowest price. Have Jewell volt-meter 0-8, 0-160 D. C. gold-lead, value \$6.50. Kodak camera F7:7, Lens. Dynamic speakers, radio parts.—Joseph A. Omelia, 139 Scott St., Wilkes-Barre, Pa. * * *

115-100 kc intermediate amplifiers, such as Silver Marshall time signal amplifier. Also large honeycomb coils as 750-1500 turns. State condition and lowest price.—W. B. Sanford, 560 Walnut St., Fall River, Mass. * * *

Patterson "PR-10" Pre-selector.—G. D. Hagen, Box 4, Hanford, Wash. * * *

Back issues of Radio Craft and Radio Call Book and Technical Reviews. Have radio parts, Jewell voltmeter, stamps, etc.—Wayne Storch, Beecher, Ill. * * *

4 or 5 tube midget or compact bar-bells, or sun lamp. Have Lincoln course in Radio and Electronics, or will pay cash.—C. L. Olson, Karlstad, Minn. * * *

Any or all of Rider's or Gernsback's Manuals. State price and condition.—Michael A. Petko, 4322 Wayne Ave., Philadelphia, Pa. * * *

Transmitter power transformers for 25 cycles, also transmitter parts and meters. Will swap or pay cash.—Bud Nastoff, 3889 Washington St., Gary, Indiana. * * *

Volumes 1, 2, 3, 4, Riders or Gernsback Service Manuals. State condition and prices.—L. M. Mick, 424-2nd Ave., Dixon, Ill. * * *

Back issues of "Motion Picture Projectionist" prior to Aug. 1932, "Better Theatres" prior to July 1, 1933, or any books or magazines pertaining to sound motion picture reproduction.—George A. Bishop, Jr., 77 Conant St., Fall River, Mass. * * *

Rider's Manual No. 4 and 5, Rider's Auto Manual No. 2. State price and condition.—Trites' Radio Service, 23 W. Wyoming Ave., Melrose, Mass. * * *

Used automobile P.A. Amplifier for cash. Give full details, input, output, etc.—Harry BeGar, 78 Florence Ave., Brooklyn, N. Y. * * *

Gernsback or Rider's manuals No. 1, 2, 3, and 4, type-writer. Cash or will swap for transmitting and receiving parts.—Joe Dugan, Jr., State Highway No. 33, Manalapan, New Jersey. * * *

Good battery radio sets and accessories for manuals, telescopes, microscopes, typewriter, H. Knife, guns, printed matter, etc.—Prefer Doerle sets.—Roy Brown, Madison, Ga. * * *

SELL

15 watt, 6 volt auto amplifier with input transformer, carbon mike, phonograph and crystal mike. \$30.00.—Willard Thiel, Valders, Wisc. * * *

Carbon Plate Type 845 used but in good condition.—Al Dayes 1418-81st Street, Brooklyn, N. Y. * * *

0-1-Mill. D.C. Jewell meter model No. 135. Excellent condition. Glass cracked on one side, \$2.50.—Supreme Radio & Elec. Service, 2408 S. 3rd St., Philadelphia, Pa. * * *

Nation FBXA Peak 58 Pre-selector with tubes, coils, 20, 40, 80 and B. Excellent condition, Nets \$105. Best offer.—R. N. Eubank, 2817 Montrose Ave., Richmond, Va. * * *

Triplitt Master Oscillator All Wave Model 1230-6 Band, with tubes, shielded test leads and batteries, \$14.25; Master Triplitt tube tester Model 1210A, \$19.00. Triplitt Portable case for Four units, \$5.50. All 1935 models.—Durkot Radio Service, 1303 Clark Ave., Cleveland, Ohio. * * *

Samson Pam 19, 15 watt P.A. Amplifier part wired only, with tubes, \$12.00.—Edward Tangora, 175 Totowa Ave., Paterson, N. J. * * *

Must sell WoARE part or complete station 20 meter 400 watt CW 200 watt fone dirt cheap. Write C. C. Richelieu, 1546 S. 50th St., W. Milwaukee, Wis. * * *

Readrite 710 analyzer and prods, minus case, \$6.00. Want ham supplies.—Henry Limbury, Ackley, Iowa. * * *

Amateur and commercial radio transmitters and auxiliary equipment designed and constructed to order. Reasonable prices. Send full information for quotations.—Howard Radio Transmitter Service, 154 Pine Ave., Chicago, Ill. * * *

10 volumes Hawkins Electrical Guides \$4.00 set. Westinghouse Tunger charger, delivers 6 volts at 2 Amps. for \$1.50.—Arthur Glaser, 7211 Whipple St., Swissvale, Pa. * * *

National FB-7 with three sets of coils, 20-40-80, new set of tubes. Like new, complete ready to operate, \$25.—Edwin K. Afflerbach, 19 Belmont Ave., Quakertown, Pa. * * *

All star senior super with tubes and speaker. Full set coils, \$24.00. Bremer Tully B-Eliminator fine condition, \$5.00. Noise eliminator with tube \$6.00 postpaid. Thordarson Power transformer Model T-4555, \$2.50, all postpaid.—Joseph Szymanski, 613 Washington St., Anthony, Rhode Island. * * *

Model 15B Jewell pick-up, chrome plated, counter-balance to match, new coil a month ago, first \$4.50 plus postage takes it.—Donald B. Lee, 408 Bereford Rd., Rochester, N. Y. * * *

Readrite tube tester model 410, perfect condition, tests metal tubes, Cost \$27.50. Will take \$10 cash. Can use Rider Manuals No. 2 or No. 5.—L. A. Stevens, Raymond, N. H. * * *

Weston Voltmeter model 201, Stromberg-Carlson Electro-static, 2 M.F. cap. cond. Both good, Make bids.—J. C. Boss, R. No. 2, Auburn, Ga. * * *

New tube condenser analyser, with tube in original carton \$7.00. List price without tube \$11.40. Shipping Weight 8 lbs.—Ted Veilleaux, 24 Webster St., Lewiston, Maine. * * *

Weston 301 meters, 50 or 100 mils, bakelite cases, \$4.00 postpaid. Guaranteed A-1.—R. K. Wheeler, 2308 Park Ave., Indianapolis, Ind. * * *

Bankrupt stock P.A. equipment. Webster 300 Watt rack, with tubes, \$135.00. Webster 26 watter with tubes \$25.00. Shure condenser mikes, tubes, \$15.00. Shure carbon mikes \$12.00. Racon 6-ft. storm proof trumpets \$17.50. Racon 3 1/2 ft. DeLux trumpets \$7.00. Racon Jr. units \$10.00. Racon Giant units \$15.00. Complete list furnished.—Platten Radio Company, 112 S. Washington St., Green Bay, Wis. * * *

Supreme AAA-1 Diagonometer Perfect Condition \$50.00 Old issues Radio Broadcast, Popular Radio, Citizens Radio Call Book, etc. Write for complete list and prices.—A. S. Cooke, 139 N. Euclid Ave., Westfield, N. J. * * *

Late model 333 Supreme analyzer \$29.95. Late model 85P Supreme tube tester \$28.95, or both for \$50.00. Late model TMV-97-B all-wave RCA Oscillator complete with batteries \$18.75. Model 9-Supreme Analyzer \$15.00 All prices are f.o.b. and cash only.—Rufus P. Voorhies, Box 128, New Iberia, La. * * *

Magnavox 2500 ohm speakers \$2.50 each, high impedance pick-up heads \$1.50 each.—Capitol Automatic Music Co., Inc., 460 W. 34th St., New York City. * * *

Best cash offer gets Gernsback Manuals No. 2, 3 and 4.—Henry Boehning, 127 Moffitt Blvd., Islip, N. Y. * * *

Weston 565 set tester, \$30.00; Philco 048 set tester, \$25.00; Jewell oscillator type 563, \$5.00; Jewell test panel type 581, 7-5 inch meters. \$35.00.—J. E. Taylor, 225 N. Cliff St., Butler, Pa. * * *

New 14 Dayrad tube tester, make cash offer.—Snider Electric Co., 1626 S. Broadway, St. Louis, Mo. * * *

See "IMPORTANT" on Page Two, This Section.

SYLVANIA NEWS

HYGRADE SYLVANIA CORPORATION
Factories at SALEM, MASS., EMPORIUM, PA., ST. MARYS, PA.

Vol. 6

Emporium, Penna.

December, 1935

No. 2

WHAT ABOUT 1936?

As this issue of Sylvania News reaches you, the radio industry will be closing a year in which more radio sets and more radio tubes have been sold than ever before in history. When the final figures are totalled up, we will see that well over 5,000,000 sets have been sold and probably a total in excess of 70,000,000 radio tubes.

Once upon a time radio was looked upon variously as a luxury, a gadget and a play-thing for youthful experimenters. Today, it has become an accepted fixture in the American home, so much so that there are in actual operation more radio sets than there are automobiles. Automobiles are placed at a figure of about 26,500,000, while authorities agree that there are something over 27,000,000 radios in operation. Of these, about 23,000,000 are in homes having one radio set. There are at least 2,000,000 homes having two or more sets, and there are an additional 2,000,000 sets in automobiles.

It is also worthwhile to note that the average selling price of radio sets increased substantially in 1935. While it is too early to figure just what this amounted to, it is somewhere between \$5 and \$10 a set.

As industries go, radio is still very young, and yet, everything points to its substantial character. After all, radio depends very definitely on broadcasting for its acceptance and popularity, so it is very encouraging to note that more money was spent for broadcasting in 1935 than ever before. In sponsored programs alone, about \$80,000,000, was spent by advertisers during this year.

Short wave radio has become an accepted feature to the extent that it is almost impossible to sell a radio which is not so equipped.

In general, we feel that the public is becoming more exacting in its demands for quality reproduction. Unquestionably, this is a factor in increased sales of replacement tubes, and this is further indicated by the tendency on the part of the public to have competent service men and technicians inspect their sets from time to time, rather than to leave this work to some member of the family who is handy with a screwdriver.

It is customary, in trade reviews such as this article, to paint nothing but rosy pictures and overlook any considerations of a negative nature. However, there are certain matters which need improving and which definitely warrant the consideration of everyone in the radio trade. It is only fair to say that the selling of sets is on a much sounder basis than the selling of tubes. From a relative standpoint, the profit margins to the manufacturer, wholesaler and retailer of sets are more equitably set up. The same thing can not be said of tube selling. Price and discount competition are rampant.

We, at Sylvania, have very definite ideas as to the principles involved. First of all, we reiterate our belief that the service men and dealers who have equipped themselves with technical apparatus and with technical knowledge deserve a much larger return than the grocer and other retailers who handle convenience merchandise. Without in any way penalizing the wholesaler or the retailer, we have maintained list prices for eight months which are considerably higher than the average for the industry. In this effort, we have received practically unanimous support and cooperation from jobbers, dealers and service men. We sincerely appreciate this loyalty and we feel that it is important, not only as recognition of our efforts to make this a more stable and substantial business, but because we know it has meant more dollars in the pockets of the men who have sold Sylvania tubes.

Through Sylvania News and various other publications, we have continued to give you the best technical information and help that our engineers could devise. It has also been our aim to offer as many practical advertising and sales helps as we could and in 1936 this work will be extended even further.

We are always interested in receiving your ideas and criticisms. It is our constant endeavor to keep the customer's point of view as our point of view, and we think we have been reasonably successful in doing this, even though our business has increased many, many times in the last ten years.

So with a farewell for 1935, we wish you prosperity and success for 1936, a year which should hold many good things for all of us.



MAKERS OF SYLVANIA TUBES
AND HYGRADE LAMPS

WHY WORRY ABOUT IT?



We can't imagine why Sally Singer looks so forlorn. She's a rising radio musical star, featured with Leo Reisman over NBC Tuesdays, 8:00-8:30 p. m., and with the "Kreuger Musical Toast" over Columbia, Saturdays 8:30-9:00 p. m. Her real name is Sarah Elizabeth Schirmerhorn, and she's a descendant of one of the old Dutch families who helped Peter Stuyvesant buy New York from the Indians. Maybe she's worried about that rumor that the country's going to be given back to the redskins.

ON THE AIR

SPONSORS OFF THE CARPET

Sponsors have been accused of so many crimes of bad taste and too much advertising blurb in presenting radio programs to the public, that it's a pleasure to recommend two programs, both new this fall. The most carping critic would have trouble in finding fault with either of them. We refer to the "Cavalcade of America", presented by the E. I. Dupont de Nemours Company, and the "Call to Arms for Peace" presented by E. R. Squibb and Sons.

HISTORY IN THE MAKING

The "Cavalcade" program is heard over CBS every Wednesday from 8:00 to 8:30 P.M., EST. The Woman's National Radio Committee has given it unqualified approval as a family program. Called "educational" it is certainly education in its pleasantest form, with dramatizations of imaginary episodes in the lives of average Americans from the past to the present. The background is historical, but the unusual handling takes history away from the school books, and makes it a part of real life. Famous actors and actresses play as guest stars in each performance.

SPEAKING OF PEACE

The "Peace" program, running thirty-nine weeks from September 19, 1935, over seventy CBS stations, 9:30 to 10:00 P.M. Thursdays, is unusual in more ways than one. It does not promote the sponsor's products (drugs) except to mention the sponsorship and to state that one cent out of each purchase of a Squibb product will be contributed to the promotion of World Peace. The program is of exceptionally high quality, with Deems Taylor as M.C., Howard Barlow's orchestra, prominent guest speakers and artists, and a fifteen minute dramatic sketch or excerpt from a well-known play, stressing the tragedy of war. Among the guest performers and speakers have been Alfred E. Smith,

Senator Borah, Bainbridge Colby, Senator Nye, Dr. Glenn Frank, Wm. Green, president of the A.F. of L., Lucrezia Bori, Jascha Heifitz, Edward Johnson, Greta Stueckgold, Elizabeth Rethberg, George Gershwin, Richard Crooks, Albert Spalding, Lotta Lehman, Richard Bonelli. This is a program to recommend to your most critical radio customers.

YOU AND THE GOVERNMENT

A third program, to be recommended to every American above the age of sixteen, comes, unfortunately, at the same hour as the Peace program. It is "America's Town Meeting" over NBC's Blue network, sponsored by the League for Political Education, with nothing to sell except an understanding of the problems that America and the world are now facing. Short talks by outstanding men and women in the fields of government, economics, education and journalism, followed by round table discussions, in which the studio audience joins, on such subjects as communism, fascism, personal liberty, social security, labor problems. Arguments pro and con, sharp skirmishes, off-side heckling, cheers, boos and groans make it lively.

PLENTY OF AIR

To fill her radio engagements on the Firestone programs, Margaret Speaks spends far more time in the air than on the air. She is piling up mileage of 12,000 miles a month of airplane travel between New York and California. Miss Speaks takes part in each Firestone program, while Richard Crooks and Nelson Eddy appear on alternate programs. Richard is kept in New York by his concert and opera engagements, while Nelson is equally held in Hollywood by his work in a picture now being screened. In order to sing with both of them Margaret must make two trips each month, back and forth across the continent.

Glancing Through The Trade Papers

If you do not read thoroughly at least one trade journal you are missing much helpful information. These brief extracts are intended to help you select the right ones for your needs

RADIO WEEKLY

Retailers are thinking, and one of the most sensible messages we have seen in a long while comes from Mr. Martin A. Tarzian, president of the Electrical Appliance Dealers Association of Brooklyn, who says: "Every business man is faced with the element of competition in business. The department stores look upon the small retailer as their competition and the small independent merchant views the specialty shops and the stores in his own neighborhood in his line as his competition. It seems that everybody in business is somebody's competition. There is no restraint placed on business, so that anyone can buy and sell any kind of merchandise. This policy of not restraining trade, and thus allowing a business man to use his own initiative and ability to the fullest extent, has resulted in the growth of business of our country so that it has become one of the foremost nations in commerce. However, there are many unfavorable factors in this unrestrained and wide-open competition, with no check on price-cutting and unfair practices.

"Let us start viewing competition from a distance, and so bring the situation home to us. Who prevents us from modernizing our stores for better business? Who stops us from going out into the field to sell more merchandise? Who restrains us from running sales and using sales-promotion methods to increase store business? What prohibition is there against adding new lines and getting into a new market? When has someone ever told any merchant not to sell his wares, and who tells us not to train our store people so that they will do a better job for us?"

"While these elements in business may seem to be separated from the question of competition, still the performance of the necessary business requisites for making a neat profit lies in the hands of the merchant himself.

"Therefore, in the humble opinion of the writer, he, the merchant, is his own greatest competition."

Mr. Tarzian's remarks deserve to be first memorized and then put into active practice by every dealer who wonders whether he is drifting. Wishbone can never take the place of backbone. There are no substitutes for knowledge and experience. Human nature being what it is, most of your worst competition comes from yourself.

FIGURING SERVICE CHARGES

By HENRY A. FISCHER

Continued from November

Investment: Such items as equipment, fixtures, merchandise, cash needed to carry on the business, and training are listed under investment, and in the list should be included everything that is provided in the original layout with which to begin and conduct business, as well as everything that is added at a later time. Equipment does not refer merely to test apparatus. It includes the car, and any other accoutrement that is provided for the purpose of doing service work or aiding the service man in the performance of his duties.

The serviceman must set aside so much from his gross income as a return upon his investment, as determined by the legal rate of interest in the state in which he operates. For instance, if the investment were \$1000.00, and the rate of interest six per cent, \$5.00 per month should be set aside. That \$1000.00 should be considered as though it were put out at interest. It is working for the investor, and should bring a return.

Cost of Parts and Accessories: The cost of parts and accessories is pretty well defined, except that few service men consider transportation charges. If a part costs \$1.00 net, but 15c postage is required to carry it to its destination, the actual cost is \$1.15. Similarly, if it is necessary to pick up the part and car fare is expended, the actual cost of that part is its cost plus the carfare. This point should be taken into consideration so that the cost of transportation does

RADIO TODAY

"Remember that a customer soon forgets what she paid, but long remembers what she got. And so make every effort to sell the better radio, insist upon the best installation you can make, and give the very best service you are capable of. The customer must be satisfied. Purchasers of new radios are going to talk about them, and if you give the customer something to be proud of and happy with, you may be sure that others will know about it." (A short quote from an article by H.L.M. Capron, who has had 14 years experience as manager of one of the largest retail radio businesses in the world. See "From Now Till Christmas" in the November issue of Radio Today. Plenty of suggestions for all the year through.)

RADIO RETAILING

Page 12 of the November issue shows a chart that should be framed and hung over the desk of every radio dealer. It forms one of the strongest arguments we've ever seen for the sale of new sets, by showing just what advances have been made in radio design in the past five years, and how much the owner of an old set is losing in convenience, clear reception and satisfaction. According to Radio Retailing's tabulation, 43 per cent of radios are five years old or more.

SERVICE

No automotive engineer would ever think of adjusting intake and exhaust valves with the motor cold. No Service Man with his wits about him will align a cold radio receiver.

A receiver should be given time to warm up before any inductive or capacitive adjustments are made. Inductance and capacity values alter with temperature, and the correct values for any adjustments are those obtained with the receiver at a temperature equal to that reached and maintained under sustained operating conditions. It takes from ten to fifteen minutes at the least to reach this temperature. Consequently, a receiver should be given about a quarter hour to warm up completely before a trimmer is touched.

This precaution is absolutely essential when aligning an all-wave or high fidelity receiver of modern design. Frequency drift cannot be tolerated in either type of set; neither can misalignment.

not constitute a high percentage of the net price.

Cost of Doing Business: It would not be sufficient to merely make the statement that the service man should tabulate the cost of doing business and base his charges upon the result for the reason that many do not appreciate what comes within the category of business costs. Some of the items that are listed under the classification of Cost of Doing Business are self-explanatory. Others require discussion.

Take the matter of rent. Those service men who operate out of regularly established store shops never fail to consider that they have a certain amount of rental to pay. It may be \$10.00 per month. It may be \$25.00, \$35.00, or more, but the rental is a definite figure. However, there is one thing that many service men who operate out of a regularly established shops do overlook—the utilities. The amount expended for light, heat, and telephone must be considered. If the heat is included in the rental charge, it is not necessary to carry it as a separate item, but if not, then the amount of money expended for heat during the winter months should be distributed over the entire year to determine the cost per month.

But, there is another class of men who very often make incorrect deductions as to the cost of conducting their business so far as rental is concerned. Reference is made to the group who operate out of shops in their homes. It is very seldom that they ever consider an expense for rent, for light, heat, or for telephone. On the other hand, they deduce that

Continued on Page Four

Sell or Swap Department

Inquiries should be addressed directly to the advertiser and not to Sylvania News. The advertisers are requested to acknowledge all inquiries whether or not the advertised article may have been disposed of. The Editor of Sylvania News retains the right to edit or reject any ads considered unsuitable. All ads for publication should be addressed to Sylvania News, Dept. S. S. Write plainly.

SELL

Used New Zealand stamps.—Cyril Caddigan, 7 Hutton St., Otahuhu, Auckland, S.E.7, New Zealand.

G. E. High Voltage sign, transformer, 12,000 volt, perfect condition. Knight "B" eliminator, consisting of "A", "B", and "C" voltage source. Trade for Rider Vol. 5, Rider Auto Radio 1 or 2, or make cash offer.—V.F. Daidone, 212-214 Fairmount Ave., Newark, N. J.

Doerle 2-tube battery set, pair phones and 2 type 30 tubes, \$5.00, C.O.D.—A. H. Nutkis, 1219 45th St., Brooklyn N. Y.

Coast to coast Crystal radio, 55 stations on log list. In large cabinet with dial and light. Requires no batteries. \$5.00 complete.—Roy Brown, Madison, Ga.

Best offer gets Readrite 710 analyzer (late model); late N.R.I. Course; back issues 3 years Radio Craft.—A. E. Kuehn, Carrington, N. Dak.

New WE242-A's matched for 250V class-C PP-RF; 20-inch X-ray (improved Crooke's) tube. Enclose reply stamp with bids.—LOG Laboratories, 222 Lonsdale Ave., Dayton, Ohio.

Dynamotors 6/400 volts 1/2 ampere \$19.50 prepaid. Permanent magnet ribbon \$5.00. New 845 and 203A tubes \$12 each. Photo electric cells, transmitting tubes, radio books cheap.—C.L. Johnson, 1975 Navarro Ave., Pasadena, California.

1935 Supreme standard diagrammer for best cash offer. A-1 condition, less adapters for metal tubes. Will answer all letters.—Joe A. Krajcovic, Empire, Ohio.

One Triplet analyzer in twin case, \$25.00; high power equipment, new carbon plate 52 guaranteed perfect condition, \$17.00; RCA 52 metal plate \$14.00 used 60 hours. Thordarson 4000-300V at 1k.w. \$12.00; G.E. 8mfid 3000V oil filled cond. \$10.00; 15mfid 5000V \$12.00; one "Best" theatre phono pickup built in vol. control in tone arm, \$5; 500V 400 m.a. M.G. set Emerson 110V 60cy 1/2 h.p. \$12.00; many small items.—Hosea E. Decker, 376 N. Sandusky St., Delaware, Ohio.

Miscellaneous parts: dyn. speakers 5", 6" \$1.00; mid. cabinet 50c; a.c.-d.c. cond. pack three sec. 50c; two 5V trans. 25c each; power trans. 300V d.c. 50c each; list on request. Consider swap for magazines.—Jim English, 4207 N. Jefferson, Spokane, Wash.

Receiving and transmitting equipment built to order. Commercial appearance at amateur prices. Low powered transmitters a specialty.—J.A. Swank, Station WHIO, Dayton, Ohio.

Supreme 333 Analyzer A-1 shape with all accessories, \$20. Jewell 210 tube tester with Na-ald 950 XLA adaptor. Good shape, \$10.00.—Carl Chase, Burrton, Kansas.

Complete printing outfit, 3x5 Excelsior press, 3 assortments type, ink, etc., \$6.50 F.O.B.—John Rau, 1460 W. 54th St., Cleveland, Ohio.

Crosley model 601 and 602 variable condensers factory part C-4336, no longer available at factory, \$1.00 each; brass condenser wheels W-4039, 50 cents each.—Henry Pardon, 111 W. 3rd St., Owensboro, Kentucky.

Few new AC-DC analyzers with tubes, cost \$12.50, sell \$5.50. Sorry, can't use manufacturer's name.—Smallwood Electric Co., 517 Minnesota Ave., Kansas City, Kansas.

All-Star Senior Super with tubes and Oxford speaker, 10-20-45 meter coils, \$20; Readrite 710 analyzer and prods with case, \$8.00.—L. Clifford Praeger, 216 E. Hoffman St., Baltimore, Md.

N.R.I. Radio course (50 lessons) \$25; 24 Q.S.T., 70 Radio News, 72 Radio Crafts, various radio and electric parts, 25-20 Winchester rifle, \$15.—Harold F. Beck, Butler, Ohio.

SELL OR SWAP

Cooke Electrical Course, over 100 lessons, includes radio, auto, mine electricity. One Radio Telephony and Telegraphy, A.H.C. of Television. Two radio courses. Want oscillator, or?—Paul Lawrence, R. 1, Swannanoa, N.C.

Indian Scout motorcycle, slight repair necessary, pair Baldwin "C" phones, Haanel air rifle, for cash or what have you in radio.—A. Zeitzer, 200 E. 3rd St., Brooklyn, N.Y.

Montgomery Ward all-wave super uses two tubes, speakers in midge cabinet, slightly damaged. Chassis and tubes perfect. \$22 or what?—Sam Samuels, 4031-48th St., Sunnyside, L.I.N.Y.

Peerless Signograph with telegraph key, two rolls \$14.00. General Electric Tuning charger, 5 AMP, takes fourteen 6-volt batteries, \$10.00.—Kelley Radio Service, 36 California Ave., Hempstead, L.I.N.Y.

Five A eliminators and seven B eliminators, \$1.00 each. Want 190 Jewell or Weston set analyzer.—John Pickeral, 4640 Broadway, New York City.

National AC SW3 complete with 8 sets of coils 14-550 meters, tubes, power supply, amplifier and speaker in cabinet to match set cabinet. \$35 cash or trade for RCA all wave test oscillator or other test equipment; also self-excited 500 watt 110 AC generator with 12 volt D.C. battery charging winding, \$25 cash or trade for any 3 volumes of Riders manuals except Vol. 5. Any or all above for RCA oscilloscope with tubes. What have you?—Dale Cern, 4685 Montclair, Detroit, Mich.

Complete up to date radio course, price \$25 or trade for tube tester or what have you?—L.O. Haight, Farmington, W. Va.

7 cameras, post card to 8x10; folding kodaks, box kodaks, stands, tripods, plate holders, back grounds, wrist and pocket watches; Winchester shotgun. Want radio test equipment and Rider's Manuals except Vol. 4.—Wootton's Radio Service, Box 32, Talihina, Okla.

Meters, rectifiers, transformers and tubes or what have you? Let us know your needs.—Miles Radio, 221 Sherman Ave., N. Y. C.

4-tube A.C. 80-500 meter radio \$8.00 or what am I offered?—Frank O'Neill, 31 Halsey Street, Brooklyn, N.Y.

N. Y. Academy of Music Tenor Banjo course, with 12 double-face records, \$15, or swap for 6 volt wind charger or radio parts.—Garland A. Milam, Knoxville, Texas.

G. E. High Voltage sign, transformer, 12,000 volt, perfect condition. Knight "B" eliminator, consisting of "A", "B" and "C" voltage source. Trade for Rider Vol. 5, Rider Auto Radio 1 or 2, or make cash offer.—V. F. Daidone, 212-214 Fairmount Ave., Newark, N. J.

SWAP

Drakes Radio Cyclopeda, new, illustrated, over 700 pages for oscillator.—Shor Radio Service, 2922 Violet Ave., Baltimore, Md.

New Thordarson compensated p.p. input audio. Type T-5742-for resistance indicator, universal output transformer or what?—Carl Barbagal, 56 Mainsgate St., Crafton, Pa.

rave multigraph, Elliott addresser, Riders 1 and 2 NRI radio course, radio parts. Want analyzer, PA system or offers.—Frank Goodwin, Kirkwood, Mo.

Typewriter, telex code machine, electric drill, 5 meter transmitter and receiver eliminators, exchange for 16 M.M. camera.—George Jackson, 2037 Frankford Ave., Philadelphia, Pa.

DX'ers, send me one of your SWL cards, I'll send you mine, also QRA's of others who will swap cards.—Glenn Godwin, 5 Mildred, Binghamton, N.Y.

Jewell 199 Analyzer perfect condition for dual speed, Green Flyer phono motor, perfect condition and Vols. 3 and 4 Riders Manuals.—R.A. Soeters, 15816 Prairie Ave., Detroit, Mich.

Jimmy DeForest boxing course, cost \$5.00, for either Rider or Gernsback manuals, Volume 2.—Ben Tayerler, R. 1, Phillips, Wis.

Bliley mounted 465 KC crystal, Hammarlund Crystal filter transformer and two air tuned intermediates, 3 unmounted crystals, meters, condensers, dials, courses, hundred other parts. Want Magic Brain only for RCA Model C15-3 or similar all-wave oscillator, dual ratio dial, metal tubes, meter rectifier, receiver parts.—N. D. Brumgard, Mason City, Iowa.

One Readrite model 720, like new, for Triplet oscillator or three Gernsback or Rider Manuals, in good condition.—Joseph C. Wunderlich, 802 E. Webster St., Clinton, Ill.

Law books, Radio Craft Library, Hawkins Electrical Guides, cartoon course, set drafting instruments, miscellaneous radio magazines and books, for up-to-date Tube Tester and Oscillator.—Clarence C. Fuller, Loxley, Ala.

Photo-finishing equipment and chemicals, value \$50.00, for radio service equipment. Rider Manuals preferred.—K.E. Smith, 536 N. Ninth St., Reading, Pa.

Complete Radio and Televisions Institute course for Supreme deluxe analyzer and tube tester, or will sell.—R. H. Hilgers, Abilene, Kansas.

WANTED

Beede or Supreme Foundation meter and kit, code buzzer, key, prods. Have speakers, Miraco converter, lenses, carbon and drawing paper.—Francis Weix, Antigo, Wis.

One good 0-1 Ma. Weston D.C. Meter. Will pay cash or swap radio parts.—Supreme Radio, 2408 S. 3rd St., Philadelphia, Pa.

Late model test instruments. State make, model and price. Must be in good shape.—Wm. J. Sobolik, 3433 W. 21st St., Chicago, Ill.

Pilot Super Wasp or any other A.C. short wave receiver.—Jerry Weiner, 1123 W. Market St., Pottsville, Pa.

Used P.A. outfits, Edison "R" power batteries. Give full technical details.—E.N. Noyes, Box 148, Coldwater, Mich.

Skyrider AC-3 or similar S.W. receiver. Will trade Electro P.A. Tuner, Rider's manuals, tube condenser analyzer, etc. Write for list.—Henry Burlington, Abington, Penna.

RCA-TVM or similar oscillator, Rider's manuals, meter rectifier; trade Gernsback's manual, slide rule, other radio equipment. Will buy or sell for best offer.—E. C. Magee, 2020 Locust St., Baton Rouge, La.

Cheap test equipment. Have windcharger, blueprints changing old generators into slow speed direct drive chargers. Complete plans 35c.—J. Orsen, Kennan, Wis.

Good used Hickok tube tester. State lowest cash price.—The P-R Service Co., 8 W. 13th St., Frederick, Md.

Edison Pick-up for "hill and dale" records. State condition and price.—E.J. Weyrick, Plattsmouth, Nebr.

Code machine with tapes. I can offer radio parts or cash.—Albert Kirchoff, 605 Hamilton Ave., W. New York, N. J.

Back issues. Proceedings IRE and QST. State dates, price, condition.—John Heinsson, 1815 W. Monroe St., Sandusky, Ohio.

Weston Selective Analyzer, Model 665 type 1, or Supreme 339 DeLuxe Analyzer, Dayrad All Wave Generator Series 36.—Andrew M. Fisher, Box 396, Crested Butte, Colo.

Good Ohmmeter, analyzer, service manuals and service course. Will pay cash.—J. W. DeBuhl, Box 93, Arlington, Iowa.

A-K 512 automatic station selector mechanism; motor, drive, discs, reverse switch, solenoid, relay, transformer, etc.—R. Williams, 98 Morningside Ave., New York City.

POSITIONS WANTED

Young man, 24, N.R.I. graduate, specialized in advanced radio servicing and merchandising, wants steady job. Have some experience. Prefer in W. Va.—Harold Goghennour, R. 1, Buckhannon, W. Va.

Young lady, experienced in radio work, wants employment in New York City.—Mary Klein, Apt. 27, 2145 Southern Blvd., Bronx, N.Y.

Serviceman age 28 with 12 years experience in selling and service desires position, preferably in Pennsylvania.—Walter G. Haupt, 1125 Railroad Ave., Sunbury, Pa.

Young man wants job in radio sales or service work anywhere in U. S. Coyne Electrical School graduate, I.C.S. and Std. Business Inst. courses, 4 years radio sales and service and seven years Motion Picture projectionist on RCA and Western Electric sound systems. Own car and willing to buy newest equipment.—Warren Chase, Chase Radio Shop, Jeffersonville, Va.

Licensed radio telegraph telephone operator, 12 years experience. Desire any radio work, prefer station. Particulars gladly furnished.—A. Schultz, 304 North Chicago, S. Milwaukee, Wis.

Young man, high school graduate with 3 years private study and practical experience in servicing and set building, wants radio work. Will go anywhere for living wage to start.—Everett C. Ingle, Isle Saint George, Ohio.

Graduate N.R.I. single, 22 years old, wants place as assistant in radio or electrical work. Attention to the job guaranteed. References given.—Clarence Maxwell, Albany, Mo.

Graduate N.R.I., five years experience, competent, age 24, will go anywhere, small salary to start. Best references.—James E. Shrewsbury, 1113 Poplar St., Kenova, W. Va.

High School graduate, radio training, radiotelephone first class license wants work any type radiophone station, location immaterial.—Harry L. Poling, Belington, W. Va.

Graduate of accredited college and Coyne Radio School, 25, honest, and reliable wants radio, office, or any sort of work anywhere. Prefers foreign contact. References.—John Wardell, Jr., Box 95, Northfield, Minnesota.

CORRESPONDENCE

John Hein, Jr., 18 S. Jardin St., Shenandoah, Pa., would like to contact several people interested in Television, especially experimenters. Will answer all letters.

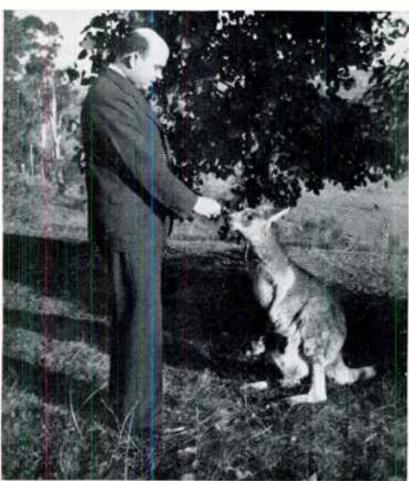
R. J. Diehn, W8MJG, 2129 Eastbrook Drive, Toledo, Ohio. Interested in amateur transmitting antennas.

IMPORTANT!

In accordance with an announcement made last month, after January 1, 1936 a charge of 25 cents will be made for each advertisement published in this department, up to twenty-five words. Name and address need not be counted as part of the advertisement. For each additional ten words, or fraction thereof, add 10 cents. The maximum number of words in any advertisement will be fifty-five, and only one advertisement per issue will be published for any one person. Remittance may be made in coin or stamps. Advertisements received up to January 1, 1936, will be published at the old rate—twenty-five words free; up to fifty words, 25 cents. This new charge policy has been established in an effort to be fair to all our readers. Actually, the charge is much lower than the cost of the space.

MARCHING ON

A little more than half a century ago Edison made the first electric lamp, with its filament of chemically treated thread which glowed feebly for an hour or two. Who could have predicted the many types of lamps, for hundreds of different uses, that are shown in the Hygrade lamp display pictured here. Many of the uses to which these lamps are put were not yet conceived when the first lamp was invented, and it is safe to say that without electric light many great industries would never have been born. The combination of Hygrade Lamps and Sylvania Tubes, displayed at the Philadelphia Electric and Radio Show, is logical too. It was the electric lamp, with its filament glowing in a vacuum, that inspired the invention of a device to capture the delicate waves of sound discovered and put to use by Marconi. The radio tube of those early days was even cruder, by comparison with the variety of complicated multi-purpose tubes in use today, than the first electric lamp, compared with present lamps. Progress marches on.



Left—Our Mr. Coogan makes advances to a charming young mother in an Australian park. Look closely and you'll see the youngster taking a look at the world from mother's pocket. Seems to be Mr. Coogan's shoes that catch his eye. Can he suspect that they're made of "Kangaroo" leather?



In this "missionary" car C. L. Decker, Sylvania special representative, advertises Sylvania tubes as he travels about the Eastern seaboard. He carries a supply of Sylvania advertising displays, and often lends a hand in helping Sylvania dealers to arrange more effective displays in their stores and windows.



Scores are flashed to the scoreboard and announced to spectators of Fullerton (California) Junior College athletic events without a second's delay, thanks to an efficient portable P.A. system, 100 percent Sylvania equipped. The "buggy" is mainly of duraluminum, and was made in the Lockheed Aircraft plant (note the wheels). Standing beside it is the designer, Wendell S. Fletcher, the school's Instructor of Radio and Aviation. Collaborating with him in the design and construction of the amplifier was Emmet Pike, prominent Sylvania dealer of Fullerton.

On the ground in front of the buggy may be seen the small portable 5 meter transceiver which is electrically connected to the main amplifier. When in use, the announcer is parked where he can get a good view of proceedings without getting mixed in the scrimmage. He broadcasts through the main amplifier and through the trumpets shown, and is also in communication with the keeper of the scoreboard, by way of the transceiver. The set-up is AC operated, the supply cord being wound on a reel inside the buggy, so that it is paid out or wound up automatically as the equipment is moved. The photograph was furnished by Howard Taylor of Fred A. Dean Co., Long Beach jobber who supplies dealer Emmet Pike with the Sylvania tubes which he enthusiastically recommended to Mr. Wendell for the amplifier and other radio equipment used in the school.



Deep in a thoughtful but cheerful discussion of radio and electrical appliance prospects for 1936 are (reading left to right) Messrs. Balasch, Vivo, Vidal and Segura. Mr. Segura is manager of the Bilbao branch, where this picture was taken, and the others are partners in the firm of Vivo, Vidal Balasch, Sylvania distributors in Spain. Other branches are located in Madrid, Barcelona and Valencia. The firm publishes a house magazine "Dielectro" which is very popular among Spanish radio dealers and service men. Just out of sight above Mr. Balasch's head is a Sylvania Handisign.



We're not sure whether that's Abe Yeagerman or Sam Kaplan standing in the doorway of United Radio, Cincinnati with Miss Sylvania. We are sure that they've found a very effective way to use up waste



J. F. Norlem, Omaha, Nebraska, has found a new use for the Sylvania metal Service Sign. Attached to the front bumper of his Leaping Lena, plainly visible by day, and illuminated by the headlights at night, it tells his story wherever he goes.

wall space by advertising the products they sell. You can't miss that "Sylvania Tubes" right beside the door.



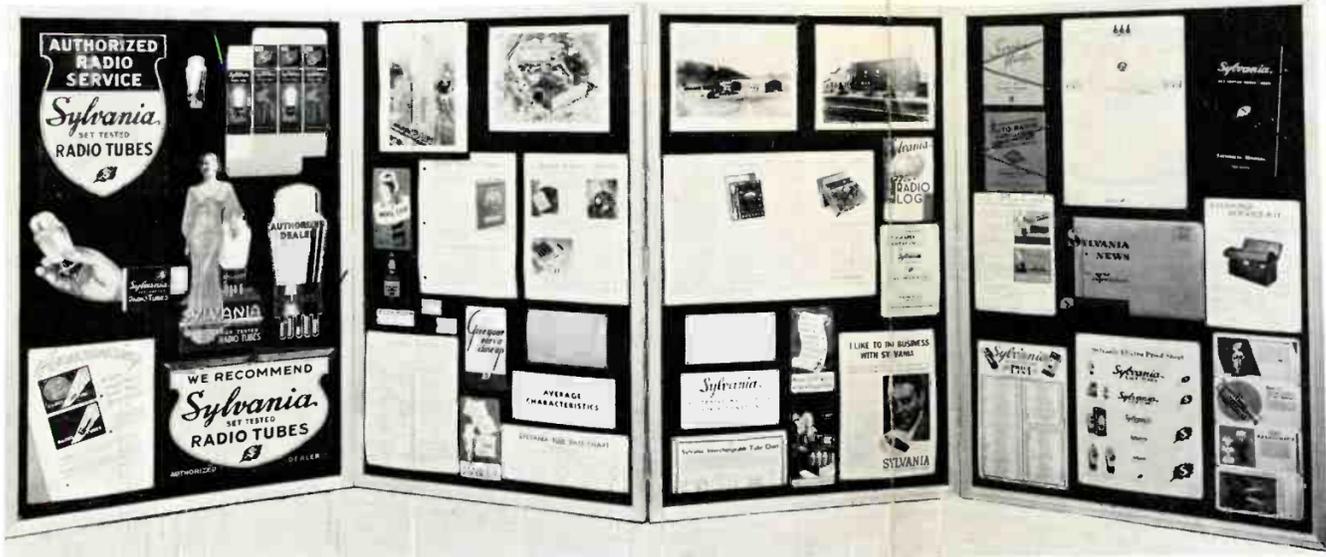
Six Akronites, three Sylvania watch the birdie, or perhaps it was a bunny, since this happened in hunting season. Two in the front row, one in the back, over in the right hand corner, are Sylvania's G. R. Wannan, sales representative, H. G. Kronenwetter and R. P. Almy. The Akronites are Carl Gahagen and Henry Howenstein, partners in the jobbing firm, Radio Repair and Service Co., and their servicemen customers, L. E. Coleman, Chas. Layman, Louis Ekesy, and Harold Brouse, of the engineering staff of Goodrich Rubber Co.

LOOKING INTO 1936

We present these four members of Hygrade Sylvania Corporation gazing cheerfully into 1936. Back row, C. G. Pyle, National Sales Supervisor, and Paul S. Ellison, Advertising Manager; front row, A. L. Milk, Advertising and Sales, Emporium office, and Stanley Harris, New England Sales Representative. On page one you will find a review of radio for 1935 and a preview for 1936, which should help to make your holiday a cheerful one.



ARE YOU TAKING THESE TONICS?



When your system gets run down, and you don't have the old pep, your doctor prescribes a tonic. When the same symptoms attack your business, it's just possible that it needs a tonic too. Take a look at the display board above and see if you can't find a suggestion that will put new

life and profit into your business. Those post cards down in the right hand corner may be what you need, or a new sign (upper left), or a set of display material for your window, or some of those clever folders (lower center). Perhaps you're not getting all the technical information available. Possibly the Sylvania Radio Log, kept up

to date with frequent changes, will please your customers. There are many others not shown here. Ask your Sylvania jobber. If his suggestions don't satisfy you, write direct to the Sylvania Advertising Department, Emporium, Pa., stating your problem. They'll be glad to make suggestions. Don't put it off. Get your tonic NOW.

Those Bad Accounts

It occurs to me that other servicemen may be having the same trouble with uncollectable credit business that I have succeeded in solving.

I have been in the radio service business since 1925, and after this length of time I naturally found myself holding a ledger full of uncollectable accounts. People generally had no intention of letting these accounts go unpaid, but other things had a way of coming first.

My problem, then, was not so much to collect these old bills, but to maintain a profitable business that would be fair both to my customers and to myself. It naturally is not fair to the customer to let him go into debt, and it is worse to let him stay in debt. What is fair for my customers I also believe applies to me and to my relations with my wholesalers.

Twice I have placed my business on a cash basis. The first time was a dismal failure, but this time my plans are working like clock-work.

Both times I wrote off every account receivable from my books. The second time I sent to each a receipted bill paid in full. The same day I put up a sign on the wall of my shop explaining the change to a cash basis. Then I began using sales and service slips I am sending you.

(Editor's Note:—The Sylvania Job Record Card serves the same purpose.)

Some have asked for credit, or rather walked into it by having the job done and delivered and then proving to be broke, or nearly so. In this case the service slip sure does the job well.

I have only about 10 per cent as many charge accounts as before, and I haven't lost one cent. Every bill has been paid as per agreement, and my business has not suffered a bit. Everybody is happy, and my customers can all walk out in the open and enjoy the California sunshine when they see me coming.—Keith Howard, 912 N. Main St., Santa Ana, California.

Figuring Service Charges

Continued from Page Two

the space is there, the apartment or the home is heated and lighted, the family telephones are at their disposal, and therefore cost them nothing.

This matter has been mentioned to the Board of Direction of your Institute many times by dealers who complain about service men who provide service at a lower rate because they have no rent to pay, working from their homes. What false reasoning. The mere fact that a service man operates from his home does not justify the practice of price cutting.

The service man who operates from his home and does not consider that he pays rent, light, heat, and telephone does himself an injustice and is hindering his own progress. The amount of rental that he charges against the business should be prorated according to the space occupied in its relationship to the entire living quarters.

A suggestion for the rental set up of the service man operating out of his home can be made from the following deductions. If the family rental is \$50.00 per month including heat for a five room apartment, this would be at the rate of \$10.00 per room and if one or more rooms were used to conduct the business, it would follow that there would be a monthly rental charge of \$10.00 per room. If basement space was used, the extra cost for the use of that space can be set up, but should no extra amount be paid for the basement a rental figure of at least \$10.00 per month should be allowed. A prorated charge should also be set up for light, use of the telephone and heat if paid in addition to rent.

It is not sufficient for the service man operating from his home to allow a meager prorated rental. He should consider that in due time he would like to move his place to a business street, in a store front shop, and should, therefore, allow a greater amount than is required to offset the actual expense. It should be the ambition of every serious minded service man to establish a store and he should take the necessary steps now to insure realizing that ambition.

Equipment: The original cost of equipment comes under the classification of investment. Unfortunately, no equipment will last indefinitely, so we must introduce a vital factor in the determination of the cost of doing business, —**depreciation**—which is often referred to as a reserve for depreciation. In other words, a certain amount is set aside each year from gross earnings to pay for equipment. For example, on a purchase of a \$300.00 device, the life of which is three years, it is apparent that after three years the equipment will have to be replaced and provision must be made to do so. A reserve of \$100.00 per year must, therefore, be set up to take care of the depreciation of this particular piece of apparatus, and any business which does not show a profit after making an allowance for depreciation is operating at a loss. It remains for the service men to determine at just what rate their equipment loses its value as determined by obsolescence or wear and tear. Modern test equipment becomes obsolete about every two years,

not because of lack of foresight on the part of the designers, but because of the development of the radio art. Test apparatus can, with the use of adapters, be made to function efficiently the second year, but it is questionable whether it will be of particular value the third year. The rate of depreciation may be said to depend also upon the ingenuity of the service man and his ability to make changes that will extend the useful life of his test equipment.

For discussion of **Operation of Car, Advertising, and Training and Study** see September issue of Sylvania News.

—Reprinted from the Journal of the Institute of Radio Service Men.

To be Continued

Radio Scarce on Farms

The farm market for radio is graphically illustrated in a new pamphlet issued by the Rural Electrification Administration. Only 20 per cent of farms have receiving sets, according to an illustrated chart of REA entitled "Too Many Farms Are Behind the Times." The REA pamphlet is issued to promote rural sales of electrical equipment.

OH DOCTOR!



This clever combination of business card and advertising folder brings in business for W. L. Linde of New York City. Its actual size is 6 1/2 by 4 3/4 inches. It folds twice, to a size a trifle larger than the ordinary business card, with the top sections on the outside, and the lower two on the inside. Note the manner in which the "diploma" speaks for Linde's experience in radio.

NOT BACKWARD

"I have been marketing Sylvania tubes for several months, and do not feel the least bit backward in using them as a means of sustaining my reputation as a service man.

They stand the hard usage of the amateurs well. They have given long and unvaried service in our Public Address system. I have never had occasion to replace one, which is saying quite a lot for tubes that have to be shipped over considerable distance.

Last, but not least Hygrade Sylvania does everything possible to back up the service man in promoting the use of, and giving satisfaction with, Sylvania tubes."—H. L. HEMM, Santa Maria, Cal.

Mr. Hemm does not say, but we will say for him, that he is the kind of service man who helps us to help him, by using the sales helps and displays that we supply. The backward service man is the one who "can't see" that the use of high quality parts, including tubes, in his service work is just as important in sustaining his reputation as high quality work.

Sec. 562, P. L. & R.
U. S. POSTAGE
PAID
EMPORIUM, PA.
Permit No. 1

N

Mr. Louis F. B. Carini
246 Wolcott Hill Road
Wethersfield, Conn.

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