

The
CORNELL-DUBILIER
CD
Capacitor



Vol. 11

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No. 6

CORNELL-DUBILIER ELECTRIC CORP.
HAMILTON BOULEVARD
SOUTH PLAINFIELD, N. J.

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

Mr. George M. Beale
130 25th Ave.
San Francisco, Calif.

MORE SERVICE DOLLARS

How to bring the customer into the shop with a minimum of sales effort and time wasted making sales calls?

This is the problem—and dream—of every serviceman. Experience has proved time and again that money is made on actual work done in the shop—not in making sales calls. Less time spent making sales calls means more time for better workmanship, increased volume, quicker service—and more profits.

The new Cornell-Dubilier sales promotion program is aimed at helping you, the serviceman, lick just this problem. Its purpose is to bring customers into your store already sold, and to help you win a reputation for being "the most outstanding service shop of your community."

Your Local C-D Jobber Will Tell You How . . .

There are forty-two units in this program. Cornell-Dubilier has developed for you the most complete promotional program in C-D's history. This isn't just a blotter or post card—it is a complete, integrated campaign involving no less than 42 units, all keyed to your '46 promotional problems. And all planned to help you do more volume, more profitably when inventories are again plentiful.



Newspaper mats . . . capacitor stock cards . . . stationery . . . shipping labels . . . catalog . . . postcards . . . displays . . . pennants . . . stuffers

ALL AVAILABLE THROUGH YOUR LOCAL C-D JOBBER

BUILT FOR SALES

This is no ordinary sales campaign, but a *promotion program* that is designed for your individual needs—prepared just as you would prepare it, if you had the time and money. *Here's exactly what the program will do for You:*

- 1** *Win customer confidence for your shop and the parts you use by helping you to establish a reputation for quality and reliability, and by linking your name with CORNELL-DUBILIER, the world's largest manufacturer of capacitors.*
- 2** *Build a bigger and more regular clientele through a brand new idea in radio service merchandising—the need for a regular six month checkup of every radio set. This sure-fire sales theme is a fundamental part of the whole C-D promotional campaign.*
- 3** *Bring actual customers into the store, by doing a good part of the actual selling job for you. This necessitates a complete promotion program, one which will reach the customer whether he is reading his newspaper, walking down the street, lighting a cigar, or glancing through the morning mail.*
- 4** *Help you run a more efficient and profitable business by supplying you with everything from helpful technical information, through the monthly issues of THE CAPACITOR, to scientific suggestions for stock items for your particular business.*

On the following pages are the actual sales aids offered by this Cornell-Dubilier sales program. Take advantage of them to build your reputation! Attract new customers! Hold your old customers, and gather in more sales dollars! Your local C-D jobber will gladly explain how to obtain and use these profitable C-D sales aids.

Newspaper Mats . . .



The "New Radios Need Attention" Mat Series.

The C-D promotion program offers servicemen mats for two entirely different newspaper campaigns. The first is based on the very current theme: "New radios need attention." (See illustration above)

With new radio sets just hitting the market, you can be certain that your present and future customers

will be mighty interested in cherishing and protecting them. Expensive sets will be the pride of many families. This series will enable you to do a crusading job in impressing radio owners with the need for regular check-up in order to maintain fine reproducing quality and uninterrupted performance.

The "Reliable Radio Service" Mat Series

Second mat series is based on the tested and strong theme—"RELIABLE RADIO SERVICE." These ads are quick and to-the-point, guaranteeing honest, quality work, and the best of replacement parts.



Mats are all free, and the space charged in local newspapers will be inexpensive. Resultant increased business will pay back many times the cost of insertion. All ad mats are obtained through your local C-D jobber FREE.

Display Pieces . . .



Three Color Counter Cards

Want to catch the eye of the shopper whose radio needs fixing, or overcome the resistance of a housewife who's "soured" on radio service from sad, past experience? Want to boast at all times about the quality Cornell-Dubilier parts that you use on all repair jobs? The display pieces, including window cards, counter cards and decals offered in the new Cornell-Dubilier promotion will do these jobs for you.

Attractive window cards give all the reasons why a six month check-up is

so important. *One, two, three, the passer-by is shown the way to continuous performance, clear reception, and longer radio life.*

Handsome, color counter cards will attract customers who are dead tired of inferior merchandise, who want to buy the best of goods, not shoddy, war weary surplus. These cards put across the important story: *"No war-weary surplus parts—only new genuine Cornell-Dubilier Capacitors are used in all repair work."*

Decals



Bright decals for your shop window or door will proudly and easily identify your store as a user of C-D products.

Just the display pieces plus the mats would probably make a successful sales promotion program for you, but Cornell-Dubilier has gone much further to guarantee that you will become the outstanding service shop of your community. Additional and punchy sales aids—postcards, matchbooks, stationery and labels—will bring in more dollars to your shop. Ask your C-D jobber to order them for you NOW!

Postcards . . .



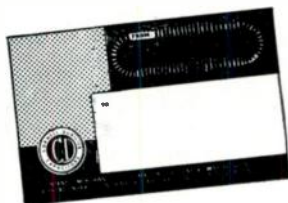
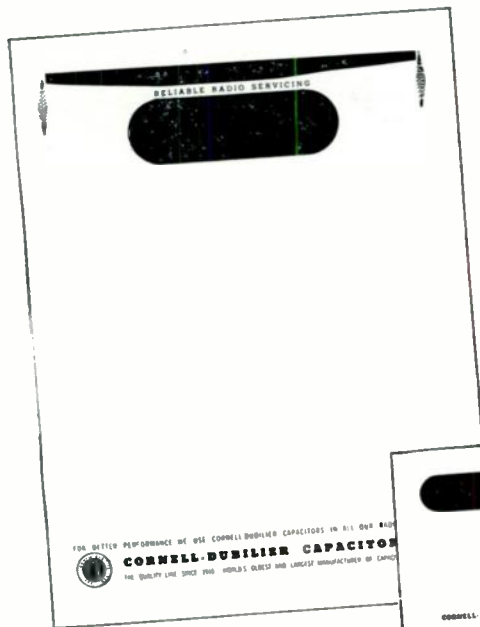
Two-color cartoon postcards, (see illustration above) promoting you as a "radio expert"—and the qualified person to fix any type of radio, make an ideal and inexpensive direct mail campaign for your shop. All you have to do is address the cards. The only charges are for postage stamps and your imprint is furnished free! Your local C-D jobber will gladly order them for you.

Matchbooks . . .

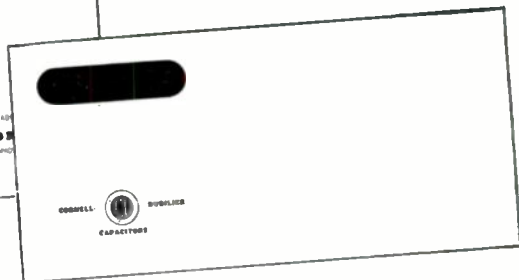


Here's a peach of a way to keep your name and business right in the midst of things. The C-D match books with your imprint can get your name all over town. Use them as a counter give-away, and to promote the 6-month check-up idea. They're printed in two colors and have the whole front surface blank for your shop name, address and phone, imprinted at no extra cost.

Stationery - Mailing Supplies



Letterheads, envelopes and labels are available with your own shop name imprint added. They'll help you to capitalize on the C-D name in all your correspondence.



Here then is CORNELL-DUBILIER's sales program for you—complete in every detail—prepared just as you would prepare it, if you had the time and money. *Now is the time to promote.*

Write or contact your local jobber pronto—tell him you want to get in on this tremendous sales-building program, and to send along all the available material—*but fast.* Tell him, too, to be sure and send along C-D stock cards, with a suggested capacitor stock you should carry. Don't overlook this new and valuable aid to efficient and profitable operation.

They make you look important

Yes! This new, complete packaged sales promotional program will make you "the" service shop in your community! *Designed for your individual needs*—prepared just as you would prepare it, if you had the time and money. Here's a program that links your name with CORNELL-DUBILIER, the world's largest manufacturer of capacitors. Here's a program that will give *your customers confidence in you and the parts you use!* Further details on how to use these C-D sales aids will be described in subsequent issues of "The C-D Capacitor."



A Free Market-Place for Buyers, Sellers, and Swappers.

These advertisements are listed FREE of charge to C-D readers so if there is anything you would like to buy or sell, if you wish to obtain a position or if you have a position to offer to C-D readers, just send in your ad.

These columns are open only to those who have a legitimate, WANTED, SELL or SWAP proposition to offer. The Cornell-Dubilier Electric Corp. reserves the right to edit advertisements submitted, and to refuse to run any which may be considered unsuitable. We shall endeavor to restrict the ads to legitimate offers but cannot assume any responsibility for the transaction involved.

Please limit your ad to a maximum of 40 words, including name and address. Advertisements will be run as promptly as space limitations permit.

FOR SALE—New 5' and 7' scopes. Vert. Horiz. and amplifiers flat to 4 mc. Linear sweep 20 to 30kc. Built in vert. and horiz. Television sweeps. 5'—\$135; 7'—\$180. Modern Design, 148 Winthrop St., Brooklyn, N. Y.

TUBES—Replacements for 1A7, 32L7, 50 L6, 70L7. Herbert Levinson, 2422 Natrona St., Philadelphia 32, Pa.

WANTED—Small ac-dc table model receivers, any condition, working or in need of repairs. State name, model, condition, and price. Stubby's Radio Service, 238 W. Elm St., Reading, Pa.

FOR SALE OR SWAP—Meissner Analyst, slightly used but perfect. Want Hickock Microvolter and Scope. Sell for \$86. fob, includes leads and instructions. Chuck Webster, 1116 S Washington, Aberdeen, S. Dak.

FOR SALE OR TRADE — Have Hickock latest 203 V.O.M. and 305 Scope. Want Jumbo V.O.M. and Jumbo Tube Checker. E. Sujak, 5321 W. 30th Place, Cicero 50, Illinois.

RADIO MEN, amateurs, experimenters get on numerous mailing lists. Receive parts and tube catalogs. Also samples. Send 10c in coin to Charles Lentz, 2300 Bronx Park East, Box 67, New York, N. Y.

WANTED—Hickock model 60 panel, model 210S jumbo meter or model 4922S jumbo meter. Have new latest Hickock 203 and cash. Edward Sujak, 5321 W. 30th Place, Cicero 50, Ill.

FOR SALE—Tubes in sealed cartons at list prices. Send in your needs and for list. Herbert Levinson, 2422 Natrona St., Philadelphia 32, Pa.

FOR SALE OR TRADE—Triplett model 1503 tube tester and set tester. De Forrest Radio Course complete. Also Army F.M. receiver. Will answer all letters and cards. John R. Naples, 836 Ford Ave., Youngstown, Ohio.

FOR SALE—6 volt vibrator packs for RCA, Zenith, Sentinel and Litatro. Also 32 volt of same. 150 volt output. Used but complete with vibrator, \$3.00 each or trade for guns, fishing tackle or radio tubes. Also have assorted 6 and 32 volt coils. Make offer. Popma Radio Service, Orange City, Iowa.

WANTED—Record Recorder. Give description in detail. Ben Cheskis, 2510 N. 32nd St., Philadelphia 32, Pa.

FOR SALE—Radio tubes, repair parts, supplies, etc., at bargain prices. Write for information and list to Radio-Electric Labs., 715 N. 7th St., Lake City, Minn.

FOR SALE—Parts for 200 watt transmitter. Includes nine Weston meters, three power supplies, tubes, coils, two keys, crystal, frequency meter monitor, spare parts. Also parts for six tube superhet. Reasonable. J. M. Capowski, 29 De Graw Ave., Clifton, N. J.

FOR SALE—Radio tubes. All numbers. Also other radio parts. Worden Radio Shop, 121 Maple St., Friend, Neb.

FOR SALE—One new C-52-A Thermador power transformer, primary 115 volts, sec. 750-volts CT, 110 mils. Rectifier filament 5-volts CT at 3 amps, filament no. 2 2.5-volts CT at 3.5 amps, filament no. 3 2.5-volts at 12.5 amps. Half shell lug mounting. Mounting bolts 2/4 by 2/4 centers. Price \$4 and postage. Lee Sprague, Star City, Ark.

FOR SALE—"Wireless Telegraphy" by Zenneck and Seelig; "Wireless Telegraphy" by A. F. Collins, 1905; and fifty other rare old radio books. Also old CRI course with corrected answers. Percy M. Ott, 507 Juniper St., Quakertown, Pa.

FOR SALE—1938-9-40 RCA Victor. Brand new Service manuals for \$4.50. Readrite 710 set tester D.C. 0-20-60-300-600v. A.C. 0-10-140-700v. M.A. 0-15-150. In good condition for \$15. J. Domino, 58-81 Maspeth Ave., Maspeth, N. Y.

FOR SALE—Complete laboratory equipment, Junior Voltohmst Hickock sig. generator, Hickock tube tester, Tobe Bridge analyzer, Riders Chanalyst, Riders manuals, Mallorrs, RCA, Philco manuals. Over 500 tubes, 99% in cartons, and parts. Edw. H. DuFour, 13 Jewett Ave., Poughkeepsie, N. Y.

FOR SALE—Rider's manuals vols. 7 to 14 inclusive. Volume 7 has lost about 10% of its pages. Best offer takes them. Wilcox Radio Service, Water Valley, Mississippi.

FOR SALE—Presto portable recorder. Make records up to 12 inches at 78 or 33 1/2 RPM. Also plays back. A-1 condition, \$215. Webster deluxe record changer, plays 10" and 12" intermixed, low pressure sapphire pickup, like new, \$80. J. S. Hill, Hudson, Ohio.

FOR SALE—Supreme model 593 point to point analyzer, complete in oak case, first money order for \$10 takes it. Wills Expert Radio Service, 215 So. Michael St., St. Marys, Pa.

WANTED—Copies of I. R. E. for 1941 and earlier years. Also copies of Electronics for 1930 to 1938 inclusive. Ralph Stair, 5068 Sherrier Place, N. W., Washington 16, D. C.

FOR SALE—Large assortment of radio tubes and parts. Also Rider's manuals vols. 9 to 13 inc. Write for prices and list. V. D. Telschow, 205 So. W. 1st St., Red Oak, Iowa.

WANTED—Set of Rider's manuals. Also swap German 6X24 Armees Trieder binoculars. War souvenir in good condition for an oscilloscope in good condition. M. Gottlieb, 1745 Fulton Ave., New York 57, N. Y.

WANTED—Hickok tube tester with filament voltages up to 117 volts. Give model, condition and price. O. F. Hamm, 4751 Louisiana, St. Louis 11, Mo.

FOR SALE—Vacuum tube volt-ohmmeter, \$895. Twelve ranges, 6000 volts, billion ohms. Complete kit. Tubes. Instructions. General Radio and Appliance Co., 166 N. Sierra Bonita Ave., Pasadena 4, Calif.

WANTED TO BUY—Audio transformers, Ferranti, Sangamo C171, D171, C210, G210 and H171, Amertran 152, 271, 442, interstage, and W-E 144A; Neobeam oscilloscope; Hickock 510X and 202; power chokes, G-R 565S, Acme 377 and others (state price, brand and model number, henries and D.C. ohms); V-T voltmeter. Address: Apt. 13B, 675 West End Ave., New York 25, N. Y.

WANTED—U. S. or foreign stamp collection and pair of opera or field glasses. Will trade transmitting and receiving parts, tubes, meters, microphone, 2" oscilloscope. Send for list. B. Bernbaum, 5746 N. Park Ave., Philadelphia 41, Pa.

WANTED—Magnifying lens suitable for an RCA TT5, 5" C-R tube television receiver. Jack's Radio Service, 296 Wainwright St., Newark, N. J.

FOR SALE—Kato rotary converter, 32 volt to 110 volt AC. 100 watts output, \$5. Zenith inverter, 32 volt to 110 volt AC. 100 watts output, \$7.50. John W. Reigel, R. D. 2, Annville, Pa.

WANTED—New or used Echophone EC1 or EC1A receiver, or an S41G Hallcrafters receiver. Will pay cash or trade for what you desire. Herbert Browne, 1709 West 10th St., Brooklyn 23, New York.

FOR SALE—Superior model 1130S set and tube tester, Riders manuals, National N. C. 44 short wave receiver, car set and other items. Want larger type short wave receiver, age or condition not important. Also Weston 772 or similar. Will exchange lists. Glenn Watt, Chanute, Kans.

WANTED—Complete set of latest Rider's manuals. Will trade two good auto radios complete and two 3105 Aircraft radio crystals and television course. Also want late model tube tester, signal generator, Presto recorder for 16 inch records and test equipment. K. H. Stello, 1584 Cross Roads of World, Hollywood 28, California.

FOR SALE OR TRADE—Schick electric shaver, .22 cal. Winchester rifle, Kelsey 3X5 printing press complete with 4 fonts of type, etc. H. Freeman, Box 5, Sta. Y, Brooklyn, N. Y.

FOR SALE—Have a S-27 Hallicrafter receiver for sale. Is in very good condition and at reasonably price. Charles Kotval, 2430 S. 58th Ct., Cicero 50, Ill.

FOR SALE—New Bell 25 watt amplifier dial set on incline two-tone grey cabinet, two 6L6 output, inverse feed-back, two microphone channels, one phono, 130 DB gain., frequency response DB, 35 to 12,000 cycles. J. Bazewick, 3000 N. Christiana, Chicago 18, Ill.

FOR SALE OR SWAP—Supreme model 85 tube tester, excellent condition, with octal adapters, instruction book and tube list. Want service equipment, 144 inc ham equipment or photo equipment. Samuel Geller, 2521 W Cold Spring Lane, Baltimore 15, Md.

FOR SALE—New tubes in cartons. Best offer takes the lot. Send for list. Want any test equipment for use on F.M. and television receivers. Must be in perfect condition. No home-made equipment. Send full details. Leading Radio Co., 158-160 East 3 St., Mt. Vernon, N. Y.

TRADE OR SWAP—The following for a 3/4 size aluminum bass violin in good shape: One 35 watt sound system with speaker, cable, crystal mike and cable all in portable case. New. One 35mm strip film projector, one 16mm Keystone projector. Can also use a good multimeter John Arnold, P.O.B. 84, Bluffs, Ill.

WANTED—Giant set tester and giant tube tester, any make. State condition and price. Have new Hickock 203 for sale. E. Sujak, 5321 W. 30th Place, Cicero 50, Illinois.

FOR SALE—Power transformers 600V and 350V2 midget Hammarlund condensers. Both transformers and condensers \$5.00 mailed postpaid. Frank Bou, c/o Bot. Dept. U. of Penna., 38 Woodland Ave., Philadelphia 4, Pa.

WANTED—All types electric motors, generators, converters, dynamotors, etc., Write only, giving nameplate data, condition and price wanted. Richardson, 530 W. 136th St., New York 13, N. Y.

WILL TRADE—7A7, 12J5, 6H6, 6K6, 12AH7, 6X5, 01A, 2B7, 46, 55, for anything. Want to buy Jackson 640 Osc. Edward Howell, Route 2, Dillon, S. C.

FOR SALE OR TRADE—Teleplex code oscillator and tapes, all brass bug. Would like 32B Collins transmitter. Will pay difference. W. L. Thiel, 96 Westbury Blvd., Hempstead, N. Y.

FOR SALE—Tubes in sealed cartons. 40% off in lots of 10 or more tubes, any type. Send for list. L. Stein, 456 Bedford Ave., Mt. Vernon, N. Y.

FOR SALE—2 meter receiver, 955-635-6V6, in enclosed metal box, P.M. speaker in front of panel. 10 watt class B modulator 635-6N7-6N7, into RF load, self-contained supply ma meter, switches, etc., ready to go. F. Craven, 2216 S. 7th St., Philadelphia 48, Pa.

FOR SALE—Slightly used heavy duty welding outfit complete with torch, 5 tips, 2 hose, and many other extras. Will sell or swap on Riders' Manuals Nos. 10, 11, 12, 13 and 14. Manuals must be complete. For complete description of welding outfit and price, write to Joe's Radio Service, Berrysburg, Pa.

WANTED—The following new or good used tubes at 30% off list price. 1-1F4, 1-1A6, 1-77, 4-950, 1-1C6, 2-1A4, 1-30, 1-1C7, 1-1F7, 1-1F5. Richard Wolf, Box 49, Rt. 2, Wishek, N. Dak.

FOR SALE—Heavy duty dual speed recording turntable. \$15. XTAL cutting head complete with arm and gears, \$15. Sam Levine, 304 Nansemond Circle, Norfolk 2, Va.

FOR SALE—Two Messiner PT No. 6779 beat frequency oscillator coils 456 kc brand new. Majestic I.F. coils. One old tube checker and some old radio chassis. I need hard-to-get tubes or what am I offered? Phil McKay, 23 Hivling St., Xenia, Ohio.

FOR SALE OR TRADE—2 De Forest 571 750 watt osc.-amp. tubes; 2 De Forest 572 Mercury rectifiers; plate trans. 4000-0-4000 with taps; also 2 C-D .0002 capacitors at 10,000 volts and 1 C-D .0002 at 5,000 volts capacitor. Also other trans. parts. John Sager, 6 Pine St., Little Falls, N. Y.

FOR SALE OR TRADE—Most types of scarce tubes, used, but guaranteed perfect. Send for details and price list. Also send for details on \$6 volt-ohm-milliammeter, using O-1MA. B. Weisberg, 2707 Creston Ave., Box 58, New York.

WANTED—Emerson X146 chassis with tuning dial and speaker. Operative or in-operative, with or without tubes. Will sell Clough-Brengle O.M. signal generator. Best offer. Harrison Radio Service, Paul St., Dedham, Mass.

WANTED—Will pay cash for Hallicrafter SX9 with or without crystal. Matthew Healey, 681 Harris Ave., Providence 9, Rhode Island.

FOR SALE OR TRADE—A miniature dresser solid walnut. Antique. Guaranteed value of \$125. Want camera, communication receiver or other items of similar value. For appointment or photo, write William Wax, 527 Bedford Ave., Brooklyn, N. Y.

(Continued on page 14)

TELEVISION RECEIVER ANTENNAS*

The antenna plays an extremely important role in television receiver installations. These installations must be perfect or the image will be extremely distorted and in many instances, there'll be no image to see.

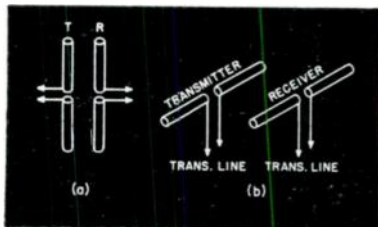


Fig. 1. Two methods of polarization. In a, the transmitting and receiving antennas are both vertically polarized. That is they are both erected in a vertical position. In b, the two antennas are both horizontally polarized. Greatest signal transfer is obtained when both antennas are in the same plane.

Because of the frequencies at which the new television transmitters will operate (44 to 88 mc and 174 to 216 mc) overall antenna lengths for most installations will run from $2\frac{1}{2}'$ to 10'. The short length of antenna required permits the use of rod antenna of the extendible type in place of the usual wire antenna. This type of antenna will require a mounting device such as a pole or other extension.

At the very high frequencies, antennas are not only directional, but must also be polarized. In addition, they may be tuned to receive certain frequencies in preference to others or may be constructed to receive a broad band of frequencies in much the same way as the tuned circuit of the receiver.

Antenna Polarization

The polarization of an antenna is determined by the plane in which it is erected. Best results, insofar as signal pickup is concerned, are obtained when both the receiving and transmitting antennas are in the same plane. Fig. 1. Television transmitting antennas are constructed for horizontal polarization, that is, the antenna is horizontal to the earth. For this reason, receiving antennas must be erected in the same plane. Vertical antennas will give very poor results on television signals, unless they are erected quite close to the transmitter. The directional qualities of a horizontal receiving antenna are such that the greatest signal pickup is achieved in a direction broadside to the antenna, and the least pickup from the direction in which the ends are pointing. The transmitter antenna is usually designed for omnidirectional transmission. That is, its elements are so arranged that it sends out a good signal in all directions. Therefore, for best reception, the receiving antenna

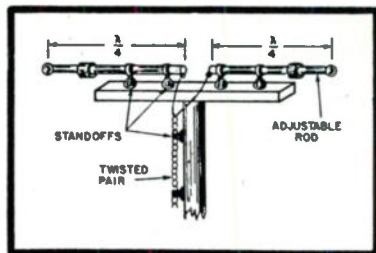


Fig. 2. A typical dipole receiving antenna. Two extendible rod antennas are mounted on standoffs on a board, and their lengths adjusted to receive the desired frequency. The lead-in is attached to the inside terminals of each section.

* By R. B. Carwood in "Service" magazine.

should face broadside in the general direction of the transmitter.

The most common type of receiving antenna used is the half-wave dipole, Fig. 2. Here, two quarter-wave sections are arranged in a horizontal position, with the two sections at an angle of 180° . By quarter-wave section is meant that each leg of the antenna is a quarter wavelength long, using the wavelength of the transmitted signal as the deciding factor. For example, a 5-meter signal is one whose points of maximum signal amplitude are 5 meters apart. Since each meter is approximately $40''$, this signal, at its full wavelength is $200''$ apart at its signal peaks. A quarter wave of the signal is represented by a distance of $50''$, Fig. 3.

The wavelength of a signal may be determined from its frequency by dividing 300 by the frequency in megacycles. For example, a 60-megacycle signal has a wavelength of $300/60$ or 5 meters.

When it is desired to receive a signal of a given frequency, the antenna may be designed to pick up the particular frequency in preference to other fre-

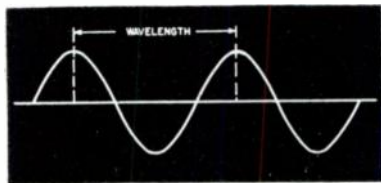


Fig. 3. Relationship of frequency to wavelength. The wavelength is the distance between two adjacent peaks of a sine wave, and may be measured in meters, or feet. The distance is determined by the speed of electricity and the frequency of the sine wave.

quencies, in much the same manner as a tuned circuit. Antennas are tuned by varying their length. Thus, theoretically, a dipole antenna of the type shown in Fig. 2, will pick up a 5-meter signal best, when each leg or quarter-wave section is $50''$ long. In actual practice, the best length is found to be about 90% of this value, so that actually, each section would be $45''$ long.

The formula used to determine the exact length of each section is:

$$L \text{ (in feet)} = \frac{234}{f_{mc}}$$

where f is the video carrier frequency.

The loss in signal attending a reduction or increase in the actual length is not critical within 10% of the established value. However, losses may be observed, and an antenna cut exactly to length is better than one which deviates from its established value.

Other Antenna Types

The strength of the received signal may be further increased through the use of more elaborate antenna systems. These are shown in Fig. 4. These antenna forms are used to perform specific functions. Some are particularly suited for covering wide frequency bands, while others may be used to give best reception from a particular direction.

Fig. 4a shows a rhombic antenna, in which two V antennas are arranged in a rhomboid pattern. This type of antenna is used for covering a wide band of frequencies, with the four sides of the pattern tuned to the center frequency in the range desired, and a half wavelength long. Its directivity is in a line with the center of the two V's, and in a direction away from the point where the lead-in is connected. However, since it is a wired type of antenna, and occupies a large area, it is not suitable for most installations. In some installations it may be necessary to resort to this type of installation, when other methods fail, since its response is excellent.

Fig. 4b shows a V-type antenna whose directivity is determined by the angle between the two legs of the V. Normally, angles of 35° to 75° are used. This type of antenna is sharply directional from the center of the V, with little pickup from the sides.

Two types of dipole installations are shown in Figs. 4c and 4d. In Fig. 4c, two pairs of dipoles are used with the second pair directly under the first pair, and spaced $\frac{1}{8}$ wavelength of the desired frequency. The dipoles are

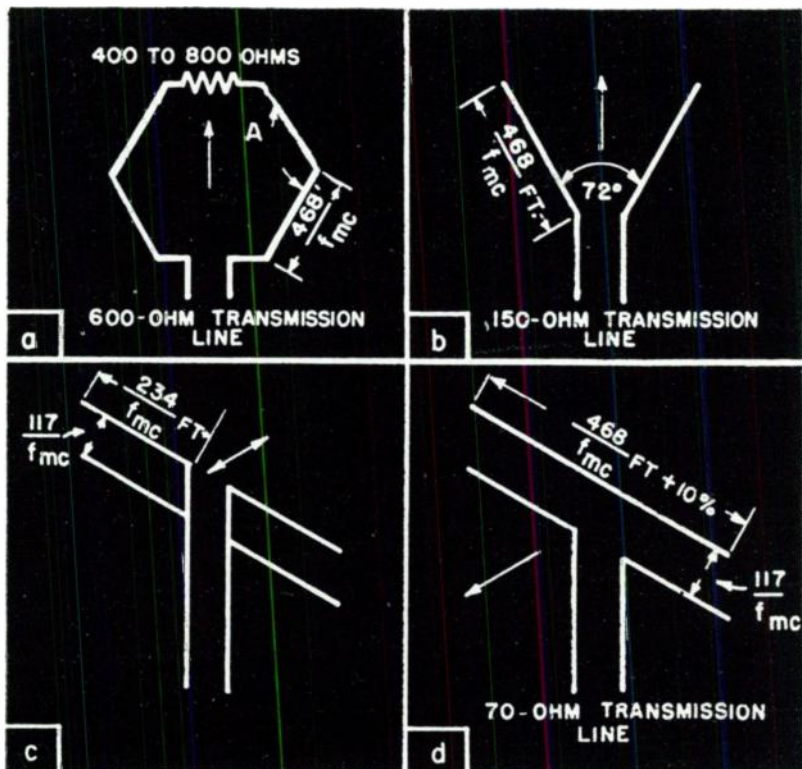


Fig. 4. Various types of antennas used at high frequencies. In a, a rhombic antenna is shown. It consists of four half sections arranged in a diamond pattern. ($A \approx 90^\circ$, approximately.) In b, we have a highly directional type of V antenna. In c, a dipole has been installed on the same mount directly beneath another dipole to increase its signal pickup and directivity. In d, a reflector has been mounted behind the dipole to make it unidirectional.

connected in parallel for increased signal strength and directivity. This type of antenna is bidirectional. That is, it will receive signals from either broadside direction. Fig. 4d shows a dipole antenna that is unidirectional. The unidirectional characteristic is obtained by mounting a reflector directly in back of the dipole, spaced a quarter wavelength, and a half wavelength long. There is no connection to the reflector. This type of antenna will pick up signals in a direction into the dipole, with the reflector acting as a shield for sig-

nals coming from the opposite direction. In addition, the reflector increases the signal pickup of the dipole itself.

Antenna Directivity

The directivity of an antenna serves two purposes. In addition to increasing the signal pickup of the antenna from a particular direction, it also prevents interfering signals from being picked up from other directions. This latter function is actually the more important of the two, since it is a most effective means of preventing ghosts

and noise pickup. These two are the most important interference factors. Where some rotation of the antenna is possible, without appreciable signal reduction, the antenna should be directed away from possible sources of diathermy interference, or high adjacent structures. This type of installation may require a communications setup between two men. Another possible method is to use a portable broad-band receiver tuned to television frequencies. By connecting the antenna to this special receiver, it is possible to determine the direction of noise sources. The second method has the disadvantage of not being able to determine if ghosts are present in the signal.

From personal experience, it can be stated that even the mild presence of a

ghost in the picture is very annoying. For this reason, every effort should be made to remove them entirely. The reflecting surface responsible may be a mile or more away. For example, in the New York area, the Palisades have been found responsible for ghosts on receivers installed on the west side of New York City. Thus, a visual inspection of the surrounding area may disclose nothing. In addition, ghosts may be present on rainy days, when the reflectivity of the surface responsible is increased. Again, the ghost may be reduced to a blurred image, when the reflecting surface is close by. All these factors add up to the need of sweating it out on the installation.

(To be continued)

THE RADIO TRADING POST

(Continued from page 10)

FOR SALE—2 and 3 ganged .000365 condensers, 25c to 50c. Tested 81's, 50's and 10's tubes, 50c to \$1.00. 4" to 8" auto speakers, 50c to \$1.00. Auto power trans., 75c each. Anthony Pusateri, 1101 Fleming St., Coraopolis, Pa.

FOR SALE—Mill's "Do-Re-Mi" juke box in good shape. Just overhauled. Will sell for \$175 cash or trade for pickup truck, or what have you? Howell Electronic Sales and Service, 110 So. MacArthur Ave., Dillon, S. C.

WANTED—MA35RC amplifier and set of Rider's manuals. Also L. C. Checker. Will pay cash or trade critical tubes. Edward Howell, Route 2, Dillon, S. C.

SWAP OR SELL—Silvertone precision series three communication receiver, 12 tube, 7 band, 550-70 meg., 456 and 1560 i-f, BFO, etc., with speaker, like new. Want 8 or 16 mm equipment. P. H. Graesser, 45 Lincoln St., New Britain, Conn.

FOR SALE—Signal Corps volt-ohm meter I-166. Price \$15. Write or call on Louis J. Amarosa, Jr., 22-60 27th St., Astoria 5, New York.

WANTED—Meissner 5-prong plug-in coils. Nos. 18-2940, 18-2941, 18-2942, 18-2944. Also a 4-prong plug-in coil that covers the BC band and tunes with .00014 MF or 100 MMF condenser. Jim Berry, Box 86, Summerville, Ga.

POSITION WANTED—As radio serviceman or helper with established radio shop in Reading, Pa., or vicinity. Am taking a course with National Radio Institute. Am 17 and will graduate from high school in May. Am familiar with the use of multimeters, tube testers, analyzers and signal generators. Andy R. Harcar, R. D. No. 2, Birdsboro, Pa.

WANTED—Dynamotor delivering around 100 ma or more at 300 to 500 volts. Have RK20 in good condition. Also 203A and couple 845 in good shape; or will pay part cash. Must be for 6.3 volt operation. C. B. Kelley, 7005 Hamilton Ave., Cincinnati 31, Ohio.

WANTED—Riders manuals, signal generator, tubes in cartons, or what have you in test equipment for sale or trade? Madlinger's Radio Service, 1704 Palmetto St., Brooklyn 27, N. Y.

FOR SALE—Tubes in sealed cartons at list prices. Send for list or your needs. Herbert Levinson, 2422 N. Natrona St., Philadelphia 32, Pa.

FOR SALE—RCA radio and television servicing course, perfect condition. First \$20 will get it. M. Navas, 69 Bank St., New York 14, N. Y.

FOR SALE—Brunswick, Majestic, Kolster, Macy's, and Philco radios. Write to Louis A. Goldstone, 1279 Sheridan Ave., Bronx 56, New York.

FOR SALE—Set of 6 Victor code records (12 sides), used but good as new. For best offer we'll send them express collect. Tenezar's Radio Laboratory, 305 Marion St., Brooklyn 33, N. Y.

FOR SALE—Large quantity of new tubes in original cartons on OPA list. We have all types in stock. Send us a list of your needs. Globe Radio, 409 Banta Ave., Garfield, N. J.

WANTED—3" illuminated S meter. Prefer Hallicrafter type. Will trade tubes, speakers, or cash. G. Samkolsky, 527 Bedford Ave., Brooklyn, N. Y.

FOR SALE—Brush RC-20 cutting head, \$10. Thordarson T15S92 output transformer, \$10. 954,955,956 tubes \$1 each. RME 5 and 10 meter converter, \$35. High fidelity 6L6 output transformer, \$12. Frank Dane, 3852 Eagle St., San Diego, Calif.

FOR SALE—Complete line of radio tubes in sealed cartons, at list price. Also two 1939 6 tube 6 volt auto radios. \$32 for both sets. Send for our new price list on radio tubes. Snyder's Radio Service, Pitman, Pa.

SALE OR TRADE—Dunlap jigsaw with 1/4 hp motor, Craftsman 1/2" chuck drill press with a one-third hp rear mount motor, 14" bench sander with 1/4 hp motor. H. Freeman, Box 5, Sta. Y, Brooklyn, N. Y.

SALE OR TRADE—30 straight, 18 curved sections standard gauge track, and 2 No. 223 automatically controlled illuminated Lionel switches. Want signal generator or other radio parts, tubes. H. R. Ringold, 132 N. Doheny Dr., Beverly Hills, Calif.

SWAP OR SELL—50 American-Bosch car-radio antenna couplers, in factory-sealed cartons. For models 736, 737, 738, 838 only. Kit No. KT9582. Walter F. Kapinos, 304 Front St., Chicopee, Mass.

FOR SALE—Nilson and Hornung "Radio Operating Questions and Answers" and Cooke's "Mathematics for Electricians and Radiomen." In first class condition. R. S. Williams, 4405 Arlington Ave., Fort Wayne 6, Ind.

FOR SALE OR TRADE—L. C. Smith No. 2 typewriter in good condition. Want short wave receiver, etc. O. F. Klein, 1622 W. Cherry St., Milwaukee 5, Wis.

WANTED—250th/1, 100th's, 810's, T200's meters, or what have you? Have new 813's, RK65's, used RK28A, 807's, many 80 and 40 meter crystals. George Pasquale, 601 Bashford Lane, Alexandria, Virginia.

FOR SALE—Hallicrafter "Sky Champion" S-20R communications receiver. Used very little; in excellent condition. Will sacrifice at \$55. M. E. Noyes, Beidler Rd., Willoughby, Ohio.

FOR SALE—McElroy telegraph recorder, model RRD900, \$75; Hallicrafter Sky Buddy, \$29.50; Mallory Vibrapack; Meissner signal splicer; other radio parts and tubes. Will trade for good 35mm camera. J. Luehne, 7743 S. Colfax Ave., Chicago, Illinois.

FOR SALE—Hickock Traceometer No. 155, crystal controlled microvolt generator No. 19XD; RCA 5" oscilloscope No. 158; Remington Threesome electric shaver (new); pair of 7X50 Zeiss field glasses; instruments used very little. T. Wojtcichowski, 2837 Fulton St., Brooklyn 7, N. Y.

FOR SALE—Riders' Manuals. Send for complete description and price list. E. W. Sinnett, 443 N. Hinkley Ave., Rockford, Illinois.

FOR SALE—Supreme radio analyzer model 339 deluxe, perfect condition; Supreme model 592 and 593, in one case, good condition, and DuMont oscilloscope model 164. Also 7 Racon driver units, 6 volt fields, in excellent condition. Daidone Radio Service Laboratories, 762 S. Orange Ave., Newark, N. J.

FOR SALE OR TRADE—Pair of used Northland hickory slalom skis, cable bindings and steel poles, all in good condition. Sell for \$25, or exchange for good signal generator or what have you? D. Clark, Box 18, Inwood Sta., New York 34, New York.

FOR SALE—Quitting radio servicing. All parts, tubes and test equipment for sale at Your price. Lists now available, all mail answered. Ed's Radio Service, 2868 Woodhill Rd., Cleveland 4, Ohio.

SELL OR SWAP—Meter tested tubes for what have you? Send for list. Hy's Radio Service, 86 Seigel St., Brooklyn 6, New York.

TRADE—Meissner Analyst, and 18 meters of all types. Want View camera, 4X5, or larger. Also photo enlarger or other photo equipment. F. W. Nichols, 314 S. MacArthur Blvd., Springfield, Ill.

FOR SALE OR TRADE—Westinghouse 4" 0-100 microammeter and 3" 0-20 microammeter in A1 condition. Want test equipment, microphones, electric Hawaiian guitar, phono-motors, hard-to-get tubes. All letters answered. Beck Radio and Sound Lab., Straw Pump, Irwin, Pa.

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