August, 1951
40 Cents
45c in Canada

QST

devoted entirely to

amateur radio

In This Issue—RADIO CONTROL OF MODEL AIRCRAFT

We fully realize the most beautiful music to any ham is his own call—especially when followed by something fancy like AC4YN. In fact, that's our favorite music, too.

When the bands close up or if you have a family that enjoys high fidelity sound, we are sure that you'd find the ARISTOCRAT corner enclosure a happy acquisition.

The ARISTOCRAT is a true corner horn loaded cabinet producing bass response that is down only 5 db at 35 c.p.s.

An E-V Model SP12B speaker is a fine companion to this cabinet but any good 12" speaker works fb.

Your E-V distributor will be glad to give you a demonstration.

KLIPSCH-LICENSED*

Aristocrat

FOLDED CORNER HORN ENCLOSURE

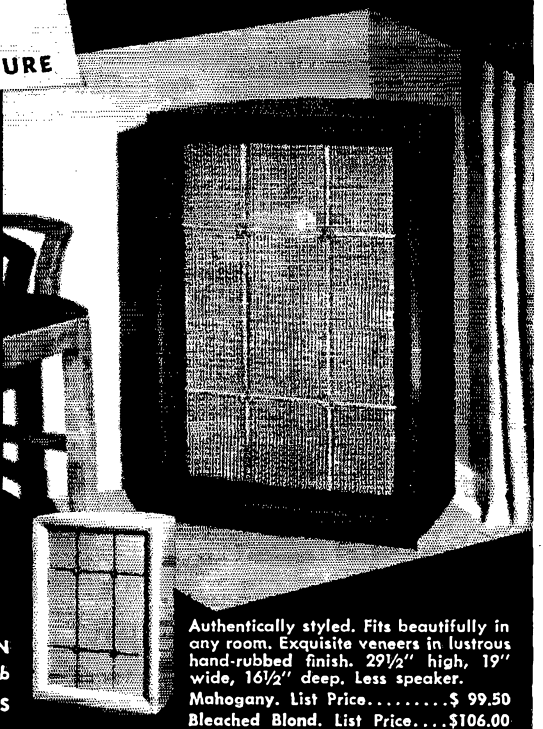
For the first time . . . one full octave of added bass range beyond the conventional bass-phase-inverted-reflex type—in a beautiful, small-size, low-cost corner cabinet with direct front radiation of high frequencies for 12" full range speakers!

EXTENDED BASS—True reproduction down to 35 c.p.s. with full efficiency. No boominess! Distortion-free!

INCREASES POWER HANDLING CAPACITY of any 12" speaker by as much as 50%.

MUSICAL BALANCE—Gives proper balance of lows and highs for fullest enjoyment.

Write for Bulletin No. 180



Authentically styled. Fits beautifully in any room. Exquisite veneers in lustrous hand-rubbed finish. 29½" high, 19" wide, 16½" deep. Less speaker.
Mahogany. List Price.....$ 99.50
Bleached Blond. List Price....$106.00

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Q-5 ALL THE WAY!

...for critical civil-defense transmission

Here's help toward that clear, understandable message you must send when lives are at stake. General Electric's 6W6-GT, so sensitive it can be "driven with a whisper," lends itself to a simple r-f circuit with few stages—one you can count on for dependably good transmission.

Feed the 6W6-GT low plate voltage, and it delivers high output—evidenced by the tube's ability to dissipate up to 10 w. Add, as an extra asset, the heavy-duty heater . . . giving you plenty of reserve emission, to draw on when you need it.

Any r-f job, from oscillator to final, will be capably handled when you plug in a G-E 6W6-GT. Study the ratings, to prove to yourself that this tube belongs in your low-power emergency rig . . . which must send a clear signal unfailingly; must be simple, fool-proof, easy to service.

Extra-reliable, the 6W6-GT! And a premium value at its low receiving-tube price! Get the full story from your G-E tube distributor! *Electronics Department, General Electric Co., Schenectady 5, New York.*

6W6-GT

High-mu Beam Power Amplifier

Heater voltage	6.3 v
Heater current	1.2 amp
Max plate voltage	300 v
Max screen supply voltage	300 v
Max plate dissipation	10 w

● *Great manufacturing resources, mean tubes great in dependability and value. Typical of the advanced equipment behind G-E tubes is General Electric's automatic filament-handling machinery which "processes a hair 2⅓-mile long." Gossamer-fine wire, only .00135 inch in diameter, is unwound from spools carrying 1,000-meter lengths . . . gets 16 coats of insulation while passing through a special coating machine . . . finally is shaped with precision to form the tiny, efficient heaters within tube cathodes. Result: exact filament uniformity, reflected in greater G-E tube reliability!*

ELECTRONIC TUBES OF ALL TYPES FOR THE RADIO AMATEUR

GENERAL ELECTRIC

184-KAB

Your Directory of Collins Distributors

These are the authorized Collins Radio dealers. Get in touch with the one nearest you. You will find him thoroughly informed about Collins amateur equipment — a good man to deal with.

Albany, New York
★Ft. Orange Radio Distributing Co., Inc., 642-644 Broadway

Amsterdam, New York
★Adirondack Radio Supply P.O. Box 88

Atlanta, Georgia
★Specialty Distributing Co. 425 Peachtree St., N.E.

Billings, Montana
★Electronic Supply Co. 214 Eleventh St., W.

Birmingham, Alabama
★Ack Radio Supply Co. 2205 Third Ave., N.

Boston, Massachusetts
★Radio Shack Corp. 167 Washington St.

Butler, Missouri
★Henry Radio 211 N. Main

Chattanooga, Tennessee
★Specialty Distributing Co. 709 Chestnut St.

Chicago, Illinois
★Allied Radio Corp. 833 W. Jackson Blvd.

★Newark Electric Co. 323 W. Madison St.

Cincinnati, Ohio
★Steinbergs, Inc. 633 Walnut St.

Cleveland, Ohio
★The Progress Radio Supply Co., 413-15 Huron Road

★Radio & Electronic Parts Corp., 3235 Prospect Ave.

Columbus, Ohio
★Thompson Radio Supplies 218 East Gay St.

Concord, New Hampshire
★Evans Radio 10 Hills Ave.

Council Bluffs, Iowa
★World Radio Laboratories, Inc., 744 W. Broadway

Dallas, Texas
★Crabtree's Wholesale Radio, 2608 Ross Avenue

Dayton, Ohio
★SREPCO, Inc. 135 E. Second St.

Denver, Colorado
★Radio Products Sales Co. 1237 Sixteenth St.

Des Moines, Iowa
★Radio Trade Supply Co. 1224 Grand Ave.

Detroit, Michigan
★M. N. Duffy & Co. 2040 Grand River Ave., W.

Duluth, Minnesota
★Northwest Radio 109 East First St.

El Paso, Texas
★C. C. McNicols 811 Estrella

Everett, Washington
★Pringle Radio Wholesale Co., 2514 Colby Ave.

Greensboro, North Carolina
★Johannesen Electric Co., Inc., 312-14 N. Eugene St.

Hollywood, Florida
★Carl's Radio Shop 2323 Hollywood Blvd.

Indianapolis, Indiana
★Van Sickle Radio Supply Co., 102 S. Pennsylvania St.

Lexington, Kentucky
★Radio Equipment Co. 480 Skain Ave.

Long Beach, California
★Scott Radio Supply 266 Alamitos Ave.

Los Angeles, California
★Henry Radio 11240 W. Olympic Blvd.

★Kierulff & Co. 820-830 W. Olympic Blvd.

★Radio Products Sales, Inc. 1501 S. Hill St.

Louisville, Kentucky
★Universal Radio Supply Co., Inc., 533 S. Seventh St.

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★Satterfield Radio Supply Co., 326 W. Gorham St.

Memphis, Tennessee
★W & W Distributing Co. 67 Madison Ave.

Milwaukee, Wisconsin
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Minneapolis, Minnesota
★Lew Bonn Co. 1211 La Salle Ave.

New Orleans, Louisiana
★Radio Parts, Inc. 807 Howard Ave.

New York, New York
★Harrison Radio Corp. 10 W. Broadway

★Harvey Radio Co., Inc., 103 W. 43rd St.

Norfolk, Virginia
★Radio Equipment Co. 821 W. 21st St.

Oakland, California
★W. D. Brill Co. Tenth & Jackson Sts.

★Electric Supply Co. 149 Twelfth St.

Peoria, Illinois
★Klaus Radio & Electric Co., 707 Main St.

Philadelphia, Pennsylvania
★Radio Electric Service Co. of Pa., Inc., N.W. Corner 7th and Arch Sts.

Phoenix, Arizona
★Radio Parts of Arizona 34-36 W. Madison St.

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★Cameradio Co. 963 Liberty Ave.

★The Tydings Co. 632 Grant St.

Portland, Oregon
★Pacific Stationery Wholesale Radio Dept., 414 S.W. Second Ave.

★United Radio Supply Co. 22 N.W. Ninth Ave.

Providence, Rhode Island
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Rock Island, Illinois
★Tri-City Radio Supply 1919 Fourth Ave.

St. Louis, Missouri
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Salt Lake City, Utah
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★Western Radio & Television Supply Co. 1415 India St.

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★San Francisco Radio & Supply Co., 1282-1284 Market St.

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Texarkana, Arkansas-Texas
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Topeka, Kansas
★The Overton Electric Co., Inc., 522 Jackson St.

Tucson, Arizona
★Elliott Electronics, Inc. P.O. Box 5081 418 N. Fourth Ave.

Tulsa, Oklahoma
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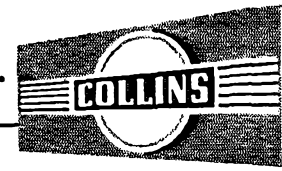
FOR THE BEST IN AMATEUR RADIO, IT'S . . .



COLLINS RADIO COMPANY, Cedar Rapids, Iowa

11 West 42nd Street, NEW YORK 18 ***2700 West Olive Avenue, BURBANK***

QST

AUGUST 1951

VOLUME XXXV • NUMBER 8

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OFFICES

38 La Salle Road
West Hartford 7, Connecticut

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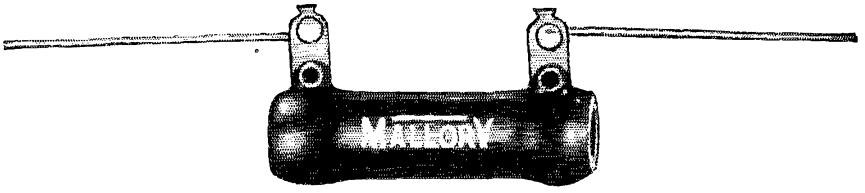
INDEXED BY
INDUSTRIAL ARTS INDEX

—CONTENTS—

MALLORY HAM BULLETIN

Better Protection for Your Transmitter and Yourself... When You Use Mallory Wire-Wound Resistors



Wire-wound power resistors of the vitreous or baked enamel type have always been an important component in the construction and operation of amateur and commercial transmitters, yet, too often these resistors have been selected and purchased entirely on a "sight-unseen" basis with no thought given to the technical merit of the unit purchased.

This is unfortunate, because the undetected failure of just one of these resistors in a transmitter can be of serious consequence not only to the personal safety of the unsuspecting operator, but also in the costly replacement of expensive transmitting amplifier tubes.

Generally, the failure of wire-wound enamelled power resistors can be attributed to one or two important chemical-mechanical factors.

For example, resistors carelessly manufactured with an inferior grade of enamel, composed of chemicals of highly alkaline characteristics, soon fail because of corrosive action on the wire windings of the resistor coil. Leakage of moisture through the carelessly applied enamel also accelerates the corrosive action and results in a resistor of "high resistance" characteristics. In these cases, an original 10,000 ohm resistor may have a measured resistance of 100,000 ohms or more.

In addition, some resistors fail because of a mechanical tension created as a result of the unlike coefficient of expansion between the enamel coating and metal end-straps to which the resistor coil is terminated. Since the enamel as well as the metal end-straps firmly grasp the tiny resistance wire, any difference in temperature expansion results in increased tension on the resistance element, with eventual breakage of the wire. The end result is an "open" resistor.

All these factors have been carefully analyzed in the design and manufacture of Mallory wire-wound power resistors, and corrective measures taken to minimize the chance of failure. All Mallory resistors use a special non-alkaline, non-hygroscopic enamel which seals the resistor coil completely under a tough glass-like, moisture-impervious barrier. This enamel is carefully applied and cured to eliminate pin-holes and internal air bubbles which can be so troublesome.

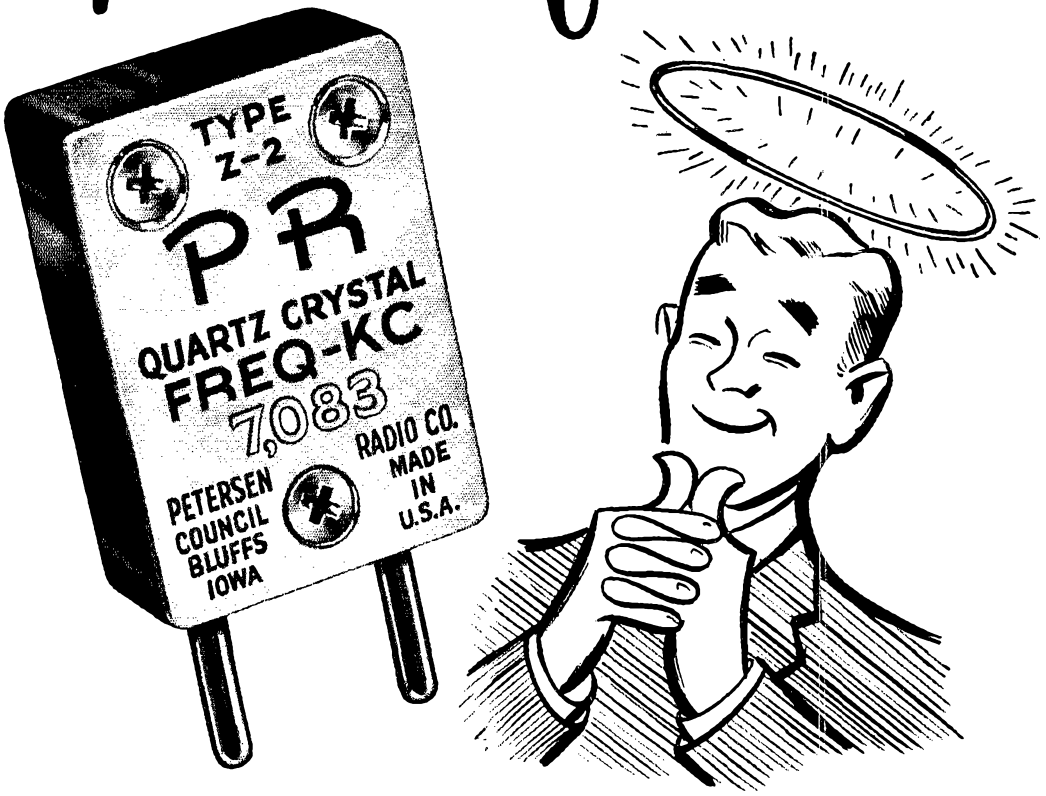
In addition, the metal terminal straps of Mallory resistors are made of a special alloy whose coefficient of expansion is practically identical to that of the enamel covering. This means that the opposing forces normally resulting from unlike temperature coefficients are for all practical purposes equalized, thus reducing the possibility of lead breakage at the junction of terminal strap and resistor coil.

Your Mallory Distributor has these resistors for your inspection. Examine the smooth, even enamel on these resistors. You will see a difference right away. Check their price, too. Surprisingly enough, you will find you can buy Mallory premium quality at standard prices.

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

P.R. MALLORY & CO. Inc.
MALLORY

Peace of Mind



If halos were in style . . . PR owners would be wearing them . . . because the happiness and serenity of T9X has no substitute. With PR Precision CRYSTALS controlling your rig frequency worries take a fast and permanent QSB. You can put your worrier to work on more important problems than "where am I?" For instance . . . the old grey matter can get busy on that super-duper dream beam you have been planning all these years. Yes — PRs give you peace of mind. For better accuracy, stability, activity and output . . . PICK PRs! They're UNCONDITIONALLY GUARANTEED . . . at your jobber!

20 METERS, Type Z-3, $3.75 • 40, 80 AND 160 METERS, Type Z-2, $2.75

PR Crystals

Since PR CRYSTALS 1934

USE PR AND KNOW WHERE YOU ARE

PETERSEN RADIO COMPANY, INC.
2800 W. BROADWAY • COUNCIL BLUFFS, IOWA

EXPORT SALES ONLY: Royal National Company, Inc., 75 West Street, New York 6, N. Y., U. S. A.

Section Communications Managers of the ARRL Communications Department

Reports Invited. All amateurs, especially League members, are invited to report station activities on the first of each month (for preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio Club reports are also desired by SCMs for inclusion in QST. **All ARRL Field Organization appointments** are now available to League members. These include ORS, OES, OPS, OO and OBS. Also, where vacancies exist SCMs desire applications for SEC, EC, RM, and PAM. In addition to station and leadership appointments for Members, *all amateurs* in the United States and Canada are invited to join the Amateur Radio Emergency Corps (ask for Form 7).

ATLANTIC DIVISION				
Eastern Pennsylvania	W3BES	Jerry Mathis	617 Crescent Ave.	Glenside
Maryland-Delaware-D.C.	W3OMN	James W. John	29 Fawcett St.,	Kensington, Md.
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Western Pennsylvania	W3KWL	Ernest J. Hlinsky	509 Beechwood Ave.	Farrell
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Utah	W7SP	Leonard F. Zimmerman	House 4	Saltair
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West Indies (Cuba-P.R.-V.I.)	KP4DJ	William Werner	563 Ramon Llovet	Urb. Truman, Rio Piedras, P. R.
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New Mexico*	W5BIW	Richard J. Matthias	P. O. Box 548	State College
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ONTARIO DIVISION				
Ontario	VE3IA	G. Eric Farquhar	16 Emerald Crescent	Burlington, Ont.
QUEBEC DIVISION				
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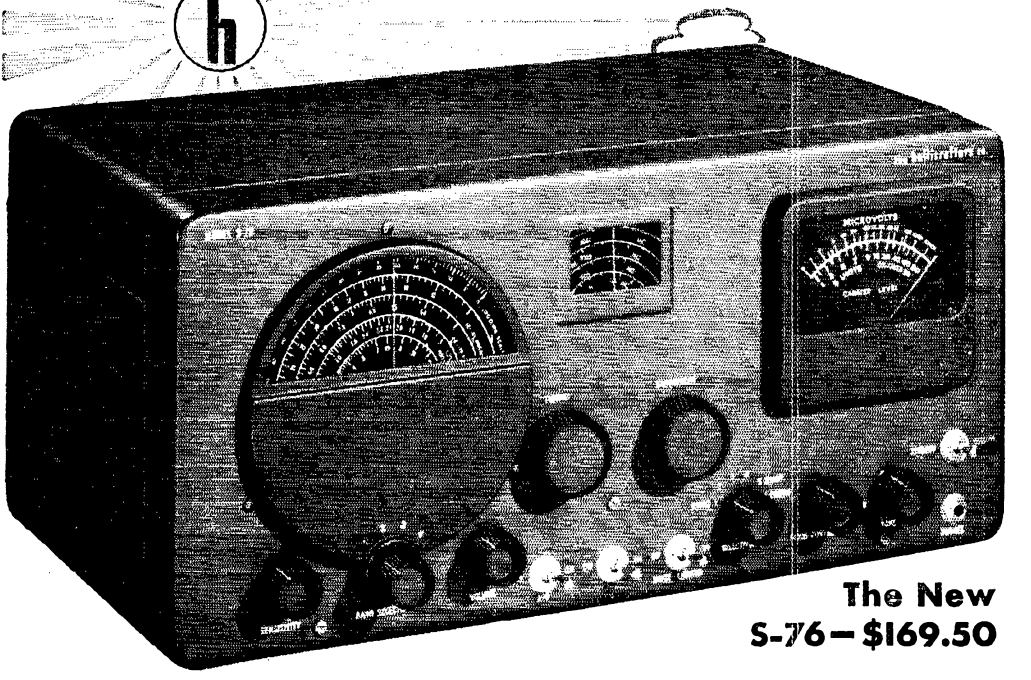
VANALTA DIVISION				
Alberta	VE6MJ	Sydney T. Jones	P. O. Box 373	Edmonton, Alta.
British Columbia	VE7FB	Ernest Savage	4553 West 12th Ave.	Vancouver
Yukon				
PRAIRIE DIVISION				
Manitoba	VE4AM	A. W. Morley	26 Lennox Ave.	St. Vital
Saskatchewan	VE5HR	Harold R. Horn	1044 King St.	Saskatoon

* Officials appointed to act temporarily in the absence of a regular official.

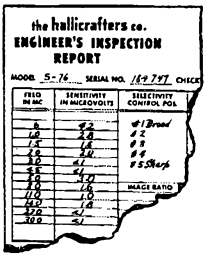
New Horizons of Ham Performance!



The New S-76 — $169.50

SENSITIVITY...SELECTIVITY never before combined!

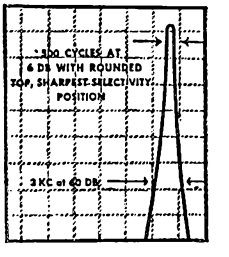
MAXIMUM Sensitivity!



2 microvolts average sensitivity with ½ watt output. One r-f, two i-f, and two conversion stages. 9 tubes plus regulator and rectifier.

PENCIL-THIN Selectivity!

500 cycle "nose" selectivity (6 db down) and 3 kc "skirt" selectivity (60 db down) with control in sharpest of five positions.



Also see the SX-71, double conversion receiver with NBFM; 11 tubes plus regulator and rectifier . . . $199.50

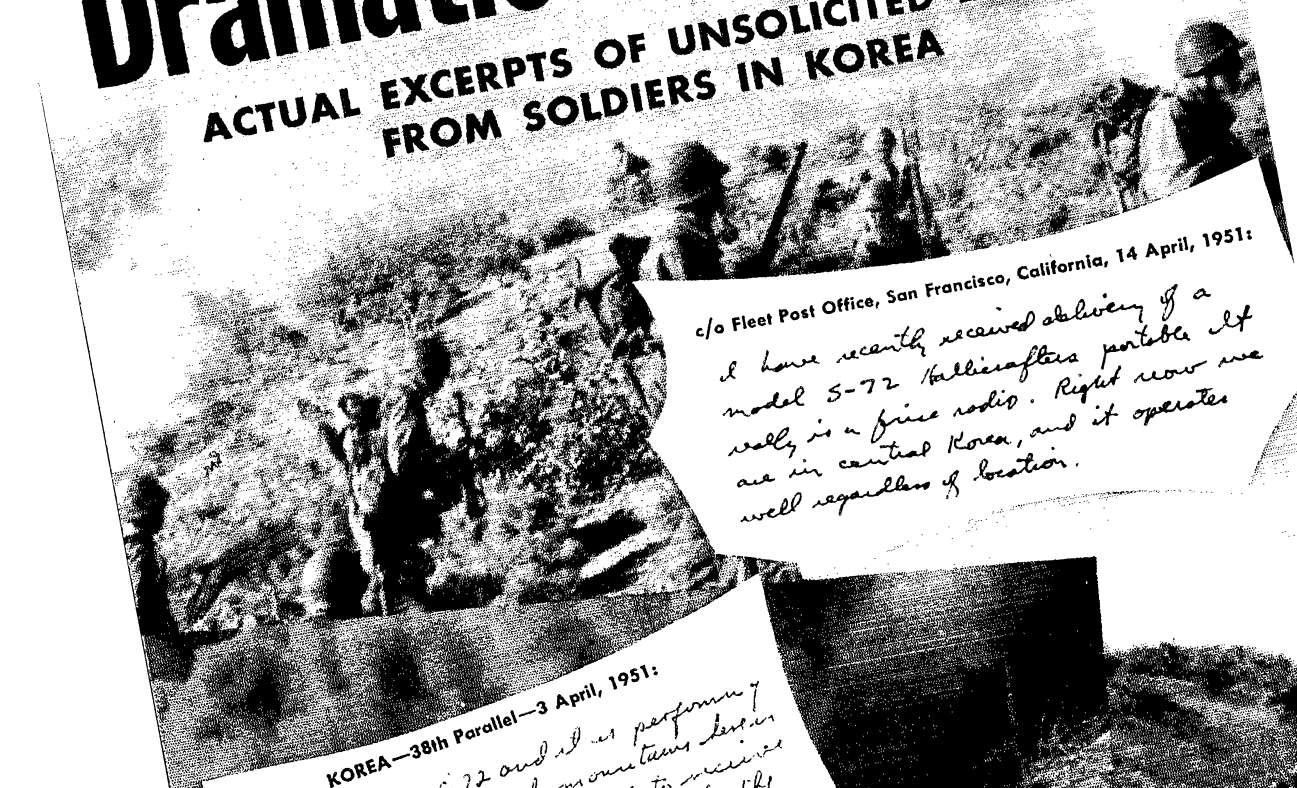
Watch for coming announcement of Hallicrafters Merit Award to the outstanding Novice-class Amateur of 1951.

hallicrafters
"The Radio Man's Radio"

WORLD'S LEADING MANUFACTURER OF PRECISION RADIO & TELEVISION • CHICAGO, ILL.

Dramatic Proof from

ACTUAL EXCERPTS OF UNSOLICITED LETTERS FROM SOLDIERS IN KOREA

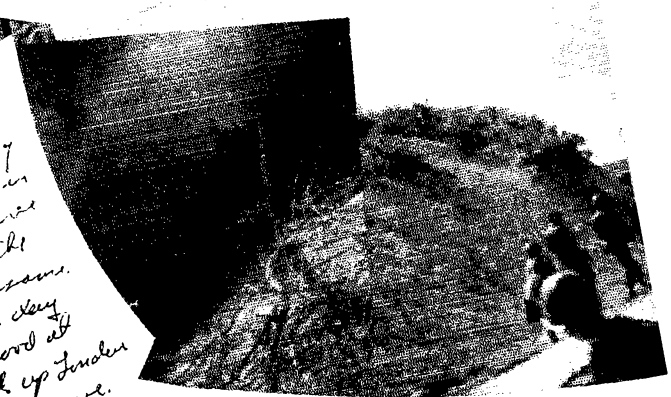


c/o Fleet Post Office, San Francisco, California, 14 April, 1951:

I have recently received delivery of a model S-72 Hallicrafters portable. It really is a fine radio. Right now we are in central Korea, and it operates well regardless of location.

KOREA—38th Parallel—3 April, 1951:

I received my S-72 and it is performing very well. Because of the mountains here in Korea, it is almost impossible to receive standard broadcasts from Japan during the daylight hours. However, I receive the same programs on short wave during the day and get standard broadcast very good at night. I have been able to pick up Tokyo and San Francisco almost on short wave.



AMIDONG, KOREA—22 March, 1951:

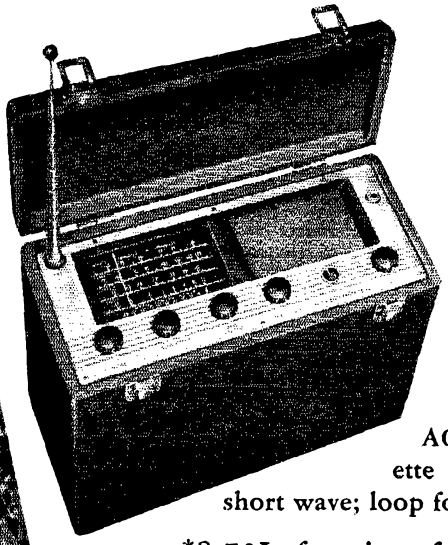
Hallicrafter S-72 radio has performed even better than I expected, and the addition of music makes the primitive life here a bit more bearable. We don't feel quite so isolated now that we can hear the news each day instead of waiting for the tardy newspapers several days later. The radio will pick up Japan easily on either the standard broadcast band or on short wave; and on the latter you can get Australia (even in the daytime), Manila, Honolulu and at night with an outside supplementary aerial, San Francisco.

KOREA!

hallicrafters S-72

LONG RANGE PORTABLE

the World's Most Powerful Portable!



Servicemen the world over are recording a new chapter in performance for Hallicrafters famous S-72. This 8-tube masterpiece of precision engineering features the widest frequency range of any portable made — with *continuous coverage* from 540 kc to 30 Mc.*

PRICE: $109.95 Less batteries. AC/DC or batteries; brown leatherette cabinet. 61-in. whip antenna for short wave; loop for long wave.

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It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors. The League is noncommercial and no one commercially engaged in the manufacture, sale or rental of radio apparatus is eligible to membership on its board.

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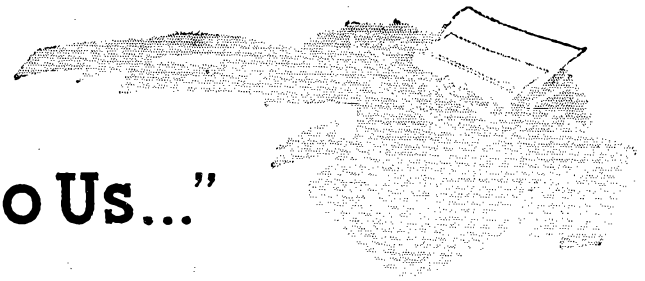


"It Seems to Us..."

VOICE PROCEDURES

Well, another Field Day has come and gone as we write this, and the usual post mortems are taking place on why we didn't do better and how we can boost our score for next year. Our own group made a break this year and operated 100% 'phone; we found it brought in a whole raft of new problems, most of which we had anticipated but some of which we hadn't. One thing that pleased us particularly was the extremely snappy voice operating we encountered — and it served to remind us of something we have noticed increasingly often in the last year or so: a distinct rise in the general level and efficiency of 'phone operating procedures.

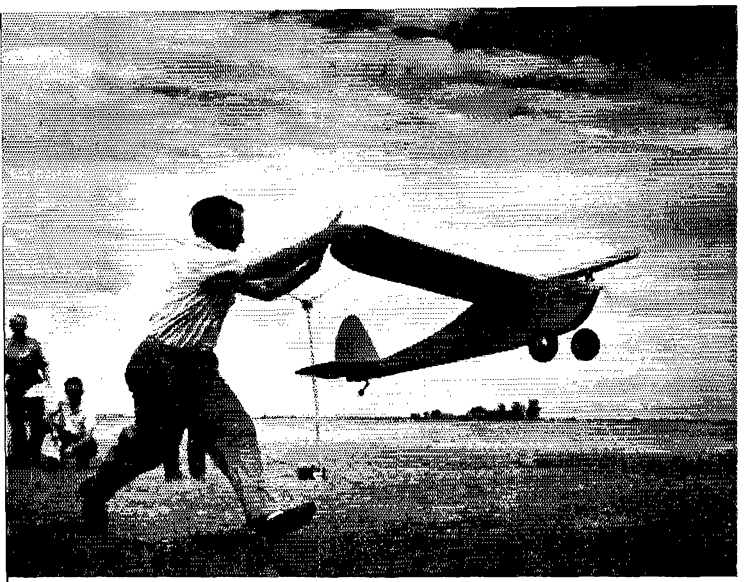
Particularly is this so in nets, which is where we are apt to spend a large part of our 'phone time. Time was, and not so long ago either, that a 'phone net was not only a pretty rare animal but was little if any more than a social roundtable. There were a few exceptions, of course, but for the most part procedure was pretty sloppy, net control informal or totally absent, and traffic, if handled at all, made a traffic man itch to reach for a key and really get things moving — except that 'phone nets too often couldn't take code! But, in our observation, all that has changed pretty generally in the nets, and changed a tremendous amount, too. We've been "net-hopping" quite a bit around the eastern United States this spring and summer — 'phone net-hopping — and it has been the rule rather than the exception that net controls know their stuff, handle their nets with despatch and efficiency, and really move traffic. It has been a source of the keenest pleasure to listen to net controls running quickly through the net roster (members get one call and one only), then putting groups of stations "up five" or "down ten," all with absence of fuss or stumbling. We like the way the directed stations proceed promptly to their temporary frequencies, handle their traffic expeditiously, and return to report back on the net frequency. But more than anything else, perhaps, has been the way these new-style nets take c.w. in their stride. In each of a number of nets we've either listened in on or reported into, there have regularly been c.w. stations reporting in; invariably, they've been handled just as efficiently as the 'phone stations, and they aren't doing any slow-speed operating, either. Maybe it is true, as is generally stated, that a lot of hams exclusively in the 'phone bands have pretty well forgotten their code, but the operators in these 'phone nets aren't among them. That's one group that won't be having any mental reservations over stating on their renewal application that they can still send and receive code at the speed they qualified for originally!

Don't misunderstand us: we're not opposed to fraternal ragchews and social roundtables on voice, in their place. We enjoy them ourselves. Our point is that now the active voice operator has learned how to be, and is when he finds it necessary or desirable in his activities, snappy, concise, efficient — a joy to listen to and work with.

As firm believers in giving credit where credit is due, we want to take this occasion to pass out some bouquets to the new-style 'phone nets heard on the bands today. We commend them to the fraternity as examples of much of the best in ham radio operation.

AUGUST ARMY MANEUVERS

On page 34 of this issue we detail once more the requests of the military for amateur cooperation in clearing 3700–3900 kc. in certain areas during the August 6th–September 7th period of extensive maneuvers centering in the Carolinas. There's a map, also, to help spell out just what is involved. We've been giving this subject a considerable amount of space because of the importance of bringing it to the attention of every amateur. It isn't only a matter of the courtesy of voluntary coöperation; it's good practical horse-sense on amateur radio's part, too. You may recall that in 1941 the military, faced with admittedly a more serious training problem but still quite similar in many respects, found it necessary to take official steps for the temporary transfer of part of our 80-meter band to armed-services operations. The national defense effort is of such vital importance that official action would probably have been taken in the present situation were it not for the faith which the military has in the ability of amateur radio to comply with a voluntary request. Let's show them that faith is not misplaced.



Walter Good launching "Big Guff" on a radio-controlled flight at the 1947 National Model Airplane Contest in Minneapolis. The ship had an 8-foot wingspan and weighed 8 pounds. This month's cover shows Bill Good putting the ship through its paces after this take-off.

Radio Control of Model Aircraft

A Review of the Most Successful Methods

BY WALTER A. GOOD,* W3NPS, AND WILLIAM E. GOOD,** W3LQE/2

THE radio control of the flight of model airplanes has been growing steadily since the days when the experimenters of the late 1930s started this new hobby. Even *QST*'s late Ross Hull and Clinton DeSoto, pioneers in radio control, would be surprised to lift one of today's midget radio control planes, which may have a wingspan of only three feet and carry a payload of seven ounces of radio gear. A prewar model with an eight-foot span and three pounds of radio gear was once considered small. Progress since the war has changed this situation, resulting in tiny rudder-controlled models and medium sized planes with multiple controls. The purpose of this article is to summarize the radio model control systems in popular use today.

The general arrangement of the radio gear within a typical model is shown in Fig. 1. The receiver and relay are vibration-mounted on rubber bands, the batteries are securely strapped to the floor of the cabin and the servo (rudder actuating device) is mounted near the tail. The single-cylinder engine is often the spark ignition type, although the "glow plug" type with its incandescent plug element (no spark coil and no batteries) and special fuel is fast becoming more popular. Signals from a low-powered ground transmitter are intercepted by the plane's receiver and actuate a sensitive relay and hence the rudder servo.

Most of the controlled flying has been done with rudder alone. In fact, all but two of the National Model Airplane Meets have been won by rudder control, even when competing against more elegant multicontrol ships. A well-tested rudder-control plane can be persuaded by a practiced pilot to perform an amazing number of maneuvers,[1] including loops and Immelmanns. Of course, glide-in spot landings within a few feet of a predetermined spot are a real test of the pilot's skill. Please don't infer from the above that multicontrol planes are out of the running. With reliability and a hot pilot, these ships will easily outperform the rudder-only ships. However, the latter still remain popular because of their simplicity and potential performance.

The bulk of the radio work is done within the 50-Mc. band, with a small amount on 11 meters and 465 Mc., the "citizen's band." The modelers view 11 meters, or the "diathermy band," with interest because of possible unrestricted use in the future for model control purposes. The Academy of Model Aeronautics is conducting flight tests on this frequency under an experi-

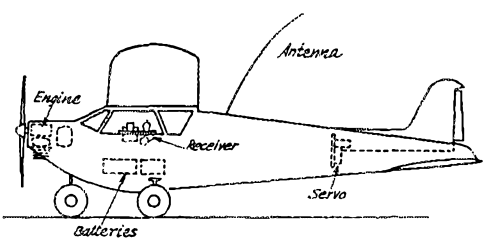


Fig. 1 — A typical modern radio-controlled model airplane uses a receiver and batteries under the wing, and a servo mechanism near the tail for rudder control. The most common servo is a rubber-powered escapement, but other systems are described in the text.

* 9802 Howard Ave., Bethesda, Md.
** Woodchuck Hill Road, Jamesville, N. Y.

[1] Good, "Radio Control Can Be Simple," *Model Airplane News*, March, 1948.

• Back in the late '30s *QST* carried a number of articles on the then-infant hobby of radio-controlled model aircraft, but we have had nothing since that time. Assuming that you might be interested to know what progress has been made and what the present techniques are, we asked the Good brothers to tell you, and they were kind enough to comply. This is one of two articles on the subject.

The Good brothers are eminently qualified to tell the story, since they were early pioneers in the work and have continued with it through the years. They won the National Championship in 1938, 1939, 1940, 1947 and 1949, and several of their designs have been widely copied in this country and in Europe.

mental license, KGX2DA, to determine the adequacy of the frequency. Flight results, thus far, are excellent. British modelers have been using this 27-Mc. frequency for successful model control since 1946, with no license requirements.

Principal Control Systems

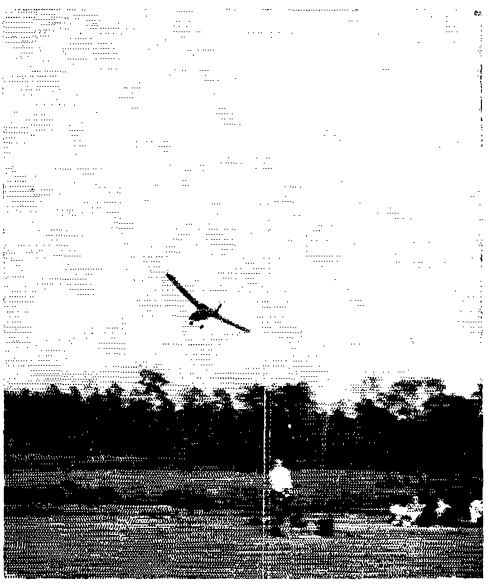
Due to the infancy of the radio control art, there is still considerable controversy whether "proportional control" (smoothly-variable rudder position following in proportion to the amount of stick movement) is superior to "full deflection" controls which give only fixed amounts of left and right along with a neutral position. Although at first thought the proportional control seems obviously better, the "fixed position" flyers make excellent showings in competition. Without attempting to settle this problem prematurely, both systems are presented below.

The escapement type of rudder servo is the most popular. It gives the three rudder positions for a servo weight of ½ to 1 ounce, and requires only a single-channel receiver and relay. The escapement may have a two- or four-spoked wheel driven by a wound-up rubber band. Tripping the escapement by means of a small electromagnet allows the spokes to advance carrying a crankpin around to move the rudder. A sequential series of rudder positions, such as left-neutral-right-neutral-left-neutral-right, etc., results from repeated signals of the transmitter. The signals, in this case, are simple carrier-on dashes, with no carrier between commands. The restriction of the sequence occasionally forces the pilot to go through an unwanted rudder position and, when rapidly done (less than one second), produces no perceptible change in the plane's course. Since the sequence problem is more mental than physical, the recent introduction of the "Beep Box" has eliminated the last vestiges of objection. The "Beep Box" is a simple motor-driven switch that automatically sends out the correct number of dashes called for by the position of the joy stick.[2] Hence, the pilot is relieved of the task of remembering which position comes next. A person who knows right from left can fly with a beep box without even knowing what kind of gadgetry is going on between him and the rudder.

H. Owbridge and R. Schumacher of Burbank, Calif., have had considerable success with an escapement-type control which they have called

[2] Good, "The Rudder Bug," *Model Airplane News*, June 1949.

The "Rudder Bug," a veteran of hundreds of radio-controlled flights and the 1949 National champion, is shown here with the transmitter and "Beep Box." Wingspan is 72 inches and flying weight 84 ounces. The power plant is a 0.29-cubic-inch displacement engine.



Bringing the "Rudder Bug" in for a precision landing requires good depth perception and a thorough knowledge of the ship's gliding characteristics. The tricycle landing gear is an acknowledgment that every landing cannot be perfect.

Gene Foxworthy of Indianapolis, Ind., the 1950 radio-control champion, with the "Citizen," a ship that features antistall wing slots and twin rudders. The radio gear operates in the 465-Mc. "citizen's band." Wingspan is 5 feet. The engine displacement is 0.19 cubic inch.

♦

the "Rudevator." It consists of a wind-driven rotating vane on the tail of the plane that has four possible "stop" positions: left rudder, up elevator, right rudder, and down elevator. The vane is stopped by the position of a rubber-powered escapement — when the signal is "off" the vane rotates freely, with no net effect on the direction of the aircraft.[3]

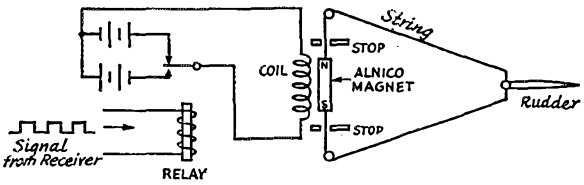


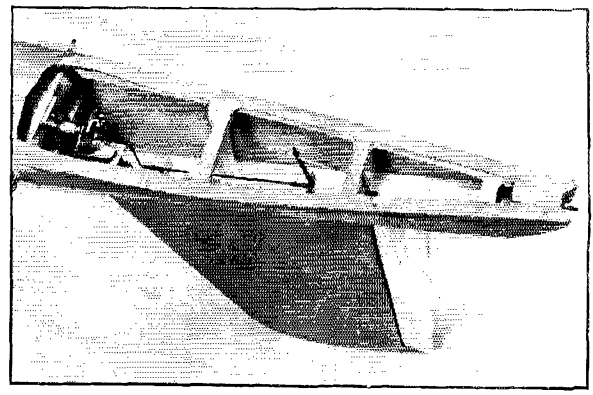
Fig. 2 — The basic "pulse width" control system of W5VS. When the relay is "off" the magnet is pulled in one direction, and when it is "on" the magnet is pulled in the other. Thus the rudder "wobbles" back and forth — if it spends equal time on both sides of neutral the ship flies straight. If it spends more time right or left, corresponding to more "on" or "off" time, the ship will turn.

Two systems have been used, one with a straight magnet as shown, and one with a rotating magnet. The latter requires a different type of linkage to the rudder.

Great effort has been expended in developing a proportional control rudder method, operating through a single-channel receiver. The simplest is that of George Trammell,[4] W5VS, although E. P. Johnson[5] and Jim Walker, W7JQQ, have made considerable contributions. Trammell uses two methods called "pulse width" and "pulse rate." The first requires a variation of the ratio of "on" time to "off" time without changing the average frequency, as shown in Fig. 2. The second varies the frequency without altering the "on" to "off" ratio. The simplest application uses small solenoids to pull full left rudder with "on" carrier and right rudder with "off" carrier. A neutral effect is gained by a rapid alternation of equal "on" and "off" signals. Three cycles per second is adequate. A slight left turn will result if the "on" dwell is longer than the "off." Or, further, it is seen that a smooth change from full left to full right may be brought about by slowly changing the relative "on" to "off" time during the rapid cycling. Automatic joy sticks are used for the production of the proper length signals. With the additional feature of "pulse rate" — that is, increasing the frequency to ten cycles per second without changing the "on"-"off" proportion — one can operate another control simultaneously with the first control. And all on a single-channel receiver! Trammell has successfully used this method for rudder and elevator control.

Many experimenters have mulled their brains trying to develop multicontrol systems without falling into the obvious trap of using separate r.f. channels for each operation. One of the most promising methods now in use is that of E. L. Rockwood,[6] W6BBJ. His system selects the proper control by means of five tuned reeds. The transmitter is amplitude-modulated with five separate audio tones from 200 to 400 cyles per second. Two tones give left and right rudder, two give up and down elevator, and the fifth tone gives two-speed engine and engine cut-off. The heart of the system is a tiny two-ounce reed selector made from a headset magnet and five 2-inch steel reeds. Each reed gives a buzzy contact and is followed by an *RC* filter and a sensitive relay. The relays control self-centering electric motors that move the control surfaces. Even

(*Continued on page 104*)



A close-up view of the escapement installation in the tail of the "Rudder Bug." The fuselage is just over 2 inches deep at the escapement, in case you think this gear is too bulky!

[3] Owbridge, "Meet the Rudevator," *Model Airplane News*, April, 1948.
[4] Trammell, "Pulse Rate Control," *Model Airplane News*, June, 1947.
[5] Johnson, "Simple Pulse Control," *Model Airplane News*, July, 1949.
[6] Rockwood, "Audio Tone Radio Control," *Model Airplane News*, August, 1949.

Seven Bands at Low Cost

30-Watt Bandswitching Exciter-Transmitter for 3.5 to 50 Mc.

BY C. VERNON CHAMBERS,* W1JEQ

THE transmitter to be described has a wide frequency range — 7 bands — and may be used as a low-powered transmitter or as the exciter for a high-powered final amplifier. It is extremely convenient to operate because it includes switching circuits for the crystals, the meter and the tuned tanks. Cost is kept to a minimum by employing only 3 r.f. stages and by using low-cost high-gain tubes. These tubes list for less than $2.00 each. Provision is made for the connection of an external VFO and a modulator. Grid drive for the final amplifier may be accurately adjusted by means of an excitation control and the power supply is built-in. An auxiliary power plug permits the transmitter to be operated from an external supply for Field Day or other portable purposes. Shielding that is neat in appearance and inexpensive and adequate for TVI purposes is obtained quite simply by housing the circuits in a pair of aluminum chassis.

Circuits

Type 5763 tubes are used in the three r.f. circuits as shown in Fig. 1. The oscillator is designed to work straight through with either 3.5-, 7- or 8-Mc. crystals. S_1, the crystal switch, has one set of contacts reserved for the leads which connect to the VFO jack, J_1. Selection of an appropriate plate coil, L_1 or L_2, is made by means of S_2. C_4 is the plate-tuning capacitor and J_2 is the keying jack.

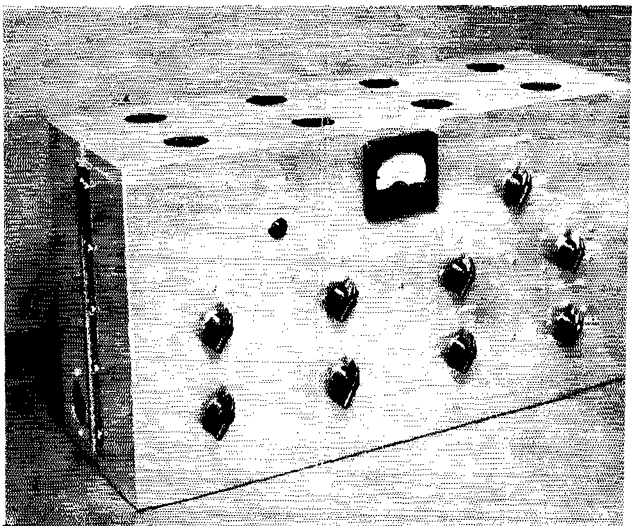
Capacity coupling is used between the oscillator and the buffer-multiplier tube. The plate circuit for this second stage consists of capacitor C_8, switch S_3 and inductors L_3 through L_7. Part of the operating bias for the 5763 is developed across the grid resistor, R_3, with the remainder obtained from a 45-volt B battery. The values of the excitation control, R_5, and the series resistor, R_6, allow screen voltage for the driver tube to be varied from 250 volts downward. C_{10} is the coupling capacitor between the driver and the final amplifier.

The tubes for the amplifier are connected in parallel, operate with 30 watts input and work into a commercial bandswitching assembly that is tuned by C_{14}. S_4 is the plate-circuit bandswitch with sections A, B and C connected to inductors L_8 through L_{12}. Sections D and E of S_4 are connected between the output coupling links and the coaxial connector, J_3. C_{15} is a padder capacitor connected across the 3.5-Mc. plate coil to extend the tuning range of the circuit down to the low edge of the band. If a 125-$\mu\mu$fd.-per-section tuning capacitor is available, it will not be necessary to use the fixed padder. The amplifier is neutralized by means of a homemade capacitor, C_{12}, and bias for the tubes is supplied by the grid-resistor (R_8) and B-battery combination. It will be noticed that the bias battery is common to both the driver and the amplifier stages.

Switch S_5 allows the d.c. milliammeter to be tapped across any one of the 5 metering resistors, R_2, R_4, R_7, R_9 and R_{11}. R_{11}, having a resistance of only 1 ohm, also serves as a shunt to extend the useful range of the 0–50 ma. meter by a factor of 3.

The power supply is unconventional only to the extent that it uses television replacement-type filter chokes. The inductance of these chokes is lower than customarily used for this application but it is adequate for the job and the price is right — approximately $1.00 each. The power supply is wired with the output leads connected to pins Nos. 1 and 6 of the auxiliary power plug, J_4. Jumper connections between Pins 1 and 2 and 5 and 6, respectively, complete the circuit be-

* Technical Assistant, *QST*.



Front view of the bandswitching exciter-transmitter. Aluminum chassis which serve as the cabinet are fastened together by a length of piano hinge.

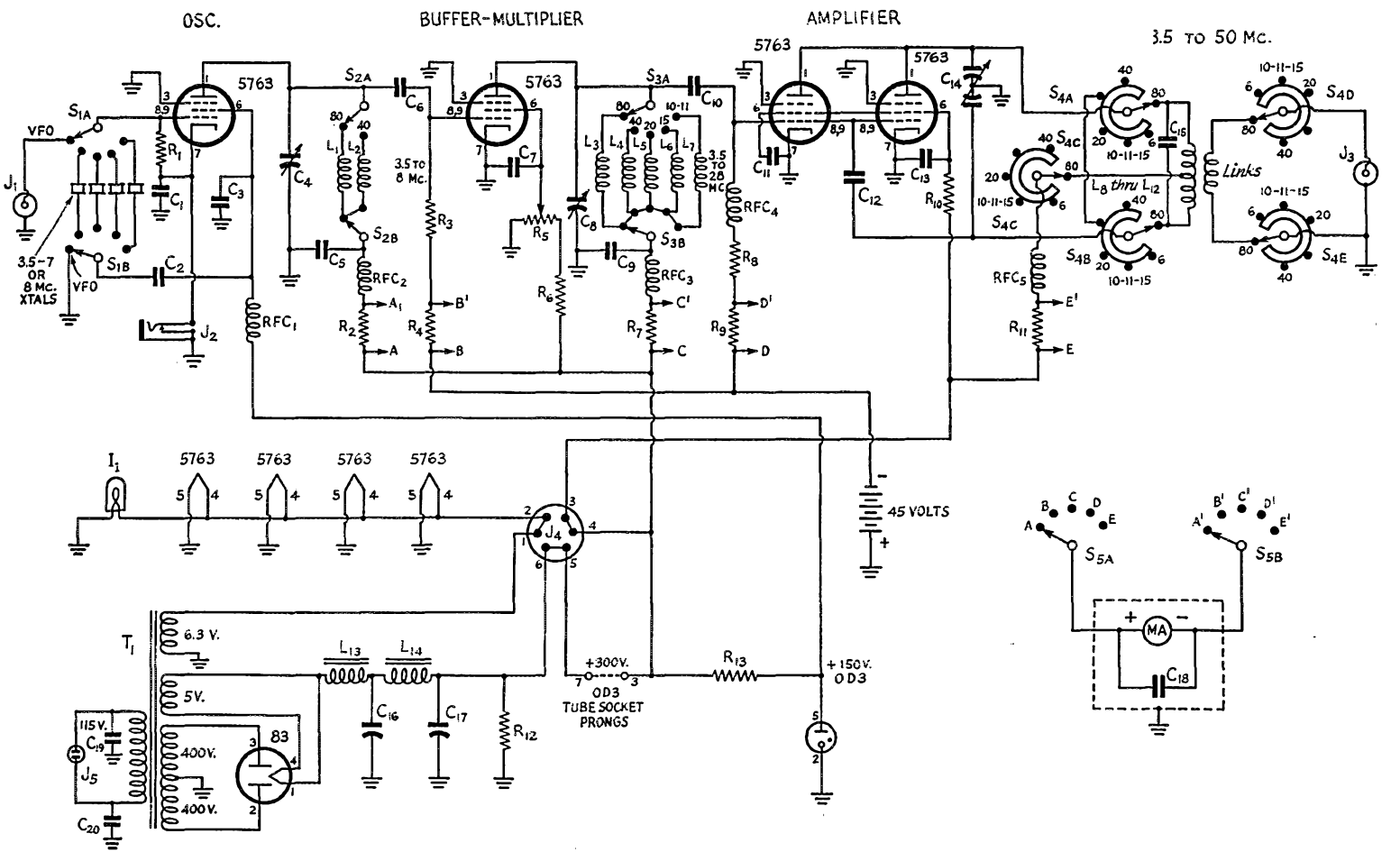

OSC.
BUFFER-MULTIPLIER
AMPLIFIER
3.5 TO 50 Mc.
5763
VFO
3.5-7 OR 8 Mc. XTALS
3.5 TO 8 Mc.
10-11-15
Links
45 VOLTS
6.3 V.
5V.
115V.
400V.
400V.
83
+300V.
OD3 TUBE SOCKET PRONGS
+150V.
OD3
MA

Fig. 1 — Wiring diagram of the bandswitching rig.
C_1, C_5, C_7, C_9, C_{11}, C_{13} — 0.01-μfd. disc-type ceramic.
C_2, C_{18}, C_{19}, C_{20} — 0.001-μfd. disc-type ceramic.
C_3 — 220-μμfd. mica.
C_4, C_8 — 100-μμfd. variable (Millen 20100).
C_6, C_{10} — 100-μμfd. mica.
C_{12} — Neutralizing capacitor (see text).
C_{14} — 100-μμfd.-per-section variable (Millen 24100).
C_{15} — 22-μμfd. mica.
C_{16}, C_{17} — 8-μfd. 600-volt electrolytic (Cornell-Dubilier KR608).
R_1, R_4, R_7, R_9 — 1 megohm, ½ watt.
R_2 — 100 ohms, ½ watt.
R_3 — 22,000 ohms, ½ watt.
R_5 — 20,000-ohm 4-watt potentiometer (Mallory A20MP).
R_6 — 2700 ohms, 2 watts.
R_8 — 2700 ohms, ½ watt.
R_{10} — 5600 ohms, 1 watt.
R_{11} — 1 ohm, ½ watt (see text).
R_{12} — 50,000 ohms, 10 watts.
R_{13} — 25,000 ohms, 10 watts.
L_1 through L_{12} — See coil table.
L_{13}, L_{14} — 1.5-hy. 200-ma. filter chokes (Merit C-2994).
I_1 — 6.3-volt pilot lamp.
J_1, J_3 — Coaxial-cable connector (Cinch-Jones S-101-D).
J_2 — Closed-circuit 'phone jack.
J_4 — 6-prong male plug (Amphenol 86-RCP6).
J_5 — 115-volt a.c. connector (Amphenol 61-M1).
MA — 0–50 d.c. milliammeter (Triplett 227-T).
RFC_1–RFC_5 — 2.5 mh. (Millen 34102).
S_1 — 2-section ceramic selector switch, points per section optional (Centralab 2511 or 2513).
S_{2A}, S_{3A} — 11-position ceramic selector switch (Centralab Y Section).
S_{2B}, S_{3B} — 11-position phenolic selector switch (Centralab J Section).
S_4 — Part of Barker & Williamson turret No. 3809.
S_5 — 2-pole 5-position phenolic selector switch (Centralab 1405).
T_1 — Receiver replacement transformer, 400 volts each side c.t., 200 ma.; 5 volts, 3 amp.; 6.3 volts, 5 amp. (Merit P-2955).

tween the supply and the transmitter proper. Pins 3 and 4 of J_4 provide terminals to which a modulator may be connected and these pins are shorted out otherwise. The jumper connections referred to are actually made across the terminals of a 6-prong female connector which plugs into J_4 when the a.c. supply is in use. A second female connector, minus the jumpers, should be used to connect an external supply for portable operation. In this case, the heater and the plate-supply leads of the supply are fed to Pins 2 and 5 of J_4.

A Type 0D3 tube provides a regulated source of voltage for the screen grid of the oscillator tube. The high-voltage wiring between J_4 and the r.f. circuits is arranged to make use of the internal jumper between Pins 3 and 7 of the 0D3. With the tube removed from its socket the power supply can be serviced or tested without applying plate voltage to the r.f. section.

COIL CHART

Coil	*FM c.*	*Lmh.*	*Wire*	*Turns*	*Diam., In.*	*Length, In.*	*B & W Type No.*
L_1, L_3	3.5	17.7	24	48	¾	1½	3012
L_2, L_4	7	5.8	24	19	¾	19/32	3012
L_5	14	2.1	20	13	¾	13/16	3011
L_6	21	1.02	20	9	⅝	9/16	3007
L_7	27–28	0.575	20	7	⅝	⅞	3006
L_8	3.5	32.5	26	60	¾	1 5/16	——
L_9	7	11.8	24	36	¾	1¼	——
L_{10}	14	3.1	24	24	½	1⅛	——
L_{11}	21–27–28	1.32	20	14	½	⅞	——
L_{12}	50	0.8	20	10	½	¾	——

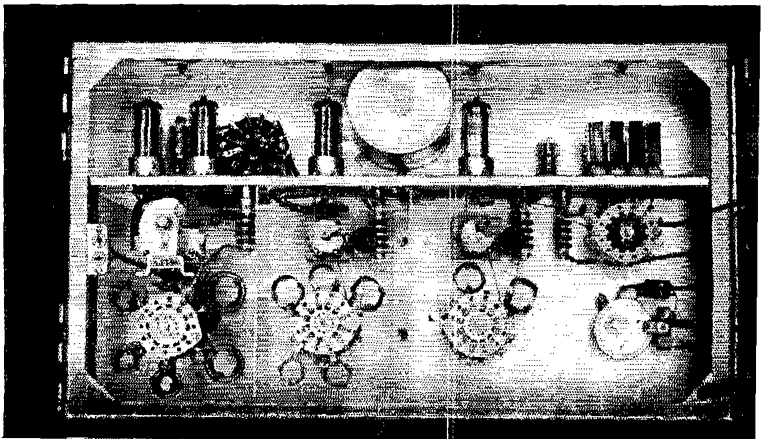
NOTE: L_8 through L_{12} are parts of B & W turret No. 3809. Links for L_8 through L_{12} are each 2 turns No. 20 wire wound around center of main coils.

Construction of the R.F. Unit

The photographs show how two E. F. Johnson type 195–371 10 × 17 × 3-inch aluminum chassis have been hinged together to form a cabinet for the transmitter. The front view shows the operating controls. The excitation control is at the lower left-hand corner directly below the crystal switch. Bandswitch controls for the oscillator, the driver and the amplifier extend in that order on a line to the right of the excitation potentiometer and the variable tuning capacitors are located above their associated coil assemblies. The vertical spacing between controls is 2½ inches and the horizontal spacing is 4 inches. The meter switch and the pilot light which flank the milliammeter are each centered 2½ inches down from the top of the case.

An inside view of the transmitter shows the r.f. components mounted in the front half of the cabinet and the power supply equipment mounted in the rear section. The 1/16-inch aluminum deck which supports the r.f. tubes and the crystal sockets is 2⅞ inches wide, 16⅞ inches long, has a ½-inch lip for fastening to the front panel and a ¼-inch lip at the rear. The deck is positioned 6⅜ inches above the bottom of the case.

A close-up view of the r.f. section shows the bandswitching circuits separated by aluminum



R.f. side of the 7-band transmitter. Power wiring enters this unit at the lower right-hand corner of the chassis.

partitions which measure 2⅞ by 6⅜ inches. One of the shields is located 4¾ inches in from the left end of the chassis and the second shield is 4 inches farther to the right. Both shields have ½-inch lips at the front and the top edges to permit bolting to the panel and the tube platform. A National type TPB bushing is mounted at the top of each partition to allow connections to be made between the grid and the plate circuits. The milliammeter is enclosed in a Millen type 80017 meter shield.

TEST CHART

Xtal.	*Osc.*	*Driver*			*Amplifier*		
Mc.	I_p, *Ma.*	I_g, *Ma.*	I_p, *Ma.*	*Mc.*	I_g, *Ma.*	I_p, *Ma.*	*Mc.*
3.5	10	3.5	6	3.5	7	100	3.5
"	"	"	7.5	7	"	"	7
"	"	"	11	14	"	"	14
7	"	"	4	7	"	"	7
"	"	"	8	14	"	"	14
"	"	"	10	21	"	"	21
"	"	"	18	27/28	"	"	27/28
8.33	"	"	"	50	9	"	50

The layout of the final amplifier is the only constructional feature of the r.f. section that requires additional description. The sockets for the tubes are spaced 1½ inches on centers. A TPB bushing to the front of the tubes permits a through-the-deck connection between the grid r.f. choke (mounted on top) and the grid prongs of the tube sockets. A piece of No. 14 wire with one end connected to the bushing runs over to and then parallel with a second length of No. 14 which has one end connected to the rear stator terminal of C_{14}. Both wires are covered with spaghetti and overlap each other for a length of approximately ⅞ inch so as to form the neutralizing capacitor, C_{12}. A crystal socket mounted on a small bracket to the rear of the amplifier compartment is connected to S_{4D} and S_{4E} by a short length of 75-ohm Twin-Lead. The interior view of the transmitter shows a second length of Twin-Lead terminated with a Millen type 37412 plug; this lead completes the connection between the crystal socket just mentioned and the output jack, J_3, located in the rear half of the unit.

The Bandswitching Assemblies

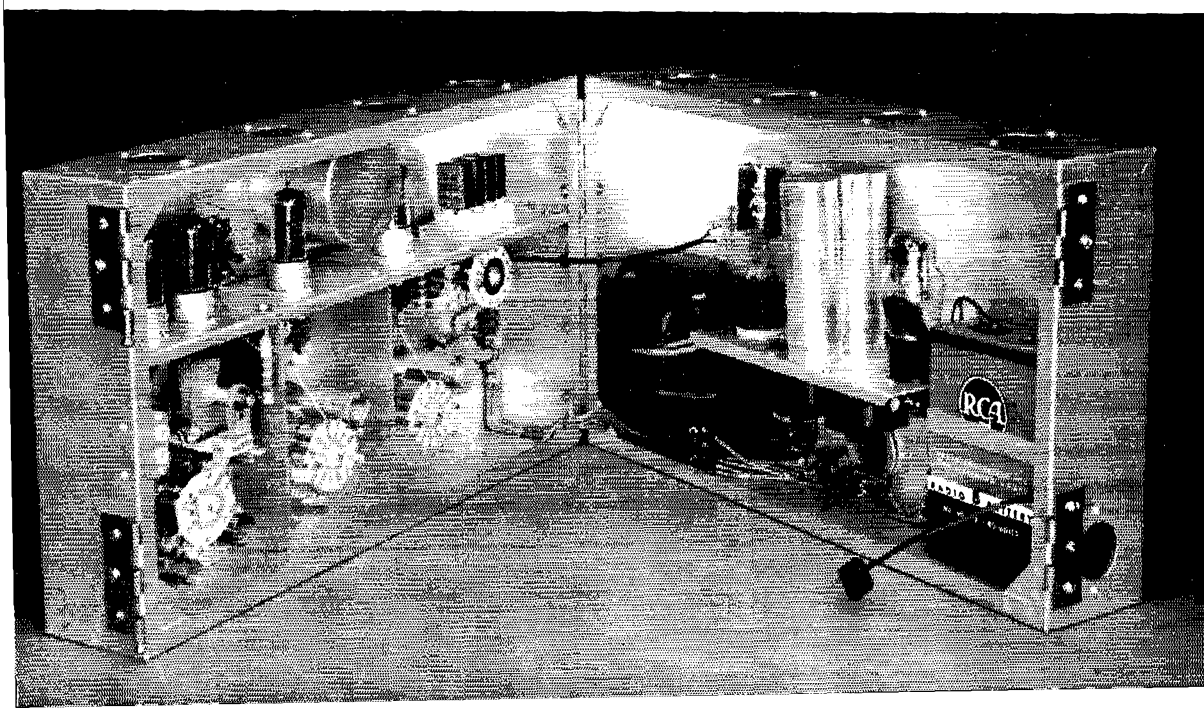
The turrets for the first two stages are homemade affairs. Centralab type P-122 index assemblies are used to mount the 2 sections of each switch. Each switch has a steatite wafer and a phenolic wafer separated on the index by 1¾ inches. The phenolic sections (used at the cold ends of the circuits) have all of the stator contacts joined together and alternate contacts of the steatite sections are used for making connection to the plate coils. (Incidentally, the B & W type BTM turret probably could be trimmed to suit the requirements of the first two r.f. circuits.)

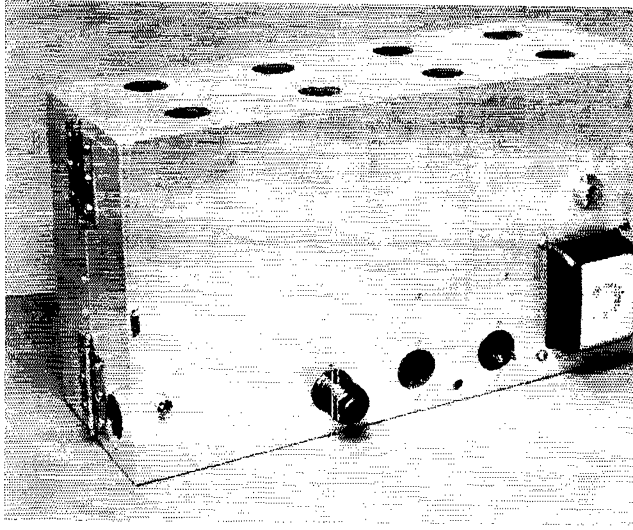
The final amplifier plate turret (B & W type 3809) may be difficult to duplicate at home because of the high-inductance 3.5-Mc. coil, which must be wound with fine wire if physical dimensions are to be kept small. Furthermore, there are mechanical problems involved in mounting and switching the output links. Then, too, the manufacturer has used switch sections unlike any listed in standard catalogues. However, if duplication is attempted it is suggested that Centralab type GG sections be used for S_{4A} and S_{4B} and that Type G wafers be used for sections *C*, *D* and *E*.

Power Supply Unit

The interior view of the transmitter shows the power transformer, T_1, mounted at the lower left-hand corner of the rear chassis. An aluminum deck, 2⅞ inches wide by 7½ inches long, is bolted

An interior view of the 30-watt transmitter, showing the r.f. section at the left and the power-supply compartment at the right.





A rear view of the bandswitching transmitter.

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to the rear wall of the chassis and provides a mounting surface for the filter capacitors. Resistors R_{12} and R_{13} are mounted on the 0D3 tube socket below deck. The bias battery, located at the right end of the chassis, is held against the rear wall by a light aluminum clamp. A length of 75-ohm Twin-Lead may be seen running between the VFO contacts of the crystal switch (in the r.f. section) and the VFO jack, J_1, which is mounted in the rear compartment just above T_1.

A rear view of the transmitter shows the r.f. output jack, the auxiliary power plug, the keying jack, the 115-volt connector and the power transformer all in a line across the rear wall of the cabinet. This view shows the two sections of the transmitter held firmly together by the door hinges that are used as locking devices and also shows the numerous ventilation holes which are backed up with copper screening.

All wiring of the transmitter, except that carrying r.f., is done with shielded wire. With TVI always waiting to cause trouble, it is worth while to heed the adage about an ounce of prevention.

Testing

The power supply should be tested with the 0D3 removed from the circuit, with a d.c. voltmeter connected between pin No. 7 of the regulator-tube socket and ground with 115 volts a.c. connected to J_5. Under these conditions, the supply output should be approximately 500 volts.

The r.f. section is prepared for testing by plugging in the crystals and the keying leads, rotating the excitation control to the zero-voltage position and by returning the 0D3 to its socket. With the key open and the power turned on, the meter should indicate no current as the meter switch is rotated through the five positions. Current will flow in the final amplifier if the circuit oscillates because of incomplete neutralization. Complete neutralization is accomplished by varying the spacing between the two wires which form capacitor C_{12}.

The accompanying test chart lists the pertinent operational data for the transmitter. The chart shows the output frequencies that may be obtained with 3.5-, 7- and 8-Mc. crystals and also lists values of grid and plate current that may be expected. Although the final amplifier may be used as a doubler at frequencies between 7 and 28 Mc., it is *necessary* to use the stage as a doubler only when output is desired at 50 Mc. Fortunately — thanks to the 5763 — the circuit does perform efficiently as a v.h.f. doubler.

When tuning the transmitter, the excitation control should be left at the zero-voltage setting until the key has been closed and the oscillator has been tuned to resonance. With excitation present, the excitation control should be advanced until the buffer-multiplier plate current reaches 5 or 6 ma. and, after this adjustment, the plate circuit of the buffer-multiplier should be tuned to resonance.

The final amplifier will start drawing plate current as soon as grid current is indicated by the meter, and therefore the amplifier plate circuit should be resonated immediately after the driver stage has been adjusted. The grid current should be adjusted to 7 ma., by means of the excitation control, when the amplifier is fully loaded to 100 ma. A plate current of 100 ma. will be represented by a meter reading of approximately 33 ma. because of the 1-ohm shunt, R_{11}.

It will be noticed that the test chart lists a grid current of 9 ma. when the amplifier is doubling to 50 Mc. The slight increase in bias caused by the increase in grid current does allow the stage to perform more efficiently as a doubler but it also represents a mode of operation which exceeds the tube ratings. If considerable operation of the transmitter at 50 Mc. is contemplated, it would be advisable to employ an additional 12,000 ohms of grid leak resistance along with a grid current of 2 ma. The extra grid-leak resistance could be cut out of the circuit by means of a toggle switch whenever the unit is switched to one of the low-frequency bands.

TVI tests of the transmitter involved use of a television receiver, located alongside of the transmitter and tuned to Channel 6. The output of the transmitter was fed through coaxial cable to an unshielded antenna coupler which was in turn loaded by a 25-watt lamp bulb. With this set-up, the transmitter caused no TVI when operated at the low ends of the 3.5-, 7- and 14-Mc. bands. TVI which occurred with the transmitter tuned to 21 Mc. was eliminated by connecting a simple low-pass filter in the output line. In order to clean up interference caused when operating at the low end of the 28-Mc. band, it was necessary to use the filter and to separate the transmitter and the receiver by a distance of approximately 5 feet. Incidentally, these tests were made in a

(*Continued on page 104*)

THE hottest news this month is from W6-land. First off, we have a note from **W6WB** with the good news that Martin, **JA2MB** is now on 20 with a phasing rig built by **VE7VP**, followed by a pair of 304TLs in the final. So there it is, a *big* s.s.b. signal from Asia and another continent toward that two-way s.s.b. WAC. But adds that JA2MB has been using the s.s.b. regularly on his 'phone-patch traffic — it works out fine, with no selective fade.

The other "first" is the QSO between **W6UOC/6** and **W1JEO/6**, which **W6KNH** tells us about. "What's so hot about a six working a six?" you ask. Oh, nothing, except that both of these stations were 75-meter *mobile* s.s.b. stations, operating about 350 miles apart, between Sun Valley and Monterey. Both rigs were crystal-filter jobs, with 250 watts peak to a modified ARC-5 at W6UOC, and 80 watts to a pair of 1624s at W1JEO. As an indication of the territory that was covered during the QSO, the following s.s.b. stations were all QRX and reading the mail: **W6BAY, W6GGM, W6KNH, W6PYH, W6VSF, W6WI, W7CAL, W7HPE,** and **WØDW.**

In the east, **W2AZW** tells us that **W2EWL** on 75 s.s.b. has worked 20-meter VKs crossband, which is mighty good DX for a 75-meter signal, you must admit.

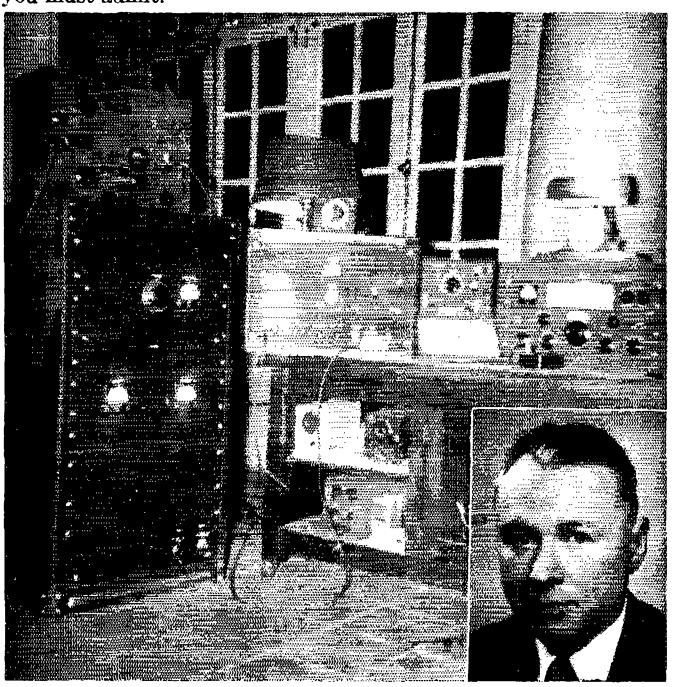
You remember Captain Hoffman, who did a lot of good 10-meter s.s.b. work from W5NRP a few years back? The reason you haven't heard him lately is that the Army has been keeping him busy. Right now he is a Major, signing SVØWP in Salonika. Here's hoping he will be able to get back on s.s.b. from over there in Greece.

G3CU and **G3FHL** continue to keep us posted on 75-meter s.s.b. activity in Europe. Most of them have been reported here earlier, although ON4CC is a new one you might hear as soon as he finishes his linear amplifier. G3CU may do a s.s.b. column for the *R.S.G.B. Bulletin*, which should help out the cause in Europe quite a bit. Here's hoping the plans go through.

Sandy, **W9UNS**, of Marshall, Ind., was finally lured away from 50 Mc. by the W1JEO crystal-filter job, and now uses one to drive an AB_2 829-B at 150 watts on 75. Occasionally, a pair of 811s are tacked on. Sandy had a little trouble adjusting the filter, and he credits **W9PHV** and WSFSA with several assists on the play. Everything is fine now, and "I think s.s.b. is the biggest advance made in ham radio since the superhet receiver was introduced. New hams are coming on s.s.b. every week, and I think that eventually the prejudice against s.s.b. held by so many a.m. hams will disappear. I would like to see a simple receiver adapter described so we can have receiving results comparable to those achieved by the YRS-1."

W8ZQH is a new s.s.b. station on 160, and Vic's rig is a phasing job that ends up with 100 watts peak to a pair of 814s. Usual operating frequency is 1820 kc. Early experiments with 4 watts peak to a 6L6 resulted in several QSOs

(*Continued on page 106*)



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This is Bob McCague, W3KPP, of Sewickley, Pa., and his s.s.b. station. The exciter is built around a WØMNN filter unit and ends up with an 807 that drives the four 811As in the final to 700 watts on peaks. Voice control is used, of course, and carrier insertion is available. The receiver is a 75-A, with either b.f.o. or BC-221 carrier reinsertion.

W3KPP is one of the landmarks on the 75-meter band, and he has helped the cause along considerably with the frequently revised lists of active 75-meter s.s.b. stations that he distributes.

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Radiological Monitoring

PART III—Instrumentation: The Ionization Chamber

BY STEPHEN S. FRIEDLAND,* W5PKI

IT was explained in Part II of this article (June *QST*) that for checking radiation after an A-bomb blast an instrument that will respond to the intensity of radiation, rather than the number of particles, is necessary. Such an instrument is the ionization chamber, the construction of which is considerably more critical than that of a Geiger counter. The operating principles, however, are quite simple. This third and concluding part of the article describes the operation and construction of an ionization-chamber instrument.

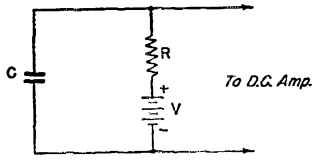


Fig. 1 — Ionization in the chamber, *C* (actually a condenser of low capacitance), causes a pulse of current to flow through *R*. The voltage developed across *R* can be amplified to give an indication proportional to the radiation intensity.

The ionization chamber is a condenser which has a source of voltage (*V*, Fig. 1) in series with a resistor, *R*, connected across it. The condenser may be placed in a vacuum-tight chamber, evacuated and then filled with a gas, such as argon, to some desired pressure; or it may be just left open to air and utilize the air as its gas. For civilian defense purposes, the latter method is suitable. When ionizing radiation passes between the plates of the chamber the number of ions formed will be proportional to the level of radiation. The positive ions will be attracted to the negative electrode and the negative electrons will be attracted to the positive electrode. A current will then flow through the resistor, *R*. The voltage drop across *R* is therefore a measure of the radiation level.

So much is straightforward. However, the magnitude of the current in *R* ranges from 10^{-15} to 10^{-11} amperes. Thus, if we want a millivolt signal across *R* the magnitude of *R* will have to be 10^{10} ohms or 10,000 megohms. Such hi-meg. resistors are made, and the source of supply is indicated elsewhere in this article. The resistor, however, places a severe qualification on the first tube to be used as an amplifier. Since the cathode-to-grid resistance of most tubes is much less than 10^{10} ohms, the ordinary tube will essentially act as a shunt for the hi-meg. resistor and the benefits of using the hi-meg. resistor will be lost. Also, if internal grid currents are high they can completely obscure the magnitude of the current being measured. Several specially made tubes have been developed for this purpose. Over ten years ago the General Electric Company developed their FP-54 and the Western Electric Company their D96475. Such tubes are found in most laboratories today but their physical size excludes them for use in a portable instrument. More recently, the Victoreen Company and the Raytheon Company have developed miniature electrometer tubes that are suitable.

Circuit and Construction Details[1]

One of the simplest but most useful circuits for an ionization chamber instrument is shown in basic form in Fig. 2. The operation of the circuit is as follows:

Together with the three resistors connected to the microammeter, the plate-cathode circuit of the electrometer tube forms a bridge with the plate-voltage source connected to one pair of terminals and the microammeter connected across the other. For a given value of plate current, the current through the meter can be balanced out by adjustment of the 0.25-megohm variable resistor. Thus, the meter will always read "up" when the grid of the tube is made more positive, as it will be when ionization in the chamber causes a voltage drop across the hi-meg. resistor. The balancing adjustment is made by taking a trial setting of the grid-bias or "zero" control and then endeavoring to balance out the current through the meter by means of the 250,000-ohm resistor in the plate circuit. If complete

This radiation detector is built in two sections, one containing the meter, controls, and batteries, and the other the ionization chamber, electrometer tube, and range switch. The latter assembly is in a plug-in shield can.

* Assistant Professor of Physics, The University of Connecticut, Storrs, Conn.

[1] The writer wishes to acknowledge the assistance of Mr. Frank Bramley of the Radio Division of the Connecticut State Police for his assistance in this section of the paper.

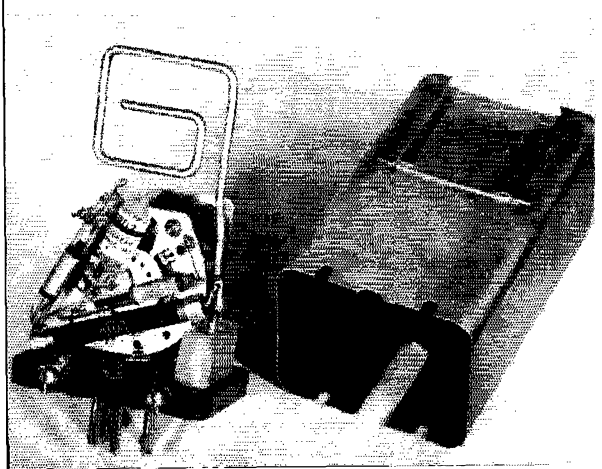
balance cannot be obtained, try other settings of the grid-bias control. Once satisfactory balance has been secured, the 250,000-ohm resistor need not be touched, the "zero" control being used for maintaining balance as batteries age.

The grid bias is adjusted by means of a potentiometer in series with the plate battery, a switch being provided so the grid of the tube can be connected directly to the bias source for zero adjustment under operating conditions. The zero setting will vary somewhat with the condition of the batteries.

The voltage applied between the tube cathode and the ionization chamber is the sum of the two battery voltages, or 90 volts.

A practical circuit arrangement is given in Fig. 3, and the photographs show the construction of an instrument using this circuit. All sensitive parts of the circuit requiring high insulation values are enclosed in the aluminum can projecting from the front of the case. The can is a National PB-10-5 assembly, a 5-prong base and shield, and contains the ionization chamber, electrometer tube, range switch, and the grid resistors. The size of the chamber and the collector probe within it determine the sensitivity. The chamber dimensions are 4 by 2 by 2⅜ inches and the probe is made of No. 10 tinned busbar bent in the form of a square approximately 1½ inches on a side. One side is extended to 3 inches and forms the mounting. The extended side is threaded and screws into a piece of carefully prepared pure polystyrene to insulate it from the base of the can, and when finished the probe resembles a flag mounted on a staff. The polystyrene insulator is cut from a piece of ⅜-inch stock and measures overall about ¾ by ⅜ by ½ inch. It is drilled and tapped twice on the long dimension to fasten it to the base, and once on the opposite side to insert the chamber probe.

The preparation of this insulator is one of the most important parts of the construction of the instrument. Pure polystyrene only should be used, because it is the only insulator having a volume resistivity of 10^{18} ohms per cubic centimeter. All other common materials — except possibly shellac, which is unsuitable mechanically — have appreciably lower resistivity. Some grades of bakelite have a resistivity which is not greater than that of the grid leak to be used and so would be wholly unsuitable. Hold the polystyrene in a vise to saw out the insulator, and allow the piece to



Construction of the ionization chamber and d.c. amplifier. As emphasized in the text, extreme care must be used to prevent leakage across insulation in this section of the instrument. This photograph shows how a window may be fitted for allowing low-energy radiation to enter the chamber.

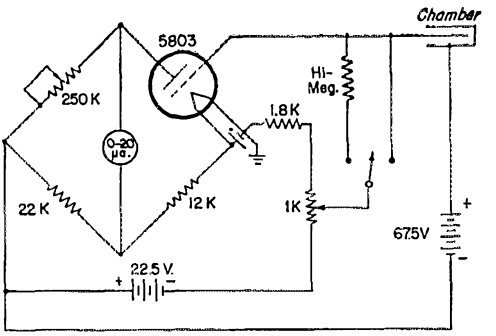
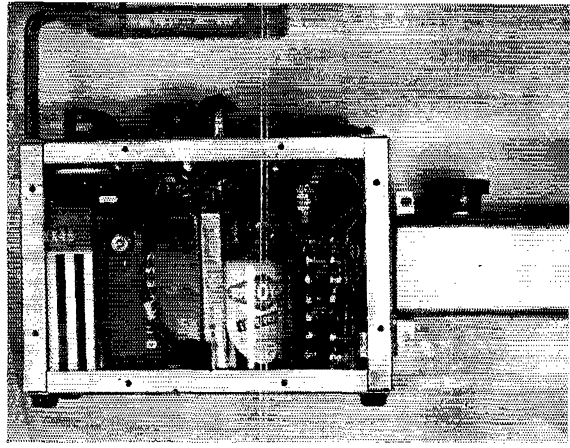


Fig. 2 — Basic circuit of the ionization-chamber radiation detector. It is essentially a d.c. amplifier added to the circuit of Fig. 1, with provision for balancing out the steady plate current in the meter circuit.

fall on clean paper, from which it may be picked up by placing the thumb and forefinger on diagonally opposite corners. It is held this way while being smoothed with a clean file and the holes drilled and tapped. When finished, it should have a polished surface. The easiest way to obtain such a surface is to paint the insulator with thin liquid polystyrene after it is completely installed in the chamber. This will, in part, obliterate any chance contamination that has occurred and give a smooth surface. Do not touch it thereafter.

The probe occupies only one-half of the can area, and the switch, tube and resistors are in the other half near the bottom. The switch is a steatite-insulated five-position single-deck unit of a type available from several companies. Insulation values can be increased by purchasing a ten-position switch and using only every other contact. If this is done the unused contacts should be carefully drilled out to increase the leakage paths. Be very careful not to contaminate the insulation with finger grease; hold the switch only by its metal parts. Unglazed insulators are particularly susceptible to contamination and a switch having a glazed insulation is much to be preferred.

The tube is mounted on its leads, using the insulation of the switch deck to hold miniature lugs to which the tube leads are soldered. There will be several spare holes on the unused side of the switch deck that can be used for this purpose. A piece of wire that fits snugly through the switch deck hole is bent to form an eyelet on both sides. The tube leads are soldered to the top side and leads to other parts of the circuit are soldered to the bottom side. Great care must be taken that no soldering flux is allowed to contaminate the insulation. Carelessness in this respect will result in failure of the chamber to operate. Although some success in cleaning contaminated insulation may be had by using absolute ethyl alcohol, no other cleaning agent must ever be considered,



Inside the battery box. The construction of this part of the instrument has no critical features.

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and there is no assurance of success with alcohol. "Grain alcohol," available in most liquor stores, is absolute ethyl alcohol.[2] A sling formed of a piece of soft insulated wire serves to suspend the Victoreen 5803 Electrometer tube below the switch in sort of a shock mounting.

The instrument may be provided with one to five ranges, depending upon individual needs and requirements. In the unit shown, the most sensitive range uses a 100,000-megohm grid resistor (10^{11} ohms) and has a full-scale reading on this range of 160 milliroentgens per hour. Two less sensitive scales are provided, in ratios of 10, so that the maximum reading is 16 roentgens per hour. Decreasing the grid resistor by a factor of ten increases the full-scale reading by the same factor. Values of 100,000 megohms, 10,000 megohms, 1000 megohms, and 100 megohms are standard values and not difficult to obtain. Plus or minus 10 per cent values are used; 1 per cent values will be found quite expensive and are probably not justified.

[2] Ceramic switch parts (or other unglazed ceramic insulators) should not be cleaned with any type of solvent, since solvents destroy the impregnating material that prevents moisture absorption.

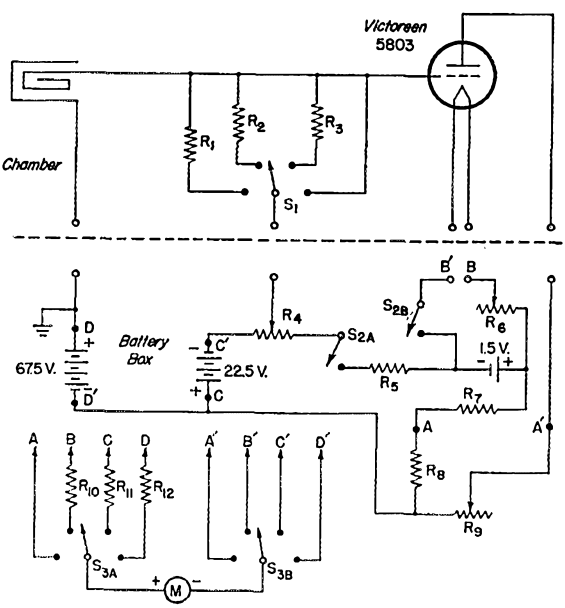


Fig. 3 — Circuit diagram of the practical instrument shown in the photographs. The microammeter is also used as a voltmeter to check battery condition, and with the resistor values given will indicate approximately full scale with fresh "B" batteries. "B" batteries should be replaced when voltage drops to 80 per cent of original value. The rated filament voltage for the 5803 tube is 1.25 volts, and R_{10} is selected so this voltage represents full scale on the meter.

R_1 — 100,000 megohms.
R_2 — 10,000 megohms.
R_3 — 1000 megohms.
R_4 — 1000-ohm potentiometer.
R_5 — 1800 ohms, ½ watt.
R_6 — 30-ohm rheostat.
R_7 — 12,000 ohms, ½ watt.
R_8 — 22,000 ohms, ½ watt.
R_9 — 0.25-megohm variable.
R_{10} — 62,500 ohms.
R_{11} — 1.15 megohms.
R_{12} — 3.375 megohms.
M — 0–20 microamp. d.c. meter.
S_1 — 1-pole 4-position ceramic wafer (see text).
S_2 — D.p.s.t. toggle (mounted on R_4).
S_3 — 2-pole 4-position wafer switch.

The three grid resistors are mounted directly on the switch alongside the tube. The fourth switch position shorts the chamber so that zero may be set in the presence of radiation. The leads emerging from the chamber are all low-potential low-impedance leads and no unusual care is required in their installation. They are: filament plus and minus, plate, the switch common, and ground.

The absolute sensitivity of the instrument will depend upon the construction of the chamber, but if the instructions are followed a sensitivity close to that specified will be obtained. Resistors larger than 100,000 megohms can be used, but there will be increasing difficulty due to leakages through insulation and possibly grid current in the tube; also, changes in the capacity of the chamber due to accidental changes in its mechanical configuration cause larger gyrations of the meter. The time constant also increases proportionately when extremely high resistance is used, and long periods are required for the meter to settle down to zero or to the measured value.

For simplicity of battery mounting, most commercial instruments prefer to have one side of the filament batteries grounded, but for home construction it seems preferable to ground the can of the ionization chamber so that it can be connected solidly to the case for the rest of the instrument. This method of wiring does not affect the operation of the instrument.

The success of the instrument, in respect to sensitivity and reliability, will in large part be dependent upon the quality of the insulators. They must be of the best

(*Continued on page 106*)

A First Receiver for the Novice

A Low-Cost Two-Tuber Featuring Simplicity and Performance

BY RICHARD L. BALDWIN,* W1IKE

• This little two-tube receiver is every bit as good as those which were used by amateurs for years and years and with which much excellent work was done. Naturally, we don't pretend that this regenerative receiver can compete with the modern superhets, but it is perfectly usable and easy to build. Anyone starting off with this unit will gain valuable experience in radio construction and will have a receiver which will prove more than satisfactory as a first project.

THIS two-tube receiver is designed for use by the Novice on the 80-meter band. It covers the whole band, not just the Novice frequencies of 3700–3750 kc. While it would have been nice for a Novice receiver to have the Novice frequencies spread out over the whole dial, we are sure that most Novices will want to hear what goes on in the rest of the amateur band. Also, ARRL is planning to sponsor some activities which will have the Novice licensee communicating with amateur stations in other parts of the 80-meter band. This receiver was designed for a maximum of performance and minimum of constructional difficulty.

If this is the first receiver you have built, and if you are brand new in amateur radio, some of the schematic symbols may seem a bit strange to you. Quite possibly you know some amateur around town who will be glad to explain the shorthand notation of radio schematic drawings to you. If not, and if you have difficulty in understanding them without further explanation, we suggest you refer to *The Radio Amateur's Handbook* and to *How To Become a Radio Amateur*, both published by ARRL.

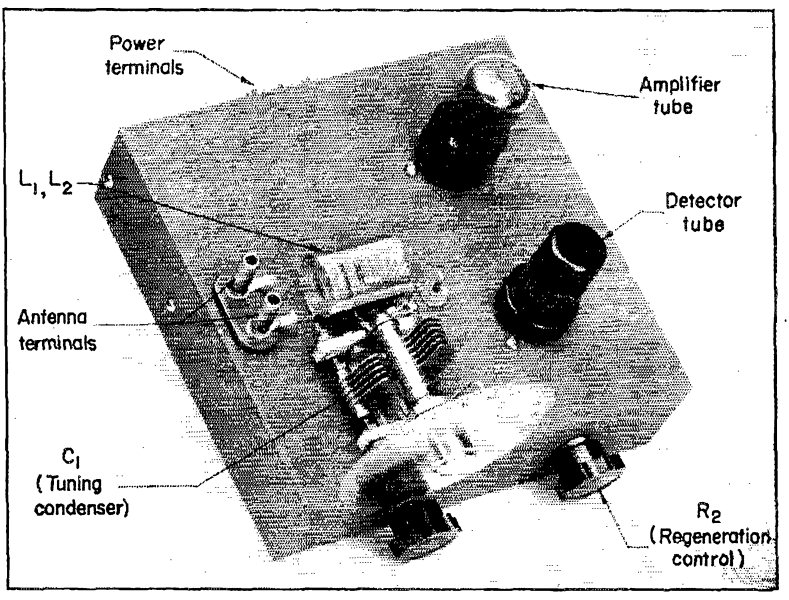
In order to build the receiver it is necessary to possess, or have access to, a modest collection of tools. Most any ham will have these, and so it may not be necessary for you to purchase them immediately. However, if you are to continue in ham radio, you will find that there is a certain minimum of tools that is essential. For this job you will need long-nose pliers, diagonal sidecutters, screwdriver with ¼-inch blade, drills (No. 28 and ⅜-inch), 1⅛-inch socket punch, and a soldering iron.

It would be possible to build this receiver on a wooden base and, in fact, the first model was so constructed. But in the end, the steel chassis was better. The slightly more difficult construction is more than offset by the better performance and reduction of hum. No panel is needed, as the large metal dial effectively reduces most of the so-called "hand capacity" between you and the receiver.

Layout

The chassis is laid out as shown in the photographs. The positioning of parts is by no means critical, and a half inch one way or the other in

* Assistant Secretary, ARRL.



Top view of the receiver, with the cathode tap visible on the coil. The two machine screws along the left-hand side of the chassis are the ones that hold L_2 in place.

the mounting of the tube sockets and tuning condenser is not going to make much difference. The chassis is of steel, 7 inches square and 2 inches deep. The tuning condenser (C_1) is mounted 2 inches in from the left-hand edge and back far enough from the front edge so that the tuning dial will fit on the rotor shaft. A template comes with the dial, which will tell you how to place the vernier knob. The length of wire fastened to the rotor bushing and bent over the top of the dial is merely to aid in tuning. The 6SJ7 detector tube socket is mounted 2 inches from the front of the chassis and 2 inches from the right-hand edge, while the socket for the 6SN7GT audio amplifier is 3 inches to the rear of the detector tube. The regeneration control R_2 is mounted on the front edge of the chassis, 2 inches from the right-hand side. On the back edge of the chassis are located the two pin jacks for the headphone connections and the terminal strip with the three connections for plate and heater power.

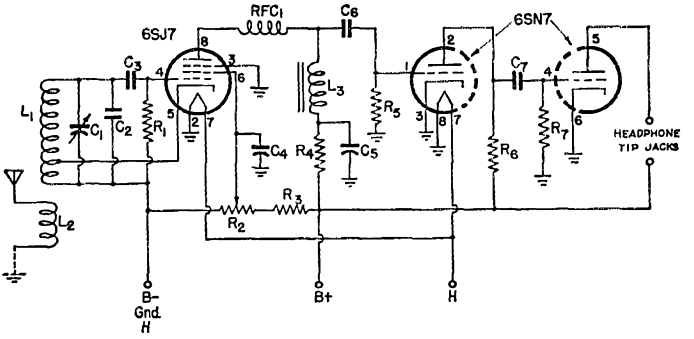


Fig. 1 — Schematic diagram of the Novice receiver.

Construction

The first step in construction is to mark and drill the necessary holes in the chassis. We have already mentioned the location of most of the components, but don't overlook the two feed-through bushings which are located just to the right of the coils L_1, L_2. It would be entirely possible merely to drill holes there and use rubber grommets, but the use of those little feed-throughs makes for a more mechanically-secure arrangement.

Not plainly shown in the photographs are two so-called tie points. These serve as anchors for components which have long leads, and assist in avoiding a sloppy wiring job. One of the tie points is located between transformer L_3 and the terminal strip to which the power leads are connected. It is fastened in place by means of the bolt which holds one end of the terminal strip. To this tie point are anchored L_3, R_4 and C_5. The other tie point is a double unit (it has two lugs to which leads may be anchored, with no electrical connection between the two) and is located right between RFC_1 and C_6. One end each of RFC_1, L_3 and C_6 are tied to one of the lugs, while to the other lug are tied R_3 and a lead which runs over to the B-plus post on the terminal strip. Here when we say "tied" we mean "soldered." Soldering lugs are fastened underneath the nuts and bolts which hold the tube sockets in place, these soldering lugs being used to make ground connections at various points in the circuit.

After having completed all the mechanical work, and with the major components mounted, you can begin the wiring. Be careful to do a good soldering job, as one improperly soldered joint might spoil the performance of your receiver. If you haven't had any soldering experience, you might read up on it in the *Handbook*.

Start the wiring with the heater circuit. As you can see from the circuit diagram of Fig. 1, a lead runs from the heater post on the terminal strip to Pin 7 on each tube. This completes one side of the heater circuit. To complete the other side it is only necessary to ground Pin 8 on the 6SN7 tube and Pin 2 on the 6SJ7 tube. Then wire up the other connections, and in this particular receiver it is convenient to start from the output end and work toward the front. In this way you won't have to make the coil and mount it until the very last, and so there will be less chance of damaging it during the course of construction.

Run a lead from the B-plus post on the terminal strip to the nearest 'phone tip jack. (Incidentally, when you mount the tip jacks, be *very*

Parts List

C_1 — 50 $\mu\mu$fd. (National ST-50).
C_2 — 100-$\mu\mu$fd. silver mica.
C_3 — 100-$\mu\mu$fd. mica.
C_4 — 0.1-μfd. 400-volt paper.
C_5 — 16-μfd. 450-volt electrolytic.
C_6 — 0.01-μfd. 400-volt paper.
C_7 — 0.01-μfd. 400-volt paper.
R_1 — 2.7 megohms, ½ watt.
R_2 — 50,000-ohm variable.
R_3 — 47,000 ohms, 1 watt.
R_4 — 1800 ohms, 1 watt.
R_5 — 0.22 megohm, ½ watt.
R_6 — 47,000 ohms, 1 watt.
R_7 — 0.22 megohm, ½ watt.
L_1 — 26 turns, tapped 5 turns from grounded end (see text).
L_2 — 8 turns (see text).
L_3 — Audio transformer (Stancor A-53).
RFC_1 — 2.5-mh. r.f. choke (National R-100).
Chassis, 7 by 7 by 2 inches.
2 bakelite octal tube sockets.
2 feed-through bushings (National TPB).
Antenna terminal strip (National FWH).
Power terminal strip (Millen 37303).
Tuning dial (National Type K).
Knob for regeneration control.
2 'phone tip jacks.
1 B & W Miniductor No. 3016.
1 6SJ7.
1 6SN7.
2 tie points.
Misc. 6-32 bolts and nuts.
Misc. soldering lugs.
Hook-up wire.

sure that none of the metal of the jack touches the metal of the chassis. If you would rather use a 'phone jack in place of these tip jacks, go right ahead — but again be mighty sure that the metal of the jack does not touch the metal of the chassis. Otherwise, there would be a dead short circuit across the power supply.) A lead from the other tip jack runs over to Pin 5 of the 6SN7. Pins 3 and 6 of the 6SN7 are grounded by short lengths of wire to one of the soldering lugs mentioned previously. C_7 is connected between Pins 2 and 4 of the 6SN7, while R_6 runs from Pin 2 to the B-plus post on the terminal strip and R_7 goes from Pin 4 to ground (the chassis). When you come to hook up the electrolytic condenser, C_5, be careful to observe the polarity printed on the condenser case. The negative side must be connected to ground, or else the condenser will be ruined.

The wiring of the whole set is continued as outlined above, and the only places that may confuse you are where the diagram shows one wire connected to another midway between two components. This diagrammatic representation is merely for the sake of convenience. Actually, in the case of C_4, for example, one end should be connected to ground (a soldering lug) and the other end may be connected either to Pin 6 of the 6SJ7 or to the center arm of the regeneration control R_2. In other words, the wire from C_4 need not actually be connected to the midpoint of the wire from Pin 6 to R_2.

The audio coupling choke, L_3, is an audio transformer with the windings in series. Almost any audio transformer may be used. If signals don't seem very loud at first, try interchanging the various leads from the transformer. It'll probably work okay with "B plus" (red lead) and "Ground" (black lead) tied together and the connections to the rest of the circuit made to "Plate" (blue lead) and "Grid" (green lead).

We have previously mentioned the two feed-through bushings. To one of these, the one to the left as you look at the bottom of the chassis from the rear, should be connected one end of C_2 and one end of C_3. Up on top of the chassis a connection from this feed-through runs to the stator (fixed plates) of C_1. Underneath the chassis again, to the other feed-through is connected a lead from Pin 5 of the 6SJ7, and up on top a connection runs to the cathode tap of the coil (see the parts list for coil specifications). The cathode tap is quite simply made by depressing (with a small screwdriver or penknife) the turns either side of the one that is to be tapped. This leaves plenty of room to attach the lead and solder it.

This pretty well covers all the "difficult" phases of the wiring, with the exception of the construction of the coils L_1 and L_2. These are made from a single B & W Miniductor No. 3016. L_2 is the antenna coil, and L_1 is the coil which when resonated with C_2 and C_1 establishes the frequency to which the receiver is tuned. L_2 consists of 8 turns, while L_1 has 26 turns. There are various factors, however, which might affect the frequency range covered by the coil. Not all condensers are exactly the same capacity, and the antenna will have some effect. So, it might be well to make L_1 with about 28 turns and then make any necessary adjustment afterwards. Starting with the Miniductor just as it leaves the factory, unwrap one turn so that you will have a lead to solder to the antenna terminal. Then count up nine turns and cut the wire. This is easily done by depressing the two turns either side of the turn you wish to cut and then using the sidecutters. This will be the upper end of L_2, and you should then peel back one turn for the other lead.

Progressing now to L_1, take the end that is next to L_2 and peel off one turn, giving you a lead which will be connected to the rotor (movable) plates of the tuning condenser C_1. Then count up 27 turns (29, if you want some leeway), cut the wire, and peel back one turn. When you go to make the cathode tap, count up five turns from the end which is next to the antenna coil L_2 and then depress the two adjacent turns as mentioned previously. The four insulating strips on which the coil is wound may be cut by using a sharp jackknife which has a thin blade.

Notice in the schematic diagram that one connection to the antenna coil L_2 is shown dotted to ground. If you use a single random length of wire for an antenna, wire up the antenna coil with that ground connection made internally as shown. If you use some sort of an antenna that has, for instance, 300-ohm Twin-Lead, then don't make that ground connection — just connect the feed line right across the antenna coil.

When all the wiring is finished, check it over carefully. We receive numerous letters from beginners, and one of the most common troubles is that certain parts are not properly insulated from the chassis. In this particular receiver you need not worry about the tuning condenser — it is supposed to be mounted directly on the chassis. But let us caution you again about the 'phone tip jacks.

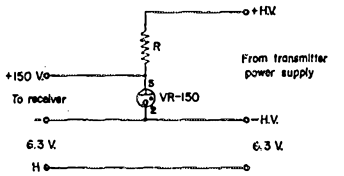
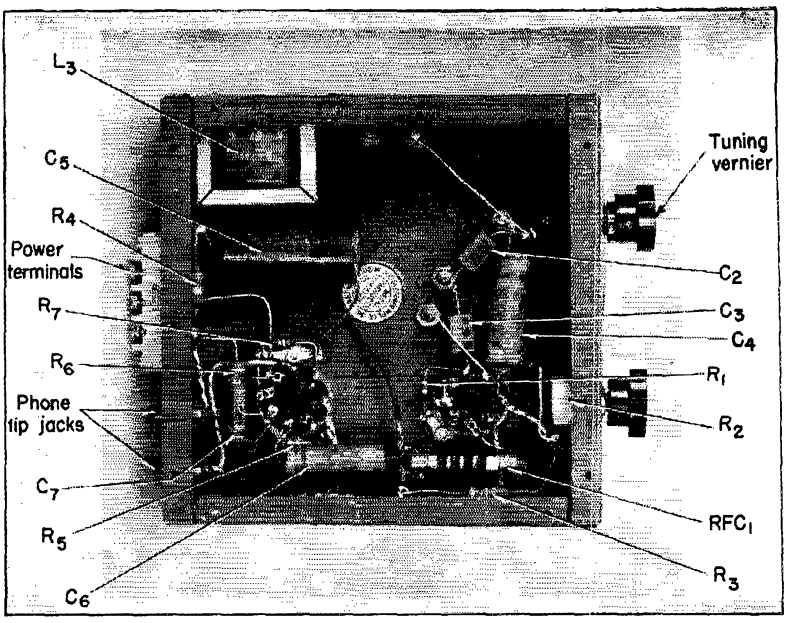


Fig. 2 — Schematic diagram of power supply connections.

With the wiring carefully checked, you are ready to connect the power and see what you can hear. This receiver is designed for use with a power supply of about 150 volts. It can be used with the power supply described on page 32 of the June issue of *QST* by means of a resistor and voltage regulator tube connected as shown in Fig. 2. The resistor R should be a ten-watt unit of 5000 ohms resistance. It is also possible to use a single 45-volt "B" battery instead of the 150-volt supply. The only change necessary will be to short out resistor R_3. In other words, run a wire directly from R_2 to the B-plus terminal. The only difference in operation is that the signals are not quite as loud.



Bottom view of the Novice receiver, with all under-chassis components identified. The placement of parts is not critical, but the general layout should be followed.

Using the Receiver

The best time to first listen on this receiver is in the evening hours, for then there are more and louder signals on the 80-meter band. With power applied, you should hear a rushing noise in the headphones, and as the regeneration control is turned clockwise, there should be one point where a slight "plop" occurs. This is the point of regeneration, and the sensitivity of the receiver is greatest at that point. With the receiver operating in this condition, manipulation of the tuning knob should enable you to hear many c.w. stations. With the tuning condenser C_1 set at minimum capacity (the plates unmeshed) you should be able to hear the carriers of 'phone stations in the 75-meter 'phone band. In order to hear what they are saying, turn the regeneration control counterclockwise until oscillation just barely ceases. You will find that the signals come in with quite respectable volume if the antenna is 50 to 100 feet long.

If you have followed all the directions carefully, you should have no trouble with the construction or operation of this receiver. You'll get a lot of enjoyment out of building this little gadget, and it won't be long before you'll be eager to try your hand at some other construction project!

Strays

"Tricks of fate" department:

Marcella Ann Hennager is W6*LAD*.

Colonel J. G. Bishop, jr., USMC, is W4*PFC*.

W7*DIE* is employed by an *undertaker*.

— *W4IA & W7OVO*

—···—

The Radio Club of America has announced the availability of a limited number of copies of the illustrated 80-page souvenir booklet published in conjunction with the dedication of the 1BCG monument (see page 20, Dec., 1950, *QST*). Entitled "The Story of the First Trans-Atlantic Short-Wave Message," the special issue contains much historical material either unavailable elsewhere or difficult to come by after 30 years. Copies are $1.00 each and may be obtained from The Radio Club of America, Inc., 11 West 42nd St., New York 18, N. Y.

A notable bit of QRP work came to light recently with the issuance of a WAS certificate to Edwin F. Laker, W3TM. Using approximately 7.5 watts plate input on the 7-Mc. band, it took Ed slightly less than ten months to work all states and scare up the forty-eight confirming pasteboards.

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United States and Canadian hams visiting in G-land during the Festival of Britain are invited to attend the exhibition sponsored by the Dolwick and New Cross Group of RSGB in coöperation with the South London Engineering Society. The exhibit will be on display from August 26th to September 15th at the School of Arts and Crafts, Borough of Camberwell, S.E. 5, and will feature microwave and single-sideband gear. Tours of local hamshacks will be arranged for visiting amateurs.

Ten-Meter Mobile with Remotely-Tuned VFO

A 25-Watt Rig with Many Novel Ideas

BY EDMUND C. HARRINGTON,* W1JEL

In the fall of 1950, I decided to go mobile on 10 meters. The original reasons are now buried under months of planning, building, rebuilding, bonding, by-passing, filtering, plain and fancy cussin', and just downright pleasant operating. Although the harsh words didn't contribute materially to the final product, they did provide an outlet without which I'm sure I would have been driven to drink! As is so often the case in looking back, the time consumed shouldn't have been so great. Actually, the planning and building of the haywire sample, working the model into a satisfactory unit, assembling and installing the finished job in the car took but three weeks.

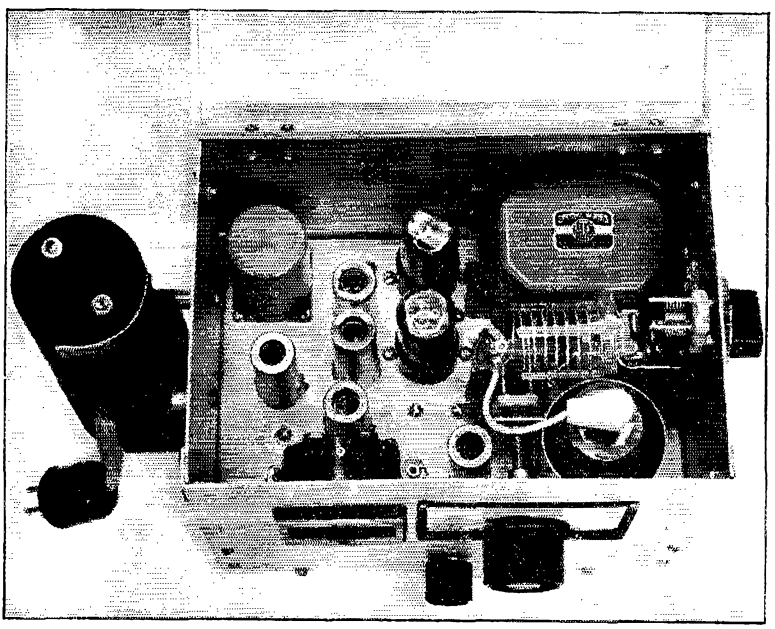
The rig discussed here probably will not be duplicated in its entirety by anyone. However, some of the circuit information and trick features may be usefully applied to other transmitters for mobile work. Naturally, the objective in design was to arrive at a combination that would offer a maximum ratio of modulated power output to battery drain. After a careful survey of the market, looking for a power source, and having settled for an input comparable to what other mobile services had found to be a fair compromise, I came to the conclusion that the 400-volt 150-ma. dynamotor manufactured by Carter fitted the requirement like a glove. This unit is small, efficient, quiet and requires little filtering.

* % National Company, Malden, Mass.

Transmitter Circuit

All that now remained was to design a circuit that required little or preferably no current for the exciter portion of the transmitter so that a maximum amount of current would be left for the final and modulator. Having no success with any exciter that did not draw plate current, I did the next best thing and kept the current required to a minimum.

I believe the most important part of the transmitter is the VFO, without which I am sure I would miss many enjoyable contacts. The oscillator circuit chosen (see Fig. 1) is the familiar Clapp, operating at 7 Mc. and doubling frequency to 14 Mc. in the output circuit which is slug-tuned. A 6AU6 tube is used and the ratio of capacitances in the oscillating circuit is made as high as possible to provide maximum isolation for the tuned circuit. With a coil Q of 220, the ratio of C_3, or C_4, to $C_1 + C_2$ can be as high as 15 or 20. As a result, the oscillator is almost entirely free from any frequency shift from either filament- or plate-voltage variation. The circuit will not function if the coil Q is much lower than 220, unless the capacitance ratio is reduced which, of course, reduces the stability. In this connection,



Interior view of the W1JEL 10-meter mobile transmitter. The miniature tube to the left is the oscillator VR tube, the one to the right is the doubler tube. In line behind the meter are the VFO tube, the modulator-screen VR tube and the speech-amplifier tube at the rear, to the left of the two modulator tubes. The driver transformer is to the rear at the left, while the modulation transformer occupies the rear right-hand corner. Behind the 807 is the plate tank condenser and coil to the left, and the link tuning condenser to the right, mounted on the end of the cabinet. The antenna relay is underneath the tank coil. The VFO tuning motor is mounted on the left-hand wall of the cabinet.

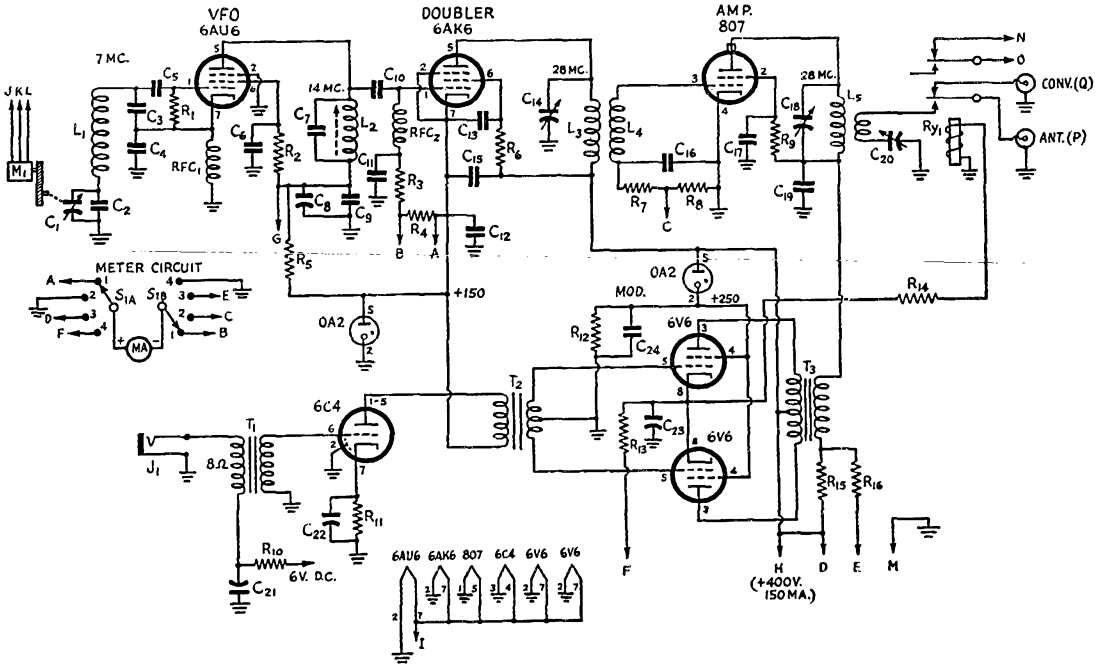


Fig. 1 — Circuit of the remotely-tuned VFO transmitter.

C_1, C_{14} — Approx. 7-$\mu\mu$fd. miniature variable (National PSE-25 reduced to 1 rotor and 2 stators).
C_2 — 22-$\mu\mu$fd. zero-temp. ceramic.
C_3, C_4 — 400-$\mu\mu$fd. silvered mica (180 $\mu\mu$fd. and 220 $\mu\mu$fd. units in parallel).
C_5, C_{10} — 100-$\mu\mu$fd. mica.
C_6, C_9, C_{11}, C_{12}, C_{13}, C_{15}, C_{16}, C_{24} — 0.001-μfd. ceramic.
C_7 — 2- to 5-$\mu\mu$fd. ceramic (to resonate with L_2 to 14.85 Mc. with slug all out).
C_8 — 8-μfd. 250-volt electrolytic.
C_{17}, C_{19} — 500-$\mu\mu$fd. 1000-volt mica.
C_{18} — 25-$\mu\mu$fd. midget variable, at least 0.35-inch spacing (National UMA-25 or equivalent).
C_{20} — 50-$\mu\mu$fd. miniature variable (National PSE-50).
C_{21} — 500-μfd. 12-volt electrolytic.
C_{22}, C_{23} — 25-μfd. 50-volt electrolytic.
R_1 — 22,000 ohms, ½ watt.
R_2, R_5 — 2700 ohms, ½ watt.
R_3, R_{12} — 0.1 megohm, ½ watt.
R_4 — 1000 ohms, ½ watt.
R_6 — 10,000 ohms, ½ watt.
R_7 — 22,000 ohms, 1 watt.
R_8 — 10 ohms, ½ watt (multiplier).
R_{15} — 4.7 ohms, ½ watt.
R_9 — 27,000 ohms, 2 watts.
R_{10} — 47 ohms, ½ watt.
R_{11} — 2200 ohms, ½ watt.
R_{13} — 39,000 ohms, ½ watt (multiplier).
R_{14} — Resistance of R_{14} plus the resistance of Ry_1 should total 375 ohms.
R_{16} — 330 ohms, ½ watt.
L_1 — 30 turns No. 26 enameled, 1-inch diam., ¾ inch long, wound on National XR-61 ceramic threaded form, minus slug.
L_2 — 22 turns No. 22, ¾-inch diam., 13/16 inch long, wound on National XR-72 form, iron slug.
L_3 — 9 turns No. 22, 1-inch diam., ¾ inch long, wound from top terminal on National XR-62 ceramic form, minus slug.
L_4 — 6 turns hook-up wire total. 4 turns wound from bottom terminal on same form as L_3, remaining 2 turns wound over bottom end of L_3, starting 2nd turn up. (See Fig. 3.)
L_5 — 8 turns No. 16, 1¼ inches diam., 1⅝ inches long (National AR-16-10SE, minus plug base).
J_1 — Microphone jack, open circuit.
M_1 — Tuning motor (see text).
MA — Milliammeter — 1-ma. scale, 100 ohms.
RFC_1, RFC_2 — 750-μh. r.f. choke (National R-33).
Ry_1 — D.p.d.t. relay (50–60 ma. — see text).
S_1 — 2-pole rotary switch.
T_1 — Midget output transformer, single plate to 8 ohms, microphone connected to 8-ohm winding.
T_2 — Driver transformer (UTC S-8).
T_3 — Modulation transformer (UTC S-19).

the ceramic form plays an important part. Other material may not only reduce the Q to the point where the circuit will not oscillate, but it may also introduce frequency drift. Silvered mica condensers are used at the critical points of the circuit, so frequency drift is negligible. The resistance-capacitance filtering in the plate-supply lead to the oscillator was added after it was discovered that the dynamotor had found a way of frequency modulating the output.

The output of the 6AK6 is tuned to 28 Mc. with a conventional variable-condenser tank circuit. So far as d.c. is concerned, it will be noted that the doubler tube is in series with the oscillator and speech-amplifier tubes. If the + h.v. circuit is traced, it will be found that the line goes first through the 6AK6 and then divides into two branches, one branch going through the oscillator tube back to ground, while the other goes through the speech-amplifier tube to ground. Thus, the power that otherwise would be wasted in a series voltage-dropping resistor is put to useful purpose in operating the doubler. The VR tube is used principally to maintain proper voltage division between the doubler and the other two stages. The total current then drawn

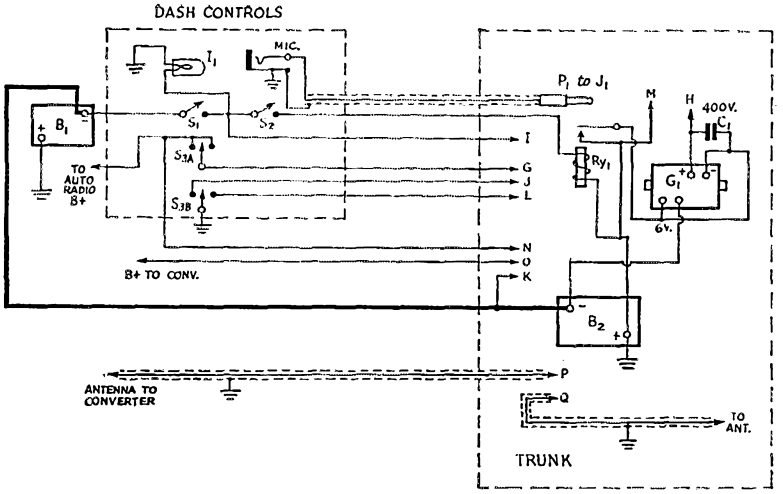


Fig. 2 — Circuit diagram of the remote-control system.
B_1, B_2 — 6-volt storage battery.
C_1 — 4-μfd. 600-volt paper.
G_1 — 400-volt 150-ma. dynamotor (Carter Type 415A).
I_1 — 6-volt dial lamp.
P_1 — Microphone plug.
Ry_1 — Heavy-duty 6-volt relay (40–50-amp. contacts).
S_1, S_2 — S.p.s.t. toggle switch.
S_3 — D.p.d.t. toggle, center off position (telephone switch with contacts bent so as to close VFO circuit first, then motor circuit).

by the three stages is between 15 and 20 ma. With the voltage to the speech amplifier and oscillator limited to 150, the balance (250 volts) appears between the plate and cathode of the 6AK6. This is somewhat above the manufacturer's ratings. Also, it was with some apprehension that it was realized that the tube was being operated with a potential of 150 volts between cathode and heater. Nevertheless, several different tubes of the same type were used to check for possible break-down and no trouble has been experienced in nearly a year of operation. Apparently the ratings are conservative. It should be noted that the doubler grid leak must be returned to cathode instead of to ground to keep the grid bias correct in respect to cathode.

Now we have excitation on 10 with a total drain of about 18 ma., leaving 132 ma. for the modulator and 807 final. The amplifier grid coil is approximately self-resonant and is coupled quite closely to the plate tank coil of the doubler. Careful attention to tank impedance and coupling results in more than enough grid drive to the amplifier, despite the fact that the input to the 6AK6 doubling is only 4.5 watts. The low-C circuits provide ability to change frequency over a wide range without retuning. The small possible sacrifice in harmonic attenuation is tolerated for mobile work, otherwise the final is conventional. It is the first 807 stage I have ever built that was free of parasitics or oscillation at the tuned frequency. This, I know, is accidental. No suppressors were needed and only normal shielding was used. The input is approximately 25 watts, with a measured output of 20 watts on a Bird Electronics wattmeter. This efficiency sounds slightly high, and the discrepancy probably arises because of the limited accuracy of the metering resistors used to measure the power input.

The Modulator

Various trick forms of modulation were considered and rejected for one or more reasons. Frequency modulation (the only type in my opinion that has a chance of offering anything) was abandoned because of the few discriminators in use in receiving installations. Other systems, such as clamper-tube modulation, were dropped because they did not offer any advantage over conventional plate modulation, except for the saving in audio components. In a transmitter of this size, the price of audio transformers is not prohibitive, and it is questionable whether economy in transformers would not be offset by the need for higher plate voltage in an effort to get the same signal from the transmitter with other systems. It is extremely difficult to reduce power consumption in this way if the transmitter is turned on, modulated for the entire transmission and then turned off.

Too often, the modulator is left crying for power in mobile rigs, with every effort being bent toward maximum input to the final. This is a fallacy, of course, especially with the usual type of limiter circuit used in mobile receivers. I am convinced that a signal of slightly lower amplitude, modulated 100 per cent, will work through noise far better than a stronger signal undermodulated. This is because of the peculiar characteristics of the series-diode self-adjusting limiter circuit which allow noise to ride through on a carrier as modulation. If the modulation is not as heavy as it should be, intelligibility suffers at an alarming rate.

The audio section makes use of the popular pair of 6V6s in Class AB_1, driven by a transformer-coupled 6C4. A phase inverter could have been used at this point. The screen current to the modulators is passed through another VR tube used as a dropping resistor. This method provides the same regulation at the screens of the modulators as at the terminals of the dynamotor. The drop across the VR tube is always 150 volts. R_{12} is needed only to fix a minimum current through the VR tube.

The combination of screen voltage and cathode bias chosen results in a minimum of plate current consistent with adequate output from the modulator. The 6V6s are operated at slightly higher than rated plate voltage (375), but again,

the tubes seem to take it. The power input is not too high, so it is felt that tube life should be normal. The filter in the 6-volt line to the microphone is necessary to prevent commutator modulation of the signal. The unusually large condenser is a common component in the television field.

All of the important circuits are metered by the 1-ma. meter that can be switched across the various shunting resistors which are chosen to provide appropriate meter-scale multiplication. With the meter used (100 ohms), the resistance values shown under Fig. 1 provide a 1-ma. scale for doubler grid current, a 10-ma. scale for final grid current and 100-ma. scales for final plate and modulator cathode currents. A different meter resistance will, of course, require a change in multiplier values.

The rig is not TVI-proof as it stands. Filtering of the power leads, plus a miniature Harmoniker [1] in the antenna circuit, would undoubtedly correct this.

I have not included constructional details of the transmitter because most mobile hams prefer to fit construction to their particular requirements. However, most of the essential details of layout can be followed in the photographs. Needless to say, all components, especially those used in connection with the VFO, should be mounted as rigidly as possible to resist vibration.

Control System

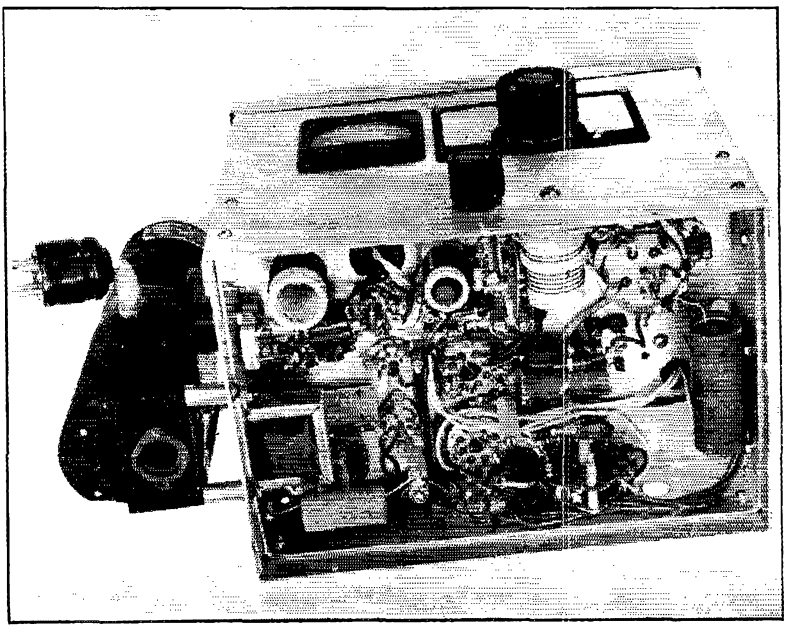
One of the initial requirements was that the transmitter be located in the trunk. This, of course, necessitated some sort of remote-control system. In this case the problem was solved chiefly by providing a motor to drive the VFO tuning condenser, C_1. With this control, operation in the car is very similar to working at the home QTH. The VFO can be easily brought to bear on any signal I want to call. A range of 500 kc. can be covered without sacrifice in power output, and the rig has been operated as much as 800 kc. off the tuned frequency with no damage to the tubes, although naturally with some reduction in output. The motor in this instance was a part of a piece of surplus donated by W1HOX. It was originally intended for 24-volt operation, but works satisfactorily on 6 volts. It is reversible, requiring only three wires for control, and is fitted with a gear reduction chain.

In Fig. 2, S_1 turns on the pilot lamp I_1 and the heaters of the transmitter through connection *I*. S_2 turns on the dynamotor through the heavy-duty relay Ry_1. The motor control is incorporated in a d.p.d.t. switch with a central off position (S_3). S_{3B} controls the motor. Whenever the motor is in operation, S_{3A} applies low plate voltage from the receiver vibrator pack to the oscillator through the line and connection marked *G* in Figs. 1 and 2. Under this condition, radiation is avoided while the VFO is being set to frequency and yet the output is ample to beat with any but the strongest of signals and it can be heard very plainly in the receiver in the absence of any other carrier.

Another control feature is the manner in which the antenna relay, Ry_1 in Fig. 1, is operated. Its winding is connected in series with the cathodes of the modulator tubes so that it shifts the antenna to the transmitter and, through connections *N* and *O*, automatically mutes the receiver when high voltage is applied and plate current flows.

A piece of ordinary garden hose enclosing sev-

[1] Technical Topics, "Half-Wave Filters," *QST*, Dec., 1949, p. 36. "Harmoniker," *G. E. Ham News*, Nov.-Dec., 1949.



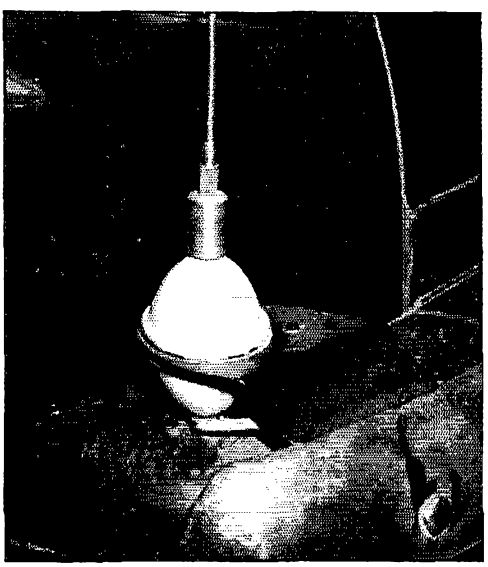
Bottom view of the remotely-tuned VFO mobile rig. The remote tuning motor is coupled to the shaft of the oscillator band-spread tuning condenser mounted against the wall in the upper left-hand corner near the oscillator tank coil. The oscillator plate coil is to the right, followed by the doubler tuning condenser, which is immediately below the doubler tube socket, and the doubler plate coupler. The microphone transformer is to the left. Tuning motor is geared down to about 2 r.p.m. It is the type used as a flap servo on military planes.

eral leads for connections between the battery and control circuit and the trunk was clamped under the car floor. At the time, I was sure that I had pulled in several spares, but I now have a number of others under the carpet in addition. At any rate, the heavier wires are in the hose where the danger of a short of any serious consequence is reduced.

Since the initial installation, I have added an extra battery in the trunk, so my winter starting possibilities are unlimited. The second battery is not a necessity. It was purchased to allow operation on mountain tops for hours without running the motor or worrying about a dead battery. Unless prolonged operation independent of the motor is contemplated, the one car battery is entirely adequate. The charging problem is handled by occasionally connecting a charger to the house power to supplement the generator output.

Noise Elimination

With the rig working properly, the installation completed and tested, I embarked on the much tougher task of eliminating, or perhaps more correctly, reducing, noises that defy description. I say "reducing" because it seems that when one predominant noise is removed, others, previously masked by the first, promptly are disclosed. These must be treated one at a time as they show up if you are to arrive at a condition satisfactory for mobile reception of weak signals. The effort is always worth the trouble, since "you can't work 'em if you can't hear 'em," regardless of how good your rig may be. After what seemed like weeks with my head under the hood, or my back on the ground under the chassis, my children still tolerate me, the XYL hasn't left me (she must be made of strong stuff) and the car still runs, so I consider the operation a success.



The antenna is mounted without drilling holes in the car by bending a sheet-metal bracket that can be fastened under the rear-bumper mounting bolt.

To start off, a limiter was added to the auto radio. I don't know if the 1948 Ford is a particularly bad customer from the consideration of noise, but I do know that many hours were spent bonding various parts of the car together, by-passing leads and searching for the causes of some of the weirdest noises ever heard. Even the

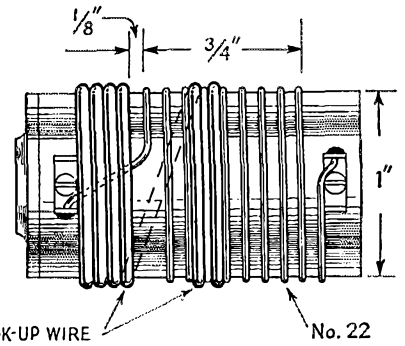


Fig. 3 — Method of interwinding L_3 and L_4 to obtain proper coupling.

flap over the gas tank had to be bonded to the fender to eliminate noise resulting from poor electrical contact in the immediate field of the antenna.

The usual tuned circuit with the coil of No. 10 wire, trimmed on a grid-dipper to the 10-meter band, was installed in series with the armature lead of the generator. The temperature gauge, oil-pressure gauge and gas gauge had to be by-passed. A suppressor was added in the high-voltage lead from the coil to the distributor and the priceless Auto-lite resistor plugs were installed. Almost all noise has been eliminated now; only a very slight increase in normal noise level of the receiver is noticeable when the engine speed is increased.

Performance

The reports on the signal have been very encouraging so far as stability, strength of signal and quality are concerned. Not one report of frequency drift or shift has been received, despite the fact that the rig is not bolted to the floor of the trunk. The one thing I would like to have now is gang tuning of all stages, so that maximum output can be obtained over the entire band. It would not be too difficult to do this and if I were to rebuild, this feature would be added. At the present time, I am able to contact stations operating far from my frequency by tuning the VFO to their frequencies, establishing contact, and then shifting back to the frequency to which the amplifier is tuned. On a recent trip to Mt. Kearsage in New Hampshire every station called en route was raised because I could always call on the other fellow's frequency. Best DX to date is W3OZA/MM off the coast of Argentina, while in motion in flat country — a distance of about 5000 miles.

Results—Armed Forces Day Activities

May 19th Events Highly Successful

Receiving Competition

Three hundred and five operators have received certificates of merit signed by the Honorable George C. Marshall, secretary of defense, in recognition of making perfect copy of his Armed Forces Day message to radio amateurs. This represents 56 per cent of the total participants (540). The message was transmitted at 25 w.p.m. by military stations AIR, NPG, NSS, and WAR on May 19, 1951.

Certificate Winners

W1s ASJ BDV CBT DWO EOB IKE KWD LZL MD NXX OI OQP QFY QIQ QJM RHU SAS TEB TGE TKX ZR.

W2s AFZ AGO ARO AUS BAI CJI CLL CWK CXD DLP DTJ EUA FLD FNE GFG GSJ HAZ HO JB KHA KTF LV LYH NIY NVB NVD PFB RQI RUK TUK UAP VIJ VNJ VWK WCE WH YAU.

W3s ADE APQ BFF BHK BIP CLY CUL ELI EUG GGF GJY IEF JAK JYS KIP LCB LGK LYN LZM MCG NCE NCJ NHI OFO OPM OYR PTZ PWH QCB QDH QIR QV RMU SEI UF UX VR.

W4s CH CVO EEP FJ IG IZG GGD JBV KFT KHZ KTE LRI LYV MWX OAF OWH PUK PPJ QCC RQV SDR SGS SR.

W5s AHT BAM BCF EGX ENE FXN HBZ JPC KUC KZK LF NBS NIY OFH OIA OTH PYU RH RKB RWJ SLC SPH SPM ZU.

W6s AOA BHG BSP CGJ DDE DPF DSY DTY FCN FYW GCD GQY GSX HIK KIE KPU LS MMG MVF NHA NJJ NQI NSK TZD YLM ZLO ZOL.

W7s BA BJY BVZ CO CZY EBS FIX FLB FOS HKV HLU HRM IM JU MQ NMJ MWH OZR.

W8s ANJ AQ ARO BKM BPU CLT FLA LX QC RN SDD SRU TPN UFA VUK WVL WW YCP YPR ZQL ZUI ZWM.

W9s AKP BEQ CFP ERW EWC GRW HDB HID/BWZ HVP IYN JTX JTY KTX LEF NHA OLU OUR RLB SUF TT VUD.

WØs BHA CJS DDF HOC KXL/NIY PTG QVA RRN UBB YBV.

KH6s AAO DL FX; *KM*6AT; *KP4s* DU DV IQ KF; *KV*4AA; *VEs* 1MK 1VJ 3IA 7NK; VO6VB.

A. J. Bakas, D. P. Baker, W. F. Bates, W. J. Beetham, G. C. Berck, F. W. Blas, J. W. Brasher, J. W. Brumit, F. G. Calvert, R. Casale, J. J. Kramer, G. B. Dixon, W. G. Donberger, H. B. Doten, W. R. Dunn, S. J. Dvorak, F. A. Dzieciolowski, R. E. Eyler, H. Farber, J. J. Finnegan, J. L. Harris, H. L. Haysler, H. F. Horvath, J. R. Joplin, R. A. Kaschenbach, H. R. Knowlton, W. C. Lewis, T. C. Lindquist, W. B. Longval, R. J. Miller, G. E. Mitchell, jr., W. L. Mitchell, G. D. Mott, I. C. Pahl, L. F. Potter, L. J. Northup, W. E. Richardson, jr., R. B. Shanok, A. M. Smith, J. Sucher, R. L. Utley, P. C. Valenti, W. R. Wilson, W. Wilson, R. A. Wood, C. Zaug.

Message from the Secretary of Defense

On this second Armed Forces Day, it is a pleasure to greet the radio amateurs of America through the combined facilities of the Army, the Navy and the Air Force. Traditionally, the radio amateur has combined a spirit of service with his hobby. Never has this been more important to the national welfare than in this critical year. As you copy these words, I want you to know that your participation in the service sponsored radio amateur systems is much appreciated by all of us who are concerned with the country's defense.

GEORGE C. MARSHALL
Secretary of Defense

Military-to-Amateur Test

A special feature of the 1951 Armed Forces Day activities was a period devoted to test QSOs between radio amateurs and the headquarters stations of the Army, Navy, and Air Force. Operating on preannounced military frequencies, AIR, NSS and WAR worked amateurs in the 3.5-, 7- and 14-Mc. bands. The three military stations made a total of 895 QSOs with 504 amateur stations. Some amateurs worked the military stations on more than one band. Contacts with all three stations were made by 127 amateurs. W3MSK worked all three stations on all frequency bands! All operation was between 1800 and 2400 EST. Special Armed Forces Day QSL cards have been sent to all stations worked by AIR, NSS and WAR.

AIR operated simultaneously on 3497.5 (A1), 7635 (A1) and 14,405 (A3) kc., working amateurs in the 3.5-, 7- and 14-Mc. bands respectively. Operators were W1QYY, Thomas Greenhalgh, Pfc., USAF; W4OAF, Harry Barrett, Sgt., USAF; W4OWH, Ira W. Matteson, T/Sgt., USAF; W9CSK, Norman K. Hester, Pfc., USAF; W9FJL, Richard Fisher, Pfc., USAF; W9QHK, Lawrence Rudolph, Pfc., USAF; and WØBCH, John Kennelly, Pfc., USAF. AIR made 319 contacts (166 on 3.5 Mc., 86 on 7 Mc., 67 on 14 Mc.) with 305 amateurs.

NSS operated simultaneously on 3415 (A1) and 7375 (A1) kc., working amateurs in the 3.5- and 7-Mc. bands respectively. Operators were W3EUG, C. W. Rickley, RMC, USN; W3MCG, Lt. Cmdr. K. R. Medrow, USNR; W3MSU, Ethel M. Smith, RMN3, USNR; W3SGO, Lt. Cmdr. F. G. Duncan, USN; W4IA, Cmdr. E. L. Battey, USNR; W4KMG, Lt. Col. L. W. Sieck, AFUS; W4LRI, C. E. Van Pelt, RMN1, USNR; W4LW, Capt. R. R. Hay, USN; Lt. j.g. H. V. McVay, USN; and M. E. Naumann, RMC, USN. NSS made 281 contacts (141 on 3.5 Mc., 140 on 7 Mc.) with 263 amateurs.

WAR operated simultaneously on 4020 (A3), 6997.5 (A1) and 13,947.5 (A1) kc., working amateurs in the 3.5-, 7- and 14-Mc. bands respectively. Operators were W4RGF, Allen C. Slaight, S1cl, USA; WØBYU, Raymond L. McSherry, Pvt., USA; WØWJA, Thomas A. Kalogerson, Pvt., USA; and WØYPA, Frank Stoll, Sgt., USA. WAR made 295 contacts (78 on 3.5 Mc., 183 on 7 Mc., 34 on 14 Mc.) with 278 amateurs.

Happenings of the Month

ARMY MANEUVERS START AUGUST 6TH

In just a few more days the military will begin maneuvers in the Carolinas in which the coöperation of amateurs has been requested in clearing 3700–3900 kc. under the following conditions:

1. For amateurs in North Carolina, South Carolina, Georgia, Delaware, Maryland, Virginia, West Virginia and the District of Columbia, and in Tennessee east of and including Hamilton, Rhea, Roane, Anderson and Campbell counties — no operation in the band 3700–3900 kc. during the period of the maneuvers August 6th to September 7th.

2. For amateurs outside the area defined in (1) and east of the Mississippi River — no night-time operation (local sunset to local sunrise) in 3700–3900 kc. during the period of the maneuvers; no limitations during daylight hours.

3. For amateurs west of the Mississippi River or outside the continental U. S., no limitations.

The cöoperation and alertness of every amateur is required in fulfilling, voluntarily, this request by the military. ARRL Hq. is supplying the OO system with full details, and has selected amateurs in key spots in area (2) to transmit special bulletins shortly before sunset times to help warn others. The most important thing is that *you* observe the request 100%. Make it an item of your conversations in QSOs up to August 6th. On that date and for the period of the maneuvers, if in area (2) make it also the subject of daytime conversations. The idea is to make certain every active amateur knows about it.

If you hear a station in "violation," *do not call him on the restricted band* if you are in an affected area. If he is in the same city or nearby, get him on the landline. If not, try to work someone west of the Mississippi below 3700 or above 3900 kc. and get him to call in on the frequency of the station failing to observe the request. Selected stations just west of the River are setting up monitoring schedules for just this purpose. The first few days will be the most difficult. Monitor 3700–3900 kc. to the extent you can the first week.

The map on the adjoining page shows the affected areas. Clip it to hang in front of your operating position, or leave this issue open to the map page on your table.

Let's keep the record 100% clean. But if you should hear a station not complying with the request, Hq. would appreciate a postcard with data on your intercept.

One very important point: the military operations are low power mobile, which get along very well by themselves but cannot work in the face of strong interference. Because they are low power they may not be at all audible even near the primary area, so the absence of any signals should not be construed as an indication that maneuver operations are not in progress.

ELECTION NOTICE

To All Full Members of the American Radio Relay League Residing in the Atlantic, Dakota, Delta, Great Lakes, Midwest, Pacific and Southeastern Divisions, and in the Dominion of Canada:

An election is about to be held in each of the above-mentioned divisions to choose both a director and a vice-director for the 1952–1953 term. These elections constitute an important part of the machinery of self-government of ARRL. They provide the constitutional opportunity for members to put the direction of their association in the hands of representatives of their own choosing. The election procedures are specified in the By-Laws. A copy of the Constitution & By-Laws will be mailed to any member upon request.

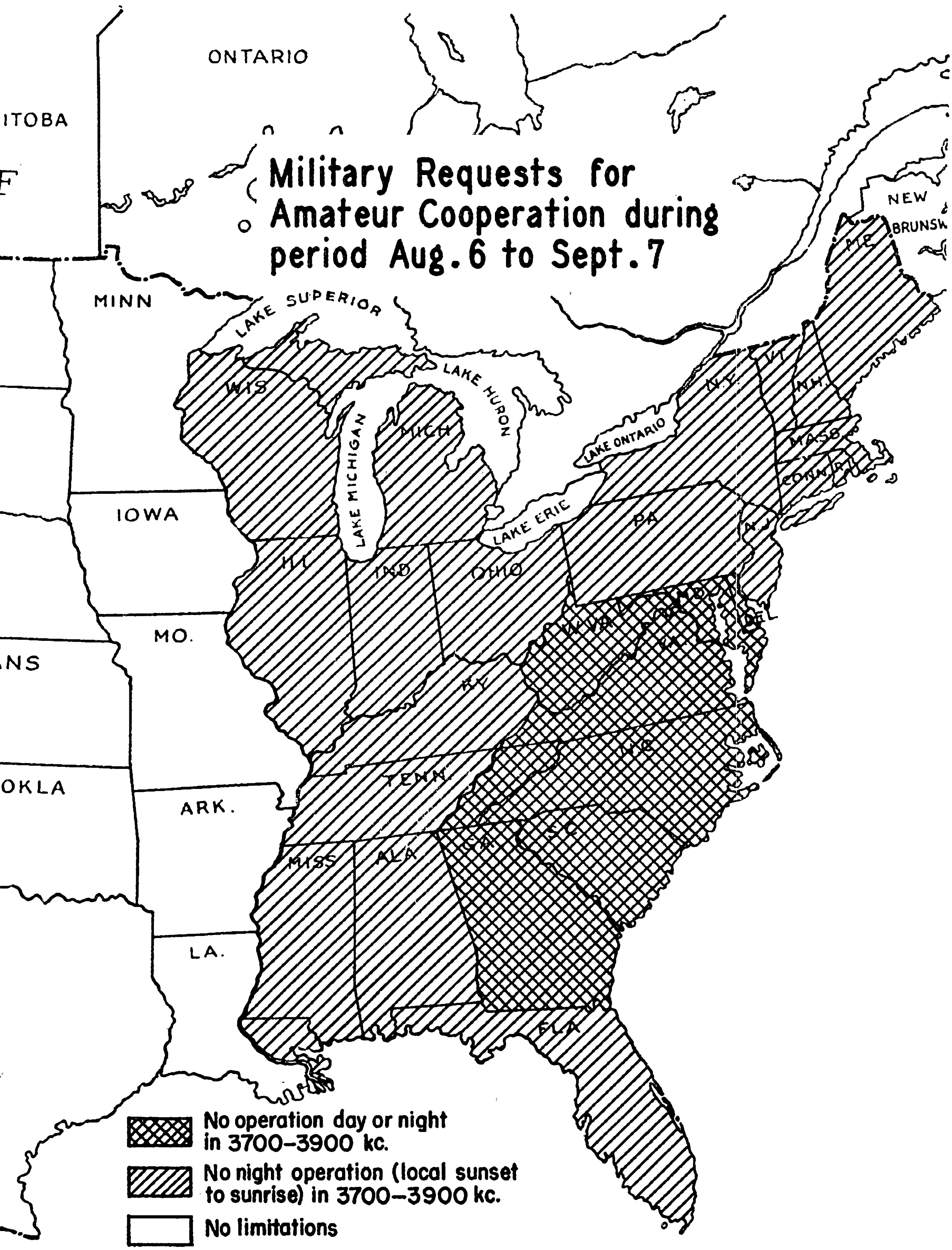
Nomination is by petition, which must reach the Headquarters by noon of September 20th. Nominating petitions are hereby solicited. Ten or more Full Members of the League residing in any one of the above-named divisions may join in nominating any eligible Full Member residing in that division as a candidate for director therefrom, or as a candidate for vice-director therefrom. No person may simultaneously be a candidate for both offices. Inasmuch as all the powers of the director are transferred to the vice-director in the event of the director's resignation or death or inability to perform his duties, it is of as great importance to name a candidate for vice-director as it is for director. The following form for nomination is suggested:

Executive Committee
The American Radio Relay League
West Hartford 7, Conn.

We, the undersigned Full Members of the ARRL residing in the.....Division, hereby nominate....., of....., as a candidate for director; and we also nominate ....., of ....., as a candidate for vice-director; from this division for the 1952–1953 term.

(Signatures and addresses)

The signers must be Full Members in good standing. The nominee must be a Full Member and must have been both a member of the League and a licensed radio amateur operator for a continuous term of at least four years immediately preceding receipt by the Secretary of his petition of nomination, except that a lapse of not to exceed ninety days in the renewal of the operator's license and a lapse of not to exceed thirty days in the renewal of membership in the League, at any expiration of either during the four-year period, will not disqualify the candidate. He must be without commercial radio connections: he may not be commercially engaged in



Military Requests for Amateur Cooperation during period Aug. 6 to Sept. 7

the manufacture, selling or renting of radio apparatus normally capable of being used in radio communication or experimentation, nor commercially engaged in the publication of radio literature intended, in whole or part, for consumption by licensed radio amateurs. Further details concerning the eligibility are given in By-Law 12. His complete name and address should be stated. The same requirements obtain for vice-director as for director. All such petitions must be filed at the headquarters office of the League in West Hartford, Conn., by noon EDST of the 20th day of September, 1951. There is no limit to the number of petitions that may be filed on behalf of a given candidate but no member shall append his signature to more than one petition for the office of director and one petition for the office of vice-director. To be valid, a petition must have the signature of at least ten Full Members in good standing; that is to say, ten or more Full Members must join in executing a single document; a candidate is not nominated by one petition bearing six valid signatures and another bearing four. Petitioners are urged to have an ample number of signatures, since nominators are occasionally found not to be Full Members in good standing. It is not necessary that a petition name candidates both for director and for vice-director but members are urged to interest themselves equally in the two offices.

League members are classified as Full Members and Associate Members. Only those possessing Full Membership may nominate candidates or stand as candidates; members holding Associate Membership are not eligible to either function.

Voting by ballots mailed to each Full Member will take place between October 1st and November 20th, except that if on September 20th only one eligible candidate has been nominated, he will be declared elected.

Present directors and vice-directors for these divisions are as follows: *Atlantic:* Walter Bradley Martin, W3QV, and Henry W. Wickenhiser, jr., W3KWA. *Dakota:* Goodwin L. Dosland, WØTSN, and Alfred M. Gowan, WØPHR. *Delta:* Victor Canfield, W5BSR, and George S. Acton, W5BMM. *Great Lakes:* John H. Brabb, W8SPF, and Harold E. Stricker, W8WZ. *Midwest:* Leonard Collett, WØDEA, and (acting director) Alvin G. Keyes, WØKTQ. *Pacific:* Kenneth E. Hughes, W6CIS, and C. Porter Evans, W6BF. *Southeastern:* Lamar Hill, W4BOL, and William P. Sides, W4AUP. *Canada:* Alex Reid, VE2BE, and William W. Butchart, VE6LQ.

Full Members are urged to take the initiative and to file nomination petitions immediately.

For the Board of Directors:

A. L. BUDLONG
Secretary

July 1, 1951

EXECUTIVE COMMITTEE MINUTES

The following is an abstract of the Minutes of the Executive Committee of the League during the past year between Board meetings, as ratified by the Board at its recent meeting, here published for your information:

Meeting No. 209, October 6, 1950. Ratified affiliation of 13 clubs, affiliated 8 additional clubs. Examined nominations in regular autumn elections, plus the special election for Alternate Director, Dakota Division; determined eligibility of candidates; in cases where there was only one eligible candidate, declared him elected without ballot; order ballots sent on others.

Meeting No. 210, November 20, 1950. Opened and counted ballots in regular autumn elections, plus the special election for Alternate Director, Dakota Division; certified winning candidates. Affiliated 3 clubs.

CALL LETTER LICENSE PLATES

Ohio recently joined the continually growing list of states (now one dozen) issuing call letter license plates, climaxing the ardent efforts of Ohio amateurs to secure this legislation which originated with W8WZ. Spearheaded by the Columbus Amateur Radio Association, the bill had the backing and support of various civil defense agencies throughout the state (the state executive director testified in its favor) as well as the Red Cross, the adjutant general's office and various law-enforcement agencies. W8s EYE, WAB, VHO appeared before committees, while WRL kept Ohio amateurs informed of the bill's progress and solicited letters advocating passage. Originally introduced by Representative Clifton Caryl, the bill passed both branches with big majorities.

The governors of Rhode Island and Maryland unexpectedly vetoed bills permitting plates in those states after passage by the state legislatures without difficulty. Amateurs in Wisconsin had some anxious moments when the governor said he would veto the bill after earlier indicating that he would sign it. Fast work on the part of state amateurs prevented this, the governor finally signing. Special credit goes to the two legislators who introduced the bill, Assemblymen LaFave and Sengstock, as well as W9s MSJ, GPI, IZO, FMH, RQM, LXC, UFX, PFK and JXY.

Tennessee amateurs are now displaying their call letter plates. With the subject initiated on the Tennessee 'Phone Net, W4LNF committed the Kingsport Amateur Radio Club to the task of expediting the bill under the guidance of EUM and CBU, ably aided by AFI, IKG, AEE and many others. Emergency work by Tennessee amateurs during a severe winter ice storm contributed much toward convincing legislators of the merits of the bill.

TVI SURVEY

The Headquarters would like the coöperation of all clubs and members in getting together statistics on TVI. We would like to compile some figures on what makes and models of TV receivers

(*Continued on page 108*)

QSL MANAGERS THANKED BY BOARD

For their excellent work in distributing DX QSL cards to American and Canadian amateurs, the QSL managers of the League were given a unanimous vote of thanks by the Board of Directors at the May meeting.

Each of us can show his own appreciation of the QSL Managers' fine work by helping to make their job a little easier. Just send your QSL manager (see his address on page 64 of this issue) a stamped self-addressed envelope which is about 4¼ x 9½ inches in size. Your name and address should be in the customary place on the face of the envelope, and your call letters should be printed prominently in the upper left-hand corner.

The Board directed the Secretary of the League to send an official letter of thanks to each QSL manager. We know that the QSL managers would appreciate your individual expressions of appreciation.

An Easily-Adjusted Low-Frequency Mobile Antenna

Slider Tuning for the Center-Loaded System

BY JAMES PERKINS SAUNDERS,* W1BDV

THE trend toward mobile operation has created unusual interest in the design of efficient mobile antennas. Many articles on the subject have appeared in *QST* and *The Radio Amateur's Handbook*. Most of these articles have approached the design of the antenna from a technical standpoint, using design formulas, graphs and other such data. The antenna shown in the photographs was developed following more or less rule-of-thumb methods.

An examination of published material shows that a 75-meter mobile antenna is very critical in adjustment to resonance if maximum efficiency is to be obtained. In adjusting base- or center-loaded jobs, it is often necessary to follow a tedious process of trimming the loading coils, turn by turn, until the point of resonance is obtained. If the proper point is passed, because too many turns have been removed, the process must be reversed and more turns added. Even after all this has finally resulted in proper resonance, the antenna is almost strictly a one-frequency affair.

A variation on this process [1] is to tap the loading coil every five turns or so, and then adjust a clip to the nearest correct tap for proper resonance. However, this does not allow connection to the *exact* turn that *must* be found for best results. Still others [2] have used a tuning slug that is varied to tune the coil to the correct frequency. But the adjustment in this case is limited to a rather narrow band of frequencies. It has been suggested [3] that the coil dimensions can be calculated from the capacitance of the radiator and this is true for arriving at a first approximation. However, it is seldom possible to take into account the influence of the car body and other hidden factors so that in the end the coil usually must be adjusted experimentally.

Slider-Tuned Coil

The antenna pictured here is a center-loaded type which has proved popular and relatively efficient for mobile use. Its chief difference from other models is in the use of a slider-tuned loading coil which to old-timers should be reminiscent of a similar device used in the early days with crystal sets. The author does not claim that this antenna is the acme of perfection or efficiency, but does maintain that in its operation it has proved to be most flexible and easy to adjust for any frequency in the 80-meter band, c.w. or 'phone.

Base Section and Support

Most of the parts required in constructing the antenna are easily obtained standard radio, electrical or plumbing items. With my car, which has no rear bumper apron, it was unnecessary to drill holes in the car. The mounting assembly is shown in the sketch of Fig. 1 and also in one of the photographs. The mounting base is made principally of a standard four-way conduit junction box having a top cover with a single central knockout. A piece of ¾-inch wood is cut to match the bottom of the box and the bottom side of the wood is notched out to match the bumper support. A pair of long bolts (they usually come with the box) is inserted in the holes in the bottom lip of the box and clamped fast with nuts. The wood block is drilled to match the bolts and counterbored for the nuts. The bottom metal cover of the box is used as a clamp for the bumper bracket. Wing nuts with lock washers are used to permit quick removal when desired.

W1BDV's slider-tuned center-loaded mobile antenna for 75 meters at full extension.

One of the knockouts in the side of the box is drilled to take a coaxial-cable connector. The knockout hole in the top cover is fitted with a

* 49 Prospect St., Whitinsville, Mass.

[1] Perry, "All-Band Mobile Antenna System," *QST*, June, 1950.

[2] Buff, "A Tunable 75-Meter Mobile Antenna," *QST*, August, 1950.

[3] Oberlies, "Installing a Practical 75-Meter Mobile Antenna," *QST*, Dec., 1949

BX-clamp insert. Then a short section of RG-8/U cable is run between the connector and the clamp insert, leaving an extension of a couple of inches. A second outlet-box cover, similar to the other, is used as the base of the antenna. It is insulated from the box on three heavy ceramic pillars (National GS3), using a rubber washer at each end of each pillar.

The bottom section of the radiator is a piece of copper pipe ½-inch inside diameter and 36 inches long. At each end a brass nipple with a threaded neck is soldered. A piece of ½-inch wood dowel, filling the entire length of the pipe, is inserted to add strength and take out some of the whip. Then a large flat washer is slipped over the threaded neck of the nipple, the neck is inserted in the hole in the cover plate and fastened securely with a threaded pipe cap. The center conductor of the RG-8/U cable is soldered to the cap. The box is fitted with a length of flexible wire terminating in a clip that can be attached to the bumper for a ground connection. A coat of black paint on the pipe makes it less noticeable on the car.

The Loading Coil

Fig. 2 and one of the photographs show the details of the coil and slider mechanism. Although the coil should be wound on the best material available, preferably polystyrene, a wood dowel properly treated works very satisfactorily. I used it because the wood was on hand while the poly wasn't. It is 1⅜ inches in diameter and 12 inches long. The ends are turned down to make a snug fit into heavy surplus plug shells of the type that

The mounting for the slider-tuned antenna is made up of standard parts and fittings as described in the text.

come fitted with cable clamps. The bottom end of the dowel is counterbored to take the threaded nipple at the top of the bottom antenna section and also a flat nut that fits the nipple threads. The top end of the form is drilled out to take the bottom end of the top section of the antenna which is a three-piece collapsible whip with a total length of 8 feet. The form was then boiled in paraffin for about a half hour, or until the bubbling ceased.

When completely cool and hard, the form was wound with 144 turns of No. 18 enameled wire, close-spaced, centering the winding on the form. The winding is 6¼ inches long. After winding, the entire coil was repeatedly dipped in paraffin to waterproof it. Then a path for the slider was sanded clean along the length of the coil.

The slider rods are of brass or copper, ¼-inch diameter. They are spaced by a short piece of ¼-inch-square rod at each end, the slider rods being drilled and tapped for the assembly screws. The slider assembly is fastened to the coil form with wood screws and suitable spacers. The slider was made out of odds and ends of copper and phosphor bronze found in the junk box. No tendency for the slider to shift with car vibration was noticed. The slider rods and contact and also the path along the coil should be touched up with sandpaper occasionally to remove oxidation.

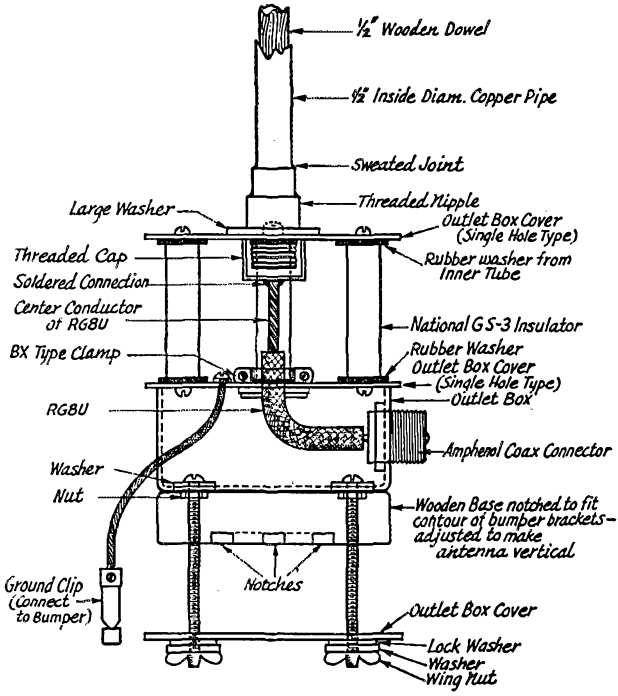


Fig. 1 — Sketch showing the base mounting for the slider-tuned mobile antenna.

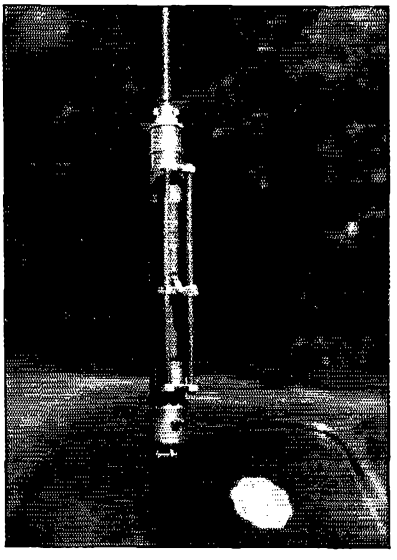
Assembly

After the slider assembly has been mounted on the form, the cable shield at the bottom (minus the cable clamp) should be fastened to the top end of the copper pipe, screwing the nut down firmly in the bottom of the

shell. It may be necessary to ream out the hole in the shell before it will slip over the nipple. Then insert the bottom end of the coil form into the shell and make it fast with several wood screws. Connect the bottom end of the coil winding and also the slider rods to the shell. Now slip the top shell on over the form and fasten it in the same manner, connecting the top of the winding to it. The top end of the slider assembly is left free, of course. The upper section of the radiator is held in place by the cable clamp on the top shell and can be removed as desired by loosening the clamp screws. The base section can be easily dismounted by loosening the wing nuts, thus leaving no sign of a mobile installation. This will appeal especially to the XYLs who sometimes have an aversion to mobile jobs!

Adjustment

The antenna can be tuned up for use with one, two or three top sections attached to the loading coil, depending upon road-clearance conditions likely to be met. Naturally, the longer lengths give better results. Adjustment is simplicity itself! The final amplifier is tuned for minimum



Close-up of the slider-tuned loading coil.

plate current in the usual fashion, with the antenna completely detuned by setting the slider at one end of the coil. Then the slider is run along the coil while either the final plate current or a field-strength meter is used as an indicator. The author prefers the latter which may be temporarily placed on top of the car and watched while moving the slider. It will be found that there is just *one* turn where the field-strength meter rises to a maximum. This point also should coincide with the maximum plate-current reading. The final tank condenser should be rechecked for resonance, but if matching is correct, this should occur at approximately the original point of

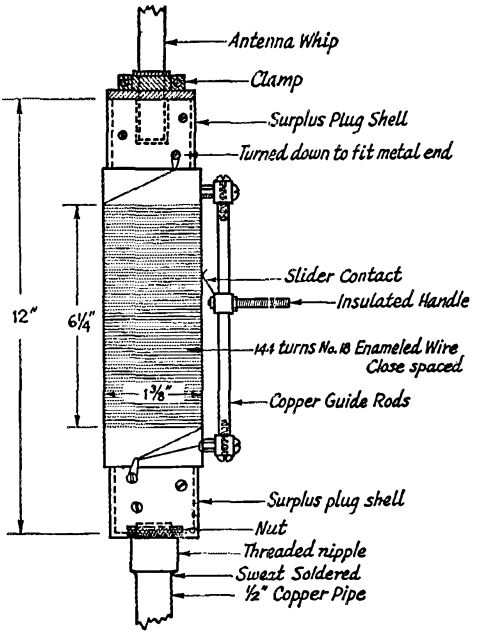


Fig. 2 — Details of the loading-coil construction.

resonance. Should loading not be sufficient, the number of turns in the link may be increased. (Be sure to remove the meter from the top of the car before driving on!)

Results

Tests with this antenna show that it puts out a potent signal. With *five* watts input to the mobile final on 3541-kc. c.w., with the car in the driveway at home, W1CRW 80 miles away gave the following RST reports: three top sections on antenna — 569, two sections — 559, one section — 539. The home station on the regular home antenna was 579 with 40 watts to the final. Road tests with W1CRW on the same frequency and with the same input also showed good signals.

W2ITK at Cohoes, N. Y., voluntarily reported by mail that he was eavesdropping on the tests with W1CRW and reported as follows: three top sections — 579, two sections — 569, one section — 559. The home station was 589.

Most pleasing, though, is the ease with which the whole system can be brought to resonance by merely moving the slider to the correct and *exact* turn when the frequency is adjusted anywhere from 3500 to 4000 kc. or the length of the antenna above the loading coil changed from three sections to one section (or any intermediate length). This can be done more quickly than you can read about it here! This, of course, applies to 20 and 40 meters as well.

Using the Motorola T-69-20A on 10 and 6

BY L. W. MAY, JR.,* W5AJG

Now that commercial mobile services have moved up into the 150-Mc. v.h.f. band from their former assignments at 30 to 40 Mc., considerable quantities of equipment have been made available covering the latter range. Some of this gear is practically made to order for 28-Mc. amateur work and it can usually be purchased very reasonably.

One of the more popular sets available is the Motorola model T-69-20A. These units have been put to good use by many hundreds of hams on the 28-Mc. band. Most of the transmitters will tune the 28-Mc. band with no changes whatever, though some units require a slight pinching of the inductors.

However, there are a few things one can do to improve the operation on 28 Mc., and without too much conversion, this unit can be made to do an excellent job on 50 Mc. as well. The following will describe one method of using the rig either on 10–11 or 6 meters. Two transmitter chassis are used here, so the coils are not made plug-in.

28-Mc. Changes

Although these transmitters look alike as two peas in a pod, quite often they do not work exactly alike. Without any changes whatever except substituting the ham crystal, one owner may obtain 5 ma. grid current in the final while another may not be able to squeeze quite enough to make the final stage tube modulate up properly. Some amateurs have reported that changing the *Q* of the inductors will increase the grid drive. This is done by increasing the diameter and spacing between turns. The oscillator plate coil, which will now be operating in the 7-Mc. band instead of the 8-Mc. band, can stand a few more turns (about 6 or 8) of the same size wire as that of which it is wound. Changing the coils is a simple matter as they are merely soldered to the button feed-through condensers on the chassis.

While the above procedure will help to some extent, the transmitter unit procured here was modified in another manner for 28-Mc. operation. These units employ a crystal oscillator (½ of a 6F8 tube) with the plate circuit operating on the crystal frequency. This drives a 6L6 quadrupler which, in turn, drives an 807 final. Usually the quadrupler is working at its very utmost, especially if there is any voltage drop in the car's 6-volt primary system. Most police service installations use a large battery and a special generator that will keep the battery voltage up, even when the car is running at a very low speed. Most amateurs use neither, and as a result, their voltage is appreciably lower.

If the quadrupler is changed to a doubler, its output can be increased materially. The oscillator stage will then have to be changed to one whose plate circuit will double the crystal frequency. The original quadrupler and final coils are not changed. Only a few changes in the oscillator circuit and the oscillator plate coil are needed.

The revised oscillator uses the tube already in the transmitter. Since the plate circuit now will resonate on 14 Mc., it is necessary to remove approximately half the turns from the original coil so that the condenser will be at about half scale. This will allow the transmitter to be used in the 11-meter band, if desired, by plugging in the proper crystal. The turns of the doubler and final coils can be pinched together to allow them to hit the 11-meter assignment.

These modifications should provide plenty of grid drive to the 807 even with the car battery somewhat down. The oscillator circuit changes consist of adding a couple of small mica capacitors and one 2.5-mh. r.f. choke, as shown on the schematic. They are easily done after inspecting the original wiring.

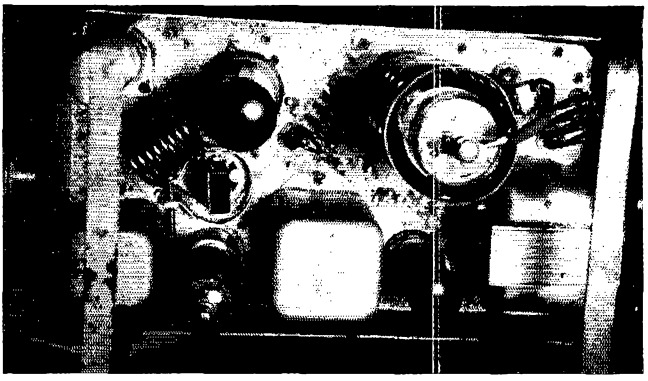
The output coupling circuit was designed to work into a quarter-wave type of antenna, with a direct connection to the whip, but a section of coax cable (RG/8-U) run from the base of the quarter-wave whip to the transmitter works very well, since the impedance is similar in these applications.

50-Mc. Changes

Using the same oscillator circuit as for the 10-meter conversion, but with an 8-Mc. crystal and a 25-Mc. coil in the plate circuit, the oscillator

* 9428 Hobart St., Dallas 18, Texas.

The two-band mobile installation of W5AJG, Dallas, Texas, using two police transmitters converted for operation on 28 and 50 Mc. A microphone and metering position are provided for tune-up purposes.



Top view of the police transmitter converted for 50-Mc. operation. The coils are (*left to right*) the oscillator, doubler and final plate tanks.

stage is made to triple. The 6L6 is operated as a doubler to 50 Mc., driving the 807 final tube straight through on 50 Mc.

The oscillator plate coil for 25 Mc. can easily be obtained by removing the former 807 final coil and installing it in the oscillator on a button feed-through insulator. The 6L6 doubler coil for 50 Mc. is wound of No. 14 enameled wire. It has 5 turns one-half inch diameter, spaced the same as the feed-through mounts, one and one half inches.

As shown on the schematic, an r.f. choke partially by-passed for r.f. is inserted in place of the cathode resistor, R_1, and the cathode condenser, C_7, originally used. This increases the doubling efficiency of the 6L6 by adding slight regeneration.

The final 807 coil for 50 Mc. is also available in the form of the former 6L6 plate coil, but with one turn removed and spacing the remaining turns to the normal one and one half inch distance, to fit the mounting feed-through studs.

Crystals for 6.3, 8.4 or 12.5 Mc. may be plugged into the oscillator and 50-Mc. output from the transmitter will result, the oscillator functioning as a quadrupler, tripler or doubler, depending on the crystal used. Very little difference was noted between the different crystals, though the grid current to the 807 final was a little higher with the higher frequency crystals.

The installation at W5AJG/Mobile consists of two of the T-69-20A transmitters, one operating on 27 or 29 Mc., and the other set up for 50 Mc. The power supply unit plugs into the transmitter being used at the time. The antenna for 50 Mc. is either a quarter-wave fed by a coax line as in the case of the 10-meter job, or a half-wave whip for 50 Mc. The half-wave radiator for 50 Mc. requires a tuned circuit at the base, coupled to the transmitter through a coax line. Results with the half-wave radiator seem to have the edge even though there is a voltage loop at the base of the whip close to the body of the car.

Tuning Hints

With original cables and typical set-up, the microphone is plugged in the control box at the driver's position, making it rather awkward to tune up the rig if it is installed in the trunk. A convenient solution is to provide a microphone receptacle in the trunk along with the transmitters. An ordinary 4-prong receptacle similar to the one on the control box is mounted on a bracket with a meter alongside. The microphone can then be carried to the rear for tune-up purposes, or an additional microphone provided for the trunk position. With T-17 microphones at a dollar or less, this is an inexpensive convenience.

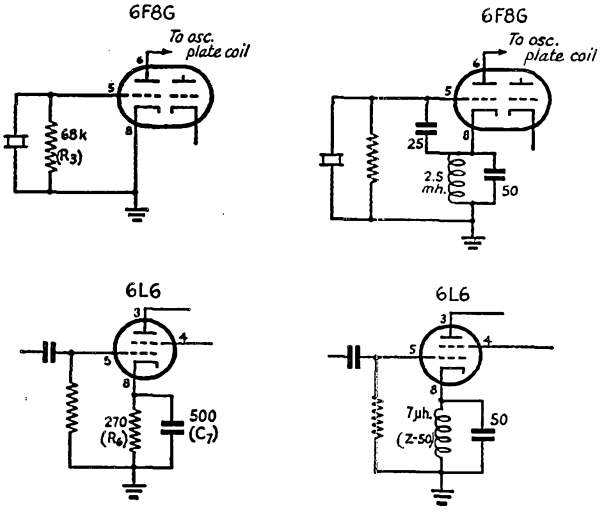


Fig. 1 — Schematic diagrams of original Motorola circuits and necessary changes. At the upper left is the original crystal oscillator, with the modifications at the right. Lower left is the original quadrupler stage. This is left unchanged in the 28-Mc. conversion, except that the changes in the oscillator allow it to operate as a doubler. At the lower right is the regenerative doubler circuit used only in the 50-Mc. conversion.

Amateur Mobile Power Sources

Limitations of Standard Car Equipment and Its Modification

BY JOHN H. PIRTLE,* W3CDL

INCREASED mobile operation in the past few years has brought forth many articles describing amateur radio equipment for the car. However, most of these fine articles have not dealt with what is perhaps the most important consideration in mobile operation — the primary power source. The study of individual power requirements often is never taken seriously until the equipment has been built and installed, only to find that the battery-charging system is overtaxed and cannot keep up with the demand. The sizes of standard car batteries and generators are determined by the car manufacturer to cover adequately the needs of the car's normal electrical equipment, but there is little to spare. Any appreciable extra power is obtainable only by intelligent use of the system.

It is, of course, impossible to set down a definite figure to be recommended for transmitter power, since so much depends upon the willingness of the operator to economize in operation and/or invest in additional equipment. It is the purpose of this article merely to point out the problems that may arise to nettle the inexperienced and to suggest some accepted ways of overcoming them. The choice, where such exists, must be left to the individual operator.

Standard Systems

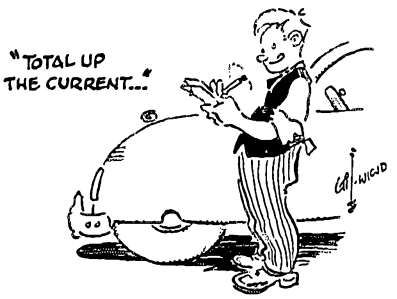
The standard installation consists of a 6-volt storage battery and a charging generator operating from the fan belt. The size of the battery (ampere-hour capacity) varies somewhat with the make of car, but an average battery in the popular-price class may have a rating of 100 a.h. The usual stock generator has a maximum safe charging rate of 35 amperes.

Every car installation has a cut-out relay. This relay is designed to close the circuit between the generator and the battery only when the generator is operating. It opens up this circuit whenever the generator is not operating to prevent the battery from discharging through the generator windings. Most cars produced in the last 10 years or so also are equipped with voltage-regulator systems, although there are still many cars on the road which do not have them. These are of different types, but all are designed primarily to prevent overcharging the battery and overloading the generator. Those of you who have cars equipped with regulators undoubtedly have noticed that after first starting the car in the morning, the ammeter shows maximum or near maximum charging rate. As the motor runs, the reading of the ammeter gradually drops back as the discharge caused by starting is made up by the charging of the generator. (Some earlier regulators have only two steps, the rate dropping abruptly to half or less of maximum when the battery nears full charge.) There is also a relay, or vibrator, that limits the generator output current to a value that will protect the generator. When the charging current tends to rise above a predetermined value, the relay intermittently inserts a resistance in series with the line to the generator field.

Whether or not the system is equipped with a regulator, the dashboard ammeter reads only the *battery* charging or discharging current as the case may be. In other words, it reads the *difference* between the total current being delivered by the generator and the load current — the current drawn by the electrical equipment. If the load current is greater than the generator current, the meter will read on the discharge side of zero, indicating that that much current is being drawn from the battery. If the load current is less than the generator current, the meter will read on the charge side and the current indicated will be that going into the battery. So long as the meter is not reading on the discharge side, no current is being drawn from the battery.

Estimating Transmitter Power

A few simple checks with the ammeter will give you an idea of what mobile equipment you can expect to operate from the standard battery



installation. With the motor dead, turn on various accessories — headlights, parking lights, heater, etc. Don't forget the car b.c. receiver that you will need for mobile work. Make a notation of the current that each draws. If your meter isn't calibrated, it will be reasonably safe to assume that full scale is 35 amperes, dividing the scale off proportionately. Now total up the current drawn by the accessories you think you won't be able to get along without while working mobile.

The average 'phone transmitter installation runs at an over-all efficiency of perhaps 20 to 25

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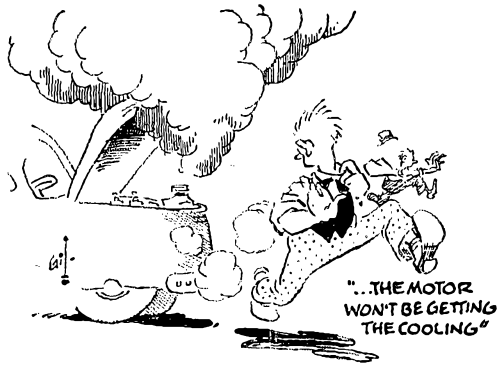
per cent. Thus the power drawn from your battery will be 4 to 5 times the carrier power you want to run. If you take the desired carrier power, multiply it by 4, or preferably 5, and then divide by 6 (the voltage of the battery), the result is the approximate current in amperes your transmitter will draw from the battery. As an example, car radio, heater and parking lights may draw 14 amperes, and a h.f. converter may add another ampere, making the total 15. If a 15-watt carrier is desired, $15 \times 5/6 = 12.5$ amperes. Adding this to the 15-ampere accessory load makes a total drain of 27.5 amperes. If the battery has a rating of 100 ampere hours, you may be able to operate 100/27.5 hours or a little over 3½ hours continuously before the battery will be down. Considering that the transmitter may be on only half of the time, you might add 50 per cent to this figure to bring the total operating time to about 5½ hours. You can't double the time because a generator or vibrator pack will take considerably more current on starting than when in the steady-running state. This is the theoretical limit. In practice, you'd probably have to stop operating quite a bit short of the above figure if you expected to start the car again in cold weather. Also, the ampere-hour rating of a battery usually is in terms of a 5-ampere discharge rate. The actual a.h. obtainable is less when the discharge rate is higher.

Charging Considerations

The substitution of a battery of greater a.h. rating will permit longer operation while parked, of course, but before you go out to buy a bigger battery, you should first consider how you are going to keep it charged. Depending upon the age of the battery, the charging efficiency may be as low as 50 per cent and seldom will exceed 75 per cent in practice. That is, if you take 100 a.h. out of the battery, you may have to put in 150 to 200 a.h. to reach full charge. You will have to figure out if you can expect to recover the charge with the kind of driving you do between periods of operating. The average speed that you drive, as well as the length of time, must be taken into consideration, because most generators do not develop maximum charging rate at speeds under 25 to 35 m.p.h. You will also have to remember that any accessories you have in use while you are charging will reduce the charging rate by that much. If most of your driving is in heavy traffic at slow speed with frequent stops, or at night when you have to use headlights and perhaps the heater, you won't stand much of a chance of recovering the charge within a reasonable length of time. You may decide that it will be necessary to install a rectifier charger in your garage and charge during the night, as many mobile hams do.

Working from the Generator

Of course, things will be much easier for your battery if you can silence the electrical system so that you can operate at least part of the time while the car motor is running. If you can be content to limit the power input to the rig and to use discretion in operating accessories, it may be possible to get by without drawing anything from the battery. Let us assume that the engine will be idled at a speed that will assure maximum charging rate (35 amperes or whatever you find the value to be). This will require an engine speed equivalent to about 25 to 35 m.p.h. Then, if the total drain of accessories and transmitter is held to this figure, nothing will be drawn from the



battery. Idling at this speed may use gas at the rate of a gallon an hour or so. However, probably you will find that you won't be able to operate this way indefinitely because the motor won't be getting the cooling it does when the car is in motion and therefore will overheat in time. But by alternating between operating from the battery and from the generator as you find it possible, the time you can work before the battery is down will be extended several times, particularly if the drain is low enough so that the battery gets at least a little charging during periods when the engine is running.

If you find that your maximum charging rate is less than 35 amperes and you want neither to reduce power nor draw from the battery, the service department of your neighborhood garage should be able to adjust the regulator or the generator to bring it up to 35 amperes, or perhaps a little above, without overloading the generator beyond the danger point. An attempt by an inexperienced person to adjust the regulator isn't recommended.

Extra Battery

Many operators who don't like to run the risk of a flat battery for starting provide an extra battery for the transmitter. This battery can be switched in parallel with the car battery for charging during periods when the transmitter is not in use. Since the regular battery will be near full charge, most of the available generator output can be diverted to the spare. Alternatively, this battery can be charged overnight with a home charger, making the operation of the transmitter completely independent of the car system. If the transmitter battery is connected in parallel with the car battery, it is advisable to provide a separate cut-out relay as shown in

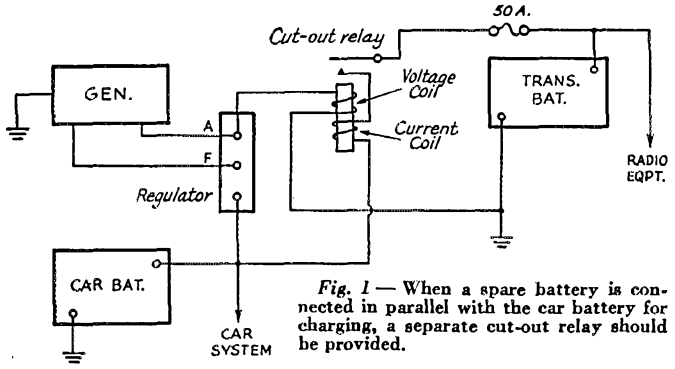
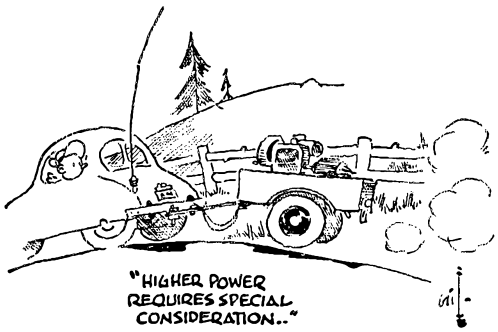


Fig. 1 — When a spare battery is connected in parallel with the car battery for charging, a separate cut-out relay should be provided.

Fig. 1. This keeps the two batteries apart except when the generator is operating.

Higher Power

Higher transmitter power requires special consideration. From the foregoing, we have seen that the standard car system is limited to a carrier power of about 20 watts unless the operating periods are short and the charging periods correspondingly long. We have also seen that the generator, even more than the battery, is a limiting factor. Even in the case of the low-power rig, it may be found that normal daily driving is neither fast enough nor long enough to keep the battery in satisfactory shape. Police cruiser and similar services have the same problem and it is solved by the installation of a "communications"-type charging generator. These generators are designed not only for higher maximum charging rates (up to 100 amperes or more) but



will maintain 40 to 50 amperes at slow cruising speeds. Generators of this type can be obtained (for a price) through your car dealer and in some sections of the country may be found in surplus stocks. Some operators have been successful in "souping up" a standard generator by decreasing slightly the diameter of the pulley. However, while this gives a higher charging rate at slower engine speeds, not all standard generators will stand the increased r.p.m. when the car is stepped up to higher speeds. Communications-type charging systems require special regulators, of course, and make use of either a huskier d.c. generator or an alternator and rectifier. The a.c. system is sometimes preferred because it avoids possible commutator troubles at high current and usually is easier to silence than the d.c. job. It has the disadvantage, however, that since its field is excited by the battery, you may not be able to start the car even with a push if the battery is allowed to run down too far.

Maintenance

It will be found that proper maintenance of mobile equipment is of greater importance than in the case of the fixed station. This is evident from the considerations of the trouble that can be caused by vibration, dirt, grease, water and extremes of temperature to which the mobile equipment is subjected. Some of the more important preventive maintenance items are listed below.

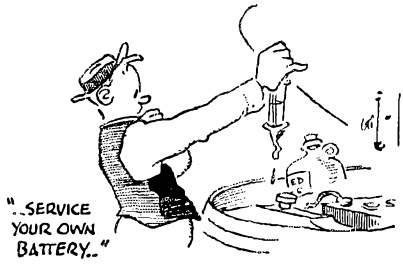
1) Commutators for both the 6-volt generator and the high-voltage dynamotors should be inspected regularly and sanded down. One of the reasons for lowered high voltage from a dynamotor will be a dirty commutator. In some cases, cleaning will reclaim as much as 75 to 100 volts. At the same time, look over the brushes, the brush rigging and any mica capacitors that may be connected across the brushes. Strip sandpaper is available for commutator cleaning at automotive electrical supply dealers or see your local auto mechanic for small lengths.

2) Lowered d.c. efficiency often can be traced to mechanical faults, rather than to electrical troubles. So, occasionally test the generator drive-belt tension. Any shift in the generator position, or a loose generator, will necessitate repositioning and tightening of the mounting bolts. The condition of the belt should be checked frequently for wear and thus forestall belt breakage. Because of the higher generator demand, there will be greater strain on the drive belt. When installing or changing generators, care should be exercised to align the generator pulley with the pump and drive pulleys to prevent excessive belt wear.

3) It is advisable to keep a log on the condition of the battery by reading the specific gravity of the electrolyte at frequent intervals and recording these readings. Over a period of time, your peculiar set of conditions can be analyzed and corrections, if necessary, can be made. A lead-acid battery does not reveal its state of charge by ordinary voltage tests until practically exhausted. Defective batteries, such as those with a bad cell, can be detected only with special testers which check voltage under load. Also, remember that the life of ordinary commercial lead-acid batteries in automobile service seldom exceeds the guarantee appreciably, and replacement should be made when this time limit approaches.

Unfortunately, most service stations resort to the use of ordinary tap water for replenishing batteries. This introduces impurities that increase the self-discharge rate. For maximum battery life, service your own battery with distilled water obtainable from your druggist or commercial chemical supplier.

With high charging currents, excessive gassing may occur if the battery is low. When this condition is frequently encountered, it is not recommended that an automatic water-feed device be used to maintain the electrolyte level because of



the possible breakage of the tubing or supply bottles by back gas pressure with the spilled electrolyte doing unnecessary damage. In northern states, where low temperatures are experienced during the winter, it should be remembered that discharged batteries can be ruined permanently by freezing.

4) All wiring, connections and grounds should be inspected periodically. Loose or poor connections do not always make themselves evident by causing noise in the receiver. Especially troublesome are the battery terminals and the ground end of the battery ground strap. If there is any doubt, connections can be checked by the *IR* drop method, using a voltmeter across the suspected joint when the battery is under load. If resistance appears in the generator voltage-control-circuit leads, the precise operation of the regulator may be affected.

All wiring should be kept securely fastened in place and not allowed to float around in space. Equipment placed under the hood within the engine compartment will be subject to an accumulation of dirt and occasional drenching from rain if not properly protected or located. Waterproof varnishes, especially those compounded with silicone, are useful here in the treatment of wires, terminals and surfaces to keep harm from moisture to a minimum. These varnishes are the same as those used by your auto mechanic to paint spark plugs.

Be sure that all circuits are adequately fused. A short in the battery circuit can start a disastrous fire within seconds. Even though you are covered by insurance, you may not be able to get a replacement at any price these days!

Test equipment for automotive electrical systems differs considerably from that used about the radio shack. These devices measure the voltages and currents of the system under certain conditions, thus revealing how well each part is doing its bit. One such tester was recently advertised as surplus at a low price and could be purchased by mobile organizations for the use of its members.

Briefly, the above discussion covers the salient points of mobile power-source systems. Successful operation from the car's power plant is largely a matter of applying common sense. One last suggestion — provide yourself with a couple of lengths of heavy military-type cable, fitted at each end with the huskiest clips you can find. Then when you find yourself stranded with a flat battery, you can flag down a passing car and borrow a start from his battery!

August 1926

. . . Technical Editor Kruse reports favorably on his investigations of commercial "A" battery eliminators.

. . . Practical arrangements for using mercury arc rectifiers in power supplies are ably detailed by A. B. Goodall, 3AB.

. . . Radio societies around the world are patterning their emblems after the familiar ARRL diamond.

. . . Don C. Wallace, 9ZT-9XAX, gives pointers on planning and running a ham convention.

. . . A neat-appearing crystal controlled rig for 20, 40 and 80 meters is featured. Built by L. B. Root, 1KF, the transmitter uses UX-112 and UX-210 tubes, costs approximately $190.

. . . The recently-formed WAC Club is enjoying a rapid growth.

. . . A series of international 5-meter tests has been arranged by the ARRL Experimenters' Section.

. . . Fred H. Schnell recommends complete shielding of wavemeters for stability.

. . . Turkey is the newest country to be represented in the amateur bands.

. . . The construction and applications of a "grid-meter driver" or signal generator are discussed by W. A. Hoffman.

. . . *The stations behind the well-known crystal signals* of 2AHM and 1AXA are pictured and described. W. E. Jackson of Schenectady operates the former, R. E. Pierce of Plymouth, Mass., the latter.

Strays

If your portable or mobile operation takes you into areas where dynamite caps are in use or storage, it will be well to heed the following warning published in *The Safety Energizer:* "Information and tests show a real danger of exploding electric dynamite caps exists when using a radio transmitter within 20 feet of an uncoiled wire on the cap."

— *W9KXK*

• Technical Topics

A New Low-Noise Twin Triode

For some years it has been customary for hams to look down on TV receiver front-end design. Much of our TVI trouble has been laid (and usually not without some justification) to "lousy TV sets." The popularity of television in the field of home entertainment has, however, not been without benefit to most of us. The tremendous demand for receivers and accessories has made possible the designing and mass production of numerous gadgets that are right up the ham's alley. Antenna erection, for instance, has been markedly easier since radio stores started stocking all those handy antenna accessories.

Now we are on the verge of other dividends in the form of new tube types that promise improved efficiency on the higher ham bands. In years gone by most tubes were designed with the broadcast and "short-wave" fields in mind. If they happened to work well on frequencies above 30 Mc., it was mostly a fortunate accident. Recently, however, much work has been done on vacuum tube design aimed at better performance in the v.h.f. range. With demand running in the millions, tube types especially designed for v.h.f. service are now economically feasible. One of the most interesting developments along this line is a new dual triode, the 6BQ7, designed specifically for low-noise r.f. amplifier service at frequencies above 30 Mc.[1]

For something better than the conventional r.f. pentode amplifier, which provided high gain with simple circuitry but was a prolific source of noise, we have had three principal avenues of approach. There was the cascode, a two-stage amplifier capable of excellent performance in all respects, but requiring too many circuits to be practical in bandswitching designs. A second method involved the grounded-grid amplifier, usually with two or more stages. This circuit gave good results, but it was somewhat low on gain. It required the rather expensive 6J4 for best performance, and it was not suitable for use in circuits involving automatic gain control. A third commonly-used circuit was a push-pull neutralized triode, such as the 6J6. Gain and noise characteristics were excellent with this circuit, but it was too critical for wideband applications. Circuit diagrams and discussions of these circuits may be found in the 1951 edition of the ARRL *Handbook*.

The new 6BQ7 can be used in any of these circuits with good results, either single-ended or in push-pull, with grounded grid or grounded cathode. In addition there are circuits designed especially for the 6BQ7 that provide the sought-after features of low noise, broadband response, and reasonably high gain, with circuit simplicity approaching that of the single-stage pentode amplifier. One such, termed the "direct-coupled driven-grounded-grid circuit," is shown in Fig. 1.

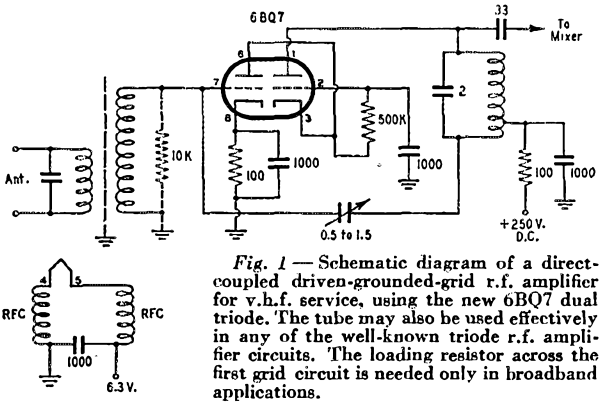


Fig. 1 — Schematic diagram of a direct-coupled driven-grounded-grid r.f. amplifier for v.h.f. service, using the new 6BQ7 dual triode. The tube may also be used effectively in any of the well-known triode r.f. amplifier circuits. The loading resistor across the first grid circuit is needed only in broadband applications.

Examination will show that it is a simplification of the cascode idea. It has the triode input stage, followed by a grounded-grid stage, the simplification resulting from the direct coupling between the two. The new circuit is more effective than the conventional cascode layout at higher frequencies, the disparity between them increasing with frequency as a result of the lower capacitance to ground from the plate of the first triode and the cathode of the second with the revised circuit. At frequencies above 100 Mc. the capacitive reactance of this combined plate-cathode-circuit capacitance may be low enough to have a considerable effect on the input impedance of the grounded-grid circuit.

The input impedance of such a grounded-grid stage is approximately the reciprocal of the transconductance of the tube in question, or about 200 ohms for the better triodes. A distributed capacitance of only 2 $\mu\mu$fd. has a capacitive reactance of 400 ohms at 200 Mc., so it may be seen that it would have a considerable effect on the input impedance of the grounded-grid unit, reducing the gain, causing degeneration due to capacitive phase angle, and allowing the noise of the output unit to contribute to that produced by the first tube.

Important considerations in attaining the lowest possible noise figure with the 6BQ7 are:

1) The physical arrangement should be such that stray capacitance in the plate-to-cathode

[1] Cohen, "Use of New Low-Noise Twin Triode in Television Tuners," *RCA Review*, March, 1951, page 3.

circuit is held to the lowest possible value.

2) The input circuit should have tight coupling, but with a minimum of capacitive coupling; in other words, a tuned primary with a Faraday shield between it and the secondary.

3) If the amplifier is to be used on several bands the inductance of the r.f. chokes in the heater leads and the setting of the neutralizing adjustment should be made for the highest frequency. The chokes should be resonant with the plate-to-ground capacitance of the first unit. Their effect is slight below 100 Mc. or so.

4) The small padder across the plate coil is necessary to assure adequate coupling between the two portions of the coil.

420-Mc. Application

It is expected that in addition to r.f. amplifier service in the v.h.f. range the 6BQ7 will be widely used as an i.f. preamplifier in television receivers for the u.h.f. band. When a crystal mixer is used for u.h.f. converter service the characteristics of the first i.f. amplifier stage are important in

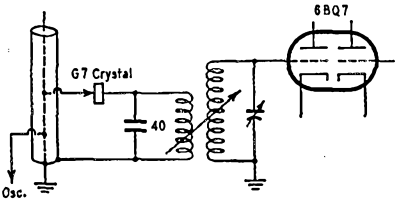


Fig. 2 — Use of the 6BQ7 as the first stage of an i.f. amplifier, in conjunction with a coaxial-line crystal mixer for u.h.f. service. The balance of the circuit is similar to Fig. 1.

determining the over-all noise figure of the system, it being roughly the sum of the noise figures of these two stages. The crystal mixer introduces an attenuation of about 9 db., so more i.f. gain is needed than with vacuum tube mixers. The 6BQ7 will supply the necessary gain, with a noise figure of 4.5 db. at 43 Mc. The circuit should be essentially the same as in Fig. 1, but with modifications in the input circuit for coupling to the low output impedance of the crystal mixer, as shown in Fig. 2.

With a good coaxial-line crystal mixer and a 6BQ7 i.f. preamplifier stage at 30 to 50 Mc., it should be possible to build a 420-Mc. receiver having adequate sensitivity and a noise figure as low as 10 db. Such a receiver should effect an improvement of 5 to 10 db. over the better converters with vacuum tube mixers now in use.

Using the 6BQ7 as the first portion of a converter for the v.h.f. bands it should be possible to obtain a noise figure of around 6 db. at 220 Mc. and appreciably lower at 144 and 50 Mc.

— *E. P. T.*

WWV-WWVH SCHEDULES

For the benefit of amateurs and other interested groups, the National Bureau of Standards maintains a service of technical radio broadcasts over WWV, Beltsville, Md., and WWVH, Maui, Territory of Hawaii.

The services from WWV include (1) standard radio frequencies of 2.5, 5, 10, 15, 20, 25, 30 and 35 Mc., (2) time announcements at 5-minute intervals by voice and International Morse code, (3) standard time intervals of 1 second, and 1, 4 and 5 minutes, (4) standard audio frequencies of 440 cycles (the standard musical pitch A above middle C) and 600 cycles, (5) radio propagation disturbance warnings by International Morse code consisting of the letters W, U or N, indicating warning, unstable conditions, or normal.

The audio frequencies are interrupted at precisely one minute before the hour and are resumed precisely on the hour and each five minutes thereafter. Code announcements are in GCT using the 24-hour system beginning with 0000 at midnight; voice announcements are in EST. The audio frequencies are transmitted alternately: The 600-cycle tone starts precisely on the hour and every 10 minutes thereafter, continuing for 4 minutes; the 440-cycle tone starts precisely five minutes after the hour and every 10 minutes thereafter, continuing for 4 minutes. Each carrier is modulated by a seconds pulse, heard as a faint tick; the pulse at the beginning of the last second of each minute is omitted.

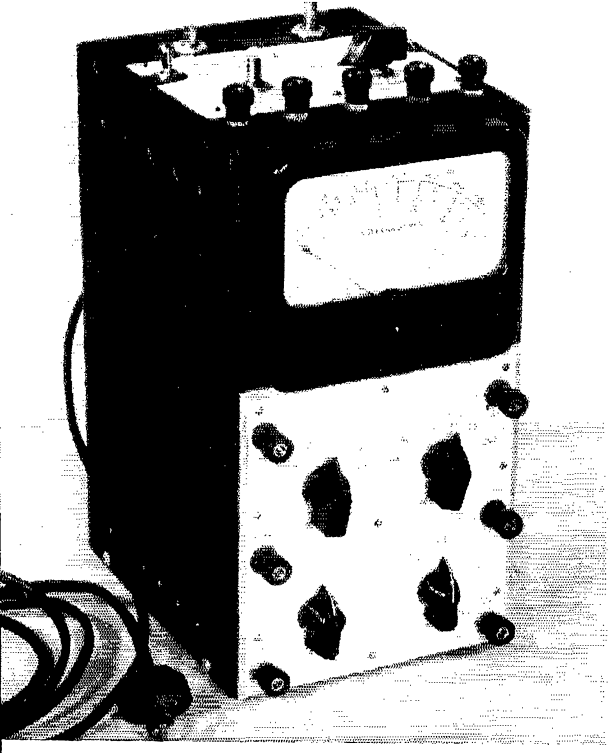
HAMFEST CALENDAR

MARYLAND — Sunday, August 19th, at Triton Beach, Mayo — fourth annual hamfest-picnic sponsored by the Baltimore Amateur Radio Communications Society. Tickets $1.00 per person at the gate (children 6 to 12, 50¢). Admission includes bathing, bath locker, picnic table, pavilion, parking lot and ball field privileges. Pack a picnic basket and enjoy the gala program. Beer and soft drinks will be on sale. The club station, W3PSG, will be in operation on 10-meter 'phone for the benefit of mobile hams, and a special prize will be awarded to the best mobile installation. To reach Triton Beach from Washington take Route 214 through Capital Heights to Route 2. From Baltimore take Route 2 through Annapolis, then follow the hamfest signs. For information write Chairman Ken Teeple, W3PSP, 718 E. Thirty-third St., Baltimore, Md.

MICHIGAN — Sunday, August 19th, at Warren Dunes State Park, 15 miles south of Saint Joseph on Lake Michigan, on U. S. Highway 12 — anniversary picnic and hamfest of the Blossomland Amateur Radio Assn. Bring the family, a basket lunch, and swimming gear; also usable radio equipment for swap and shop or auction. No admission charge to park or to picnic. Amateur registration fee, $1.00. Please make reservations in advance through Dean Manley, W8FGB, Saint Joseph, Mich.

PENNSYLVANIA — Sunday, August 12th, at Spreading Oaks Grove, South Park — hamfest of the South Hills Brass Pounders & Modulators. Registration fee of $2.00 includes a box lunch and fun and entertainment for young and old. Make advance reservations through C. J. Lauer, W3KVL, 345 S. Millvale Ave., Pittsburgh, Penna.

QUEBEC — Saturday, September 22nd, at Victoria Hall, Westmount — hamfest sponsored by the Montreal Amateur Radio Club. Program starts at noon, continuing until 1 A.M. Sunday. Official welcome by CGM Alex Reid, VE2BE, will take place at 2 P.M., and the banquet, at 7 P.M., will feature a full-course turkey dinner followed by a few short speeches. Dancing and entertainment will continue until closing time. Special parking arrangements have been made. Tickets, $4.00 single and $7.50 double.



The combination of vacuum-tube voltmeter, S-meter, and auxiliary power supply makes this a useful gadget for the ham shack. It measures a.c. and d.c. voltages up to 1000 volts and has current ranges from 1 milliampere to 1 ampere. All the components can easily be housed in a 5 × 9 × 6-inch box.

V.T. Voltmeter/S-Meter for the Ham Shack

BY PHILIP S. RAND,* W1DBM

THE instrument to be described is not only an excellent S-meter for your receiver but also serves as a general-purpose a.c./d.c. v.t. voltmeter, multirange milliammeter, and a 300-volt 70-ma. general-purpose power supply.

If you are the owner of a surplus receiver or any of the cheaper communications models you probably miss a good S-meter. After all, the first thing the other end of a QSO wants to know is, "What is my signal strength?" Many circuits have been published for using milliammeters in the plate or cathode lead to one of the i.f. stages; however, in my experience, by far the best way is actually to measure the a.v.c. voltage. Metering the a.v.c. line is like keeping your finger on the pulse of the receiver. Anything that goes wrong with the receiver will affect the a.v.c. For example, leakage between i.f. coils will show up as a positive voltage with no signal input, changing to a negative voltage when a station is tuned in. If the a.v.c. voltage is normal but no sound comes from the 'speaker, the trouble is in the a.f. amplifier. If there is no a.v.c. and the audio is distorted, look for a shorted decoupling condenser or grid by-pass.

In short, this meter not only tells you that your receiver is working fine but also helps you locate the trouble when trouble develops. When the receiver quits, the v.t. voltmeter may be used to measure a.c., d.c. and audio voltages to find the trouble, and can also be used as an output meter in realignment. If the trouble is located in the power supply, the instrument may be used temporarily to supply the needed voltages to get the receiver working.

* % Laboratory of Advanced Research, Remington Rand, Inc., South Norwalk, Conn.

It may also be used to power and meter various small units under construction, such as r.f. exciters, converters, and a.f. amplifiers.

Circuit

Fig. 1 shows the schematic diagram of the unit to be a more or less conventional v.t. voltmeter with an oversized power supply. The power transformer has a rating of 350 volts at 70 ma. which was deemed adequate for most supplementary uses. Miniature voltage regulator tubes were used to conserve space. Regulated voltages are brought out to binding posts on the panel. The −80 volts needed for the v.t. voltmeter was obtained by using an extra filament transformer connected backward, with a 6AL5 hooked up as a half-wave rectifier.

The milliammeter used is a 4-inch 0–1 ma. Simpson. The 0–1 ma. type was selected not only because it is cheaper but because it has a more rugged movement than the microammeter usually employed in instruments of this type.

The v.t. voltmeter circuit consists of two tubes, one a 6AL5 rectifier for changing a.f. voltages to d.c. so that they can be measured by the second tube, a 12AU7 dual triode.

The first half of the 6AL5 rectifies the incoming a.c. voltage, producing a negative d.c. voltage, while the second half bucks out the contact potential and allows an a.c. zero adjustment of the meter. This negative d.c. voltage is fed to the voltage divider by the function switch, S_1, where it is taken to the first grid of the 12AU7.

The operation of the 12AU7 is as follows: With both plates tied together to + 250 volts, both grids grounded, and with 3000-ohm re-

sistors in both cathodes, the plate currents in each half of the 12AU7 should be identical and should produce the same cathode bias, about 12 volts. Hence, a 0–1 ma. meter connected from cathode to cathode should read zero. Now, if the first grid is made either 5 volts positive or 5 volts negative, this will make the first half of the 12AU7 draw more or less plate current, causing its cathode voltage to change either up or down. This in turn will make the 0–1 ma. meter read forward or backward. With the circuit values shown, plus a meter reversing switch and a 5000-ohm series resistor ("D.C. Calibrate"), the meter can be made to read exactly full scale for 5 volts input. It is also necessary to have a d.c. zero-adjustment potentiometer at the bottom of the two cathode resistors to correct for differences in the tubes and cathode resistors.

A separate "A.C. Calibrate" potentiometer is provided so that the a.c. ranges can be read from the same meter calibrations. This is necessary because the d.c. output from the 6AL5 rectifier is not equal to the a.c. input.

With the circuit values shown in Fig. 1, the input to the d.c. v.t. voltmeter must be limited to 5 volts d.c. on all ranges. Hence, the attenuator is designed for a maximum output of 5 volts.

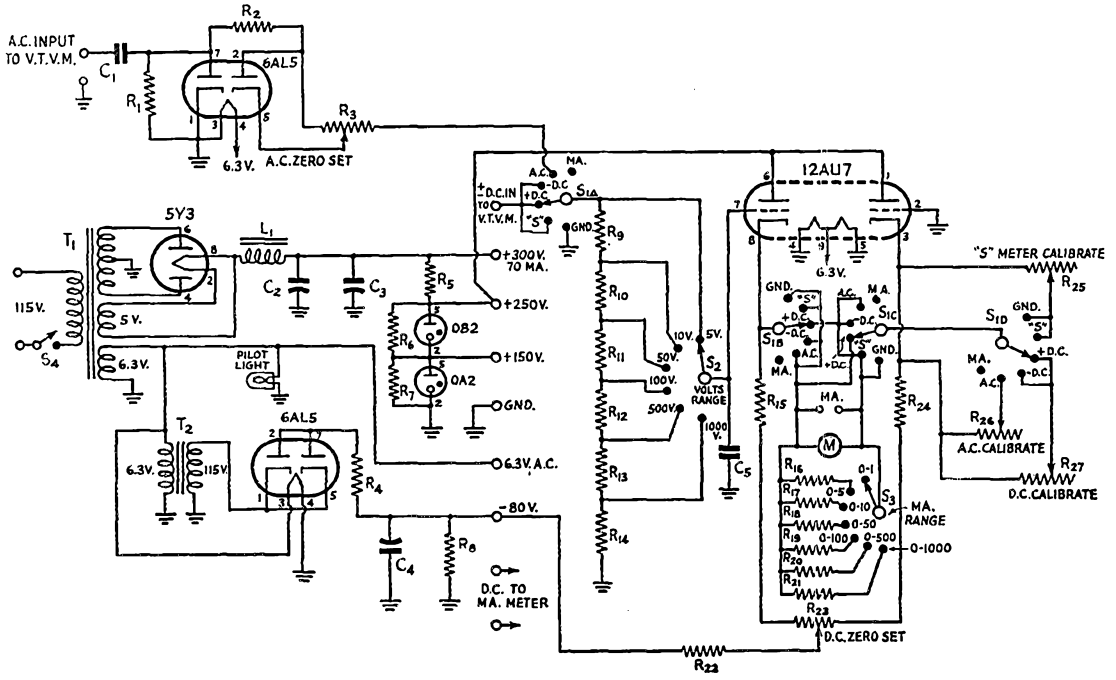


Fig. 1 — Circuit diagram of the v.t. voltmeter and power supply.

C_1 — 0.01-μfd. mica.
C_2, C_3 — 8-μfd. electrolytic, 450 volts.
C_4 — 8-μfd. electrolytic, 150 volts.
C_5 — 0.005-μfd. mica.
R_1 — 10 megohms, ½ watt.
R_2 — 3.3 megohms, ½ watt.
R_3 — 10-megohm potentiometer.
R_4 — 1000 ohms, 1 watt.
R_5 — 5000 ohms, 10 watts.
R_6, R_7 — 0.1 megohm, 1 watt.
R_8 — 33,000 ohms, 1 watt.
R_9 — 5 megohms (3.3 + 1.5 + 0.22 megohms, ½ watt).
R_{10} — 4 megohms (1.5 + 1.5 + 1.0 megohms, ½ watt).
R_{11} — 0.5 megohm (0.47 megohm + 33,000 ohms, ½ watt).
R_{12} — 0.4 megohm (0.39 megohm + 10,000 ohms, ½ watt).
R_{13}, R_{14} — 50,000 ohms (39,000 ohms + 12,000 ohms, ½ watt).
R_{15}, R_{24} — 3000 ohms, 1 watt.
R_{16} — 10 ohms.
R_{17} — 4.44 ohms.
R_{18} — 0.816 ohm.
R_{19} — 0.404 ohm.
R_{20} — 0.0802 ohm.
R_{21} — 0.0400 ohm.
R_{22} — 12,000 ohms, 1 watt.
R_{23} — 500-ohm potentiometer.
R_{25} — 15,000-ohm potentiometer.
R_{26}, R_{27} — 5000-ohm potentiometer.
L_1 — Replacement-type filter choke, 70 ma.
M — 0–1 milliammeter (40-ohm movement, for shunts specified for R_{16} to R_{21}, inclusive).
S_1 — 4-pole 6-position ceramic wafer switch.
S_2 — 1-pole 6-position ceramic wafer switch.
S_3 — 1-pole 7-position wafer switch.
T_1 — Power transformer, 350 volts each side c.t., 70 ma.; 5 volts, 3 amp.; 6.3 volts, 2.5 amp.
T_2 — Filament transformer, 6.3 volts, 1 amp.

NOTE 1: R_9 to R_{14}, inclusive, adjusted as described in text. Values given above were those actually used; alternative combinations may be used so long as they add to the correct value.

NOTE 2: R_{16} to R_{21}, inclusive, may be adjusted as described in text. For other instruments than the Simpson 4-inch milliammeter shown, the values of shunts will depend on the internal resistance of the meter.

NOTE 3: Leads from meter to S_3 should be of No. 12 wire and should be short, to avoid introducing additional resistance on the high-current ranges.

Attenuator

The voltage attenuator is assembled on a single-pole 6-position ceramic wafer switch. Each resistance is made up by connecting several smaller resistors in series so that their total value equals the specified number of ohms. Assuming that run-of-mill resistors will vary within the tolerances both above and below the marked value, the chances that several resistors in series will add up to a close approximation to a desired value are much greater than that a single resistor will be equally close. In this way it is possible to get good accuracy without the expense of buying the precision resistors normally required.[1]

The "MA. Range" switch, S_3, is also a single-pole ceramic job but has seven positions. The shunt multiplying resistors are made up by connecting several small resistors in parallel until the required resistance is obtained. They can also be wound from fine copper wire "à la" the ARRL *Handbook*.

Before the values of these resistors can be determined by formula the resistance of the meter to be used must be known. To determine it, connect the meter in series with a 1-megohm variable across a low-voltage power supply and adjust the resistance for exactly 1 ma. Next, connect another variable resistor of, say, 100 ohms in parallel with the meter and adjust to exactly ½ ma. Now, measure the resistance needed to give this half-scale reading and it will be equal to the resistance of the meter.

The required values of shunt resistors can be found from

$$R = \frac{R_m}{n - 1}$$

where R = resistance of multiplier,
R_m = internal resistance of meter,
n = the scale multiplying factor.

If you have determined that $R_m = 40$ ohms, and you wish your 0–1 milliammeter to read 0–10 ma., then

$$R = \frac{40}{10 - 1} = \frac{40}{9} = 4.44 \text{ ohms.}$$

To obtain a resistor of 4.44 ohms you may jumble-wind approximately 6 feet 7 inches of No. 38 enameled copper wire on a high-value one-watt resistor as a form. No. 38 wire has about 673 ohms per 1000 ft. (See wire table in *Handbook*.) Therefore:

$$\frac{673}{1000} = \frac{4.44}{x}$$

$$673x = 444$$

x = 6.6 ft. = about 6 feet 7 inches.

The shunt can be adjusted to a fairly exact value by passing a current of exactly 1 ma. through the meter without the shunt, using a set-up as described above for measuring meter resistance, and then connecting the shunt, adjusting its length a little at a time until the meter reading is 1 ma. divided by n. In this example above, the required reading would be 0.1 ma. The wire for the shunt initially should be cut slightly long for this purpose.

Shunts for other multiplying factors can be calculated in the same way. Adjust the low-value multipliers first, and work up to the maximum current range. Alternatively, the shunts may be adjusted by comparison with a calibrated multirange meter if one can be borrowed.

The 12,000-ohm resistor that is common to both 12AU7 cathodes is necessary to improve the linearity of the voltage readings and make the reading the same with either positive or negative input. This resistor increases the positive cathode bias to too high a value, which has to be bucked out by the negative 80 volts of bias as shown.

S-Meter

When using this v.t. voltmeter as an S-meter it is desirable to be able to set the S9 point to some convenient midscale reading, therefore a separate calibrating 15,000-ohm variable resistor is included on the front panel. For the average receiver the voltage range switch is set for 10 volts and the function switch is set to the S-meter position. The meter will then read the negative a.v.c. voltage when the ± binding post is tapped on the a.v.c. line of the receiver. In the writer's case, a shielded wire is run from the a.v.c. line of each receiver and Q5-er to an external single-pole 5-position switch so the S-meter can be switched to any one of the receivers.

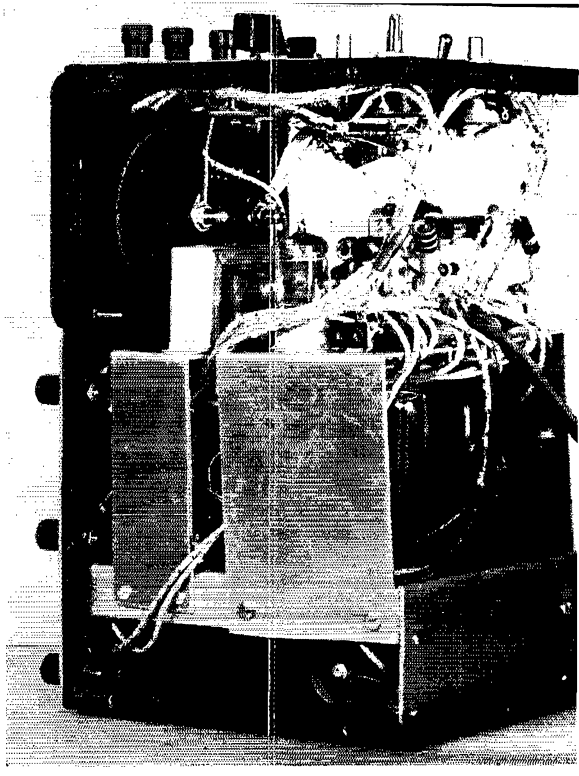
Calibrating the S-Meter

If your receiver has a.v.c. applied to three or more r.f. and i.f. stages, the a.v.c. voltage should be fairly logarithmic with respect to signal strength and the S units should be nice and linear; that is, spaced equally apart on the meter scale. The meter is most conveniently calibrated in 6-db. steps per S unit. This means that every time the signal strength doubles or halves, the meter reading will increase or decrease by one S unit. A convenient method of calibrating the S-meter is to get a near-by ham who has a Variac in his final power supply to vary his plate voltage in the following steps: 100 v., 200 v., 400 v., 800 v., and 1600 v. This gives us 6-db. steps (assuming the other station's final amplifier is operating Class C) and the meter readings are noted down, first with a very short antenna on the receiver and then with a long antenna. In my case each 6-db. step moved the 0–1 milliammeter 0.04 ma., the steps being uniform over the entire range, so that S1 = 0.04, S2 = 0.08, and so on.

This method of calibration is, of course, only accurate for the one receiver and the one band it was calibrated on. However, it is close enough to be useful on other bands.

Many amateurs probably will be surprised when using this S-meter to find that a 1-watt

[1] Another method that requires only two resistors and an initial measurement on a good resistance bridge was described by Dudley, "An Impedance Bridge for Less than Ten Dollars," *QST*, June, 1950, p. 22.



The power supply is mounted on a folded piece of aluminum serving as a chassis. The voltmeter tubes are on an upper deck made by folding a piece of aluminum into a "U." Since only d.c. and low-frequency a.c. circuits are involved, any convenient layout may be used.

♦

transmitter reading S1 only goes up to S2¾ when the power is increased to 10 watts and to S4½ with 100 watts and to only S6 with one full gallon. This is a total increase of 30 db. in power, or 5 S units. Similarly, a 1000-watt station reading S9 + 40 db. will still be S9 + 10 db. when the power is reduced to one watt.

Without a standard signal generator, the meter, of course, cannot be calibrated in terms of actual signal strength at the antenna terminals of the receiver. However, so long as the reading is fairly well up on the scale so that possible variations in a.v.c. action near the zero end are eliminated, we are in a position to give reliable reports in db. increase or decrease in our friends' signals when they tune or rotate their beams or make adjustments on their transmitters. It is even possible to swing your own beam while tuned to a steady carrier and plot the directional pattern in db.

Construction

The general layout and construction are shown in the photographs. The power supply is mounted on the bottom deck while the miniature tubes are mounted on the top deck.

The "MA. Range" switch, the d.c. calibrating control, and the a.c. calibrating and centering controls are mounted on the top of the cabinet, together with the power supply output binding posts. The remaining controls are on the front panel under the meter as shown.

After testing the completed unit the meter may be carefully removed and its dial hand-calibrated as shown. The panel calibrations are lettered in India ink on white cardboard, covered with clear celluloid and held in place with 2-56 machine screws tapped into the panel.

Checking

Reference points for the meter calibrations can be established by simply measuring the a.c. and d.c. voltages appearing at the power supply terminals on the top of the cabinet. First, set the function switch, S_1, to the ground position and rotate the d.c. zero-set control until the meter reads zero. Next, switch to the a.c. position and rotate the a.c. zero-set control until the meter again reads zero. Now, connect the a.c. binding post of the meter to the 6.3-volt power supply terminal and adjust the a.c. calibration control so that the meter reads 6.3 volts a.c. on the 0–10 volt range. Next, switch the function switch to the plus d.c. position, set the range switch to the 0–500 volt range, connect the ± d.c. meter binding post to the regulated +250 terminal, and adjust the d.c. calibrating control to make the meter read 250 volts. The meter is then all set for use. If your voltage-divider resistances have been measured carefully the meter should read accurately on all the other ranges.

Current Ranges

The "MA. Range" switch should be a shorting-type switch; that is, it should make the next contact before breaking the last one; otherwise the meter may be burned out if the switch is turned while measuring current. To be on the safe side, never operate the "MA. Range" switch while measuring current. Also, always set the range switch for a higher-than-expected reading and shut off the gear being measured before switching the meter to the next range. Treat the meter with all the care that a 0–1 milliammeter deserves. It is not protected against overloads when measuring current.

V.O.A. AMATEUR RADIO PROGRAMS

The following is the transmission schedule for the VOA radio amateur program. Times and frequencies are subject to periodic change with changing conditions for propagation.

Latin American Service — 0230 GCT Sunday, 9650, 11,830, 11,890, 15,210, 15,350 and 17,830 kc.

Far Eastern and Pacific Service — 1230 GCT Sunday, 6060, 6075, 6120, 6185, 9515, 9570, 9600, 11,790, 11,890, 15,105 and 15,330 kc.

European and Middle Eastern Service — 1915 GCT Sunday, 9700, 11,870, 12,095, 15,270 17,780 and 21,500 kc.; 2100 GCT Sunday, 6080, 6140, 6170, 9540, 11,830, 11,870, 15,210, 15,270, 15,350, 17,780, 21,500, and 21,650 kc.

Address reports and comments on this program to ARRL.

Crystal Lattice Filters for Transmitting and Receiving

Part II—A Crystal-Filter S.S.B. Exciter†

BY C. E. WEAVER,* W2AZW, AND J. N. BROWN,** W4OLL

THE exciter contains a majority of the essential features which most s.s.b. operators consider desirable. No attempt was made to design an exciter with a bare minimum number of tubes or parts. It was felt that the exciter should not require the addition of external audio stages, voice-control or other appendages to make it complete. These features have been included in a unit that is comparatively simple and easily lined up with test equipment usually available to most ham stations. When once adjusted properly, the exciter should stay in alignment for months without further attention.

The VFO was not included as part of the exciter because this item is usually available as part of the existing station equipment. Generally, the VFO can be modified to cover the frequency range required by the exciter. This is done by adding enough capacity to the existing tuned circuits of the VFO so that it will tune approximately 475 kc. lower than the 'phone band to be used. For 3.8- to 4.0-Mc. operation, this will be in the vicinity of 3.325 to 3.525 Mc. The exact frequency range will depend on the choice of crystals for the lattice filter in the exciter.

The exciter shown in the photograph is the original experimental model. The chassis is one that happened to be on hand and is adequate for the purpose, but rather difficult to wire. The builder can use any size chassis or arrangement desired. However, a few precautions should be observed. The low-frequency oscillator (V_3, Fig. 1) and associated components should be isolated as far as practicable from the other equipment, and particularly from the output of the crystal filter, to prevent leakage of the carrier around the filter that would result in incomplete carrier suppression. The crystal lattice sections and associated transformers should be arranged approximately as shown in Fig. 2. The crystals and their sockets should be mounted above the chassis in a shield cover, large enough so that it does not add appreciable distributed capacity to the crystals. It is also advisable to shield the wires between the transformers and the crystal lattice sections to prevent stray pick-up. This wiring should be kept as short as possible.

The narrow-band crystal filter was chosen for the exciter because it is easier to adjust than the wide-band filter and normally should not require additional shunt capacity across the crystals. Tests on several sets of crystals indicated that the capacity due to the plating alone is sufficiently uniform for all practical applications. The crystals used were Channels 49 and 50 of the surplus FT-241-A type, although any adjacent channels of the two-digit serial number with fundamental frequencies between approximately 430 kc. and 490 kc. should be satisfactory. The loss-frequency characteristic of the filter alone was shown in Fig. 6 of Part I. †

The Exciter Circuit

Referring to Fig. 1, the circuit diagram of the exciter, briefly the operation is as follows: V_1 amplifies the voice frequencies from the microphone and steps the output down to approximately 600 ohms impedance, which feeds into the balanced modulator (twin crystal diode 1N35) to combine with the carrier from oscillator V_3. This produces an amplitude-modulated signal with the carrier suppressed. The resulting upper and lower sidebands feed into T_3 through an impedance-transforming network consisting of C_{19} and the trimmer condenser in series with

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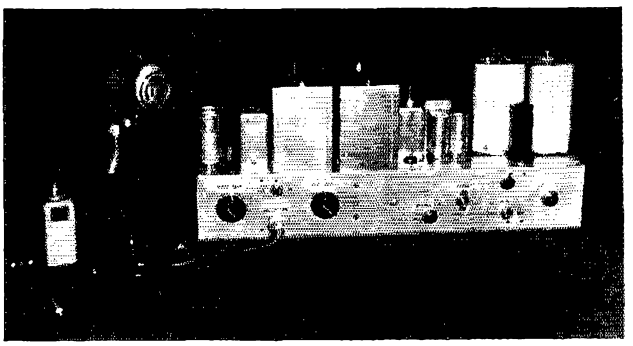
† Part I appeared in the June, 1951, issue of *QST*.



A complete s.s.b. exciter using the crystal lattice filter. The small chassis in the left foreground contains the low-frequency oscillator circuit and the sideband selector switch.

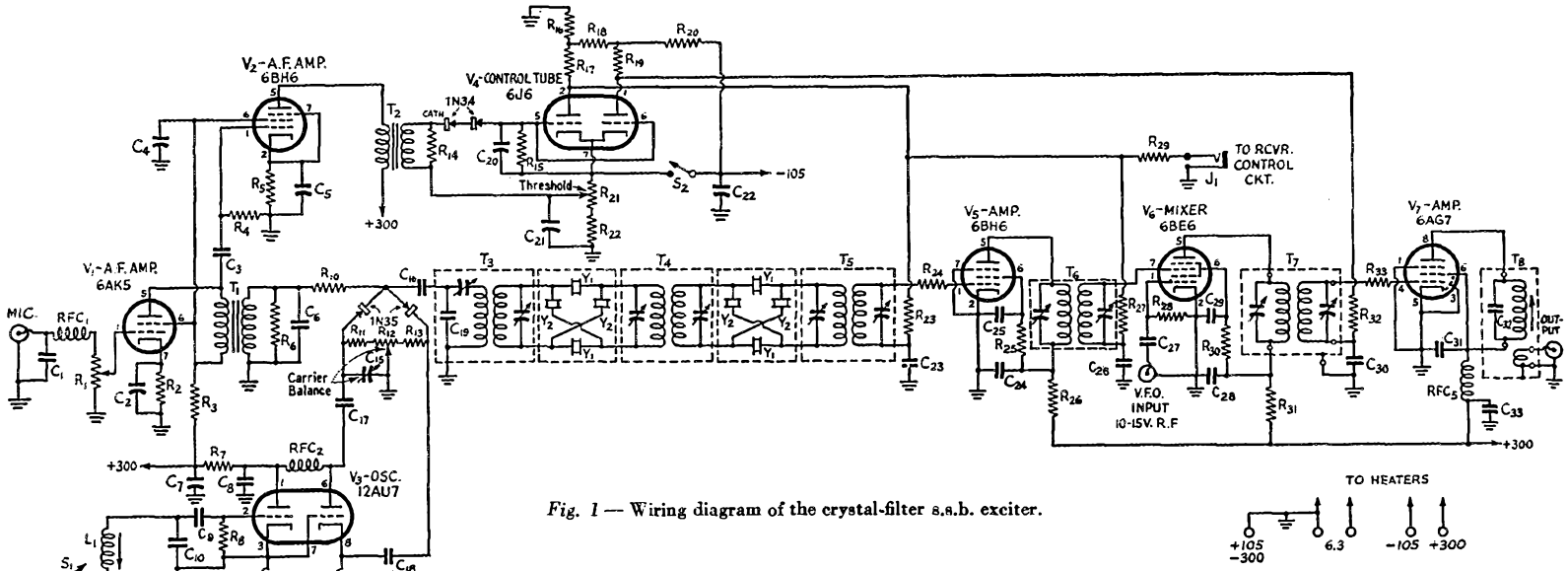


Fig. 1 — Wiring diagram of the crystal-filter s.s.b. exciter.

C_1, C_9 — 220 $\mu\mu$fd.
C_2, C_5 — 10-μfd. 25-volt electrolytic.
C_3, C_{16}, C_{19} — 0.001 μfd.
C_4 — 10-μfd. 450-volt electrolytic.
C_6, C_{17}, C_{18} — 330 $\mu\mu$fd.
C_7 — 20-μfd. 450-volt electrolytic.
C_8, C_{14} — 0.01 μfd.
C_{10}, C_{11} — 0.0039 μfd., silvered mica.
C_{12} — 550 $\mu\mu$fd. (or sufficient to resonate L_1 to crystal-filter range).
C_{13} — 50-$\mu\mu$fd. air trimmer.
C_{15} — 50-$\mu\mu$fd. air trimmer. Required only if complete carrier balance cannot be obtained with R_{12}. If balance not obtained with C_{15} across R_{11}, try across R_{13}.
C_{20} — 0.1-μfd. oil-filled or high-grade paper.
C_{21}, C_{22} — 0.05-μfd., 300-volt paper.
C_{23}, C_{24}, C_{25}, C_{26}, C_{28}, C_{29}, C_{30}, C_{33} — 0.0082 μfd.
C_{27} — 100 $\mu\mu$fd.
C_{31} — 0.015 μfd.
C_{32} — 330 $\mu\mu$fd.

All condensers mica or ceramic unless specified otherwise.
R_1 — 1-megohm volume control.
R_2 — 220 ohms.
R_3 — 15,000 ohms, 5 watts.
R_4 — 0.22 megohm.
R_5 — 150 ohms.
R_6, R_{10} — 1000 ohms.
R_7 — 18,000 ohms, 5 watts.
R_8, R_{14}, R_{17}, R_{19} — 47,000 ohms.
R_9 — 2700 ohms.
R_{11}, R_{13} — 820 ohms ±5%.
R_{12} — 250-ohm linear carbon potentiometer.
R_{15} — 2 megohms.
R_{16} — 510 ohms.
R_{18} — 4700 ohms ±5%.
R_{20} — 47,000 ohms ±5%.
R_{21} — 20,000-ohm wire-wound potentiometer.
R_{22} — 82,000 ohms.
R_{23}, R_{27} — 0.1 megohm.
R_{24} — 2200 ohms.
R_{25}, R_{30} — 47,000 ohms, 2 watts.
R_{26}, R_{29} — 4700 ohms.
R_{28}, R_{32} — 22,000 ohms.
R_{31} — 1500 ohms, 1 watt.
R_{33} — 47 ohms.

All resistors ½-watt composition, ±20%, unless specified otherwise.
L_1 — 455-kc. b.f.o. coil rearranged in series for Clapp oscillator circuit with C_{10}, C_{11} and C_{12}. May need trimming to resonate in crystal frequency range.
T_1 — 20,000-ohm plate to 600-ohm line audio transformer. (Stancor A-3250)
T_2 — Midget 2:1 interstage audio transformer, reversed.
T_3, T_4, T_5, T_6 — 455-kc. interstage i.f. transformers. Must tune through crystal-filter range. Note revision of T_3 primary connection.
T_7 — 4-Mc. i.f. transformer (capacity-loaded 5-Mc. unit), remounted in National PB-10 plug-in shield can.
T_8 — Plate coil is 31 turns No. 22 enam. close-wound on Millen 69046 coil form. Link winding, 4 turns over B+ end of winding. Assembly mounted in National PB-10 can with C_{32}.
RFC_1, RFC_3, RFC_5 — 2.5-mh. r.f. choke.
RFC_2, RFC_4 — 60-mh. r.f. choke, iron core, shielded.
S_1 — S.p.s.t. ceramic switch for sideband selection.
S_2 — Toggle switch for disabling voice-control circuit.
Y_1, Y_2 — Filter crystals (surplus FT-241-A, adjacent channels of two-digit series with fundamental frequency preferably between 430 and 490 kc. Y_1 is higher, Y_2 is lower adjacent channel.

TABLE I — ALIGNMENT PROCEDURE

Test No.	*Test*	*Signal Generator Frequency* [1]	*Signal Generator Connection*	*Measuring Set Connection* [3]	*Measuring Set Adj.* [2]	*Test Condition*	*Adjust . . .*	*Adjust for . . .*
1	Crystal-filter alignment	Center of crystal-filter passband	Apex junction of 1N35, R_{10} and C_{16} through 20-$\mu\mu$fd. condenser	Plate of V_6 through 20-$\mu\mu$fd. condenser	Tune to sig. gen. freq. AVC-On BFO-Off	S_2 open, V_3 removed, b.f.o. disconnected, R_1 off (CCW)	T_3, T_4, T_5, T_6	Maximum S-meter reading
2	Same	Vary sig. gen. plus and minus 3 kc. as required under "Adjust for"	Same	Same	Same	Same	None	Note S-meter reading at several points above and below center freq., devia. and loss *vs.* freq. should be approx. same as Fig. 6, Part I [4,5]
3	Converter V_6 and output amplifier V_7 alignment	Center of crystal-filter passband	Same	Output of T_8 (link) loaded with 50-ohm 5-watt carbon resistance. Antenna lead in close proximity to 50-ohm res. but not directly connected	Tune to desired operating freq. (3.8–3.999 Mc.) AVC-On BFO-Off	Same except VFO connected and adj. to desired operating freq. (3.8–3.999 Mc.) minus center freq. of crystal filter [8]	T_7, T_8	Maximum S-meter reading [3]
4	Carrier adjustment	None	None	Same	Same	Same except V_3 in place, S_1 open, R_{12} full CCW or CW [7]	L_1	Maximum S-meter reading [3]
5 [6]	Same	None	None	Same	Same	Same	L_1 toward high freq. side of filter. (Decrease inductance)	Decrease of five S points from max. obtained test No. 4 (25–30 db.)
6 [9]	Same	None	None	Same	Same	Same except S_1 closed	C_{13} from min. toward max.	Same as test No. 5
7	Carrier Suppression	None	None	Same	Same	Same	R_{12}, C_{15} [5]	Minimum S-meter reading [6]
8	Voice quality check	None	None	Same	AVC-Off, BFO-On. a.f. gain-full on, r.f. gain for normal receiver level	Same except mic. connected	None	Tune receiver slowly for normal intelligibility while talking into mic. — observe speech quality [10]
9	Voice control operation and adjustment	None	None	Same	Same	Same except S_2 closed	R_{21}	Adjust slightly below the point where clipping disappears

[1] Preferably a BC-221 frequency meter. A good signal generator should also be satisfactory. A shielded cable should be used between the signal generator and point of connection.

[2] A communications receiver used as a measuring instrument. If 200-kc to 500-kc. band is not available, use crystal-controlled converter suggested in Part I. A shielded cable should be used between the point of connection and receiver input.

[3] For best accuracy, maximum S-meter readings should be taken around S9 or slightly above. The output of the signal generator should be adjusted as required. A carbon potentiometer output control may be necessary if a BC-221 is used.

[4] It is assumed that the S-meter calibration is approximately 5 db. per unit.

[5] If S-meter reading is too high, adjust R_{12} to lower.

[6] Try adjustment first with C_{15} disconnected. If suppression is insufficient, connect C_{15} as shown (Fig. 1) and alternately adjust R_{12} and C_{15} for minimum carrier. If no improvement is noted, move outside connection of C_{15} to the opposite side of the bridge and repeat the adjustments

[7] The r.f. voltage from either side of the bridge will ordinarily be between 1.5 and 2.5 volts with the components shown. It should be measured with a v.t.v.m. if available.

[8] The r.f. voltage at the No. 1 grid of V_8 (Pin No. 1) should be checked initially, by placing a 0–1 ma. meter in series with the ground end of R_{23}, by-passed with a 0.01-μfd. condenser at the point of connection. The d.c. through R_{23} should be between 0.5 and 0.8 ma.

[9] Repeat several times alternately.

[10] Repeat test with S_1 set for other sideband.

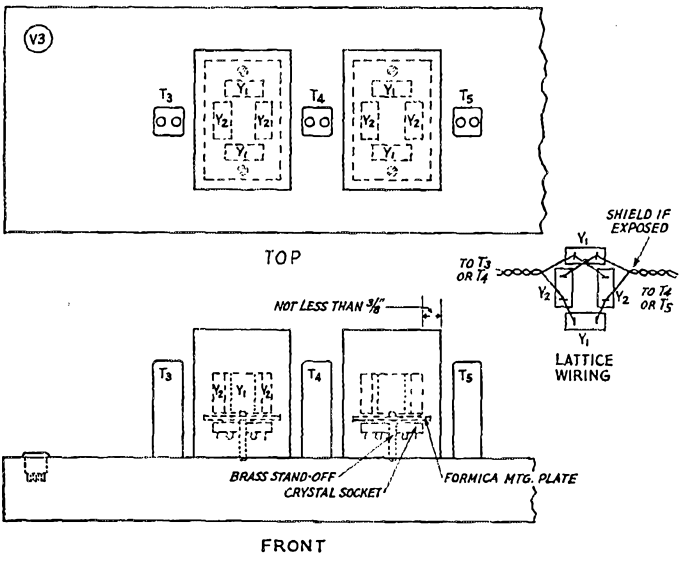


Fig. 2 — A suggested chassis arrangement for the crystal filter.

the primary winding of T_3. As the signal passes through the filter, one sideband is removed. V_5 amplifies the remaining sideband signal from the filter output and feeds it into the r.f. input grid of V_6 where it is mixed with an external VFO to produce the final frequency. Mixer tube V_6 is coupled to amplifier tube V_7 through a 4-Mc. i.f. transformer. V_7 is a 6AG7 operating Class A and will deliver approximately 3 watts average power into a 50-ohm load. T_7 and T_8 are enclosed in National plug-in shields so that transformers can be constructed to cover other bands if desired. The coil values given here are for the 75-meter 'phone band only.

Voice Control

V_2 is the additional audio amplifier for the voice-control circuit. V_4 is a 6J6 that serves as the voice-control tube. The secondary of T_2 connects to the 1N34 rectifiers (in series for voltage and back-resistance considerations) and R_{15} and C_{20}. Potentiometer R_{21} is a threshold sensitivity control, which is advantageous where room noise is present and it is desired to lower the sensitivity of the voice control to prevent false operation. When there is no audio input to the exciter, the grid of V_4 has zero bias, thus permitting it to conduct. This in turn causes a voltage drop across R_{17} and R_{19} that biases V_5, V_6 and V_7 to cut-off, disabling the exciter and permitting the receiver to pick up incoming signals without being masked by thermal and room noise from the transmitter output stage. When the microphone is energized, V_1 and V_2 amplify the audio, which in turn is rectified by the 1N34s. The resultant voltage is used to bias the grids of V_4 negative and to cut off the plate current. This turns on the exciter by placing normal operating bias on V_5, V_6 and V_7 from voltage divider R_{16}, R_{18} and R_{20}.

If the receiver control unit, Fig. 3, is connected to the transmitter voice control circuit, J_1, Fig. 1, the receiver will be automatically disabled during transmission and restored to receiving condition when the operator stops talking. Referring again to Fig. 1, no clipping is discernible even on the first syllable because the voltage produced across the secondary of T_2 is comparatively high and the bias required to cut off the plate current of V_4 is quite low; therefore, the transmitter is energized in the matter of a few milliseconds. When the operator stops talking, it takes a longer time for the bias to drop to zero through the R_{15} and C_{20} network. The network values shown are about optimum, but the "hangover" time can be changed to suit the individual by the proper choice of values for R_{15} and C_{20}. The transmitter and receiver control circuits are timed so that the receiver is completely disabled a few milliseconds before the transmitter is energized. When the operator stops talking, the receiver is again energized approximately 0.1 second after the transmitter

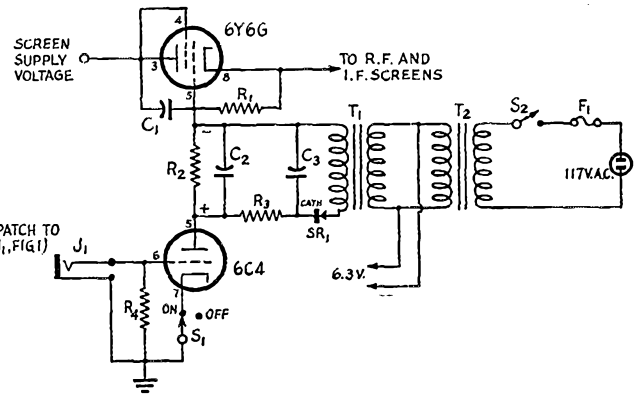
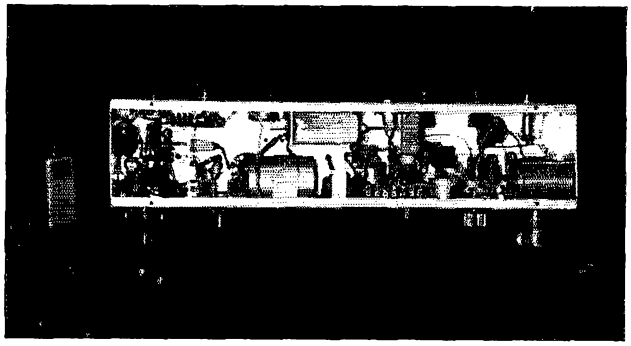


Fig. 3 — The receiver voice-control circuit.

C_1 — 0.01 μfd., 600 volts.
C_2, C_3 — 16-μfd. 150-volt electrolytic.
R_1 — 0.47 megohm, ½ watt.
R_2, R_4 — 0.22 megohm, ½ watt.
R_3 — 22,000 ohms, 1 watt.
T_1 — 6.3-volt 1-amp. filament transformer.
T_2 — 6.3-volt 1.5-amp. filament transformer.
F_1 — ½-amp. fuse.
J_1 — Open-circuit jack.
S_1, S_2 — S.p.s.t. toggle.
SR_1 — 50-ma. selenium rectifier.

If battery bias is preferred, replace R_2 with a 60- or 90-volt hearing-aid battery and omit T_1, SR_1, C_2, C_3 and R_3.



A view underneath the chassis of the s.s.b. exciter, showing an i.f. transformer (T_4 in Fig. 1) mounted under the chassis.

is de-energized. This split-second timing permits the operator to engage in a normal conversation with one or more single-sideband stations similarly equipped and operating on the same frequency, without annoying clicks or howls from the receiver as it is automatically switched on and off.

Alignment

The alignment procedure is covered step by step in Table I. Where measurements are made with the signal generator and receiver operating on the same frequency, previous tests should be made to insure that the receiver does not pick up an appreciable amount of signal from the generator through stray coupling, even when they are disconnected.

When selecting the crystals for the filter, they should be "paired" for each section; that is, the two like crystals in each section should be as nearly identical in frequency as possible. Tests indicate that the frequency of a pair can deviate as much as 50 cycles from each other without serious effect. Generally, most of the 241-A crystals with the same channel designation will be found to be within these tolerances. Occasionally, one may be found that deviates 100 cycles or more. If this occurs, it should be replaced with another crystal, or the lower-frequency one can be edge-ground slightly until it matches the higher-frequency crystal of the pair, as covered in the first part of this article.

Operation

The exciter can be used directly as a low-power transmitter, but it is not recommended, particularly on 75 meters. A good linear amplifier such as the one described in the March, 1951, issue of *QST* will put you directly into the medium- or high-power class. A very creditable job can be done with a pair of Class B 807s following the exciter. If everything is properly lined up, the unwanted sideband at the output of the exciter will be suppressed 50 db. or more and distortion products should be greater than 35 db. down at 3 watts output. The linear amplifier following the exciter will more than likely determine the amount of distortion products radiated by the antenna. Other articles have been written on Class B amplifiers and their adjustments, and they will not be covered here.

The exciter described here and shown in the photographs has been in use at W2AZW for several months now and from on-the-air reports as well as local tests and measurements, it performs as well or better than the previous 10-kc. filter job which is a maze of tubes, controls, filters and conversions. Furthermore, it only slices about an even 2500 cycles out of the spectrum.

The authors would like to express their appreciation to W. S. Felch, W2EAS, who contributed many constructive suggestions during the preliminary work on the crystal filter and subsequent design of the exciter.

A.R.R.L. WEST GULF DIVISION CONVENTION

Austin, Texas, August 17th–19th

The twenty-first annual ARRL West Gulf Division Convention, sponsored by the Austin Amateur Radio Club will be held at the Stephen F. Austin Hotel, Austin, Texas, on August 17th–19th. The Austin gang hope to make it the best ever.

For early arrivals there will be a special party on Friday evening, featuring a barbecue dinner, refreshments, and entertainment, in the City Coliseum.

The program committee is working out a roundtable discussion on TVI, participants being representatives of FCC, manufacturers, and amateurs. A. David Middelton, W5CA, Director of the West Gulf Division, has agreed to represent the hams

There will be many technical talks, contests, a dance, and the banquet, with the program committee working out a well-rounded schedule of fun for the whole family. There will be contests designed not only for the experts but for all those who wish to participate.

FCC amateur examinations will be given, making this an excellent opportunity for Novices and other beginners to meet the amateur fraternity while taking their first step toward getting on the air.

For the ladies there will be a special dinner, a style show, and visits to points of interest in the historic city of Austin.

Preregistration for the convention will be $8.00, with preregistrations closing August 10th. The barbecue and party on Friday evening will be $1.50. Registrations and reservations may be obtained by mail from W5BGH, Convention Registrar, P.O. Box 1716, Austin, Texas.

The World Above 50 Mc.

CONDUCTED BY E. P. TILTON,* W1HDQ

It had to happen eventually. Our three-per-year v.h.f. contest program has been in effect since 1947, but in four years, none of the contest dates has coincided with a major v.h.f. band opening of any kind. In past parties there have been good tropospheric conditions here and there, and aurora has helped things along a few times. Two of the spring parties were enlivened by all-too-short bursts of sporadic-*E* skip on 50 Mc. But never has there been anything like the week end of June 9th and 10th.

Sporadic-*E* ionization seemed to be everywhere at once, both on Saturday evening and during the following Sunday. Tropospheric conditions were good in several localities, and a new high in something or other prevailed across Southwestern U.S.A. Call it sporadic-*E* ionization of a super-dense nature, or an extraordinarily high and widespread tropospheric inversion — the important thing is that it netted a new DX record for two-way communication on 144 Mc., and the first W5-W6 contacts on that band. The results of all this show plainly in the tabulation of scores at the end of this department: the largest stack of reports ever received in a spring or fall contest, and the highest scores and section multipliers on record. It was quite a show!

The break to the West Coast could hardly have come at a worse time, so far as the W5s were concerned, however. Violent thunderstorms were prevalent all across Texas, keeping the noise level at an almost constant S9. In Texarkana, W5QNL had been checking the f.m. and 2-meter bands at intervals. When a Los Angeles f.m. station appeared at 6:35 P.M. CST, Mac turned his 2-meter beam west and began calling CQ. An unidentified c.w. signal was heard on 145.5 Mc. at 7 P.M., but the fading and noise were so bad that the call could not be copied. Then at 7:05 W6WSQ, Pasadena, Cal., came back, his signal running S5 to 6, and the two-way record for 2-meter communication jumped to approximately 1390 miles. W6WSQ's hold on the record was brief, to say the least, for at 7:10 W2PJA/6, Long Beach, was worked with S6 to 9-plus. This was perhaps another five miles farther, but Bud, too, was a record-holder for less than five minutes, as W6ZL, Glendale, made it at 7:15. Don's location is about 10 miles west of W6WSQ, but it will take some close figuring to determine whether W6ZL or W2PJA/6 is the record holder. Decision awaits receipt of exact location information from all parties, but it looks like W6ZL on the maps.

While all this was going on, W5AJG in Dallas was dodging the lightning bolts and trying to stay on the air to work the W6s. Despite his receiver antenna terminals arcing across and his mike buzzing him in the nose, Leroy managed contacts with all three above-mentioned stations, the distances being well in excess of the previous 1200-mile 2-meter record. In Fort Worth, W5CVW heard the W6s but could never be sure if any of them came back to his calls, so frequent were the lightning flashes. Many other signals were heard each way by all participants. W5PDW, thought to be in Biloxi, Miss., was heard by W6ZL. This would be a distance of nearly 1800 miles. W6NLZ, Los Angeles, heard W5AJG and a W4CNA, but unfortunately, this call is not in recent callbooks, nor is W5PDW. W5MJC, Shreveport, and W5DXB, Vivian, La., also heard W6WSQ and W2PJA/6.

Much speculation as to the cause has followed this latest outburst of 2-meter DX. Because the 50-Mc. band was open over the same path at the time (W5AJG went to 50 Mc. to cue some of the W6s down to 144 Mc.) and sporadic-*E* ionization had been very dense and widespread during the contest period, it is natural to think that this was *E*-layer communication. The signals had the characteristic sporadic-*E* fade so well known to 6-meter men, and the DX coming in the midst of a thunderstorm is old stuff to the 6-meter DX operator. But W5CVW says that the violent thunderstorms extended along a line out to at least El Paso, according to airlines weather data, with a very pronounced inversion at 60,000 to 90,000 feet showing up just east of Guadalupe Pass (below El Paso). The breaking up of this high inversion coincided quite closely with the disappearance of the 2-meter DX. Take your choice!

Equipment and antennas used are of interest. W5QNL used a 5-over-5 array, an 829B at 80 watts input, and a cascode r.f. stage ahead of a BC-639 used as a converter with an S-20R receiver. W6ZL has an 829B at 110 watts input, a crystal-controlled cascode converter ahead of a Super-Pro, and a 30-element array of W2NLY design. Don tried both horizontal and vertical polarization, the former having a slight edge. W6WSQ worked his DX with a 12-element *vertical* array, and an AX-9903 at 120 watts input. His receiver is a cascode converter feeding an SX-71.

Here and There on the V.H.F. Bands

Albuquerque, New Mexico — An unusual opportunity for propagation observations on 144 Mc. will be afforded by an interesting experiment to be conducted under the joint sponsorship of Hams, Associated, of Albuquerque, and Air Force MARS, according to information received from W5CA, ARRL West Gulf Division director. At about 7 to 8 P.M., MST, August 11th, a free-flight balloon carrying

*V.H.F. Editor, *QST*.

2-meter gear will be launched on a cross-country flight of 18 to 24 hours' duration. The balloon, known as the HA-2, will carry a crystal-controlled transmitter of one to two watts output, radiating an automatically-keyed tone signal on 143.9 Mc.

The call, AF5QPK, followed by a five-letter code group for checking reception reports, will be transmitted at slow speed constantly for the duration of the flight, expected to be 18 to 24 hours. Traveling at an altitude around 50,000 feet, the balloon is expected to drift across the country in a northeasterly direction, bringing it within range of many of our larger cities. Antenna polarization will be vertical.

Hams all over the country are asked to be listening for the HA-2, and detailed observations of its flight are requested. Special QSL cards will be sent to all persons reporting reception. Include information on your location, type of receiver and antenna, and as complete a reception log of the balloon's signal as possible. Be sure to record the code group received. Send reports to Hams, Associated, Tijeras, New Mexico.

San Juan, Puerto Rico — The first 50-Mc. communication between the U. S. mainland and Puerto Rico took place on June 19th. On June 11th, KP4HN and KP4NX had gotten on 6 and worked each other, and KP4NX heard W5ONS at 8:44 the following evening. At 7:30 P.M. on the 19th, he heard W8CIT and raised W8LPD, Cincinnati, Ohio, at 7:42, for the first known KP4-W 50-Mc. QSO. This hop of some 1800 miles indicates that quite a few Ws missed out on the KP4 chance.

Pensacola, Fla. — The long-awaited CO-W 50-Mc. work finally came off on June 16th, when W4EQM, Langdale, Ala., worked CO6WW (also reported as CO2WW) at about 6:10 P.M. CST, according to W4MS, who worked him immediately after.

W5ONS also worked him at 6:50 CST, when stations were coming through at Victoria in both directions. W6ANN was heard along with the Cuban station, both near 50.1 Mc. The KP4s are also working near this frequency. On June 23rd, W8NQD, Ashland, Ohio, worked CO2CT, and CO6WW was working Midwest stations on June 28th. CO2ED is also reported to be on 50 Mc.

St. George's, Grenada — The first 50-Mc. station to work out of the West Indies, VP2GG, will be dismantled in September, when Smitty leaves for an extended stay in Toronto. He is looking for a likely candidate in VP2 or VP6 to take over his 50-Mc. gear and carry on. Any takers?

Marseille, France — Another "first" — the crossing of the Mediterranean on 144 Mc. — is reported by F8KY. He and F9BG of Toulon worked FA3GZ of Algiers on June 16th and 18th, with S9 signals on voice. The distance is approximately 500 miles.

Wimblington, Cambridge, England — Still another intercountry "first" (England and Denmark) was made on 144 Mc., June 1st. Turning on his 2-meter receiver about 2130 EST, G3WW was amazed to hear OZ2FR calling G6LI. Not making the grade, OZ2FR then called "CQ G" and G3WW answered. Contact was established with S8 to 9 signals each way. The OZ then went on to work G6LI and a total of 16 G stations and several PA0s. The path has been open several times since, and G3WW has worked OZ6PX and OZ1WP. SM7BE is also believed to have worked one or more Gs on 144 Mc.

Garden City, Kans. — Here's something of a low-power 50-Mc. record. W0UQM built a battery-operated portable rig similar to the civil defense portable described in *QST* for May, 1951. One night recently when sporadic-*E* skip was hot he made a check with it with W4FWH, Nashville, Tenn., who was able to hear a good signal from the portable rig on W0UQM's beam antenna. W0UQM then went over to the little center-loaded whip, normally used for mobile (on the hoof) communication. The signal was still solidly readable. Not bad for well under ½-watt input and an antenna less than two feet long!

Delft, Netherlands — The first All-European V.H.F. Contest will be held the last two week ends of September, under the management of the V.E.R.O.N. Participation is open to any amateur station in IARU Region 1. Operation is on the 144-Mc. band and contacts may be made using any legal emission. Code numbers consisting of the RST (RS for 'phone) report and three following numbers indicating the contact serial number (001, 002, etc.) must be exchanged. Contacts will be scored by mileage, as follows: up to 40 miles, 1 point; 40 to 80 miles, 3 points each for the first 25 contacts and 1 point per contact thereafter; 80 to 160 miles, 5 points for each of the first 12 contacts and 3 points per contact thereafter; 160 to 240 miles, 10 points each for 10 contacts and 5 points each thereafter; over 240 miles, 15 points per contact.

Logs should contain the call of the station worked, the time, date, numbers sent and received, the distance, and the location of the station worked. They should be sent to the V.E.R.O.N. Traffic Department, Prunuslaan 33, Delft, Netherlands. It is hoped that a similar contest will be held each year, with a different IARU affiliate handling each succeeding contest.

Which gives us an opportunity to get in an early plug for the September V.H.F. Party, to be held the same week end as the first section of the contest described above. Details in September *QST*.

Arlington, Mass. — The Arlington Civil Defense Net on 53.4 Mc. is coming along nicely, with 9 stations now participating and several more nearly ready. W1CTW reports that on June 19th he reported in to two civil defense nets, the regular Arlington operation on 53.4 at 9 P.M., and the Oak Ridge, Tenn. net on 50.7. Hearing W4NDE say he was standing by for anyone near the frequency, Cal called in and worked W4EYM, W4FQI and W4BBL, all mobile. W4BBL was running only 2 watts input!

Brattleboro, Vt. — At least one W1 is strong for horizontal polarization on 144 Mc. W1CGX has a high location with

2-Meter Standings

	Call	States	Areas	Miles		Call	States	Areas	Miles
W1HDQ		16	6	650	W5IRP		6	2	410
W1IZY		15	6	750	W5ONS		5	2	950
W1MNF		14	5	570	W5FSC		5	2	500
W1BCN		13	5	500	W5JLY		4	2	650
W1CTW		12	4	500					
W1KLC		12	4	500	W6ZL		2	2	1400*
					W6WSQ		2	2	1390*
W2BAV		21	7	1175	W2PJA/6		2	2	1390*
W2NLY		18	6	750	W6ZEM/6		1	1	415
W2PAU		15	6	740	W6GGM		1	1	300
W2DFV		13	5	350	W6YYG		1	1	300
W2CET		12	5	405					
W2DPB		12	5	500	W8WJC		20	7	775
W2QED		12	5	365	W8BFQ		20	7	775
W2FHJ		12	5	—	W8WXV		18	8	1200
W2QNZ		12	5	—	W8UKS		18	7	720
W2ORI		8	6	570	W8EP		17	7	—
					W8WRN		16	6	670
W3RUE		17	7	760	W8RWW		14	7	500
W3NKM		17	7	660	W8WSE		14	6	620
W3QKI		16	7	820	W8FQK		13	7	—
W3LNA		14	7	720	W8CYE		12	6	—
W3KWL		14	6	480	W8BAX		12	–	655
W3GKP		14	6	610	W8CPA		12	–	650
W3OWW		13	6	600					
W3KBA		13	6	—	W9FVJ		20	7	790
W3KUX		12	5	575	W9UCH		19	7	750
W3PGV		12	5	—	W9SUV		19	7	—
W3LMC		11	4	400	W9EQC		17	7	820
					W9BOV		15	6	—
W4HHK		15	6	660	W9WOK		15	5	690
W4JDN		13	6	—	W9AFT		14	–	—
W4JFV		13	5	830	W9NFK		12	7	690
W4IKZ		13	5	650	W9UIA		11	7	540
W4JFU		13	5	720	W9FPE		11	5	800
W4LVA		13	5	400	W9GTA		11	5	540
W4MKJ		12	7	665					
W4OXC		12	7	500	W0NFM		14	7	660
W4CLY		12	5	720	W0IHD		13	6	725
W4JHC		12	5	720	W0EMS		13	5	1080
W4OLK		12	5	720	W0ZJB		12	7	1097
W4FJ		12	5	700	W0WGZ		11	5	760
					W0HXY		8	3	—
W5JTI		14	5	670	W0JHS		7	3	—
W5QNL		10	5	1400*					
W5AJG		8	3	1260	VE3AIB		12	6	600
W5ML		8	3	725	VE1QY		11	4	900
W5ERD		8	3	570	VE3BOW		8	5	520
W5VX		7	4	—	VE3BQN		7	4	540
W5VY		7	3	1200	VE3BPB		6	4	525
W5CVW		7	2	560	VE3DER		6	4	450
W5FBT		6	2	500	VE3EAH		5	4	380
W5FEK		6	2	500	* Tentative.				

Standings as of June 25th

WØZJB.....48	W5VY.....47	W9ZHB.....48
WØBJV.....48	W5GNQ.....46	W9QUV.....48
WØCJS.....48	W5JTI.....44	W9HGE.....47
W5AJG.....48	W5ONS.....44	W9PK.....47
W9ZHL.....48	W5MI.....44	W9VZP.....47
W9OCA.....48	W5JLY.....43	W9ALU.....46
W6OB.....48	W5JME.....43	W9QKM.....46
	W5VV.....42	W9RQM.....45
W1CLS.....46	W5FAL.....41	W9UIA.....45
W1HDQ.....46	W5NHD.....41	W9UNS.....42
W1CGY.....45	W5FSC.....41	
W1LLL.....44	W5HLD.....40	WØQIN.....47
W1KHL.....43	W5HEZ.....38	WØDZM.....47
W1HMS.....43		WØNFM.....47
W1LSN.....42	W6WNN.....48	WØINI.....47
W1EIO.....40	W6UXN.....47	WØTKX.....47
	W6TMI.....45	WØKYF.....44
W2RLV.....45	W6IWS.....41	WØJOL.....44
W2BYM.....44	W6OVK.....40	WØJHS.....43
W2IDZ.....43		WØPKD.....43
W2AMJ.....42	W7HEA.....47	WØHVW.....42
W2MEU.....42	W7ERA.....47	WØMVG.....41
W2GYV.....40	W7BQX.....45	WØIPI.....41
W2QVH.....38	W7DYD.....45	
W2FHJ.....37	W7JRG.....42	VE3ANY...42
	W7BOC.....40	VE3AET...32
W3OJU.....45	W7JPA.....40	VE1QZ.....32
W3NKM.....41	W7FIV.....40	VE1QY.....31
W3JVI.....38	W7CAM.....40	HC2OT.....26
	W7KFM.....40	XE1GE.....19
W4FBH.....46	W7ACD.....40	
W4EQM.....44		Calls in **boldface** are holders of special 50-Mc. WAS certificates listed in order of award numbers. Others are based on unverified reports.
W4QN.....44	W8NSS.....46	
W4FWH.....42	W8NQD.....43	
W4CPZ.....42	W8YLS.....41	
W4MS.....40	W8CMS.....41	
W4OXC.....40	W8RFW.....41	
W4FNR.....39	W8LBH.....39	
W4IUJ.....38	W8UZ.....37	
W4BEN.....35	W8WSE.....36	

respect to most of the rest of the town, but there are much higher hills in all directions. There is no clear path to any other 2-meter station from his home, and for some years he had been able to work only an occasional mountain-top portable on 144 Mc. When W1GJO set up for business in Westminster, Mass., W1CGX was able to work him regularly, but with only an S2 to 3 signal. W1RYL in Greenfield, Mass., was also heard regularly, but weakly. Then Ray made provision for flopping his 4-element array over to horizontal. Result: W1RYL's signal (vertical) came in better, and W1GJO, who has 16-element arrays for both horizontal and vertical, jumped up to S6 to 8. Repeated comparisons between vertical and horizontal have shown several S-units advantage with horizontal.

This is the sort of path over which your conductor has had many similar experiences. Distances of 10 to 100 miles or so, where the path traverses rough country, seem to work much better with horizontal polarization. See W2SNY's article on tropospheric scattering (*QST* for February, 1951) for a possible explanation. Ray's contact with your conductor during the June V.H.F. Party was the first Vt.-Conn. 2-meter QSO between fixed stations. We had checked several times before with vertical, without success.

Sheboygan, Wis. — Checked your S-meter calibration lately? W9FAN cites some front-to-back ratio tests recently made to show the need for more attention to meter calibration. One fellow read a front-to-back of 65 db. on his meter, and another called it 30 db. W9FAN estimates it at around 24 db., which is still plenty!

Watertown, Wis. — Some very widespread aurora work was done on 50 Mc. by W9OCA during the evening of June 17th. Don worked W7JRG, Sheridan, Wyoming, and W3BGT, Pittsburgh, the former being the farthest west Don has worked via aurora. While this was going on, CAA signals on 49.99 Mc. were heard from Juneau, Alaska! This Alaskan teletype stuff has been heard quite frequently by stations in the northern part of the Middle West, and almost regularly during the spring by VE5NC, Boharm, Sask. How about some KL7 business on 6? It's a little late now, but about next May would be a good time to have it.

Thunderstorms over much of the best aurora territory prevented most of the aurora regulars from catching the June 17th session. W2AMJ, Bergenfield, N. J., found a mixture of aurora and double-hop E_s bringing in a rare assortment of 50-Mc. signals. Among others he worked VE7CN, Prince George, B. C., shortly after 11 P.M. EST. Very little has been heard of 2-meter activity, though it is known that W3MOQ, Allentown, Pa., worked into W8.

St. Pierre et Miquelon — DX-peditions to this island group have become frequent enough so that issuing FP8 calls has become something of a local industry, but this expedition is different — and of interest to v.h.f. men. W1PVF and W1ORN/W4RXP are going to St. Pierre for a stay of about two weeks in the latter part of August. Plans are now being made to take along equipment for 144-Mc. work. It is not certain that 2-meter operation will be possible, but word will be sent out via W1AW giving the vital statistics if and when 144-Mc. schedules are arranged. Watch W1AW and other OBS stations for news of FP8AG and FP8AH. This is a long shot — it's 400 miles to the nearest 144-Mc. station, and about 600 miles to Boston, but some good tropospheric conditions along the coast and the right sort of equipment at St. Pierre could make things mighty interesting!

The World Above 420 Mc.

Many fellows who have an interest in work on the higher frequencies are slow to do anything about it because they feel that there will be nobody to work. This has kept down our 420-Mc. population, certainly, in the past. Most of the activity heretofore has been either crossband (usually to 144 Mc.) or of a coöperative nature, where two fellows work together to get gear going and then meet on 420 at a prearranged time. Use of the 420-Mc. band along the Atlantic Seaboard from Southern Connecticut to Southern Virginia has now reached the point where, during the summer months, at least, it is possible to make 420-Mc. contacts frequently without previously arranged appointments.

W2QED, Seabrook, N. J., has almost no "locals" to work on 420, yet in June he made contacts almost nightly; a total of 36 up to June 27th. Stations worked two-way on 420 included W3NAG, Havertown, Pa., 40 miles, W3BSV, Salisbury, Md., 80 miles, W2TM, Bridgeton, N. J., 5 miles, W3OWW, Stewartstown, Pa., 75 miles, W3AIR, Glenmont, Md., 100 miles, and W3RE, Washington, D. C., 100 miles. W3AIR was worked two-way for the first time on June 22nd, with S9 signals each way, after many crossband contacts and numerous unsuccessful tries. W3RE was worked for the first time the same night. W4CLY, Cape Henry, Va., 190 miles, has been worked crossband many times, but Bill's tripler has yet to be heard by W2QED. Crossband contacts were also made with K2AH, East Orange, N. J., 113 miles.

In looking back over his work on 420, W2QED observes that most of his contacts, regardless of distance, have been made with fairly strong to very strong signals. If anything comes through it is usually loud. Practically all the successful work over long distances was done after 10 P.M. Without exception the good DX signals come from the stations with the big antennas, and most of these stations are crystal-controlled. A high percentage of the time contact can be made on 420 if the signals are at all good on 144 Mc. over the same path, where well-equipped stations are involved. The boys with the 5-element Yagis and the 6J6 oscillators don't get much beyond line of sight. Though Ken has a flop-over array, all his contacts so far this year have been made with horizontal polarization.

In regard to 420-Mc. polarization, your conductor is making a determined effort to standardize 420-Mc. work on horizontal. Long experience on all v.h.f. bands has demonstrated that DX can be worked more successfully with horizontal than with vertical. The admittedly valid arguments for vertical polarization on 144 Mc. (local net activities, mobile work, etc.) simply do not hold on 420. If we are going to get anywhere on 420 we've got to build big antennas, and

it's just too much for the average fellow to make them capable of being turned over. We have seen again and again that horizontal has at least a slight advantage in work over paths where tropospheric scattering is a factor. In some cases this advantage amounts to making the grade or not making it, depending on whether horizontal or vertical is used.

As a long-time user of vertical who refused to "take sides" in the polarization question as long as the issue was open to question, the writer has come to the conclusion that it is time to standardize, on 420, at least. The way we see it, that standardization should be on horizontal. All directive antennas used at W1HDQ are now built that way. They include a total of 62 elements, used on 50, 144, 220 and 420 Mc.

Final Results — June V.H.F. Party

As mentioned earlier, the June V.H.F. Party broke all records for our spring and fall v.h.f. activities. More than 200 reports came from 40 ARRL sections, the 50-Mc. openings bringing contestants into the picture in areas where there is little regular v.h.f. activity. In addition, the faithful in the v.h.f. strongholds turned out in force, and a fine time was had by all.

Scores and section multipliers reached an all-time high. At least 12 contestants made more than 100 contacts, and section multipliers in the 20s were commonplace. There was increased use of 420 Mc., and one group of W1s made good use of 2400 Mc. A glance through the tabulation will show that the fellows (and gals) who made use of more than one band were the ones to reach the upper brackets of scoring. There were no one-banders in the top ten scores.

The largest number of contacts and the country's highest competitive score were posted by W1GJO, Westminster, Mass. Grid used 50 and 144 Mc. to run up 144 contacts. His section multiplier of 33 gave him 4752 points — a winner's record score for v.h.f. competition. The most-sections-worked record was set by W9ZHL, Terre Haute, Ind., who knocked off 31 ARRL sections on 50 Mc. With two more added on 144 Mc., Charlie had 2739 points, second high for the country. As always, our two fair-sex competitors, W8BFQ and W2FHJ, finished at the tops of their respective sections, both of them getting stiff competition this time. Margaret's 106 stations worked on 4 bands gave her the competition's No. 3 score, 2622 points.

Activity was high in the W6 sections, and the DX chances boosted West Coast scores far above those in previous affairs. Working from Mt. Loma Prieta in the Santa Cruz Mountains, W6GCG/6 topped all western competitors with 119 contacts in 17 sections for 2023 points and the Santa Clara Valley Section award. W6AJF made hay on 50, 144 and 420 Mc. for 1785 points to win in the East Bay Section. W6LOZ/6, atop Mt. San Bruno, found an even 100 stations to work on 144 Mc. alone.

Portable and mobile stations were plentiful, as club groups warmed up gear and tested locations in preparation for the ARRL Field Day, two week ends later. W9LJV/9 carried this mobile business to extremes, flying for seven hours above Waukesha, Wis., and doing all his own flying, operating and log-keeping meanwhile.

One group made the Party a workout for 2400-Mc. gear. Operating from Mt. Wachuset in North-Central Massachusetts, W1OED/1 worked W1JSM/1, Hogback Mountain, Vt., and W1AQE in Waltham, Mass., with the help of W1IAP and W1SNN. Their set-up is shown in the accompanying photograph.

In the tabulation by ARRL divisions and sections, below, the columns are the total score, the number of contacts made, the section multiplier, and the bands used. A is for 50 Mc., B 144 Mc., C 220 Mc., D 420 Mc., and E 2400 Mc.

ATLANTIC DIVISION

E. Pennsylvania

W3MRQ/3[1]	2461	107	23	AB
W3IBH	900	100	9	B
W1QMO	217	31	7	B
W1BQY	72	12	6	B
W3UKI	60	20	3	B

Md.-Del.-D. C.

W3CGV	496	31	16	A
W3LMC	399	57	7	B
W3OTC	319	29	11	A
W3GKP	192	24	8	B
W3QNC	133	19	7	AB
W3AHQ	120	20	6	AB
W3NH	36	18	2	B
W3RKD	26	13	2	B

S. New Jersey

W2MEU	774	43	18	A
W2QED	600	75	8	BD
W2BAY	190	19	10	A

W. New York

W2RPO	1332	91	13	ABD
W2TBD	897	69	13	AB
W2ORI	510	65	6	BD
W2OPQ	315	315	9	B
W2UPT/2[1]	275	25	11	AB
W2QNA	270	45	6	AB
W2DPL	204	51	4	B
W2WDO	168	42	4	B
W2UTH	152	38	4	B
W2OWF	124	31	4	B
W2VVG	124	31	4	B
W2CFY	99	11	9	A
W2ERX	60	15	4	B
W2SSS	60	30	2	B
W2ZHB	54	27	2	B
W2FCG/2	48	16	3	B
W2UAD	46	23	2	B
W2ZUX	32	16	2	B
W2UYS	18	9	2	B
W2QY	14	14	1	B
W2VBH	14	14	1	B
W2SJV	12	12	1	B
W2QXE/1[1]	10	10	1	B
W2ZS	4	4	1	B

W. Pennsylvania

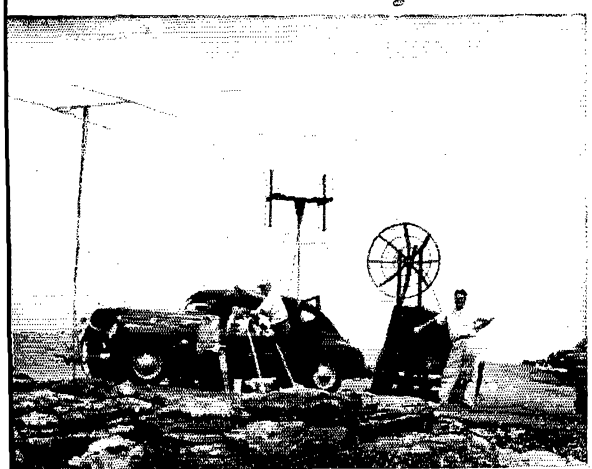
W3NKM	704	44	16	AB
W3KWL	210	30	7	AB
W3KWH[1]	136	17	8	AB
W3CJB/3[1]	36	18	2	B
W3QYK	33	11	3	B

CENTRAL DIVISION

Illinois

W9FJB	2000	80	25	AB
W9FVJ	855	45	19	AB
W9DRN	90	30	3	B
W9CX	16	8	2	B

(Continued on page 108)



The June V.H.F. Party set-up of W1OED/1, Mt. Wachuset, Princeton, Mass. Standing by the 2400-Mc. parabola is W1IAP. Beside the car, under the 6-element 2-meter array, is W1OED. A third operator, W1SNN, is inside the car. The array at the front of the car is for 50 Mc. Using a c.w. magnetron with 100 watts output on 2400 Mc., W1OED/1 worked W1JSM/1, Hogback Mt., Vt., W1QQW/1, Fay Mt., W. Mass., and W1AQE, Waltham, Mass. — three ARRL sections.

♦

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

How:

Out of the corner of an eye we watched Jeeves lay aside his slide rule with a flourish. He appeared to complete some sketches with his thumbnail and then he settled back contentedly in his chair while the smoke rings he blew toward the ceiling retained the shape of the grin on his pan.

Begging him did no good and neither did the proffered bribe of a brand new surplus Optimum-Skip-Angle Indicator; he just wouldn't 'fess up the objective of his month's spare-time labor. So we were forced to give him an extra day off for the purpose of our prying off the loose board on the back of his padlocked highboy. Then the secret was ours!

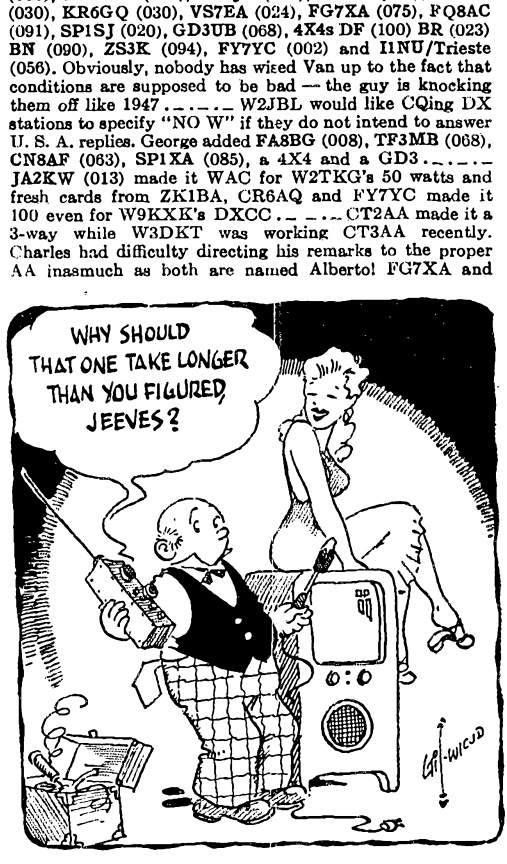
The sprouting seed that plopped into Jeeves' usually barren brain was the squib about the W3 making DXCC during TV commercials. Since neighbors actually enjoy the sight of emaciated vitamin salesmen or hacking fag pluggers being swallowed alive by a maze of herringbone thatch, our boy dreamed up a dilly. He figures a wire or tape recorder at each end of the QSO will do it. When working 'phone he'll record a 10- or 15-minute transmission and then zip it into the ether high speed during one of said on-the-half-hour commercials. Joker Joe at the other end records this gibberish and then has a half hour in which to play Jeeves back slow and make his own recorded repartee. (But it doesn't say how he'll lick 15-kc. sidebands or fix everybody up with a deep bass voice.)

For c.w. the guy deems it a cinch. One records one's fist at normal sending speed with about 200-c.p.s. audio and, during a convenient sales-blab pause on TV, speeds it up to key the rig at high speed through a rectifier-vacuum-tube keyer unit. At station No. 2 it's recorded at high pitch and then played back slow for the copy. (Or else you can QRX for an expectant half hour to hear "SRI OM, QRM.")

One thing more. Jeeves figures it should be customary to confirm such QSOs with QSLs engraved on the heads of pins.

What:

Two lads not yet harrassed by video are FB8XX and FR7ZA. On *twenty*, W6AM finds them scheduling Wednesdays around 2330 Don's time. This near 14,030 kc. FB8XX hails from Kerguelen and brother FB8ZZ is parked on Amsterdam . . . . One CR9AB (012 t5) didn't set too well with W5FXN and W2UNR. He didn't even know the name of the ship making the regular Macao-Hong Kong run. FO8AH (052 t8c), MD2JB (050), CR4AH (090) and CN2AA (082) were also added to W5FXN's log, as well as ZV1BS (070), 9S4AX (075), FF8AB (075) and SU1AD (100) . . . . W2QHH still has his 807 coasting nice and cool: HA5BD (097), YU3AC (042), EA8s BE (070) BF (074), EK1BT (023), CP5EK (001), CR5AF (134), VPs 3TY (116) 5BH (132), ZM6AK (011), F8EX/AR (021) and 4X4AS (034). Until the latest burst of FG7 activity, Howy held the only FG8 card submitted for postwar DXCC and that was obtained some five years ago. Furthermore, one more Puerto Rican QSL will qualify W2QHH for his WPR-*200* sticker. If ET9X or YK1VL QSLs would show up he'd have 200 confirmed for 203 worked — some percentage! . . . . W5FFW got in on FB8ZZ (043), SU1GM (048), I5A (030), VS1DU (022), SP1XA (020), KB6AT, VR4AB, UAØKKB, 4X4BD (098) and 4X4BA (030). One YD5AT also intrigued Hal, appearing to stem from South Europe or the Middle East . . . . Any guy with an A-minus high school average shouldn't have much time to work DX, especially when on the track team, too. But WØAIH caught up with VR2CD (085), VQ2H (076), ZE4JC (022), ZK1AB (035), KB6AQ (045), FK8AI (038), GC5OU (090) and EL6IA whose QTH is quite in demand. A Boys State scholarship deal will keep Paul off the air for a while after which he'll start construction of an Orient-oriented rhombic . . . . A Belgium-eyed view of the DX situation is furnished by ON4RM. Maurice went for 3V8AN, YS1O, TF3RD, CE7ZB, CX6AD and many South and Central Americans which go well in European logs. After a siege of punk W conditions, ON4RM was glad to make quick work of W6s BZE CBP LW NGA PFD SPQ and VRL during one fast opening . . . . The six-watter of FO8AH (022) was snapped up by W9HUZ and so were ZB2s I (094) L (036), SU1GO (074), SV1SP (045), DU1VVS (056), MP4BAF (022), UG6AB (096), UP2KBC (070), UQ2AN (000), YU1CAG (004), VU2JG (046), CR4AI (074), VT1AF (030), KR6GQ (030), VS7EA (024), FG7XA (075), FQ8AC (091), SP1SJ (020), GD3UB (068), 4X4s DF (100) BR (023) BN (090), ZS3K (094), FY7YC (002) and I1NU/Trieste (056). Obviously, nobody has wised Van up to the fact that conditions are supposed to be bad — the guy is knocking them off like 1947 . . . . W2JBL would like CQing DX stations to specify "NO W" if they do not intend to answer U. S. A. replies. George added FA8BG (008), TF3MB (068), CN8AF (063), SP1XA (085), a 4X4 and a GD3 . . . . JA2KW (013) made it WAC for W2TKG's 50 watts and fresh cards from ZK1BA, CR6AQ and FY7YC made it 100 even for W9KXK's DXCC . . . . CT2AA made it a 3-way while W3DKT was working CT3AA recently. Charles had difficulty directing his remarks to the proper AA inasmuch as both are named Alberto! FG7XA and



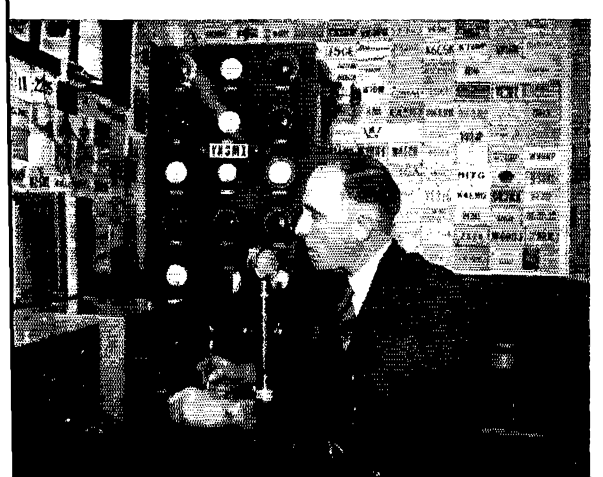
* DX Editor, *QST*. Until further notice, reports of DX activity should be sent to ARRL Hq. for forwarding to W9BRD.

EAØAB made it 199 for W3DKT . . . . HA4SA (008), VR1C (068), VQ2s AB (085) GW (013), C3AB (079), VK9s GB (048) QK (095), FA8RJ (012), DU1WP (082), FO8AC (049), LJ3B (037), KM6AT (010), VS1EJ (025), VP3VN (085), VS6BZ (077) and a bunch of JAs rolled WØFID up past the 100 mark. Dick also lists CR9AB/MM who apparently gave up trying to fool people further sans the "MM" . . . . The previously-specified FR7ZA and FB8ZZ weren't missed by WØBAF. Nor were ZE4JE (050), ZE2JV (050), CT2AA (140), FP8BX (100), KH6HB/KM6 (100), KR6EK (100) and ZK1AA (090) . . . . W1DYV reeled in EAs 6AF 8BC 9AP, VP8AI, CT2BO, YU1AA and the nifty VT1AF while W4RYS busied himself with KW6AR, TF3NA, EK1DS, YU2DGJ and CT3AB . . . . Somewhat stymied by TVI, W8KPL limited his efforts to HR2AD (060), VP1AA, KX6AB (070), JA2CG, KB6AT and the ubiquitous FB8ZZ . . . . CR9AF, VR4AA, VK9MT and one XZ1AD came back to W6ALQ as well as an HL2DX . . . . W2CTO has DU1GT, HZ1JD, VP3FD, EK1CW, ZC4s TF XP, and ZB1BJ accounted for; and W7OY mentioned 3A2AF (054) in Monaco . . . . Tom, 2nd operator at TI2TG, was Costa Rica for 9S4AL (009), EA9AP (013), UA9KCA (090), KC6WC (056), TF3SF (016), UB5DM (013), SP1JF (015) and LZ1DX. The last-named feller really gets around both in mailboxes and on the air . . . . The So. Calif. DX Club *Bulletin* lists MD2PJ, FB8AA (027), MP4BBC (040), AC3SQ (026) and EA9AQ (071) while a few more items from WØAIH include CR7CR (048), FA8GO (070), VS6AC, VS6AE (075) and OQ5VN (046).

W9RBI grants us some good squeezings from *twenty 'phone* contacts. VK9YT will give you New Guinea, VK9HI ditto Papua and VR1B is good on Tarawa Isle. FK8AH (VFO) has a new stock of QSLs and FB8ZZ may be found either on 14,040 or 14,230 kc. UAØKKB (VFO and distorted), KC6AA on Truk, EA6AF, CT3AN and SP5AB (120–127) also entered Ross' log. TT2KMC, FI8QH and AC3KE are W9RBI nominations for the Josh Club . . . . 25-watter PZ1TB (275), OE13RL and ZC6DO answered W5JUF. The ZC6 commented on his early return to the U. S. . . . . W5FFW found VK9YT on 14,390 kc. as well as MD2AM (190) and WØAIH comes through with MD2JB (350), VP2KM (180) and ZK1BA (360) . . . . Around 14,250 kc. you may find KW6AR who desires all cards be sent airmail according to W1RAN . . . . TI2TG's log features IT1s BXX (186) CLP (186), YU3AC (089), ZM6AA (310), ZC4XP (377) and VR1G (308) of British Phoenix fame . . . . HC8GI (185) puts a consistent signal into Lansing asserts John DeMyer and the latter is curious about ZA1CC and ZA1A (380) . . . . In the *Bulletin* we note that W6s KQY SHW and UHA were among the first lucky people to snag AC3PT (190).

Not much cooking on the other bands but we do have a report or two. On *forty*, TI2TG encountered UB5KAO (016), HA5FA (033), VP5BH (030), VP5BF (021) and OZ4KT (003) . . . . W2QHH reached 87 countries with 4X4RE (007) and FY7YC (003).

W2TJK did some eavesdropping while stationed on Eniwetok in the Marshalls and here are a few of the boys heard on *eighty*: W4s CLS SJI, W5SGH/MM, W6s BAX BES CJZ CMN ELQ HTS KIO NHY NLQ SWP VXL WXC ZAT, W7s ETO FBD GHJ JOL KKB MSB NQB NUR PFP RD, W8s GLX LPI, W9NH, VE6XO, VE7s AKI XA. On *seventy-five*, W2BLP, W6GKN, W7s GHJ and QWC stood out . . . . CP1AD would like to try some voice work on this band with his 32V-2 and NC-183 . . . . Back on c.w., the band is still good for Europe in New Brunswick. VE1JD assembled DLs 1AO 1TW,



Jean Moyon and Jack Lambert relax on the premises of their very popular FQ8AC. The boys are due back in Paris in September but plan much hamming in Bangui prior to that date. (*Photo courtesy Bud Rugel*)

9AC, Gs 2DOW 6TD 8NI, GW3GXL, I1NU/Trieste, HB9LQ, PAØRZ and SV1VS/MM near CT2. In other directions Liz collected PYs 2AQ 5RZ, LU1EP, CE3AX, FP8BX and VP9AG. All of these inhabited the range from 3500 to 3525 kc. . . . . At Fond du Lac, Wis., W9BQM has found it great sport to sick his 30 watts on Oceania for a total of 22 ZL and 3 VK QSOs. During a down-under QRP test, ZLs 1HM 3OA and 4GA were raised as they ran less than five watts input. ZL4GA also worked G6ZO on that power.

Where:

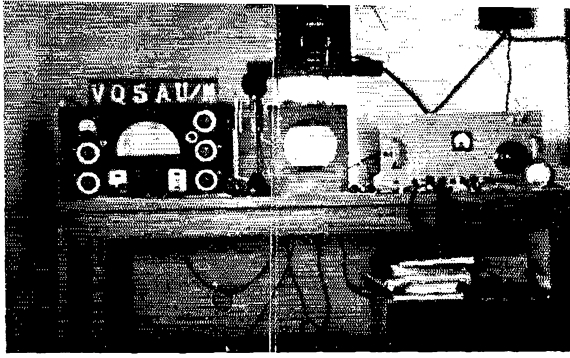
SP1CM's QSL found its way to W6EAY via the Dead Letter Branch of the U. S. Post Office. It had apparently been addressed "W6EAY, U. S. A." . . . . The FG7XA listed below is not to be confused with the previous holder of the call (but undoubtedly will be) . . . . The following Argentine-licensed Antarctic stations may be QSLd via RCA (Argentina) but cannot be accredited for DXCC purposes per DXCC Rule 7: *South Orkneys* — LU1ZA, LU9ZA, and LU1ZG through LU9ZG; *South Shetlands* — LU1ZC, LU4ZC through LU9ZC, and LU2ZI; *Palmer Islands, Melchior Archipelago* — LU1ZB, LU5ZB through LU9ZB, LU1ZH and LU2ZH; *Continental Antarctica* — LU1ZD, LU3ZD, and LU6ZD through LU9ZD.

AP5TM	Capt. McLuskie, Royal Signals, Kuldana, Murree Hills, Pakistan
ex-CN8BP	Sgt. Lucien Ferrand, French Battalion, 23rd Inf., APO 248, % PM, San Francisco, Calif.
CR4AI	Sal Island, Cape Verde Islands
CR1ØAA	Cunha Eca, G. P. O. Dili, Portuguese Timor
DL4RK	319th Station Hospital, APO 69, % PM, New York, N. Y.
EK1DX	American Legation, Tangier Zone
F7AR	Capt. A. Hix, Hq. 7966 EUCOM Det., APO 58, % PM, New York, N. Y.
FB8XX-ZZ	(QSL via REF)
FG7XA	Andre Latil, % PAA, Guadeloupe, F. W. I.
FO8AH	Tubuai Island, French Oceania
JA4AG	Kyoto Sig. Svc. Det. 5, APO 9, % PM, San Francisco, Calif.
LZ1DX	(QSL via W8PSV or WØYXO)
MD2JB	QSL to J. Bowen, Box 99, Jamestown, R. I.
MI3VG	G. Vinicio, Via Ascianghi 18, Box 513, Asmara, Eritrea
MP4BAF	J. A. Faithful, % Cable & Wireless Ltd., Bahrein Island, Persian Gulf
MP4KAB	E. P. Pout, % Kuwait Oil Co., Ltd., Kuwait, Persian Gulf

♦

A familiar signal from Down Under for many years has been radiated by VK3MX. An RK-20 at 50 watts feeds a 2-element rotary and the receiving is handled by a 7-tube super and a 5-tube t.r.f. VK3MX has answered over 500 different W stations and looks for more.

QST for



Of late one of the more active Uganda stations, VQ5AU puts 45 watts into 807s with 6F6s modulating when desired. Ernie works as police inspector of the Colony's force and has spent some 20 years in the British Colonial Police. *(Photo courtesy W9TQL)*

♦

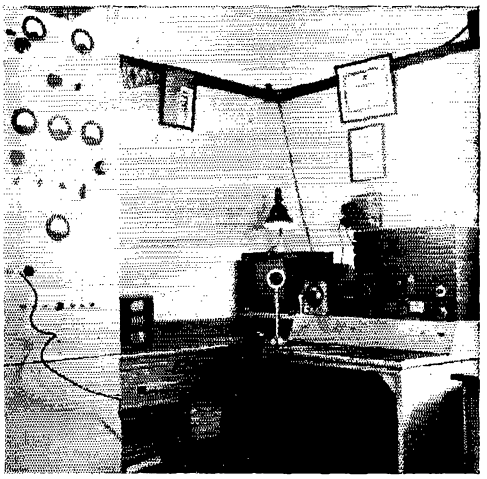
PZ1TB	Box 748, Paramaribo, Surinam, S. A.
SU1GM	(QSL via RSGB)
SU1GO	(QSL via RSGB)
SU1NK	(QSL via RSGB)
SV1VS/MM	(QSL via RSGB)
ex-SVØAB	(QSL to W2SUC)
VP9AK	Clarence Fray, Box 241, Hamilton, Bermuda
VQ3CF	H. A. Seaman, Aeradio, Moshi, Tanganyika Territory
VQ4CM	Box 4030, Nairobi, Kenya Colony
VR2CD	Chas. Freeman, Nadi Airport, Fiji Islands
VS1DW	G. H. Eckles, Braddell Hill, Singapore 11, Malaya
ex-VS2CP	(QSL via RSGB or VS2AA)
VS7EA	Box 907, Colombo, Ceylon
YU1AA	Box 48, Belgrade, Yugoslavia
YU1CAG	Box 48, Belgrade, Yugoslavia
ZB1AIS	Lt. D. A. Smith, Royal Navy, % F. M. O., Dockyard 7825, Malta
ZB1DL	(QSL via RSGB)
ZB2L	Den Auton, Lloyd's Signal Station, Windmill Hill, Gibraltar
ZC6DO	K. Boesenhofer, % Evergreen Memorial Park, RFD 2, Bristol, Penna.
4X4BN	Box 831, Haifa, Israel
4X4DC	P. O. Box 5108, Jerusalem via Israel
9S4AX	(QSL via W1NWO)

Plaudits and a fanfare to W1s DYV GKK, W2s GT QKE ZVS, W4s BVD RYS, W5s FFW FXN JUF, W8YGR, W9s ABS CFT ESQ HUZ, WØs BAF YXO, HE9RDX, CN8EG and J. DeMyer for these pasteboard routes.

Tidbits:

Infrequent good U. S. A. openings have limited ZC4XP to a total of 63 Ws during the last few months. Sid has 118 confirmed for 153 countries worked and lists as currently active Cyprus stations ZC4s AB BW HV KN and RH . _ . _ . _ ZK1AB has a total of over 163 Ws contacted and this activity has kept down his countries total. "But he's a good sport about it and does QSL," says W6ALQ . _ . _ . _ The Radio Marina Amateur Radio Club runs the oft-worked MI3US and lists as officers President MI3ZX, Secretary MI3NJ. Members include MI3s RP NA SL and GH. Three other prospects are studying for their tickets. MI3US starts out with a BC-221 VFO driving a TBS-50 which in turn drives two 813s modulated by 828s. An SX-43 sorts out W QRM. Several rotaries are available for 10 and 20 as well as a 75-meter dipole. MI3ZX writes that MI3IM has been QRT and gone for some time and MI3ZZ is no QSL enthusiast . _ . _ . _ The Aargau local group of the USKA made special effort to enable Ws to hook the rare Swiss cantons during the annual Helvetia-22 contest in July. 100-watt rigs on 14-Mc. c.w. were used plus beam antennae centered on the U. S. A. Cantons St. Gallen, Appenzell and Glarus are specifically mentioned in a letter from HB9EU. The accomplishment of a "Swiss WAS" isn't simple. We hear the W2QHH has racked up 16 of the required 22 . _ . _ . _ John DeMyer has it that KC6WC was preparing to pack up for a return Statesward. KC6WC is quite disappointed by the poor showing of Ws who demand cards, get them fast, and then send none in return. Bob was active on Koror of the Palaus for some 10 months and has QSLs from 34 countries with many more worked . _ . _ . _ LA7Y has had over 12,000 QSOs on DX bands since he first cranked up in '37. Besides the holding of just about every top DX award, Chris has 183 countries confirmed for 200 worked. He is very active from 80 through 2 meters. "Conditions have been extremely poor here since August, 1950," wrote LA7Y to W9ESQ . _ . _ . _ W7MJ1 tells us that ham radio enthusiasts among the Japanese nationals are eager to return to the air after a long session as SWLs . _ . _ . _ W2CTO believes that CP5EK (ex-CP1AP) deserves a strong vote of thanks for his untiring efforts in giving so many Ws one of the toughest-to-work of the South American countries complete with QSL . _ . _ . _ W6BIL's address is now 2154 Court Street, Redding, California, and W1GKK would like info on ex-MD4BPC, YJ1AB, ZA1A and ZD1KR . _ . _ . _ It's perfectly okay to work duly licensed U. S. citizens operating in the countries recently listed as banning amateur radio communication. OE13 stations, for example, fall in this category; OEs with other numerals do not. To sum up the situation, play it safe. Unless you are sure regarding such technicalities work something else instead . _ . _ . _ Maximum soup permitted Nigerian stations is 50 watts and ZD2s active at present are DCP DYM FAR GAJ GHK JAB JHP LMF PLL PVS RGY and TBS. Excepting ZD2S, all Nigerian calls are three-letter affairs; therefore, ZD2LO is ungood. This from Francis Rugel whose older brother, Bud, a frequent contributor, now is sporting khaki . _ . _ . _ W2BMX is curious about one HB9CI/FR and HC2JR hears from VS1AX that the Majaraj Kumar of Sikkim is now radiating with a 6L6-807 rig and full-wave 14-Mc. zepp as AC3PT . _ . _ . _ W2ADP has been the only W applicant for the 5-call-area WHC (Ecuador) award which isn't as easy as it may sound. ZL2GX has the special certificate for seven prefix numbers and VK4WF did it with six. HC2JR of the Guayaquil Radio Club admits that is made quite difficult at present because of the inactivity of HC4, HC7 and HC8 stations. HC8GI should help out these circumstances considerably . _ . _ . _ "We plan to leave New Hampshire on the week-end of August 19th for Halifax and then take a ship from there to [St. Pierre]." So writes W4RXP. He and W1PVF will sign FP8AG and FP8AH respectively and will perform on 20 and 40 with an 807 rig and dipoles. A BC-348 and Howard 435A will also go along. Plenty of the gang still need FP8 and here's another good chance to pull it off . _ . _ . _ VP6CDI has sent about a thousand cards and thinks he has taken care of all requests. These were all sent via bureaus. Check your bureau first before reapplying to VP6CDI including date, time and frequency of the QSO . _ . _ . _ Ex-PK6XG, now putting out a hefty signal as PAØMOT, will be heading for DX again around 1952. The destination may be PK7. ". . . things are pretty hard here in Holland due to our dollar deficit. . . . It's quite tantalizing to read all those advertisements in *QST* and not be able to buy, hi." Which points out that we Ws should take time out from our TVI griping long enough to appreciate our other blessings . _ . _ . _ All roads seem to be leading to Andorra or Monaco. HB9KU told Tom of TI2TG that two HB9s would be operating there at some time between the 1st and 21st of August. This would dovetail with info received from HE9RDX: "For the first weeks of August there is scheduled some activity of 3A2AD. The cards can be sent to Box 60, Basel 12, Switzerland, or via the Swiss QSL Bureau." This August is doing to be a busy month on the DX front! . _ . _ . _ HB9KU operated HE1KU in Liechtenstein during July and HB9JJ is slated to put HE1JJ on the air there during August . _ . _ . _ "Ye gods, man," said neighbor. "Fire! Fire! The house is on fire!" HC2JR stirred uneasily, turned to neighbor and said, "Look . . . I have been trying to contact Poland for over a year and here he is turning it over to me. Please excuse me, old man." Neighbor retreated hastily. (The fire was put out all right and John completed the QSO uninterrupted. So goes a favorite true yarn of Howard Gabbert, TI2TG's first operator, concerning one of South America's top DXers.) . _ . _ . _ Caught with our ear trumpet reversed again, let us admit that the LA2JA mentioned in April's Tidbits should have been LA2*UA* . _ . _ . _

Said Tidbits can serve other ends than mere entertainment, too. W6JVE/6 writes to say that ex-HL1AN and WØJON located each other again via this medium some four years after the severance of their Korean acquaintanceship . . . . . WØYXO heard mention of a legit Bulgarian "club station" to sign LZ1KSR and also that G3FNJ (ex-SV1RX) should be signing SU1RX directly. Ken adds that LB5ZC was closing down on Jan Mayen at the end of June . . . . . FB8ZZ informed W9HUZ that he won't return to France until late this year. So don't bate your breath for a QSL. Van went home with a lot of thought food after seeing W9LM's 7-Mc. rotary and new super-selectivity gimmick . . . . . MD2JB manages to get in some 20-meter work almost every day, either 'phone or



ZS1JD boasts an efficient-looking layout in Capetown. A pair of 35Ts and a 4-element rotary are used on 28 Mc. while an 813 feeding a long wire does the job on 14 Mc. George enjoys chatting with W-VEs but has also rolled up a good share of the rare ones.

c.w. or both, and his Stateside cognomen is W1LIV. He writes to say that his QSLs may be delayed but will all eventually arrive to and from . . . . . SVØAB knocked off around the 20th of July. "I have tried to QSL every station I worked but if any of the cards went astray will repeat upon receipt of note so stating via W2SUC." . . . . . Another of the mushrooming number of Egyptian entries, SU1NK, gave word to W2QKE that although he will QSL all contacts the task may take some time. Patience, therefore, please . . . . . The strikes and power shortages in Australia are delaying everything, including the QSL stock VK9GB has on order. Via W2GT Arch tells us everyone will get a card in due time . . . . . Later this summer KH6s ACL FL and PA intend to do some operating from U. S. Samoa. They are now engaged in flying weekly between KP6 and Honolulu, according to W1QIS of W1AW's staff . . . . . "I am one of the six amateurs which have started up in this small country. Our strength at the moment consists of two Americans, three Englishmen, including myself, and one Arab." This from MP4KAB. Looks like the MP4K designation replaces VT1 for Kuwait while MP4B remains as Bahrein Island . . . . . Juice from the So. Calif. DX Club's *Bulletin:* After FP8, HB9AW is rumored to be thinking about Clipperton Island. An LZ SWL card to W6CUQ read that Bulgarian amateur radio became legitimate as of May 7th. The W6s are figuring that a good number of the many C-prefixed stations now being heard are working out of Japan. And more rumors — this time anent an impending CR8 splash. (Jeeves, whereinell is CR8?)

— • • • —

Will HB9AW make it to Clipperton? Is TTØKKA legit? Can W2QHH possibly find his six missing Swiss cantons? Ah, what developments the future may portend. Don't fail to be on hand next month for another episode of One Ham's Mailbag.

A.R.R.L. QSL BUREAU

The function of the ARRL QSL Bureau system is to facilitate delivery to amateurs in the United States, its possessions, and Canada of those QSL cards which arrive from amateur stations in other parts of the world. Its operation is made possible by volunteer managers in each W, K and VE call area. All *you* have to do is send your QSL manager (see list below) a stamped self-addressed envelope about 4¼ by 9½ inches in size, with your name and address in the usual place on the front of the envelope and your call printed in capital letters in the upper left-hand corner.

For a list of overseas QSL bureaus, see page 62, June '51 *QST*.

W1, K1 — J. R. Baker, jr., W1JOJ, Box 232, Ipswich, Mass.
W2, K2 — H. W. Yahnel, W2SN, Lake Ave., Helmetta, N. J.
W3, K3 — Jesse Bieberman, W3KT, Box 34, Philadelphia 5, Penna.
W4, K4 — Thomas M. Moss, W4HYW, Box 644, Municipal Airport Branch, Atlanta, Ga.
W5, K5 — L. W. May, jr., W5AJG, 9428 Hobart St., Dallas 18, Texas
W6, K6 — Horace R. Greer, W6TI, 414 Fairmount St., Oakland, Calif.
W7, K7 — Mary Ann Tatro W7FWR, 513 N. Central, Olympia, Wash.
W8, K8 — Walter Musgrave, W8NGW, 1294 East 188th, Cleveland 10, Ohio
W9, K9 — John F. Schneider, W9CFT, 311 W. Ross Ave., Wausau, Wisc.
WØ, KØ — Alva A. Smith, WØDMA, 238 East Main St., Caledonia, Minn.
VE1 — L. J. Fader, VE1FQ, 125 Henry St., Halifax, N. S.
VE2 — Austin A. W. Smith, VE2UW, 6164 Jeanne Mance, Montreal 8, Que.
VE3 — W. Bert Knowles, VE3QB, Lanark, Ont.
VE4 — Len Cuff, VE4LC, 286 Rutland St., St. James, Man.
VE5 — Fred Ward, VE5OP, 899 Connaught Ave., Moose Jaw, Sask.
VE6 — W. R. Savage, VE6EO, 329 15th St., North Lethbridge, Alta.
VE7 — H. R. Hough, VE7HR, 1785 Emerson St., Victoria, B. C.
VE8 — Roy Walton, VE8CZ, Box 534, Whitehorse, Y. T.
KP4 — E. W. Mayer, KP4KD, Box 1061, San Juan, P. R.
KZ5 — P. C. Combs, KZ5PC, Box 407, Balboa, C. Z.
KH6 — Andy H. Fuchikami, KH6BA, 2543 Namauu Dr., Honolulu, T. H.
KL7 — Box 73, Douglas, Alaska

Silent Keys

IT IS with deep regret that we record the passing of these amateurs:

W1HLH, Chester A. Snyder, Burlington, Vt.
W1MM, Frederick H. Remington, Vineyard Haven, Mass.
W3ABJ, William A. Poppe, Washington, D. C.
W5BBV, Rev. Temple B. Anderson, Houston, Texas
W5QQI, ex-W2DSI, Lieut. Charles Dickson, USN, Albuquerque, N. M.
W6HPE, Thomas Dains, Long Beach, Calif.
W6CVG, Leo M. Reese, Lakeport, Calif.
W8IAI, Orley J. Corkwell, Continental, Ohio
ex-W8OIQ, George W. Mooney
W9TMR, Chester H. Klingebiel, Moline, Ill.
W9TOA, Oral E. Washburn, Nekoosa, Wis.
W9VXR, Hubert E. Giltner, Indianapolis, Ind.
G2SY, W. Rogers, Daventry, Northants
G8SJ, John R. Treadwell, Halifax, Yorkshire
PY1GH, Col. Jorge Bayma De Paula Guimaraes, president of L.A.B.R.E.

Correspondence From Members-

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MANEUVERS

4301 Tremont Ave., Lynchburg, Va.

Editor, *QST:*

Just finished reading the editorial in the June issue of *QST*. I call this tops in coöperation between the Army, FCC, and ARRL. To comply with such a *request*, I would gladly shut down the rig for the month if necessary. Maybe if all of us do as requested and coöperate, we can keep the bands until something big happens, like another war, which we all hope *will* not happen. Let's all retain and, as the FCC says, "further enhance" the excellent reputation the amateurs have for coöperation, by doing as we are asked to do.

— *James N. Noon, jr., W4PDP*

LEGAL MATTERS

10471 LeConte Ave., Los Angeles, Calif.

Editor, *QST:*

Your very timely article in the June issue of *QST* regarding the favorable outcome of the case of Frederick W. Wright, jr., against Sigfried Vogt and the Borough of Haworth reminds me of another case decided by the Supreme Court of Minnesota. This case entitled Village of Saint Louis Park *vs.* Casey, 218 Minn. 394; 16 N.W. (2) 459 also held that an amateur's telephone pole antenna was an appropriate incidental use to residential property and it also refused to apply the town's zoning laws to deprive the amateur of the use of his antenna.

The Casey case is interesting because the important status of the ARRL is given recognition by the highest court of Minnesota. While it does not appear from the official court opinion that the ARRL actively participated in the Casey case, the action of the League in the Wright *vs.* Vogt case again demonstrates the eagerness with which the League protects the rights of the amateur.

As an attorney who has actively represented many amateurs in the Los Angeles area, the coöperation of the ARRL has been a source of great satisfaction. It must be remembered that the League cannot undertake to represent every amateur with legal problems arising out of his hobby. Only those cases which appear to be of precedent making caliber can be undertaken by the ARRL, as was the case of Wright *vs.* Vogt. But whether or not the case warrants the intervention of the legal staff of the ARRL, the League never fails to assist local counsel for the amateur if the facts are made known to Headquarters.

— *Maurice J. Hindin, W6EUV*

PUBLIC SERVICE

Miami 42, Fla.

Editor, *QST:*

Just prior to the current watermelon season our teletype station at Valdosta, Ga., originated an urgent message addressed to all circuits requesting watermelons for a 13-year-old child who was dying of cancer. Apparently the doctors involved felt that watermelon juice might be of some benefit.

Although our teletype system reaches 33 cities in 7 states, the District of Columbia, and Havana, Cuba, no one immediately knew where any of the desired fruit might be obtained. However, our Tampa chief operator, W4CQX, observing the negative results of the teletype solicitation, decided to try amateur radio. He called W4LEP, who is a member of the Florida Emergency 'Phone Net, and explained the situation, requesting help.

Exactly 9 minutes later W4LEP called back to say that through the help of W4JEP in Miami two watermelons were in our Miami office for shipment to Valdosta. Also he stated that some Cuban stations had been contacted and additional watermelons would be available for shipment to the States via our international flights.

It developed that at the time W4CQX called W4LEP the net was in practice session with about 85 stations participating.

It is felt that the splendid service rendered an unknown child in this incident reflects to the individual credit of those participating and to amateur radio as a whole. As a former amateur operator (ex-W4CRS) I should like to express my personal thanks as well as the thanks of my company for the help given us in our efforts to help someone else.

— *W. E. Morris*
Asst. Dir. of Communications
National Airlines

8 CENTS A WEEK

607 8th Ave., Yuma, Ariz.

Editor, *QST:*

Several times you have printed the question, "Is *QST* worth 8 cents a week to you?" Here is an example of what I think: The average daily newspaper sells for 5 cents a day for 6 days a week. *QST* sells for 1¼ cents a day or 8 cents a week. The newspaper sells for 3.75 times as much as *QST*. You can enjoy an issue of the paper for about an hour. You can enjoy *QST* an hour a day for a month. In my opinion, *QST* is well worth $4.00 a year. My dollar goes a lot further with *QST*.

— *Bob Steenbergen, W7OEE*

AURORA AND MAGNETIC STORMS

67 Broadway, New York, N. Y.

Editor, *QST:*

My attention has been called to an article appearing in the June issue of *QST* by R. K. Moore. In the 7th paragraph of that article dealing with aurora and magnetic storms he makes the statement, "Trans-Atlantic cable traffic is completely disrupted." This statement is no longer correct. In former years magnetic storms did affect cable communication in the east/west direction very severely and in the north/south direction to a much slighter degree. Practically all east/west cables are now operated in such a manner that all low-frequency disturbances such as those caused by magnetic storms have no effect whatsoever on the transmission or reception of signals. This company installed such equipment on its cables in 1945 and ever since that time communication has never been halted or damaged in any way by magnetic storms even though the disturbances were sufficiently severe to cause total radio blackouts at the time.

The incidence and severity of magnetic storm disturbances on north/south cables has not been sufficient to warrant the installation of this equipment on such cables.

— *H. J. Rosenberger*
Asst. Chief Engineer
The Commercial Cable Co.

GRIN AND BEAR IT??

245 Cambridge St., Syracuse, N. Y.

Editor, *QST:*

There oughta be a law agin it! The "trashy" Armed Forces Day traffic jammed our "traffic lanes" far more than any fair or exhibit has done.

In your "Traffic Topics" column in *QST* for November, 1950, you stated, "How much more worthwhile a service to handle traffic for the boys in the service than the trashy fair and exhibit traffic which at times crowds our traffic lanes these days!" A message such as "Greetings on Armed Forces Day" is certainly trash, regardless of where it originated.

Let's discourage this type of traffic. Let's encourage the kind that makes a delivering operator or a relaying operator say to himself, "Here is an intelligent message. It deserves prompt handling." If a station makes BPL for originating that type of traffic, he's really done something!

— *Joseph M. Belth, W2COU/A2COU*

(Continued on page 112)

Hints and Kinks For the Experimenter

A CURE FOR "ITV"

AN article on interference caused by television receivers published in the September, 1950, issue of *Electronic Engineering* (a British magazine) contains a clue worth passing along.

To reduce the annoying hash radiated by poorly shielded TV receivers, they recommend spraying the inside of the cabinet with a conducting paint. Using shielding of this sort is not a new idea, but the application in reducing ITV is worth knowing about. — *Charles B. Martin, W4PXS*

FURTHER IMPROVEMENTS IN THE BC-342

GREATLY IMPROVED i.f. selectivity in this popular surplus receiver results if the last two i.f. transformers are replaced with Millen type 62456 units. It is necessary to cut the shield cans down if the receiver is to be replaced in its case after this modification, but it is a simple job. New spade lugs are bolted or riveted to the cut-down cans.

In addition, it is necessary to remove 7 turns from each of the windings in the transformer, because their tuning range must be moved a little higher to correspond to the 470-kc. crystal filter frequency. Litz wire is used in these coils, so care is required to assure a good joint when the leads are resoldered.

After replacement, the transformers can be aligned by ear to the crystal frequency. Alignment with a signal generator will be better, but it is not a requisite. The improvement will be quite obvious to anyone who has tried to combat QRM with the receiver in its original form.

Another great aid in knifing through QRM can be obtained by *tripling* the apparent bandspread in the 7-Mc. range. This can be done with no tools except a small screwdriver. Set the bandswitch to the 8- to 11-Mc. range. This range is not used to cover any ham bands, but by turning the oscillator padder condenser on the rear of the set, 7 Mc. can be made to come in at the low end of the dial, where the rate of capacitance change is much slower than at the high (numerically speaking) end. This, too, can be done without the aid of a signal generator. First tune in a strong signal near 8 Mc. Turn the oscillator padder a little bit at a time until the signal shows up at 8.2 Mc. Now peak the r.f. and mixer trimmers for maximum signal strength. Repeat this operation several times until the original signal has been moved up to where the dial reads about 8.7 Mc. You will now find that the receiver will tune to 7 Mc. when the dial is set near zero. A new calibration can be drawn on a crescent-shaped piece of paper and glued to the dial scale. It will take approximately *eleven* full rotations of the vernier dial to cover the 7-Mc. ham band, a big improvement. Most of the "expansion" will be found to have taken place at the low-frequency end of the range, where it is most needed. With the added selectivity gained by changing the i.f. transformers, this slower tuning rate will be a big help in spotting the weak ones.

A minor change will be of help to those who like to use the b.f.o. to tune in single-sideband 'phone signals. The tuning rate of the pitch control is reduced by bending the rear rotor plate on the pitch-adjusting condenser away from the remaining plates. Only slight adjustment is needed here to restrict the range of control to just cover the full audio range instead of considerably more. This will also be of help when the b.f.o. is used in conjunction with the crystal filter to get single-signal performance. — *R. M. Smith, W1FTX*

JR. OP "INSURANCE"

AN automobile ignition switch of the universal type, available at auto supply stores, is just the thing to lock the primary circuit of the transmitter so unauthorized persons cannot turn it on. It helps keep the exploring fingers of the Jr. Op out of harm's way while Dad is at work.

Simply wire the ignition switch in place of the master filament switch. It can be mounted in the same hole by enlarging the hole with a ¾-inch socket punch. — *Adelbert Kelley, W2CSX*

ANOTHER USE FOR THE GRID-DIP OSCILLATOR

ASIDE from its many uses as a variable-frequency device, the grid-dip meter also is usable as a crystal-controlled oscillator. For example, a crystal may be plugged into the coil socket of a Millen grid-dip meter to produce a form of Pierce crystal oscillator. The same can probably be done with the grid-dip meters described in recent editions of *The Radio Amateur's Handbook*. (The socket used for the plug-in coils in these units *is* a crystal socket.)

Tests made with the Millen unit with crystals from 1000 kc. to 14.3 Mc. resulted in all oscillating with ease. The tuning condenser is adjusted for best stability, and in the case of the 1000-kc. crystal, it is used to zero-beat the oscillator with WWV.

The meter serves as a tuning indicator, and will show the relative activity of several crystals of about the same frequency.

To extend the possibilities a bit more, this arrangement can also be used as a low-power crystal-controlled transmitter for short-haul c.w. work. — *Melvin H. Dunbrack, W1BHD*

HIGH-VOLTAGE DIVISION FOR POWER-SUPPLY ECONOMY

CONSIDERABLE saving of space and power can be obtained through the use of the circuit arrangement shown in Fig. 1. A single high-voltage supply is used for both driver and amplifier stages by placing the two in series across the supply. In addition to the savings in power supply, the arrangement has certain other advantages which are discussed below.

The suggested arrangement shown in the diagram may be adapted to nearly any tube complement. The high voltage is applied to the plate and screen circuits of the amplifier, VT_2, in the usual manner. The driver stage, VT_1, is then connected in series with the amplifier, making use of the voltage drop between plate and cathode to reduce voltage to the value needed by the driver tube. This means, of course, that the cathode of the amplifier stage is above ground by the amount of the voltage drop encountered in R_6 plus R_3. The voltage applied to the plate circuit of the driver is thus determined by the cathode current of VT_2.

In the diagram, R_3 is the cathode-biasing resistor for the amplifier, R_2 is a grid-blocking resistor of about 50,000 ohms, and R_5 is the required grid leak for the stage. It is returned to cathode through the blocking resistor, which is shorted out when the key is closed, and through R_3.

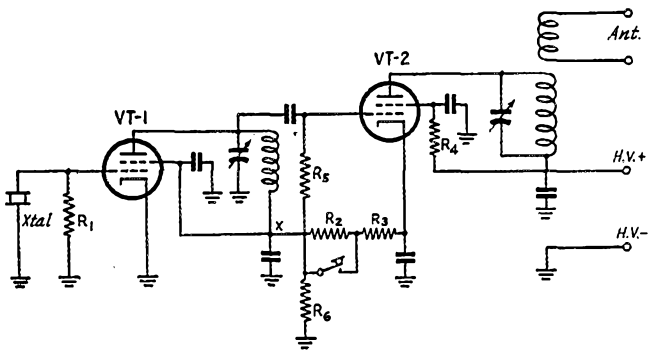

Fig. 1 — An unusual arrangement for using a single power supply for both driver and final amplifier. Values of the various components are discussed in the text.

Assume that VT_2 is an 807 or a 6L6, and the crystal oscillator is a 6C4 or 6C5. The plate supply is rated to furnish 450 volts at 100 ma. In the arrangement shown, 350 volts will be applied to the amplifier plate circuit, and 100 volts to the crystal oscillator. The plate-screen current of the amplifier may be as much as 100 ma., while the oscillator will draw about 20 ma. R_6 should be of sufficient wattage and resistance to pass the total current requirements of both stages and to produce, in conjunction with the voltage drop through VT_2, the necessary plate voltage for the oscillator. In the example cited, the value of R_6 is 1250 ohms.

The voltages and currents mentioned above are those encountered when the amplifier is fully loaded. The novelty of the arrangement becomes apparent when the circuit is tuned. With the oscillator operating normally, and the grid of VT_2 fully excited, the plate-screen voltage of VT_2 will depend upon its loading. Should the antenna be disconnected and the amplifier tank circuit resonated, the plate-screen current will drop appreciably. This, in turn, will reduce the voltage applied to the driver stage VT_1. In consequence, the r.f. drive to VT_2 will be reduced. Thus, grid drive to VT_2 is proportional to its plate loading, and is self-regulating. This prevents high r.f. voltages from appearing in the tank circuit of the amplifier when it is unloaded, which always happens in conventional circuits. It therefore becomes possible to use plate-tuning condensers and band-changing switches of much smaller dimensions and voltage rating than ordinary. As a matter of fact, receiving condensers and small ceramic switches may be used quite successfully in a 50-watt rig.

Another desirable feature of this circuit is the keying arrangement. With the key open the grid is negative with respect to cathode because it is tapped onto the voltage divider made up of VT_2, R_3, R_2, and R_6. Thus, plate current in VT_2 is reduced to a very low value. With VT_2 almost inoperative, the plate voltage applied to the oscillator, VT_1, drops to a very low value, rendering the oscillator inoperative. A hand key is shown in the diagram, but in the interest of safety it is desirable to substitute a relay, especially where high voltages are involved. As a matter of fact, the voltage across the key will not exceed that applied to the plate circuit of the driver tube, as measured from point X to ground.

The circuit described has been used by the writer with many tube arrangements. In one case, VT_2 represented a pair of 813s and VT_1 was a series of three 6L6 tubes in multiplier stages. The cathode current of the two 813s was used to provide the voltage drop to the plate-screen circuits of the 6L6s. The number of tubes in the driver circuits is limited only by the cathode current of amplifier, which must equal the sum of the plate and screen currents of all the driver tubes.

While it is true that a sacrifice in amplifier plate voltage must be made to provide plate voltage for the drivers, this reduction is more than offset by the great saving in space and weight of separate supplies, or of the relatively tremendous wattage consumed by dropping resistors. — *E. F. Lewis, W2CPD*

RECTIFIER PROTECTION

WHEN testing experimental gear for the first time, put a small resistor in series with the high-voltage between the rectifier cathode and the first filter condenser to act as a fuse in case something in the gear is short-circuited. — *Robert Schuetz, W2BDG*

Strays

"What's in a name?" department:

C. W. Sharp is W3IYU.

R. F. Wyer is the junior op of G8RY.

— *W1AGM & W3ROU*

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Owners of Hallicrafters SX-28 and SX-28A receivers will be interested in the availability of instruction sheets for installing a series noise limiter, a low-impedance cathode-follower output connection for a 'scope or panoramic adapter, and a marker crystal. Requests for these sheets should be addressed to The Hallicrafters Co., 4401 West Fifth Ave., Chicago 24, Ill., Attn.: Fritz A. Franke.

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A cloth-bound volume of General Electric's *Ham News*, containing a copy of every issue since the first one published in May-June, 1946, up through the November-December 1950 issue, is now available to amateurs and experimenters from the G-E Tube Divisions. Price of the volume is $2.00.

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An "all ham" wedding highlighted the May 18th meeting of the San Fernando Valley Radio Club of North Hollywood, Calif., when James C. Hinkle, W6DJU, and Lucille M. Weston, W6JMS, were joined in holy matrimony. The ceremony was performed by the Rev. Errol O. Shour, W6ABM. Earl O. Fuller, W6CSS, the bridegroom's boss, served as best man. To add further ham touches to the event, Gil De Bard, W6HVC, pianoed the wedding march, Betty De Bard, W6KOY, baked the wedding cake, and Myron Thoen, W6HOV, and Bob McKenny, W6VFG, made wire recordings of the ceremony. Our reporter, Louis H. Hippe, W6APQ, states, "Now that the two stations and two operators are consolidated, great things are expected in DX operation."

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The Edwards Perpetual Calendar, devised by Lt. Cmdr. Willard E. Edwards, USNR, KH6KZ, ex-11E-W6ATM, is back in the news as a result of its being introduced in Congress as House Resolution 3397. The calendar designates New Year's Day as a day apart which is followed by a 364-day year. This is divided into quarters of equal length, the month lengths in each quarter falling into the pattern of 30, 30 and 31 days and the first day of each month being successively Monday, Wednesday and Friday. Each week would begin with Monday, allowing Saturday and Sunday to become the week end by the calendar dates as well as in fact. In leap years, "Leap Year Day" would be observed as a day apart between June 31st and July 1st, as the first day of the second half-year. If the calendar were adopted, superstitious folks wouldn't have to worry about Friday the 13th — there isn't any!

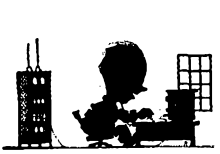
It's a long way from his native Mafeking, South Africa, to Boston City Hospital, but for Louis Nel, ZS6XQ, the ordeal of many months of confinement and three major operations has been eased through the untiring efforts of ham and non-ham friends here and abroad. A brilliant schoolboy athlete and holder of many South African track championships, Louis was severely injured in a diving accident in 1947 which resulted in paralysis. Thanks to a fund raised by the people of Mafeking, he is in this country as a patient of Dr. Donald Munroe.

Free passage to this country for Louis and his mother Sally was provided by the States Marine Corp. on the freight steamer *La Sierra*. As a result of advance word from ZS6MD, Louis and his mother were met at the Boston dock by a welcoming committee consisting of W1BB, W1GM, W1SS, W1MPP, W1QMD, and W1BUG.

Louis Nel's 19th birthday didn't pass unnoticed by Boston-area hams. *L. to r.:* Clair Young, daughter of W1HX; Charlie Beaudette, W1PLQ; ZS6XQ; Tisha Young (XYL of W1HX), W1NUO; Norm Young, W1HX; Eunice Randall Thompson, W1MPP; "Stew" Perry, W1BB.

Once Louis was comfortably settled at the hospital, local hams arranged a rotating schedule to fill in the visiting hours. And to while away other hours, ZS6XQ was supplied with a National NC-57 receiver by W. A. Ready, president of the National Co. On many occasions, 'phone recordings of a schedule between W1BB and Louis's brother, ZS6JL, have made it possible to keep in touch with the folks back home. Local ham clubs have voted ZS6XQ honorary membership, and the Veteran Wireless Operators Association has awarded him the Marconi Scholarship.

Next to a personal visit, Louis most appreciates the QSL cards, hamshack photos, and letters of encouragement he has received from scores of amateurs all over the world. By helping to swell his mailbag you will be adding hours of good cheer to the life of a courageous and appreciative visitor to our shores. Write: Louis Nel, ZS6XQ, c/o 7th Floor Medical, Boston City Hospital, Boston, Mass.



Operating News

F. E. HANDY, W1BDI, Communications Mgr.
JOHN E. CANN, W1RWS, Asst. Comm. Mgr., C.W.
GEORGE HART, W1NJM, Natl. Emerg. Coördinator

J. A. MOSKEY, W1JMY, Deputy Comm. Mgr.
L. G. McCOY, W1ICP, Asst. Comm. Mgr., 'Phone
LILLIAN M. SALTER, Administrative Aide

Full Amateur Coöperation Requested; 3.7–3.9 Mc. Needed for Military Exercise August 6th to September 7th. The most important event to be noted in radio operations for the coming month will be our coöperation with the Army and Air Force maneuvers. The National Defense Program deserves our fullest support as well as that of all citizens in times like these. It is one of the finest tributes paid our ham fraternity, that the League was asked to represent amateurs in working out this matter. As already reported there are military plans to conduct extensive exercises in the Carolinas starting August 6th. Only scrupulous and complete coöperation in keeping with the request of the Armed Services and the Public Notice of the FCC will justify the confidence placed in us amateurs.

The communications requirements of the exercises during the maneuvers will involve the operation of large numbers of low-power mobile military stations and some fixed stations. The equipment utilized covers some frequencies where use has been coördinated with others and also the frequency ranges touch the higher-frequency end of our 80-meter band. Mobile and field types of antennas as used for a variety of frequencies cannot be as efficient as fixed antenna installations designed and operated on a single frequency. Under combat conditions steps to clear frequencies militarily might be feasible.

It is requested that all operating amateurs who read this page extend coöperation — not only by observing injunctions to "stay off," if in particular areas where this is requested — but also that assistance be rendered in the necessary monitoring to secure coöperation from any U. S. amateurs who may have missed the notices or forgotten the plans for our coöperation. Military work as exemplified by these field exercises will utilize many low-power units. Amateurs should not jump at any conclusion that maneuver operations are not in progress just because no signals may be heard.

Please reread the FCC Public Notice. This appeared in June *QST*, and page 10 of July *QST* gives the full list of states defining the maneuver area. Note well the specific requests (1) to refrain from *all* 3.7–3.9 Mc. operation during the August 6th–September 7th maneuver period *in those states* and (2) that there be no sunrise-to-sunset operation in other territory east of the Mississippi. Full details are additionally set forth specifically in this *QST*. See pages 34–35.

Here's What To Do . . .

If in any part of the critical area: (North Carolina; South Carolina; Georgia; Delaware; Maryland; Virginia; West Virginia; District of Columbia; Tennessee, east of Hamilton, Rhea, Roane, Anderson, Campbell counties) . . .

Stay off 3700–3900 kc. at all times, August 6th–September 7th, 1951.

Help monitor and keep 3700–3900 kc. clear of interfering amateur signals.

Follow the guide to monitoring suggestions (below) at any time. However, never transmit on 3.7–3.9 Mc. sector between those dates, even to effect clearance.

If east of the Mississippi but not in the above area:

Stay off 3700–3900 kc. between your local sunset and sunrise time. Contact your local U. S. Weather Bureau office for daily sunset times during the maneuver period.

Help monitor and keep 3700–3900 kc. clear of interfering amateur signals.

Follow the monitoring suggestions.

If west of the Mississippi:

Help monitor and keep 3700–3900 kc. clear of any interfering signals from amateur stations: (a) such as coming from stations in the maneuver area, at any hour; (b) such as heard from amateurs east of the Mississippi, but not in the maneuver area, *after their sunset time.*

See monitoring suggestions below.

Assisting the Monitoring Effort: Please note well the five tabulated points set up as a Guide to Monitoring Operations.

Guide to Monitoring Operations

1) *Never transmit* in 3.7–3.9 Mc. if in the critical area or east of the Miss. R. (night condx), even for clearing QRM. Signals from assisting personnel might cause as much or more interference than the offending station.

2) *Help monitor.* If an amateur station is heard in 3.7–3.9 Mc., at times contrary to requests for designated areas, and the station is *near* 3.7 or 3.9 Mc. and you can place your transmitter *just outside* these frequencies, try to call and work the station heard. Invite his attention to dates of the maneuvers. Request his coöperation! Refer to the *QST* and FCC Notice, to save transmission.

3) If you can't work him, and he is within telephoning distance, try to 'phone.

4) If outside telephone range, *try to work a neighboring amateur on other frequencies than* 3.7–3.9 Mc. (even on another band). Get *this* amateur to telephone or take a radio message to deliver.

5) If the above means fail, please drop this offending station a penny postal card. While it may not give as immediate action, it should prevent interference on any following day!!

The League has issued special information to ARRL official observers and likewise to OBS appointees who are doing their stint just before and during the maneuvers to carry out a program to help remind *all active operators* of these arrangements. In addition ARRL requested MARS to assist. K4USA and K4AF are setting up monitoring advisory service for this period. All readers: Please keep an eye on the designated frequencies 3.7–3.9 Mc. All amateurs can do themselves as well as amateur radio a service by pitching in, if no one else is doing so, and following the "guide suggestions" to help keep these frequencies clear! — *F. E. H.*

ELECTION RESULTS

Valid petitions nominating a single candidate as Section Manager were filed in a number of Sections, as provided in our Constitution and By-Laws, electing the following officials, the term of office starting on the date given.

Western Florida	Edward J. Collins, W4MS/RE	July 29, 1951
New York City & Long Island	George V. Cooke, *jr.*, *W2OBU*	July 31, 1951
Eastern Florida	John W. Hollister, W4FWZ	July 31, 1951
East Bay	Ray H. Cornell, W6JZ	Aug. 16, 1951

ELECTION NOTICE

(*To all ARRL members residing in the Sections listed below.*)

You are hereby notified that an election for Section Communications Manager is about to be held in your respective Sections. This notice supersedes previous notices.

Nominating petitions are solicited. The signatures of five or more ARRL full members of the Section concerned, in good standing, are *required* on each petition. No member shall sign more than one petition.

Each candidate for Section Communications Manager must have been a licensed amateur for at least two years and similarly a full member of the League for at least one continuous year immediately prior to his nomination.

Petitions must be in West Hartford, Conn., on or before noon on the closing dates specified. In cases where no valid nominating petitions were received in response to previous notices, the closing dates are set ahead to the dates given herewith. The complete name, address, and station call of the candidate should be included with the petition. It is advisable that eight or ten full member signatures be obtained, since on checking names against Headquarters files, with no time to return invalid petitions for additions, a petition may be found invalid by reason of expiring memberships, individual signers uncertain or ignorant of their membership status, etc.

The following nomination form is suggested: (Signers will please add city and street address to facilitate checking membership.

Communications Manager, ARRL [place and date]
38 La Salle Road, West Hartford, Conn.

We, the undersigned full members of the.....
.....ARRL Section of the.....
Division, hereby nominate.....
as candidate for Section Communications Manager for this Section for the next two-year term of office.

Elections will take place immediately after the closing dates specified for receipt of nominating petitions. The ballots mailed from Headquarters to full members will list in alphabetical sequence the names of all eligible candidates.

You are urged to take this initiative and file nominating petitions immediately. This is your opportunity to put the man of your choice in office.

— *F. E. Handy, Communications Manager*

Section	*Closing Date*	*SCM*	*Present Term Ends*
Indiana	Aug. 15, 1951	Wilbur E. Monigan	Oct. 14, 1951
New Mexico	Aug. 15, 1951	Lawrence R. Walsh	Oct. 20, 1951
North Carolina	Aug. 15, 1951	Herman P. Jolitz	Resigned
Western N. Y.	Sept. 17, 1951	Harding A. Clark	Nov. 21, 1951
Eastern Penn.	Sept. 17, 1951	Jerry Mathis	Nov. 24, 1951
Quebec*	Oct. 1, 1951	Gordon A. Lynn	Dec. 15, 1951
North Dakota	Oct. 15, 1951	Rev. L. C. Standenaes	Dec. 20, 1951
Utah	Oct. 15, 1951	Leonard F. Zimmerman	Dec. 20, 1951

* In Canadian Sections nominating petitions for Section Managers must be addressed to Canadian General Manager Alex Reid, 169 Logan Ave., St. Lambert, Quebec. To be valid such petitions must be filed with him on or before the closing dates named.

Y.L.R.L. NOTES

The Young Ladies' Radio League announces the winners and high scorers in its 2nd Annual YL-OM Contest, held last February. Leading YL contestant was Ellen White, W6YYM, who scored 7654 points. Other high YL scores: W4HWR 7210, W1QON 4654, W1SCS 4070, KP4KQ 3540. The top YL 'phone score, 6895, was chalked up by W4HWR; other high 'phone-only scorers were W6YYM, W1QON and W1SCS with the point totals indicated above. Leading YL c.w.-only score was entered by W9JTX, 2000 points, followed by W9JUJ 1898, W3CUL 1032, W2EBW 697, WØZWL 660. In the OM category, Carl Evans, W1BFT, reigned supreme with 544 points; next in line were W4CKB 325, W4NTT 126, W8YGR 104, W8GSJ/2 99. W4CKB also submitted the top 'phone-only score, 78 points, and W1BFT turned in the highest c.w.-only total, 260. Engraved loving cups will be awarded to the highest YL and OM scorers. Both cups are awarded on a yearly basis, with a three-time winner obtaining permanent possession. Second- and third-place scorers will receive certificates. The highest 'phone and c.w. scorers will also receive awards.

Newly-elected officers of the YLRL for the 1951–52 term are: W9JTX, president; W3LSX, vice-president; W1BCU, secretary-treasurer; W1QON, publicity chairman. District chairmen for the term are W1SCS, W2PVS, W3CDQ, W4UTO, W5MJU, W6FEA, W7FTX, W8ATB, W9MLB, WØOCB, VE6MP, G3YL. The names of the new Editor and the District Chairman for the South African District will be announced later.

YLRL continues to invite licensed YLs the world over to become members. Any YLRL officer will be pleased to provide further information about the organization.

A.R.R.L. ACTIVITIES CALENDAR

Aug. 9th: CP Qualifying Run — W6OWP
Aug. 11th-12th: CD QSO Party ('phone)
Aug. 20th: CP *Qualifying* Run — W1AW, WØTQD
Sept. 8th: CP Qualifying Run — W6OWP
Sept. 13th: Frequency Measuring Test
Sept. 14th: CP Qualifying Run — W1AW, WØTQD
Sept. 22nd-23rd: V.H.F. Contest
Oct. 7th: CP *Qualifying* Run — W6OWP
Oct. 13th: Simulated Emergency Test
Oct. 17th: CP Qualifying Run — W1AW, WØTQD
Oct. 20th-21st: CD QSO Party (c.w.)
Oct. 27th-28th: CD QSO Party ('phone)
Nov. 5th: CP Qualifying Run — W6OWP
Nov. 17th-18th, 24th-25th: Sweepstakes Contest
Nov. 20th: CP Qualifying Run — W1AW, WØTQD
Dec. 7th: CP Qualifying Run — W6OWP
Dec. 7th-10th, 14th-16th: 10-Meter WAS Party
Dec. 19th: CP Qualifying Run — W1AW, WØTQD

TRAFFIC TOPICS

The summer slump is upon us. Most of those nets which have not ceased operation for the summer have cut down their meeting times in favor of the balmy outdoors, the QRN and the generally poor propagation conditions. Already the traffic nets are beginning to show participation only by the few zealots who "stick it out" all summer and hang the QRN.

There is something to be said for these fellows, for they are the ones who make the amateur radio traffic service one which operates the year around. Some of them readjust their operating habits to fit into summer conditions, but many of them gravitate toward nets which operate the year around with none but minor changes.

We need these fellows in our National Traffic System, and that's one of the reasons why we try to keep NTS going all summer. If we were to fold up and cancel all nets at the first sign of balmy weather and summer QRN, this part of the amateur traffic-handling fraternity would be lost to us, in all probability. Our hats are off to those traffickers who stuck with it through winter conditions which were unusually poor, and who are now willing to keep at it during the summer when QRN and the lure of the great outdoors only serve to add to the distraction.

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Since we printed VE2AFV's picture in May *QST*, W2RUF informs us that the New York State Net also has a boy prodigy in its midst. He is Ed Wolf, W2DJF, of Fairport, N. Y. Ed got his ticket in early 1950, when he was 13. He handles traffic about as fast as you can dish it out, and serves not only as NCS of NYS but also fills in on occasion as NCS of the Second Regional Net and as 2RN representative to EAN — a large assignment for a youngster!

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W4PHQ calls our attention to the message blank being used by the civil defense of Kingsport, Tenn. It bears a strong resemblance to the ARRL message form, except that the space for the text is divided into broken lines, each of which is numbered. In this way, fills can be asked for by the number of the missing word, and an immediate check is available upon completion of the text. This will not only assist in learning to send five or ten words to a line, but is a device which can be put to use immediately, without losing valuable time in training.

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National Traffic System. Continued unsteady propagation conditions have combined with summer QRN to make deep inroads into the effectiveness of our National Traffic System. Some NTS nets have moved to 7 Mc. in an effort to get away from these conditions, with moderate success. How about giving 160 a try?

New Section Net certificates are now available. They are to be authenticated by the SCM of the section, with a box endorsement which can further be made by the SCM if the net sends a representative to its regional net and is therefore a part of NTS. Those section nets which participate in NTS should take steps to take advantage of this opportunity to further decorate your walls. Despite decreased attendance, the System is still handling plenty of traffic, and will continue to do so throughout the summer. Here are the monthly summary and commentary from reports received:

Net	*Sessions*	*Tfc*	*High*	*Low*	*Average*	*Most Consistent*
EAN.....	23	1555	207	11	68	3RN
PAN.....	15	1070	220	26	71	
4RN (Apr.).	33	314	28	0	9	S.C.
4RN.....	17	242	28		14	S.C.
RN7.....	50	157	30	0	3	Idaho
TEN.....	23	922	101	4	40	Ia., Minn., Nebr.
TRN.....	41	51	9	0	1	Ont.

Eastern Area Net (3670 kc., Mon.–Fri.): An FB June EAN bulletin issued by net manager W2CLL set the stage for summer operation. The net moves to 3670 kc. effective July 30th, for the period of the military maneuvers and perhaps permanently, restricting future net sessions to 60 minutes.

Pacific Area Net (7207.5 kc., Mon.–Fri.): Reporting for only 15 sessions, WØZJO says that representation has been excellent from all regions and areas. Hal is doing the NCS work almost single-handed and is badly in need of help.

Fourth Regional Net (3615 kc., Mon.–Fri.): Virginia dropped from best-represented in April to poorest-represented in May, as Virginia Nets closed down for the summer. Certificates have been issued to W4REZ and W4RFM. Orchids to W4ANK who is doing a splendid job under most adverse conditions.

Fifth Regional Net (3645 kc., Mon., Wed., Fri.): Our secret agents inform us that RN5 is being run unofficially by W5MRK, and we are trying to make his status official.

Seventh Regional Net (3575/7225 kc., Mon.–Sat.): Representation is still lacking from Wyoming, Alberta, Saskatchewan, Alaska, and now B.C. is added to those among the missing. How about some action out of you Western Canadians? Roses to W7s GHT FRU and KGJ for their assistance in May.

Tenth Regional Net (3560 kc., Mon., Wed., Fri.): TEN is now on summer schedule and has moved to 3560 kc. to avoid possibility of QRM to military maneuvers. Certificates have been issued to W8AUJ and W9JTX. Many out-of-region stations report into TEN, but Manitoba is totally absent and N. Dakota almost so.

Thirteenth Regional Net (3675 kc., Mon., Wed., Fri.): VE3BUR reports that warmer weather, time changes and summer QRN have had their toll on TRN, but what traffic is on hand is still rolling. Much of it goes through QON, the Ontario 40-meter net, operated by VE3ATR.

BRASS POUNDERS LEAGUE

Winners of BPL Certificates for May traffic:

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
W4PL.....	14	1814	1503	258	3589
W3CUL.....158		1675	1382	276	3491
W7IOQ.....	77	1321	1320	98	2816
W7CZY.....	10	1386	1359	25	2780
W6JF.....150		1291	1125	51	2617
W9ILH.....	31	1256	1139	119	2545
W6KYV	91	1029	242	787	2149
KG6FAA.....690		652	477	175	1994
W6GYH.....	10	739	528	214	1491
WØZJO.....	18	673	620	49	1360
JA3AC.....592		357	118	239	1306
WØTQD.....	3	641	632	3	1279
WØQXO.....	17	631	448	182	1278
W5PTV.....	11	599	585	20	1215
W6BAM.....	53	487	296	209	1045
W1CRW.....	17	496	426	63	1002
W2RUF.....	26	501	413	42	982
W5GZU.....	7	483	441	31	962
W3NHI.....	6	438	332	101	877
K5NRJ.....	60	399	355	42	856
K4WBG.....615		117	90	21	843
K4WAR.....403		186	103	83	775
W2BNC.....	16	374	359	15	764
W5MN.....	8	376	330	45	759
W8AUJ.....	9	365	286	48	708
W5GZK.....	26	330	327	3	686
W2VNJ.....121		226	134	88	569
WØAY.....	12	269	267	14	562
W2CCS.....	10	276	251	24	561
W4ANK.....	80	282	146	50	558
W1EMG.....	3	295	173	71	542
W2ANG.....	78	231	176	50	535
VE3IA.....	9	273	237	4	523
W7FRU.....	4	257	211	44	516
Late Reports					
W9JUJ (Apr.)..	38	555	522	14	1129
WØTQD (Apr.).	2	512	502	4	1020
W9JTX (Apr.).	25	385	328	51	789

The following made the BPL for 100 or more *originations-plus-deliveries:*

KR6AF	192	W9ESJ	113	W7TH	106
KR6FG	169	W4CKB	110	W4PHQ	103
K5WAH	158	W4KJ	110	W8ARO	102
W4RQV	128	WØWAP	110	Late Report	
W6BHG	122	W5SJN	109	KR6FG (Apr.)	212
				W9DGA (Apr.)	117

A message total of 500 or more or 100 or more *originations-plus-deliveries* will put *you* in line for a place in the BPL. The Brass Pounders League is open to all operators who qualify for this monthly listing.

In case SECs, ECs and members of emergency nets (which include most of the AREC) didn't notice it, a little item in the ARRL Board Meeting minutes last May reads as follows: "On motion of Mr. Hill, unanimously VOTED that the Board hereby expresses its deep appreciation for the services being performed in the name of amateur radio and the League by the Section Emergency Coördinators, Emergency Coördinators, and members of Emergency Radio Nets."

This is a well-deserved commendation, fellows, and one which we wanted to make sure you were aware of. The past year has been noteworthy for the progress that has been made in emergency organization, especially toward civil defense. None of it would have been possible without the qualities of leadership exhibited by our SECs and ECs, and the exemplary spirit of service displayed by the many thousands of amateur participants in emergency nets. Take a bow, gang!

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On the 18th of May disaster struck the town of Olney, Texas, in the form of a tornado. Within four hours a transmitter was set up in the Olney City Hall, and was put on the air using the call of the Wichita Falls Amateur Radio Club, W5US. The club station handled hundreds of welfare messages as well as official messages for Texas State and National Guard, American Red Cross, and the city of Olney. Direct contact was established with many cities in both Texas and Oklahoma. The station handled messages to places throughout the country and to the Philippines. Work horses at the scene of disaster were W5OHE, W5MWQ, W5NRI, W5AAV, W5CLT, and W5BDG. Among those who did yeoman work clearing traffic were W5LRU, W5MQW, W5GYW, W5CJE, and W5SHE. W5s ARS and KUB were handling the mike at the home location of the club in downtown Wichita Falls. W5KWW also helped out. Amateurs all over the state pitched in and helped out throughout the night and the next day. The North Texas Emergency Net was alerted and handled traffic of an emergency and welfare nature. Mobiles from Wichita Falls and other near-by localities converged on Olney to assist in the work.

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Jan. 31, 1951, brought to Muskingum County, Ohio, a driving rain that froze upon contact causing severe damage to power and telephone circuits. By Thursday morning all communications were disrupted, leaving the town of New Concord isolated. By Thursday night over 3000 consumers were without power. Thursday night EC W8DVH made contact with W8RVU in New Concord, W8LQB, and W8FZF in Zanesville by 10 meters. Arrangements were made for a 10-meter 'phone net to monitor 28.8 on the hour every hour. About 8:30 Friday morning the American Red Cross called W8DVH at work asking for emergency communications between New Concord and Zanesville. Seven minutes later contact was made with New Concord and the first message got under way. W8FZF maintained the Zanesville end of the net from Friday morning until the next Sunday night. Assistance was also given by W8s LQB, EGG, CAB, FRM, and BSY. A total of 188 messages were delivered by W8RVU, some of them enabling the Power Co. to dispatch its crews at a great saving of time.

At McConnelsville, all the telephone lines were down for about three days. A few hams were dispatched there to set up communications.

— W8DVH, EC, Zanesville, Ohio

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A cloudburst that hit Hays, Kans., on May 22nd, brought amateurs and the AREC of the area into action. The flood that resulted from the terrific downpour brought WØHJM into action in the morning, and with WØKWA assisting as operator some 149 messages were handled during the day. Wøs IYR, BGW and PKD also came over from Salina to assist. Messages were received at radio station KAYS, whose announcers were WØHJM and WØKWA, and were then transferred to WØHJM/Ø for transmission. Hays hams who were active included Wøs NGQ FER CXG PHY and MJQ. WØAHC from Kansas City happened to be in town and also assisted. WØETZ also came over from Ellis and brought an invaluable crew of dam workers with him.

Most of the out-of-town message load was carried by the Kansas QKS Net, principally through WØFER of Hays. FER was not able to get on until afternoon, but he then reported into QKS and raised WØDJE and WØNJS. During the day traffic was handled with Wøs WAP WGM LNK MUY IJV OZN YOS and W5LNC. Helping clear the traffic on other frequencies were Wøs NI TDW FDJ KXL and W5AHT. During the afternoon, WØIYR of Salina sat in at WØFER to help handle the traffic, and some 60 messages were cleared. WØLOU of Great Bend and an operator at KØNAK (Ralph Pivonka) also assisted and offered to come to Hays if needed.

Traffic was handled for the Red Cross, the National Guard, the Highway Patrol, and many anxious people. Says SCM WØICV, "The AREC went to work true to form."

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The Dayton, Ohio, AREC has standardized on the transmitter described in March 1950 *QST*, with some minor modifications and has already produced 50 of these units on a production line basis. Their experiences and recommendations in setting up this procedure, obtaining parts, etc., are completely summarized in a small pamphlet which is available for a nickel apiece to cover printing and mailing. The pamphlet includes complete details for layout and construction of the 2-meter transmitter, complete parts list and some good suggestions as to how to obtain parts. AREC groups who are trying to get some new equipment going on two meters would do well to get a copy of this pamphlet from W8ZFO, EC for Montgomery County, Ohio.

SOO LOCKS "DESTROYED" BY ATOM BOMB

From 0600 to 0615, April 16th, the City of Sault Ste. Marie, Mich., and the Soo Locks were "destroyed" by atom bombing. Civil Defense officials estimated one-half of the city was in ruins, one-half the population had been "killed," and the locks were completely knocked out.

By 0630 the amateurs of Michigan had proved they are capable of handling emergency traffic on a large scale.

With W8MHH/8 as the key station in the bombed-out city and the Michigan Emergency Net operating on 3950, 3930 and 3910 kc., a pipeline was established within a matter of minutes. The c.w. gang on the QMN swung into action on 3663 kc.

By 0700 messages from aircraft coördinators in every county in Michigan were moving into W8DCF/8 at Civil Defense Headquarters in Lansing. Requests for supplies, medicine, blankets, plasma, fresh water, personnel, doctors and nurses, and estimates of damage and loss of life were funneled directly from the Soo to state CD headquarters on 3930 and 3663. By 1200 almost all traffic had been cleared, and officials from the Army, CAP and CD proclaimed it a successful demonstration of emergency operations.

The part played by amateur radio in the simulated attack cannot be overemphasized, but the success enjoyed would not have been possible without considerable planning. SEC W8GJH, backed by his authority as SEC, "sold" amateur radio as a means of communication to state and CD officials. He did this so well that it was decided to let amateurs handle practically all radio communications and a special on-the-air meeting of the Michigan Emergency Net was called the Saturday before the attack was to take place. A plan was then drawn up to include many ideas and suggestions, and this plan was later outlined to all members.

The state was divided into two sections. The frequency 3950 kc. was assigned to the eastern section, 3910 kc. to the western section. This left 3930 clear for direct communication between the Soo and Lansing. Even with this precaution, 3930 was badly clogged by 0900, and it became apparent that more than one station would be required at the scene of any major disaster and several frequencies would be necessary.[1]

Taking a leaf from the experiences of the New Jersey

[1] FCDA has previously indicated the probability that the 75-, 80- and 160-meter segments will be used only for "certain medium-distance circuits in special cases." In more recent conversations, the inadvisability of planning these segments for local or mobile use has been reiterated. — *Ed.*

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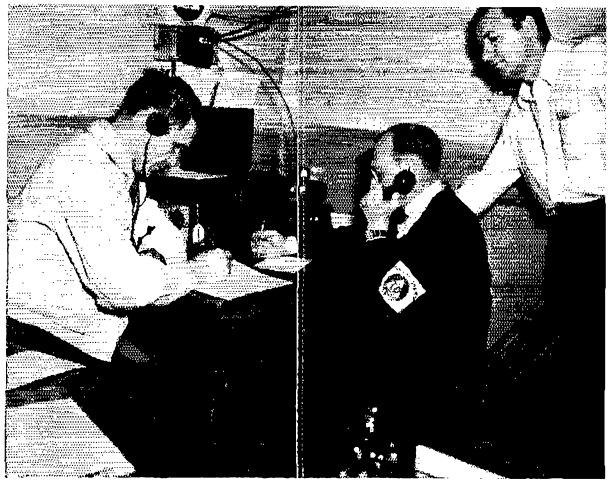
While W8OJT of Sault Ste. Marie, Mich., copied incoming messages from VE3AAM in Sault Ste. Marie, Ont., W8MHH of Traverse City operated the controls of the battery-powered station, a permanent part of the Sault's CD set-up. On the right is W8III of the Sault who with W8OJT set up the station with funds provided by the city. The radio operators were on duty more than nine hours from the time the alert was sounded.



♦

gang, no 2-meter operation was planned. However, the 10-meter and 75-meter mobile units proved themselves to be indispensable for "on the scene" reports to the more powerful fixed stations. According to plan, certain of the more powerful fixed stations were appointed as relay points between the Canadian border and Lansing. It was immediately obvious that the strictest net discipline was an absolute MUST.

The CD Headquarters station in Lansing monitored all frequencies, taking traffic from anyone calling. However, transmissions from W8DCF/8 were made only on 3930.

Summing it all up, several things are apparent.

1) Net training proved itself, and traffic moved fast.

2) More outlets, mobile and portable-mobile, are necessary at the scene of any major disaster if traffic pile-up is to be prevented.

3) A predisaster preparedness plan *must* be established. To attempt the handling of emergency traffic on a volume basis without a definite plan is folly. The SEC, SCM, RMs, PAMs, and net managers, together with the assistance and advice of experienced traffic men, must coördinate and coöperate in laying out such a program. The plan needn't be perfect — and tests will prove it to be anything but — but ANY plan will prove to be better than a cut-and-try hit-or-miss method.

To give any special credit to certain stations would be unfair to the rest of the gang. Everyone pitched in and carried his share of the load. We can only say, with pardonable pride, that when the chips were down, Michigan amateurs held the winning cards.

— *W8DLZ, SCM Mich.*

CODE-PROFICIENCY PROGRAM

Twice each month special transmissions are made to enable you to qualify for the ARRL Code Proficiency Certificate. The next qualifying run from W1AW/WØTQD will be made on August 20th at 2130 EST. Identical texts will be sent simultaneously by automatic transmitters. Frequencies of transmission from W1AW will be 1887, 3555, 7120, 14,100, 28,060, 52,000 and 146,000 kc. WØTQD will transmit on 3534 kc. The next qualifying run *from W6OWP only* will be transmitted on August 9th at 2100 PST on 3590 and 7248 kc.

Any person may apply; neither ARRL membership nor an amateur license is required. Send copies of *all* qualifying runs to ARRL for grading, stating the call of the station you copied. If you qualify at one of the five speeds transmitted, 15 through 35 w.p.m., you will receive a certificate. If your initial qualification is for a speed below 35 w.p.m., you may try later for endorsement stickers.

Code-practice transmissions are made from W1AW each evening, Monday through Friday, at 2130 EST. References to texts used on several of the transmissions are given below. These make it possible to check your copy.

Date	Subject of Practice Text from June *QST*
Aug. 3rd:	*Aurora and Magnetic Storms*, p. 14
Aug. 6th:	*Aurora and Magnetic Storms*, p. 18
Aug. 8th:	*Practical D.S.R.C. Transmitter Design*, p. 20
Aug. 14th:	*The Dallas Plan for TVI*, p. 26
Aug. 16th:	*Radiological Monitoring*, p. 29
Aug. 22nd:	*The Novice One-Tuber*, p. 32
Aug. 24th:	*Crystal Lattice Filters . . .*, p. 48
Aug. 27th:	*The World Above 50 Mc.*, p. 53
Aug. 30th:	*A Low-Drain 2-Meter Mobile Transmitter*, p. 60

DX CENTURY CLUB AWARDS

HONOR ROLL

W1FH.....239	W6VFR.....231	W2BXA.....227
W8HGW....238	WØYXO.....231	W3CPV.....226
W3BES.....232	W6ENV.....230	W3GHD.....226
	G2PL.....228	

RADIOTELEPHONE

W1FH.....205	XE1AC.....197	W1JCX.....182
LU6AJ.....198	PY2CK.....197	W6DI.....181
VQ4ERR....198	W8HGW....192	W2BXA.....180
	W9RBI.....184	

From May 15 to June 15, 1951, DXCC certificates and endorsements based on postwar contacts with 100-or-more countries have been issued to the amateurs listed below.

NEW MEMBERS

PY1BG.....167	G6BS.....112	G3AJP.....102
W2IWM.....139	VP7NM.....109	W2IYG.....101
W2DSU.....131	DL1LD.....108	W6ZTW.....100
DL1AU.....129	ZS6JZ.....105	VE3QB.....100
G3BQ.....120	W7HJC.....105	W3HA.....100
ZS2EC.....117	CN8EJ.....102	W1EYP.....100
	KS4AI.....102	

RADIOTELEPHONE

W4FBH.....123	W2RUI.....107	OH2OV.....101
W3MMH....113	KH6OR.....103	PY1AQT....100
ZS1GG.....110	PY2JU.....102	

ENDORSEMENTS

W3EVW.....221	W2TXB.....180	W4NNH....134
W6MEK....221	W3BXE.....180	VK5RX.....132
W6ADP.....220	ZL1BY.....180	HA4SA.....132
PAØUN.....220	KV4AA.....174	W8CKX.....131
W2NSZ.....211	W7PGS.....171	CP5EK.....131
ZL2GX.....210	KH6CD.....170	W3MLW....130
PY2CK.....202	LU7CD.....170	W6GPB.....121
W5FNA.....202	W3HRD.....163	G8PL.....120
W6CUQ.....200	VE3AAZ.....161	W1MRP.....120
W2AGO.....200	SM5WI.....160	W3RNQ.....115
W1CLX.....192	W4JFE.....159	F8TM.....113
KH6IJ.....190	PY4IE.....153	KZ5WZ.....113
W5JC.....190	W4HA.....151	PY2NX.....111
W4OM.....180	W3LVJ.....140	W8EKK.....111
W1GKK.....180	LA6U.....140	W2LV.....111
W8DMD....180	W8ZZU.....139	IS1FIC.....110
	OH2NB.....137	

RADIOTELEPHONE

W2AFQ.....170	W1LMB.....150	WØVSK.....120
W3BES.....164	LU8CW.....140	VE3BNQ....120
HC2JR.....163	W2ZKG.....135	W2SGX.....120
W6AM.....163	W3KT.....131	W3GHD.....120
W9ROQ.....161	F9HE.....130	ON4PJ.....110
I1SM.....152	W3EVW.....122	W1CLX.....110
W3DHM....151	CT1PK.....121	

Station Activities

• All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

ATLANTIC DIVISION

EASTERN PENNSYLVANIA — SCM, Jerry Mathis, W3BES — QMP is Net Control Station of the Philadelphia Wireless Net, which operates on 28 Mc. OML is rebuilding his rig. New officers of the Delaware-Lehigh ARC are PQX, pres.; OLO, vice-pres.; PYF, secy.; QBF, treas.; and 2ZVW, 2nd vice-pres. The Delaware-Lehigh Net held a simulated emergency drill May 6th with 10 mobiles and 10 fixed stations. This Net has a channel through to N.Y.C. and Philadelphia on 29,640 kc. Eastern Pennsylvania amateurs are asked to listen on this frequency Sundays at 10 A.M. for PYF/3, the NCS. EU fell off a 20-ft. T.V. tower and cracked his wrist in two places. ELI's XYL presented him with a set of twin YLs. PSH and PDJ are building a new radio-controlled boat. It will operate on 11 meters. The Abington Twp. ARA has applied for a club call. OQG, club treasurer, spent his vacation in Florida. NNV belongs to the all-band net which operates all bands, 160 meters through 430 Mc. The Philadelphia Area Council of Radio Clubs again supplied communication for the Delaware River boat races. 2LY, of SJARA, used a TBS-50 aboard a boat at a turning point on 75-meter 'phone and worked the NERC station, PKV, at the central control point at Columbia Yacht Club. Another circuit was formed by QV (NCS), HUV/2 at the Trenton Marine terminal, the northern turn, and 2SAI mobile at the Medford airport (CAP liaison). BES watched this frequency from his home QTH to keep it free of QRM. A third circuit was formed by the Philmont Mobile Club, with the help of the Delaware Valley Radio Assn. and the West Philadelphia Radio Assn. MKA, the WPRA station, was operated on board the *Sally Ann* by OWK and QHF. This net did an FB job in reporting accidents and stalled boats and in locating missing craft. Those known to have taken part are 2LY, 3DYL, PSH, QV, PDJ, QMP, QLI, PMD, QQH, QFY, KCG, AAG, VVS, GIF, RIE, 2UPS, 3OWK, QHF, 2ZEW, 3HUV, GHD, 2SAI, and 3BES. Apologies to any who are not mentioned. The PACRC was invited to inspect the new civil defense control center. The West Philadelphia RA is to be particularly complimented on its fine work in outfitting the center with radio gear. Traffic: (May) W3CUL 3491, NHI 877, PDJ 58, BIP 46, QEW 23, EAN 12, QMP 12, NNV 4, ELI 3. (April) W3NHI 442.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA — SCM, James W. John, W3OMN — New officers for the U. S. Naval Academy Radio Club are ØCAZ, pres.; Corky Moore, vice-pres.; NII, secy.; and 8FOK, treas. 8YNZ and ØCNR graduated from the Academy this year. The Capitol Suburban Radio Club meeting of June 1st featured a talk by FQB on electronic keys. IZL now is president of the CSRC in place of MVO, who was transferred to England. An auction was held at the May 11th meeting of the Rock Creek ARA and on May 25th GA spoke on the FCC. Net Controls for the Potomac-Rappahannock Valley Net during May were FQP and PYW. CIQ and BNC have been reporting into the Net on 144 Mc. from Hagerstown. JTK is another newcomer to the 144-Mc. band. FY now is DX as KG6FY. LZM has just completed a two-meter converter and has a companion transmitter under construction. ROU is a new call and is the youngest amateur in the Baltimore Area. He has a 457 on 3.5-Mc. c.w. and a BC-348 receiver. QWN now is the broadcasting station in Frederick. MCG is QRT until he can remove some trees so that new antennas can be erected. NL installed two "auto-calls" in Minneapolis while there on vacation. EUQ has been spending more time in the air than on it. However, he can be worked on 144 Mc. as airborne mobile. JQN is rebuilding his antenna system since only the 10-meter beam remained up after a high wind storm. LZY has something different in interference-hearing aid BCI with his neighbor. LZM has been appointed RM for the Baltimore Area. Additional appointments as ORS went to QZC and PRT. Traffic: W3LZM 338, ADO 58, QZC 38, AKB 30, CJT 28, NNX 14, BWT 10, MCD 9.

SOUTHERN NEW JERSEY — SCM, Dr. Luther M. Mkitarian, W2ASG — EC Charles B. Roop, ORS, has a new QTH. 8 Lawrence Ave., Barrington. FLW is a new ham in Pitman and is active in MARS. ZI is active with emergency nets in the Trenton Area. HAZ still is rebuilding. ZVW handled heavy traffic during Armed Forces Day. K2BG is an active traffic man. Just a word of warning regarding that ticket on the wall: Watch the expiration date and if it's at all possible, apply for renewal two months or so before the expiration date. Remember, you can't operate the rig after that expiration date while renewal application still is pending at the FCC office. Wish you all an FB summer vacation. Traffic: W2ZVW 233, ZI 170, RG 93, K2BG 74, W2FLW 18, ASG 14.

WESTERN NEW YORK — SCM, Harding A. Clark, W2PGT — SEC: SJV. RM: RUF. The Rochester Amateur Radio Association has elected the following officers for the coming year: UTH, pres.; TEX, vice-pres.; YUE, secy.; NES, treas. QHH worked VK1NL for country No. 203 postwar with 35 watts. WZQ has been called to active duty and resigned as EC for Watertown. RUT and YFZ have been appointed Asst. ECs for Fulton and Oswego, respectively. QY, EC for Monroe County, has twenty 14-Mc. stations organized and operating as a net holding joint drills with Rochester c.d. and DPW. COU has returned home from special training at Fort Sill and ran up a nice traffic total for 6 days operating. ABM, DEX, GOR, and TPN send in first traffic reports, with the latter running up an FB score with TCPN. COU, YRH, and ZSG visited ZHU and FFU and succeeded in working 7 miles with handy-talkies on 3.8-Mc. 'phone with only ¼ watt. ABM and PJM are narrowing the gap in the number of countries worked. GOR is a new ham in Elmira. RTW, QBJ, and KIJ are planning a trip to Mt. Pisgha for U.H.F. Field Day. The two NYSCD nets on 3509.5 and 3995 kc. are going strong but are badly in need of stations in various parts of the State. RUF continues to roll up large traffic totals and maintain her unbroken string of making BPL over a long period of time. Traffic: W2RUF 982, DJF 244, TPN 168, EMW 120, RUT 94, COU 93, DPL 86, ZHU 64, SJV 44, ZJ 36, BLO 32, RZP 32, PGT 27, ABM 4, GOR 3, DEX 1.

WESTERN PENNSYLVANIA — SCM, Ernest J. Hlinsky, W3KWL — Up Oil City way LST has a new sixteen-element 144-Mc. beam and a Wallman converter. LFX knocks off the VKs before breakfast. RNS is a new station with an NC-183 receiver. MLG is knocking off the DX on 7 Mc. AER, our PAM, reports his wife has had a serious operation. MOT, in Dubois, made 80 contacts in 31 sections in the CD Party. PTU sends in these few: 7PFX, now 3RJM; 1LSY, now 3RLH; ØTIH, now 3RXM; and a new station, RPE, are all active up Emporium way. LS8 now is at a new QTH. *Hamateur News* of the Horseshoe Radio Club of Altoona tells us that LQD, TXQ, WPA, and RYN are the club officers. LJQ is in Japan. PRO is a new one on 144 Mc. POO has a four-element 144-Mc. beam. RFM moved to Texas. TXQ is the proud owner of a Century Club certificate. The Amateur Transmitters Assn. of Pittsburgh tells us that LOE is being transferred to the Baltimore Division of the Westinghouse Electric Corp. The ATA gang did a wonderful job covering the annual Regatta again this year. The Steel City Radio Club, KWH, lets us in on some of its activity news. OMY says his new Viking rig is doing FB. RIK now is located in Ingram. RXT says 144 Mc. is picking up. New on 144 Mc. are OUA, UQ, and TIF. Congrats to Miriam, UUG, on winning the YLRL International Contest. PAP is in Korea. Down Jeannette way UVD reports that he is quite QRL with farming but still tinkering with radio. The Upper Ohio Valley Emergency Net still carries on its regular monthly drills with NUG and MPO as Net Coördinators. The Mercer County Radio Assn. paid the Erie Radio Club a visit recently with KQA, GEG, GLT, NCD, QCN, CJF, and George Heim representing the local club. Up Erie way NMP is recovered from his illness. We hear that QWL, QZE, and RIX are going on 28 Mc. TFX is receiving congratulations on his new assignment with the Civil Aeronautics Authority. QPP does a swell job with his newspaper articles, as does PIY. NXK is using supermodulation. Traffic: (May) W3MOT 314, UHN 52, LSS 40, VNL 24, AER 8, KUN 8, PTU 2. (April) W3GEG 435, NCD 50, AER 5, MOT 4. (Mar.) W3GEG 153. (Feb.) W3GEG 249.

CENTRAL DIVISION

ILLINOIS — SCM, Lloyd E. Hopkins, W9EVJ — GDI is getting set to buy a house and is getting ready to move. The Starved Rock Radio Club Hamfest was a success even in the face of threatening weather. Many drove 250 to 300 miles to attend. LIN took vacation trips to Pennsyl-

vania and Iowa. KRH is waiting for house-cleaning to end so he can find his rig. PK worked 23 states and VE1, 2, and 3 on 50 Mc. during May. LMC snagged his 48th state. SKR reports conditions improved on 14 Mc. The Quad City Amateur Radio Club bulletin reports the passing away of TMR. JNB is handling lots of G.I. traffic on 14 Mc. OLU was home for Field Day. The North Suburban Radio Club puts out the most colorful bulletin yet seen by your SCM, and it is chuck full of well-written material. FGZ, a major in USAF, is active in MARS and pounding brass at K7FAE these days. EBZ resigned as EC in Cook County Area C, and is on the Lakes as radio operator. The Fenwick High School Radio Club, ANF, ended the school year with five active operators: AYG, GSO, KMO, MJI, and NDJ. The St. Clair Amateur Radio Club annual election produced the following results: BAE, pres.; JSQ, vice-pres.; UXY, treas.; and DIB, secy. KNP has TVI problems but continues active on 3.8-Mc. 'phone and 3.5-Mc. c.w. YIX is gathering parts for his proposed mobile job. IAY spent Armed Forces Day at DUA. SXL is planning to take it easy for the summer as far as traffic goes. JMG expects to be on the air from new QTH within a month. LCG reports a good time during the month with RCC and 15-w.p.m. Code Proficiency certificates obtained. FPE, one of the outstanding v.h.f. men in this part of the country, has moved to our section. MEM is a new ORS. EVJ is making plans for vacation in southwestern Illinois. Traffic: (May) W9ILH 2545, YIX 286, KRH 231, PK 107, SXL 107, BUK 67, KJ 36, DOQ 31, DZW 29, YTV 26, MEM 24, LAX 17, LMC 15, LIN 11, BGN 10, IAY 9, HKA 7, CHI 6, EHS 5, LCG 2, MKU 2, SKR 2. (April) W9DOQ 38, KCN 12.

WISCONSIN — SCM, Reno W. Goetsch, W9RQM — SEC: UFX. PAM: ESJ. RMs: CBE, CWZ, LFK. WIN slow c.w. net has discontinued operations for the summer. JM mobile has worked all states on 28 Mc.! ANM is new EC for Oconomowoc Area. ELY is QRL with new job. IXA has added PAN certificate to his collection. Net certificates (BEN) have been issued to FWO, ELY, OGT, APU, CPN, and AOW. We regret to report TOA as a Silent Key. BTI is putting sixteen-element 144-Mc. beam on top of an 80-ft. pole. FAN worked three W8s on 144 Mc. ECV is on 144 Mc. with 9 watts to a 522. LJV, airborne mobile, worked across the lake to 8MRK on 144 Mc. RSR was promoted to captain in the Air Force Reserve. KHO was host to the NWRC at its May meeting. VHA, Wausau EC, reports the setting up of a club station in the Fire Dept. Headquarters building, utilizing an HT-9 transmitter and NC-101X receiver. QYH is chief engineer at WOKW, Sturgeon Bay. Four DCARC members and one XYL took the exams in April. ONY has circularized all clubs on questions concerning the organization of the Wisconsin Council of Radio Clubs. FLARC's new officers are GWK, pres.; HMG, vice-pres.; GFH, secy.; WWW, treas.; and KUZ, IHB, and TPS, directors. WVRA elected HFV, pres.; CFT, vice-pres.; EWM, secy.; VHA, treas. and EC; RQM, custodian. JGG is working in Milwaukee this summer. LSK worked ØCWG with battery-powered 3S4 rig with 1 watt input! YCV (now 4YCV) has been named as chief, MARS-Army at Washington. Another former ORS, LVR, says it's easy to work DX from W6-Land, where he is stationed with the Army. Cards from CR6, FY7, and ZK1 gave KXK 101 confirmed and DXCC. ERW has new jr. operator. KUZ, Madison EC, reports the installation of a net control station in the Red Cross Building. Traffic: W9ESJ 427, IXA 415, KZZ 244, FXA 106, DR 72, JGG 63, PFK 38, IQW 34, HDZ 30, LFK 29, IQM 25, ELY 19, NRP 16, CWZ 14, OVO 12, RQM 12, MUM 6, UFX 6, AFT 5, TQ 2.

DAKOTA DIVISION

NORTH DAKOTA — SCM, Rev. Lawrence C. Strandenaes, WØJWY — The long-awaited call-letter license plates now are being mailed out by the State Highway Patrol and should be in the hands of all the hams soon. A new call in Drayton is DGB. Look for him on 160-meter 'phone and 40-meter c.w. More new calls are DBI and DBH, Nick Beste and his XYL Edythe, of Newburg. With their Viking I they operate on all bands. In line with civil defense preparations, the Jamestown Club has a ten-meter beam on top of the court house, using a ten-meter portable rig to feed it. They can contact the various mobile units many miles out of the city. SSW, our SEC for the past several years, has resigned from that position because of other duties. All of us owe him a debt of gratitude for the great amount of good he has done for the section in his SEC work. Thanks from all of us, John. Traffic: WØCAQ 3, JWY 3, DBI 2, DBH 1.

SOUTH DAKOTA — Acting SCM, J. W. Sikorski, WØRRN — The Howlin' Wind Radio Club now is affiliated with ARRL. The Black Hills ARC conducted a Hobby Show which was so successful that the Rapid City Chamber of Commerce suggests it be made an annual affair. CQI is QRT for three months while building an all-band rig. CXM, a new amateur in Pierre, is running 100 watts on 3.5 and 7 Mc. After several years off the air, HSH has an all-band rig ready to go. UIR is settled in a new house and is "accumulating" a new rig. HWS is operating 3.8-Mc. mobile — the only mobile in Sioux Falls. ZRA is back on the air with a new Viking. Traffic: WØPHR 87, ZWL 55, CQI 15.

MINNESOTA — SCM, Charles M. Bove, WØMXC — Asst. SCM, Jean Walter, ØKYE. SEC: BOL. RM: RPT. PXB received his Class A license, and rebuilt his old 10-meter beam for 20. JVV says his newly-built antenna 'scope is like having an extra left hand. Ex-9GIY now is ØGYI in Duluth, and is working 3.8- and 28-Mc. mobile. IPA is teaching a new prospect in Floodwood. HRY likes his new QTH on top of the ridge at Duluth. RXL got a "new" car so he can go mobile. FTJ had the job of printing the official law covering our mobile license plates, and RA has a copy if you want to see it. TSN is busy passing to the various clubs a summary of the Board Meeting. JZP is covering the State nicely with his 10-watter, using the 136-foot, 300-ohm off-center feed antenna. The Minneapolis Radio Club has found a home for its two big kw. rigs at the sheriff's transmitter station at Golden Valley. Operators are needed to get acquainted with the layout in case of emergency. With the advent of the Novice Class license don't overlook the chance to help that newcomer over the first hurdles. The University of Minnesota ham station in the armory now has the call KØUOM. This is very nice as its broadcast transmitter is KUOM. New officers of the St. Paul Radio Club are HKF, pres.; PDN, vice-pres.; ALI, secy.; and SXD, treas. BOL's mobile rig was so heavy the car fell apart under it and he had to get another. Car license plates with our calls are expected to be available in October or November for 1952. OLJ is off to the Marine Corps. CXR is a new ham at Branden. Traffic: WØBPI 59, BGY 53, UCV 18, EPJ 17, RXL 14, DAB 8, RA 6, EYW 5.

DELTA DIVISION

ARKANSAS — SCM, Dr. John L. Stockton, W5DRW — Everyone seems to be QRL with business, vacations, and fishing. Guess the QRN on 75 and 80 meters can be blamed for some of the lack of activity. K5WBA, at Camp Chaffee, had a big Armed Forces Day, with W5EIJ being the main operator. BAB has a mobile going on 3.8- and 14-Mc. 'phone. MED has mobile on 3.8 Mc. ONL graduated from high school. Congratulations, Dick. Hope everyone had a successful Field Day and see you on the band. Traffic: K5WBA 176, W5ANR 130. ICS 33, DRW 31. EA 29, BAB 27, RWJ 14.

LOUISIANA — SCM, Robert E. Barr, W5GHF — The Pelican and the Delta 'phone nets, on 3870 and 3905 kc. respectively, are continuing their activity throughout the summer. RIQ and NG are the chief traffic stations reporting. The change to daylight time in the East forced NG to drop his TXN schedules because of conflicts. One of the latest calls issued in Shreveport is SUM. OXF continues his MARS and other traffic activity from Dixie Gardens. CEW and HBY are abandoning the old shack idea, modernizing with studio and console designs. EB, LVG, RIQ, and several others meet the Armed Forces net on 14,255 kc. consistently, and have been receiving quite a bit of traffic from Japan and Alaska. The MARS station at Barksdale Field operates under the call AF5FBI, using a BC-610 and a 32V-2, along with a 75A-1 receiver. MTR shows up in Minden operating portable when on vacation from school in New Orleans. FMO has been portable in Plaquemine recently. KTG again is active on 3.8 Mc. from Berwick, using an 813 final. It is suggested that the Novices form a state-wide net somewhere in the vicinity of 3725 kc. Handle it yourself, if you wish, or such old-timers as NG, VT, and CNG will gladly meet with you, at a code speed desirable to you, and help you with your code development. CNG now has an estimated code copying audience of well in the hundreds each Mon., Wed., and Fri. at 7:30 A.M. on 3905 kc.

MISSISSIPPI — SCM, Norman B. Feehan, W5JHS — K5FBB is in new club house at Keesler AFB. OGR is MARS OPP at Turner AFB. DEJ is chief of communications section for Meridian civil defense. DNS is on with ART-13. OSA is active on 7 Mc. DNV is on 3.8 Mc. We are starting a slow-speed c.w. traffic net in the State this fall and want representation from every town and city in the State. Drop your Route Manager, WZ, or your SCM a card now. SKI changed QTHs, joined the Hit and Bounce Net, and made BPL in one month. The Gulf Coast and some of the up-State hams made the Tri-State hamfest and picnic in Mobile, Ala., and SEP, RMC, HAV, and JHS's XYL brought back some nice prizes. SNR has a new mobile rig. KZs and KPs are his DX. ROB and ROC had a small hamfest at their home in Guntown. The ECs and AECs on the Gulf Coast met at JHS's home to make plans for the hurricane season. Traffic: W5SJN 111, JHS 96.

TENNESSEE — SCM, D. G. Stewart, W4AFI — The Tennessee Section C. W. Net closed on May 31st for the summer. In the event of an emergency all are urged to monitor 3505 kc. for activation. This is in keeping with the Armed Services request to keep 3700 to 3900 kc. clear during August and the early part of September. The Section 'phone net will continue operation on a limited basis. PL again stacks up a whopping traffic total with Mother's Day and Armed Forces messages the major contributors.

A newcomer to BPL is PHQ. He has designed an FB "automatic check" message form. FCU and LNF are clearing stations for G. I. traffic accepted at TEC Plant Recreation Room. NNJ has moved to New York for further duty. The Oak Ridge emergency group operates on 50.7 Mc. Tues. and Fri. at 1900 EST with ten units. SEC Carroll turned in a nice AREC report. Net certificates were issued to the following Davidson Co. Ten-Meter Emergency Net stations: SOC, SOJ, SON, SNZ, and SPN. The Memphis Emergency Corps demonstrated its set-up to City and County Civil Defense Commission with a fixed station at CDC Headquarters contacting six mobiles and two fixed stations throughout the area on 28 Mc. The same group furnished communication for the Cotton Carnival Parade. The Memphis Two-meter Net meets each Friday evening. New 28-Mc. mobiles in Memphis are BQW, GJB, IBG, LUI, and SBE. GD and ALM are chasing 14-Mc. DX. IIB is meeting MARS Nets regularly. HQM is active in Jackson 28-Mc. Net. Traffic: W4PL 3589, PHQ 103, OOA 40, RPT 37, IIB 29, BAQ 18, CXY 18, HQM 12, NNH 12, AEE 11, PMR 10, NDC 8, PFP 8, OGG 7, AFI 4, FLW 3.

GREAT LAKES DIVISION

KENTUCKY — SCM, I. W. Lyle, jr., W4KKG — VP comes through with his usual FB OO report. Doc recently was elected secretary-treasurer of the Louisville Section of the IRE. SKE is working on TVI elimination. NZY is operating portable at Outwood. MWX says the hot weather has hurt his traffic total. ERP rattles a mean bug on 7 Mc. and handles lots of traffic. MGT covers the State both personally and on the air. KZF is a good OBS on 160 meters. MQ says summer time has him down. WBG, at Ft. Knox, fires in a real traffic total. KQI has a nice mobile outfit. RQV makes BPL. CDA requests that all those wanting to join KYN, which opens again in September, drop a card to him or MWX. OXT now has radiotelephone first and radiotelegraph second. BXU was the most consistent and reliable member of KYN during the past year. Also he has never failed to report his monthly traffic total. NBY is handling traffic on all nets. SMU pounds in with that church-steeple antenna. OGB is QRL with work. BAZ has resigned as manager of 9RN/TLJ after fifteen years. He is EC for the Louisville Area and this, plus Civil Air Patrol duties, demands all of his free time. MDB missed Field Day because of Great Lakes Training Cruise. KKG spent his vacation in Jeffersontown painting his house, his wife, himself, and the dogs! Traffic: K4WBG 843, W4ERP 371, RQV 176, MGT 175, MWX 105, OXT 61, NBY 49, BXU 22, SKE 20, NZY 17, CDA 15, KZF 14, MQ 13, KKG 11, SMU 4.

MICHIGAN — Norman C. MacPhail, W8DLZ — Asst. SCM (c.w.): J. R. Beljan, 8SCW. Asst. SCM ('phone): R. B. Cooper, 8AQA. SEC: GJH. PAMs: JUQ and TTY. RMs: UKV and YKC. New appointments: QPO as OPS, and WFA as EC (Wayne and Macombe Counties). Summer schedules for Michigan traffic nets are as follows: QMN, 3663 kc., 1830 to 1930, Mon. through Fri.; BR Net, 3930 kc., 1730, Mon. through Fri. The Hot Air Net is QRT until October. A 40-meter QMN net will operate at 2100 Mon. through Fri., with SCW, DOI, and EGI alternating as NCS. MEN continues on 3930 kc. at 0900 Sundays only. FM advises he is in Tripoli and has scrounged up the necessary equipment for QSOs on 14 Mc. TTY received a Public Service certificate for his work in the big sleet storm. TUX is in Upper Peninsula for the summer. TYJ was elected president of the Central Michigan Amateur Radio Club, with DOI as vice-president. UKV is taking a well-deserved vacation. QPO is new vice-president of the Cherryland Club. YMG has moved to Kalamazoo. QQN is proud of his new 32V-2. AQA has completed his p.p. 813 final with TVI 99.9 per cent licked. We have a complete list of all ARRL members in Michigan. Any club that wants information on amateurs and SWLs in its own area, please drop us a letter. It's a good source of prospective new club members. DAW is very active on the TCPN in the wee small hours. FTT, CPY, and DKL were overheard making plans for 40-meter coverage of the annual Detroit-Mackinac Sailboat Race. The 1100 daily Michigan MARS net on 4020 kc. is growing more and more popular. BKV is NCS. The mobile ranks are growing by leaps and bounds, especially on 75 meters. ELW/M reports into BRNet from Great Lakes NTS regularly to establish some sort of a DX record for low power in the net. MHH/8, OJT, III, GNS, and ZDF operated the emergency rig during the simulated attack on the Soo Locks, and racked up a traffic total of 134 points in 6 hours. GIQ and GPQ are two new calls in Port Huron and St. Claire, respectively. EAF now is Class A. Traffic (May): W8RJC 230, WVL 179, ELW 174, DLZ 99, DAP 95, TZD 91, ZLK 90, SCW 89, WXO 82, QBO 74, IV 58, EJD 43, ILP 42, OAF 42, FX 27, UGD 20, LR 17, TQP 17, TBP 15, QPO 14, YGS 12, AQA 11, HKT 10, TUX 10, EGI 9, MHH/8 8, FWQ 6, ZKV 5, TTY 4, FBJ 2. (April) W8UGD 98, DOI 49, EJD 46, EXZ 46, YDR 46, TQP 19, HKT 14, MHH/8 12, DSE 7.

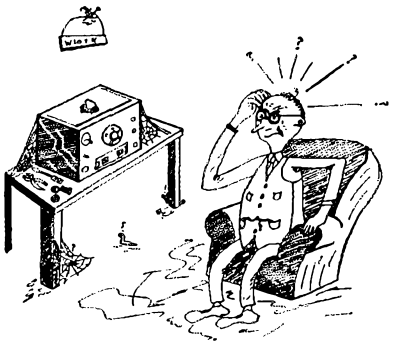
OHIO — SCM, Leslie Misch, W8HGW — Asst. SCMs, C. D. Hall, 8PUN, and J. E. Siringer, 8AJW. SEC: UPB. RMs: DAE and PMJ. PAM: PUN and AJW. ARO made BPL this month. New ORS appointee is EIV. ZAU recently returned from overseas and is glad to be back on the air. GMI is doing very well with the Medina County c.d. set-up. ZJM still is working FB DX even with conditions as poor as they are. LBH has been giving 3.5-Mc. c.w. a good workout. Good news from the Ohio Legislature, the "Amateur Call on Auto Tags" Bill has passed and now is awaiting Governor Lausche's signature. VHO and WZ deserve a lot of credit for their helping hands, along with a lot of other Columbus amateurs. JFC has worked a lot of new DX on 14 Mc. in the early A.M. OAC has new 20-meter beam. CBI has new all-band rig in operation. Our sincere sympathy to AL, whose father passed away. IB now has his DXCC sticker 130. YJE worked three new ones: CP5, FG7, and MD2JN. He recently visited NBK to drool over AC4YN's card. DTD now is operating 10-meter mobile. LYD is organizing Area Five into a smooth working communications network. Activity seems to have hit the summer slump. Traffic: W8IB 390, FYO 378, DZX 334, ARO 278 DAE 165, SFI 159, EZC 118, PMJ 64, YCP 64, AL 58, CBI 39, QIE 29, WE 29, BFH 27, EQN 26, PUN 14, GZ 12, DZO 7. DXO 6, JFC 4, WAB 3, BEW 2, LBH 2, ZJM 1

HUDSON DIVISION

EASTERN NEW YORK — SCM George W. Sleeper, W2CLL — SEC: NJF. RMs: TYC, KBT. PAMs: NIV, IJG, ILI. Congrats to the NYS c.d. 'phone net for the good job in connection with the c.d. test at Utica. NIV handled the message for the Governor. Orange County AREC, under PCQ, is going to town. A recent test on Route 17 with 10 units obtained S8 144-Mc. signals along the entire route. VPG, OSL, JRX, SQJ, HO, DWX, and PCQ participated. PCQ also reports 1000- and 350-watt fixed now available on all bands. The SARA recently had its annual dinner. ZLL, 3PPO, and 2OOW have moved to Schenectady. Helen, BNC, hit the big time with a traffic total of 764. Members of 'phone nets such as NYSCD should report traffic handled to the SCM. The annual section meeting was held at Poughkeepsie June 16th. NYS is on summer schedule at 7:30 P.M. AWF is on vacation in the mountains with portable. JQI is getting out the annual year book for AARA. KBT is issuing some fine bulletins for NYSS. EFU is the big gun in charge on GED. GTI has acquired an emergency generator. HUM reports full emergency equipment and that Columbia County is ready HUM also reports good activity on the 160-meter emergency net. A new club has been formed in Catskill with twenty members. SUL still is patrolling 9W with mobile on 144 Mc. PHO still manages to handle traffic. IJG reports his NYSCD 'phone net has an average attendance of forty-five stations. Appointments made: KED as EC for E. Greenbush; GSJ as EC for Ulster County; IRT as EC for Hastings; AIH as EC for Peekskill; SZ and BVF as ORS; YXE, PV, and KUJ as OPS. Endorsements: TYC and LRW as ORS. Traffic: W2BNC 764, TYC 263, GSJ 116, KBT 57, BRS 27, CLL 24, WBH 24, PHO 18, GTI 14, BVF 11, CEV 8.

NEW YORK CITY AND LONG ISLAND — SCM, George V. Cooke, jr., W2OBU — Asst. SCM, Harry Dannals, 2TUK. SEC: SYW. RMs: PRE, TUK. News from Staten Island shows VKF, EC, conducted 5 AREC drills on 29.492 Mc. with 20 members participating. EFA won a transmitter hunt at Basking Ridge, N. J. HXL is in charge of code classes at the Staten Island Radio Club and assisted GGD, GGJ, and GOG in getting their tickets. In Brooklyn BIV, EC for the Borough, reports increased AREC interest and activity with 17 new members this month for a total of 132. Regular drills are held 4 times a week as follows: Mon., 2100, 145.26 Mc. with YHS as NCS; Thurs., 1900, 29.540 Mc. with BXK as NCS; Thurs., 2300, 29.540 Me., YHS as NCS; Fri., 1500, 29.540 Mc. with ZLK as NCS; and a new 80-meter c.w. net on 3508 kc. at 2300 with DXN, who received Section Net certificate for efforts in NYS Slow Speed Net. QGK and EXE have been appointed Asst. ECs to BIV. BPV conducted airborne tests and reported contacts with many W1s when operating 150 miles off shore; he also stands by for emergencies at Floyd Bennett Field, all this on 144 Mc. Section Net certificates were issued to BBE, BIV, BXK, CHS, DIR, DLP, EWJ, EXE, HYF, MVQ, PF, PYX, OEQ, YHS, YHX, ZLK, ZRY, ZVB, and ZVL. JSV, new Queens County EC, reports continued activity on both 28 and 144 Mc. and a 144-Mc. station opened at the North Shore Red Cross. The nets operating on 145.62, 29.520, 29.6, and 29.64 Mc. held 15 drills during the month. PRE, new Manhattan EC, is augmenting his AREC assignment by placing stations in 9 precincts and 2 hospitals. KTF, EC for Baldwin and Freeport in Nassau County, reports 8 drills during the month with 20 per cent of his nets operating with emergency power. The Nassau County 'phone net operates at 1000 Sundays on 3910 kc. The 2-meter Nassau 'phone net operates at 2100 Mondays on 144.148 Mc. The Mid-Island Radio Club net operates at 1100 Sundays on 145.05 Mc. and participates almost 100 per cent in AREC nets. UBW/2 is the call of the last listed net, located at Freeport C.D. Control Center. Oceanside AREC/c.d. group is applying for a license under the guidance of ER. In Suffolk, AJF, Asst. EC to KDB, makes known that AREC/c.d. work is going

(Continued on page 78)



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FRANK LOPEZ, W1KPB

along strong with increased contacts with c.d. officials and operates on 3995 kc. Sundays at 1100 and on 146.8 Mc. Mondays at 2100. WDP worked WAR ('phone) WAR (c.w.) AIR (c.w.) and NSS (c.w.) in 15 minutes on Armed Forces Day. A practice alert was held in N.Y.C. and a total of 26 stations responded during the alert time of 40 minutes. VKF, BIV, DUP, JSV, and PRE met with your SCM and SEC to formulate operations of AREC with New York City for possible c.d. work. All non-members of AREC are urged to enroll now. RTZ is in Florida recuperating from a recent operation. HAE is serving with the Navy in Manila. ZXQ is taking electronics course at Fort Devens. ZPG, at Fort Monmouth, contacts UHF Club members on 144 Mc., with OTA in Wantagh Building with a 2-meter square corner reflector to do the same. BIV, CHS, and EXE earned OPS appointments. MHE picked up OPS and OES certificates. AAB and UYX have been called to active duty with the Air Force. PF recently joined with TCPN on 3970 and OT on 3990 kc. YOO and EBB worked for Section Net certificate in Queens AREC. AWI advises of the formation of the Lincoln Radio Club at the Lincoln School of Radio and Television, Inc., to further the interests of amateur radio. Licensed operators will be allowed to operate the school station, a modern 500-watt a.m. 'phone/c.w. unit. Traffic: W2VNJ 569, BO 467, OJX 126, MQB 115, GP 114, ZZA 111, JBQ 76, OBU 72, OUT 68, RUZ 66, BVL 28, PF 28, EC 24, KVG 20, IVX 9, IAG 7, BNX 6, WDP 4, EGV 3, LGK 1.

NORTHERN NEW JERSEY — Thomas J. Ryan, jr., W2NKD — As this goes to press, your SEC is waiting for copies of the minutes of a meeting of the Eastern States Civil Defense Council which was recently held in New York City. NUI, in Bayonne, has complete installations running at the Police Athletic League rooms and the Red Cross. At the PAL they have two Harvey-Wells rigs, two S-77 receivers, and power generator. The Raritan Area Defense Council was donated a $2,500 communications truck by Mrs. Joseph H. Freedman, wife of the Freedman Trucking Service owner. It will contain equipment that will enable the operator to maintain contact with the mobile dispatch service and at the same time remain in constant communication with the ham service set up in the area by BAI, Middlesex County EC. Area 4 has taken possession of its new quarters in the County Yards Building in Westfield. Chairman IIN and his assistant, KOJ, already have had the headquarters on the air during the weekly c.d. drill on 3995 kc. Wednesdays at 8:00 P.M. They use a BC-474 and BC-342 on 3.8-Mc. 'phone and an ARC-5 and HQI29-X on 3.5-Mc. c.w. KOJ supervised the erection of antennas for all bands. DRA reports his station is in operation from the Rutherford Boro Hall. His group includes AJQ, ANW, BLS, CDG, CPJ, DBW, HT, JJR, JLZ, LEM, LKW, LMQ, MJC, NCQ, NDY, NEL, NWT, ODA, OV, SQG, TWN, UZC, and ZTR. LDG, Irvington EC, reports four finished two-meter mobiles and thirteen approaching completion. VBA is the two-meter NCS. The Irvington Amateur Radio Club has pledged 100 per cent coöperation with civil defense. The New Jersey Civil Defense C.W. Net, known as "CDN," got off to a flying start on May 14th. The Net is designed to handle the load of traffic flowing between defense headquarters. It will relieve the load from the 'phone net on 3.8 Mc., leaving it as a command net between c.d. officials. Net representatives are ANG, VJM, SMK, CGG, WCL, BDL, RQI, ZVW, CWK, DRV, KHA, QUH, ZEP, BTS, K2BG, BNF, RG, ZI, and FLW. On June 6th the c.w. net stood by during its 8 P.M. drill to tune its receivers to 3995 kc., where each of the 'phone net members welcomed them into the amateur group working with c.d. CCS, temporary net control, called each station and the SEC, VQR. VPL and GPV completed the communications center at Milltown. EKU now is a regular on MARS and the Middlesex two-meter net. NQA keeps this column well informed on activities in the Raritan Valley RC. CZA tells of a demonstration on May 23rd for the benefit of the City Council of Summit. They had six 28-Mc. mobiles and 2 fixed stations, one at the Red Cross and another at the hospital. Those in the drill were ZKT, WCO, SHF, MTJ, ROY, GZZ, JDW, and TIS. On May 25th ZKT and CZA handled traffic from the scene of a very serious fire to the Red Cross Headquarters. GUM was Field Day chairman for the Garden State ARA. EGM now is using a new rig with a pair of 813s running 300 watts. NIY worked NSS, AIR, and WAR during Armed Forces Day. NCY now uses a Harvey-Wells transmitter powered by a "Leece-Neville" unit. The following were sworn into the Roselle Park c.d. committee: CCY, HVK, LRB, IYU, WCC, and LOP. QUF was elected president of the North Jersey Mobile Radio Club. Traffic: W2CCS 561, ANG 535, CUI 249, LMB 125, ZK 122, WCL 76, ZEP 62, NCY 33, DRV 30, CZA 25, OUS 11, OXL 10, COT 5, CJX 2, EGM 2, NIY 2.

MIDWEST DIVISION

IOWA — SCM, William G. Davis, WØPP — TLCN held its 4th annual party on May 26th at the home of AUL with a fine crowd present. The past and present net managers, AUL and QVA, were surprised with 24-hour electric clocks as gifts of appreciation for their work with TLCN. The TLCN schedule effective June 4th is Mon., Wed., and Fri., at 1845 CST. BDR and CFX are new ORS. QVA received A-1 Operator Club membership. IVA has been recalled to the Navy. Doggone, SCA did *not* get his BPL. He blames it on a 16-day vacation. TEN went on summer schedule on June 4th, moving to 3560 kc., and dropping the second session, Mon., Wed., and Fri. only. YTA reports he's running the old rig up to 200 watts. CFX sends in his first report since making ORS. There was no news from the Iowa 75 gang this month. BQJ says he's going to paint his house, make a garden, and finish his exciter. Something's going to suffer. DLD has ambitions toward 50 Mc. JHC took the fatal step and acquired an XYL. JUI, YKN, and QDB and their XYLs saw to it that the knot was properly tied. QDB got up the Field Day plans. WLY is building 50-Mc. receiver. Anyone heard YKN on c.w.? JAJ is a new EC. ANK applied for EC appointment. PP is going in for DX and has a schedule with 5CF. There were not many reports this month; it must be that time of year. Oh, for a couple of weeks in the mountains. Traffic: WØSCA 320, QVA 185, YTA 184, CFX 104, NYX 83, BDR 52.

KANSAS — SCM, Earl N. Johnston, WØICV — The big news story for May is the Hayes Flood emergency, when both c.w. and 'phone nets did a wonderful job and all participating deserve high commendation. The newly-formed Jayhawk Amateur Radio Society of Kansas City, Kans., held an election of officers May 24th and elected ZGK, pres.; AHC, vice-pres.; KXL/NIY, secy.-treas.; and IMW, RXB, FIK, and FGY, directors. The AREC of Wichita went into action with mobiles during the high water from the Arkansas River May 18th. The River Valley two-meter gang, MVG and QDH of Salina, BDK and JFE of Abilene, and KRZ and ICV of Topeka, had a two-hour ragchew May 11th with R9-plus signals at times and excellent conditions all the time. The Salina gang worked ONQ in Kansas City later after the Topeka gang folded up. Christy's Picnic at Osage City May 27th was one of the best attended picnics ever, with more than 125 registered. About 25 mobiles were parked over the grounds. LIX, of Independence, is getting a rig on 7 Mc. to bone up on c.w. KØNRZ, Naval Reserve Training Center at Topeka, handled over 300 messages Armed Forces Day. It was operated by HOC and UPU for about thirty-four hours clearing and relaying AFD traffic. AHT, of Topeka, has just completed 250-watt rig for all bands, c.w. now and 'phone later. CWF, CMG, MYQ, and 6WWD/Ø are new calls in Topeka. Traffic: (May) WØNIY 211, UPU 167, ICV 65, WGM 57, LIX, 17, KXL 10. (March) WØNIY 114, KXL 10.

MISSOURI — SCM, Clarence L. Arundale, WØGBJ — QMF lost his antenna in a recent electrical storm. ARH sent in his 100 DX cards for DXCC but received credit for only 97 countries so is waiting for more confirmations. WAP has moved to another QTH in Liberty and will be back on the air when the antenna problem is solved. HUI has a new HRO-50 which is a very fine receiver. BPD had the misfortune to blow power transformer in the transmitter. BHC has just received his Class A ticket. AIG is back on the air and will be remembered as old HWL and more recently as 6GUN. QXO made BPL for the second consecutive month and is looking for traffic around 7150 kc., 6 to 9 A.M. daily. BKV is entering the armed services. BAF, in the past two months, has acquired WAS, WAC, OTC, RCC, CP-35, ORS, and made BPL. GAR is alternate NC for the Show-me Net and now is a member of the A-1 Operator Club. OUD's mother has returned from the hospital. GIW and FNN are engaged in a friendly competition for the DXCC certificate. PLJ reports no two-meter activity during the month of May. The Missouri Amateur License Plate Bill has reached the Senate. Traffic: WØQXO 1278, WAP 191, HUI 65, GBJ 62, GAR 55, OUD 40, EBE 35, BAF 14, NNH 11, QMF 10, ARH 8.

NEBRASKA — SCM, Scott E. Davison, WØOED — IAJ still is holding a few traffic schedules. The Nebraska c.w. net closed operations for the summer on May 17th. Operations will be resumed on 3695 kc. this fall. The 'phone net still holds Sunday drills. The Lincoln group held a real-life drill of emergency units during the flood stages of June 2-3. JDJ reports the Lincoln group is ready for anything. AIN reports in regularly from Korea. KNT has 3.8-Mc. 'phone and 3.8-Mc. mobile going. EAO has moved to Indiana. QHG's 810s are giving him trouble. GJM, LPU, and SUS are the SENRC's generator supply for their emergency unit. The NENRC Hamfest at Stanton was a fine get-together even though weather conditions were poor. A lot of Nebraska hams attended the Rocky Mountain Division Convention June 9-10 at Estes Park. AQQ is on 3.5 and 28 Mc. now. AYO reports in monthly from an LST. AY banged out his *10th BPL* in a row. Thanks, AYM, for the nice report. YDE now is in Lincoln. TVS and VYX are new mobiles on 3.8 Mc. ZNI and BXJ hold low-power c.w. schedules. CMS plans 3.8-Mc. mobile soon. LJO reports the Hastings Club emergency unit is operating on 29.5-Mc. mobiles. YZI has new 29-Mc. mobile. RXU, LZO, LJO, WWU, and YZI staged emergency demonstration for the Lions Club at Hastings. LHZ has FB 3.8-Mc. mobile. VOI mobiled across Nebraska with FB results. ADK is on 28 Mc. AGP now is on 3.8-Mc. 'phone. TQD has been busy on MARS frequencies as well as on regular traffic schedules and is trying to get new rig with final 304TLs ready to go.

(*Continued on page 80*)

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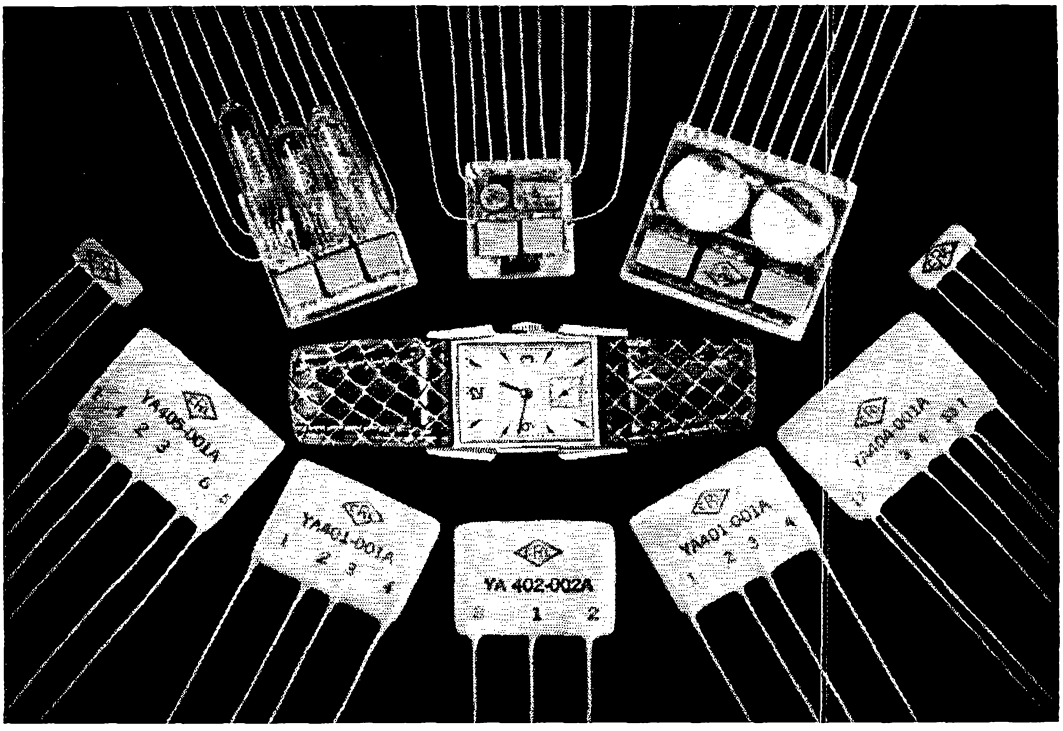

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Traffic: (May) WØTQD 1279, AY 562, OED 21. (Apr.) WØTQD 1020.

NEW ENGLAND DIVISION

MAINE — SCM, Orestes R. Brackett, W1PTL — The Pine Tree Net still is operating on 3596 kc. The Deep Sea Drag Net also is operating but under adverse conditions. VV is working at Bingham for the Allen Quimby Veneer Co. and can be reached any time through PTL. MGR is going to work for CAA. SWX is in the Navy. Don't forget that annual get-together at BOK's at Dexter, on August 12th. A grand bunch got together on that beautiful island of Mt. Desert on May 27th for a shore dinner with all the fixings. About 160 attended, including 21 mobiles. Also present was Eck, TJS, Blue Hill, who we understand is the youngest ham in the State, and Joe Rogers, GE, Portland, who we believe is the State's oldest ham. Eck is 11 years old and operates c.w. on both 3.5 and 7 Mc. All who know QDO are very sorry to learn that he is being transferred to the second call area. Best of luck to a swell guy. OLQ made a trip to Florida the first part of June. JSY is a new mobile station and is putting out a swell signal from Fort Fairfield. CV also has a bang-up signal on mobile, using a TBS-50 de luxe. EOP, mobile, finally has been heard from Calais to Auburn, using Stancor 10-P, home-made bottom-loaded whip. Traffic: W1LKP 174, LRG 166, RQR 119, QQY 99, OLQ 86, LBJ 68, QIQ 59, NXX 51, PTL 51, BTY 28, VV 22, IGW 15, RBD 10, SEJ 8, SJN 6, EFR 1.

EASTERN MASSACHUSETTS — Frank L. Baker, jr., W1ALP — HUP is EC for Dover. SUV has been calling in on the Eastern Mass. Net. HZR, in West Roxbury, is back on the air again after ten years. LMB has rig in his car. NQA has mobile rig. QXX is looking forward to a three-element beam for 7 Mc. PSF gave a talk at Quannapowitt Radio Assn. on "Industrial Applications of Electronics." SUR is on 144 Mc. BGW gets on 3.5 Mc. in the morning. AVY reports that the Cape and Islands Net has moved to 29,500 kc. ALP attended the Board Meeting at Hartford with BVR and gave a report at the South Shore Club. I regret to have to announce the death of MM, of Vineyard Haven. QMD now is with the FCC in Boston. TNK is a new ham in Dorchester on 28 Mc. FVD is in New England Emergency Net on 1.8 Mc. The Frequency Allocation Committee for Region 5 has spent a lot of time working out the plan for the various c.d. bands. This committee consisted of BL, DFS, KTG, BB, Mort Reardon, and ALP. SIT is secretary of this committee. SNK, Wayland EC, has a net on 28 Mc. The Newton Emergency Net will be on the last Tuesday of the month at 7:30 P.M. on 145.62 Mc. DFS, Somerville EC, says that they are going on 50 Mc. for c.d. work. The T-9 Radio Club met at ISX's QTH. PMC has schedule with his boy on 7 Mc. through K4WSC at Fort Bragg. Ben is in the Cape Cod Emergency Net on 147.15 Mc. Mondays at 7 P.M. DMS is working DX after midnight on 14 Mc. RRP has been operating at KBN. BB, Winthrop EC, has c.d. net going with several mobiles on 144 Mc. Reading Emergency Net members BLR, DXD, KRE, PAY, PAN, PKW, RX, SQB, and SUV are operating on 3700 kc. and 28.6 Mc. and will be on 145.5 Mc. AAQ, Concord EC, reports on the activity of QJU, OTN, OBC, HAR, DPP, John Morse, Russ Anderson, and Commander Daniels. AAQ is on 14 and 144 Mc. PLQ has left for Sweden, and MR is taking his place in the Watertown Emergency Corps. HKG, Malden EC, is going right ahead with his c.d. plans. JTS became a member of the Corps. The Norfolk County Radio Assn. held its annual banquet with movies by SUT. GDY won the grand prize. JKR and ALK are new members. AVY reports that the Southeastern Amateur Radio Assn., 39 strong, went to the Providence Amateur Assn. Hamfest. AVY has 32V-1. MHN has Globe King transmitter. CTZ has rig in his car. WK has rig in the car on 14, 28, and 3.8 Mc. AKN will be at his camp with rig. NUP keeps schedule with POK in Portsmouth. N. H. AWA reports the following active on 50 Mc.: ATD, FSN, CK, AWA, DJ, CLS, LJ, BAQ, PMS, CTW, HWC, ELP, KNW, AKE, MMY, NWL, and IN. AWA is working portable from Kingston, N. H., on week ends. EKT has returned from the hospital. SS was the MARS station of the month. EPE is back on 3.5 Mc. Traffic: W1EMG 542, SS 261, TY 243, JCK 224, DMS 153, KBN 102, RRP 60, NUP 57, LM 40, PU 29, AVY 21, BB 16, HWE 12, SUV 11, BGH 4.

WESTERN MASSACHUSETTS — SCM, Victor W. Paounoff, W1EOB — SEC: JYH. RM: BVR. The West. Mass. Net meets at 7 P.M. on Mon., Wed., and Fri. The slow-speed net meets at 6:30 P.M. Mon. and Fri. Summer season is the time to take stock and incorporate those improvements in your equipment that you have been thinking about all spring. Whatever your plans, get that rig working for Sept. 14th when we will have a West. Mass. QSO Party to get in trim for the coming winter season. The net frequency will remain 3725 kc. for August since our operation is during daylight hours. BDV has favorable results with that new mobile antenna. BVR activities were curtailed slightly because of his attendance at the ARRL Board Meeting. MOK is doing good work despite his outside activities. LLN is reporting into Region 9 net regularly. GZ has been NCS for 48 consecutive sessions of the same net. EHH and GUI worked Kentucky and Georgia respectively, with their low-power c.d. rigs on 28 and 50 Mc. The Worcester boys are finding vertical antennas good for their local nets. A new EC is LUA in Great Barrington. RDR was appointed by Governor Dever to the Gov. Defense Council for c.d. communications. IZN is having good luck with crystal mobile receivers. LPF applied for and received EC appointment for Clinton. MUN would like to try the "Dallas Plan" except that the subject is his landlord! JYH has a fine-sounding exciter completed. Start saving your money now for the New England Division Convention, which will be held in Springfield early in November. The Hampden County Radio Club will be host. Traffic: W1RZG 94, EOB 81, BVR 54, RHU 14, MOK 9, AGM 6, LLN 3.

NEW HAMPSHIRE — SCM, Norman A. Chapman, W1JNC — RM: CRW. KYG and QJY have a new QTH in sunny W6-Land. The Dartmouth Radio Assn., ET, has suspended operation for the summer but will have the 225-watter going again in October, with 2UWV and 3NZL as operators. TNO is a new ham in Concord. APK has a new Harvey-Wells and 10-meter beam. A simulated c.d. emergency test was successfully carried out in Manchester on May 10th, with 150 messages for the Red Cross, Fire and Police Departments, and other agencies completed. Contact with the State Police at Concord was maintained through APK. Operation was on NHEN frequencies, 3890 and 28,700 kc. Participating stations were QJX, QJY, RYC, LDR, PZU, RET, GMH, BT, SLJ, EXZ, OCV, KYG, and K1FAC. Net Control Stations: SGD, NKI, and GDE. Our Route Manager has been very busy with traffic from Northeastern U. and Rochester Trade fairs. KHF, NFY, RCP, GIJ, IBX, JUW, and ENY are members of the c.d. unit covering Durham, Rollinsford, Madbury, and Dover. Interested stations in this area should contact KHF. BXU now is Class A. Traffic: (May) W1CRW 1002, POK 249, QJX 49, JNC 35, GMH 16, MCS 4. (April) W1GMH 17.

RHODE ISLAND — SCM, Roy B. Fuller, W1CJH — The Rhode Island Net (RIN) meets Mon., Wed., and Fri. at 1900 on 3540 kc. The organization work is handled in this section by Asst. SCM LWA, SEC MIJ, RM BTV and PAM BFB. Here is something for other clubs to think about. The Newport County Radio Club has a reporter and photographer at each business meeting and frequent pictures and write-ups appear in the local newspaper. This is good publicity for ham radio. The PRA held its annual dinnner dance and a fine time was had by all as usual. Prizes were distributed to the lucky ones. The XYL and yours truly were guests of the PRA. The Quonset Radio Club has its station on all bands with 100 watts and traffic is being handled in ever-increasing volume. The club call is TNH and TKX is trustee. A new appointee is TKX as ORS and EC. MMX now is on c.w. on 7172 kc. JFF also is on 7172 kc. New 28-Mc. mobiles are SUP, QEX, MTA, and TNX. Traffic: W1BBN 47, TKX 25.

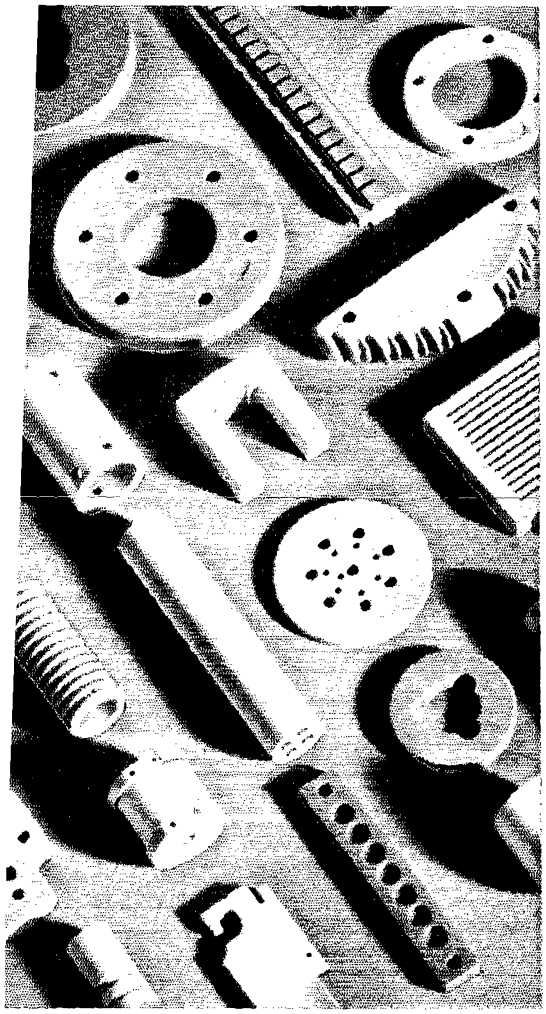
VERMONT — SCM, Burtis W. Dean, W1NLO — We regret the passing of HLH. Chet was active on 80- and 160-meter 'phone before the war and was on 29-Mc. 'phone postwar. He was a charter member of the BARC. RNA has a Globe King. QQN is mobile on 3.8 and 14 Mc. MMV is working for the State Highway Dept. MMN is working for the State Police. KJG visited ETE, MMV, and RWX recently. CGV and family took an automobile trip to Florida and back. MEP has two-meter rig in the car. The Tri-County Amateur Radio Club is running a WAS Contest among its members from May 1 to Dec. 31, 1951. The Club has applied for a club station license. SOV finally is on 29-Mc. 'phone. RWX has TBS-50 in his Ford V-8. PWB is experimenting with balloon antennas. QNM is chief engineer at WDEV. SIO is OBS. The EC appointments of AD, AZV, MEP, and QQN have been endorsed for another year. Traffic: W1OAK 171, AVP 22, JLZ 12, SPK 11, TAN 10, BJP 7.

NORTHWESTERN DIVISION

IDAHO — SCM, Alan K. Ross, W7IWU — Nampa: IYG attended the Starved Rock Hamfest in Illinois while on vacation. Meridian: MKS has a jr. operator but still finds time for the FARM and GEM Nets. Hayden Lake: EC FIS is trying to "mobilize" the mobile gang again. Shelley: ACD and BKJ say last call for the Big Springs Hamfest Aug. 4–5–6. See July *QST* this column. Boise: GHT replaces EMT as RM, to give EMT a chance to work his farm. Announcing Idaho Slow Speed Net on 3745, Tues., Thurs., Sat. (optional) for the benefit of the Novice at 9 P.M. MST. Anyone wishing to brush up on the code is welcome. Write me for details, and/or check in. Remember 7155 kc., Idaho's frequency for 7 Mc., and 3935 kc. the FARM Net for 'phone traffic. Comments and suggestions for an Idaho 'phone net are welcome. Please send news and traffic reports. Traffic: W7NH 154, GHT 89, MKS 43, JL 12, FT 8, IWU 7, FIS 4.

MONTANA — SCM, Edward G. Brown, W7KGJ — JFR has requested cancellation of his EC appointment for the Butte Area. FLB has agreed to take over as Butte EC. LIT has been stationed at Hawaii. On one occasion he was able to make a 'phone contact with his folks in Billings, with the able assistance of IWW. He also contacted LCM and gave Earl traffic for home. KUH and FMV, as enter-

(*Continued on page 82*)



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tainment committeemen or the SMARA, have come through with some very educational and enjoyable programs this season. The SMARA has discontinued meetings for the summer. Yellowstone County, in support of emergency work, made available to the Billings gang large trailers which were used as "shacks" for Field Day operations. JZW has returned to Butte after spending a few months in Chicago. EOI now is working s.s.b. LBK has a new job as switchman with the NP Railroad. JID soon will be on the air with a 304TL. Both Montana nets intend to continue operation through the summer season and invite any and all to check in as often as possible. PGF is a new call in Missoula. Traffic: (May) W7KGJ 56, CVQ 30, BNU 9, KGF 6, COH 2. (Apr.) W7CT 13.

OREGON — SCM, J. E. Roden, W7MQ — AXJ has a new rig. HJU is new EC for Astoria. ESJ received his 35-w.p.m. Code Proficiency certificate. LYT is new EC for Ashland Area. PIU is a newly-licensed ham in Pendleton. KGU has moved from Salem and has been replaced as Salem EC by MTT. PCL reports that CZ in Hermiston now is Class A and has new mobile on 3.8 Mc. OSD now is located in Helix. EJ has transferred from Columbia Gorge Ranger Station to Cascade Locks. MUY is new Asst. SEC. The Baker Amateur Radio Club put on its annual district ham picnic with a large attendance. EDU is new EC for Hood River Area. NUR is new ORS. IRZ is the newly-appointed EC for Medford. RACES Net, the official State of Oregon civil defense net on 3993 and 3507 kc., which meets each Monday at 8 P.M. DST, is being very ably set up and organized by the two Net Managers, IEJ and AIZ. NTL now is Gresham Area EC. HBO is doing a good job getting the LaGrande Area more emergency-minded as far as amateur radio is concerned. ADH is doing a lot with s.s.b. activity. OVM, the Klamath Falls High School station, is using controlled-carrier on 29 Mc. NNQ has just received his Class A license. JTT is representing Milton on the RACES Net. PEN is a newly-licensed amateur in Baker. Traffic: W7HLF 349, AJN 222, OVO 133, MQ 123, HDN 105, TH 95, KTG 88, APF 71, IIV 66, AHZ 60, BSY 55, OJA 52, GUR 39, BWD 27, BDN 24, EJF 22, NOB 22, GNJ 21, AXJ 18, HJU 18, NFU 7, FY 5, MBE 5.

WASHINGTON — SCM, Laurence Sebring, W7CZY — SEC: KAA. RM: FIX. PGY, NWK, PDB, and GXP topped a 75-foot fir tree and helped OHQ install his four-element beam. GFM has a new YL. KZP, mobile near Everett, worked 7CZU, maritime mobile off the coast of Chile. BA raised his tower to 95 feet and has gone mobile. OMX and BSD have identical beams. NGF and OMX now are Class A. CV is ex-2GKB. DND is mobile on 28 Mc. The Northeast Seattle Radio Club held its Field Day at the home of MSI, with NL as chairman. The Spokane Two-Meter Net meets at 9 P.M. nightly. JXC hopes to work Seattle on 144 Mc. with his 48-element beam. Spokane's mobile net meets on 29,600 kc. and has a breakfast net from 7:45 to 8 A.M. and a dinner net from 12:30 to 1 P.M. ETO painted his house. CWN made a quick trip to Ohio, and without a mobile, too. APS does not get much time on the air. BYK is back from Japan and stationed at Bainbridge Island. DAS works at KCJ (CAA) receiver station with FBX. LTK is Net Control for MARS 'phone net. KTL hopes to get a day shift so he can spend more time on the traffic nets. ACF is using a 1-watt rig on MARS and WSN. OPO is active as OO in Walla Walla. LVB built a 24G rig for 7 Mc. EVW is busy working on his yard and catching ferries. ZU jr. hopes to be the first novice licensee in Washington. JZR is trying to build a 10-meter mobile out of a BC-457 and a BC-455. MCU is in the Coast Guard on the East Coast. LFA hopes to get in another year of school before entering the Army. TH makes BPL for the second time in a row. Traffic: (May) W7IOQ 2816, CZY 2780, FRU 516, TH 210, FIX 203, NWP 102, LFA 96, JZR 54, ZU 50, KCU 49, BA 36, ETO 36, DRA 27, EVW 26, ACF 24, LVB 24, OPO 13, KTL 4. (April) W7ETO 35 GAT 7.

PACIFIC DIVISION

HAWAII — SCM, John R. Sanders, KH6RU — *Far Pacific Area:* Increasing numbers of Far-Pacific stations are reporting in to our expanded section. First OBS for the new area is KG6FAA. Schedules: 14,127-kc. 'phone, week days at 0300 and 0900 GMT. KG6AAD, new ORS on Guam, had to replace his antenna three times to work four new countries. KG6HG returned Stateside. KC6AA, on Truk, soon will be joined by KH6KA and KH6QL, who will work down there this summer. *Hawaiian Area:* The Honmobile Club conducted a pre-Field Day tryout at Waimanalo Beach June 3rd with great success. ACR reports spreading fame for the new 7-Mc. WIND BAG CLUB, whose aims make the RCC seem conservative indeed. The Club has reached 50 certificate-hunter hams in two months. Aspirants to membership need only to prolong a QSO with a member to gain the certificate. ADK bemoans the lack of activity on 1.8 Mc. ADY is on 3.8-Mc. 'phone. LB now is KW6. Traffic (May): KG6FAA 1994, JA3AC 1306, KR6AF 434, FG 221, KH6ADY 26, ADK 20, KG6AAD 12, KG6ACR 11. (April) KR6FG 269.

NEVADA — Carroll W. Short, jr., W7BVZ — SEC:

(Continued on page 84)

"Sylvania tubes in daily operation since 1934...still working fine,"

writes J. Jessop Nott, VE6JJ

"J-J" first burned his fingers with "wireless" in 1912, got his first ticket in 1928, made WAC early. Pictured are his 10-11-20 rig with 808's and 75 fone rig. He also operates a 10-through-160 mobile rig with push button control and gas generator in the trunk. Fixed antenna is beam with 3 corrugated copper tubing elements, good (so far) for 80 mph gusts.

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"These include two type 6D6, one 6C6, and two 42's. Two Sylvania 53's in my 10-11-20 transmitter, built in 1937, are also still 100% useful whenever I go on xtal."

Thank you, Mr. Nott! Letters such as yours speak volumes for the long life, trouble-free performance, and economy of Sylvania receiving and transmitting tubes.

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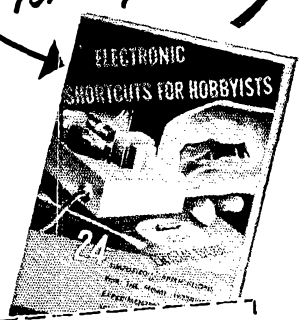

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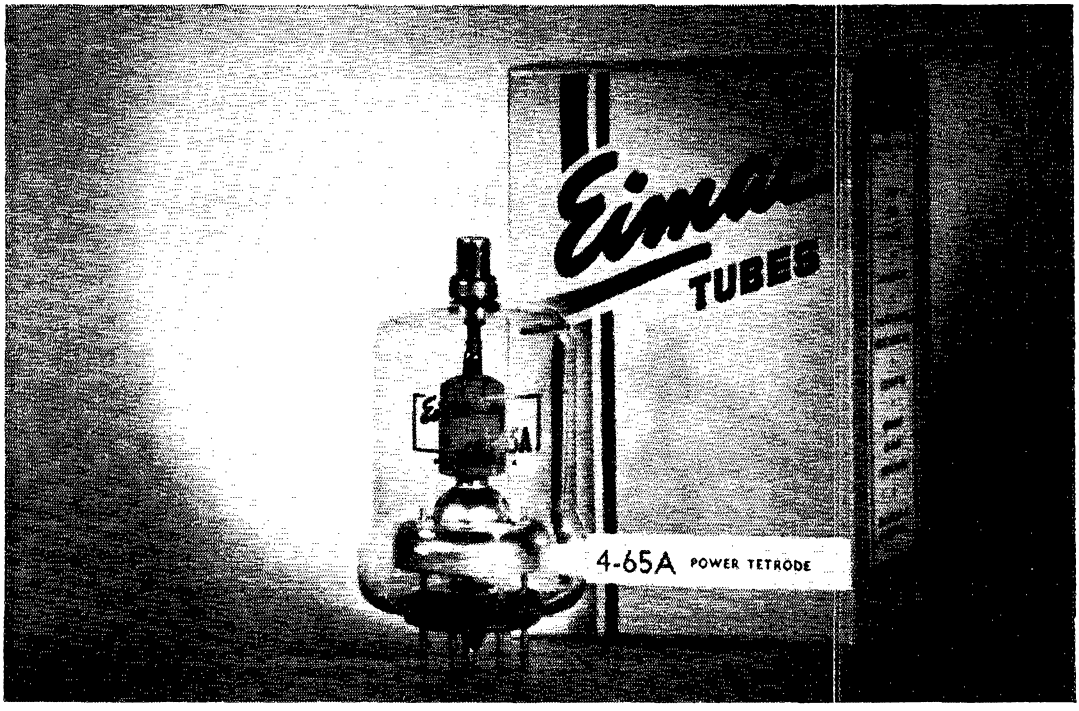
JU. ECs: HJ, JLM, JVW, KIO, KOA, MBQ, TJY, VO, and ZT. RM: PST. OPS: JUO. Nevada State frequencies: 3660, 7225, and 29,360 kc. The Southern Nevada Amateur Radio Club held its 4th annual picnic at Lake Mead in June. PGE is a new ham at Crystal Bay with 40 watts on 3.5 and 7 Mc. MJB has a new Zepp on 7 Mc. TQZ is experimenting with battery-powered rig on 28 Mc. LJX has new all-band c.w. rig with 813s. LLS has purchased a 16-acre ranch and is going to raise antennas. JU worked NSS, WAR, and AIR on Armed Forces Day, and is working on a new mobile installation for the Seattle Convention. HJ and LGS are members of the Electronics Unit of USNR at Boulder City. If you need a Nevada QSL, write HJ or LGS for a schedule with K7NRX on 3.8-Mc. 'phone or 3.5- and 7-Mc. c.w. Your SCM has a new SX-71 and still watches 7225 kc. mornings. Traffic: W7JU 11.

SANTA CLARA VALLEY — SCM, Roy I. Cousin, W6LZL — SEC: AEV. ECs: CER, CLF, FTG, IXJ, NOE, QIE, QNK, and TFZ. Our new SEC has a very sound plan which is in the process of making our section as well protected and covered via radio as one could expect. A lot of time and effort went into the system, which will be in working order soon. The sticker will be the coöperation he gets from the respective ECs. AEV sent a fine report from the State Civil Defense meeting and the proposals voted upon were for better and closer working teams throughout the section and State. The North Peninsula Electronics Club had BF talk on Automatic Modulation Control. NTU also gave a short talk and demonstration of his Carter Modulation. The SCCARA had BF speak on Basic Nuclear Physics. Endorsements: MMG as ORS; CBX as OO. RFF is in the Navy and now in an Asiatic DX area but is unable to operate. YHM is rebuilding exciter to bandswitching and keeping fairly active. HC is getting back into the swing now that school has closed for the summer. He is a professor at San Jose State. BPT rebuilt the rig into an enclosed rack, installed low-pass filter and coax feed line. PDX is on 144 Mc. with surplus gear. CLF and LZL are installing 3.8-Mc. mobile. Your SCM would like to ask for better coöperation in the activity report department. Four cards this past month was not much of a showing. Please try to get them in by the first of each month. Traffic: W6HC 162, YHM 97, BPT 70, RFF 2.

EAST BAY — SCM, Horace R. Greer, W6TI — Asst. SCM, Charles P. Henry, 6EJA. SEC: OBJ. ECs: ZZT, EHS, NNS, IT, IDY, LMZ, OJW, WJN. Your old SCM would like to take this time to say many thanks to the gang for all the help and coöperation that he has received in the many years he has served in this capacity. My term expires August 16th, and after thinking it over and considering the many requests to re-run, I have decided to put this job in moth balls and bring to a close a most interesting run as SCM of the East Bay section. It is my wish that everyone get behind the new SCM and keep the old East Bay section on the map. TT and DUB, owners of the Electric Supply Co. of Oakland, moved into new quarters on July 5th. They have taken over the old location of the Gilson Electric Co. at 140 13th Street. The new set-up will be the largest radio store on the Pacific Coast. Their many friends wish them all the luck in the world. These two boys have made a great success and they are deserving of every bit of it. BB still is giving full time to building and hopes to have everything under control soon. JZ comes through as usual and makes BPL with a traffic total of 2617. OJW has rebuilt the rig with 807s in the final running 150 watts. YDI is plugging along. ITH is getting set for radioteletype on 7 Mc. QDE has new Collins 75A-2. SKI is the latest TVI victim. EJA reports that the Richmond Radio Club now is in a summer slump. AKB received his Class A license. FZC gave a talk on and showed colored movies of the 1949 Trans-Pacific Bi-Annual Yacht Race to the SARO at its May meeting. DEX reports that the Mount Diablo Amateur Radio Club was at the Muir Camp Area on Mt. Diablo for Field Day. JVE/6 visited DUZ and AL, who work on 160 meters. Armed Forces Day was the occasion of a birthday party for the NBARA station, HTB. The following amateurs took part in the initial work of setting up the East Bay Emergency Mobile Net: AKB, KZF, UHM, CML, MVU, UMZ, CX, NTU, UV, DTI, QNH, VJN, EE, QZ, VS, JCR, and UGO. Don't forget the ARRL Convention in Seattle. The Mission Trail Net had an outstanding conclave at Coyote June 30th–July 1st. A great time was had by all. Traffic: W6JZ 2617, YDI 23, TI 4.

SAN FRANCISCO — SCM, R. F. Czeikowitz, W6ATO — Phone: JU 7-5561. SEC: NL. Phone: PL 5-6457. *Santa Rosa Area:* EC: IEN. The Emergency Corps in the Santa Rosa-Sonoma territory is gaining members rapidly. IEN says the two-meter net is in operation Tuesdays at 8 P.M. on approximately 147 Mc. Active in the net are DTV (mobile), Sebastopol; GGE, Healdsburg; AJF, Sonoma; IEN, Petaluma; WOR, BAZ, and ADM, all of Santa Rosa. The ten-meter net is active Wednesdays at 8 P.M., but has encountered heavy QRM to date. A total of eight test runs were made for both nets this month. County officials have ordered c.d. crystals for the Emergency Corps. HQN continues to handle the bulk of traffic for this area through RN6. The Sonoma County Radio Amateurs Club meets the first Wednesday of the month in the Tap Room of the

(*Continued on page 88*)



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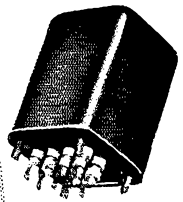

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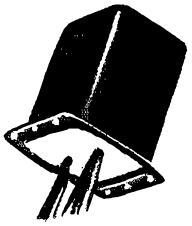

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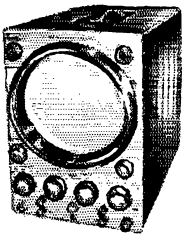

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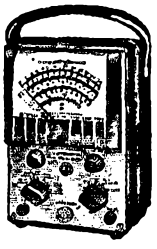

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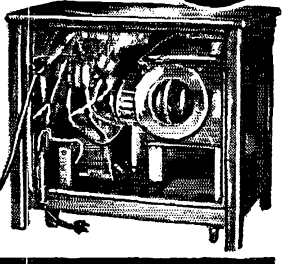

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Grace Bros. Brewery on Second St., West of the Freeway, Santa Rosa. *Eureka Area:* EC: SLX. At the baby shower for NAO, welcoming a new YL, a number of gifts were received. Quoting NAO: "I am taking this opportunity to inform you that I am very grateful for the bottles for my Final, and they are serving their purpose well. They are no doubt contributing to a large extent in the satisfactory control of the Third Harmonic." The ten-meter emergency net continues active, and in close coöperation with the Red Cross. The Humboldt Radio Amateurs Club meets the second and fourth Fridays in the YMCA rooms, rear of Municipal Auditorium, entrance on "E" St., Eureka. *Marin Area:* EC: KNZ. As a result of their excellent work last year, KNZ and several other mobiles were invited to report the Pebble Beach Stock Car Race from strategic positions around the race course again this year. KNZ, in conjunction with OW, of Salinas, made all plans, and Marin County mobiles FYJ, KNZ, and YBT, together with UZV, of Salinas, and NOE, of Santa Cruz, did the actual radio coverage. NOE acted as Net Control and did a most efficient job. The mobiles were given a vote of thanks by the Race management and received publicity from the Salinas broadcasting station. Two new Official Relay Stations have been appointed: SG and FYJ. The Tamalpias Radio Club meets the third Friday at 232 Mirimar Ave., San Rafael. The Marin Radio Amateurs Club meets the second Friday in the Engineering Lecture Room, Marin College, Kentfield. The Marin Club is complimented on the very fine Old-Timers Night held at the Mill Valley Golf Club. *San Francisco Area:* Back on the air after 14 years with the newly-issued call of WQX is James Shovlin, formerly 3BWE and 1DDU. With an 807 he has worked 21 countries since March. PHF can be reached as follows: M/Sgt. K. K. Kennedy, R. A. 6821959, Hq. Japan Logistical Command, Signal Section, APO 343, % P.M., San Francisco. Jack Wichels now is KL7ADQ, and his QTH is % CAA, Nome, Alaska. SWP, JCG, and WQX reported traffic this month. Join the Emergency Corps. The San Francisco Radio Club meets the fourth Friday at the American Legion Hall, 1641 Taraval St. The High Frequency Amateur and Mobile Society meets the second Friday at the Red Cross Building, 1625 Van Ness Ave. Traffic: W6SWP 193, HQN 91, WQX 46, JCG 21, ATO 9, FYJ 6.

SACRAMENTO VALLEY — Acting SCM, Willie van de Kamp, W6CKV — Asst. SCMs: Northern Area, 6YNM; Central Area, 6CKV; Southern Area, 6ZYV. SEC: KME. ECs: Met. Sacramento, BVK; Walnut Grove, AYZ; Dunsmuir, JDN; Mt. Shasta City, EWG; Paradise (Chico Area), HBM; Roseville, GHP. RM: PIV. OES: AF, BTY. PAM: ZYV. OES: PIV, GHE. OOs: ZYV, YNM, BTY, GDO, YV. OPS: JDN. Nets: Sac. Emergency (city) AUO NCS. Sac. Valley Net, JEQ NCS. Mother Lode, UNT NCS. Tall Pine, YNM NCS. *Northern Area:* ATQ was heard on 160 meters. *Central Area:* HBM is building 144-Mc. mobile. DGK gets on occasionally. QEE uses iron slug from a b.c. set to resonate 75-meter Master Mt. antenna on 160 meters. Radio crossword puzzles prove popular at GERC meetings. JRY gave a talk on magnetism at GERC meeting. AF, a confirmed c.w. man, is talking 160-meter 'phone. *Southern Area:* GDO was chairman of SARC Field Day. INZ is on 28-Mc. mobile. Traffic: W6GDO 24.

SAN JOAQUIN VALLEY — SCM E. Howard Hale, W6FYM — SEC: FYM. ECs: BCL, CQI, EHN, FIP, GCS, GJO, HZE, JPU. RM: GJP. ORS: HU, GJP, JQB, LRQ. OBS: GS, EXH, GRA, OHT. OES: RJE, UWY. OO: FKL. The Taft Amateur Radio Club reports that ZSO is working over Tehachapi Mountains into the Los Angeles Area consistently on 144 Mc. GJP, our SJVN Manager, has changed the schedule of SJVN to Tuesdays, Wednesdays, and Thursdays on 3525 kc. for the summer. He reports that the boys probably will be around the frequency on other nights at 1900 PDST also, however. Section Net certificates are being issued to K6AU, W6EXH, QUE, and LRQ for their FB work on SJVN. BCL, EC for San Joaquin County, reports that the San Joaquin Valley two-meter emergency net probably will evolve into a local net in the near future since the formation of other two-meter nets has lessened the check-ins from outside areas. LOC and LKL are new calls in Fresno. The Taft, Stockton, Fresno, Modesto, and Turlock Clubs were all active on Field Day. HXR, IHN, HJQ, and UBK, all of Fresno, are new holders of Class A privileges. OHB and his XYL were the recipients of a 3-lb. female harmonic during the month of May. W6VRF-K6FAJ, at Edwards Air Force Base, is being appointed EC in this section but will be assigned to work with the Los Angeles section. I hope to see a lot of you in Seattle in July. Traffic: W6GJP 38, HZE 26, BCL 3, FYM 2.

ROANOKE DIVISION

NORTH CAROLINA — SCM, Herman P. Jolitz, W4DCQ — SEC: ZG. PAM: DLX. RM: AKC. This is the final report from your present SCM. I appreciate the fine coöperation received from all. The Acting SCM for the remainder of my term, or until an election is held,

(*Continued on page 90*)

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will be DLX, who now is our PAM. Send Slim all your reports or requests for appointments and he will take care of you. RRH, of Morganton, reports activity on the Atlantic Net and two MARS nets and the Great Lakes Net on 160 meters. AKC is doing a fine job on his net bulletin and reports that the summer slump already has taken place on the North Carolina c.w. net. Speaking of the c.w. net, the following are new ORS appointees: BDU, RFM, DLX, IMH, OTE, and REZ. New ECs appointed by ZG during the past month are BBZ, of Wilmington, and NGO, of Murphy. ZG visited the Wilmington gang and came by to see DCQ on his way down. Several net certificates were issued for attendance on the 'phone and c.w. nets during May. The Winston gang at NC went to High Rock Lake for Field Day activities. REZ has a new 'phone patch and BC-221. EMV is going mobile on 3.8 and 28 Mc. PZE is 75-meter mobile and uses it to let the OW know how he gets along on his trips down to White Lake and back. CVQ has moved into his new Raleigh location. DLX is turning into a combination painter and radioman, as is PZE. Traffic: W4REZ 152, RRH 50.

SOUTH CAROLINA — SCM, Wade H. Holland, W4AZT — SOD has been appointed Emergency Coördinator for the Dillon section. CPZ has accumulated a grand total of 42 states confirmed on 50 Mc. NLP is on 14 Mc. Congratulations to ANK on making BPL again this month. RBP is a new man on 3.8 Mc. in Charleston. DCE, in that port city, has moved to 14 Mc. Traffic: W4ANK 558, AZT 26, FFH 26, DX 12.

VIRGINIA — SCM, H. Edgar Lindauer, W4FF — That Second Annual Va. QSO Party was a whopping success, bringing out many new signals. LAP and NAD tied for top honors, each with a score of 4408; MWH, 3960; KFT, 3600; FV, 3364; NQV, 3250; SDK, 3200. KFC garnered 6270 points but we fixed his buttons in advance by appointing him to the contest committee, making him ineligible. Since he would have had to enlarge the attic to make room for additional trophies, we console ourselves with the thought that we acted in humane fashion. From NAD, our SEC, we learn that Richmond, Norfolk, and Newport News have taken the lead in civil defense and Emergency Corps work by holding drills and building equipment. Norfolk has 35 mobiles lined up with scheduled drills. The Newport News Emergency Corps group was sworn in by the Office of Civil Defense as a definite part of their defense set-up in recognition of its efficiency and organization. Radio clubs and others would do well to contact NAD any evening on 3835 kc. from 7:30 P.M. EST until bedtime for dope on AREC. The Richmond Club is sponsoring the construction of a dozen 50-Mc. rigs for OCD there. Attention please! RVO, of Norfolk made a total of 23 readings in May FMT with all readings right smack on the button. CVO soon will grace the Great Lakes Area for the Navy as electronics officer. The Peninsula Amateur Radio Club officers are RIX, pres.; OHZ, vice-pres.; RTZ, secy.; AKN, treas. Its meeting place every other Friday is Marshall Court Civic Center, Newport News. The Blue Ridge Amateur Radio Society, Inc., elected the following: KQC, pres.; JSF, secy.; JXE, treas.; KPZ and OLD, directors. Glad to be able to resume my SCM duties again, with thanks to KFC for keeping things going during my six-week absence. Traffic: W4JAQ 133, PWX 50, CVO 28, QDX 27, LK 14, IYI 6, GR 5.

WEST VIRGINIA — SCM, Donald B. Morris, W8JM — EVR, secretary of the Charleston Radio Club, has been appointed temporary chairman on formation of the State Radio Council. PNR has a new 14-Mc. mobile rig. HI has been appointed Radio Amateur Coördinator for Kanawha County by the civil defense headquarters. COE, Charleston Radio Club, was quite active in Field Day. The Club holds code and theory classes for Boy Scouts. CFB has a new HRO-50 and plans to increase power to 1 kw. 2YKW now is 8GMJ and GRO is a new Charleston amateur. EVR has received the call A8EVR. CCF, with new antenna, is active on all bands. EUA is building a low-power rig for 50 Mc. In Huntington GIO, DPF, DVF, EUA, BWX, WUH, and FUM are active on 28 Mc. and AHF, BDD, RJG, and SNT are on 3.8 and 14 Mc., with EZR, LSJ, and FUM holding down 3.5 and 7 Mc. The Huntington Radio Club has renewed interest and has a club frequency of 29.1 Mc. New amateurs in Weston are GTW, GUL, and GVR. PZT has built a new final with 4-250As. AUJ reached a new high in traffic handled and received a visit from DAE. Congrats to the Tri-City Radio Club on its affiliation with ARRL. The Club had OQ5DQ as a recent visitor. BTV is building a grid-dipper and antennascope and has been working a little DX on 7 and 14 Mc. Traffic: W8AUJ 708, BTV 227, YPR 127, DFC 81, GFV 6, OIC 3, FPZ 2, FVQ/8 2, SPY 2, ELX 1.

ROCKY MOUNTAIN DIVISION

COLORADO — SCM, M. W. Mitchell, WØIQZ — SEC: KHQ. RMs: ZJO and LZY. Only four report cards were received this month. If you fellows want a news column you had better start sending in a few cards. 5KSW and his XYL, 5OTU, from Brownsville, Tex., visited yours

(Continued on page 92)

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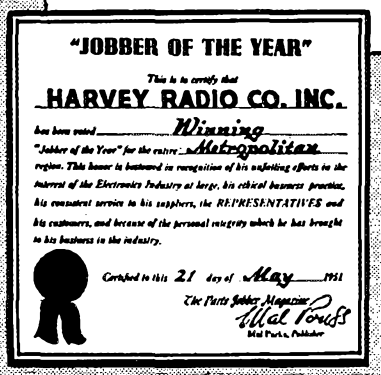
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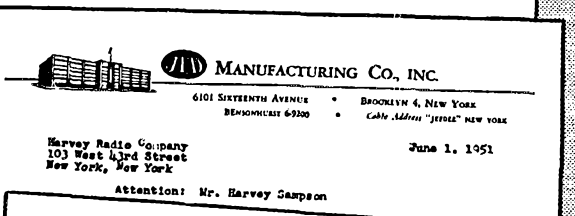
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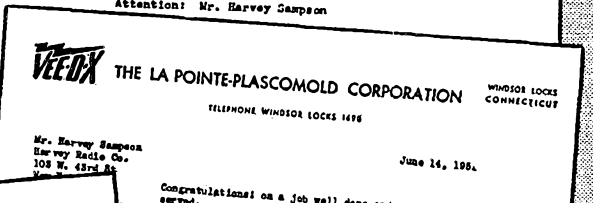
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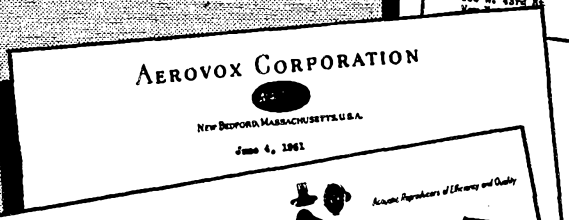
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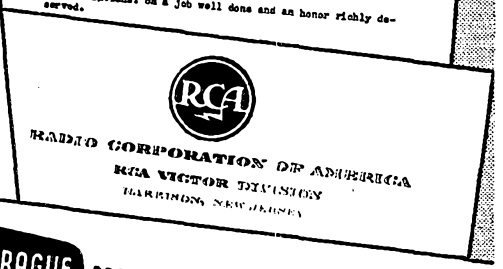
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truly. Between 5KSW's tool kit and IQZ's spare parts we got his mobile rig going on 3.8 Mc. He claims the rough roads in Colorado broke down his rig and introduced parasitics in it. After many moons KHQ has his new powerful 150 watts on the air. It sure puts in a good signal, too. The C.W. Colorado Emergency Net has folded because of the same old complaint, lack of interest in a good thing. By the time this is in print, yours truly and family will have made a flying trip to Los Angeles and back, and a motor trip to South Dakota to visit SRX. 5KSW and 5OTU plan to visit us at SRX's at same time yours truly gets there. Let's get those cards in, men, because I ain't foolin'. If no more cards are received in the future than have appeared in the past two months, we will just forget the news column and let it be used for a more worthy cause. Radio messages originated with your totals and news are very acceptable. A flood isolated several towns in Southeastern Colorado this month and created an emergency which was ably handled by KHQ, AGU, MOM, AJJ, PGX, ACH, IXM, OTG, and NIT. Traffic: WØZJO 1360, KHQ 83, MOM 60.

WYOMING — SCM, A. D. Gaddis, W7HNI — SEC LKQ is laying plans for an emergency net. DXV is home with an interesting report after a long time at sea. KFV is back in Laramie. Welcome home, Trapper. AMU, ILL, and BJS attended the Spokane CAP meeting. ABO thinks the mobile bug is contagious after a visit from HNI. GS was back on 3.8 Mc. until his power supply blew up. OWZ rebuilt 144-Mc. mobile. JRG is having a big time on 50 Mc. FB, Ken. 3920 kc. still is the spot to find the Wyoming gang on Sundays although roll call has been suspended for the summer. AEC, AXG, and OWZ have renewed their appointments.

SOUTHEASTERN DIVISION

ALABAMA — SCM, Lewis C. Garrett, W4LEN — SEC: ISD. Appointment for the month of May went to PUZ, DEC district 7. DXB is on 3.8 and 7 Mc. PXO now is on AENP from Fairfield. MVM is on AENP; he also handled Armed Forces Day traffic. KIX has moved all his equipment to a nice shack in the back yard. LEN moved from a small shack to a larger basement. GHZ is doing a fine job in RASCO with 50 Mc. from Mobile. 5QWN now is at Craig AFB on 28 Mc., mobile and fixed. LYE is on 3.8 Mc. with medium power. KAC is planning to operate from Ft. Monmouth during summer camp. IKM has new 75A-2 receiver. SLJ completed super-de luxe VFO. Many fine mobile rigs, both home-grown and commercial, were seen at the Tri-States Hamfest. Thanks to the Birmingham, Mobile, and Montgomery Clubs for the fine job on the auto license deal. The Alabama QSO Party will be held Sunday, August 12th, with Field Day rules and scoring, substitute county for section, 2:30 to 3:30 P.M. same band, 3:30 to 4:30 cross band. There will be duplicate prizes, 'phone and c.w. Listen to the Alabama nets for more details. Traffic: W4KIX 73, HFP 51, BFM 32, MVM 32, ISD 18, LEN 16, OAO 16, DXB 8, PPK 4.

EASTERN FLORIDA — SCM, John W. Hollister, jr., W4FWZ — Thanks for your confidence, fellows. I'm to be your SCM for another two years. The new plan being developed by the Miami Weather Bureau sounds good. Mr. Pardue gave a very good talk about it over WS. The Dade Radio Club station, NVU, will be the focal point and incoming data will be assembled there for the WxBu. Clewiston: ONF received many congrats on the new jr. operator. Ft. Lauderdale: IM has been appointed EC. BMR reports his ART-13 working FB on 3.8 and 14 Mc. He worked FG7XA for 68 countries. Ft. Pierce: OOR has been appointed EC. He is working in USCGA 3855-kc. net. Gainesville: RT has been appointed EC. Garvin is chief engineer at WRUF. Miami: SAT has been appointed ORS because of his Gator Net work. Jay is going north this summer. IYT took himself a spouse and says "QRL XYL." GHP reports he assisted in having medicine put on a special plane for Honduras and thereby helped to save a life as the result of a request for rush assistance from HRIBG. That is ham radio at work. And that is not all. Bill has handled several such messages. Tampa: Real congrats to HAD and LAW for their 144-Mc. QSO across the Gulf to 5ONS. West Palm Beach: CKB has been appointed RM for the 7-Mc. traffic net activities. New OOs at West Palm Beach are WPB, GAU, POF, BRB, RTX, and 9IOR/4. CKB has been appointed ORS. We have two operators making Brass Pounders League on 100 or more deliveries: CKB and KJ. All OPS and ORS appointees, get in the swim. Those not reporting activities may be dropped. Several have not reported in the past four months. Traffic: W4LMT 168, PJU 149, KJ 139, CKB 120, PZT 46, WS 38, DES 37, SAT 35, GHP 32, RWM 30, GHP 20, BMR 16, FWZ 16, OGI 9, RT 9, KWA 6, IYT 5, OOR 3, PNS 2.

WESTERN FLORIDA — SCM, Edward J. Collins, W4MS/RE — The Tri-State Hamfest was a tremendous success, with approximately 300 attending. LUF now is Class B. PTK, NYZ, and PAA now are Class A. PQW worked 20 states on 50 Mc. in two days. MS now has 40 states on 50 Mc. GSO now is in Pensy. PLE is EC over Eglin way. SAW has new 75A-2. FHQ is on 28 Mc. with

(*Continued on page 94*)

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new HRO-50T-1. ODO, BFD, and JPD are building Wallmans for 50 Mc. RZV still is after 28-Mc. DX. PRV has moved back to North Carolina. PLA has gone mobile. ROM is back at Crestview. VR still clings to 7 Mc. NOX was heard on 3.8 Mc. HIZ is at CAA school in Oklahoma. MEN is planning more power. ACB is QRL c.d. work. PSC is in Embassy in London. RDC is active in c.d. work. UW is on 28 Mc. after years of quiet. UC is QRL selling radio parts to the gang. MFO is ill. MUX burns up the traffic lanes. Thanks for electing me SCM, fellows. Traffic: W4MUX 20, AXP 12, MS 3.

GEORGIA — SCM, James P. Born, jr., W4ZD — PER, in Macon, is active on 144 Mc. and wants other towns to organize on 144 Mc. and hold schedules. KWC has sold out and joined the merchant marine. PBF has moved to Washington, D. C. BOC has returned to Atlanta after a month visiting and fishing in Florida. KL is active on 7-Mc. c.w. NXD has a new rig on 7- and 14-Mc. c.w. GMP, who is stationed in Key West, Fla., visited FBH recently. LXE is building a new 28-Mc. beam. EPA now is stationed at Arlington, Va. GVU, ex-TA3GVU, now is at Camp Gordon, Ga., and is a member of the Camp Gordon Radio Club. New officers of the Georgia Cracker Net elected at the annual meeting are as follows: Net Manager, LXE; North Net Control, FFC; East Net Control, OKL; South Net Control, CVY; secretary and treasurer, NS; committee on license tags, LXE, NS, and ZD. Of the 72 members of the net, 51 were present. RFS won the 32V-2 Collins transmitter at the hamfest in Atlanta. MZO has a new 28-Mc. beam. MTY is rebuilding. ZD now is on 50-Mc. 'phone and c.w. K4WAR is active on all bands, 160 to 2 meters, and is looking for traffic. KXX is fighting the TV bug. The Macon Amateur Radio Club had a banquet at its May meeting. BOL and ZD were guest speakers. Traffic: (May) K4WAR 775, W4KOR 123, HKA 70, ZD 45, LYG 34, BOC 30, MTS 12, HZG 9. (Apr.) W4KOR 44.

WEST INDIES — SCM, William Werner, KP4DJ — SEC: ES. DV and KD built FD transmitters. DJ is accumulating transmitter, receiver, etc., for 3.8-Mc. mobile. NJ was off for two weeks for a new roof on the school. Ponce CAP has ten cadets up to 5 w.p.m. AZ repaired rotator for 20-meter beam. CO has been reappointed EC for Mayagues. DV was appointed ORS. HZ is new EC for San Juan in which live the majority of KP4s, whose assistance HZ will require to organize AREC nets on other than 3.5 and 3.8 Mc. 10-meter hams should contact HZ for details on the 10-meter AREC net. HX is back in Puerto Rico. PC is enjoying 28-Mc. 'phone. Don't forget the code, OM. CL is planning 3.8-Mc. mobile to compete with the OM, CK, also mobile. PRARC's *Ground Wave*, with DV as editor, is an FB club paper. Police headquarters soon may appear on the 3925-kc. net sponsored by DC, communications chief. EY, USWB, transferred from Sta. Isabela to San Juan Airport. Traffic: KP4DV 12, MO 12, ID 6.

CANAL ZONE — SCM, Everett R. Kimmel, KZ5AW — Civic-minded Panamanian hams, forming their own AREC, plan a typical ARRL section organization, with PC, RM, WA, and AW as advisors. The first joint meeting, held at the Panama Chamber of Commerce Building, proved HP hams are sincerely interested in preparing for civil defense participation. TB is piloting a 144-Mc. rig suitable for mass production for AREC-DCC nets. The combined AREC-MARS-DCC net organization is ready for its first dry run. MN held plenty of meetings to get the gang all set for Field Day. The XYLs of TB and WG were among those who passed the FCC exam when the airbourne examiner was flown in from KP-Land. We now have six XYLs, all of them wives of key AREC members, who can keep the rig on the air if emergencies tie up the OM elsewhere. With Novice Class operators to work the 220-Mc. rigs, plenty of spare operators are available for emergency work.

SOUTHWESTERN DIVISION

LOS ANGELES — SCM, Samuel A. Greenlee, W6ESR — SEC: KSX. RMs: CMN, DDE, and FYW. Again, KYV tops the traffic list and, with several new schedules, says, "We ain't seen nothin' yet." In GYH we believe we have the only ham copying 35 w.p.m. in longhand. DTY is on with a 6L6 until he rebuilds. Reason: HVJ (the YL) talked him out of his big rig! Hi! CKO is rebuilding for several separate finals. YVJ is raising his antenna 35 feet higher. AM is new prexy of So. Calif. DX Club. Other officers are CUQ, KPC, ADP, SYG, AOA, and BXL. LS gave a fine demonstration of amateur teletype before the 2 Meter & Down Club; he says about 50 are on 144-Mc. TT in the Los Angeles Area. If interested, contact him. The grand old man of radio, Horace Bates, now is LJO. OHX is Asst. EC for San Luis Obispo County. FYW reports that LKF, POD, and YCZ, of Paso Robles, attended the Tri-County Hamfest at Santa Barbara. FYW couldn't land his flying machine because of overcast conditions that day. Armed Forces Day had WMQ jumping to handle the traffic from WAR. EBK is building new 75/80 final. VPK ran a snappy AREC demonstration for El Segundo Kiwanis; he set up an MBF on 28 Mc. right on the luncheon table as control. Social Note: CMN, new prexy of the San Fernando Club, reports an all-ham wedding at the

(*Continued on page 96*)

HARRISON HAS HARVEY-WELLS

Here's Ray Farwell, W2BJ, the well known DX'er tuning up the TBS-50C. Dynamotor supply is located in speaker cabinet. (Note AC pack, APS-50, for plug-in, fixed-portable operation).

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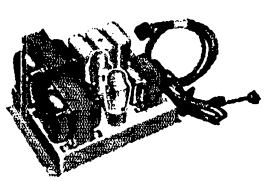

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LONG ISLANDERS try our Jamaica Branch

regular Club meeting. Principals: JMS (bride), DJU (groom), ABM (minister), and CSS (best man). Other new officers of the San Fernando Club are HVC, KOY, VOU, TFC, YSK, JUD, SRJ, and JXP. NAZ is QRU with her own TV program. BUK is active on 28-Mc. short skip. PJ sports a new rhombic for 3.8 Mc. MU is rebuilding. COZ reports the Tri-County ARA is meeting at Los Angeles County Fair Grounds on the 2nd Wednesday of each month. In honor of the 2000th QSO between DLI and PMS, the Knucklehead Net (3968 kc.) threw a picnic at DLI's with a big attendance from several counties. GAE claims a huge traffic total for Armed Forces Day; now he's trying to prove it. DGB and GUM are on 3.8 Mc. HYS, JMY, LEI, HCC, and IDM are recent high school graduates. IDM is building all-band 813 rig. BMH and EJQ are newlyweds. MVK has moved his practice to Pomona. DGB, IDM, IGE, and GUM are sporting new Advance Class licenses. GAE has a new mobile rig. LGO is going to 144 Mc. Thanks, Gene (Winchell), COZ. The Inglewood Radio Club was host at a bang-up picnic sponsored by the Los Angeles Council of Radio Clubs on May 27th. KSX (SEC) reports several AREC nets have moved to new emergency frequencies and others will move soon. The Crescent Bay Area participated in a full-dress disaster drill put on by the Venice-Mar Vista C.D. There were ambulances, bandages, and lots of ketchup (simulated blood). Your SCM invites reports from all amateurs in the section. The following made BPL this month: KYV, GYH, and BHG. Members of the South Bay Area AREC net helped with March of Dimes collections. UHY reports use of six mobile units collecting from Redondo Beach, Hermosa and Manhattan Beaches for about four hours. Traffic: W6KYV 2149, GYH 1491, UHY 369, DDE 224, BHG 133, HOV 119, PJ 89, HLZ 64, CMN 51, COZ 46, FYW 40, WMQ 37, DBY 28, VG 28, CKO 23, EBK 15, DTY 12, BLY 11, OHX 11, FMG 7, AM 6, TDW 6.

ARIZONA — SCM, Jim Kennedy, W7MID — The May c.w. party for the Arizona gang on 3.5 and 7 Mc. brought out 26 calls. A groundwave party on 28 Mc. for the gang in Maricopa County brought out 19. Both these are to be monthly events, so better get in and meet some new calls and renew some old friendships! In Tucson, the clubs now have 750-watt gas-driven generator for emergency work. Nearly forty stations have reported into the Tucson Emergency Net, which meets on Tuesday and Thursday nights. NYK is the new EC there and he has lots of plans cooking. 6APW/7 has moved to the Coast for the summer. JGZ has moved back to Nogales. OFA has a new dual mobile rig for 28 and 50 Mc. LOC is on 28 Mc. from the Veterans' Hospital. NSJ is operating from Mt. Lemon, handling lots of Boy Scout traffic. OYJ got his master's degree July 14th, and has been invited back into the Navy on July 19th! New officials of the 25 Club are RMB, pres., RNB, secy., THJ, vice-pres. The 40-meter daytime net, K7NRZ NCS, has folded for the summer. JYY is conducting a civil defense radio class in St. Johns, OWL and MNU are building 50-Mc. rigs there. Traffic: K7NRZ 41, W7LVR 5, JGZ 4.

SAN DIEGO — SCM, Mrs. Ellen White, W6YYM — Asst. SCMs: Shelley E. Trotter, 6BAM; Richard E. Huddleston, 6DLN; Thomas H. Wells, 6EWU. SEC: NBJ. RM: ELQ. ECs: DEY and VJQ. Orange County amateurs were called upon to furnish emergency communications in the recent Patricia Jean Hull kidnap-murder case by the c.d. officials of Buena Park, Calif. Traffic was handled between headquarters and searching parties by 6HDT, NGN, AXH, DEY, EZL, ETO, ZPB, GJC, GBY, PMS, and TIK on 3965 kc. The success of the operation was evident from the FB comments regarding amateur radio given by the officials over the TV networks. BAM should get two BPL certificates for his May traffic total of 1045! IZ handled traffic for 36 hours during the Ensenada Races. YYM is happy about being the winner of the cup in the 1951 YL-OM Contest. New IVARA officers are QUS, pres., QKY, vice-pres., BSP, secy-treas., GAX, act. mgr., UQI and CQW, trustees. IRS expects to be operating portable KG6 shortly. LVN may be moving to San Bernardino. The June meeting of the IVARA included a fish fry. Bill Clements donated a king-size fish caught in Ensenada. We hear that GUP has foresaken his bug for a microphone! An FB net directory, tabulated by frequencies, has been prepared for your SCM by KIO. Two rigs are in operation at the AREC room in Balboa Park. Beams for 14 and 28 Mc. also are on display on the roof on the House of Charm. Some of the local hams who plan to attend the convention in Seattle are ZYD, AMQ, VJQ, YXI, and ZSA. Soledad Club used Mt. Soledad again this year as its operating site during Field Day. Please excuse the short report, fellows, but I had to make an emergency trip to New York and have yet to catch up. Traffic: (May) W6BAM 1045, IZG 130, FCT 29, GTC 12. (April) W6BVI 10.

WEST GULF DIVISION

NORTHERN TEXAS — SCM, William A. Green, W5BKH — Asst. SCM, Joe. G. Buch, 5CDU. SEC: AAO. RMs: GZU and LSN. PAM: IWQ. OBS/OPS appointment was made to VIM. KRZ, new NCS of NTEN,

(Continued on page 98)

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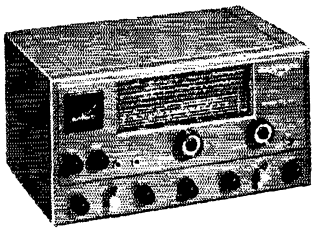

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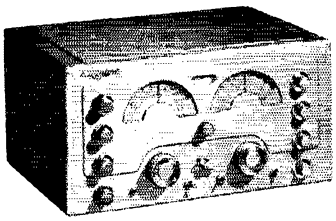

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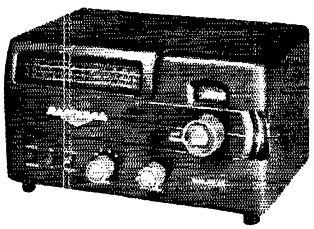

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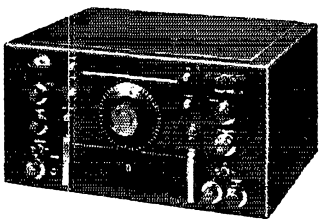

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has a letter from the Governor commending the work of that net in the Olney disaster, in which US/5 of the Wichita Falls ARC did some fine work. At the STEN Convention need of local nets to supplement the present state-wide emergency nets was stressed by Bill Broman, c.d. communication head. Mr. McGill, executive secretary to the Governor, urges amateurs to be ready with c.d. communication plans even though the c.d. head in their area seems to be unaware of the urgency. Joe McKinney, of FCC, congratulated the emergency nets and adds that it seems desirable to build c.d. networks around material already available. The Blue Ridge Emergency Net (160 meters) has petitioned FCC for night-time operation on 160 meters in Northern Texas. The value of a local 28-Mc. mobile net was demonstrated by Abilene ARC in the local flash flood. A net on 144.1 Mc., the Southern States C.D. Net, has been organized by CVW to cover the Southwest. KRZ and PTR are handling a large volume of overseas traffic feeding into the Texas/Okla. and So. Tex. traffic nets for delivery. The Big Spring ARC elected NUJ, pres., SHS, secy., PXD, treas. New holders of Advanced Class tickets are RJM and QIF. LY has a new shack while OFV has gone mobile. Traffic: W5GZU 962, PTR 359, BKH 342, KRZ 209, ARK 190, QHI 155, CVW 142, IWQ 107, EBW 89, LEZ 63, RHC 30, HBD 22, AWT 19, GUD 14, HD 9, VIM 9, LGY 8.

OKLAHOMA — SCM, Frank E. Fisher, W5AHT/AST — SEC: AGM. RM: FOG. PAM: ATJ. Two ham outings were featured this month; one sponsored by the Tulsa ARC at Bristow, the other by WQ and ROZ, of Canton, and the Enid ARC at Canton Lake. LTE now is with CAA in Hawaii. LHZ, president of Enid ARC, is leaving for New Jersey to work for RCA. RYB and SNB are new members of Enid ARC. GZK and GVV have regular schedules with JA2MB for traffic with boys of the 45th. MRK is working hard to establish a summer net on RN5. HZD lost his beam during a big wind. The North Texas traffic net ('phone) has gone together with a group of Oklahoma stations to form the Texas-Oklahoma traffic net. They meet daily at 1730 on 3960 kc. and are doing a thriving business. AOM gave a fine talk on the amateur in civil defense and emergencies at the Bristow Hamfest. ECA, HXT, and 6VRP/5 are mobile in Oklahoma city. EHC is using clamp tube modulation on his 3.8-Mc. mobile. ATB has a super-duper custom-built mobile job. K5NRJ says he doesn't have much time for traffic but makes BPL just from habit. GZK shows what can be done with traffic on 'phone for BPL also. K5WAH makes BPL on originations. The Bartlesville ARC held another pre-Field Day check-up at Osage Hills Park. Traffic: K5NRJ 856, W5GZK 686, MRK 259, OQD 243, FOM 231, K5WAH 229, W5RIT 183, AHT 150, MQI 51, OWG 44, LCN 38, WQ 37, PHR 28, BGC 21, IOW 17, EHC 10, OFG 6.

SOUTHERN TEXAS — Dr. Charles Fermaglich, W5FJF — OUQ is doing nicely with his FB 50-watt rig on 3.8 Mc. GNX, BZL, JAA, HRO, APP, and QFA are on 3.8 Mc. FGR has 300 watts to a pair of 813s. He is active in MARS and on 3.8 Mc. ONS worked 4LAW and 4HAD on 144 Mc. (900 miles). 4LAW heard DCV and BDT. PTV works the Hit and Bounce Net, STX, TCN, OLZ, and has a schedule with MN and GZU. MRV has mobile rig and emergency generator set. NXZ is returning to active duty in the Navy. QYT left the border patrol and went back to merchant shipping. OYX is going on 3.5- and 7-Mc. c.w. SHH is going on 7-Mc. c.w. QOF just made WAS. IZB is on 160, 75, and 10 meters with 100 watts and 75- and 10-meter mobile with 2 transmitters. FWC, DDC, RAN, CPG, and IZB are on 160 meters. CPG is building 10-meter mobile. OBA is on 75-meter mobile. The Bayshore Amateur Radio Club has applied for a club station license. CPG is chairman of the new Pasadena Radio Club. FEK has worked 6 states on 144 Mc. with 90 watts to an 829B. FSC has worked 5 states on 144 Mc. FBT and IRP have each worked 6 states on 144 Mc. Plan to attend the ARRL West Gulf Convention in Austin Aug. 17-18-19. RIH is active in the c.w. net on 3783 and 7280 kc. ACL is active on 14 Mc. NHB, one of our most active hams, has 300 watts to p.p. 35Ts modulated by Class B 811s on 28 Mc. He uses a VFO and three-element gamma matched beam. He uses a 522 and six-element on 144 Mc. For receiving he uses an R9-er ahead of an NC-173 and on 144 Mc. a Wallman crystal-controlled converter ahead of the NC-173. A 28-volt generator is used for emergency power. PTR attended the STEN Convention; she was elected public relations officer for STEN. FNY has resigned as EC and PY has been appointed in his place. RT was chairman of the SARC Field Day program. EEX planned the Field Day activities for HARC. UB gave an interesting talk on 2-meter gear to SARC. The Bayshore Radio Club was active in Field Day under GLS. RFG is active in ELPEN and works CE1CP at 1330 Sundays. He has a 75-A receiver and checks against WWV daily. IPT is active on MARS So. Tex. 'phone, MARS N.E. Tex. 'phone, MARS Tex. c.w., and STEN. AMK is active on 7 Mc. LM is busy with Novice Class candidates. ESL is planning kw. final. QGD is wondering what to do with two Super Pros. PYC is working on a rig to take on a long trip. The TARC held Field Day in Cameron. MN works

(Continued on page 100)

Hit and Bounce Net on 7155 kc. AQE has been on 14 Mc. MAD is in USAF at Ellington Field and is active on 3.5, 7, and 28 Mc., also 3.5- and 28-Mc. mobile. NXZ is interested in mobile work. SJY has an FB new all-band rig and is going on 144 Mc. BCN, OGG, and BHO are new OPS. FJF is on 3.8-Mc. mobile with 120 watts input to p.p. 807s and tri-band converter. BCN has been working 96 hours a week and it has been interfering with his traffic work. Harris County hams, plan to attend HARC Barbecue and Hamfest July 29th. Call FJF at PR 8685 or JA 7428 for reservations. PTR and RAL are new AREC members. IBT has 400 watts to a pair of 8005s on 3.8 and 14 Mc. and p.p. 807s on 28 Mc. RAL was heard working MARS W5USA/5 at STEN Convention. LLT still is giving ham exams for FCC. MXM and OWS are on 3.8-Mc. mobile. QZG is going mobile soon. DZ has photos showing his ham rig in 1921. GYM has 180 watts on 3.8, 14, and 28 Mc. KBP has BC-610 on 3.8, 14, and 28 Mc. and is active in El Paso emergency net. FZB works 3.8, 14, and 28 Mc. with 304-TL. Please send news to FJF by the 1st of each month. HPJ has a 30K. QFA has been appointed OBS. Traffic: W5PTV 1215, MN 759, PTR 359, OGG 194, BCN 59, QFA 56, QEM 34, RIH 29, TV 15, ABQ 14, CPQ 12, 1PT 5, RFG 3.

NEW MEXICO — SCM, Lawrence R. Walsh, W5SMA — Acting SCM, Richard J. Matthias, W5BIW. The picnic at White Sands National Monument was held May 19th and 20th. A complete MARS station was sent by Col. Carl Hatch, QVE, from San Antonio. Col. Grant, trustee of K5WSP at White Sands Proving Grounds, also sent a complete rig with BC-610 and PE-95 power unit. The Army boys from White Sands Proving Grounds also gave a demonstration, erecting two 60-ft. poles in 28 minutes. The mobile contest was judged by JYX, 6IMY, and 4KAW and won by OAI and DAH, with CTG second, and JOT third. The attendance prize was won by CVI. Others winning prizes were JIF, RES, and BIH. The Sandia Base Radio Club recently had a talk on Geiger Counters by WRS. On May 28th another interesting talk was given by Burt J. Bittner on the subject of "Mobile Antennas." New officers are as follows: IH, pres.; PQA, vice-pres.; PTF, secy.; and QIT, treas. The Mesilla Valley Radio Club has a new club call, SRW. RCQ is the newly-appointed EC. The Los Alamos Radio Club arranged a radio display in the Public Library. Hams Associated heard talks by Patterson and Dave Middelton during the past month. The Santa Fe Club is giving a training course under the sponsorship of civil defense organization. Classes are being taught by KWR and MYI. LGS got his 150 sticker for DXCC. PXN has a new 100-watt rig. Traffic: W5NKG 101, A5ZU 91, W5QKJ 75, ZU 43, SU 8.

CANADA
MARITIME DIVISION

MARITIME — SCM, A. M. Crowell, VE1DQ — SEC FQ has the new coax line on the 14-Mc. beam. The Halifax Ladies Dit and Dah Club held a banquet and social evening at Lakeledge recently. Civil defense plans are coming along nicely and the HARC executives are improving and enlarging same for the use of all available equipment in the area. Notes on the FRAC gang follow: PF still is working on the new rig. ABT is itchy for 14-Mc. DX. BI has been doing some work on the oscillator. CM has an electronic key going. HB was out as HB/1 and got a nice report. AAY/1 worked WB, BM, and LU while portable at Renous. VJ is going portable. AAY and WB have been doing some mobile work. EG gave a nice talk on the range system. AAV has been using the new bug. AO has been QRL exams. YW is a new call in Sackville. OL/3 is running 15 watts on 7 Mc. from Toronto. JJ still is chasing bugs in the 813. W hams stationed at Goose Bay are W1MYZ, W2FUW, ex-W9FKD, now headed for northern Greenland, W4PAW, W4CUP, W4QOC, W6ZNA, W9FQO, and W9SWI. W8VDF now is holding down the fort at Padoloping Island. Val probably will return to Goose Bay in September. W1JYV paid us a short visit recently and has now returned to Newfoundland. W4QOC also is AK2AM on the MARS frequencies, which is the only amateur radio outlet at Goose. Traffic: VE1FQ 98, MK 83, AAK 38, PO 34, YV 31, OM 22, AL 21, ZM 18, ZO 18, ABJ 13, PS 13, XH 11, JS 10, KI 9, ABA 7, KG 7, AAN 6.

ONTARIO DIVISION

ONTARIO — SCM, G. Eric Farquhar, VE3IA — To BUR goes the distinction of contacting the most northern station, 8ML, located 200 miles from the pole. VD was heard during the May emergency test. IA made BPL again, his third certificate earned the hard way. KM, our SEC, reports a very successful emergency test held during May. He extends thanks to all for a fine showing. IL had a birthday. WN has been confined to bed for a long time. AZZ has been having receiver trouble. BBV, DCS, and DEF passed Class A tests. AZH's new QTH is Sudbury. AVS is active on 3.5 and 7 Mc. in Kapauskasing. PH has returned from vacation. There's much rejoicing at the

(Continued on page 102)

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PERSONAL ATTENTION: The Butler store is run by Bob Henry, WØARA, and the Los Angeles store by Ted Henry, W6UOU. We make the deals ourselves. We finance the time payments ourselves. That way we have the lowest overhead and can do more for you. That's why YOU AND I CAN DO BUSINESS. Write, phone, or visit either store. Export orders solicited.

73.

Bob Henry WØARA

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"WORLD'S LARGEST DISTRIBUTORS OF SHORT WAVE RECEIVERS

QTH of AJR because of hubby getting his ticket and the call DNV. Starting June 1st TRN, on 3675 kc., operates three times a week, Mon., Wed., and Fri. at 10 P.M. EDST. This popular net will operate until October. The Ontario traffic net, 7267 kc., operates daily at 1930 EDST and invites all who are interested. AFARS operates six nights a week on 3715 kc. at 1930 EDST. Up Brantford way activity on 144 Mc. is increasing. BMG is repainting the tower. BUL moved to Milton. AVK is enjoying ten. AWB made a trip to Maritimes. BOW is active on 50 Mc. HA, BGT, and AQG are busy gardeners. The Kitchener-Waterloo Radio Amateur Club is to be congratulated on its fine bulletin. Results of recent election of officers of this up-and-coming club are VL, pres.; ANU, vice-pres.; BIS, secy.-treas. QT sports car license 73H88. While shack-rebuilding DGZ got caught in a man-made mantrap. Traffic: (May) VE3IA 523, BUR 243, ATR 138, BVR 109, DGZ 46, BBM 45, EAM 39, IL 35, BMG 34, AYW 21, BL 16, WE 14, WY 9, VD 8. (Apr.) VE3BL 20, TO 15

QUEBEC DIVISION

QUEBEC — SCM, Gordon A. Lynn, VE2GL — The Verdun Amateur Radio Club now is affiliated with ARRL. AO sends a nice report and says that 21 future hams are studying under MD in Thetford Mines. GH is back on 3.5 Mc. with 350 watts from Lachute. AO has visited AFH, APK, MB, AEN, AEH, GC, MD, and EI lately. SR is QRL with TVI RZ recently completed rebuilding his rig, which has taken six years, and is VFO with all bands 3.5 to 28 Mc. SR, GR, and AOP all work at CJAD transmitter. ABB is in charge of new broadcast station in Shawinigan. ACD is on 14 Mc. and OD is back on 75-meter 'phone. CA continues schedules with the North Country and had VK3ZW as a visitor. CK participated in the CD Contest and remarks on the lack of VE2 participation. He found it tough going, no doubt because he is living in an apartment house with "invisible" antenna. WW now is located at Beaurepaire and has joined the Lakeshore Club. IN has joined the RCAF. AT, AIM, VI, and AON continue to keep 144 Mc. hot in the St. Maurice Valley Area. KZ now is using AR-88 receiver. TX and XA are on 50 Mc. and have worked several midwest stations. XA is building a beam for it. Traffic: (May) VE2AO 45, EC 13, AKJ 8. (Apr.) VE2CA 34, GL 9, RZ 6, CK 4.

PRAIRIE DIVISION

MANITOBA — SCM, A. W. Morley, VE4AM — PAM: FA. From the BARC comes word that IF and GE are settling in Winnipeg. Brandon's loss is our gain. YW spent his vacation in Chicago. HD and CI are both mobile. QD has new HQ-129X. JQ, at Erickson, has ticket endorsed for 'phone and is heard on 75 meters regularly. BL completed a course in Winnipeg and is back home and active on 7 Mc. OS, at Carman, has applied for a 'phone ticket. The Assiniboine Valley Radio Club elected JB as president and AI as secretary-treasurer. The Club's hamfest held on May 24th was a great success. The VE5s won the annual baseball game for the first time. Thanks to the BARC for all the above. SR is conducting code and theory classes for prospective amateurs. QV has new "V" beam. IW has been transferred to Watrous and will be signing VE5. C.d. frequencies have been announced, and in spite of all rumors to the contrary the help of amateur radio is being solicited. There is a place for you and your inquiries will be welcomed. If you are discussing c.d. and amateur radio be sure of what you are talking about. Don't let those rumors get any bigger.

SASKATCHEWAN — SCM, Harold R. Horn, VE5HR — Reports were slim this month, gang. It's only through your coöperation in sending in material that this column can be made up. Please let's know what you are doing so the rest of the gang can see it also. There are vacancies in various appointments that you will be interested in, so please ask your SCM about them. PJ puts out a good signal with his new antenna. JD has moved to VE3-Land. EE is listening on 56 Mc. for signals to contact. MA reports a good attendance at the Assiniboine Valley Hamfest, with QL winner of the Hidden Transmitter Hunt. The VE5s were winners over the VE4s 8–1 in a ball game. New calls heard are DU, LA, MW, SM, RW, LN, and MM. Welcome, fellows. There has been a good response to the membership campaign for ARRL and SARL but there still are a number of fellows we should like to see in both organizations. GI, Lipton, Sask., or the SCM can give you particulars. A new club has been formed at Weyburn with PQ, pres.; SW, vice-pres.; and FG, secy. Our best wishes to the southern gang. Traffic: VE5MA 105, YF 39, TE 21, HR 14, WJ 14, DD 8, JW 8, PJ 7, SE 7, FG 2, QL 2.

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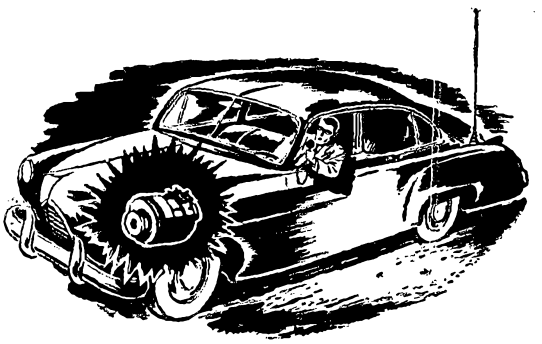
Recently removed from Police Cars, these complete *altenator systems* are less than 3 years old and are in excellent shape — many years of top performance left. Simple wiring and installation on most popular make cars (1936 to 1951). Wiring diagram and instructions — altenator, rectifier and regulator — ALL FOR **$49.95**



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80 Meter XMTR, Kit incl., Tube, Key and Xtal	$15.95
Power Supply Kit for above	9.95
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Combination of three above items	25.95
3700 to 3750 Kc. Xtals (your choice). Each	2.80
Lysco Novice XMTR, factory wired—less tube, key and Xtal	24.95
Lysco Code Oscillator	12.50
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Hi-Frequency Code Practice Buzzer	.88
Code Practice Key	.98
Learner's Code Practice Set Buzzer and Key mounted on plastic base with terminals. Each	2.25
2 Sets for	4.00
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Radio Control

(*Continued from page 14*)

though proportional control does not result from this method, it does provide rapid selection of the desired control without sequential problems. The tuned-reed idea is not new; it has been pursued by many, including John Lopus and Leo Weiss back in 1937, but Rockwood has made it work. The little reeds are rather marvelous as tuned "circuits," since they have *Q*'s of several hundred at low audio frequencies. In other words, at 400 cycles per second the operational band is only a few cycles wide! This makes a superb bandpass filter in this application. Further development of the tuned-reed system appears to be the most promising direction for multichannel controls. The weight of the current reed systems is greater than any other system, but the benefits are greater, too.

Performance

Average sport flights last from five to ten minutes and stay well within a quarter-mile radius. A six-foot plane is easily visible at a half-mile distance, but it is very difficult to judge its altitude. Occasionally, altitudes exceed a thousand feet — half of that is more likely. Recently, two and three planes have been flown simultaneously. Follow-the-leader and mock dog fights are more difficult than they appear, but they are a lot of fun. Another toughie is the Navy's radio-control bomb-drop event, which scores for quick take-off, short landings, and close misses of actual miniature bombs. Of course, the big contest of the year is the National Model Meet where the Radio Control Event is flown on a four-day basis; that's tougher than a double-header Field Day!

(A subsequent article will treat the radio receivers in detail, describing the various circuits in vogue and comparing their merits.)

Radio Control Books

G. Honnest-Redlich, *Radio Control for Models*, a Harborough Publication, England.

E. L. Safford, jr., *Model Control by Radio*, Gernsback Library, No. 43.

Seven-Band Transmitter

(*Continued from page 19*)

fringe area where the strength of the TV signal rarely exceeds several hundred microvolts.

The results just described can be duplicated only with the two chassis of the transmitter bonded tightly together. If either of the chassis is out of shape it will be difficult to meet this requirement merely by locking the two sections in place. In the event that the units do not butt at all points, it is possible to complete the shielding with the aid of strips of screen wire placed between sections at places where gaps previously existed.

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RECEIVERS AND TRANSMITTERS
(Transmitters include tubes and coils for at least one band)

Babcock P2A Preselector	$ 22.50
Breting 9 Receiver and spkr.	25.00
Breting 12 Receiver and spkr.	49.50
Collins 75A Receiver and spkr.	275.00
Collins 75A1 Receiver and spkr.	299.50
Gon-Set 10 meter converter	21.95
Gon-Set 20 meter converter	21.95
Gon-Set Noise Clipper	7.50
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Hallicrafter HT18 VFO	89.50
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Hallicrafter S20R	44.50
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Hallicrafter SX25 and spkr.	79.50
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Hallicrafter S38	32.5
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Hallicrafter S38B	42.50
Hallicrafter S40A	59.50
Hallicrafter SX43 less spkr.	134.50
Hallicrafter S47 less spkr.	109.50
Hallicrafter S53	50.00
Hallicrafter SX62 less spkr.	229.50
Hallicrafter SX71 less spkr.	159.50
Hallicrafter S72 Portable	79.50
Hammarlund HQ129X and spkr.	139.00
Hammarlund HQ120 and spkr.	79.50
Howard 440H and spkr.	49.50
Johnson Viking—Wired	250.00
Jones Micromatch MM 1	14.95
Meck T60-1 Transmitter	79.50
Meissner EX Signal Shifter	49.50
Meissner 9-1090 Shifter	54.50
Millen 90800 Exciter	24.00
National HFS less PS	89.50
National HRO5TA1 PS spkr. coils	175.00
National HRO7 PS spkr. coils	219.50
National HRO7R PS spkr. coils	229.50
National NC173 and spkr.	137.50
National NC183 and spkr.	209.50
National NC240D and spkr.	129.50
Pierson KP81 and spkr.	199.50
RME HF10-20	59.00
RME 45 with spkr.	95.00
RME 45A with spkr.	99.50
RME 84	49.50
Simpson 380 Wavemeter	29.50
Sonar AMP50	29.50
Sonar XE10	14.95
Sonar VFX 680	39.50
Surplus BC224 — 110V ac, no spkr.	49.50
Surplus BC312 — 110V ac, no spkr.	49.50
Sylvania Modulation Ind.	19.50
Telvar T60-2	109.50
Transmeter Wave Meter	19.50

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Single Sideband

(*Continued from page 20*)

with a.m. stations. The 160-meter band would seem to be ideal for s.s.b., since stability problems would be minimized. Why isn't there more activity up there?

At the other end of the spectrum (well, almost the end), W1PNB has a pair of 2E26s working on 50 Mc. as a linear for his s.s.b. rig, and the reports from fellows using crystal-controlled converters are excellent. The v.h.f. gang should be able to extend their consistent ground-wave coverage quite a bit with s.s.b., but it does require crystal-controlled converters for reception.

— *B. G.*

Radiological Monitoring

(*Continued from page 25*)

grade obtainable and must not be contaminated with dust, grease or moisture. Grid resistors of the high values that are required are not ordinary resistors, are high in price and easily damaged by handling. The Victoreen Company is the chief supplier of such resistors.[3] Great care must be exercised in handling the resistors, the tube, and the switch insulation. This point cannot be overemphasized.

The chamber can be provided with an opening in the bottom, directly under the probe. This opening can be provided with windows made of different materials that will allow the entrance of rays other than gamma for demonstration or actual measurement purposes. If such windows are provided they must be coated on the inner side with aquadag or similar conducting material that will keep the chamber enclosure electrostatically tight. This will be especially necessary if the window is made of a nonconducting material such as nylon or cellophane. The whole chamber should be painted on the inside with aquadag or the instrument will be unstable unless the chamber is tight with respect to electromagnetic waves and fields.

The instruments described in this series of articles represent some of the simpler forms of radiation detection equipment. A textbook such as "Electronics," by Elmore and Sands, which is part of the National Nuclear Energy Series, published by McGraw-Hill, is suggested for further reading.

[3] The Radio Shack, Boston, is agent for Victoreen resistors. Stock numbers are as follows: 100 megohms, 09–007; 1000 megohms, 09–008; 10,000 megohms, 09–009; 100,000 megohms, 09–010.

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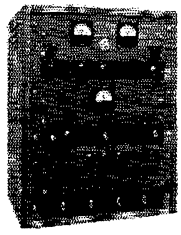

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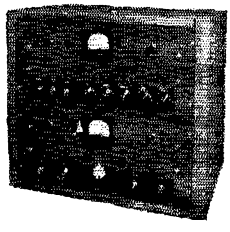
HIGH POWER—MORE WATTS PER DOLLAR

Our newest model with increased power—400 watts Phone, 425 watts CW. Incorporates some of the latest TVI protective features. Efficient performance on all bands — 10 to 160 on phone and CW. Provisions for ECO. Complete with tubes, meters, and one set of coils. Low Down Payments.

KIT FORM **$439.45** WIRED-TESTED **$459.45**



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R.F. Section a complete 150 watt XMTR. Provisions for ECO. Automatic fixed bias on Final and Buffer. Class B Speech Modulator. 150 watt input — 10 thru 160 meter bands. Complete with tubes, meters. Low Down Payments.

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NEW LOG BOOK

For mobile or fixed station. Spiral binding — turns up — lies flat. Full column log listing all FCC required info. Log will accommodate 1,525 stations. Front and back covers show "Q" signals, phonetic alphabet, and amateur international prefixes. **25¢**

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MODEL P69-13, 8 tube..**$29.50**

MODEL P69-12, 6 tube (same as above).....**$19.50**

Crystals for above sets $2.75 each. (Please state type of converter to be used so proper crystal frequency will be sent you.)

EXTRA SPECIAL
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Collins 32RA 100 watt XMTR. **$125.00**

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160 METER
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Address_____

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Happenings

(*Continued from page 56*)

are most easily interfered with by amateur transmitters, what form the interference takes, what steps are necessary to clear up the interference, etc. To that end, would all of you who have suffered with TVI, past or present, send us the information requested below. For ease of analysis, please list it in the following order:

1. Make and chassis model number of TV set affected, and type of TV antenna in use.
2. TV channels in use, TV channels affected, and channels known to be unaffected.
3. Simple sketch showing directions and distances involved between TV receiver, TV transmitter, and ham transmitter.
4. Amateur transmitter band, mode, power, and type of antenna in use.
5. Description of interference patterns, and whether they vary when beam is rotated.
6. Successful remedies, if any.
7. What TVI measures incorporated in the ham transmitter?
8. Was a TV serviceman involved? If so, was his technical knowledge adequate and was he coöperative?
9. Other comments you may have.

50 Mc.

(*Continued from page 60*)

Indiana

W9ZHL	2739	83	33	AB
W9DGA	153	17	9	A
W9UIA	36	6	6	A

Wisconsin

W9AFT	160	40	4	B
W9TQ	152	38	4	B
W9LJV/9	148	37	4	B
W9UJM	104	26	4	B
W9PYM	76	19	4	B
W9OFL	63	9	7	A
W9DKU	45	15	3	B
W9FAN	42	14	3	B
W9ECV	39	13	3	B
W9BTI	22	11	2	B
W9HDZ	12	6	2	B

DAKOTA DIVISION

Minnesota

WØTKX	740	37	20	A

DELTA DIVISION

Tennessee

W4FWH	480	32	15	A
W4HHK	280	28	10	ABD
W4FLW	220	22	10	A

GREAT LAKES DIVISION

Kentucky

W4OXC	1407	67	21	AB

Michigan

W8RFW	250	25	10	A
W8OLD	104	13	8	AB
W8NNF	80	20	4	B
W8DIV	32	8	4	B

Ohio

W8BFQ	2622	106	23	ABCD
W8LPD	2525	101	25	AB
W8NSS	798	42	19	A
W8WRN	396	33	12	AB
W8VOZ	306	34	9	AB
W8FKC	36	8	3	BC
W8TCO	16	4	4	A

HUDSON DIVISION

E. New York

W2VRE	1576	72	21	ABD
W2BVU	572	44	13	AB
W2PV	231	33	7	B
W2ACY	175	25	7	B

N. Y. C. — L. I.

W2FHJ	2470	95	26	AB
W2NSD	1800	120	15	AB
W2GOO	801	89	9	B
W2BNX/2	637	91	7	B
W2DHB	621	69	9	B
W2DLO	531	59	9	B
W2AOD	455	61	7	BD
W2QAN	455	65	7	B
W2CET	275	55	5	B
W2YSL	252	42	6	B
W2BIV	141	47	3	B
W2MHE	135	45	3	B
W2KU	120	30	4	B
W2TZU	114	19	6	B
W2AUF/2	99	33	3	B
W2KH	54	9	6	A
W2ODB	52	26	2	B
W2DIC	22	22	1	B
W2CAX	12	12	1	B
W2FDP/2	12	6	2	B
W2TUK	10	10	1	B
W2AOT	6	6	1	B
W2MFP	3	3	1	B
W2QEA	2	2	1	B

(*Continued on page 110*)

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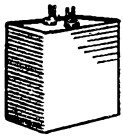

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54G003	12.5	2500	3½x4½x4⅝"	3.45
54G001	1.75	3000	2¼x2⅛" dia.	1.75
54G002	.25	3000	1¼x2⅜x3¼"	.89
54G004	1	5000	3¾x4¼x4½"	6.95
54G005	.01	5000	2⅞x2½x2⅛"	1.19

PANEL METER CLEARANCE!

Flush mounting types with phenolic cases. Zero center.

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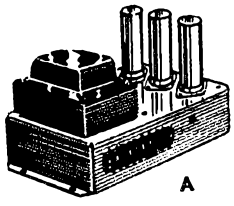
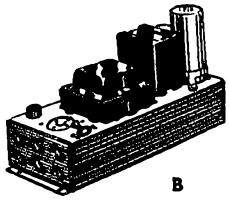
DC Voltmeter. 0-3 volts. 2½" round. Calibrated for use on non-magnetic panel. Wt., 1 lb.
54G301. .....**Special 2.45**

DC Microammeter. 0-500 movement. Reads 0-600 DC volts. 2½" round. Black scale. Wt., 1 lb.
54G302. .....**Special 3.95**



A



B

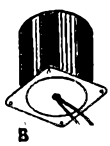
WIRED POWER SUPPLIES

Made by RCA for use with tuners, low power amplifiers, and test equipment. Higher current obtained by substituting choke in RC filter.

Fig. A. For 110 volts, 60 cycles. Delivers 250 V @ 50 ma, 100 V @ 15 ma, 6.3 V @ 2.5 amps and —24 V bias. Hum level 94 db below 250 V and 57 db below 100 V. Chassis, 4¾x8x2". Less 5Y3 rect. Wt., 8 lbs.
54G400. .....6.95

Fig. B. Output: 250-300 V @ 2-8 ma, or 280-320 V @ 8-16 ma. Filament: 6.0-6.3 V, adjustable @ 1.5 A. Hum level 90 db below 300 V @ 10 ma. Size, 3½ x 10¼ x 6". Less 80 rectifier. Wt., 6 lbs.
54G401. .....4.95

A



B

TRANSFORMERS AND CHOKES

High quality units made by nationally-known manufacturers. Ideal for all audio and Amateur applications.

54G100. Fig. A. Multi-filament xformer. Six CT secondaries; (3) 6.4 V @ 8A; (2) 2.6 V @ 2.5A; (1) 2.6 V @ 10A. 4¼x5x5¼". 14 lbs.....3.29

54G101. Fig. B. Hi-fi output xformer. 4000 ohms P to P; sec. tapped 4, 7.5, 15, 60 and 250 ohms. 40 watts. 4½x3⅞" dia. 7 lbs.....2.45

54G102. Fig. A. Filter choke. 6.5 hy @ 230 ma. 3000 V ins. 5x7½". 23 lbs.....2.95

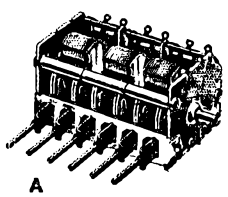
54G103. Fig. B. Filter choke. 4.2 hy @ 300 ma. 78 ohms. 2500 V ins. 4½x3½" dia. 9 lbs.....2.49

RECEIVING CONDENSER CLEARANCE!

Oil-Filled. Rated .25 mfd @ 2500 volts. Inverted can with insulated terminal and lug connection. **While Quantities Last!**
54G201. .....**Special 89c**

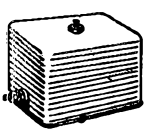
FP Electrolytic. Rated 40 mfd @ 450 volts. Brand new. Made by a leading manufacturer. **Order Now While Quantities Last!**
54G202. .....**Special 19c**
10 for.....1.75

MISCELLANEOUS VALUES



A

B



C

D

54G500. Fig. A. 3-Gang FM-AM Var. Capacitor. With 8 push-button mechanism. Two AM sections, 510, 365 mmf. Two FM sections, 12 mmf. Third section 13 mmf. Ball bearing ⅜" shaft. 5¾x3x6¼". **39c**

54G501. Fig. B. G.E. RPX-010 Cartridge. Built-in sapphire stylus. 2.79

54G502. Fig. C. 50 Amp Line Filter. Eliminates generator noise. 4x3⅛x2⅜". **75c**

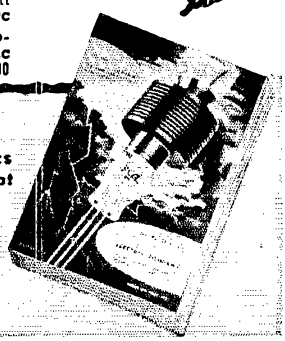
54G503. Fig. D. Feed-Thru Insulator. Porcelain. 5x1¾" dia. **9c**
10 for.....**80c**

54G504. Anode Connector. Molded bakelite. With 7" HV leads and 47 ohm, ½-watt resistor. **10c**

54G505. Elbow Suppressor. **12c**
100 for.....**9.00**

NEWARK'S 160-PAGE CATALOG

***The New Electronics Reference Book* — offering the widest selection of electronics equipment and supplies for Amateurs and Industrial Users. If you have not received your copy of this up-to-the-minute catalog, send for it today!**



NEWARK ELECTRIC COMPANY

323 WEST MADISON STREET — CHICAGO 6, ILLINOIS

50 Mc.

(Continued from page 108)

N. New Jersey

W2COT	2448	144	17	AB
W2IQQ/2	156	39	4	B
W2MPP	99	33	3	B

MIDWEST DIVISION

Iowa

WØOLY	817	43	19	AB
WØJOL	420	30	14	A

Missouri

WØZJB	1029	49	21	AB

NEW ENGLAND DIVISION

Connecticut

W1HDQ[2]	5418	121	42	ABD
W1NEM/1[2]	2520	74	28	ABD
W1MRP	240	20	12	A
W1PHR	224	32	7	B
W1CEG[2]	200	20	10	A
W1DJV[2]	126	18	7	A
W1RWS[2]	50	10	5	A
W1FWH[2]	26	13	2	B
W1BDI[2]	16	4	4	AB

Maine

W1PWW	408	34	12	A

E. Massachusetts

W1HIL	1782	81	22	AB
W1GTZ	1584	72	22	A
W1MMY	1460	73	20	AB
W1BJN	600	75	8	B
W1AQE	488	61	8	BE
W1SUR	259	37	7	B
W1DJ	190	19	10	A
W1NFQ	150	30	5	B
W1MCR	125	25	5	B
W1QOI	124	31	4	B
W1BDF	108	27	4	B
W1CTR	100	25	4	B
W1TMB	92	23	4	B
W1LYL	78	26	3	B
W1SQE	18	6	3	B
W1MGP/1	2	2	1	A

W. Massachusetts

W1GJO	4752	144	33	AB
W1OED/1[1]	2226	94	21	ABE
W1RVW	1008	48	21	AB
W1CGY	722	38	19	A
W1CCH	238	26	7	BD
W1DRF	235	47	5	B
W1FKI/1	45	9	5	A

New Hampshire

W1MHL/1[1]	954	106	9	B
W1AWA/1	435	29	15	A
W1DUB	208	26	8	AB

Rhode Island

W1KCS	1560	78	20	AB

Vermont

W1CGX	465	31	15	AB
W1JSM/1	369	37	9	BE

NORTHWESTERN DIVISION

Idaho

W7ACD	693	33	21	A

PACIFIC DIVISION

Santa Clara Valley

W6GCG/6	2023	119	17	AB
W6LOZ/6	500	100	5	B
W6LF	260	52	5	B
W6ZBS	228	38	6	AB
W6CDX/6	205	41	5	B
W6MMG/6	90	45	2	B

East Bay

W6AJF	1785	97	17	ABD
W6VDR/6[1]	819	63	13	AB
W6EXY	210	70	3	B
W6NGV/6	205	41	5	B

San Francisco

W6MHF	228	57	4	B
W6BAZ	45	15	3	B

Sacramento Valley

W6HBM	56	14	4	B

San Joaquin Valley

W6GQZ	585	45	13	AB
W6FYM	546	42	13	AB
W6IAZ	156	26	6	B
W6VKD	130	26	5	B

ROANOKE DIVISION

Virginia

W4JAZ	868	62	14	AB

SOUTHEASTERN DIVISION

Alabama

W4KCQ	5	5	1	B

E. Florida

W4FNR	1512	56	27	A
W4IUJ	1100	44	25	A

W. Florida

W4MS	270	27	10	A

SOUTHWESTERN DIVISION

Los Angeles

W6NLZ	1328	79	16	ABD
W6BHG	80	40	2	B
WØSZU/6	21	7	3	A

WEST GULF DIVISION

South Texas

W5FSC	504	36	15	AB
W5IRP	144	18	8	AB
W5MIL	14	14	1	B

Oklahoma

W5EMY	28	7	4	A

CANADA

Maritime

VE1BC	516	43	12	AB
VE1WL	396	36	11	AB

Ontario

VE3AIB	1575	105	15	AB
VE3BQN	1440	100	12	ABCD
VE3AXT	1190	85	14	AB
VE3AQG	930	93	10	AB

(Continued on page 112)

HAPPY DAYS ARE HERE AGAIN!

UNCLE DAVE is here again—Remember . . . we carry one of the largest and most complete stock of all nationally advertised lines . . . . . .

YOU NAME IT—WE'VE GOT IT!

TRANSMITTERS

Harvey-Wells Bandmaster Senior	$111.50
Harvey-Wells Bandmaster Deluxe	137.50
Harvey-Wells Bandmaster Junior	87.50
Harvey-Wells Modulation kit	15.50
Harvey-Wells APS-50 power supply AC	39.50
Harvey-Wells DPS50 6 volt power supply	87.50
Harvey-Wells DPS50 12 volt power supply	54.50
Johnson Viking I kit less tubes, mike and key	209.50
Hallicrafters SR-75 trans. and receiver	89.95

RECEIVERS

Hallicrafters S-38B	$49.50
S-40B	99.95
S-53A	79.95
S-72	109.95
S-76, less speaker	169.50
S-77	99.95
SX-62, less speaker	289.50
SX-71, less speaker	199.50
R-46, speaker	19.95
Hammarlund HQ129-X, less speaker	199.50
speaker	14.50
National NC-183, less speaker	279.00
HRO-50, less speaker	359.00
HRO-50T1, less speaker	383.50
NC-125	149.50
SW-54	49.95

LAST CALL WHILE THEY LAST

NC-33	$67.50
NC-57B	99.50
National HRO-7 NEW with ABCDEF coils, less speaker or power supply	250.00

CONVERTERS

Gonset—3-30 meter	$44.75
10-11 meter	44.75
20 meter	44.75
75 meter	44.75
Two meter	44.50
Tri-Band	47.60
Noise clipper	9.25
Universal Steering post bracket	3.90

ANTENNAS

Hylite—4 element yagis, 2 meters	$ 8.75
two 4 element yagis, 2 meters	20.50

COMPLETE LINE MASTER MOUNTS

We also stock Bud, Millen, Par-Metal, Stancor, UTC, Thordarson, Johnson, Lysco, RCA, GE, Barker and Williamson, Mallory, Bliley, Eitel-McCullough, Raytheon, Belden, Sylvania, Ward, IRC, Webster. TRADE-IN ALLOWANCES ON ANY USED EQUIPMENT.

FORT ORANGE RADIO DISTRIBUTING COMPANY, INC.

904 BROADWAY ALBANY 7, N. Y.

LONG DISTANCE PHONE: ALBANY 5-1594 CABLE ADDRESS: "UNCLEDAVE"

50 Mc.

VE3AJJ	300	80	10	AB	VE3TY	96	32	3	B
VE3DER	306	51	6	AB	VE3CAU	88	11	8	AB
VE3DHL	270	45	6	A	VE3DHP	62	31	2	AB
VE3BQP	212	53	4	B	VE3DNS[4]	34	17	2	A
VE3IR	196	49	4	B	VE3AKO	23	23	1	A

[1] More than one operator — not eligible for award.
[2] Headquarters Staff — not eligible for award.
[3] Hartford County Amateur Radio Association — W1SPX operator.
[4] Blue Arc Radio Club — VE3DAT operator.

Correspondence

(Continued from page 65)

THE DALLAS PLAN

Dubois, Ind.

Editor, *QST:*

Congratulations to the Dallas radio amateurs for a practicable and effective public relations plan in the vexing TVI problem. It seems to me those very principles applied elsewhere ought to produce some gratifying results for both TV viewer and radio amateur.

— *Rev. Joseph Terstegge, W9LQE*

[EDITOR'S NOTE: Members may obtain reprints of the Dallas plan story in June *QST* without charge by writing ARRL Hq.]

S.S.B.

34 Wharfage, Ironbridge, Shropshire

Editor, *QST:*

Quite frankly, I'm not satisfied with the rate at which s.s.b. is catching on either here or anywhere else. If only they realized the terrific advantages of the stuff I'm sure that many more stations would try it. The trouble is they've been pumped full of all sorts of tripe about supermod, and seem to think that s.s.b. is too complicated. Admittedly, there is a large proportion of the hams who haven't the know-how or ability required to make s.s.b. rigs, but when you consider that out of some 8000 hams in these islands only seven have tried it — well, it makes you think!

Is progress over there in W-land greater or less than our seven per eight thousand?

— *Geoffrey Bagley, G3FHL*

1714 35th Ave., San Francisco, Calif.

Editor, *QST:*

Prior to last December my interest in s.s.b. was just like that of the average "in the dark" amateur. Just as has been told me many times, I passed over, very lightly, any article even tainted with sideband techniques as too deep for me.

But my eyes were opened and my interest kindled when my very good friend and fellow amateur, Buddy Alvernes, W6DMN, asked me to read several of the articles from previous *QST* issues to him. You see, Buddy is totally blind! By being forced to read the papers on s.s.b. in this manner, I came upon the great discovery that they were not printed in Chinese or Greek, but in plain English, which I could understand if I would only think! Now I know that the greatest handicap any amateur can have is to be unable to use the brain power God gave him. Unfortunately this is true in too many cases, and the remarks passed on the band only serve to illustrate more clearly this point.

When I hear remarks like "I would try s.s.b. but I have no scope or test gear," I constantly think of my friend who can't even tell the color coding on a resistor or read a meter on his rig because he has been deprived of his sight since the age of seven!

So, when a "Class A" operator gives me a long list of excuses on why he can't go sideband for lack of test gear, it makes me feel sorry for him. It is for this reason only that I feel the Class A group needs a little shaking up, and a re-examination for license rights would surely disclose some glaring deficiences.

— *Clyde J. Schoenfeld, jr., W6KNI*

(Continued on page 114)

4025 S. E. Ave., Berwyn, Ill.

Editor, *QST*:

Some time ago I dreamed up a super a.m. rig using a pair of 4-125As in the final and as a result have been accumulating parts for it. While browsing through a stack of *QST*s looking for some helpful hints applicable to my project, I kept running across various articles on single sideband. To be truthful, I must admit that prior to this I haven't paid much attention to s.s.b., but for some reason I read a couple of these articles this time. Before I knew it, I had read every article written since 1948. Being rather inspired by this time (in a skeptical sort of way), I tuned across 75 and looked for this thing called single sideband. I was very fortunate and found a 4-way QSO, three s.s.b. stations and one regular a.m. What a startling revelation!! The band wasn't too good and had plenty of QRM and QRN. I tuned in the s.s.b. stations as suggested in *QST*. I was unable to copy the a.m. station any better than 25% of the time, but the s.s.b. stations came through clear as a bell! Just as amazing was the voice-controlled carrier used by the s.s.b. stations. What an amazing and convincing demonstration to this uninitiated person!

This all boils down to one thing. I am going to hold off on that super k.w. and get in the groove with s.s.b. This s.s.b. is the most amazing thing I've ever run across. I hope others aren't as slowt o see the light as I was.

— *James Novak, W9HNI*

Junction City, Kans.

Editor, *QST*:

W9KNP's letter about s.s.b. on 40 — evidently he is not a c.w. operator on 40 meters. If he were he surely would not want it cluttered up with any more fone carriers, as we have very heavy QRM from Mexico and South America on 40 now.

And if W9KNP doesn't think we are utilizing the 40-meter band, take a listen some Saturday evening when the band is really open. If he can turn his dial from one end to the other without running out of signals, he is doing better than I can.

— *C. J. Hass, W9BLI*

1125 S. Ridgewood Ave., Daytona Beach, Fla.

Editor, *QST*:

In the April issue of *QST*, W9KNP sounds off on the possibility of using the 7200–7300 section of the 40-meter band for single-sideband operation. May I have the privilege of being the first guy to protest, long and loudly?

I think that if W9KNP were to come to Florida and try a bit of operation on 40 meters, and had to put up with the QRM from the Latin-American 'phones that are permitted to operate on the 40-meter band, he might not feel that the high end of the band is so neglected! You find yourself forced to go up in that high end a lot of times to get out from under those guys — so why make it any tougher?

— *James H. Millard, W4BHG*

HANDS ACROSS THE SEA

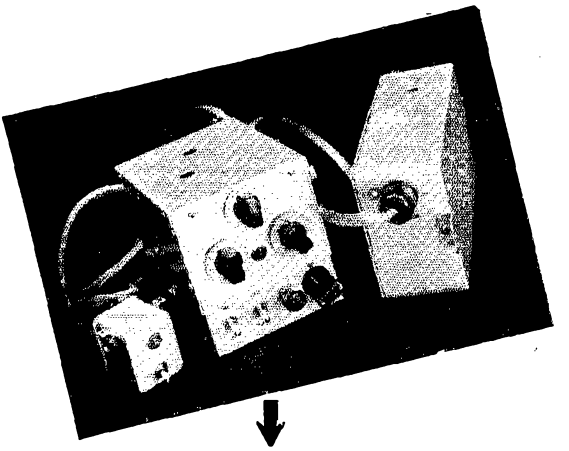
Hq. Wurzburg Military Post, APO 800
℅ Postmaster, N. Y., N. Y.

Editor, *QST*:

As an active DL4, I come into close contact with many German hams and find that in several cases parts and equipment available here are too expensive, especially for the young beginner.

If any American ham, in looking through his junk box, should come up with discarded material that might be put to further use, I will see that it gets into good hands. To avoid unnecessary duplication, I would suggest that anyone interested communicate with me first.

— *Capt. George C. Whitney, DL4CE*



Going Mobile?

Then better see page 451 of the 1951 Edition of the Radio Amateur's Handbook . . . !

● There you will find a complete constructional description of a band-switching transmitter for mobile, covering the 75-, 20-, 11- and 10-meter bands.

The dope, complete with schematic, will help you to get rolling with your rig and pull in those motor-borne QSOs so popular about this time of the year. There are many other interesting and useful articles in this popular ARRL Handbook (23 pages on mobile data alone). No matter what your problem, whether you are a Novice or an Advanced Class ticket holder, you'll find the answer in the

RADIO AMATEUR'S HANDBOOK

$2.50 postpaid
U.S. Proper
$2.75 U.S. possessions and Canada. $3.00 Elsewhere

THE AMERICAN RADIO RELAY LEAGUE, INC.
38 LaSalle Road West Hartford 7, Conn.

Very little space is required to say:

"TELEPLEX TEACHES THE CODE"

But how it teaches it; The advantages of TELEPLEX; Fundamental principles that you must know, is a long story. Get the facts and compare. A Postcard will bring you "Some pertinent facts about Code."

TELEPLEX CO. • 804 E. Dawn Drive • MODESTO, CALIF.
(See it at Blan's, 64 Dey St., New York)

COMMERCIAL RADIO INSTITUTE

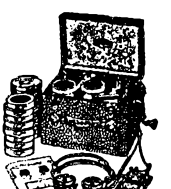
A RADIO TRAINING CENTER FOR 30 YEARS

Resident Courses Only • Broadcast, Service, Aeronautical, Television, Radar, Preparatory Mathematics. Frequency Modulation and Marine telegraphy. *Classes now forming for fall term October 1st.* Entrance examination September 17th.

Literature upon request. Veteran training

Dept. B, 38 West Biddle Street, Baltimore 1, Maryland

EASY TO LEARN CODE



It is easy and pleasant to learn or increase speed the modern way — with an **Instructograph Code Teacher.** Excellent for the beginner or advanced student. A quick, practical and dependable method. Available tapes from beginner's alphabet to typical messages on all subjects. Speed range 5 to 40 WPM. Always ready, no QRM, beats having someone send to you.

ENDORSED BY THOUSANDS!

The Instructograph Code Teacher literally takes the place of an operator-instructor and enables anyone to learn and master code without further assistance. Thousands of successful operators have "acquired the code" with the **Instructograph System.** Write today for *full particulars* and convenient rental plans.

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RADIO and TELEVISION

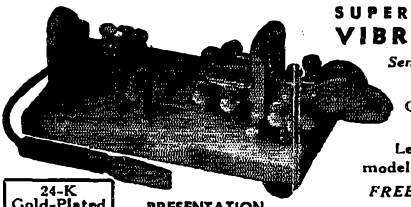
Over 30 years N.E. Radio Training Center. Train for all types FCC operators' licenses. Also Radio and Television servicing. FM-AM broadcasting transmitters at school. Send for Catalog Q.

MASS. RADIO SCHOOL
271 Huntington Avenue Boston 15, Massachusetts
Lic. by Comm. Mass. Dept. Educ.

Send Better

WITH ½ THE EFFORT!

SUPER DELUXE VIBROPLEX



Semi-Automatic
KEY
Other models $12.95 up
Left hand models $1.00 more
FREE CATALOG

24-K Gold-Plated Base Top $29.95

PRESENTATION

AMAZINGLY SIMPLE AND ALMOST EFFORTLESS in operation, sending with this Super DeLuxe **Vibroplex** requires only half the effort of hand sending! Simply press lever — it transmits clean cut signals SMOOTHLY! EASILY! PERFECTLY! Never tires the arm! No extra weights necessary to slow it down. Made for long life and hard usage, with **Jewel movement** for easier operation; **Adjustable Main Spring** providing speed range from dead slow to lightning fast, and **Adjustable Touch Control** for individual touch. We sincerely believe that, for better sending with half the effort, this is the best key money can buy. **ORDER YOURS TODAY!** At dealers, or direct.

Headquarters for new portables, all models and styles of type. Also, REBUILT standard and portable typewriters with ALL CAPITAL letters and other styles of type. *Immediate delivery.* **Get our prices before buying.**

THE VIBROPLEX CO., INC.
833 Broadway New York 3, N. Y.

HAM-ADS

(1) Advertising shall pertain to radio and shall be of nature of interest to radio amateurs or experimenters in their pursuit of the art.

(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters be used which would tend to make one advertisement stand out from the others.

(3) The Ham-Ad rate is 30¢ per word, except as noted in paragraph (6) below.

(4) Remittance in full must accompany copy. No cash or contract discount or agency commission will be allowed.

(5) Closing date for Ham-Ads is the 25th of the second month preceding publication date.

(6) A special rate of 7¢ per word will apply to advertising which, in our judgment, is obviously noncommercial in nature and is placed and signed by a member of the American Radio Relay League. Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, if by a member of the American Radio Relay League take the 7¢ rate. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising by him takes the 30¢ rate. Provisions of paragraphs (1), (2) and (5), apply to all advertising in this column regardless of which rate may apply.

(7) Because error is more easily avoided, it is requested signature and address be printed plainly.

(8) No advertiser may use more than 100 words in any one issue nor more than one ad in one issue.

Having made no investigation of the advertisers in the classified columns, the publishers of QST are unable to vouch for their integrity or for the grade or character of the products or services advertised.

QUARTZ — Direct importers from Brazil of best quality pure quartz suitable for making piezo-electric crystals. Diamond Drill Carbon Co., 719 World Bldg., New York City.

QSLS, 100, $1.75 up. Stamp for samples. Griffeth, W3FSW, 1042 Pine Heights Ave., Baltimore 29, Md.

MOTOROLA used communication equipment bought and sold. W5BCO, Ralph Hicks, 204 E. Fairview, Tulsa, Okla.

SUBSCRIPTIONS. Radio publications a specialty. Earl Mead, Huntley, Montana, W7LCM.

WANTED: Teletype 1/40th HP synchronous motor, W6ITH, Moraga, Calif.

QSL'S-SWL'S. Mead WØKXL, 1507 Central Avenue, Kansas City, Kansas.

PHONE patch schematics, practical discussion. $1.00. Nichols, W1MRK.

WANTED: Your surplus radio receivers, transmitters, ARC-1, ARC-3, ART-13. We buy anything. What have you? Tom Allen, 562 Atlantic Ave., Brooklyn 17, N. Y.

QSLS! Taprint, Little Rock, Mississippi.

WANTED: Radio officers for Merchant Marine. $400 per month. Should have FCC tel. Lic. and Coast Guard officers lic. and 6 mos. experience. Write Radio Officers Union, AFL, 1440 Broadway, New York 18, N. Y.

QSLS, SWLS. High quality. Reasonable prices. Samples. Bob Teachout, W1FSV, 40 Elm Street, Rutland, Vt.

WANTED: APR-4 receiver and tuning units. State condition and price. W2DB, 274 Boulevard, Scarsdale, N. Y.

QSLS, SWLS. C. Fritz, 1213 Briargate, Joliet, Ill.

WORLD Time Chart. Indicates correct time around the world. 50¢ postpaid. Long, 104 East 14th St., Kansas City, Mo.

WANTED: March and May 1916 QSTs. 200 copies for sale, 1920 to 1951 at 25¢. WØMCX, 1022 N. Rock Hill Rd., Rock Hill 19, Mo.

ATTRACTIVE labels. Four lines, call letters. Gummed, perforated and rolled. 500, $1.00; 1000, $1.50. W2TPQ, Litzenberger, 810 Post, Rochester, N. Y.

BEST offer: Fifteen 450TH Eimac tubes. In original factory cartons. W2AIW, Charles W. Rogers, Curtis & Union Aves., Manasquan, N. J.

CONVENTION Noticel ARRL West Gulf Division Convention in Austin, Texas, August 18th and 19th, 1951. The Convention Committee is planning a great program with fun for the whole family! Plan for a great time in Austin in August! For general information, write: Austin Amateur Radio Club, Box 1716, University Station, Austin, Texas.

SELL 100 watt 812 final home-built xmitter with 20 watts audio, 1000 v., 300 ma. power supply, as unit or in sections. J. L. Dougan, Hamburg, Iowa.

FOR Sale: National HRO-50-1, new and in original, unopened carton. $150 express prepaid. James W. Craig, jr., 332 Henry Clay Blvd., Lexington, Kentucky. Also: RK-4D32 tube. New, original carton. $20.50, prepaid.

FOR Sale: Kaar Engineering Company PTL-19X 20-watt (output) 75-meter mobile transmitter. Very good condition. Original new cost $273. Best offer takes it, or would consider trade for good 35 mm. camera. L. E. Huggins, W5GBS, Morton, Texas.

WANTED: Old radio magazines and catalogs prior to 1925. Send list and prices — or will trade. Vance Phillips, W6GH, Hope Ranch, Santa Barbara, Calif.

QSLS? SWLS? Modernistic? Cartoons? Mobile? Photographic? QSL samples 10¢. Sakkers, W8DED, Holland, Michigan.

SELL SX-71 with speaker, Geiger counter, both like new, cheap. Jack Watt, W8HYQ, Ontonagon, Mich.

SELL HRO-7 with power supply, NBFM adaptor and broadcast coils E and F, $235. Also National HFS receiver with power supply, $110. Pair Eimac 4-125A tubes in original cartons and sockets, $35.00. E. F. O'Brien, 86-10 34th Ave., Jackson Heights, L. I., N. Y. AR-88 "S" meters, new, $9.95. W6EH, Messman.

FOR Sale: BC-348 receiver with AC supply, $75. BC-221 frequency meter, new, $60. W7IKV, Elmer A. Searle, Route A, Helena, Mont.

SWAP: Sonar MB-611 10-meter mobile xmitter for Meissner signal shifter or similar VFO. Robert Eshelman, W4QCW, Parkview, Harrisonburg, Virginia.

FOR Sale or trade: Johnson Viking I, factory wired, with BC-459A VFO, 600V 300 mil power supply, 300 watt modulation transformer (multi-match), pair 250TH's, three 100TH's. Want: matched pair 4-250A's or 4-125A's. Jesse L. Sprouse, W4PNF, 760 Poole Drive, Fayetteville, N. C.

SELL: VHF-152A, $69.50 Drake TV-300LP Lo-pass filter, $10.00. Speedx Bug, $5.00; BC-222 ten and six meter battery transceiver, $25.00. W5ALA, 4531 Fairway, Dallas 4, Texas.

SELL: BC-224 (BC-348) AC, $80; FB7X, $18; 10 meter mobile converter, $15; 25 w. mobile 75 meter xmitter, $20; 76 in. standard relay cabinet, $30. New in carton. Hickok 610A sweep generator, $160. W2AEV, Jones, 14 Coral Road, Bethpage, N. Y.

WANTED: Collins 32V2. Give particulars. P. Allan, 906 First St., South, Kenora, Ontario, Canada.

HAVE Hallicrafters S-40-A, perfect condition. Want: larger receiver. Will pay cash difference. Must be in good condition. Dewey Temple, Atlanta, Louisiana.

FOR Sale: RA-10 receiver in new condition. Covers .135-1435, .570-1.49, 1.9-5.1, 4.9-10.2 Megs with broadcast coverage, completely converted to 120 VAC operation. Tubes 3-6SK7, 1-6B8, 1-6C5, 1-6F6, 1-5V3, 1-955, complete with all controls. S-Meter and speaker, $36. G. Ashley, 301 Wyckoff Ave., Ithaca, N. Y.

1 KW 304TL final, complete with coil, meters, tube, TVI treated, $40. 600 watt Class A or B modulator, complete with 304TL's, meters, high level lowpass filter, $45. Panel mounted 25-watt Stromberg-Carlson speech amp. with clipper, $25.00. 6-foot Bud DLX cabinet and dolly, like new, $45. 2000 V. 750 Ma. reg. pwr. supply, complete, $100. Write to W9DSV, Daniels, Box 261, Webster Wisconsin.

LIKE new: HRO-50T with speaker, crystal calibrator and NBFM attachments, $285. Collins 32V2, $495. Both in factory cartons with operating manuals. W5DA, Young, 4425 Bordeaux, Dallas, Texas.

SELL: R44/ARR-5 with pwr. supply, RCA Model 155 3" 'scope with extra CR906-P1. RCA Model M101 Auto radio. Make an offer. Franke, 172-42 Grand Central Parkway, Jamaica 3, L. I., N. Y.

HQ-129X receiver, Meissner signal shifter. Stancor mobile rig, ST203, PE103 dynamotor, power supply and modulator parts for pair 813's and misc. meters and parts, $350. C.o.d. C. Hall, 1059 W. 8th St., Erie, Penna.

GOING to try for an amateur radio operator's license? Check yourself with a complete coverage multiple-choice type test similar to those used by the FCC. Surecheck tests with answer key, Novice Class, $1.50; Condition and General Class, $1.75; Advanced Class, $2.00. Order your time-tested Surecheck test today. Amateur Radio Supply, 1013 Seventh Ave., Worthington, Minn.

SUPRE-PRO 400X, power supply, speaker, excellent condition, $170. SCR-221 frequency meter, 110 volt regulated power supply, built-in, $60. KW power supply, 3000 or 2500 volts at 375 Ma., 872 rectifiers, 2 section filter, overload and operating relays, picture on request. $100. W4HDC.

PORTABLES, Bantams and antenna dope in Bantam Transmitter Manual. Send $1.00. W4BIW, B & B Labs, Box 3281, Station F, Atlanta, Ga.

SELL: TCS-12, RA-34, BC-221, BC-342, BC-348, test equipment, T. Clark Howard, 46 Mt. Vernon St., Boston 8, Mass. (W1AFN).

WANTED: BC-654A, PE-104A, PE-103A, GN-45, BC-348, BC-342, BC-221, TCS-12 sets, cables, accessories, ART-13, ARC-1, RA-34, test equipment, technical manuals. Arrow Appliance, 525 Union, Lynn, Mass.

FOR Sale: Hallicrafters SX-25, A.F. gain touchy, otherwise in good condition. With R-42 speaker, like new. Best offer. Bill Timby, 251 Churchill Ave., Palo Alto, Calif.

BC-342 and Millen VFO, both brand new with instruction books. First $110 takes both. Barney Spiegel, 3 Stuyvesant Oval, New York 9, N. Y.

5 Element 2-meter beams. Riverside Tool Co., Box 87, Riverside, Ill.

WANTED: Collins 32V1 or 32V2. Cash purchase. Lloyd Colvin, W4KE, AFF Board #1, Fort Bragg, North Carolina.

10 and 20 Meter Beams, $23.25 up. Aluminum tubing, etc. Willard Radcliff, Fostoria, Ohio.

USED equipment samples from our latest list: Millen 90-700 VFO, $29.50; Sonar XE-10, $15.00; BC-645, new $15.00; Mark II complete, $25.00; VX-101 Jr., VFO $45.00; RME VHF-152A, $69.50; Lysco 500 factory modified to Model 600, $89.50; Temco 75GA, $225.00; National 1-10A, $35; others. Write for complete list to Carl, W1BFT, at Evans Radio, Concord, N. H.

QSLS. Samples free. Wunder, W2TDV, 135-21 Francis Lewis Blvd., Rosedale 10, N. Y.

SWAP 10" TV-FM-2 meter with Mallory-DuMont front end, also all kinds of ham gear, for any good surplus (ARC-1, ARC-3, "TS" units, etc.) and lab quality equipment, or will pay top cash. Littell, Farhills, Box 26, Dayton 9, Ohio.

NEW crystals for all commercial services at economical prices, also regrinding or replacement crystals for Broadcast, Motorola, Link, G-E and other commercial types. Over fifteen years of satisfaction and fast service! Eidson Electronic Co., Phone 3-3901, Temple, Texas. 1802 North Third St.

866A, special, new, $1.35. 1N34, 69¢. G-E tuning meter, basic 5 Ma. movement, $1.20. Sell your surplus tubes and gear. Send list, best prices. "TAB" 109 Liberty St., New York City.

SELL: QSTs January 1930 through December 1950, complete. In excellent condition. Make an offer. W. C. Plumb, WØBGE, 6565 Oleatha, St. Louis 9, Missouri.

WANTED: Collins 310B or 310C exciter. Write W2COU, Belth, 245 Cambridge Street, Syracuse 10, N. Y.

NEW Meissner 150B with tubes and spares, new final for ten. Best offer or trade for good receiver or photo gear. R. Long, 184 L Street, South Boston, Mass.

BARGAINS! Extra special! Motorola P-69-13 mobile receivers, $29.50; Globe King, $315; HT9, $199; HRO7, $199; Temco 75GA, $225; Collins 32RA, $125; Collins 32MA, $99.50; Collins 75A1, $295; new 150 watt phone, $199; HRO-5T, $175; Hallicrafters S-47, $119; RME-45, $99; SX-17, $89.50; Meissner Ex Shifter, NC46, S-40A, $69.50; VHF 152A, $69; SX-24, $69; Bud VFO 21, $39.50; Globe Trotter, $57.50; New Meissner signal calibrators, $24.95; MB611, $29; 90800 exciter, $29.50; Gonset 10-11 converters, $25; XE10, $14.95 and many others. Large stock of trade-ins. Free trial. Terms financed by Leo, WØGFQ. Write for catalog and best deal to World Radio Laboratories, Inc., Council Bluffs, Iowa.

OA5C wants best receiver buy around $200. Prefers National, Collins or Hammarlund. Reply through WØANQ.

QSLS: Uncle Fred QSLs. Three colors and up. Rainbow map QSLs. Special DX QSLS. Bargain QSLs. Samples rushed, 10¢. Uncle Fred, Box 86, Lynn, Penna.

SELL. Stancor 10-P kit, three 6L6 rack doubler stages, six foot open metal relay rack, three element Elincor ten-meter beam kit, crystal mike, 500 watt 813 neutralized final with clamper tube, 200 watt class AB rack modulator and speech amplifier less pwr supply, BC-453 85 kc. IFs, 540 Kc. crystal, ARR-1, Alliance Tenna-Rotor, parts list. Make offers. Details on request. Al Martin, W4RXP/-FP8AG, Whitefield, New Hampshire.

FOR Sale: NC-183, PR-16, receivers; Collins K8A, AVT-112A transmitters; four SCR-522 mobile and one ground station of same; BC-654A transceiver; 600 AM mobile 10 meter transmitter and Gonset 3-30 converter; Rek-O-Kut Challenger; all for quick sale. Will consider Magnecorder or 1 Kw. transmitter in trade. F. Knapp, W7LXD, 1316 N. River Ave., Glendive, Montana.

SELL modern station. Two 1 Kw. finals, P.P. HF300 and P.P. 4-125A. 805 Mod. metered and Variac controlled throughout. Two solid aluminum racks Std. 6 ft. VX-101 VFO. BC-348P and NC-183. Single button controlled. Wkd fone WAC and DXCC. Send for picture and description. Reasonably priced. G. D. Rice, Watterson Trail, Jeffersontown, Kentucky, W4FQX.

REMEMBER Blossomland Amateur Radio Association's hamfest picnic, August 19th. At Warren Dunes State Park, 15 miles south of Saint Joseph, Michigan on U. S. #12. See Hamfest Calendar this issue for details. Manley, W8FGB, Secy.

FOR Sale: Collins 75A1, Hammarlund SP400X, National NC-125, BC348 converted to 110 VAC, Bud FCC90 frequency calibrator, Hallicrafters HT-18 exciter, 6 v. 10 amp battery charger, BC-433 compass receiver, BC434 control box, BC456 modulator, BC522 transmitter, BC307 transmitter, and many small items. Wanted: VHF 152 and other VHF gear. W5QCB, M. D. Haines, 206 W. Hart Ave., San Antonio 4, Texas.

NEW HQ-129X, in perfect condition. $150. Paul Lee, W4RXO, Box 116, Isle of Palms, S. C.

FOR Sale: Millen rig, typewriters, BC458, want: Lysco 600, HT6. Samkofsky, 527 Bedford Ave., Brooklyn, N. Y.

WALKIE-Talkie 6-10 meters, BC-222 complete. Xtal and extra tubes, $30. Van Wuyckhuyse, 412 Humboldt St., Rochester, N. Y.

"NEW" looking reconditioned receivers. Perfect alignment via sweep generator-oscilloscope method. Photos. Electronic Labs, Box 1821, Lincoln, Nebraska.

BARGAINS: New and reconditioned Collins, National, Hallicrafters, Hammarlund, RME, Millen, Gonset, Meissner, etc. Reconditioned S-38, $29; S-40A, SX-43, $129; SX-42, $199; NC57, NC173, $149; S72, NC183, $199; HRO7, $189; HFS, $99; HQ-192X, $139; SP400X, $259; SX-25, SX-28A, Collins 75A, HT9, BC610, DB22A, HF-10-20, VHF152A, Meissner 9-1090 VFO, $49; others. Shipped on approval. List free. Write to Henry Radio, Butler, Missouri.

WANTED: Marconi apparatus, Wireless Specialty apparatus, Electro Importing Co. apparatus, Wireless Age 1913 to 1925; Electrical Experimenters, "Ultimate" bug key, Year Book of Wireless Telegraphy and Telephony, 1913, 1914, 1915 A. F. Collins Wireless Telegraphy; Marconigraphs, English or American. L. Rizoli, W1AAT, 100 Bay View Ave., Salem, Mass.

WØCVU, Iowa's most truthful station again mobile. 10-20-75 meters. Bandmaster DeLuxe, Gonset Tri-band and Master Mount Antenna. 38 years on the air.

CRYSTALS: Bassett precision Type 100A units 3.5 to 4, 7 to 7.3, 14 to 14.4 megacycles plus MARS 2 to 5 megacycle channels at $1.50 each. Specify exact frequency and include postage. Rex Bassett, Inc., Bassett Building, Fort Lauderdale, Florida.

QSLS. Samples. Noble Press, Chatham, Mass.

WANTED: Harvey-Wells TBS 50, Gonset converter, Box 104, Dyker Station, Brooklyn 28, N. Y.

FOR Sale: Mon-Key very slightly used. Instructograph tapes. Book A.C. Buildg osc. and R9ner. Make offer. W2WDT, GL 3-1929.

WANTED: Faberadio crystals to complete personal collection. Round and square block holders, hand-made models wanted especially. Lee Faber, W9EH, Sandwich, Ill.

WANTED: 20-meter beam. Write to W5IVF, 1608 Fairview, Monroe, La.

WANTED: Complete SCR-522 or transmitter unit BC-625A. W5ASO, Box 601, Mountain Home, Arkansas.

FOR Sale: BC-348Q receiver, converter for A.C. Excellent quality. $55.00. J. W. Collie, W4NXE, Rt. 2, Box 192, Elizabeth City, N. C.

LEARN Morse Code in just 8 hours! Code-Voice Record Method gets you ready for Novice Class License, good Army job in radio. You get 4 slides of code instruction on two 10-inch, 78 RPM, Vinylite records in handsomely illustrated, completely detailed album. Send only $4.00. Money-back guarantee. Dept. No. 1, The Raybrun Company, Box 60, Orangeburg, N. Y.

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GATES

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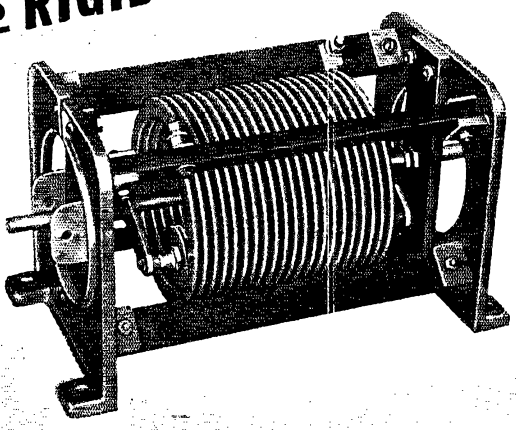


GATES RF Inductors, standard or special, offer the much desired combination of high efficiency PLUS rigid strength. This important feature has made them favorites the world over — for all commercial applications, fixed or mobile.

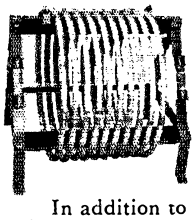
An outstanding example of the GATES quality line is the Continuously Variable Edgewise Inductor illustrated. Stocked by GATES in a wide range of inductance and power ratings, inductors of this type have thick cast aluminum end plates, split through the center to prevent an inductive loop. End plate sections are joined by heavy bars of Mycalex. The heavily silver-plated ribbon coil is supported by four thick and accurately slotted Mycalex bars.

The extreme rigidity attained by this design completely eliminates vertical twist.

Contact wheel on GATES Variable Inductors is of silver-plated phosphor bronze and grips over 75% of ribbon surface—an important feature in all applications where high current is encountered.

Special Coils To Customer Specifications

Manufacturers and engineers are invited to write GATES about their inductor problems. Special coils with rotating elements, split sections or varied spacing are all possible. Specially designed inductors can be delivered almost as quickly as those of standard design.



A standard GATES Fixed Inductor wound of copper tubing around extra heavy Mycalex bars. Triangular end frames electrically broken to prevent current loop. Coil will not bend or lose shape under own weight.

In addition to types shown, GATES manufactures and stocks coils of many other designs. Whether fixed or variable — of ribbon or copper tubing — all GATES Inductors possess an extra measure of strength and can be depended upon for a long life of efficient service.

FRONT PANEL CONTROLS FOR VARIABLE COILS

Here is a sturdy, accurate counter type control for panel tuning of continuously variable coils. Counter is gear driven to shaft assembly and reads in turns and tenths of turns.

Counter dial is easily and quickly read. White numbers indicate number of complete turns; red numbers, tenths of turns.

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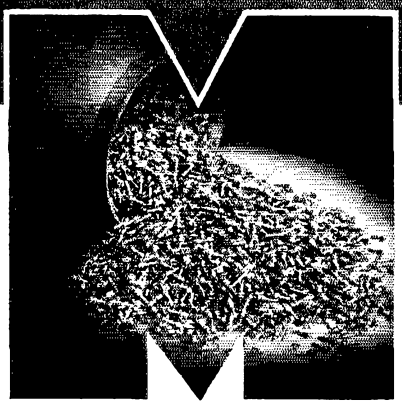

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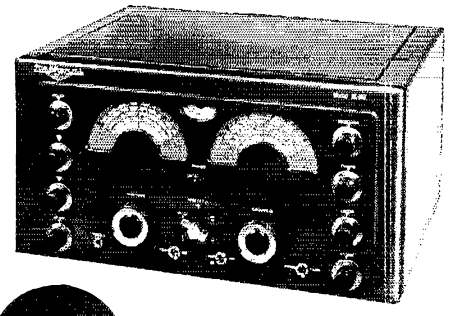

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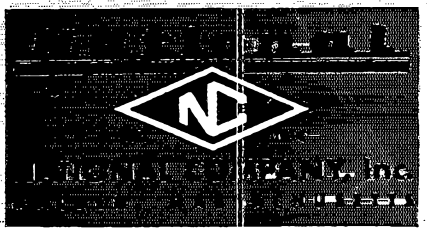

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