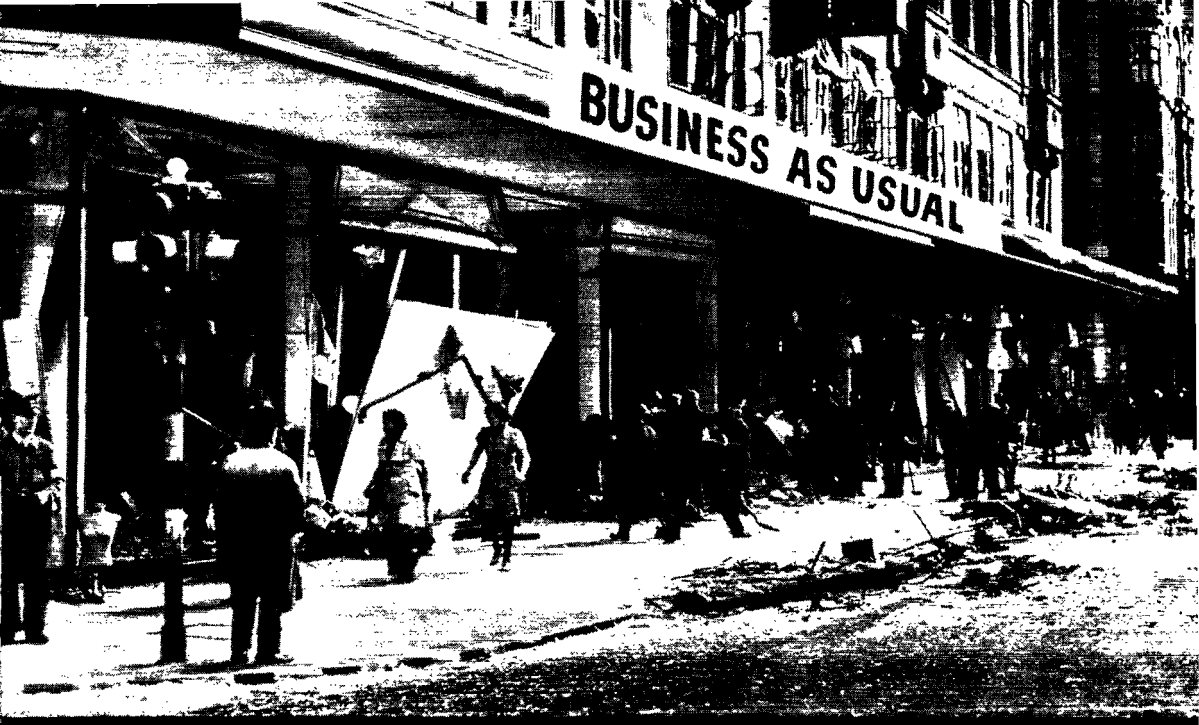
march, 1942
25 cents
35c in Canada

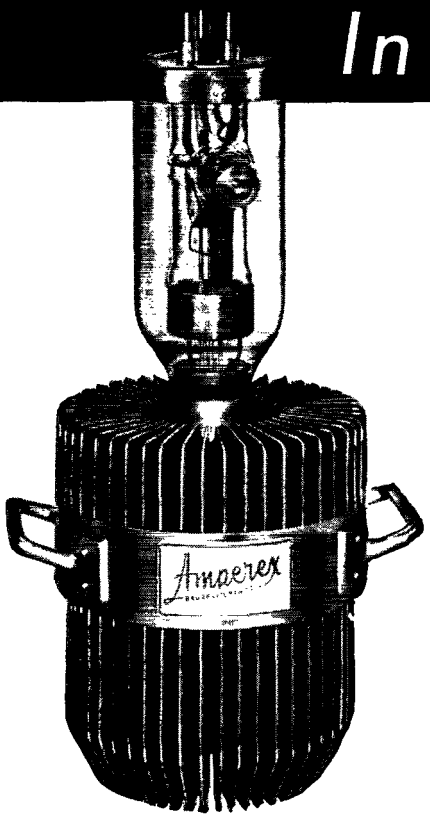
QST

entirely to

amateur radio



In a world at war



BUSINESS AS USUAL? . . . Hardly! We'd say that it's a "topsy-turvy" business, at best.

Unprecedented requirements for our military services . . . as well as for the armies and navies of the United Nations . . . have transformed our normal surpluses into acute shortages.

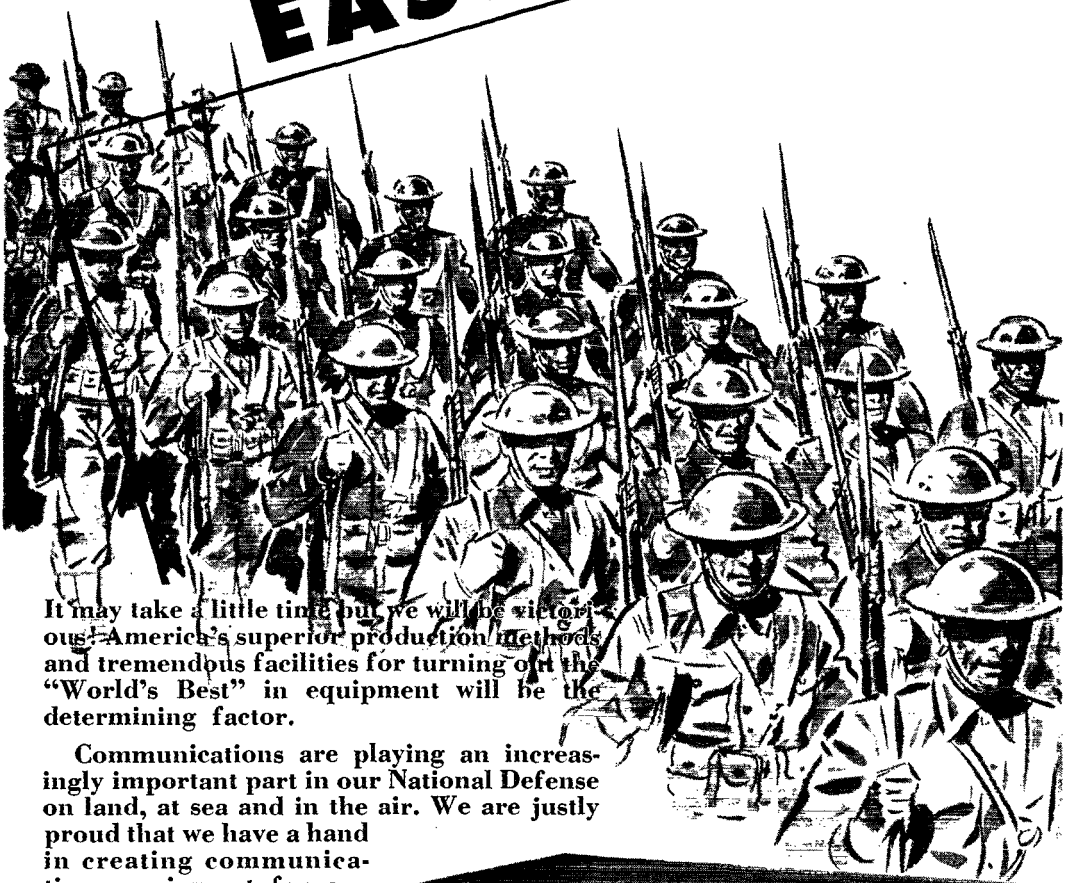
However, despite many severe curtailments, our regular clients have not been unduly inconvenienced, and every possible effort is being made to continue serving them.

You can help us expedite such deliveries by scheduling your requirements for the future, NOW . . . and by forwarding priorities extension certificates, whenever these are available.

AMPEREX ELECTRONIC PRODUCTS

79 WASHINGTON STREET · BROOKLYN, NEW YORK

Somewhere EAST of SUEZ...



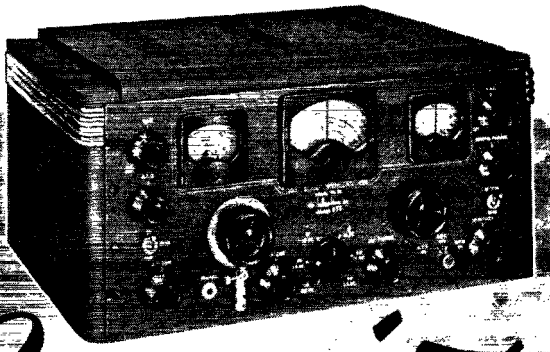
It may take a little time but we will be victorious! America's superior production methods and tremendous facilities for turning out the "World's Best" in equipment will be the determining factor.

Communications are playing an increasingly important part in our National Defense on land, at sea and in the air. We are justly proud that we have a hand in creating communications equipment for our country.

Model S-27 (illustrated) FM-AM reception. 15 tubes. 3 bands. 28 to 145 mc. $195. Model S-27B. 38 to 165 mc. $195.

the hallicrafters co.
CHICAGO, U. S. A.

Keep Communications Open!



Communications were PERFECT!

Hallicrafters receivers and transmitters are making history in keeping communications open for the armed forces of the United Nations. We wish we were at liberty to name places and dates but of course that is impossible just now. However, as soon as we can, we want to write the achievements of this equipment. We are as proud as though we had several thousand sons in the service. You can be assured we will continue our efforts until victory is final and complete. The SX-28 (illustrated) 15 tubes, 6 bands. 550 kc. to 42 mc. $179.50.

the hallicrafters co.
CHICAGO, U. S. A.

Keep Communications Open

MARCH 1942

VOLUME XXVI

NUMBER 3

★

★

OFFICES

38 La Salle Road
West Hartford, Connecticut

Subscription rate in United States and Possessions, $2.50 per year, postpaid; all other countries, $3.00 per year, postpaid. Single copies, 25 cents. Foreign remittances should be by international postal or express money order or bank draft negotiable in the U. S. and for an equivalent amount in U. S. funds.

Entered as second-class matter May 29, 1919, at the post office at Hartford, Connecticut, under the Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in section 1103, Act of October 3, 1917, authorized September 9, 1922. Additional entry at Concord, N. H., authorized February 21, 1929, under the Act of February 28, 1925. Additional second-class entries to cover sectional editions authorized March 20, 1935.

QST *devoted entirely to*

AMATEUR RADIO

PUBLISHED, MONTHLY, AS ITS OFFICIAL ORGAN, BY THE AMERICAN RADIO RELAY LEAGUE, INC., AT WEST HARTFORD, CONN., U. S. A.; OFFICIAL ORGAN OF THE INTERNATIONAL AMATEUR RADIO UNION

CONTENTS

Section Communications Managers of the A.R.R.L. Communications Department

Reports Received. All amateurs, especially League members, are invited to report communications activities, training plans, code classes, theory-discussion groups, civilian-defense building or planning each mid-month (16th of the month for the last 30 days) direct to the SCM, the administrative official of ARRL elected by members in each Section whose address is given below. Radio Club reports and Emergency Coördinator reports representing community organized work and plans and progress are especially desired by SCMs for inclusion in *QST*. **ARRL Field Organization appointments** with the exception of the Emergency Coördinator and Emergency Corps posts, are suspended for the present and no new appointments or cancellations, with the exception named will be made. This is to permit full efforts of all in Emergency Corps plans.

ATLANTIC DIVISION				
Eastern Pennsylvania	W3BES	Jerry Mathis	6208 Master St.	Philadelphia
Maryland-Delaware-District of Columbia	W3CIZ	Hermann E. Hobbs	9701 Monroe St. Silver Spring P. O.	Linden, Maryland
Southern New Jersey	W3CCO	Lester H. Allen	704 Quinton Ave.	Trenton
Western New York	W8PLA	Fred Chichester		Sonyea
Western Pennsylvania	W8CKO	E. A. Krall	703 Broadway	East McKeesport
CENTRAL DIVISION				
Illinois	W9ILH	Mrs. Carrie Jones	2407 Central Ave.	Alton
Indiana	W9AB	Harry B. Miller	729 E. Lowell Ave.	Mishawaka
Kentucky	W9ARU	Darrell A. Downard	116 N. Longworth Ave.	Louisville
Michigan	W8DPE	Harold C. Bird	R.F.D. 2	Pontiac
Ohio	W8AQ	E. H. Gibbs	405 Broad St.	Wadsworth
Wisconsin	W9UIT	Aldrich C. Krones	2702 S. 46 St.	Milwaukee
DAKOTA DIVISION				
North Dakota	W9RPJ	Don Beaudine	620 First N St.	Fargo
South Dakota	W9ADJ	E. C. Mohler	Box 149	Rapid City
Northern Minnesota	W9FUZ	Armond D. Brattland	Birchmont Rd.	Bemidji
Southern Minnesota	W9YNQ	Millard L. Bender	608 N. Huron Ave.	Spring Valley
DELTA DIVISION				
Arkansas	W5GNV	John R. Sanders	P. O. Box 1563	Little Rock
Louisiana	W5DWW	W. J. Wilkinson, Jr.	Room 313, Jefferson Hotel	Shreveport
Mississippi	W5EGE	S. Benton Cain	221 E. Monticello	Brookhaven
Tennessee	W4DDJ	M. G. Hooper	4908 Georgia Ave.	Nashville
HUDSON DIVISION				
Eastern New York	W2LU	Robert E. Haight	356 West 34 St.	New York City
N. Y. C. & Long Island	W2AZV	E. L. Baunach	102 Central Ave.	Massapequa, L. I.
Northern New Jersey	W2LMN	Edward Gursky, Jr.	367 Van Winkle Ave.	Hawthorne
MIDWEST DIVISION				
Iowa*	W9PJR	L. B. Vennard	1113 So. 9th St.	Burlington
Kansas	W9AWP	A. B. Unruh	1617 S. Seneca St.	Wichita
Missouri*	W9AEJ	Wm. G. Skinker	7126 Pershing Ave.	University City
Nebraska	W9WKP	Garold Bennett	214 East St.	Hastings
NEW ENGLAND DIVISION				
Connecticut	W1KQV	Edmund R. Fraser	48 Willow St.	West Haven
Maine	W1BAV	Ames R. Millett	37 Morning St.	Portland
Eastern Massachusetts	W1ALP	Frank L. Baker, Jr.	91 Atlantic St.	North Quincy
Western Massachusetts	W1JAH	William J. Barrett	239 Columbia St.	Adams
New Hampshire	W1FTJ	Mrs. Dorothy W. Evans	P. O. Box 312	Concord
Rhode Island	W1HRC	Clayton C. Gordon	70 Columbia Ave., Gaspee	Plateau, Warwick
Vermont	W1KJG	Clifton G. Parker	Box 537	Morrisville
NORTHWESTERN DIVISION				
Alaska	K7GNN	James G. Sherry		Chicagof
Idaho	W7CRL	Clifford A. Jessup	Post Office Dept.	Moscow
Montana	W7CPY	Rex Roberts	Box 1088	Glendive
Oregon	W7GNJ	Carl Austin	1137 Federal	Bend
Washington	W7EPB	Carl F. Hofmann	4413 East E St.	Tacoma
PACIFIC DIVISION				
Hawaii	K6ETF	Francis T. Blatt	837 16th Ave.	Honolulu
Nevada	W6BIC	Edward W. Heim	509 Claremont St.	Reno
Santa Clara Valley	W6IUZ	Earl F. Sanderson	101 Claremont Ave.	San Jose
East Bay	W6TI	Horace R. Greer	414 Fairmount Ave.	Oakland
San Francisco	W6CIS	Kenneth E. Hughes	209 Lincoln Way	San Francisco
Sacramento Valley	W6MDI	Vincent N. Feldhausen	113 South Quincy St.	McCloud
Philippines	KA1GR	George L. Rickard	Box 849	Manila
San Joaquin Valley*	W6QDT	Anton J. Silva	Route 5	Modesto
ROANOKE DIVISION				
North Carolina	W4CVB	W. J. Wortman	P. O. Box 566	Morganton
South Carolina	W4BQE/ANG	Ted Ferguson	1213 College St.	Columbia
Virginia*	W3BZE	Thomas S. Jones	2918 Montrose Ave.	Richmond
West Virginia	W8JRL	Kenneth M. Zinn	P. O. Box 132	Clarksburg
ROCKY MOUNTAIN DIVISION				
Colorado	W9EHC	Carl C. Drumeller	723½ N. Tejon St.	Colorado Springs
Utah-Wyoming	W7GZG	Henry L. Schroeder	P. O. Box 731	Laramie, Wyoming
SOUTHEASTERN DIVISION				
Alabama	W4DGS	James F. Thompson	12 Clanton Ave. Waucoma Apts.	Montgomery
Eastern Florida	W4PEI	Carl G. Schaal	Lakeview Hotel	Clermont
Western Florida	W4AXP	Oscar Cederstrom	Second St. & Bruce Ave.	De Funiak Springs
Georgia	W4AOB	William U. Hanks	4 Hunter St., S.E.	Atlanta
West Indies (Cuba)	CM2OP	Mario de la Torre	Escobar 110 (Altos)	Habana, Cuba
(Puerto Rico-Virgin Islands)	K4KD	Everett Mayer	24 Lindberg St.	Santurce, P. R.
SOUTHWESTERN DIVISION				
Los Angeles	W6MQM	Ralph S. Click	1038 Milwaukee Ave.	Los Angeles
Arizona	W6KOL	John K. Oliver	Box 642	Nogales
San Diego	W6BKZ	Louis A. Cartwright	7214 Fay St.	La Jolla
WEST GULF DIVISION				
Northern Texas	W5HIP	George W. Smith	Route 2	Celina
Oklahoma	W5GFT	Russell W. Battern	Box 290	Enid
Southern Texas	W5MN	Horace E. Biddy	1746 Schley Ave.	San Antonio
New Mexico	W5ENI	Dr. Hilton W. Gillett		Lovington
MARITIME DIVISION				
Maritime	VE1DQ	A. M. Crowell	69 Dublin St.	Halifax, N. S.
ONTARIO DIVISION				
Ontario	VE3EF	Flying Officer Donald R. Gunn	c/o Canadian Bank of Commerce	New Toronto, Ont.
QUEBEC DIVISION				
Quebec	VE2CO	Lindsey G. Morris	Apt. 6, 4510 Girouard Ave., N.D.G.	Montreal, P. Q.
VANALTA DIVISION				
Alberta	VE4GE	C. S. Jamieson	581 W. Riverside Drive	Drumheller, Alta.
British Columbia	VE5DD	C. O. I. Sawyer	2634 West 31st Ave.	Vancouver
PRAIRIE DIVISION				
Manitoba	VE4AAW	A. W. Morley	747 McMillan Ave.	Winnipeg
Saskatchewan	VE4SY	Arthur Chesworth	1071 4th Ave., N.W.	Moose Jaw

*Officials appointed to act until the membership of the Section choose permanent S.C.M.s by nomination and election.


Centralab
The Quality Line
SEND FOR CATALOG NO. 23
Centralab
For Every Need in EVERY Emergency
Centralab
AXIAL LEAD
RESISTORS
Complete
NET
only
$10.95
Always THE RIGHT
REPLACEMENT CONTROL
WITH THIS Centralab
REPLACEABLE
Answering the Call
A—STANDARD
B—MIDGET
C—ELF
Centralab
RADIOHMS
'41 PASSES in REVIEW
The history of CENTRALAB can be read in its advertisements down through the years. New developments . . . the result of research and pioneering . . . keep Centralab constantly in the vanguard.
Today . . . research alone is not enough . . . the demands of the present emergency call for an "ALL OUT" program of production.
In '42 CENTRALAB will not fail to maintain its record. In '42 as in '22 and '32 . . . always "SPECIFY CENTRALAB".
Centralab
Div. of Globe-Union Inc., Milwaukee, Wis.
CONTROLS • SWITCHES
RESISTORS
CAPACITORS
Plotting the Curves of Progress
Centralab
RADIOHMS
There's a

THE AMERICAN RADIO RELAY LEAGUE

Directors

President
GEORGE W. BAILEY W1KH
74 Webster Road, Weston, Mass.

Vice-President
CHARLES E. BLALACK W6GG
Box 55, Yuma, Ariz.

Canadian General Manager
ALEX REID VE2BE
169 Logan Ave., St. Lambert, P. Q.

Atlantic Division
WALTER BRADLEY MARTIN W3QV
c/o Naval Air Station, Lakehurst, N. J.

Central Division
GOODWIN L. DOSLAND W9TSN
10 No. Clark St., Chicago

Dakota Division
TOM E. DAVIS W9VVA
915 W. Becker Ave., Willmar, Minn.

Delta Division
E. RAY ARLEDGE W5SI
P.O. Box 286, Pine Bluff, Ark.

Hudson Division
ROBERT AKERIDGE KIRKMAN W2DSY
250 Albert Place, Elberon, N. J.

Midwest Division
FLOYD E. NORWINE, JR. W9EFC
7405 Hiawatha Ave., Richmond Heights, Mo.

New England Division
PERCY C. NOBLE W1BVR
37 Broad St., Westfield, Mass.

Northwestern Division
KARL W. WEINGARTEN W7BG
3219 N. 24th St., Tacoma, Wash.

Pacific Division
J. L. McCARGAR W6EY
66 Hamilton Pl., Oakland, Calif.

Roanoke Division
H. L. CAVENESS W4DW
2607 Vanderbilt Ave., Raleigh, N. C.

Rocky Mountain Division
C. RAYMOND STEDMAN W9CAA
925 So. Gaylord St., Denver

Southeastern Division
WILLIAM C. SHELTON W4ASR
Box 652, Daytona Beach, Fla.

Southwestern Division
JOHN E. BICKEL W6BKY
801 E. California St., Whittier, Calif.

West Gulf Division (Acting)
WAYLAND M. GROVES W5NW
Route 1, Overton, Texas

THE AMERICAN RADIO RELAY LEAGUE, INC., is a non-commercial association of radio amateurs, bonded for the promotion of interest in amateur radio communication and experimentation, for the relaying of messages by radio, for the advancement of the radio art and of the public welfare, for the representation of the radio amateur in legislative matters, and for the maintenance of fraternalism and a high standard of conduct.

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 non-commercial and no one commercially engaged in the manufacture, sale or rental of radio apparatus is eligible to membership on its board.

"Of, by and for the amateur," it numbers within its ranks practically every worth-while amateur in the nation and has a history of glorious achievement as the standard-bearer in amateur affairs.

Inquiries regarding membership are solicited. A bona fide interest in amateur radio is the only essential qualification; ownership of a transmitting station and knowledge of the code are not prerequisite. Correspondence should be addressed to the Secretary.

Past Presidents

HIRAM PERCY MAXIM, W1AW, 1914–1936
EUGENE C. WOODRUFF, W8CMP, 1936–1940

Officers

President ..... GEORGE W. BAILEY, W1KH
Weston, Mass.

Vice-President ..... CHARLES E. BLALACK, W6GG
Yuma, Ariz.

Secretary ..... KENNETH B. WARNER, W1EH
West Hartford, Connecticut

Communications Manager ... F. EDWARD HANDY, W1BDI
West Hartford, Connecticut

Acting Treasurer ..... DAVID H. HOUGHTON
West Hartford, Connecticut

General Counsel ..... PAUL M. SEGAL
1026 Woodward Building, Washington, D. C.

Address all general correspondence to the administrative headquarters at West Hartford, Connecticut.

"IT SEEMS TO US—"

THE TIME HAS COME!

THIS country has before it a task the difficulty of which must not be underestimated. All the energies and intelligence of the nation are necessary to its accomplishment.

There is an immense need for skilled radio personnel. Many thousands of us are already serving in the armed forces. Others of us are finding our places in technical positions directly connected with the war effort. Most of us who stay at home are offering our services in local auxiliary communications. All of us can do something. We know that the radio amateur will bring to these tasks the fidelity and competency which are traditional to him, and that he will again demonstrate that there are few jobs in radio that an amateur cannot do better than any one else.

The radio needs of the Services are particularly acute. The time has now come when every available radio amateur should place at the disposal of his country the skill and knowledge which he has acquired through the years of building and rebuilding transmitters and receivers, the days and nights of transmission and reception through interference and static. The trained ears, the clever hands, the keen minds — they are needed by the United States of America. If you can be spared from home you are wanted in the Army or the Navy, and you are urged to seek enlistment or a commission in the service of your choice.

A.R.P. COMMUNICATIONS

JUST as we went to press last month the griefs associated with the "reactivating" of ham stations for civilian-protection purposes caused DCB and FCC to wash out all authorizations and prepare for a new start — as reported in this month's "Happenings."

As we close our pages for this issue the matter is still in process and no announcement is available. However, the new deal moves closer and this is our understanding of the status of things: DCB is understood to be receptive towards an officially-requested plan to employ amateur apparatus and amateur services in ARP secondary communications if the needs of national security are met. OCD is keen on such amateur collaboration, definitely wants it, and is preparing a detailed plan for DCB's consideration. It is believed that such a plan will propose that the commanders of the local Citizens' Defense Corps be responsible for the operation of the amateur stations and that such operation be confined, for the time being, to the ultrahighs. The expectation is that a proposal of this nature will receive DCB's blessing and result in the issuance of detailed regulations by FCC to govern the new arrangement. It could also be expected that the issuing of new operator licenses would be resumed at the same time, not only to facilitate CDC communications but because the "ticket" is an attestation of operator proficiency which is recognized for enlistment in both Army and Navy. At the moment, we are QRX for Washington. When the announcement is made, ARRL Hq. will rush the particulars to directors and their alternates and assistants and to the SCMs and ECs and clubs. Keep in touch.

Meanwhile another angle of approach is developing. In some cities the responsibility for ARP communications rests with the police radio systems, which are expanding under "police experimental" licenses to carry their increased load — on u.h.f. Providence, R. I., has been the first city to embrace this solution and may be used as an example. Under an FCC "X" license, its police department has the use of four police frequencies in the 116–117 Mc. vicinity, one of them being 116, 150 kc., just outside our 2½-meter band and reachable by practically all amateur gear. Amateur stations are being bought by the city under a resale agreement and are being installed in control points, schools and other needed spots in the ARP plan. About fifty local amateurs are being sworn in as unpaid members of the police force, issued credentials, and assigned to posts of service. The whole thing is now part of the municipal police radio system.

We may remain confident that a place in civilian-protection work will soon be made for the u.h.f. stations and services of amateurs — quite possibly before this issue of *QST* reaches you.

CARRYING ON

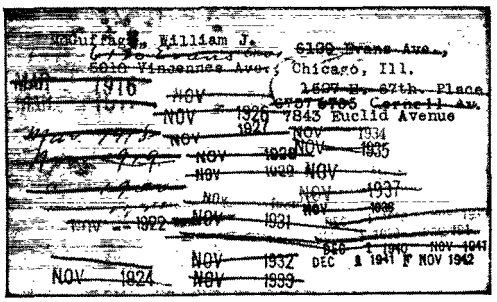
THIS League intends to carry on throughout the war. We have much to do. Our headquarters establishment is groaning with overload in every department, almost every bit of it associated with the war effort. As you've seen in *QST*'s pages, we've been designing special apparatus for ARP communications, gear easily and inexpensively built for this particular purpose. We have before us a task of the first magnitude in arranging for the effective participation of amateurs and their apparatus in this civilian-protection work in every city in the land, and in planning the other communication needs that will inevitably arise. We are very busy finding skilled people for crying government and defense radio jobs. We're finding hurry-up apparatus for the military services, writing training manuals, promoting wholesale code instruction, planning the organization of an amateur intercept corps.

The League must maintain the Washington liaison: to represent us through these changing times, to watch over our frequencies, to see that we get them back when the national job is done. In particular, we must keep ARRL going so that *QST* may continue to come to us each month with the news of each other, of the jobs to be done, of the new developments — now that we cannot chew about these things over the air.

Yes, we all need the League. And we at ARRL hq. will say quite frankly that the League needs the support of every amateur. It is necessary if this useful work is to be continued and the amateur position safeguarded for the return of peacetime operating. Wherever you go, wherever the war effort takes you, we ask you to maintain your membership in ARRL and your subscription to *QST*. It will keep you a part of things back home, help us pay the printer, and bring you each month the news of what is going on.

Which reminds that much is going to be going on. Amateurs are peculiar people, as has been sagely remarked under all sorts of circumstances. While we'll be interested in reading of the radio gear of other services and in studying theory, we're primarily communicating people. Talk all you want about how things work, what we really want is two-way communication with each other by means of key or mike. Radio may be temporarily out for most of us, but there are other ways. Radio amateurs are the heirs of the old backyard telegraph gang. We can go on to other methods during this war. Look at your own situation. Chances are you've got a buddy in the next block or two with whom you were wont to chew the fat for hours on end in bygone days. If radio be out, there are a myriad of other ways of doing it: buzzer lines, carrier current, induction, infra-red blinker, our old friend lambda-over-2-pi, modulated lightbeams, new things that only a fertile ham brain can concoct. So we're starting something, fellows! See the announcement and dope elsewhere in this issue. It will help you to some ideas. We recommend that you get together with that buddy and see what you can cook up. You can lick that communications problem, have a whale of a lot of fun and education for yourselves. Then tell us how you do it, so that the rest of the gang may benefit from your experience. It's like the old pioneering days all over again. If a few of us will put our minds at work on these alternative forms of communication, we have small doubt that in a few months many thousands of us will again be enjoying local QSOs. QSA? QTC?

K. B. W.



25TH ANNIVERSARY

When you have been a member of the League a few years your membership card naturally gets a bit battle-scarred. Here's one that shows 25 years of membership without a lapse — and if member McGuffage had maintained the same QTH we would have been able to sneak on a few more before the card had to be turned!

OUR COVER

OUR cover this issue shows W1LOP scanning the West Hartford skies from atop the ARRL Hdq. building, endeavoring to locate a distant aircraft heard over the acoustic airplane detection system described on page 22. Inset is the microphone suspended in its wind- and weatherproof housing.

Strays

At the amateur quiz program broadcast from WICC as part of the Connecticut State Convention events in Bridgeport, W1KCS was asked, "What is the largest selling book in the world?" He promptly replied, "The ARRL Handbook!"

Well, after all, it has been called the "Bible" of radio amateurs.

What Do We Do Next?

Wartime Offers Opportunities for New Ham Activities

BY GEORGE GRAMMER,* WIDF

Thanks to the Japs, we've all suddenly attained the status of "pre-war ham." Until the fuss is over and we get back once more to ordinary operating, we all want to continue with amateur activities of such nature as conditions will permit. The inescapable necessity for closing down on transmitting does not mean that there's now nothing for hams to do. Far from it! Those who have the opportunity and time to continue with amateur work can do so — the accent will have to be shifted, of course, but the pattern is familiar. Here are a few suggestions.

WHAT to do in wartime? Though the transmitter still stands beside the operating table, its perforce darkened filaments and silent transformers only emphasize the aching void in our ham lives — those roseate hours spent in pleasant communication and busy competition with fellow amateurs. Some day, we know, we'll be back at it again, and the memory of these dark days of close-down will dim. But in the meantime — what to do?

Let's first say that we'll do our part in national defense — and, conditions being as they are, many of us would have little time to spare for hamming even if we weren't restricted. Civilian defense communication should come first, of course, for those who won't be in the military services. But we'll probably have some hours now and then when the urge won't be downed, when some kind of ham radio has to be practiced even though the old set can't be fired up and a hopeful CQ broadcast to waiting ears. There's no cause for discouragement — barring actual radio transmitting, it looks as though we could find plenty to keep ourselves busy.

A lot of the gang have written to tell us they feel just that way about it. While some have curled up their toes, they're very few indeed compared to those who say, in essence, "Well, it's come. Let's make the most of this forced retirement to try some of the things we've always wanted to do but never had time — or necessity — for. We've been so busy on the air that we've let a lot of things slide. Now's the time to catch up."

* Technical Editor, *QST*.

They're right. Amateur radio has never been wholly a matter of two-way communication, although no one would dispute that communication has been the most important part of it. Odd as it may seem to many, there are plenty of hams who get their fun out of fussing around — experimenting, to be dignified — with equipment which seldom, if ever, is put on the air. Those fellows are curious to know about things — why they work, why they don't work, how they can be made to work better. Maybe everything they do merely duplicates something which has been done before — but there is no substitute for first-hand knowledge. The pursuit of such knowledge can be a lot of fun, whether or not an ulterior motive lurks in the background.

Now the fact is that we can do all those things we could do before except radiate signals. There are no restrictions on receiving, for instance, *except the need to preserve secrecy of messages.* Years ago there was an amateur cult which specialized on receiving — in the days when it was counted a real achievement to hear POZ or MUU, or to pick up 600-meter signals from far-distant ships or coastal stations. The super-DX of short waves changed the thrill of hearing foreign stations to a commonplace, but there is still a lot to be said for just plain listening when some attention is paid to the *content* of what's heard. How many present-day hams have ever listened from 600 meters up? How many know what goes on between the ham bands? And speaking of listening, there's a national defense angle too. There's an opportunity for us to help in spotting some of the phonys that are bound to be on the air in wartime, reporting signals which seem to be behaving suspiciously, getting directional "fixes" on them. Direction-finding is an art in itself, particularly over long distances, and one which could keep any amateur occupied for a long time; setting

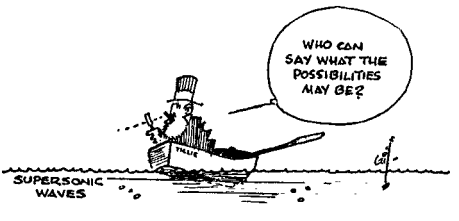
up a good direction finder is far from being the easiest thing in the world. We'll have more on the subject in a future issue.

Too many of us think of a receiver as something that comes in an iron box — when the necessary number of dollars is available to lay on the counter. How many can honestly say they have any comprehensive knowledge of how the circuit is supposed to work? Some of the remarks we've heard on the air about receiver "faults" or performance (or lack of it) certainly have not reflected any great knowledge on the part of those making them. And since receivers are hard to get now, why not use this period to do two things — first, find out how and why the black box works; second, figure out how its faults can be overcome? Besides providing something interesting to do, it should pay dividends in stepped-up performance.

We needn't stop there, however. New ideas are and will be coming along — for instance, panoramic reception, described in another article in this issue. If we could only have had one of those gadgets in the last DX contest! Imagine being able to keep continual tabs on four or five important multipliers, taking advantage of the many opportunities that are bound to be missed when only one station can be heard at a time!

For the u.h.f. men — and those who have any thoughts in that direction, too — this is a really good opportunity to get better receivers under way, and a chance to do some experimenting with f.m. reception. With f.m. broadcasters opening up all over the country there will be signals to practice on; signals which, incidentally, provide a means for checking the results of modifications made in r.f. stages, mixers, antenna coupling systems. The fact that the family can get a taste of high-quality broadcasting shouldn't hurt any in such a program. This in turn leads to such things as building high-fidelity amplifiers, improved reproducing systems, things most of us have promised ourselves we'd do some day — but somehow that day never seemed to come. Why not now?

And, speaking of receiving, how about extending it to recording? Probably no one needs to be told that home recording has been the most popular innovation in radio in years. We can go a bit further, tinker with the recording gear to make it suitable for recording high-speed stuff, possibly turn up something that will be useful to the authorities. Homemade tape recorders are something to think about, too.



Yes, there ought to be plenty to do in the receiving line. It's not impossible that some organized activities, linked up with national defense, are in the works.

Now, on another subject, maybe the rig could stand a little overhauling. Not rebuilding, perhaps; it would be just as well to wait a bit and see what developments come along in the interim while we're off the air. But certainly any equipment we have now should be *usable* after the war, and it's the exceptional transmitter that hasn't a few bugs that need to be eradicated, small operating conveniences that need to be added, minor changes in design or layout that ought to be made. There's no objection to carrying on such revamping and testing, so long as no signal is radiated. But don't take it for granted that a signal won't get out just because the antenna isn't connected as in days of yore. A tank coil can radiate, especially if it's operating without a load to absorb the power. An elementary precaution that should always be taken is to move the feeder connections as far as possible from the transmitter and to tune the whole antenna system to some frequency considerably removed from that on which the testing is done. With low-power stages this, plus loading, should prevent any radiation, but if there is any considerable voltage applied to the tube it will probably be necessary to shield the stage. A grounded shield made from ordinary window screening will not be hard to put together and ought to do the trick. Before going very far with any such testing, try it with low power and have some nearby ham friend listen to see if he can hear the carrier. Don't try keying or other direct communication via the transmitter! If it can't be heard with low power, run the power up to normal and try again. If the carrier can be heard at a greater distance than a couple of hundred yards it isn't safe to do any testing until suitable shielding has been installed. Such a range is about comparable to what the oscillator of a "modern" b.c. receiver gets under ordinary conditions.

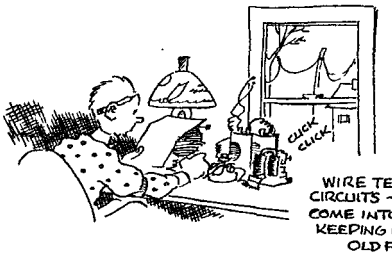
Another field which most hams have neglected, and one in which most of us really need more practice, is that of measurements. Few of us have even elementary measuring equipment, aside per-

haps from a milliammeter or two for the transmitter. Now's a good time to work on that long-planned frequency meter, or on a standard of the 100-kc. oscillator-multivibrator type. Probably crystals will be out of the question, but there's nothing to prevent work on a self-excited oscillator to stabilize it to as near perfection as we can get. Most hams need a general purpose multi-range voltmeter-milliammeter and, granted that meters are among the items missing from most dealers' stocks nowadays, those that do have 1-mil meters (or meters having scales near that range) probably can find such other parts as will be needed. A simple resonance indicator ("wavemeter") is a mighty handy thing to have around the shack; building and calibrating one will provide several evenings' entertaining work. The 'phone man will find an a.f. signal generator (which may be nothing more than a one-tube audio oscillator) especially useful for checking up on speech equipment, especially if a calibrated attenuator is provided, along with a meter of some sort (such as a vacuum-tube voltmeter) for checking amplitude. The vacuum-tube voltmeter, incidentally, has lots of useful functions in an amateur station. And how many of us have oscilloscopes? And of those who do, how many are equipped with amplifiers and linear sweep circuits, without which one cannot begin to realize the possibilities of the 'scope as a measuring instrument? How many fellows have ever heard of a grid-dip meter, let alone own one? — yet it's capable of doing things that can't be handled by any other simple methods. How many own anything resembling a test oscillator, the basic necessity for keeping receivers in alignment? Most of these things can be built from junk-box parts, and once owned it will seem almost impossible to get along without them. There's a year's work at least in getting together a set of test instruments which represents only the minimum of what a reasonably well-equipped ham station ought to have in this day and age. The beauty of it is that most of them can be built from salvaged parts.

This is also a good time for a little serious study of the radio art. Even without any thought of radio as anything other than a hobby, a technically informed amateur is a better amateur. We expect to offer some practical helps in this respect from time to time in *QST*. A bit of code practice wouldn't do harm, either, especially for those who've mislaid their keys for the past several years.

Finally, we come to means of communication other than radio, but sufficiently related to the radio art to interest us as radio amateurs. In this field we can include such things as wired wireless, inductive transmission, transmission by means of light beams (visible or invisible), inaudible sound waves — almost anything, in fact, except radio and the ordinary everyday forms of communication. We'll have to curtail drastically our ideas of DX — but after all it's the business of getting a little farther than the other fellow that really counts, whether the distance is 1 or 10,000 miles. Most of these methods will be unfamiliar to us in one aspect or another, and therefore that much more interesting. There's an opportunity here for clubs to organize communication groups, work out the problems, get some activity under way. Maybe the backyard telegraph line will be in vogue again — modernized, undoubtedly.

And there are problems, so far as the ordinary ham is concerned. Take wired wireless, for instance. Just what is it reasonable to expect in the way of coverage in a typical city of moderate size? How much interference is likely to be caused to existing services using the wires? Is radiation appreciable when the line is strung on poles, as it is in most cities? How much power is necessary and what frequency is most desirable? Some of these are discussed in another article in this issue. Or take light-beam transmission. What schemes can be used for modulating the beam from an ordinary lamp of sufficient power to



cover a reasonable distance? What are the possibilities of installing a reflector at some high point which can be seen by all the hams in a community, directing the beam at it and thereby providing a working path when direct communication would not be possible? What optical systems will be most suitable, and how much light is it going to be necessary to have for working photoelectric cell receivers? These questions may be elementary to those familiar with the field — but most hams are not.

To accumulate the information necessary for reducing some of these things to a practical communication basis, we're reviving the Experimenters' Section, dormant these many years. As described elsewhere in this issue, several projects have been set up, and those who find one or more of them of particular interest are invited to join, contributing any information they may possess on their chosen subjects. The organization will be the minimum necessary to accomplish something — simply a division of the total body of experimenters into groups, each under a leader who will coördinate the activities and assemble the technical and other information which accumulates, re-

(Continued on page 58)

Wired Wireless

Low-Frequency Communication Over Commercial Power Lines

BY BYRON GOODMAN,* WIJPE

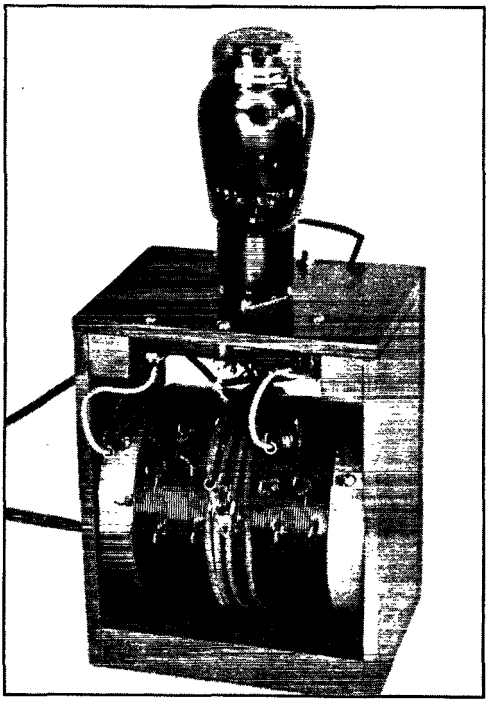
As pointed out elsewhere in this issue, the curtailment of normal amateur radio communication need not throw all amateur communication into a state of suspended animation. For example, it is a well-known fact that so-called "carrier current" communication is used by both telephone and power companies for long-range work over their wires, and the thought that the 110-volt power lines might be utilized for amateur communication has no doubt occurred to many hams during the past several months. Let's look at the picture a little more closely.

Low-frequency radio waves do not radiate as easily as high-frequency ones because the radiation efficiency increases with the frequency. While it is true that they can be radiated, it is equally true that the radiators become large affairs, and any small antenna for such work is practically hopeless. This is a headache to the long-wave radio engineers but a boon to the telephone and power company men — and possibly to the amateur. By keeping the frequency low, the radio energy can be made to travel along wires with little or no radiation, depending mainly upon the balance of the two wires and their spacing. The r.f. follows along the line in much the same manner as the 60-cycle current except that it is much more susceptible to the by-passing effects of lines that connect to the main line. This is one factor that limits the range of 110-volt power-line communication because, while the power and telephone companies can put chokes in strategic points along the lines that are carrying carrier currents, the amateur must be content with the line as he finds it.

Another factor involved in the amateur use of low-frequency carrier current communication is the proper choice of frequency and power. The amateur might use a frequency around 40 or 50 kc. without any danger of radiation and consequent interference to *radio* services, but there would be the possibility of interference with established telephone and power company service, with its resultant ill will and possible legislation. The same holds true of frequencies up to about 160 kc., the upper limit of the frequencies used by the services mentioned. From 160 to 200 kc. there seem to be no "wired wireless" services, but the chances for radiation increase and there is the possibility of broadcast receiver interference in receivers using a 175-kc. i.f. By keeping the power down to a low value (less than 50 watts), there isn't much chance for any appreciable radiation and *radio* interference. In any event, the radiation can be checked roughly by listening at a distance on a long-wave receiver. There still remains the possibility of harmonic interference with local b.c. receivers, but a judicious selection of frequency which keeps the harmonics farther than 10 kc. away from the local b.c. stations will practically eliminate this problem.

The use of frequencies higher than 200 kc. is unwise because of the increased chances for radiation. We once had the idea of using the regular 80-meter transmitter on the power lines for local

* Assistant Technical Editor, *QST*.



A 25-watt transmitter for wired wireless. Since variable condensers large enough to give much frequency change are out of the question, a tapped coil is used for tuning.

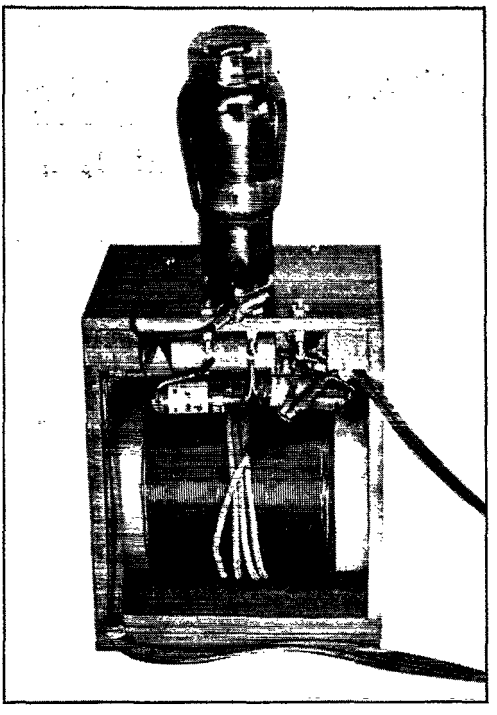
work without QRM, and tested it with a receiver about three miles away that was also coupled into the 110-volt line. The signal came in over the power lines all right — it was a fairly strong one, at that — but the signal that came in through the regular receiving antenna was not more than three S points weaker and represented a signal that would certainly be considered a violation of the law under the present FCC Order No. 87-A. Hence utilization of our amateur transmitters without modification is not a possibility, convenient as it would be. So, rather than skate on thin ice, we propose that amateur wired wireless be conducted on frequencies between 160 and 200 kc., with powers not exceeding 50 watts. The frequencies should be selected with proper consideration of possible harmonic interference in the b.c. range and with the 175-kc. i.f. amplifiers that may be in some local receivers. After we find out what can be done in various localities and under a wide variety of circumstances, it may be possible for us to spread the limits a bit, but we should consider at all times the possibility of interference with other services and act to avoid it.

This is not a brand-new thing, but something that has been tried before and made to work by other amateurs. Mr. John E. Williams, W2BFD, has put a 175-kc. signal over the lines for distances up to five miles[1] without any detectable interference to other services, and with the equipment to be described in this article we got a good signal over a distance of two miles. There are so many possibilities for complicated routing (and by-passing!) that it is impossible to predict the range of any installation within 200%, and it makes a nice thing for amateurs to try for themselves. It might be expected that greater distances could be covered in rural areas than in thickly populated centers, but that remains to be seen. That is the attraction to wired wireless — like high-frequency DX its range is fairly unpredictable.

A Wired-Wireless Transmitter

Any problems connected with the design and construction of an oscillator for the 160-200-kc. range center around the tank circuit. Using an *L-C* ratio that will give a decent order of stability means using a tank capacity of at least 0.002 μfd., and the average ham no longer has variable condensers of that size kicking around the shack. A number of b.c. tuning condensers can be connected in parallel to get the necessary capacity, but we finally decided upon the use of mica condensers, and a check on their performance showed them to be entirely satisfactory for the work. Using mica condensers means changing frequency by changing the inductance unless a large variable shunting condenser (500 μμfd. or more) is available. Tapping the coil is simpler than trying to build a variometer to cover the range, and we ended up with a transmitter that is fairly simple (and reminiscent of 12 or more years ago!). It is not exactly a thing of beauty, but the fact that it doesn't cost very much to put together should compensate for its artistic shortcomings.

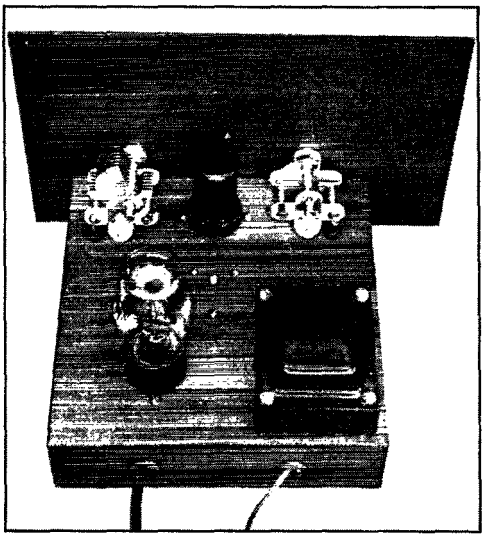
The circuit, shown in Fig. 1, is the conventional series-feed Hartley. The tank condenser, C_1-C_2, consists of two 0.006-μfd. mica condensers in series (to decrease the chances for breakdown), and the frequency and excitation are adjusted by the proper selection of taps on the coil. The "antenna" coupling is adjusted by the proper



A back view of the transmitter shows the antenna condensers, C_5, C_6 and C_7, and the clip used to select the proper combination for correct loading. Note also the 4-turn coupling loop around the tank inductance.

[1] Williams, "Wired Wireless for Remote Control," *QST*, February, 1940.

If you have the urge to warm up the old bug and chew the rag with your fellow hams, here is one way to do it without too much trouble. The distance that can be covered is usually limited to a few miles (unless some enterprising experimenter cooks up an improvement), but that's a lot better than nothing. Here's how to get started.



A top view of the converter. Note the adjusting screw of the output tank condenser, C_5, just in front of the 6SA7.

selection of condensers in series with the coupling coil, L_2.

About the best source of cardboard tubing for the inductance is our old friend of early broadcast-receiver days, the Quaker Oats box. A look at the local grocery showed this to be the only cheap source of 3½-inch diameter cardboard tubing, and if the kitchen won't furnish you with one, buying a box in the store won't ruin your financial standing. After the contents have been removed and the box cut down to a length of about 4¾ inches, the box should be given a coat or two of shellac. We finished ours off with gray lacquer, but this isn't necessary for the proper operation of the transmitter. The 80 turns of No. 18 enameled wire should be wound on as tightly as possible. The taps at every 5th turn are made by twisting a 1-inch loop of wire tightly for several turns at each tap so that it will not twist apart as the rest of the coil is wound. When the coil is finished, the loops can be scraped bare of insulation with a knife or fine sandpaper. As a final touch, spots of Duco cement can be used to secure the twisted portions.

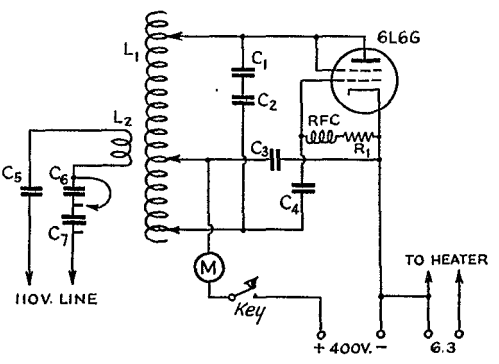
The framework used to support the coil and other components was made of ¼-inch plywood except for two corner strips at the top of ½-inch square stock and the two bottom strips of 1- by 2-inch wood. The whole assembly is held together by brads and glue. The box was made just wide enough to allow the coil to be pushed in, and the spring of the sides is enough to hold the coil firmly in place. Our box measures 6⅞ inches high by 5¼ inches long by 4¼ inches deep.

The tube socket is set down in a hole in the center of the top of the framework. The tank condensers, C_1 and C_2, are fastened underneath by screws. The grid choke, *RFC*, is supported on a ½-inch pillar on the rear screw which holds the socket. The coupling condensers, C_5, C_6 and C_7, are supported on lugs under the heads of the screws used for coupling taps at the rear of the box. The flexible leads to the coil are fastened to the terminals of the tank condensers.

When the transmitter is completed, it can be hooked up to a power supply giving 350 or 400 volts at 100 ma. A meter and key should be put in the positive lead, as shown in Fig. 1. Some may object to the key in the positive lead, but it is convenient to have it there because as long as one's hand is off the key there is no chance for shock when adjusting the coil taps. A certain amount of care must be exercised, of course, and we heartily recommend that all tuning adjustments be made with one hand in your pocket. The first tuning should be done without the oscillator coupled to the line. Set the clips so that there are 60 turns between grid and plate and attach the cathode tap 25 turns from the grid

Fig. 1 — Circuit of the wired wireless transmitter.

C_1, C_2 — 0.006-μfd. mica, 2500 volts.
C_3, C_5 — 0.1-μfd. paper, 600 volts.
C_4 — 100-μμfd. mica.
C_6, C_7 — 0.05-μfd. paper, 600 volts.
R_1 — 50,000-ohm wirewound, 10 watts.
RFC — 80-mh. r.f. choke (Meissner 19-2709).
L_1 — 80 turns No. 18 enam. close-wound on 3½-inch diam. form. Coil tapped every 5th turn.
L_2 — 4 turns No. 18 rubber-covered wound over center of L_1.



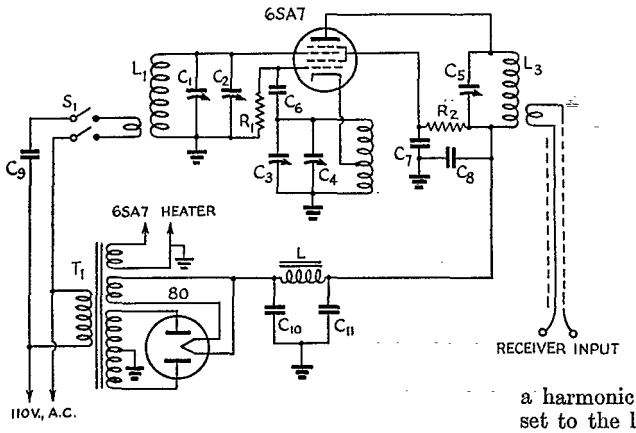


Fig. 2 — Wiring diagram of the low-frequency converter.

C_1 — 100-$\mu\mu$fd. variable (Hammarlund MC-100-S).
C_2, C_5 — 260-$\mu\mu$fd. adjustable mica (Hammarlund CTS-160).
C_3 — 20-$\mu\mu$fd. variable (Hammarlund MC-20-S).
C_4 — 350-$\mu\mu$fd. adjustable mica (Hammarlund CTS-230).
C_6 — 50-$\mu\mu$fd. mica.
C_7 — 0.1 μfd., 400 volts.
C_8 — 0.01 μfd., 600 volts.
C_9 — 0.1-μfd. paper, 600 volts.
C_{10}, C_{11} — 8-μfd. electrolytic, 450 volts.
R_1 — 20,000 ohms, ½ watt.
R_2 — 20,000 ohms, 1 watt.
S_1 — D.p.s.t. toggle.
T_1 — 240-0-240 a.c., 6.3- and 5-volt filament windings (Thordarson T-13R19).
L — 8 henrys, 40 ma. (Thordarson T-13C26).
L_1 — 175-kc. i.f. transformer replacement winding (Carron S735). Antenna winding is 11 turns No. 32 d.s.c. wound over L_1.
L_2 — 43 turns No. 32 d.s.c. closewound on 1-inch diam. form. Cathode tap at 5th turn from ground end.
L_3 — 50 turns No. 32 d.s.c. closewound on 1-inch diam. form. Output coil is 14 turns No. 32 d.s.c. closewound ⅛ inch from L_3.

♦

A bottom view of the converter also gives an idea of the panel layout. The output tank coil, L_3, can be seen in the center of the chassis; L_2 is directly under the oscillator tuning dial, and the mixer grid coil, L_1, can be seen at the right, next to the toggle switch. Padding condensers C_4 and C_2 are mounted on the left- and right-hand sides of the chassis, under their respective tuning condensers.

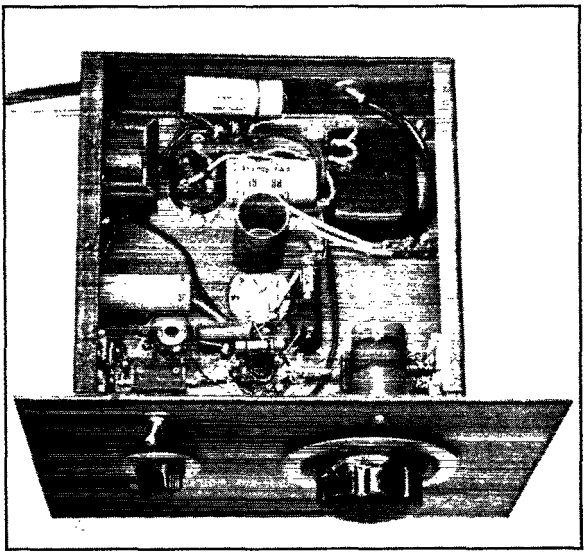
♦

end. Press the key and read the plate current, and then try again with the cathode tap on either side of this position. The setting of the cathode tap which gives the lowest plate current reading is the one to use. With a 350-volt supply, the no-load plate current should run around 25 or 30 ma. Connect the output into the line and set the coupling clip so that it isn't shorting any condenser (loosest coupling). The plate current will increase to 30 or 40 ma., depending upon the frequency of the transmitter, and the note can be checked by listening to a harmonic with your communications receiver set to the lowest frequency range. The coupling can be increased until the note becomes too rough or yoopy, which indicates that the coupling is too tight or that the cathode tap needs adjusting. The same rules hold for adjusting a transmitter on 170 kc. as on the higher frequencies, and a little experimenting will bring back the old touch. With no loading at all, the signal from these low-frequency oscillators is truly beautiful — they should be coupled up to the point where the note starts to go sour, and that is the place to stop. The note will roughen up before it chirps — you can tolerate the roughness, but the chirp makes it difficult to copy. And be careful in making adjustments — you have deliberately hooked into the 110-volt line, and you can get a good shock from it!

The Wired-Wireless Receiver

The first thought in building a receiver for the wired-wireless frequency range might be to throw

(Continued on page 58)



The Panoramic Radio Spectroscope

Simultaneous Visual Reception of a Band of Frequencies

BY H. G. MILLER*

AMATEUR radio communication has been marked by continual progress since its inception in the spark and coherer days. The technical advances have been many, but just as important are improvements in operating technique, which amateurs and professionals alike have developed. Under the heading of "operating technique" are such items as operating schedules, proper choice of frequency to do a certain job, and a considerable acquaintance with variations in the "wireless" part of the communications circuit.

But recently there has been added a powerful operating aid known as panoramic reception which gives the operator enhanced control over the uncertainties of transmission and reception.

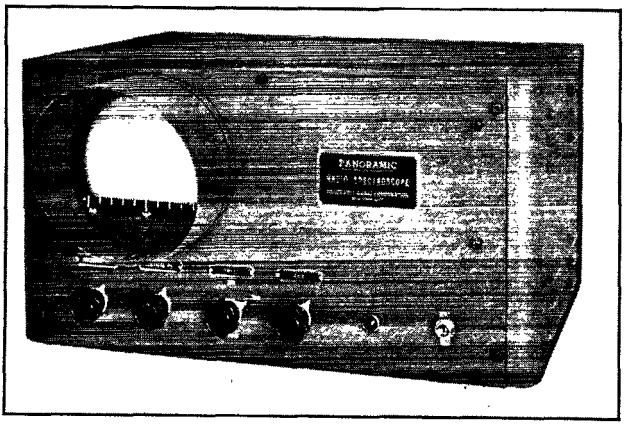
Seeing the Radio Spectrum

In the same manner that the familiar light spectroscope makes visible the spectrum of light frequencies, the panoramic spectroscope makes visible the spectrum of radio frequencies. As a light spectroscope is attached to a telescope for pickup from distant sources, so the panoramic spectroscope is attached to a communications receiver for bringing in any desired band of frequencies. The radio spectrum is displayed on the screen of a cathode-ray tube, where each signal appears as a separate indication showing its frequency, strength, type of modulation, fading characteristics and frequency stability, as well as the nature of any interference.

Panoramic reception can be easily understood by reference to Fig. 1. Suppose we have an ordinary communication receiver and tune it through a band of 100 kilocycles, starting from any frequency desired. In normal times the starting frequency might have been 3900 kc., represented by zero in Fig. 1, in which case the whole 100 kc. covered would be the 3900- to 4000-kc. 'phone band. If we should plot the strength of the signals as we pass them (by means of the "S" meter, for instance) against frequency the curve might resemble that shown. Each peak would represent a received station, the strength as we tuned through it being low at first, then rising to a maximum when the signal is on the resonance peak of the i.f. amplifier, then dropping off again on the other side. The width of the signal will depend upon its strength and the selectivity of the i.f. amplifier, and what we actually do is plot a series of i.f. resonance curves as we pass through the various signals. Peaks *a* and *b* are too close in frequency for complete separation; in other words, the signals are so close that the i.f. selectivity is not sufficient to make them appear as isolated peaks.

In the panoramic receiver a similar curve is traced by the oscilloscope spot each time the receiver is tuned through the band, and by repeating the tuning rapidly (25 times per second or more) the trace appears as a continuous line. The rectified output of the second detector, with suitable d.c. amplification, is applied to the vertical deflection plates of the cathode-ray tube, thereby using the c.r. tube as an indicator of instantaneous signal strength. The horizontal deflection is synchronized with the receiver tuning, one trace for each tuning cycle. The process is quite similar to the synchronization in an ordinary oscilloscope equipped with a linear sweep circuit. The rapid tuning of the receiver can be accomplished by either mechanical or electrical means, the latter being preferable for a number of reasons. A saw-tooth generator can supply both the oscilloscope sweep voltage and the control voltage for a reactance tube which does the

* Panoramic Radio Corporation, 298 Broadway, New York City.



A panoramic radio spectroscope in manufactured form, using a 5-inch cathode-ray tube. The frequency band to be examined can be varied from 0 to 100 kilocycles.

Panoramic reception is a comparatively new development which has not yet made its impress on amateur radio, but it promises to become one of our important operating tools when we're back on the air again. For amateur work the adapter or "spectroscope" described here offers a practical way to get started in visual reception. This article tells what panoramic reception is and gives a brief description of the spectroscope; we expect to follow it up with "how to build it" material just as soon as possible. The spectroscope is a fascinating thing to operate, and its obvious advantages in communication are supplemented by a high order of usefulness in various measurements that need to be made around the ham station. Panoramic reception is the invention of Marcel Wallace, one-time owner of F3HM, and up until a few years ago an active amateur.

actual rapid tuning of the high-frequency oscillator in the receiver. A tuning rate of 25 times per second or more is necessary to eliminate flicker. It is advantageous to choose a tuning rate which can be synchronized with the

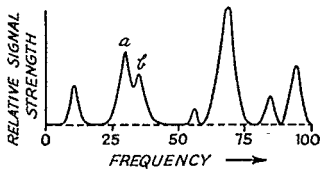


Fig. 1 — Representation of panoramic reception over a 100-kc. band. The cathode-ray tube beam traces the pattern which would result from plotting instantaneous response of the receiver to signals of differing amplitude and frequency, assuming that such a plot could be made instantaneously.

supply frequency, which in most cases will be 60 cycles.

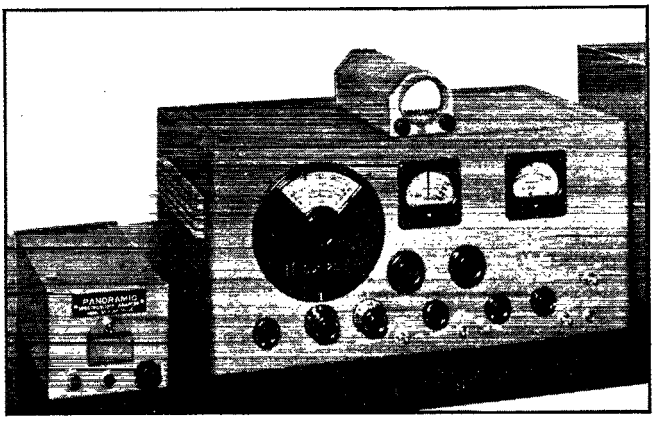
The selectivity of the receiver must be taken into account in determining the permissible width of the band to be scanned and the rate at which the tuning can be repeated. The higher the selectivity, the longer the time required for oscillations to build up to their maximum value, so the scanning rate must be slow enough so that the tuned circuits can follow instantaneous changes in signal strength accurately. Since by far the greater part of the receiver's selectivity is in the i.f. system, only that part of the receiver need be considered in this connection. A practical formula based on experience, and applying to sets with i.f. transformers having Q's in the vicinity of 100, gives for the minimum time in seconds:

$$T = \frac{4\ (F_{max} - F_{min})}{f^2}$$

where T is the minimum time permissible in scanning the band once, F_{max} is the highest frequency and F_{min} is the lowest frequency of the r.f. band being scanned and f is the desired visual selectivity of the receiver.

All frequencies are in cycles per second. For example, if the whole broadcast band (550–1550 kc.) is to be scanned and the desired selectivity of the receiver is 10 kc., the formula gives 1/25th second as the minimum time which should be consumed in tuning once across the band. If the reactance tube which does the tuning is driven by a sawtooth oscillator having a wave-shape in which the "fly-back" time is negligible, this means that a tuning rate as high as 25 per second could be used. Lower rates, and therefore a longer period of time to go once across the band are necessary if greater visual selectivity is required. The "static" selectivity, or the selectivity as shown by the ordinary resonance curve, of the receiver should be twice the desired visual selectivity. In the example above, a receiver having a 5-kc. pass band would be necessary to secure 10-kc. visual selectivity.

Rather than a special receiver for panoramic reception, it is more practical for amateurs to use an adapter which provides panoramic reception in conjunction with an ordinary communications receiver. An adapter of this type, the "panoramic radio spectroscope," does not interfere in the least with the normal functioning of the receiver. Neither is it necessary to modify the receiver in any way, since the adapter can be connected to it without doing anything more than



A simplified spectroscope adapter set up with a communications receiver. This model uses a 2-inch cathode-ray tube, housed separately from the power supply and other circuits.

connecting a wire to the plate pin on the mixer tube.

The Radio Spectroscope

A communications receiver with such a panoramic "'scope" attached is shown in one of the photographs. A station to which the receiver is tuned would appear in the center of the cathode-ray screen, and also would be heard in the usual manner. Stations above this frequency would appear on the right half of the screen and stations below on the left half, spaced along a calibrated frequency scale. A close-up of the screen, on another model of the spectroscope, is shown in the first photograph.

The stronger the signal the higher its deflection, so that relative signal strengths may be read directly off the screen. If desired, an entire amateur band may be reproduced, but the mass of information is then enormous. It is more practical to operate with a fraction of this coverage. Usually a band including 50 kc. on each side of the receiver (center) frequency contains information of most interest to the operator.

If the operator tunes the receiver slowly, incoming signals move in a procession across the screen, each station in turn passing over the mid-frequency mark as the receiver tunes through it and it is heard. As the procession moves, stations pass off the screen at one side and other stations move in on the other side, so that a visual picture of the whole band is quickly presented. This complete visual picture stands out in full detail, instantly showing voice-modulated stations going on and off the air, c.w. stations keying, carriers being shifted, or stations interfering. There is no chance of missing a carrier which stays on for even a very short time. The band is "open like a book," and the operator can see at a glance the frequency most free of interference, or can "follow" a transmitter which is being shifted to a new frequency. Even if a station to which the receiver is tuned has a bad frequency drift, the operator can easily follow it with the tuning dial, because the panoramic 'scope shows the direction and amount of the drift. This makes possible the use of more selectivity in the receiver i.f. than would ordinarily be practical, or the use of more flexible transmitters, or both.

Circuits and Methods

The panoramic radio spectroscope utilizes an input cable which is run into the receiver cabinet. Connection is made to the receiver mixer or converter tube plate prong by means of a clip on the end of the cable. Detuning of the receiver i.f. is prevented by an isolating resistor at the clip. The i.f. signals are carried through the cable to the panoramic 'scope and are then amplified and passed through a second mixer where they are converted to a new (second i.f.) frequency, then through a sharply tuned second i.f. amplifier, a final detector, and an audio amplifier, to the vertical plates of the cathode-ray tube.

Signals in the plate of the receiver mixer include i.f. signals at (say) 455 kc., and also i.f. signals falling off in amplitude on each side of this frequency because of the selectivity of the r.f. circuits. A wide band of these frequencies is transmitted to the panoramic 'scope and amplified through a compensated band-pass stage so that a "flat-topped" band is delivered to the second converter. By this means the relationship between actual strength of the incoming signal and its deflection on the screen is maintained fairly constant over the whole band of frequencies scanned.

The second converter is "swept," that is, the frequency of its oscillator section is varied periodically through a range of frequencies by means of a reactance tube. A saw-tooth generator feeds the reactance tube and also feeds (through an amplifier) the horizontal plates of the cathode-ray tube. Thus at any instant the second mixer with its second i.f. selects a single frequency from the wide band of first i.f. signals, and delivers it to the cathode-ray screen as a vertical deflection. But the frequency selected is varied periodically

(Continued on page 62)

Silent Keys

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

George Bambridge, ex-BAM, F3OTB, Papeete, Tahiti
James Bolton, G4KT, Blackburn, England
William Thomas Caswell, jr., W5BB, Austin, Texas
Jack D. Giles, W5HLZ, Natchez, Miss.
N. K. Godskesen, OZ4G, Trustrup, Denmark
Charles Guth, W6NAL, Carmel, Calif.
Ignacio Armond y de Leon, CO2AL, Havana, Cuba
John E. Manion, W9YHD, Maysville, Ky.
Ellsworth M. McCollum, W8VBR, Cozaddale, Ohio
Ricardo R. del Monte, CM2MZ, Havana, Cuba
Chester J. Pokrzywa, W9IOI, Chicago, Ill.
Fred B. Raymond, W3GYK, Philadelphia, Penna.
Dr. Charles E. Sceleth, W9GV, Chicago, Ill.
Worth S. Sorenson, W1JUK, Boston, Mass.
Joseph Spoor, W2GWB, Catskill, N. Y.
G. E. Turner, W5CAM, Kilgore, Texas
Frank R. Winn, W6LFM, Niland, Calif.

★ HAPPENINGS OF THE MONTH ★

SK W5BB

WILLIAM THOMAS CASWELL, JR., W5BB, acting director of the West Gulf Division, ARRL, died peacefully in his sleep at his home in Austin, Texas, at 1 o'clock in the morning of January 26th. He was 25.

In poor health since a childhood illness, Tom Caswell nevertheless gave liberally of his energy and time to amateur radio. He was first licensed in 1929 at the age of 12, and from that time on was almost continuously active on the air, working both 'phone and c.w. on all bands. Few amateurs have ever exceeded the time and devotion he bestowed on the game.

Recent years brought increasing activity in the organizational sphere, and in March, 1940, he was elected alternate director of the West Gulf Division. When Director William A. Green, W5BKH, was called to active duty with the Navy in 1941, Tom took over the duties of the office. He represented the division at its 1941 meeting, and both in the annual meeting and in the discharge of the other varied directorship duties displayed exceptional faithfulness and sagacity. His loss in the councils of ARRL will be greatly felt.

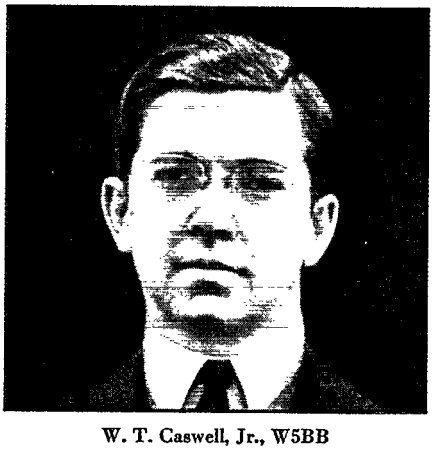
During 1941 W5BB participated in the development of the Texas Defense Guard. Appointed a captain on the staff of the Adjutant General, he served as communications officer. As such he organized the TDG's comprehensive amateur radio net which linked most of the state's fifty battalion centers until the closedown, acting also as NCS of the net. Under his leadership this net distinguished itself during last year's Gulf Coast hurricane as well as in the faithful conduct of the routine twice-weekly on-the-air drills (at which attendance constantly exceeded 90%). Its performance has elicited the highest praise from the governor of Texas and other officials.

Prior to his service of state and nation, W5BB was president of the Austin Radio Club. He was the first W5 to receive a DX Century Club certificate; held three WAC certificates (c.w., 'phone and 28 Mc.), as well as WAS, WBE and BERTA. He was an A-1 Op, RCC member and formerly held an ORS appointment. Before becoming alternate director he was a member of the ARRL Planning Committee.

Widely known in amateur circles both because of his thousands of contacts on the air and his extensive personal acquaintanceships, Tom Caswell was liked and respected by his comrades in amateur radio and ARRL. He was proud to be an amateur, and we are proud that he was one of us.

—···—

Ensign Green, W5BKH, although still director of the division, has been unable to act because his service duties have called him outside the division. He has therefore appointed former Director Wayland M. Groves, W5NW, as assistant director and asked him to assume the administration of the division pending the election of a new director. Because of his active-duty status he has felt it desirable that he resign effective with the election of a successor. Consequently, a special election has been ordered for both director and alternate in the West Gulf Division, the formal notice of which follows.



W. T. Caswell, Jr., W5BB

ELECTION NOTICE

To all members of the American Radio Relay League residing in the West Gulf Division:

You are hereby notified that, because of the resignation of Director William A. Green, W5BKH, account nonresidence in the division, and the death of Alternate Director W. T. Caswell, Jr., W5BB, acting director, a special election is about to be held in your division to elect both a member of the ARRL Board of Directors and an alternate thereto, for the remainder of the 1941–1942 term and for the following two-year term, 1943–1944. Your attention is invited to the provisions in the Constitution and By-Laws for the government of ARRL by a Board of Directors, defining their eligibility, and providing for the nomination and election of directors and their

alternates. Copy will be mailed any member upon request.

You are particularly cautioned to observe that, in order to permit the selection of a new director in time to represent you at the annual meeting of the Board of Directors in May next, less time than is customary is being provided for each action in the process of choosing the new director and alternate. The time will be ample for the requirements of each step in the process, but your reasonably prompt action is required. Nominations will close April 6, 1942; ballots will be mailed from the headquarters office as soon thereafter as possible; voting will take place between about April 10th and noon EST of April 30, 1942. The result will be determined as quickly thereafter as possible; and the new director and alternate will take office immediately upon that determination. The ballots will list in one column the names of all eligible candidates nominated for the office of director by ARRL members residing in the West Gulf Division; and, in another column, all those similarly named for the office of alternate. Each member will indicate his choice for each office. If there be but one eligible nominee for an office, he will be declared elected without balloting.

Nomination is by petition. Nominating petitions are hereby solicited. Ten or more ARRL members of the West Gulf Division may join in nominating any eligible member of the League residing in that division as a candidate for director therefrom or as a candidate for alternate director therefrom. No person may simultaneously be a candidate for the offices of both director and alternate. Inasmuch as the by-laws were recently amended to transfer all the powers of the director to the alternate in the event of the director's death or inability to perform his duties, *it is of as great importance to name a candidate for alternate as it is for director.* The following form for nomination is suggested:

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

We, the undersigned members of the ARRL residing in the West Gulf Division, hereby nominate ....., of ....., *as a candidate for DIRECTOR;* and we also nominate ....., *of* ....., *as a candidate for ALTERNATE DIRECTOR; from this division for the remainder of the 1941–1942 term and for the 1943–1944 term.*

(*Signatures and addresses*)

The signers must be League members in good standing. The nominee 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 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 eligibility are given in By-Law 12. His complete name and address should be stated. The same requirements obtain for alternate as for director. All such petitions must be filed at the headquarters office of the League in West Hartford, Conn., by noon EST of the 6th day of April, 1942. 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 alternate. To be valid, a petition must have the signatures of at least ten members in good standing; that is to say, ten or more members must join in executing a single document; a candidate is not nominated by one petition bearing six signatures and another bearing four. Petitioners are urged to have an ample number of signatures, since nominators are frequently found not to be members in good standing. It is not necessary that a petition name candidates both for director and for alternate but members are urged to interest themselves equally in the two offices.

Classification of members into Full Members and Associates is still in process, occurring at time of renewal throughout coming months. Members possessing certificates of Full Membership, and members not yet classified and holding valid old-style membership certificates, may nominate candidates, or may stand as candidates if otherwise eligible. But members holding certificates of Associate Membership are not eligible to either function.

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

For the Board of Directors:

K. B. WARNER,
Secretary

January 27, 1942

"ESMDT"

THROUGHOUT the radio industry there is a great shortage of men trained in the fundamentals of radio theory. In the military services the need is even greater. To meet this need, a vast training plan has been started all over the country in the form of special free radio courses. The work is part of the Engineering, Science & Management Defense Training program of the Office of Education

(part of FSA; see page 29, November *QST*) under the sponsorship of the National Association of Broadcasters, which is acting at the request of Army and Navy. Scores of colleges and universities, both engineering and liberal arts, are to give these courses in perhaps several hundred cities. Instructors will come partly from the faculties of the colleges and partly from the engineering staffs of broadcasting stations. Most classes will be in the evenings, two or three nights a week, for a duration of some months. There is no tuition charge and no obligation to accept radio employment, but the student must pay for his texts and supplies. The thought is that these courses will give invaluable premilitary radio training which the youths of the country will be glad to have and that it will also help an industry overloaded with vital war orders. Women may take the course as well as men.

This is an immense project that will give solid radio knowledge to perhaps a quarter of a million people. We have seen an outline of the courses prepared in some states and they are splendid. If you are an average amateur your theory is shaky, and you can greatly profit by enrolling. (The usual entrance requirement is that applicant be a high-school graduate with some knowledge of algebra.) Your particular patriotic duty in this matter, however, is to spread the news of these courses and to get the right kind of people to enroll for them in sufficient quantities. Some of the classes have already started, others are coming along rapidly; since they will occur in several cities in every state, there should be one near you. You can get data from your newspaper office or broadcasting station, or from the nearest engineering university. If you happen to be thoroughly grounded in theory yourself, you are badly needed as a (paid) instructor.

Incidentally, NAB recommends that students in these courses study *The Radio Amateur's Handbook*. You'll be interested to know that ARRL has bought out a special defense edition of the *Handbook* with changes especially calculated to make it of maximum usefulness as a manual for defense training classes — as announced elsewhere in this issue.

In addition to ESMDT, Boards of Education throughout the country have been requested by the Bunav of the Navy Department to establish radio courses in high schools to give training in operating and theory to the youth of America. Hundreds of such classes are being set up.

Maybe these programs won't swell the amateur ranks after this show is over!

SOUTHEASTERN ALTERNATE

THE Southeastern Division has a new alternate director in the person of William P. Sides, W4AUP. Some of the boys also attempted to nominate Ernest L. Morgan, W4FDJ, but had the hard luck to have an inadequate number of signers who were League members, so that the petition was not a legal one. This left the field to Mr. Sides, who was therefore declared elected without membership balloting.

Mr. Sides is a division operator of the Alabama Power Company at Montgomery. He is an OPS and AEC, and although he was ANCS of the AARS 75 'phone net he also has a 25 w.p.m. code certificate and is the holder of two public service certificates.

TICKLER

WE GIVE you three memory-joggers:

If you are available for a job in defense radio, fill out immediately the registration form appearing on page 27 of December *QST* and file it with us.

If you are in the military service in communications work, please report the fact for the ARRL roster. See page 34, November *QST*.

Voting membership in the League is confined to licensed amateurs residing in ARRL divisions. To permit properly classifying you, please show whether you have an amateur license (either station or operator) when joining the League or renewing membership.

ATTENTION, HAMS IN SERVICE

APPARATUS is becoming difficult to procure. Much is needed in the colleges that are conducting defense courses. Many useful pieces of apparatus and parts could be obtained from idle amateur stations. If you care to dispose of your station, write, or have your folks at home write in your behalf, to the department of electrical engineering or science of the college or university nearest to your home, and offer it for sale.

ABOUT O.C.D. VOLUNTEER OFFICES

WE HAVE previously reported how the OCD organization provides for the maintenance of a local Volunteer Office in each city, where personnel is recruited and assigned to the ARP services. It was originally our understanding that arrangements would be made whereunder amateurs wishing to take part in the civilian-protection work would be enrolled through these Volunteer Offices. This would involve a formal amendment of the standing instructions, and it now seems that the question may be permanently stymied. It will not make any difference to our plans. The Volunteer Offices are concerned chiefly with the assignment of personnel to ARP tasks (and with the various women's auxiliaries), whereas we will serve as part of the control staff. We have discussed this matter with the OCD people at Washington and it now seems preferable to work on the following basis: The Commander of the Citizens' Defense Corps will appoint a communications officer with general re-

(Continued on page 64)

An Acoustic System for Aircraft Detection

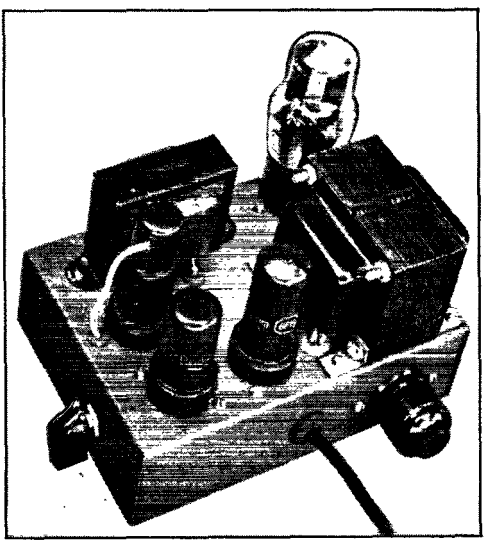
A New Job for the Speech Amplifier

BY DON H. MIX,* WITS

This article tells how to set up a simple acoustic system for the detection of aircraft. Such a system is urgently needed by spotters in local units of the AWS. Because of priorities, the demand cannot be immediately filled by government agencies. Here's a chance for the ham to make a real contribution to national defense. It's a job right down his alley. Furthermore, there's plenty of fun connected with it. It's an interesting subject for the experimenter too, since there is surprisingly little available information on the subject. There are problems to be solved and there is plenty of room for development.

ALTHOUGH the picture of the future is not completely clear at the moment, it seems probable that the chief function of the amateur not directly involved in military service will be that of replacing vital local wire communications which may succumb in the event of attack by air, or possibly natural disaster. These are contingencies for which we have been training ourselves for many years.

* Assistant Technical Editor, *QST*.



A simple high-gain audio amplifier with power supply.

There are, however, other ways which will undoubtedly appear from time to time as the war progresses in which we can contribute our skill and the use of our equipment. Some of these, we are confident, will be definitely out of the "watchful waiting" class; they will be interesting things to which we can immediately turn our itching hands without restriction.

One thought which has occurred to many hams is that idle or simply-built audio gear can be made to serve importantly in assisting the civilian aircraft spotter in his lonely vigil in all kinds of weather. Not only does inclement weather add to his physical trials, but it also decreases his efficiency as an observer. This applies particularly to the effects of cold weather which force the observer to keep his ears more or less under cover.

For some time before the development of the radio locator, the British had had considerable success in detecting the course of approaching aircraft by acoustic methods. A system of this type has also been used by the military services in this country. The device usually consists of a pattern of several large horns terminating in a single outlet for sound which is led directly to the observer's ears or, through audio amplifiers, to electrical indicators. The horns may be orientated to determine the direction of approach of aircraft. Several amateurs have recently written us regarding the possibility of home-brewing something along the same lines built around existing ham gear. It seems to us, however, that the immediate need can be filled as well, if not better, by a less-cumbersome arrangement consisting of simply a non-directional mike, high-gain amplifier and headphones or loudspeaker. Such an arrangement removes many of the headaches involved in directional systems. The problem of continual orientation of a directional system is further complicated by the necessity for eliminating noise contributed by microphone vibration. Tests with a simple horn of plywood for directivity also showed that this type of horn is entirely unsuitable because of the rumble introduced by the vibrating sides of the horn. This undoubtedly has something to do with the thick-walled horns shown in published photographs of directive systems in use.

It is apparent that the job of the spotter may be divided into two distinct stages. The first stage is that of detecting the presence of aircraft in the vicinity, while the second is that of determining the course of approach. It seems quite

obvious that a highly-directive system would be at a distinct disadvantage in the first stage; it would be similar to the case of searching for one or two signals over an otherwise unoccupied wide band of frequencies with the crystal filter cranked up for maximum selectivity. Although little information is available on the subject, it seems highly probable that directive systems must be equipped with non-directional auxiliaries to cover this first stage to facilitate rapid detection of the presence of aircraft after which the directive system is brought into use. It should be a relatively easy job to set up equipment which will permit the spotter to remain out of the weather until the approach of aircraft is detected after which he may go outside to make his usual observations.

While it is probable that the authorities plan eventually to provide some sort of gear for the spotters, it may be some time before the necessity for concentration of production along other lines will permit issue of such equipment to any but the most-important posts. In the meantime, individual amateurs and clubs are in a position to ease the job of the local spotters tremendously. In many cases, speediest relief can be supplied by the loan of existing idle speech equipment. In others, it may be more advisable to build up a simple unit available from spare parts, while under still other circumstances, it may be necessary only to act as constructor or adviser when components or complete equipment can be furnished by local authorities.

A high-gain amplifier with a power stage rated at 3 watts will give excellent loudspeaker performance. This means that the speech amplifier and driver stages of almost any medium-power modulator will fulfill the requirements. It is particularly important that the amplifier be free from hum, since the audio frequencies of importance are those of the lower part of the range. Microphones of the dynamic type are less susceptible to extremes in temperature. The carbon and crystal mikes in predominant use among amateurs may be used successfully with suitable precautions, however. The crystal type is unaffected by low temperatures, but must be protected against excessively high temperatures. Speakers of the permanent-magnet dynamic type will be most convenient to use in most locations.

If the speaker is equipped with the usual type of coupling transformer, it should be possible to arrive at a reasonably close match between driver output and speaker by simply connecting the

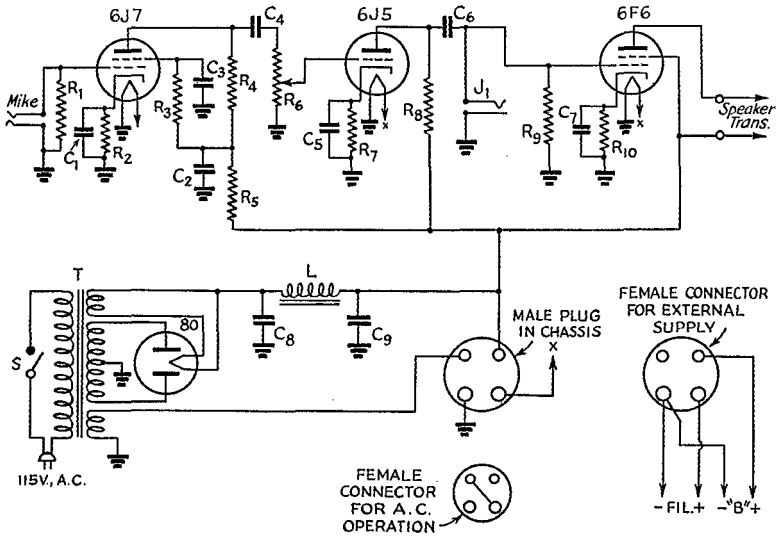
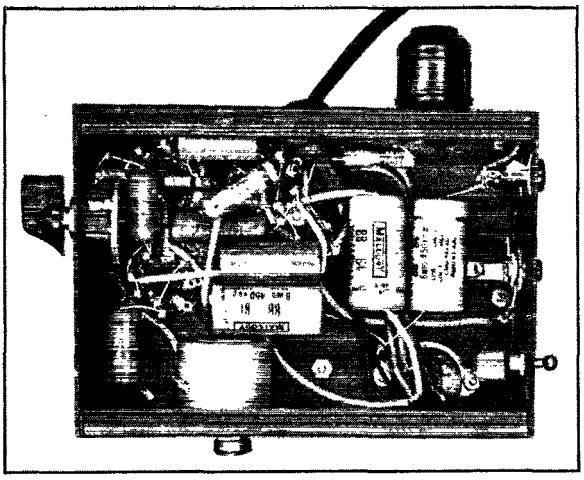


Fig. 1 — Circuit diagram of simple audio amplifier for aircraft detection.

C_1 — 25-μfd., 25-volt electrolytic.
C_2 — 8-μfd., 450-volt electrolytic.
C_3 — 0.1-μfd. paper.
C_4 — 0.01-μfd. paper.
C_5 — 25-μfd., 25-volt electrolytic.
C_6 — 0.01-μfd. paper.
C_7 — 25-μfd., 50-volt electrolytic.
C_8, C_9 — 16-μfd., 450-volt electrolytic.
J — Open-circuit jack.
L — Filter choke, 10 hy., 65 ma.
R_1 — 5 meg., ½-watt.
R_2 — 1300 ohms, ½-watt.
R_3 — 1.5 meg., ½-watt.
R_4 — ¼ meg., ½-watt.
R_5 — 50,000 ohms, ½-watt.
R_6 — 1-meg. potentiometer.
R_7 — 1500 ohms, 1-watt.
R_8 — 0.1 meg., 1-watt.
R_9 — ½ meg., ½-watt.
R_{10} — 400 ohms, 1-watt.
S — S.p.s.t. toggle switch.
T — B.c. replacement transformer, 290 volts, r.m.s., 40 ma., each side of center; 5 volts, 3 amp.; 6.3 volts, 2 amp. (Thordarson 13R11).



Bottom view of amplifier, showing shielding around microphone connector.

primary winding of the speaker transformer to the output winding of the Class-B input transformer. By trial, it may be determined whether it is better to connect across the entire output winding of the Class-B transformer or across only half. By using the Class-B input transformer in this manner, it will avoid the necessity for passing the driver d.c. plate current, which may be excessive, through the primary winding of the speaker transformer. The audio output of the driver can be limited to that which the speaker will handle by adjustment of the gain control. If this arrangement is not used, it will be necessary to substitute a speaker transformer of suitable rating between the output of the driver stage and the speaker voice coil.

In some cases, it may be deemed more desirable to build up a simple amplifier for the purpose. The one shown in the accompanying photographs is designed to work with a crystal microphone. The circuit diagram is shown in Fig. 1. It consists of a 6J7 pentode high-gain stage followed by a conventional 6J5 resistance-coupled triode stage, ending up with a 6F6 in the power stage.

A small a.c. power supply delivering 250 volts is included. The output of the power stage will operate a speaker of decent size at good volume. A jack for headphones is provided in the output of the triode. A socket is also included to permit application of independent supply from batteries or vibrator pack in localities where a.c. supply is not available. A dummy plug with two pins shorted is inserted in the socket to complete the heater circuit when a.c. supply is obtainable. When using a storage battery for heater supply and "B" batteries for plate supply, most economical operation will, of course, be obtained by removing the power tube and using headphones. In this way, long battery life may be obtained.

The unit is constructed on a chassis 7 inches by 3 inches by 2 inches. The only precaution necessary is that of isolating the microphone input connection from components which might introduce feedback or hum. The standard Amphenol microphone cable connector is covered with a National microphone jack shield which also houses the input grid resistor, R_1. Shielded wire is used for the connection between the mike connector and the grid of the 6J7. The grid cap of the 6J7 is covered with a shielding cap. The gain-control potentiometer, R_6, is mounted at one end of the chassis between the 6J7 and 6J5 sockets, while the power switch, headphone jack and pin jacks for the speaker connection are mounted at the opposite end. External power connections for independent supply are made at the socket in the rear edge of the chassis. Other components are placed close to the points to which they connect.

The successful operation of such a unit will depend greatly upon the location of the installation. A noisy location makes it difficult to distinguish weak aircraft responses. The remarkable ability of the human ear to distinguish selected sounds amidst a confusion of sounds because of the directivity of the aural system is entirely lost when all sounds from a large area emanate from a single source, in this case, the loudspeaker. The only selective means left for the ear to work upon are the frequency and certain other characteristics of sounds of various types. Thus, a restriction is placed upon the usefulness of the ear in detecting the approach of aircraft which can be best compensated for only by a low noise level at the location of the microphone. Traffic noises are particularly bothersome, since the frequencies are in the range most useful in detecting aircraft. At the same time, however, an audio system can be made more sensitive than the unaided human ear, so that in quiet locations it should be possible to detect the presence of aircraft at greater distances with the amplifier.

In an otherwise quiet location, wind will be the source of greatest noise. Wind noise may be greatly reduced by the use of a silk screen and

(*Continued on page 68*)

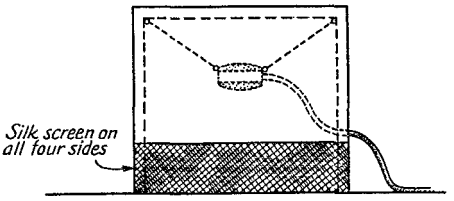


Fig. 2 — Suggested weather-proof housing for microphone.

★ U. S. A. CALLING ★

SIGNAL CORPS COMMISSIONS

THE Electronics Battalion takes only unmarried men without dependents. Many married applicants have been rejected. Here is big news for amateurs:

The Signal Corps wants several hundred communications officers for immediate duty, not in the EB, and will take men between the ages of 30 and 60 even if they are married or have dependents. In fact, applicants between 21 and 30 will be considered if it can be shown that their services in the Signal Corps would be of more value than in any other capacity. It is preferred that candidates have college training in electrical or radio engineering, but in some cases years of commercial experience will be accepted in lieu of a degree or college credits. Initial appointments are available in ranks from *second lieutenant to colonel*, depending upon age, experience, capabilities. We understand that the urgency is sufficiently great to have resulted in a very liberal policy concerning physical defects, with the result that almost any disability that will not interfere with an officer's functioning can be waived, except heart trouble.

This makes it possible for many skilled amateurs with families and good positions to rally around and yet be able to support their families in comparable manner. As with the electronics group, the ARRL prezz is qualifying applicants. Write to George W. Bailey, National Research Council, 2101 Constitution Ave., Washington.

ENGINEERING STUDENTS AS OFFICERS

GOOD news for students of engineering and physics: You are encouraged to stay in college and complete your technical training, so that you may qualify as an officer.

The Chief Signal Officer is authorized to enlist junior and senior students of electrical engineering in the Signal Enlisted Reserve Corps. Students so enlisted will be deferred from active duty until the date for completion of their academic courses. Upon satisfactory completion of engineering training and the recommendation of the CSO, these students will be tendered commissions in the Army and discharged from their enlisted status.

If you're an EE student, no need to go into the draft as a private and let your schooling be interrupted. Get deferment, finish it up, serve as a lieutenant. For more dope, see your dean.

S. C. PRODUCTION ENGINEERS

THE pressure of work in the Coördination and Equipment Division of the Office of the Chief Signal Officer at Washington has reached the point where more trained engineers are desperately needed. An appeal is being made for several dozen trained engineers of industry experience to lend themselves to this work.

The C&E division deals with military communications equipment. Engineers engaged in this work study the military characteristics of comparable equipments, figure out how existing designs may be made to fill a new tactical need, analyze the tactical and technical requirements, the manufacturing practicability of a new design, the available production capacity in the country, etc. What are needed, therefore, are trained engineers with experience in industrial radio and, if possible, familiarity with Army radio equipment. In addition to radio, help is needed in the wire and sound fields. It is interesting work and almightily important in getting our vast radio requirements into production.

Compensation commensurate with the positions can be arranged. In many cases this will be a Civil Service rating, which the Signal Corps will arrange for after correspondence with the applicant. Commissions up possibly as high as the rank of colonel are also available. Engineers patriotically willing to attach themselves to this

(Continued on page 78)

Recruiting by broadcasting: ARRL President Bailey, representing radio amateurs, joins Rear Admiral Randall Jacobs, Chief of the Navy's Bureau of Navigation, and Colonel O. K. Sadtler, head of the Army Communication Service, in an NBC broadcast appealing for trained men for the communication branches of the Services. U. S. Navy official photo, made in Admiral Jacobs' office.

Radio and Atom Busting

A Glimpse at the Cyclotron

BY J. S. V. ALLEN,* W8UNS

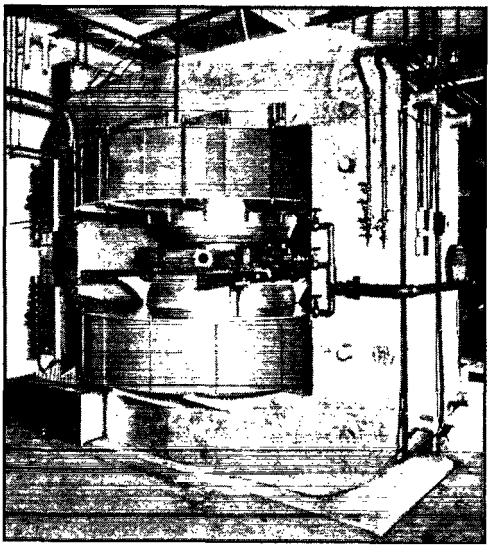
IMAGINE the ecstasies of an amateur who had nursed a 200-watt transmitter up to 300 watts, and then suddenly had the opportunity of playing with an 80,000-watt rig that loafs along at 40 kilowatts input! Therein lies a story.

One of the more recent scientific developments employing radio frequency power is the cyclotron or "atom-smasher," which threatens to revolutionize our lives some time in the future by unleashing almost limitless sources of atomic energy. A brief description of this scientific wonder and the part played by high-frequency radio may be of interest to the radio amateur. Also, some of the humorous and unusual experiences and observations of an enthusiastic ham may be interesting to others in the realm of hamdom.

The 100-ton cyclotron recently completed at the Ohio State University, at a cost of $60,000, is the product of over two years of unceasing toil by Dr. M. L. Pool [1] and his associates. Eighty tons of iron went into the construction of the magnet core, which was wound with more than nine miles of 7/16-inch copper tubing. Through this tubing a current of 300 amperes may be passed, if at the same time water is circulated through the tubing for cooling purposes. Automatic switches have been installed to stop the current if the water should cease to flow, thus preventing the high current from burning up the large magnet coils. It requires several minutes for a 50-kw. motor-generator to build up a current of 300 amperes, and during this time the magnet creaks from magnetic forces being set up within the coils. If the circuit should accidentally be opened, the destructive forces would be considerable because of the enormous amount of energy stored within the large magnetic field (15,000 gauss over 1400 square inches). For this reason the magnet and the generator are permanently connected. If the motor of the M.-G. set is turned off, the energy flows from the magnet into the generator and reverses the set. Hence, the field in the generator is reduced first, and then the M.-G. set is shut down.

* Bethany College, Bethany, W. Va.

[1] "The Ohio State University Cyclotron," Alpheus W. Smith and M. L. Pool, Physical Review, Feb. 15, 1940.



A cyclotron is a tremendous affair because it is necessary to build up terrific particle velocities to disintegrate atoms. This 42-inch (chamber diameter) cyclotron at the Ohio State University was constructed and is operated through the aid of Julius F. Stone, the Ohio State University Development Fund, and WPA aid.

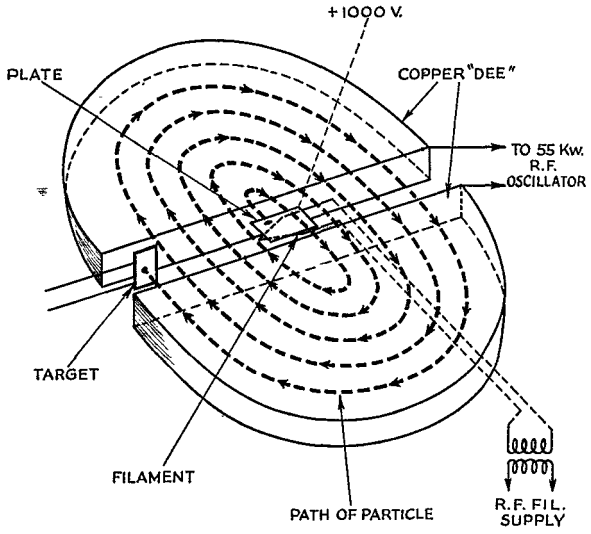
How the Cyclotron Works

The construction and operation of the cyclotron, briefly stated, are as follows: There is a large cylindrical vacuum chamber, 42 inches in diameter and 8 inches high, between the magnet poles. Within this chamber are two "dees," so-called because they are shaped like the letter D. These two copper dees are electrodes supported within the chamber by insulators and connected to the radio frequency power oscillator.

Near the center of the chamber is a tungsten filament, which must be heated by radio frequency current because the interaction between ordinary alternating or direct current and the 15,000-gauss magnetic field would bring destructive forces to bear upon the filament. Hence, an 806–833 "transmitter" (650 watts), operating on 200 kc., is used to light the filament with r.f. Above the filament is a plate, at 1000 volts positive potential to draw a beam of electrons from the filament. The beam passes vertically along the axis, ionizing the low-pressure hydrogen within the chamber. The protons, or ionized hydrogen nuclei, have a positive charge, and are pushed and pulled around and around between the two hollow dee-shaped electrodes 10.5 million times per second as the polarity of the dees oscillates. When a state of resonance exists, the positive hydrogen ion arrives between the dees in

time to be attracted by the negative charge on the one dee and repelled by the positive charge on the other dee.

But in moving, the proton must pass through the strong magnetic field which turns the ion in a semicircle. Each time the ion runs the gauntlet between the dees it receives an electrical kick in the pants, figuratively speaking, of about 40,000 volts. In this way the speed of the ion is increased to about 6000 miles per second before it crashes into the target at the outer edge of the chamber. With higher velocities a new difficulty is encountered — relativity. The ions become heavier because of their tremendous velocities, and hence cannot be accelerated as easily. The path of the ion from the center to the target is a series of about 125 semicircles with increasing radii, the increase taking place each time the ion is accelerated between the dees.



Schematic representation of the cyclotron.

The R.F. Oscillator

The most interesting part of the cyclotron to the ham is the 80-kw. power oscillator used to drive the ions back and forth between the dees. This shielded radio transmitter employs a pair of 859 tubes. Don't look in your *Handbook* for the characteristics of this tube for it exceeds the maximum amateur input by about 4000% (2000% in California)! Each tube is capable of handling more than 40 kw. at 10.5 megacycles, the frequency used. With an input of 50 kw. the plate dissipation is 20 kw., requiring a flow of from 8 to 15 gallons of water per minute. The filament current is 70 amperes and the voltage across the two units of the filament is 22. The tube is two feet in height — a real bottle!

With an input of 40 kw., perhaps 2 kw. reach the water-cooled target where the atoms are cracked, and is dissipated over an area approximately 0.05 square inch. Try that on your final amplifier tube! The target becomes white hot during some bombardments.

The power oscillator is housed in a large copper enclosure several feet from the cyclotron. The r.f. power is transferred to the chamber of the atom-smasher by means of a transmission line which includes a quarter-wavelength section. The shorting bar on this line is adjustable, permitting rough tuning. The fine tuning is accomplished by a man-sized variable condenser — a 13 square-foot vane hinged over the transmission line and adjusted by means of a motor. This whole Lecher system is made of 5-inch copper tubing and must be water-cooled for good stability. The voltage multiplication obtained by making the transmission line shorter than a quarter-wavelength is about 100. If one stands close to the transmission line his ears become uncomfortably warm from induced r.f.; there is some evidence that sinus trouble has been cured while working in the r.f. field of the transmission line.

The frequency of the power-oscillator must be maintained within a few kilocycles of the resonance frequency for a certain strength of magnetic field, otherwise the ions will fall out of step and will arrive at the gap between the dees at the wrong time to receive the greatest acceleration. The operator can control the frequency by varying the capacity through the tuning vane above the transmission line. Or an automatic gadget called a discriminator can be used.

This automaton[2] consists of an electron-coupled oscillator, amplifying circuits and a bridge circuit. Its oscillator is tuned to a frequency 5000 kilocycles below the frequency of the

While cyclotrons and many other devices utilizing the electronic art which has developed as a result of radio research are not, strictly speaking, "another part of the family," some of them are not very distant cousins. This article is presented with the thought that the ordinary amateur is enough interested in general science to want to know what the more interesting developments are in allied fields. If the gang wants, we'll try to have more articles of this nature from time to time.

[2] "An Automatic Frequency Control for Cyclotron R.F. Power Supply," R. B. Jacques, Physical Review, June 1, 1941.

power oscillator, giving a heterodyne signal of 5000 kc., which is applied to a bridge circuit balanced at 5000 kc. Any variation in the frequency of the power oscillator resulting from load reactance changes caused by heating in the power circuits causes the heterodyne beat to change and the bridge to become unbalanced proportionately. The unbalanced voltage controls the motor which varies the position of the tuning vane, and the frequency of the large oscillator is thus restored to resonance.

Occasionally the power oscillator becomes unstable and a heavy r.f. arc jumps across the grid line used to tune the grid circuit. At these times the discriminator is thrown into a state of nervous disorder. Sometimes it will adjust the tuning capacity first in one direction, then in the other, very rapidly. But under normal conditions this gadget operates very well.

When the grid circuit breaks down with a thunderous arc, the discharge sometimes drills a very fine hole through the centers of the nine-inch insulators, or an insulator may be shattered by the arc. The operator is always alert for such emergencies, and quickly turns off the power to prevent more damage.

One rainy day the 100-kva., 20,000-volt, three-phase power transformer [3] arced with a great flash and noise. Later the same day the author was operating the cyclotron and worrying about another transformer flash-over when a 150-watt lamp over his head burned out with a bright flash. Nervous prostration set in, but not before he had turned off all the power in a split second!

[3] Donated by Radio Station WJR through Professor W. L. Everitt.

W8UNS alongside the 100-kva. power transformer. The bottle is an 859, rated at 40 kw. input. Two of them are used in the cyclotron oscillator.

Warning— Leave Watches Outside!

Many interesting things happen around a cyclotron which are not duplicated elsewhere. One source of several interesting tales is the strong magnetic field. If one approaches the large magnet with iron tools in his pockets he can feel them move in strange ways under the influence of the field. An eight-inch wrench which was passed carefully from one man to another was drawn with terrific force to the magnet, and it took two men to pull it off the magnet pole. An iron box was once carried too close to the cyclotron, with the result that the magnet had to be turned off before the box could be extricated.

Many people visit the cyclotron, and are warned before they enter the laboratory that their watches will be magnetized if carried near the magnet. In spite of this warning one lady carried her watch into the cyclotron room in her purse and later asked if it was not all right, since she had not removed it from her purse while near the large magnet! She did not realize that imitation leather is a very poor magnetic shield. A demagnetizing coil such as a jeweler uses is kept in an adjacent laboratory for such cases.

One day a visiting monkey from a near-by laboratory was scampering all over the cyclotron, with workmen in hot pursuit. An ether gun and other devices were used in trying to catch the unwelcome visitor but the cyclotron itself finally accomplished this feat. When the monkey tried to run through the belt of a small vacuum pump its foot was caught, and the belt held it until a keeper captured the monkey. But atom-smashing is not all monkey business, as the following paragraphs about the products of the cyclotron will demonstrate.

The material placed in the cyclotron is bombarded with protons, neutrons, deuterons, or alpha particles, with the result that minute quantities of the material are activated, after which they radiate much the same as radium does. In fact certain radioactive elements are used instead of radium in treating cancer, leukemia, and other diseases. These radioactive substances can be used as tracers within the human body, as shown by the experiment in which a person is fed some radioactive material which enters the blood and reaches the fingers within a very few minutes. The radioactivity can be detected in the finger tips by holding them near a Geiger-Muller counter which clicks each time a particle from an exploding atom pierces the counter tube. These radioactive substances have been called the greatest contribution to medical research since the discovery of the microscope.

Atomic power is perhaps a possibility in the not

(*Continued on page 82*)

• For the Junior Constructor — Code Practice Oscillators

A pair of modern code-practice oscillators. The one at the left gets in power from the 110-volt a.c. line, and the right-hand one uses batteries that are housed in the case. Both units are built of wood and painted with gray lacquer. The handle on the battery job is the final touch that makes it truly portable.

TIME was when a key and buzzer made up the usual practice set, but vacuum tube oscillators are vastly superior to anything but special high-pitched buzzers and are now universally used. The vacuum tube oscillators to be described differ from others only in their economy and convenience. Both use a minimum of parts — one needs only to be connected to a 110-volt a.c. source to be ready for operation (with slight modification it can be arranged for 6-volt d.c. use), and the other is entirely self-contained. Enough output can be obtained to operate several pairs of headphones or a small speaker.

The 110-Volt A.C. Oscillator

CODE-PRACTICE oscillators have been built in the past which utilized only the voltage drop across the filament for the plate voltage, some have incorporated a small B battery for the plate supply, and still others have used the 117-volt cathode types to work directly from the power line. The oscillator shown in Fig. 1 uses a double-triode type of tube, with one triode section forming the oscillator portion and the other connected as a diode rectifier to furnish a small amount of plate voltage for the oscillator. By using the twin-triode tube in this arrangement, the oscillator is completely isolated from the power line, and there is no opportunity for a novice or careless person to get an electrical shock from the equipment. The voltage applied to the diode rectifier is obtained from the heater transformer, and thus there is no connection between any part of the unit and the 110-volt line.

As can be seen from Fig. 1 and the photographs, there are very few components in the unit and it is a simple matter to assemble them. Two jacks were used for connection to the key and headphones or speaker, but the ingenious constructor can easily replace these with cheaper substitutes if he desires. However, it is likely that one's headphones will normally be connected to a plug, and thus at least one jack is a good investment.

The oscillator chassis was built of pieces of ¼-inch thick plywood and two strips of 1- by 2-inch pine. The top was cut to 4 by 5½ inches, but the construction and size can of course be modified to meet the requirements of the builder. The hole for the socket can be cut with an expanding bit or scroll saw, and the hole should be made large enough to pass the base of the tube

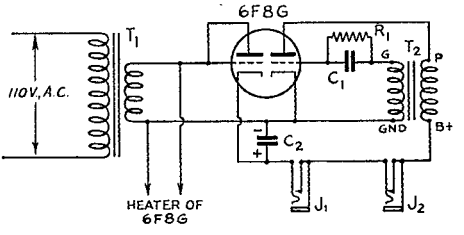
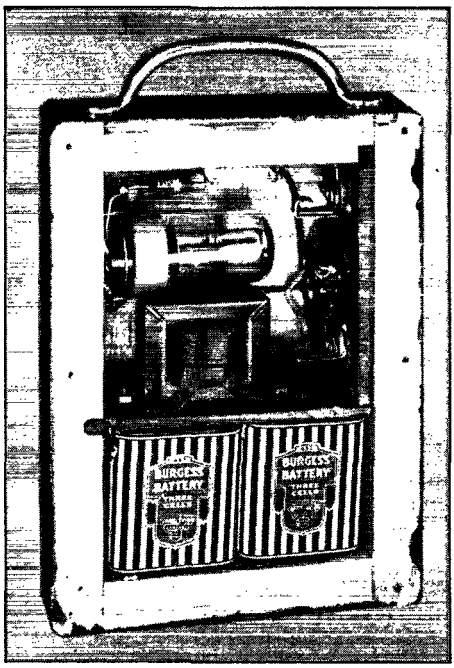


Fig. 1 — Wiring diagram of the code-practice oscillator.
C_1 — 250-$\mu\mu$fd. mica.
C_2 — 25-μfd. electrolytic, 25 volts.
J_1, J_2 — Small closed-circuit jacks.
R_1 — 0.15 megohms, ½ watt.
T_1 — 6.3-volt, 1-ampere transformer (Thordarson T-19F80).
T_2 — Small audio transformer (Thordarson T-13A34).

A code-practice oscillator is a handy gadget to have around the shack at any time, and one becomes even more useful and appropriate under the present circumstances. Whether used to increase one's code speed beyond the pre-war rate or for code instruction of a group of potential operators, a key and an audio tone generator become a good investment at this or any other time.

(which is slightly larger than the diameter of some sockets). The wood was fastened together by nails and glue and then given a coat of shellac and a coat of gray lacquer.

There is no special care necessary in wiring the oscillator, except in the case of the 110-volt leads running to the heater transformer, T_1. The connections from the line cord to the transformer primary should be soldered, well taped, and then forced between the transformer and the chassis. A staple can be used to secure the line cord to the chassis, as shown in the photograph. The grid connection that is brought out the top of the 6F8G is tied to the corresponding plate of that triode section. The key and phones can be plugged into either jack.



This inside view of the battery-powered oscillator shows the general placement of parts, and particularly the method of mounting the transformer shelf and recessed control panel.

Anyone who wishes to build a similar oscillator for 6 volts d.c. battery operation can do so by eliminating the filament transformer and substituting a 6J5 for the 6F8G. The circuit diagram is given in Fig. 2.

A Self-Contained Unit

TYPICAL of the "personal portable" era, and every bit as convenient, is an alternate design shown in Fig. 3 and accompanying photographs. Battery-powered, self-contained, book size, this little unit will be found easy to carry over to a

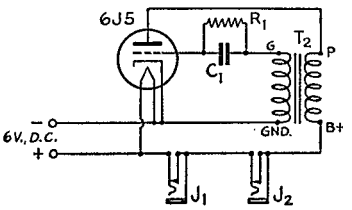


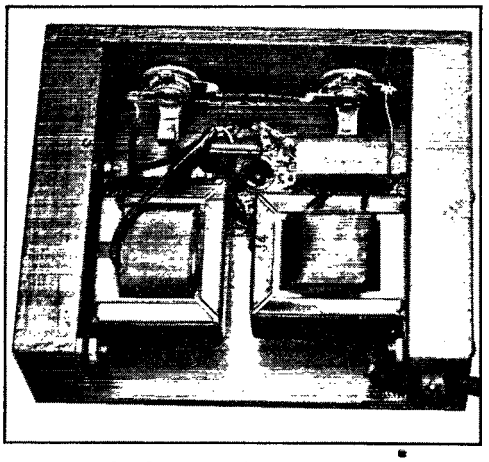
Fig. 2 — Circuit diagram of the code-practice oscillator for 6-volt d.c. operation. See Fig. 1 for values.

friend's house along with the *Handbook* for an evening's code practice; you will find it smaller than the *Handbook*, and not much thicker.

The circuit is the standard one using separate battery power for the plate circuit, since the filament voltage here would not successfully do the job. This unit employs a 1LE3, but of course any 1½-volt triode with low filament drain would serve the purpose. In fact, with the growing scarcity of tubes it may be necessary to dig into the "junk box" for an old type 30. Any 3:1 audio transformer will suffice, the smaller the better.

The box itself is made up of a rectangular frame of 1×2 white pine, with the top and bottom consisting each of a sheet of ¼-inch plywood. It measures 8×5½×2 inches outside, but here again the actual size will depend upon the parts available to the constructor. Long wood screws hold the frame; the rear side is fastened to the frame with small brads. The front panel, which must be removable to allow access to the batteries and tube, is held in place by small wood screws. The box can be dressed up a bit by rounding the corners and beveling the edges with a wood rasp (be extremely careful of the plywood!), a little sandpaper and a lot of elbow grease.

Battery life would be reduced considerably if the control switch were accidentally tripped to the "on" position and unknowingly left there a day or two. For that reason, the switch panel is recessed. This is done simply by cutting a small rectangular slot in one of the long frame members, of sufficient size to accommodate the switch and jacks, and fastening behind it a small piece of



A view under the a.c. oscillator shows the construction of the chassis and the arrangement of parts.

Presdwood or plywood, of slightly larger dimensions than the slot, on which the controls have been mounted. A bit of edge-rounding is in order here, too. Two closed-circuit jacks are connected in series in this unit also, allowing use of either or both at will.

Filament power is supplied by two small flashlight cells connected in parallel, with three 4½-volt "test" batteries (Burgess 432, or equivalent) for the plate circuit. A total plate voltage of 13½, this gives ample headphone volume with about 0.1 ma. plate current, which allows maximum battery life. Although not visible in the photograph of the inside, the two "A" cells are behind one of the "B" batteries in the battery compartment. As can be seen from the inside view, the transformer is mounted on a small rectangular piece of Presdwood fitted into slots in the frame; this mounting serves also to hold the batteries in place. Homemade battery clips being a troublesome task, we soldered connections directly.

Since the pitch of either oscillator can be adjusted by changing the values of R_1 and C_1, it is not recommended that the connections to these two parts be made permanent before the oscillator is tested, particularly if a different type of transformer (T_2) is used. If the pitch is not pleasing, the values of R_1 and C_1 can be changed until it is. If the circuit does not oscillate right off, reverse the grid and ground connections of T_2.

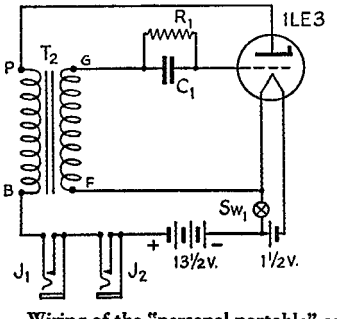


Fig. 3 — Wiring of the "personal portable" oscillator. Values of components are identical to those of Fig. 1 except that C_1 is .01 μfd and R_1 is 0.25 Megohms.

—•••—

Take your choice. Build one of these gadgets, pull up a chair, and do some serious practicing. You can build up a lot of proficiency, particularly if you find another ham to work with you, criticize your sending, and give you receiving practice. Past *QST* articles[1] form an excellent course in advanced study.

— *B. G. & J. H.*

[1] Battey, "The Secrets of Good Sending," *QST*, September and October, 1941. Huntoon, "This Business of Code," *QST*, February, 1941.

October Battery Power Contest Scores

Low Frequency Stations

(Stations are listed in order of scores. . . . Figures following call indicate score, number of sections and contacts.)

W8RMH/8	6726-19-82	W8OVB/8	272– 4–17
W3BYF/3	6006-21-71	W9AGV	264– 8–17
W3FQB/3 [1]	4576-22-50	W8HSW/8	252– 6–13
W8VUL/8 [2]	3840-20-45	W2MZB	215– 5–19
W8GP/8	1848–11–36	W7RT	200– 5–20
W6AM/6 [3]	1694–11–35	W9SWY	180– 3–29
W1MKR	1508–13–30	W2LGK	168– 6–12
W8MCB/8	1494– 9–35	W9SSU/9	152– 4– 8
W8CUG	1424–16–42	W9KXJ [13]	150–10–15
W9LNQ/9 [4]	1302– 7–40	W1EEY/1	140– 5– 7
W9JU/9 [5]	900–10–20	W9AB	140– 4–14
W8MV/8 [6]	846– 9–21	W5FDW [14]	120– 4– 7
W9VLT	700–10–32	W8QIE/8 [15]	120– 2–15
W8TJU/8 [7]	602– 7–20	W1BEH	84– 6– 7
W9ZGX	546– 7–34	W2IAT/2	80– 4– 5
W7GNJ/7 [8]	540–10–27	W9FLA	72– 6– 8
W3FGR/3 [9]	490– 7–19	W9HUV	64– 4– 7
W8JUQ/8 [10]	470– 5–19	W7ANI/7	48– 2– 7
W2AA/2	368– 8–12	W9EGQ	45– 5– 7
W8NLG/8 [11]	360– 3–35	W2AER	24– 4– 4
W8TQA/8	324– 3–22	W7BFI/7	18– 1– 9
W9GLU [12]	320– 8–17	W1TO	10– 2– 3
W8OVB	273– 7–20	W9ARN	7– 1– 7

U.H.F. Stations

(All stations reporting used 112 Mc. . . . Figures indicate score and number of stations worked.)

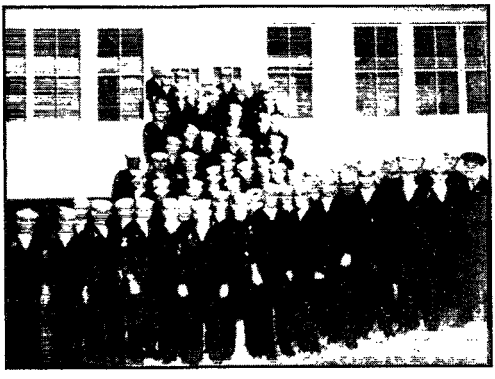
W2NPN/2 [16]	316–72	W2OAA/2	42– 9
W6RNN/6	228–52	W3JOS/2	40– 8
W2DZA/2	140–31	W1MKR/1	8– 2
W3HPX/3	80–17	W6QLZ/6	6– 3
W1GB/1 [17]	62–13	W8VUL/8	4– 2

[1] W3EJB, W3FQB, oprs. [2] W8OCT, W8VUL, oprs. [3] W6AM, W6POP. [4] W9TAL, W9YQJ. [5] Prairie Dog Emergency Crew. Oprs., W9ABR, W9CNM, W9HLB, W9JU, W9VTV, W9YWA, W9ZKQ, W9ZPN. [6] W8DYH, W8MV, W8NXT, W8UQR. [7] W8OML, W8TJU, W8VMF. [8] W7GNJ, W7HHH, W7HXV, W7IIK. [9] W3EBX, W3FGR, W3IQJ, W3IZQ. [10] W8FLA, W8JUQ, W8WCT, W8WMP. [11] Operated at Detroit Red Cross Headquarters. W9WLB, operator in charge. [12] W9GLU, W9MUX. [13] W9KXJ, W9SFZ. [14] W5ABI, W5EHO, W5EKD, W5ENH, W5GNV, W5JXD, W9CWN, W9JXI. [15] W8QIE, W8TOR. [16] W2MPI, W2NPN. [17] New Haven Amateur Radio Assn. W1LTB, opr.

IN THE SERVICES

RADAR TRAINING

AMATEURS are going in for the Navy's radiolocator training in a big way. Over two hundred have already appeared at the Noroton Naval Training Station, for example, to begin an eight months' course in the new technique. Here are some of the calls: Radiomen Delaney, 1FLR; Conte, 1GAO; Buchner, 1HWW; Hutchinson, 1IAW; Hendler, 1JBT; Wetlinsky, 1JPT; Pierce, 1LHH; Greene, 1MCN; Cavallini, 1RR; Philactos, 2AAY-IWH; Middleman, 2DZP; Meyer, 2GHK; Fergusson, ex-2GVW; Cleeland, 2HHP; Junior, 2HPS; Cummings, 2KUF-9LEJ; Papernow, 2KAT; Daniels, 2ODA; Dickson, 3DSI; Cornwell, 3EFR; Kelley, 3FAI; Lorentson, 3GSD; Ford, 3HQL; Erdman, 3JBJ; Robinson, 3JBG; Weitzel, 3JXV; Kelly, 4ATW; Tanner, 4BJG; Gammell, 4CFD; Baker, 4DKV; Smallen, 4DWR; Green, 4ELT; Azar, 4EUY; Wyatt, 4EMC; Fowler, 4EYD; Newman, 4EYT; Windham, 4FAT; Smith, 4FDG; Rice, 4FIG; Powell, 4FIY; Taylor, 4GGK; Ward, 4GAN; Henson, 4IER; Frederick, 4HTE; Selby, 4OS; Hawkins, 5BCK; Whitaker, 5HLT; Harbus, 4HRN; Cline, 5IDI; Horney, 5IDS; Reid, 5IMU; Miles, 5JOS; Williams, 6NNW; Rex, 6QHW; Reynolds, 8EZR; Drenchko, ex-8FYY; Henderson, 8GBB; Mace, 8MWZ; Rowe, 8REJ; Lotto, 8QKZ; Frederick, 8QLC; Olsefsky, 8RCL; Kemzura, 8RYY; Scott, 8TLB; Dunkerton, 8QCK; Long, 8TWZ; Heitfield, 8VVP; Wilson, 8WSB; Crane, 9ARQ-5KFG; Soltow, 9BIW; Fowley, 9CRY; Hill, 9JUL; Roberts, ex-9IGS; Flicgel, 9IVE; Lambrecht, 9JLM; Pulliam, 9LBQ; Smith, 9QUF; Hurt, 9RGI; Rowe, 9TNN; Damrow, 9SOZ; Bayer, ex-9SUC; Lee, 9TVY; Osler, 9YDW; Neusbaum, 9YQS-3JWK; Brown, 9YQB; Johnson, 9ZSB; Tlapa, K6UJX; Baird, 5GXU; Blossom, 5IMG; Canino, 8ERZ; Carter, 4HGH; Davies, 1AZG; Fisher, 3IFT; Geer, 1NCY; Gelardi, 1CCX; Heath, 3HQO; Leahy, 8TKY; Lovering, 1FDS; Martin, 3JJL; Miron, 1ARQ; Podroskey, 8NUS; Poindexter, 4FHS; Roberts, 5HRA; Ford, 9HGM; Hargis, 4FWS; Hurt, 9RGI; Leiphart, 8JFK; Munizza, 9SRZ; Schreiber, 1KNX; Ledbetter, 9WTT; Parker, 8KA; White, 9MMT; Smith, 5KAA; Killingsworth, 4EGI; Alexander, 4DPY; Bacon, 9VCJ; Ratcliff, 4CJE.



Part of the amateur group now receiving instruction in radiolocator technique at the Noroton (Conn.) Naval Training Station.

RM2cs Blanchard, 9JKC, and Wharfield, 9HLJ, Denverites at the Los Angeles "radar" school.

Lt. Comdr. Boyd Phelps, 9BP, has been transferred from Indianapolis to become executive officer at Noroton. Lt. LaVielle, 9ELL, is now communications officer of the inshore patrol, Norfolk. Congratulation to Lt. (jg) Battey, 1UE, on the extra gold stripe, and the assignment to special recruiting duty among northeastern amateurs.

AIR CORPS

MAJOR BUNDY, 5GQK, has been appointed director of pilot training in the advanced school at Kelly Field, Texas. Lts. Miller, 4CWB, and Moyer, 3EWJ, recently acquired their wings. Lt. Ready, 5CTP, is at Randolph Field, and Lt. Brooks, 4EDJ, at Tuskegee, Ala. Pvt. Leonard, 5HDR, is in the 154th Obsn. Sqdn. at Elgin Field, Fla. Sgts. Anderson, 6GSP, and Stoddard,

Frank Miller, 4CWB, now has his wings and commission as second lieutenant, USAC.

6SYN, who used to "scrap" over the air, now do so *in* the air with the 4th Obsn. Sqdn., California State Guard. Gridley, 4GJO, is taking advanced radio training at Scott Field.

SIGNAL CORPS

Lt. Spillner, 2NCY, is awaiting call to active duty. Lts. Hall, 3GOL, and Reynolds, 4BT, are new members of the electronics battalion. Gruble, 7RT, enlisted in the S.C. for Alaskan duty. Sgt. Rubin, 2LAD, is doing radio repair work in Iceland. Pvt. Samardza (operator license only), and Staff Sgt. Eanelli, 4HNP, are stationed at Ft. Jackson, S. C. We find Pvt. Burke, 8TYF, operating in the 37th Sig. Co., Camp Shelby; Franklin, 6JVG, with the 40th Sig. Co., Camp San Luis, Obispo, Calif.; Scanlan, 5JHZ, 3rd Comms. Sqdn., Marshall Field, Kans. Major Elward, 3JJO, is with the 64th Sig. Bn., Ft. Meade, Md.

ARMY

Pvt. Baker, 1MTX, is rounding up service data on the draftees at Ft. Monmouth. Draftee Tree, 2JGE, operates aboard a tank at Ft. Meade, Md. Others in the armored section include Sgt. Brust, 8QCU, and Pvt. Golec, 9VGA, at Ft. Knox. Capt. Mack, 5KOX, is assigned to the Ordnance Dept. at Ellington Field, Texas; Capt. Longley, 3JIZ, to Aberdeen Proving Ground, Md.; Lt. Plant, 6DKZ, to the Motor Training Bn. at Ft. Benning, Ga.; Lt. Roadstrum, 8UTM, to the 18th F.A., Ft. Sill, Okla.; Lt. Towsley, 8JZV, to the Coast Artillery School at Ft. Monroe, Va.; and Capt. Meermans, 8OIS, to the 10th Bn. at Ft. Eustis, Va. Cpl. Hobbs trains with the 11th Bn. at Camp Wheeler, Ga.; Pvt. Hudson, 8SRD, is with the 135th F.A. at Camp Shelby; Sgt. Hampton, 4HUR, 67th Armored Regiment, Ft. Benning; Pvt. Taylor, 7IWE, Ft. Lewis, Wash.; Pfc. Kay, 9WDB, Camp Roberts, Calif.; Rosick, 8TRN, 111th QM Regt., Camp Bowie, Texas. Pvts. Stolpensky, 2HZQ, and Compton, 8TKM, are on detached duty in Trinidad.

NAVY

Ensign Hancock, 6ALK, is at the Los Angeles NTS. Rogatsky, 6LUJ, is assigned to the radio station at Chollas Heights, Cal. CRM Collins, 8QN, operates aboard the aircraft carrier *Saratoga.* RM2cs Lee, 6NOO, and Lee, 6NON, are assigned to the D/F station at Imperial Beach, Cal. The Richmond brothers are doing their part: RM 7GKZ, operating on the *Saratoga;* 7AHF in Washington, and 7CRH operating for American Airlines in Memphis. And there are the Brogan brothers: 3ARM an op. and 6USG a machinist's mate in the Navy, and 3JEW going into the Army! Lt. Snyder, 8OUT, is senior dental officer of the *Griffin.* Tomblin, 9ULO, has enlisted in the Naval air service. RM3C Strauss, 2MFR, is stationed with the Coast Guard at San Juan, P. R. CRM Davis, K6UJO, repairs radio equipment on the *Dobbin;* Glanzman, 8OFW, is assigned to the *Rigel;* and Welling, K6TRF, to the *Argonne;* all of the Pacific fleet. In the other ocean we find RM2C Swartz, 8BLL, on the *Eberle;* Schreiber, 2MGL, on the *Woodcock;* Lt. (jg) Von Dohlen, 4HC, on the *Milwaukee;* and CRM Tarditi, 2BPV, at the N.A.S. in Brooklyn. Officers taking physicist training at Noroton: Bullock, 6MKP; Dulevich, 9MYP; Edgerly, 1BOO; Homsher, 3AXR; Horrell, ex-9SVK; Schrader, 2INC. More "Radar" men are Blanchard, 9JKC; Miller, 5DED; Wharfield, 9HLJ; and O'Connor, 8VHU.

It is our unhappy duty to report the deaths, in line of duty, of Ensign Marvin Zimmerman, 9NZW, killed in a plane crash at Atlanta, Ga.; Radioman Sampson, 9WQD, operator on the *Arizona;* Lt. (jg) Bush, 4FB, of the Naval Research Lab., Washington; and J. Pokrzywa, 9IOI, USAC, killed in action in the Philippines. Lt. Wm. Clark, 6DHS, California State Guard, was killed upon the accidental discharge of a pistol he was examining.

RM1c Kellogg, 6MRE, who pounds brass on a Pacific patrol bomber, tells us of the following other Beverly Hills hams now in service: Lt. Winchell, 6NHK, chief weatherman at Randolph Field, Texas; Lt. Davis, 6NMA, in radio training at Scott Field; and RM2c Stynes, 6MFJ, of the Navy. Pvt. Fowler, 3GJZ, is now with the 16th Sig. Svc. Co. at Ft. Meade, Md. Capt. Creighton, 4HZK, teaches in the infantry school at Ft. Benning, Ga. Pvt. Sprague, 9UZW, enjoys his Marine Corps radio training at San Diego.

If you are an amateur in the services and not yet so registered with us, we'd like to add your name to our rapidly-growing list. Drop us a postcard, won't you, telling us your name and home call, your rank and radio duties, name and location of outfit to which assigned, and whether selectee, reservist or volunteer?

New Ideas on Semi-Automatic Keyers

A Symposium of Recent Designs for Automatic Dots and Dashes

As might be expected, W2ILE's article in the issue of *QST* for April, 1941, describing his electronic keyer has proved to be an inspiration to the inventive-minded of the ham fraternity. Ever since its appearance, we have been receiving a steady trickle of mail from both those who have developed improvements or simplifications of the original model of electronic key and those who have been working on the problem of semi-automatic keying from entirely different angles, some for many years. We believe the collection presented here will bring forth, for the first time, some new and novel approaches to the subject.

A Mechanical Semi-Automatic Key for Both Dots and Dashes

BY R. S. NASLUND, W9ISA*

MANY efforts have been made to reduce the labor of manual telegraphy. In addition to the conventional type of "bug" key found in nearly every station, are the motor-driven cam key,[1] electronic models of both the feedback- and relaxation-oscillator types[2] and perhaps others which form both dots and dashes. The mechanical-vibrator key to be described is, however, singularly unique in that it requires no electrical power for operation.

The theory behind the practical development of this key was evolved back in 1938. At *A* in Fig. 1 is shown a representation of dots typical of those obtained with a correctly-adjusted "bug" of the usual type with a vibrating dot contact. Without serious thought on the matter, it might be assumed that the making of dashes by a similar mechanism would be a simple matter of simply slowing down the vibrations. The results, however, as shown at *B* are far from correct. While the length of the contact has been increased, the length of the space between dashes has also been increased to equal the length of the dash. Correct formation of Morse characters requires that the dash be three times as long as the dot, while the space between dashes should be equal to the length of one dot.

This difficulty is overcome in this design by the use of two correlated vibrating members. One of these produces dots in the usual manner, while the other, by itself, produces dashes of length equal to twice that of a dot, with long spaces, as shown in Fig. 1*B*. To produce correct dashes and spaces, both vibrating members are actuated simultaneously when the control paddle is swung to the dash side. The result is that a dot is added to the short dash, which brings the total dash length to equal that of three dots, and which also shortens the space between dashes to equal that of one dot, as pictured in Fig. 1*C*.

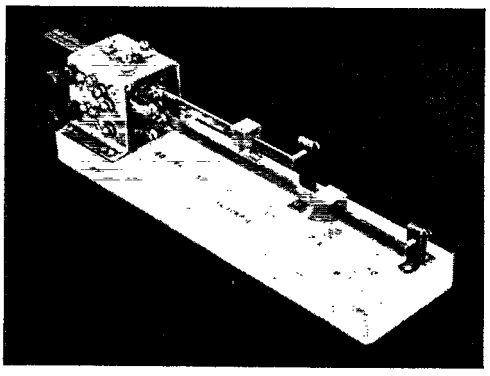
The mechanical principles, by which this theory is put into practice, are shown in the sketch of Fig. 2. The dash and dot vibrators are free to move independently on separate bearings. When the control paddle is swung to the left for dashes, both vibrators are set in motion simultaneously. When the control paddle is swung to the right, the "reversing lever" is pivoted around to strike the dot vibrator only, thus keeping the dot vibrator moving to the same side for both dots and dashes.

An experimental model of the key is shown in the photograph. It was built by the author mostly from junk-box material. The bearings for the various pivots and the adjusting screws are mounted in a housing bent up from sheet metal at one end of the base. The fixed lower bearings are small depressions drilled in the tempered bottom plate of the housing. Flat strip material is used for the vibrating rods. The square weights for adjusting the speed of vibration are slotted to

* Lake Bronson, Minn.

1 "New Keying Device," p. 122, *QST*, April, 1939.

2 "A V.T. Bug," p. 50, *QST*, Feb., 1933. Beecher, "Electronic Keying," *QST*, April, 1940. Grammer, "An Inexpensive Electronic Key," *QST*, May, 1940. Gunkle, "A Versatile Electronic Key," *Radio*, April, 1941.



An experimental model of the mechanical dot-dash semi-automatic key, built by W9ISA.

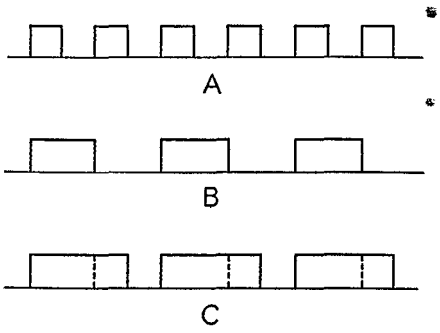


Fig. 1 — A: Characters formed by the dot vibrator. B: Characters formed by the dash vibrator. C: Proper dash characters formed by combination of both vibrators.

slide along the vibrating strips. It is important that the contact springs be as flexible as possible so as to prevent damping from this source, although the material should be stiff enough to hold adjustment. The dash vibrator is approximately 7 inches long and the dot vibrator approximately 4 inches long but, of course, the proper length to be used for any given speed will depend upon other factors as well, such as the stiffness of the vibrator spring used and the weight of the rod and adjustable weight.

The model described can be adjusted for speeds from 20 w.p.m. to 40 w.p.m. The dash vibrator is adjusted to give one dash per second for each five words per minute. For 25 w.p.m., it should be adjusted to give 5 dashes per second. The dot vibrator should be adjusted for twice the frequency of the dashes or two dots per second for each five words per minute. This will mean 10 dots per second for 25 w.p.m. Notches for each 5 w.p.m. may be filed in the rods and the sliding weights fitted with springs to snap into the notches. It is then a simple matter to change speed by simply sliding the weights to the desired notches. No other adjustments should be required.

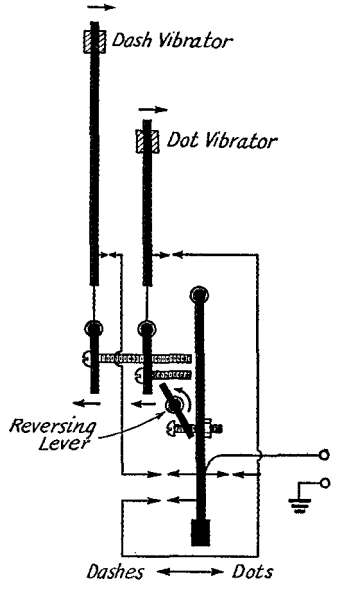


Fig. 2 — Sketch illustrating the constructional principles of the "bug" for both dots and dashes.

This key, in its present form, requires somewhat more operating pressure than a conventional "bug" because of the extra weight which must be moved. This is at least partially offset by the fact that less effort is required in making dashes. In performance, this key is somewhat similar to other devices for automatic dots and dashes in that the development by the operator of a proper rhythm is required to produce readable code. In other words, it places the operator under a certain degree of compulsion to develop correct habits of character formation. While it may be a little hard for those who have already developed an individual swing to adapt themselves to a key of this type, once the old habits have been broken, the formation of characters approaching machine perfection will not be difficult.

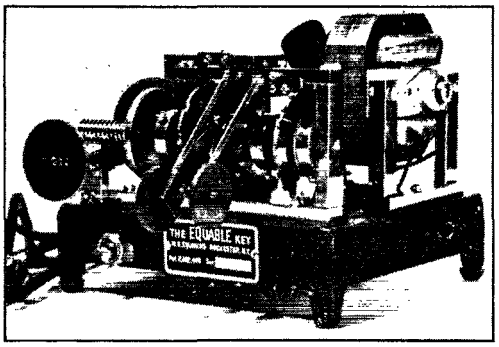
A Motor-Driven Semi-Automatic Key

THE accompanying photograph shows a motor-driven keying device called the "Equable Key" developed and produced commercially by W. R. Starkins,* of Rochester, N. Y. This key produces both automatic dots and dashes.

The shaft of the small motor is connected to a speed-reduction gear box. On the reduced-speed shaft of the gear box is mounted a friction disc which drives a shaft carrying the keying wheels. The keying wheels are somewhat similar to those used in the old Omnigraph code-practice machines. One wheel has projections in its periphery corresponding to dots, while those in the other wheel correspond to dashes. Both wheels are friction mounted on the shaft; under relatively-light pressure, they will turn with the shaft, but under heavier pressure, they will not turn with the shaft. The character projections on the wheels make contact with stationary brushes at the rear by which the keyed circuit is opened and closed.

The controls, which correspond to the paddle on the usual type of semi-automatic key is a double-lever affair. Each of these levers actuates a ratchet which serves to prevent the disc turning whenever pressure on the control lever is released. One section of the double control lever controls dots, while the other controls dashes. Speed is controlled by changing the speed of rotation of the shaft carrying the character discs by means of the variable-ratio friction drive. The

* 212 River Street



A motor-driven key making both automatic dots and dashes. The knob at the left controls the speed.

speed may be adjusted over an exceptionally-wide range (5 to 45 w.p.m. or better) by the simple twist of a speed-control knob which changes the ratio of the friction drive.

As in the case of other devices for both automatic dots and dashes, proper operation of the motor-driven key requires that the average "bug" operator give up some of his bad habits. An individual "swing" simply can't be imposed upon a key of this type. This is particularly true of the habit of exaggerating the length of dashes in respect to the length of dots. With this key, a dash can be neither cut short nor lengthened for the speed for which it is set. An undertimed pressure on the dash lever will do no harm, since the dash will automatically complete itself, once it has been started. However, if the dash lever is held over too long, another dash will be transmitted in its entirety. The same applies to dots, of course, although most operators will have less trouble with dot timing than with dash timing. The operator does, of course, have latitude in forming the spacing when alternating between dots and dashes and between letters and words, but the enforced rhythm required to execute the correct number of dots and dashes will tend automatically to develop correct spacing habits.

It is the belief of the designer that greater speed and less fatigue result from an arrangement of control in which the forefinger or middle finger controls the dots and the thumb controls the dashes. This is opposite to the action of the usual form of "bug" and the reason given is that it is possible to move the finger four to five times faster than the thumb. However, the Equable key may be obtained with dot controls for either thumb or finger as desired.

The unit is very quiet in operation, since all vibration has been cushioned. It weighs approximately 10 pounds, so that it will not slide over the operating table while in use.

Improved Switching Arrangement for Simplified Electronic Key

BY H. B. SAVAGE, W4GRB*

IT MAY be remembered that the original article on the electronic key by W2ILE, which appeared in the issue of *QST* for April, 1940, was followed by another by W1DF in the May issue which described a simplified model in which two of the three relays required in the original model were eliminated by the use of a special homemade multicontact key which served to perform the functions of the two relays eliminated.

It was noted, after careful study of the circuit diagram in the May issue that the keying arrangement could be somewhat simplified by eliminating the provision for making dashes manually, since this feature was not considered to be of importance to anyone except "visiting firemen" who might not be familiar with the operation of the electronic key. The revised circuit diagram is shown in Fig. 3. However, the main purpose of this article is to describe the construction of a key which requires no "hard to get" parts and which "feels" like a "bug" in operation.

The two levers, with their bearings, are constructed as described in Grammer's article. Instead of the Yaxley switch parts, which work much too stiffly in this application, the contact

* P. O. Box 365, Coconut Grove Station, Miami, Fla.

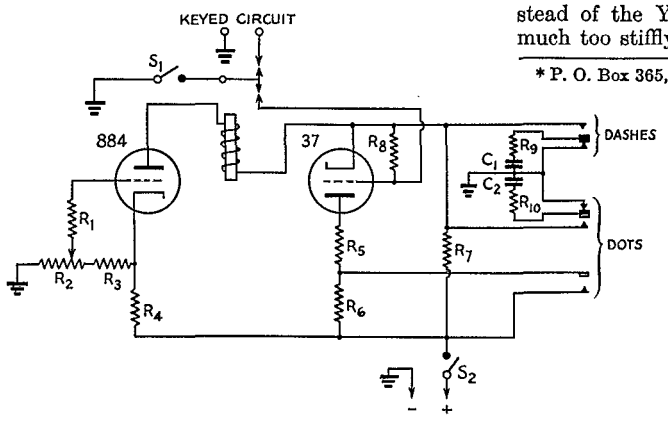


Fig. 3 — Circuit diagram of the electronic keyer used by W4GRB.
C_1, C_2 — 1-μfd. paper, 400-volt.
R_1 — 40,000 ohms, ½-watt.
R_2 — 500-ohm potentiometer.
R_3 — 600 ohms, 1-watt.
R_4 — 25,000 ohms, 1-watt.
R_5 — 25,000 ohms, 1-watt.
R_6 — 0.25 meg. potentiometer.
R_7 — 0.15 meg., 1-watt.
R_8 — 2 meg., ½-watt.
R_9, R_{10} — 100 ohms, ½-watt.
S_1, S_2 — S.p.s.t. toggle switch.
The relay has double contacts and is rated to close at 1.5 ma.

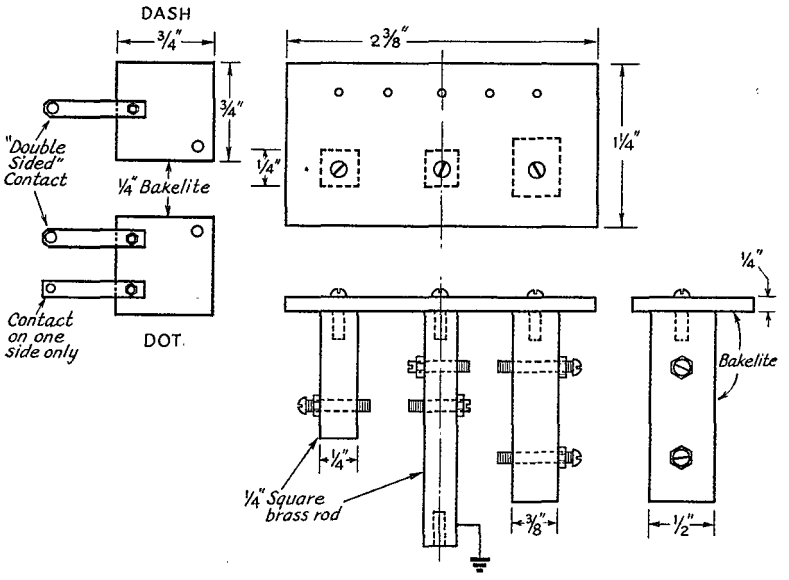


Fig. 4 — Sketches of key parts described in the text. To the left are shown the mountings for the movable contacts. The central and right-hand sketches show the construction of the stationary-contact supports.

arms were obtained from a defunct vibrator unit of an automobile-radio power supply. The vibrating element has a large double contact of tungsten which was cut out and trimmed into shape, as shown in one of the sketches of Fig. 4, with tin shears. Two of these double contacts are necessary in addition to a single-contact which is also usually found as a part of the vibrator unit.

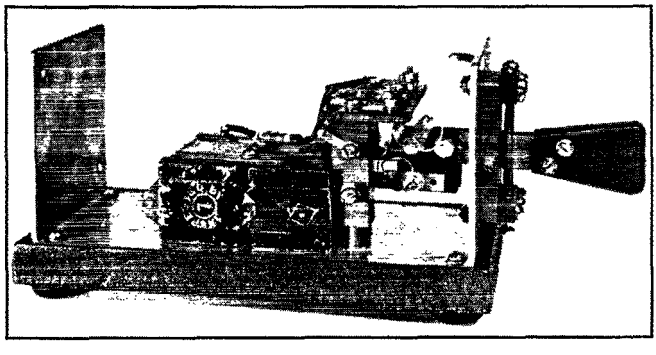
These contact arms are fastened to pieces of ¼-inch bakelite approximately ¾-inch square with machine screws as shown in Fig. 4. The bakelite pieces containing the contact arms are then fastened to the operating levers.

The construction of the mounting for the stationary contacts is also shown in Fig. 4. A piece of bakelite 2⅜ by 1¼ inches is used to space the bars holding the contacts. Two of these bars are cut from ¼-inch square brass rod, while the third is cut from bakelite or other insulating material. The central bar holding two of the stationary contacts may be grounded and is, therefore, used as a support for the assembly. The other brass bar must be insulated and, consequently, it is cut shorter than the other. While the bakelite bar is also shown shorter than the central bar in the sketch, it may be made the same length to provide additional support for the assembly.

Undoubtedly silver for the stationary contacts would be best, but ordinary brass screws have proved to be entirely satisfactory.

Across the rear of the bakelite top plate are a series of machine-screw terminals which are connected to the movable contacts with flexible leads. A view of the assembly is shown in the accompanying photograph.

It is hoped that this description will enable some amateurs who have shied away from attempting to build a key around the jack-type switching unit to build a unit with confidence that the results will be something which closely approaches the usual bug in handling and which does not feel like a wrestling match with a clock spring.

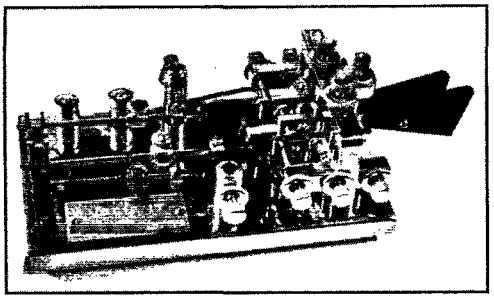


Close-up view of the construction of the key used by W4GRB in connection with his electronic keyer.

Another New Mechanical Key

OPERATING on lines somewhat similar to those described by W9ISA is the "Valiant" key which Melvin E. Hanson,* W6MFY, has placed in limited commercial production. The dot vibrator, the dash vibrator and the control paddle are mounted in separate bearings with the bearing for the control paddle between the other two. Moving the paddle to the right actuates the dot vibrator, while the dash vibrator is set in motion by moving the control paddle to the left.

Both vibrators are quite similar in construction to the dot vibrators of the usual form of semi-automatic keys. While the total length of each vibrator is the same, the steel reed of the dash vibrator is about twice as long as that of the dot vibrator to slow down the rate of vibration. The



The "Valiant" mechanical key for making automatic dots and dashes.

moving dash contact is mounted on a much longer spring of greater flexibility than that of the dot contact. This permits the dash contacts, with proper adjustment of the stationary contact, to remain closed over three quarters of the vibration cycle and open over one quarter of the cycle, thereby providing correct proportioning of dash and space lengths.

The key is well-built mechanically, with heavy chrome-plated machined parts and base. The length and position of the bakelite control paddle may be adjusted to suit the individual operator.

The "Valiant" key exhibits characteristics common to all types of keys which form both dots and dashes automatically. Its satisfactory operation requires the development of timing habits of greater accuracy than the minimum necessary for producing readable (but not necessarily correct!) characters with the ordinary bug. Anyone who has become accustomed to an electronic key should have no difficulty in turning out excellent code with this key. It is capable of speeds well in excess of 60 words per minute.

* 821 Main St., Huntington Beach, Calif.

25 YEARS AGO THIS MONTH

THERE is a familiar ring to an editorial in the March, 1917, *QST*. The editor is wondering about the effect upon amateur wireless if this country drifts into the European war. When that war first broke out, amateurs on the Pacific Coast were compelled to suspend operations, although later they were released. The editor thinks it is a serious question whether we would be allowed to go on now if the country does go into war. "Military necessity is one of those things which does not have to explain its actions. We certainly hope that we shall be successful in showing the authorities that we are sufficiently well organized to make it a military advantage to keep us going." The ARRL's Department of Defence, under Edgar Felix, announces that arrangements are under way to demonstrate to departments of the government, by test messages over our trunk lines, just what we can do in the way of relay service.

Some still-familiar names are to be found in this issue. Fred Terman (now Professor Terman at Stanford University and retiring president of the IRE) sends a list of calls heard and asks for reports on his station 6FT. Robert C. Higgy (now Professor Higgy of the EE Dept. at Ohio State) has just set up 6DM at Phoenix, Ariz., and is obtaining such good results that he foresees the early success of a transcontinental relay. Hoyt S. Scott, 8LE (now Lieutenant Scott, Navy Department, Washington), writes the editor that he has ordered a new 1-kw. transformer and although he has "been in the game five years, each day is just as interesting as the first day." Amongst the stations described is the special-license station 6ZD, that of the vice-president of the Fresno Radio Club, Reginald Denny — later to become a cinema star and also well known to the fraternity of model builders.

The late Professor J. H. Morecroft leads off this issue with a Radio Club of America paper on "Inductance and Capacity Phenomena." A. L. Groves of Brooke, Va., later to become famous for his long-wave reception, contributes the first of his many articles to *QST*, in this one reporting his observation that the amateur wave seems more suited to distances of 250–600 miles than to distances shorter or greater than that. M. B. West, the famous 8AEZ, pleads for brevity, a standard message preamble, standard procedure for fills and the elimination of unnecessary calling. The editor quotes "The Great Unwritten Law" which permits "big fellows" and "little fellows" to live in the same town: After 9 P.M. (and until 7 A.M.), no small talk, conversation, testing or other unnecessary interference with long-distance traffic; up to 9 P.M., local work of all sorts, long-distance traffic to keep out.

The League contemplates offering affiliation to the hundreds of local clubs over the country and a directory of such societies is being compiled. . . . When traffic gets off the organized trunk lines, messages jump around in a demoralizing manner; so relayers are urged to keep their traffic on the organized routes. . . . The editor, after a long wrestle over price versus quality, announces that *QST* will have to be 15¢ a copy starting with the next issue, instead of the usual dime. "We know you will feel it is well worth another 5¢. We hope you will back us up. We certainly need it."

Navy Day—1941

FOR the seventeenth consecutive year radio amateurs participated in the celebration of Navy Day on October 27, 1941. On this day each year ARRL has sponsored a Receiving Competition in which a message from the Secretary of the Navy is copied. Letters of commendation from the Navy Department were offered to all operators making perfect copy of the message text.

The message was transmitted from Radio Washington (NAA) and Radio San Francisco (BPG) at an approximate speed of 25 w.p.m. Four hundred and seventy-five operators submitted copies. Of these 196, or 41% of all participants, made 100% accurate copy and each will be awarded a letter signed by the Secretary of the Navy.

The Honor Roll lists all participants alphabetically and by Naval Districts. A surprisingly large number of those taking part in the competition were amateurs on active duty in the U. S. Army and Navy. Hearty congratulations to all whose code proficiency was high enough to put them in line for one of the letter awards!

1941 NAVY DAY MESSAGE

It is my pleasure to transmit a message of greeting to the radio operators of the United States and insular possessions in celebration of Navy Day. This message has particular significance at this time because we face a major national emergency. Not since the First World War has so much attention been focused upon radio communication and the Communicator Naval Reserve and commercial operators are already serving the Navy and many of these were once amateur radio operators. During peacetime the amateur radio operators have been busily engaged in preparing themselves to serve during an emergency. We now face such an emergency. The importance of our Naval Communication Service and the increasing demands thereon created by the growing size of our fleet is of particular interest to those skilled in the art of communication by radio. I sincerely believe that from among them will continue to step forward the additional radiomen the Navy will require to satisfy the ever-increasing need for communication personnel in the expanding Naval Communication Service.

The Secretary of the Navy.

(This is the text of the message transmitted from NAA.)

Honor Roll

Letter Winners

First Naval District: W1BB, W1BDU, W1BDV, W1BVR, W1DGN W1GHB, W1HX, W1JAH, W1KCT, W1KWD, W1WV, W1ZR, W2JAU/1, W2KTR/1, W8TWP/1, Charles Hollisian, L. E. Marston. **Second Naval District:** W1BYW, W1CCF, W1KYF, W1LOL, W1MBN, W1NKC, W1NQK, W1UE, W2ALD, W2AYJ, W2BZJ, W2CPD, W2DXS, W2HAQ, W2HPG, W2HVO, W2HXI, W2JN, W2LBI, W2LOS, W2OEN, W3FWC, W3HNY/2, W8DZC, W9DKC, W9ZHD, S. M. Fox. **Fourth Naval District:** W3ADE, W3EFH, W3GKO, W8GCP/8, W8NCJ, W8NSY, W8TYO, Beth Rosenberg, David A. Snyder. **Fifth Naval District:** W3EIZ, W3IRD, W3JEI, W3VT/3, W9EVA, George De La Matyr, **Sixth Naval District:** W4AOB. **Seventh Naval District:** W4AKV, W4BKX, W4DVO, W4GEE, W4IP. **Eighth Naval District:** W5BNO, W5GJG, W5IGO, W5IHA, W5IMX, W5KC, C. W. Baldwin, K. C. Francis, Donald B. Lemmer, R. G. Loucks, Morris C. Toft. **Ninth Naval District:** W8AQ, W8AW, W8CLL, W8DAE, W8FLA, W8HMH, W8HSW, W8IFT, W8MCB, W8PP, W8RN, W8SFI, W8SS, W9BMJ, W9BWW, W9CSB, W9DND, W9EFC, W9EVM, W9FFD, W9FYX, W9GFU, W9HDP, W9IAN, W9KPA, W9LEG, W9MDJ/W9EZ, W9MMT, W9MUX, W9NGS, W9NJU, W9NKM, W9NLA, W9NZE, W9OKQ, W9OMA, W9ONY, W9QIL, W9QPG, W9QVA, W9RLB, W9UZ, W9VUD, W9WUU, W9YDI, W9ZQW, W9ZTN, W9ZUO, K. H. Nonweiler. **Tenth Naval District:** K4HQY, KB4HXU. **Eleventh Naval District:** W1CY, W5ENI, W6AM, W6AOA, W6AVR, W6BBR, W6BVZ, W6CLV, W6EC, W6EEW, W6GTM, W6IIK, W6KWP, W6LBP, W6LM, W6MCG, W6MGL, W6MXC, W6QAC, W6ROZ, W6SZV, W6TDC, W6TPP, W9QUY, J. N. Balsley, P. K. Beisel, Charles P. Calhoun, Maurice B. Dance, J. Maisello. **Twelfth Naval District:** W6ALO, W6CIS, W6DBQ, W6LGQ, W6PBV, W6PGB, W6MRT, W6RBQ, W6UFJ, W9EHO, W9EHP, W9HLH, W9MOI, W9MTF, W9REU, W9RXM. **Thirteenth Naval District:** K7AIF, K7GBF, W6IGA, W7AJ, W7DET, W7EBQ, W7EBS, W7ESV, W7FBV, W7FPN, W7GNJ, W7GRE, W7GTW, W7HAZ, W7HZG, W7ITF, W7WU, W7RT. **Fourteenth Naval District:** W2KNR/K6, W7GMC/K6, W9GHQ/K6, K6CGK, K6NDF/KD6. **Fifteenth Naval District:** Jack Farrance.

Alphabetical and numerical listing by Naval Districts of the remaining participants follows:

First Naval District: W1AUN, W1AVJ, W1BFT, W1BPI, W1BTY, W1FTJ, W1IJF, W1JSM, W1KBG, W1KFV, W1KRV, W1KXU, W1LQQ, W1MOV, W1LJQ, W1LOA, W1MUW, W1NJY, W1TY, W3HDH, W9BBW, George F. Baptiste, I. J. Sheffield. **Third Naval District:** W1BQL, W1EAO, W1JRP, W1KCF, W1KQX, W1KYL, W1MAU, W2AER, W2DOG, W2DYF, W2EAF, W2FLL, W2GE, W2GIJ, W2GTZ, W2JSS, W2JZX, W2LA, W2LCD, W2LMR, W2LQP, W2LR, W2MLO, W2MTC, W2MZB, W2NDQ, W2OBZ, W4FEO, W5JJH, W5JOS, W6TWX, W8CZM, W8IOW, W8PSM, W8QCH, W8SEI, W8SSC, W9MRU, W9NJT, J. G. Bates, Jr., Thomas Crehan, Gerard D. Furlong. **Fourth Naval District:** W3AKB, W3AOC, W3FAK, W3FXZ, W3HAZ, W3INH, W3JAK, W8DIL, W8LGD, W8NTE, W8UCS. **Fifth Naval District:** W2FRC, W2KC, W3AVW, W3CDQ, W3CIZ, W3GJY, W3GKN, W3JHW, W3JTA, W5JVQ/3, W9LSV, W8CSF, W8JWL. **Sixth Naval District:** W4CPU, W4DEFC, W4HJL, W4HMH, William M. Meloney. **Seventh Naval District:** W4ALP, W4AZJ, W4BYF, W4EFM, W4GIP, W4GVC, W4EQQ, W4HAD, W4HGT, W4HJQ, W4IE, W4PEI, W4VS, W5JHE/

(*Continued on page 70*)

Making Use of Induction

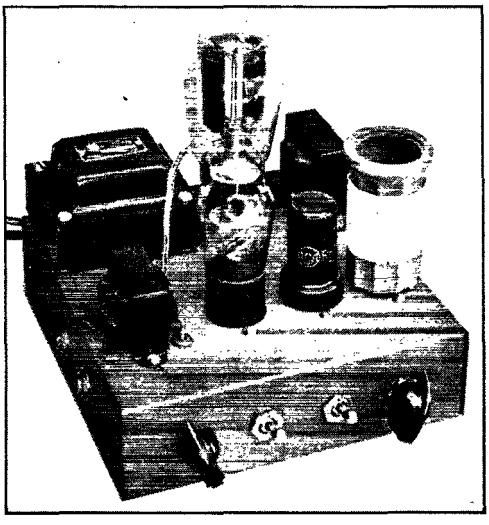
Induction Transmission for Short Distance Communication

BY VERNON CHAMBERS,* W1JEQ

This novel communications system and its simple gear will provide communication up to distances of 285 feet at the frequencies suggested. And incidentally, the operator doesn't have to build a receiver — and he doesn't need a license!

THE communication system to be described employs an old idea dressed up to give it ham appeal. The apparatus and its operation are closely related to other systems commonly known as wireless-record players, wireless inter-office communication installations, mystery control and similar devices. All of these methods of transmission may be used without licensing by the FCC, providing that the signal does not exceed a strength of 15 microvolts per meter at a distance equal to the wavelength divided by 2π. The distance over which this type of device may be used is, therefore, directly proportional to wavelength, and when used in the 550-600 kc. portion of the broadcast band, it is possible to communicate between points separated by as much as 285 feet. This is, indeed, a short haul compared to normal radio communication in the ham bands, but it is not so short as to make it unusable for many purposes. For instance, it is sufficient to provide contact between defense offices or stations located within large buildings, or for giving code practice to the next door neighbor, or conversing with a near-by friend without depending upon the regular telephone.

*Technical Information Service, ARRL.



This top-view photograph of the induction transmitter shows the r.f. and audio sections laid out at the front of the chassis. The power supply components are at the rear. Microphone- and key-jacks are mounted on the left side of the base and the switches and variable controls are mounted on the front wall.

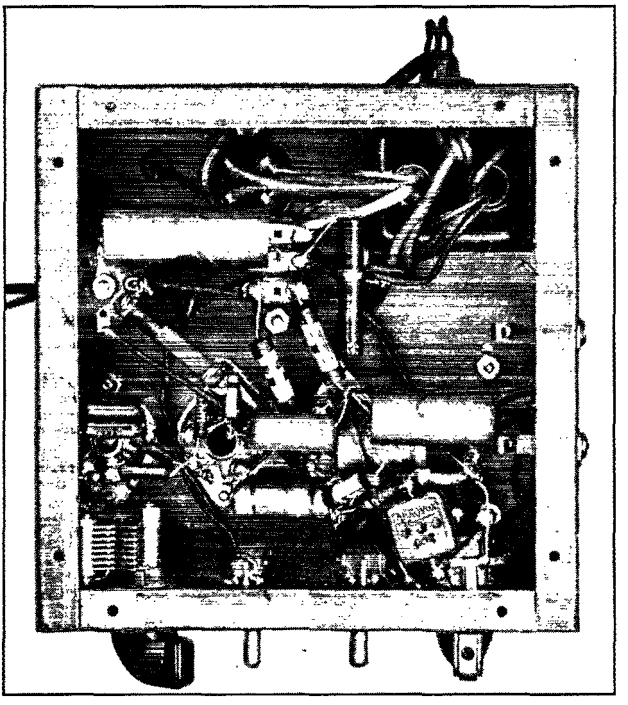
The induction transmitter does not cost as much as the average low-power transmitter. It is simple in design and construction. Both modulated c.w. and voice transmission are available (a valuable asset so far as code practice is concerned). Receiver construction or purchase is not required because the unit operates on frequencies covered by the standard broadcast set.

Circuit Details

The r.f. section of the induction transmitter is nothing more than an ordinary electron-coupled oscillator. The basic circuit is described in the *Radio Amateur's Handbook*. However, in this case we used a pentagrid converter tube rather than one of the screen-grid types because it is convenient to have a separate grid to which modulation can be applied. The regular oscillator circuit for the 6SA7 is used, with the source of modulation connected to the No. 3 grid. The plate circuit of the oscillator is untuned, and the grid circuit has a fairly low *LC* ratio for the benefit of stability. The high order of tuned-circuit capacity is obtained by connecting the mica condensers C_2 and C_3 in parallel with the variable condenser, C_1. This combination has a tuning range of approximately 50 kilocycles with the coils specified. Feed-back is obtained by tapping the 6SA7 cathode on the grid coil, L_1. Cathode bias, not ordinarily used with this type of circuit, is employed in order that the operating characteristics of the tube may be set for proper modulated operation; the modulation percentage is low and the output distorted unless the bias is provided.

The audio oscillator-modulator will not be treated in detail because it is identical to the front end of the unit recently described in *QST*.[1] We need only say that the audio-oscillator section is used to modulate the e.c.o. for code communication (the e.c.o. output must be modulated because it is expected that the receiving equipment will

[1] Grammer, "More Gear for Civilian Defense," *QST*, February, 1942.



A bottom view of the induction transmitter.

not be equipped with a beat oscillator), and that the other half of the circuit is employed as a standard one-tube modulator.

Construction

The parts are mounted on a metal chassis measuring 2 by 7 by 7 inches. The photographs of the transmitter show how the components are mounted on the base, and in attempting to duplicate the layout it is only necessary that the constructor follow the general plan. In other words, a low-frequency gadget of this type does not require the extreme care given to the arrangement and wiring of a high-frequency circuit. Of course, you can encounter hum in the audio circuit just as you can with any speech-amplifier or modulator, but aside from this difficulty, little trouble should be expected. Hum can be eliminated if the fields of the microphone and power transformers are not allowed to interact. Such magnetic coupling can be prevented by providing sufficient spacing between the two transformers and by selection of the mounting positions. Although the microphone transformer must be wired into the circuit before the unit can be tested, it is not necessary that it be bolted in place immediately. Therefore, the position of T_1 may be varied as the testing proceeds and, as a result, the position which eliminates hum may be selected.

Feedback for the audio oscillator is secured through C_7. The circuit will not oscillate unless the connection is made at the correct end of the transformer primary winding; the correct end is to be found experimentally. If the oscillator does not function when the cathode circuit is closed by the key, try reversing the primary leads.

Leads for the microphone battery and the a.c. line cord are brought into the chassis through a hole drilled in the rear wall. The switch S_1 is in series with the line cord and is used to turn the transmitter on and off. Switch S_2 opens or closes the microphone circuit and the d.c. lead to r.f. and audio circuits. This switch is opened during the stand-by or receiving periods. The microphone plug should be removed from J_1 when the modulator is not used.

The tuned-circuit coil, L_1, is wound on a plug-in form for convenience and also to permit use of longer wavelengths for greater range should suitable receiving equipment be available. A new coil can be used for the operating frequency without necessitating any other changes in the unit.

Testing and Operation

The on-off switch should be snapped on after the coil and tubes have been plugged in their respective sockets. A broadcast receiver should then be set to the low-frequency end of the dial and a key should be plugged in J_2. The send-receive switch is now closed and, while keying the tone oscillator, the modulated signal is tuned in on the receiver. If the signal falls on a broadcast station carrier, it is advisable to tune the transmitter to a new frequency so that the e.c.o. signal will not heterodyne with the b.c. station signal. The modulator may now be tried, this test being made either with the key open or removed from J_2. During these tests it is necessary to adjust R_4 for the desirable degree of modulation or for the modulation tone which appeals to the operator.

The distance over which this method of transmission may be legally used can be determined by

$$D \text{ (meters)} = \frac{\text{(meters)}}{2\pi}$$

or

$$D \text{ (feet)} = \frac{157{,}000}{f \text{ (kc.)}}$$

As we have said before, it is essential that the signal strength be not more than 15 microvolts per meter at this distance. A means of accurately measuring the signal strength is not available to the average person and, as a result, we must depend upon our own judgment to prevent infrac-

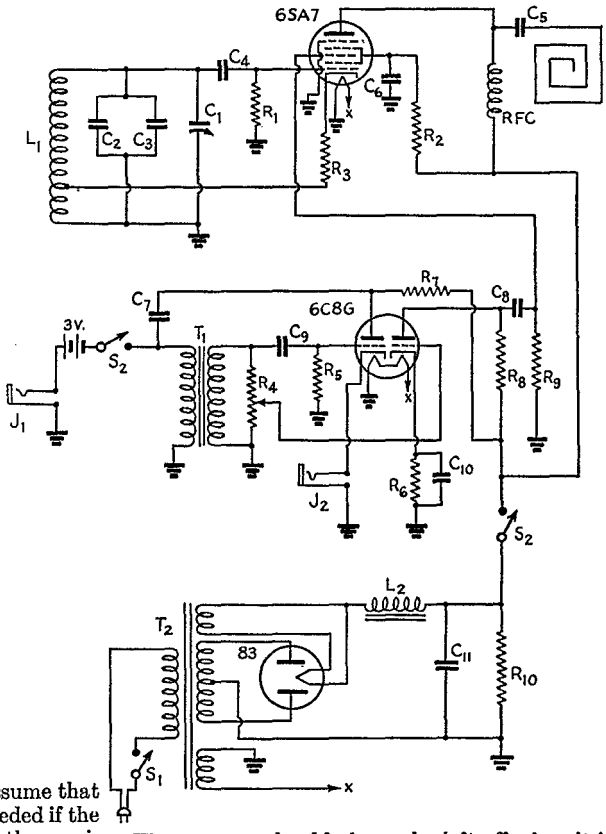


Fig. 1 — Wiring diagram of the induction transmitter.

C_1 — 140-$\mu\mu$fd. tuning condenser (National EX-140).
C_2 — 500-$\mu\mu$fd. midget mica.
C_3 — 250-$\mu\mu$fd. midget mica.
C_4 — 100-$\mu\mu$fd. midget mica.
C_5 — See text.
C_6, C_7, C_8 — 0.01-μfd. paper.
C_9 — 0.002-μfd. mica.
C_{10} — 10-μfd. electrolytic, 50 volts.
C_{11} — 8-μfd. electrolytic, 450 volts.
R_1 — 0.1 megohm, ½ watt.
R_2 — 20,000 ohms, 1 watt.
R_3 — 250 ohms, ½ watt.
R_4 — 0.5-megohm volume control.
R_5 — 0.5 megohm, ½ watt.
R_6 — 1500 ohms, 1 watt.
R_7 — 0.1 megohm, 1 watt.
R_8 — 50,000 ohms, 1 watt.
R_9 — 0.25 megohm, ½ watt.
R_{10} — 50,000 ohms, 2 watts.
J_1, J_2 — Open-circuit jack.
S_1 — S.p.s.t. toggle.
S_2 — D.p.s.t. toggle.
T_1 — Single-button microphone transformer (Stancor A-4706 or equivalent).
T_2 — 325 volts each side center tap, 40 ma.; 5 volts, 3 amp.; 6.3 volts, 2 amp. (Stancor P-6010 or equivalent).
L_1 — 65 turns No. 24 d.s.c. close wound, 1½-inch diam. Tap 15 turns from grounded end.
L_2 — 10 henrys, 40 ma. (Thordarson T-13C27 or equivalent).

tion of FCC regulations. It is safe to assume that the field strength limit is not being exceeded if the signal is just usable in any receiver at the maximum distance permitted. We have made it a practice to keep our range slightly below that actually permitted, just to play safe.

It will be found that a wide area can be covered without any form of antenna or radiator connected to the e.c.o. Of course, the effective range depends considerably on the sensitivity of the receiving equipment. If an antenna has to be used, it should be no longer than necessary to give the signal strength described above, and the coupling condenser C_5 may be almost any condenser that happens to be on hand. As a matter of fact, it is often possible to use only the capacity formed by placing the antenna close to the plate r.f. choke. The antenna should always be left off when it is not essential to satisfactory communication; a few feet of wire should be sufficient in any case.

The operator must remember that his transmitter is radiating in or near the broadcast band and that its fundamental and harmonic frequencies can cause interference with broadcast-program reception. Therefore, it is an excellent idea to learn the listening habits of your neighbors in order that you won't break up one of their favorite programs. And remember that it is possible to select an operating frequency that will cause the fundamental and harmonic frequencies to fall at points where broadcast carriers do not appear.

The Delaware Valley Radio Assn. held its 5th Annual Outing and Hamfest at the Trenton Fair Grounds on August 10, 1941 with a record attendance of 575. W2MLW rounded up eight popular YL ops there for this group photo. Left to right: "Frances" W2MWW; "Dottie" W2MIY; "Shirley" W2LMI; "Pauline" W3HVO; "Jean" W3INL; "Norma" W1MUW; "Millie" W5IIT; "Mary" W2JLL.

ON THE ULTRA HIGHS

CONDUCTED BY E. P. TILTON,* W1HDQ

MAKING model airplanes? Collecting stamps? Going in for photography? Hi! The fellow who bought commercially-built gear solely for the purpose of rag-chewing may find very little of interest left in amateur radio but the u.h.f. enthusiast is, at heart, an experimenter, and as such he is making the best of what is left of his hobby while we QRX for Washington developments.

Intensive plans for civilian defense are being worked out in almost every city and town in the country, and in many places arrangements are so advanced that groups await only the word from Washington to have the situation completely in hand. As the responsibility for the establishment of an emergency communications system, even though it be u.h.f. in nature, now rests with all of amateur radio, news of our progress now appears elsewhere in *QST*.

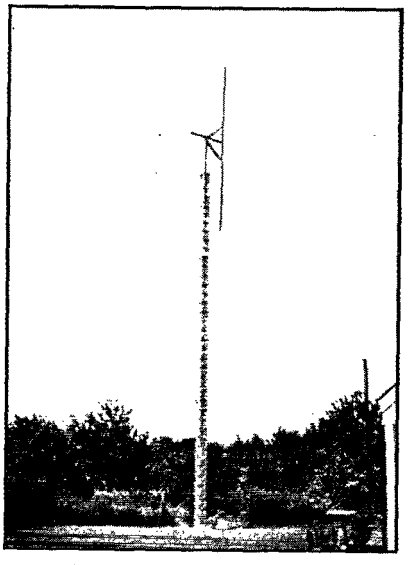
But what of the time when all plans are made, and all emergency stations are ready to go when and where needed? There will be some of us who do not go into the country's armed forces; some of us will not be working long hours in defense industries; some of us may not be required to spend too much time in civilian defense work. What, then, can we find in our hobby to keep interest alive? Friendly contacts on the ultra-highs have been a large part of the fun we have derived from our work, of course, but still a considerable amount of satisfaction has also come from making gear which works satisfactorily; and more from everlastingly tinkering to squeeze just a little more performance out of it. That angle remains with us — we may not be able to measure the extent of our improvements by the better reports we get from stations worked, and certainly we are not going to be able to "make a chest" at the Radio Club when we give out with the choice details of the DX worked with that new rotary; but we can put almost any amount of time to good use in giving our receivers a going over.

In the rush to get more watts into the antenna the receiver angle has been sorely neglected in recent years. We have frequently been content with a fancy and reliable piece of commercial equipment when we might have made ourselves something considerably better had we taken the time and trouble to build something especially designed for the job at hand. We have a strong suspicion that once the current unpleasantness is over we are going to see some real advances in u.h.f. technique, simply because, as a result of our enforced "time-out", we have spent some time making improvements in our receivers.

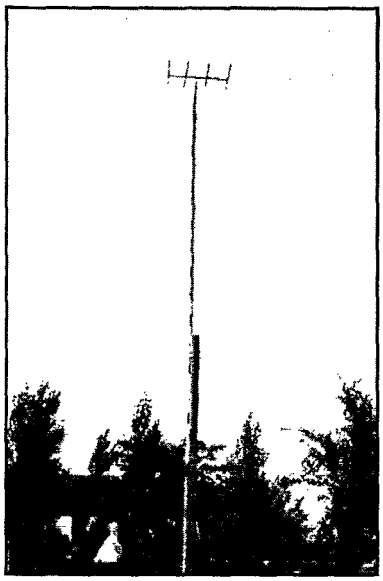
W1JFF, Newport, R. I., suggests that now, if ever, is the time for us to get going on f.m. We have had the excuse, for our backwardness in adopting this new technique, that the receiver was too complicated for us. Fred points out that if the f.m. receiver is considered from the standpoint of its various units (r.f., i.f., limiter, discriminator, and audio) it is nothing to scare anyone who has had any experience in construction or servicing of receivers. The f.m. receiver has the very definite advantage of being useful at the moment, too. It can be built up for the f.m. broadcast band and be changed over to 112, 56, or 28 Mc. with a minimum of trouble. F.m. is "here." It is certain to play a greatly-increased part in amateur and commercial radio after the war, and right now is not a bit too soon to begin getting ready for it. It would do all of us no harm to dig out that January, 1940, *QST* right now and bone up on f.m. fundamentals laid down in *QST*'s first feature article on the subject as applied to amateur communication. Other very useful material appears in *QST* for February, April, June, September, and December, 1940, and March, 1941.

If you think you are in a bad way, not being able to put that rig on the air, consider the case of W1MEP. Chet accepted an assignment to make weather observations and tend a battery of

*329 Central St., Springfield, Mass.



This neat bit of tower construction supports the extended double-Zepp of W2FHJ, Little Neck, Long Island. Viola Kapp, operator, is one of the few YLs on Five.



The 4-element W6QLZ array of W9LLM, Downers Grove, Ill., is 65 feet above ground. It was to have gone up another 20 feet on December 7th!

weather instruments on the top of Glastenbury Mountain, Vt., for just one reason — to permit continuance of his u.h.f. activities. At the end of his season's work as Vermont Fire Warden in 1940, Chet returned to his home in Bennington to find himself lost without his daily contacts on Five. So when the chance to spend the winter of 1941–2 on the summit came along, Chet welcomed it — and now he spends his spare time listening to the broadcast band and watching the snow pile up and his antennas blow down! Broadcast reception is good, though, and well it might be, for Chet has a receiving antenna that is something of a record — seven miles of telephone line!

The vast number of stations operating on 2½ along the Atlantic Seaboard in New England, New York, and New Jersey makes it a foregone conclusion that this primary target area will be well supplied with emergency communication when the need arises, but it may be something of a surprise to some to learn that Tampa, Florida, had eight stations lined up for 112-Mc. emergency duty at the time of the close-down. W4BYR reports that plans are going right ahead, and though they are not giving out details for publication, it appears that the Tampa area will be well provided for when the time comes that they are permitted to put their plans into execution.

W6ANN, San Pedro, Cal., is strong for the 112-Mc. superhet with superregen i.f. system. Bill completed such a receiver just a few days prior to Dec. 7th and was able to hear the fellows in San Diego (100 miles) under ordinary conditions. On one occasion a fellow operating a transceiver in the projection booth of a San Diego theater, with no outside antenna, was heard clearly by W6ANN!

And W6OVK has found a unique use for his modified S.I.G. recently described in *QST*. The Arizona State Police use a frequency of 116,150 (transceivers, note!) for communication with patrol cars. One of their commercially-built superhets broke down recently and Jim installed his receiver while the ailing unit was being repaired. They report that Jim's receiver performs as well as the commercial jobs.

The W6QLZ-W6OVK combination is now interested in light-beam communication. Having been successful in establishing consistent communication over 107 miles of mountains on both 2½ and 5, Jim and Clyde are now wondering what sort of gear would be best for making the hop with a sealed-beam headlight!

W7CIL, Salem, Ore., reports that signals on Five follow the seasonal changes noted by the Arizona boys. In contrast to observations in other sections of the country, these fellows say that atmospheric bending is more pronounced in winter than in summer. W7's FFE and FDJ at Houlton, Ore. (70 miles), were down an average of 12 db. in June and July, as compared with the January-May level. "Bake" is getting set for f.m. by adding an adapter to his HQ-120. A converter for 2½, 5, and the f.m. band will then work into the HQ-120 or into a 20-Mc. superregen. The f.m. band is going to be watched for signs of sporadic-E DX. Like many another skip-DX enthusiast, Bake will undoubtedly go in for a bit of hair-tearing and nail-biting when the DX starts rolling in on that 42–50 Mc. range!

W7RT, Seattle, Wash., reports that 112-Mc. activity received a setback last summer when most of the gang sold their portable gear to soldiers on maneuvers. John enlisted in the Army December 27th and is now with the Alaska Communication System, Signal Corps.

Sometime ago we mentioned, as a likely prospect for the advancement of our 56-Mc. relay plans, W8KHG of Kane, Pa. He didn't make the grade in time to help out in the Ninth U.H.F. Roundup, but is now all set to go on Five, having received a new DM-36 on December 8th! In a high-altitude location less than 30 miles from the New York state border, W8KHG should help to make things interesting for W8RTW, Elmira, W8PK, East Bloomfield, and other Western New Yorkers — when we get back to such things as the promotion of relays. He has been working on locals, W8NM and W8BRJ, and had tests lined up with W8RUE at Pittsburgh.

W9LLM, Downers Grove, Ill., was about to raise his 4-element W6QLZ array another 20 feet, to a height of 85 feet above ground. A block and tackle was mounted at the top of the mast —

(*Continued on page 80*)

★ THE EXPERIMENTER'S SECTION ★

As announced elsewhere in this issue, the Experimenter's Section is returning to the pages of *QST*. Since this department last appeared in its original form about 12 years ago (before many of our present readers could pronounce the word) a review of the aims and functioning of the Section is in order.

The amateur fraternity has always included a good number of experimentally-inclined persons — those whose calls may not be so familiar on the air as in print in the "by-lines" of contributed *QST* articles. This group must, by now, have been greatly augmented by those who have had experimental inclinations, but whose first love may have been the luring of DX contacts, the prompt handling of traffic or, perhaps, ragchewing, all now in abeyance. Many of these have already written, asking,

"What interesting problems are there for us to work on? What information relating to my chosen subject is available? If collaboration is desirable in the solution of a problem along specific lines, where may stand the best chance of finding it?"

To answer these and similar questions is the main purpose of the Experimenter's Section.

To start the ball rolling, we are listing a group of numbered projects. Most of these, it happens, relate to communication systems which may be made to serve as a substitute for the duration of the emergency. This angle should prove to be of more than casual interest to those who are looking for something to do with idle gear. Many of the subjects have little previous history; we shall have to start from scratch. This means that almost *any* results will prove to be of interest. Some of the projects may not bear fruit, but we shall have the satisfaction of knowing that their potential usefulness has been disproved.

The second function of the Section is that of organizing the work of the individuals. This includes the establishing of bureaus or centers to which progress reports can be made and through which information between individuals working on the same project may be exchanged. The organization will involve the appointment of a leader for each project. The leader will be someone who has especial interest in the project and who is willing to act as a collecting and sifting center for information forwarded to him by those working on the same project. At intervals, he will submit a progress report on the status of the project which will be published in *QST*. As a starter, various members of the Headquarters Staff have assumed temporary group leadership of certain projects until sufficient time has elapsed to permit those interested to volunteer.

Everyone who is interested in working on any of the listed projects is urged to enroll with the leader of the particular project on which he plans to work. Through *QST* or the group leader, he will be able to contact others working on the same project for collaboration, or exchange of notes. The leaders are particularly desirous of hearing from those who, at any previous time, have worked along any of the lines suggested.

The projects thus far suggested are listed below. Whenever a sufficiently large number of individuals express interest in other projects, they will be added to the list.

Project A — Temporary group leader — Byron Goodman, W1JPE, ARRL Headquarters, West Hartford, Conn.

Communication by means of a carrier-current system.

In this system, wire circuits are used as non-radiating transmission lines from transmitter to receiver. An article on carrier-current systems appears in this issue. While telephone and power companies have used such systems successfully for years over special wire circuits, very little has been done to investigate the possibilities offered by ordinary house-lighting circuits.

Project B — Group leader — R. B. Bourne, W1ANA, 27 Sulgrave Road, West Hartford, Conn.

Communication by means of light beams.

This category might include sunlight reflection (the heliograph) as well as artificial light-beam communication at night. Although some direct-ray work has been done, the possibility of communication among amateurs of a group by means of indirect rays from reflectors at high, centrally-located points may be visualized. Voice modulation of light-beam transmitters is another distinct possibility.

Project C — Temporary group leader — George Grammer, W1DF, ARRL Headquarters, West Hartford, Conn.

Communication by means of audio-frequency induction fields.

Here is a practically brand-new field. As an encouragement, it may be said that distances up to a half-mile or more have been reported by this means. The essentials of such a system consist of an audio oscillator feeding an inductance of large physical dimensions at the transmitting end and an audio amplifier and similar inductance at the receiving end. The coils may consist of several turns of wire around a group of trees, for in-

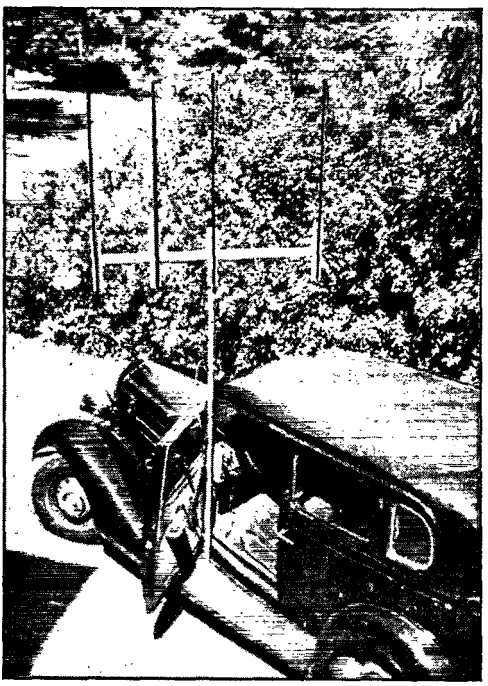
(Continued on page 82)

A SIMPLE COLLAPSIBLE ROTARY ANTENNA FOR 2½-METER MOBILE WORK

THE sketches of Fig. 1 show the construction of a simple four-element beam antenna which I have found very satisfactory for 2½-meter mobile use. The antenna system consists of a vertical half-wave antenna fed by a short twisted-pair line and a "J" matching section, two directors and a reflector.

The frame is made of ½-inch, by 1½-inch furring-strip material. The "mast" is a "closet pole" 1½ inch in diameter. A hinge near the middle of the frame permits the structure to be folded for carrying in the trunk or back seat of a car.

For elements, ½-inch copper tubing is the most efficient, although aluminum is more convenient for portable work because of its light weight. The elements may be snapped into place in heavy-duty fuse clips mounted on the frame with stand-off insulators, as shown at *B* and *C*.



The four-element collapsible rotary in action.

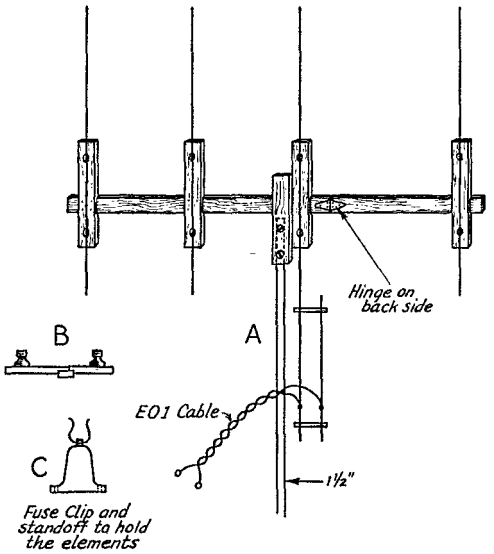


Fig. 1 — W1LFI's collapsible 2½-meter 4-element beam for mobile work. The frame is hinged, while the elements are held in position by fuse clips to make assembling and disassembling an easy job. B and C show the details of element mounting.

The antenna element is 48 inches long, while the reflector is 51 inches long and the two directors each 45 inches long. A spacing of 12½ inches is used between all elements except the antenna and reflector which are spaced 25 inches.

The "J" matching section is 24 inches long and the match is adjusted by moving the low-impedance line, fitted with clips, along the section.

The "mast" may be set in a fitting near the front door of the car so that the antenna may be rotated by hand. The installation is shown in the photograph.

The outfit sure did work wonders for me last summer and it's simple enough so that no one should have any trouble making one up.

John Klar, W1LFI.

—···—

WINDING SMALL SELF-SUPPORTING COILS

AFTER playing around with h.f. receivers and transmitters for some years, I have found that the easiest, simplest and most-efficient way

of constructing chokes and coils is to wind them on a thin glass tubing. The outside should be coated lightly with Amphenol cement (or collodion will do in a pinch). Then, when the cement is dry, clamp the coil in a vise and slowly tighten the jaws until the glass breaks. Shaking out the glass completes the job.

Grid-leak glass can be used for r.f. chokes and tubes and vials of various sizes for larger coils. I have never yet injured the insulation on the wire in this manner, but would suggest that if the vise has grooved jaws, you put a piece of smooth aluminum on each side of the coil.

I have used this same method to wind coils of heavy wire on cellophane.

Percy E. Buchtel, W8JTI.

—···—

SIMPLE LOUDSPEAKER-BUZZER COMBINATION FOR CODE-CLASS INSTRUCTION

WHEN first invited to give Morse instruction to the local A.T.C. Squadron, the writer decided to use an audio oscillator in conjunction with a stage of l.f. amplification and a loud speaker. However, he soon found that the necessary apparatus, together with batteries, was rather cumbersome, consequently other methods had to be considered. The only buzzer on hand

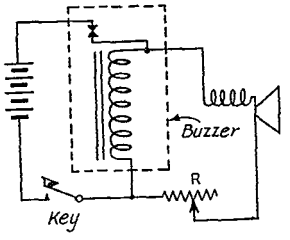


Fig. 2 — **Circuit diagram of G5VT's simple arrangement of buzzer and loudspeaker for code-class instruction. R is a variable resistance of 250 ohms.**

which gave a really clear note was a tiny model, but this did not give sufficient volume for a large classroom. This drawback was, however, overcome by connecting a loudspeaker (minus transformer) across the buzzer winding, with the result that a strong signal of almost c.w. quality was obtained.

The arrangement at present, shown in Fig. 2, comprises a 3-inch moving-coil speaker wired in series with a 250-ohm variable resistance, which acts as a volume control.

The midget speaker makes for portability, although any low-resistance unit can be used. To avoid slight key thumps, the volume control should not be set at maximum.

The whole of the equipment, which comprises a 3-volt dry battery, volume control, loudspeaker, key and incidentally a signalling lamp, is housed in a box of less than gas-mask container size and is provided with a carrying strap.

Circular holes, covered with gauze, have been cut out in front of the speaker diaphragm and lamp bulb. — *A. E. J. Cooper, G5VT. From T & R Bulletin.*

NOTE. — This arrangement has been found to work very well working directly into the tube-to-voice-coil transformer, provided the volume-control resistance is omitted. — ED.

—···—

RE—THE SINGLE-WIRE CONNECTION FOR TRANSFORMERLESS POWER UNITS

I AM a licensed electrician and, although I can readily see the idea behind the arrangement, I do not believe that the one-wire circuit you recommend in most small transformerless units, such as the code-practice oscillator (*QST*, January 1941), the frequency standard in the September issue and in numerous other places in recent articles is in accordance with the National Electrical Code used by the electrical inspection departments of most cities. I am sure it would not be accepted in this city (Richmond, Va.). I do not have a copy of the code at hand, but I know it expressly forbids the flow of *any* current over ground, except when performing its normal function — that of carrying off high currents under short-circuit conditions, etc.

The changing of convenience outlets to polarized type is not expensive and the use of a neon bulb to indicate polarity is even cheaper. One lead from the lamp should be held in the hand while the other lead is touched to one side of the line. Or the lamp could be connected between the chassis and one side of the line so as to burn when the plug is in wrong — this with chassis grounded through lamp. Possibly there are other ways too, but I prefer the insulated circuit throughout, using a common grounding point, insulated from the chassis.

Since high-resistance joints in pipes are not usually indicated by a small lamp normally used as a test light, it is assumed that the additional current used in this type of installation would eventually pay the small cost of polarity identification in circuits used for metal-cabinet equipment.

— *Chas. H. Imel.*

—···—

HOMEMADE NEUTRALIZING CONDENSER

IN BUILDING my new rig, I needed neutralizing condensers for my 809 buffer and HF100 final. Not wanting to wait too long for delivery, I made a dive into the junk box and came up with enough odds and ends to make a pair of very acceptable substitutes for the commercial product.

A sketch of one of the condensers is shown in Fig. 3. It is patterned after the well-known coaxial cylinder type. The cylinders are cut from defunct electrolytic condensers. The inner one is one inch in diameter and was taken from a 4-μfd. condenser, while the outer one, taken from an 8-μfd. unit is $1\frac{3}{8}$ inches in diameter. For a maximum capacity of 10 $\mu\mu$fd., the cylinders should be approximately 2 inches long. For the same diameters, other maximum capacities will be proportional to the length of the cylinders.

Care should be taken to drill the hole for the adjusting screw for the movable cylinder at the exact center and to mount the stationary cylinder centrally in respect to the movable cylinder. The air gap should be sufficient to prevent breakdown when used in a plate-modulated amplifier operating at plate voltages up to 1500.

Pieces of metal strip are used to mount each

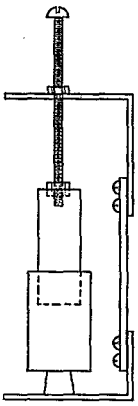


Fig. 3 — Neutralizing condenser made from old filter-condenser cans by W8VTC.

cylinder. The upper strip is tapped to fit the long machine screw used for adjusting the capacity. The two metal portions are insulated by a strip of insulating material, such as polystyrene.

— *Samuel A. Balaban, W2KVA/W8VTC.*

—···—

TUBELESS R.F. STAGE FOR B.C. MIDGETS

FIG. 4 shows a simple, but very effective, gadget for anyone in the services who may be in some rather distant spot and who wants to boost the gain of his midget b.c. receiver. We have an ordinary a.c-d.c. t.r.f. four-tube midget here and, while the stations rolled in strongly enough during the night, there just wasn't enough hop during the day to cover the 600 miles between New York and Bermuda. We were going to add another r.f. stage, but the simple tuner shown raised the gain so strikingly that this was unnecessary. Most cheap midgets have simple capacitive or inductive coupling, so tuning of the antenna circuit adds almost as much gain as would an entire r.f. stage. A fixed condenser and variable coil is used rather than variable condenser alone, since this gives a

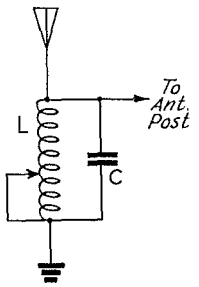


Fig. 4 — Circuit used by W2HNH for tuning b.c. antenna for improved response.
C — 50-$\mu\mu$fd. mica.
L — $\frac{3}{4}$-inch diameter form wound to a length of 3 inches with No. 28 enameled wire, close-wound.

much wider range of compensation for different lengths of antenna than could be obtained by variable condenser alone. The gadget can be built quite compactly on a small strip of bakelite, using a piece of spring brass for the sliding coil contact. It is a good idea to mount the tuner right on the receiver, since in actual practice it is necessary to adjust the coil for every station for maximum gain. Addition of the unit here enabled us to bring up to comfortable volume half a dozen stations which were formerly entirely inaudible.

— *Jack Najork, RM2C, USNR, W2HNH.*

—···—

Strays

"In a recent conference of college professors called together to provide plans for courses on u.h.f., the question of terminology came up, now that the ultra-ultrahigh frequencies are being used. It was decided to use the term UHFI ("ultrahigh frequency indeed") for these super-short waves." — January *Electronics*

No, no! We admit this system has some merits, since one could go on and say UHFAH (u.h.f. and how!), etc. But it is at best a system with limited imagination. We'll need more than one additional classification. We suggest the following division: 30-300 Mc., ultrahigh frequencies; 300-1000 Mc., superfrequencies; 1000 and up, colossal-frequencies. This system has the advantage that should further subdivision be necessary, "super-colossalfrequencies" are still available.

—···—

P. O. W.

IT IS reported that G2XQ is being held as a prisoner of war.

He may be addressed as follows:

Sgm. F. E. Marshall, B.P.O.W., 19304, Stalag, XXB, Germany.

CORRESPONDENCE FROM MEMBERS

The Publishers of *QST* assume no responsibility for statements made herein by correspondents.

"KEEP THE HOME FIRES BURNING"

Box 336, Peach Creek, W. Va.

Editor, *QST:*

Please accept this letter as a note of appreciation for the dear old ARRL from the very heart of the West Virginia mountains. I'm thankful that there exists a League for the radio-minded hill-billies like myself.

Like many other hams, I suppose, my head is full of questions about the future of amateur radio and the ARRL. How long will it be? What will become of the League? What are the other boys going to do? Can we tear down our rigs? Will we get 2½ meters? Will the other boys forget the ARRL and what it means to them? Can the ARRL survive without calling for financial help? Will memberships decrease, or increase?

These questions and many others go through my head every day. I'd like to know the answers. So would lots of others, but here's one thing sure: The American Radio Relay League *must not* fail. Now is the time for all amateurs, whether members or not, to come to the aid of the League, whether the League needs it or not. Now is the time for memberships in the League to go to a record high! And if the League should need more money in 1942 to carry on its work, now is the time to start assessments of all amateurs in the United States. I'm sure that here in the West Virginia mountains I could find at least *one* dollar, and if every ham in the country would do that much, certainly the League could go on. . . .

I'll never forget Sunday, December 7th. I was trying to get my little 22-watt rig on the air. The 160-meter band was full, as usual. Then the ARRL station began to pull the boys off, one at a time, two at a time. It was most disheartening to listen to, but I followed W1AW until almost 3 A.M. sliding up and down the band to catch the "CQ" calls as they came in. No one could help but marvel at the efficiency and precision of the whole set-up. It's hard for me to understand just how the situation was handled so nicely. I tuned from 10 meters to 160 meters and it seemed as though they all went off automatically — every one of the thousands of hams doing his part!

. . . I have the greatest admiration for the American Radio Relay League, and I still contend, it must not go down, or, rather, *it must not be let down.*

— *W. W. Adams, W8VQV*

Phi Mu Delta House, University of Maine

Editor, *QST:*

. . . I wish to express my appreciation for the help that I have received from the League since my membership began about six years ago. Since that time my most valuable technical periodical has been *QST*, from all points of view. And this is saying a lot, because over the greater part of this time I have had access to all types and "sizes" of technical magazines at the University Library. . . .

You shall have my hearty support in the future as in the past.

— *Robert E. Kelley, W1IEB Ensign, USNR*

1819 Beverley Rd., Brooklyn, N. Y.

Editor, *QST:*

I just took my exam for amateur Class B, and I desire to compliment the ARRL very, very highly indeed for the comprehensiveness and accuracy in setting up the 60-odd questions for study for this license. . . .

It is now not too difficult to understand the high esteem in which the ARRL is held, nor why every single one of the eight young men who appeared for the exam this Tuesday morning carried the same ARRL pamphlet I did. (Lest ambiguity appear here, accidentally, I hasten to add that the pamphlets were left outside the exam room, but what I do not want to emphasize as having impressed me is that such unanimity existed in the choice of study material.)

With the kindest thanks — and greetings from an expectant newcomer to the ranks.

— *Erman Burger*

Scott Field, Ill.

Editor, *QST:*

I've been intending to report for some time. I still maintain the habit of digesting *QST* from cover to cover every month. . . . I will graduate from the Air Corps Technical School and get back to my own squadron very soon.

Keep the home fires burning at W1AW and keep the good ol' League functioning while we take off to blast those insolent fools to hell!

"Keep 'em flying!"

— *Tech. Sgt. G. C. Corrigan, W9BBB*

COPYING ON THE MILL

1771 E. 24th St., Cleveland, Ohio

Editor, *QST:*

I read with considerable interest your items about copying on the mill. I am engaged right now in trying to make the change-over from stick copying to the typewriter. It is no cinch, but I may be able to help other hams by making a few suggestions:

1. Right off the bat, *memorize* the keyboard of the typewriter, so you have an accurate idea of where each one is located.

2. Get a touch typewriting book from any of the typewriter companies or from the public library. Then make a job of learning to operate by touch. You haven't learned it until you can sit down and write with your eyes closed at, at least, twenty words a minute. You can see that this licks an important part of the job. You don't have to give any attention to locating keys.

3. When this is done — and not until it is done — you are ready to start copying. Try first on call letters. Then, after this, the messages from W1AW. Then all it takes is practice. But I have found that it saves time to think of code sounds in terms of *finger positions.* . . .

— *Chas. H. Seaver*

NOW IS THE TIME TO QSL

168 Lakehurst Road, Toms River, N. J.

Editor, *QST:*

In my recent copies of *QST* there have been requests of amateurs to QSL and send their cards out for every new contact made on the air.

Now that our amateur activities are temporarily halted I feel sure that every ham could find time to sit down and answer those cards which are unanswered.

I, like every ham old or new, think a great deal of QSL's, and I feel sure, fellows, that now is the time to send out those long overdue cards. . . .

— *Walter Voelker, W2OCP*

(*Continued on page 84*)

OPERATING NEWS

F. E. HANDY, W1BDI, Communicating Manager **J. A. MOSKEY,** W1JMY, Asst. to the Coms. Mgr.

Build Stamina. The war requires cheerful acceptance of sacrifice. That takes stamina. The test for the amateur started early with restrictions on foreign communications, extending now to the cessation of all but defense requirements. A good many people who have just talked of sacrifice and payment for the war effort are now to feel the impact. While many are stimulated by war excitement, the real test is in the months ahead. This war is a long pull effort to which each must contribute. How can we take it? Luxuries must go, and conveniences formerly thought to be necessities. We expect reverses until increased production gives us the offensive. Each of us must help the nation to be strong by conservation in the use of articles as well as by finding ways to contribute of our equipment or personal effort. Energy and enthusiasm must be husbanded to meet each day of challenge and adversity with the proper stamina. On all fronts it is a war of nerves. Burdens, tasks, and even boredom will test stamina often. Our spirit as amateurs should set the example for others. Great changes in the civilian life of the nation must be met with cheer and patience. New values in human relationships and friendship will reward us as we learn to help our fellow travellers on life's highway. We must retain our faith in the future, and all of us amateurs must do our full part in the all-out national effort.

Stamina and application will win the war on the home front as well as elsewhere. The danger around us is very real. It must be faced by common sense and assumption of a personal part in the war effort that each must find for himself, especially if one is not accepted for a place in the services. Production and civilian defense call for all we can do! Every day in this office we see civilian calls from companies with defense responsibility for lists of amateurs who have specialist qualifications, or gear that is needed in the defense effort. Each day there are civilian calls from companies with defense jobs for lists of amateurs who have specialist qualifications or gear suitable to the defense effort. Each day the government wants personnel or equipment for particular situations. With pride that ARRL can help, our records and knowledge assist in digging up the best answer to all such numerous requests.

In the field amateurs may think there is uncalled for slowness in government action elaborating ways in which our services count, approving OCD plans for supplementary radio defense services, establishing new controls and safeguards. But amateurs of stamina understand that time in study may be in the interest of national security. Above all we must guard against over optimism such as undermines stamina and is replaced with panicky fear when dispelled by realities. Strength and sacrifice must replace softness and smug words. France trusted a Maginot Line of forts instead of maintaining an impregnable nation built on the confidence of each Frenchman in his own strength and ability. The Line crumbled. Disillusionment and panic followed. To be self-reliant let us amateurs build our personal qualifications, knowledge and strength by continued study and self-training. By making ourselves part of the war effort in the services, in production, or in civilian defense we shall acquire understanding and mental stamina that will make us shock-proof and capable of contributing our full share to the national effort.

Field Organization. The assaying of all amateur facilities in each community continues under the direction of SCMs and Emergency Coördinators. With the exception of the Emergency Corps all other appointments are suspended, as explained in this column last month. SCMs make no additions whatever to mailing lists of appointees in suspended classifications. But more Emergency Coördinators are wanted, and will be appointed. From time to time there will be bulletins as explicit possibilities in civilian defense develop and training programs in the national interest are launched.

Any amateur not registered in the ARRL Emergency Corps should ask blanks from ARRL at once, enclosing a stamped envelope for same. Emergency Coördinators may soon be required to make selections from their registrations to cover a fixed plan of municipal defense stations for their city or town. Scores of cities only await new word from the DCB to call on their ECs for such help. In Providence, R. I., amateurs registered in the AEC will become part of the police-defense set up . . . see story in this issue. Be ready for more such work, or a broader scale civilian defense plan now expected, by registering now!

Report General News to SCMs. All amateurs are requested to report each mid-month to SCMs (address page 4) any of the things they are doing. Clubs have been asked to report their

training plans — code classes — theory-discussion groups — civilian defense building programs, via SCMs. A postal will give the SCM the first results of "wired wireless" attempts with your ham pal. Word from Emergency Coördinators to SCMs will be used as a basis for concise reports on each community-defense development. How many 2½-meter rigs can be located in your town? Reports via the SCM will keep us amateurs together. See that your SCM has something from you by March 18th!

Amateur Radio's Future. Every so often someone asks, "What of the future?" In a time when the nations of the world are locked in an all-out struggle no predictions can be made. Some general observations are possible. Taking care of each day as it comes along is the best way to take care of any future. ARRL is keeping open for business, and for representation of the amateur. Placing first things first, full support of every citizen and individual amateur to the war effort is the first necessity. The quicker the winning of the war and the shorter the duration, the better amateur radio may fare. The threat to amateur radio is not potentially so much different than the threat to many other accustomed patterns of our living. Much will depend on the continued support of the individual amateur for his ARRL throughout the emergency. Continued strength for amateur radio requires maintained support by every amateur licensee, continued interest of the individual amateur, continued life on the part of club and training groups, and the League's continued contact with government officials through every stage of our national future. The record of the amateur is a growing one of real service to the nation in the hour when it called for specialists and more specialists in radio technique. ARRL is compiling the best record possible and aiding in the victory effort through every means possible. Individual service on the home front and in the services is the thing for every amateur, not forgetting to keep up full support of ARRL through actual membership therein. ARRL is doing its best for you. Your support will keep it strong.

A strong ARRL is the best insurance for Amateur Radio.

— *F. E. H.*

Consistency: "Ever since I can recall (which admittedly is not real dyed-in-the-wool 'old time' but is far from being 'young squirt' — 1921) W3BWT has appeared consistently in the 'roll of honor' BPL — not always on top of the heap but always well up in the list. It has always been my contention that this great hobby of ours should justify itself by the *service rendered.* For nearly twenty years this particular station has been justifying itself by the continuous appearance in the Brass Pounders' roster. Some of us will not be inclined to give that much credit — but there is no denying the spirit of service that stood back of that enviable record." — *W2GTB.*

WBUUW tells us of another all-ham family: W5HFS, father; W5IZL, mother; W5FYZ, son. He has worked each of the family under their respective calls.

Remember Pearl Harbor!

BY LAWRENCE R. MITCHELL, W1HIL*

ARTICLE CONTEST

The article by Mr. Lawrence R. Mitchell, W1HIL, wins the CD article contest prize this month. *We invite entries for this monthly contest.* Regarding subject matter, we suggest that you tell about what activity you find most interesting in amateur radio. Here you will find an almost limitless variety of subjects. Perhaps you would like to write on working for code proficiency, Emergency Corps planning, traffic work, working in Section Nets, 'Phone and Telegraph operating procedures, holding a League appointment, working on radio club committees, organizing or running a radio club, the most interesting band or type of ham activity, or some other subject near to your heart.

Each month we will print the most interesting and valuable article received. Please mark your contribution "for the CD contest." Prize winners may select a bound *Handbook, QST* Binder and League Emblem, six logs, eight pads radiogram blanks, DX Map and three pads, or any other combination of ARRL supplies of equivalent value. Try your luck!

I AGAIN feel the urge to write some of my personal feelings, thoughts and suggestions as to the possible use of, and service by, the amateurs of this country. Even though at the time of writing we are off the air, every amateur should act as a jury of one to examine himself — his qualifications, intentions and desires — to see how he can be of some service to his country; to see if in some small way he can repay his debt to those who made it possible for him to enjoy all the happy hours afforded him when he was operating under peacetime conditions. He should determine how he can be of the greatest service to his country, his state, his community, his family and to himself in order that in future years he may look back and say that he did his best to fulfill his duty as an amateur.

For the purpose of general discussion let us divide amateurs into two groups. First, let us take the amateurs who are in a position to serve in the *armed forces* of our country. Are *you* in a position to serve in the radio section of the Army, Navy, the Marine Corps, the Coast Guard, or any other branch of the Military Services? If you can qualify, don't wait to be drafted. Enlist to-day! Radio men are needed in great numbers and need have no fear that they will be doing other than radio work under present wartime conditions. Go to the nearest recruiting office to-day and get the story on radio men in the *armed forces.* Review the many opportunities present in *QST's U.S.A. Calling* department in recent months. Then *act.* Radio is one of the most important branches of the Military Services. Every amateur who is in a position to do so should serve his country in the Army or Navy, where his skill and training are badly needed and can be of great service.

Look through the past issues of *QST* and see the many jobs open in the radio field for the properly qualified. Consider for example the call of the Navy for men to operate the new radiolocator equipment. Get the dope on this and other opportunities, you hams who are in a position to take advantage of them. Help your country, and at the same time help yourself to some knowledge of the very latest in the field of radio.

Now let us examine the second group of amateurs, no doubt larger in numbers than the first: those amateurs who are not in a position to serve in the *armed forces.* Right away I can hear many of you saying: "What can any of us do?"

For most of us, radio has been a hobby. We are not in a

* 4 Sidney, Wakefield, Mass.

position to give radio our full time and we may be too old or have dependents or any one of many other reasons why we cannot give full time to the job at hand. Yet we too should serve.

How can we best serve? Well, forget that for the moment we are not licensed to operate our rigs, and take stock of ourselves and our equipment. Are we signed up with the ARRL Emergency Corps so that those in charge know what we have and where we can be reached if needed? Sign up, gang! If you don't know who your Emergency Coördinator is, get in touch with your SCM. Sign up whether you belong to ARRL or not. If you have no equipment, don't forget a pool of operators will be needed in any activity of this kind. Find out the local plan for the use of hams in an emergency and if none has been made, get busy and find out why not, and do something about this situation. If you are in a position to do so, join your State Guard as well, as they are in need of radio operators.

Remember Pearl Harbor — lack of planning, lack of co-operation, lack of most everything that makes for success when taken by surprise. Every one of us not in a position to serve in the *armed forces* should see what we can do to be of service at home even though amateurs are now off the air. Look into your qualifications and see what kind of a job you can hold down in the radio field. Possibly you can *take the place of someone who can serve in the armed forces.* Start training yourself for that!

Keep your present radio equipment in operating condition. In the event of a real emergency and loss of the regular channels of communication no one knows when he might be needed to furnish communication on any band even though at the moment we are off the air. ARRL has suggested that every amateur build 2½-meter equipment for possible emergency use. Have you done that? Do your part. Amateurs going into the army who have 2½-meter equipment should leave it with another ham where it can be used in case of civilian emergency, or leave it with the proper officials in your town. Even though you live in the wide open spaces where there are no other hams, build up some 2½-meter equipment, as you may be moved where the equipment will be of great value, and you should be prepared. Any simple 2½-meter outfit which will work on 110 a.c. and/or 6 volts d.c. may be of great value and may enable you to save many lives. Every radio magazine has presented articles on simple 2½-meter rigs which any ham can build. The DCB-approved plans to permit supplementary radio facilities in civilian defense are likely to be announced by late February.

Be prepared! Even though you may never be called upon, don't get caught short. This is total war and anything can happen. Don't wait, take stock of yourself and your equipment. Sign up with the ARRL Emergency Corps and build up that 2½-meter equipment. REMEMBER PEARL HARBOR!

—•••—

Conn. Amateurs Stage Mock Disaster

JUST twenty-four hours before the electrifying news of December 7th, amateur radio came successfully to the aid of relief at a simulated "disaster" in New Canaan, Conn. As an emergency tryout of home defense, the New Canaan Defense Council and the local branch of the American Red Cross, staged a theoretical detonation of a truck-load of explosives near a large educational institution some three miles west of the town. The scene of the mock disaster was one of "widespread destruction."

It was the earnest work of Cedric Root, W1BCG, president of the Connecticut Brasspounders Association, which brought recognition of amateur radio before the New Canaan Defense Council and final incorporation of its facilities in the home defense plans. As a result fully equipped ultra-short wave communication was rushed into action when the emergency alarm was sounded at 2:35 P.M. Two self-powered Abbott DK-3 transceivers were successfully employed to establish contact between the scene of destruction and the defense headquarters located in the New Canaan Town Hall. W1GDW operating the field set was forced to move his transmitter to several locations, representing the centers of activity at the scene, yet constant communication was held with W1JEC working the control transmitter atop the roof of the Town Hall.

The Red Cross and the Defense Council have been officially quoted as "highly pleased with this demonstration." The unfortunate passing of Mr. Root's mother prevented his active participation in this defense test.

—•••—

Providence Adopts New Plan for Civilian Defense Radio

Fifty Amateur Operators To Be Sworn into Police Department

WHILE the Office of Civilian Defense will be momentarily expecting Defense Communications Board action on broad plans for setting up supplementary facilities for radio communication after air attack about the time this issue of *QST* appears, the City of Providence, R. I., has developed a satisfactory solution of this need. Perry Briggs, police radio engineer, W1BGF, is largely responsible for getting necessary approval of the defense-organization plan. We are grateful to Rhode Island's Emergency Co-ordinator for Greater Providence, Mr. Walter B. Marshall, W1JEZ, for sending us a preview of the plan.

Under the Providence set-up for ARP work, much responsibility for civilian-defense communication has been assigned to the police radio system. Threatened with the necessity for low-frequency radio silence during air attack, and in view of the additional burden of "air raid damage" messages that might be expected at such a time, a Mobile Radio Patrol had been planned using u.h.f. and radio amateurs to take care of any emergency. However, with the FCC action withdrawing operating privileges from reactivated amateur station defense groups Providence was obliged to re-plan its set-up to give appropriate public protection for any eventuality.

Providence obtained from the FCC a license for police-experimental communication, with assignment of four designated frequencies between 116 Mc. and 120 Mc., which frequencies are just adjacent to our 2½-meter amateur band. On these a u.h.f. extension of regular police coverage is being established. The City is installing equipment, purchased from amateurs with the agreement to sell it back after the need has passed, we understand, at the various important fixed points that have been designated. Schools and other public buildings are usually named for control points in Warden-to-report-center systems.

About 50 radio amateurs are being sworn in as full-fledged but unpaid members of the police force. Their amateur operator licenses must be kept up and a plan of selections insuring high qualifications and considering the interest and facts shown in emergency registrations is followed.

The 2½-meter equipment is easily modified to tune it to the designated frequencies. The new experimental police-radio emergency system is to utilize high class amateur equipment for the control point. The city net will cover at least ten district control or report-points. The equipment will be manned by licensed amateur operators, sworn in and given special credentials. It is planned, we understand, to have two or three portable-mobile rigs at each district station to cover gaps that pop up in the municipal or commercial wire signalling system, for special assignment, etc. The amateur appointments are in the capacity of captain and lieutenant, and ten appointments as sergeant are being made. Amateurs qualify for third class certificates for operating the system in addition to receiving special identification badges. We hope for more extensive data on the Providence plans and progress for next *QST*.

—•••—

The Assistant Chief Signal Officer of the U. S. Army is Colonel James A. *Code*, Jr.

The Code Proficiency Frolic

BY J. A. MOSKEY,* W1JMY

THE Code Proficiency Frolic, held during two week-end periods in September, was well received indeed. Undaunted by a spell of spotty conditions due to a somewhat severe magnetic storm, the gang stuck to their posts and came through with many excellent scores. It was an activity open only to the several thousand holders of ARRL Code Proficiency Certificate awards. High quality operating was the prevailing theme and it warmed the heart of many a dyed-in-the-wool brasspounder to hear the clean-cut flow of contest exchanges in the various bands. We at Headquarters are justly proud in the realization that the League's efforts in its intensive code-training program of the last year and a half has had such a marked effect in raising operating ability to the high level observed in the Frolic. Already large numbers of amateurs whose skill was developed in no small measure by participation in ARRL's Code Proficiency Program are playing an important role in the communications service of the U. S. military and naval forces, proving that the project has made a definitely valuable contribution to the unified war effort of our great nation.

Comments

"Thanks for introducing me to a swell bunch of ops." — W3DGM. "Sure had a lot of fun and got in a good lot of operating practice." — W8TOJ. "Even though northern lights messed up conditions on the second week-end, it was a swell get-together." — W5AQE. "This was the first contest of any kind I have ever entered. As far as I am concerned, it was an overwhelming success." — W3GOL. "The CP Contest was one of the most interesting that I have ever participated in. If I could contact under normal conditions as many stations willing to QSP as I did in this contest, I could be BPL every month of the year." — W9EUT. "Enjoyed it very much and heard many of my old pals from K5AA days also on the air in the CP Frolic." — Eddie Turcotte, op at K4CSG. "One thing was noticeable and that was the fact that all CP stations sent better than average code." — W4HHK. "It was plenty of fun and most of the old standbys of SS and ARRL QSO Parties were around. Thanks a lot for the fun." — W6CLZ. "One of the finest parties ever!" — W9MRQ. "I was really surprised at improvement in operating ability since the last contest of this type. I found fewer repeats necessary on both ends, even under the very bad conditions of the second week-end." — W1FGC. "Lots of fun and good experience."— W8RYP. "Thanks for thirty-two hours of fun." — W3IEN. "I was thoroughly impressed by the number participating and the rare sections heard and worked. Was thrilled by working my first K6 and a new section, San Joaquin Valley." — W9GHD. "I enjoyed this contest as much as any ORS, SS or other annual contest." — W2LPJ. "This was my first contest of any sort and it taught me a great deal about break-in operation and station handling." — W9IBU. "Although I was not active for the full fifty hours, I had a great deal of pleasure during the time I spent." — W5DPI/5. "Sure did have a swell time even with only ten watts. Contacted eight new states and really improved my operating ability." — W9TJR. "Worked every section heard." — W3BXE. "I certainly got a big kick out of the contest. After the Frolic a bunch of glass-armed crickets in my back yard kept sending 'CQ CP'. Hi!" — W1KIO. "Renewed many new acquaintances after a summer lay-off." — W8JIW.

Leading Scorers

Scoring was relatively simple in the Frolic. Exchanges consisted of section and the issuance date of the participant's Code Proficiency Certificate. Special credit of 10 points was allowed for each complete handling of a message, with a maximum of 100 points permitted for traffic work. The sum of contact points and message credits was multiplied by the number of ARRL sections worked for the final score.

As prizes autographed copies of the new DeSoto book Calling CQ are awarded to the five top participating operators.

Highest score was rolled up by that four-star contest performer W3BES. Jerry finished up to the tune of 31,620 points, working 427 stations in 60 sections.

Another Eastern Pennsylvania lad, W3DGM, made second best showing, 29,662 points from contacts with 403 stations in 59 sections.

W9DIR, also a consistent placer in many of our operating competitions, rates third with 57 sections and 381 contacts for a total of 27,417.

Fourth highest scores is that of W9RQM — 26,936 points, 381 QSOs, 56 sections. W9BRD made fifth place with 357 contacts in 53 sections for 24,221.

The following deserve special mention as leaders in their respective call areas: W1BIH 19,604 (W1TS 21,041, non-competitive), W2NCG 17,088, W3BES 31,620, W4DWB 12,241, W5KC 21,010, W6BHV 15,300, W7RT 5,863, W8NNF 22,735, W9DIR 27,417.

General

Activity, although open to both c.w. and 'phone was limited almost exclusively to code operation. Two hundred and forty-six logs were received from Code Proficiency Certificate holders active in the Frolic. Leaders in number of contacts were: W3BES 427, W3DGM 403, W9DIR 381, W9RQM 381, W9BRD 357, W1TS 337, W3FQZ 336, W3IWM 335, W3BXE 308, W5KC, W9GKS 282, W9VKF 280, W1BIH 277, W8SSC 263, W2NCQ 256. Leaders in number of sections: W3BES 60, W3DGM 59, W9DIR 57, W9RQM 56, W5KC, W9VKF 55, W1TS, W3IWM, W9BRD 53, W1BIH, W9GKS 52, W2LPJ, W3BXE, W9NCS 51, W3FQZ, W6BHV, W9GFF, W9GHD, W9MUX 50.

SCORES

(Stations are listed in order of scores. . . . Score, number of ARRL sections and number of contacts indicated. . . .

W3BES	31620–60–427	W8FLX	11340–42–170
W3DGM	29662–59–403	W5DPI/5	11250–45–170
W9DIR	27417–57–381	W8ROX	11120–40–178
W9RQM	26936–56–381	W1BFT	10988–41–168
W9BRD	24221–53–357	W2JUU	10962–42–151
W3IWM	23055–53–335	W8EBR	10428–33–216
W8NNF	22735–45–183	W4FIJ	10152–47–186
W3FQZ	21800–50–336	W1BBN	10019–42–133
W1TS [1]	21041–53–337	W6UFJ	9998–44–157
W5KC	21010–55–282	W9INU	9720–40–163
W9VKF	20900–55–280	W8SJF	9504–44–116
W3BXE	20808–51–308	W9LMG	9404–49–196
W9GKS	19864–52–282	W4FDT	9360–39–140
W1BIH	19604–52–277	W9JNC	9310–49–190
W8SSC	17424–48–263	W9VFZ	9225–45–155
W2NCG	17088–48–256	W9KXK	9118–47–174
W9NCS	15759–51–209	W5AQE	8932–44–183
W9GHD	15350–50–207	W6AM	8568–42–104
W6BHV	15300–50–206	W2MZB	8541–39–119
W3HQU	15216–48–217	W2MLW	8460–36–235
W9GFF	15150–50–203	W8UUW	8177–37–151
W9IHN	14640–48–205	W9MHD	8112–39–118
W4DWB	14241–47–203	W1FTJ	7998–43–186
W8DAE	13920–48–190	W2IYY	7840–40–166
W1CSY	13708–46–208	W5JEW	7774–46–129
W3JBC	13680–45–204	W3IZU	7650–45–170
W6RBQ	12985–49–165	W9MUX	7600–50–122
W9NZZ	12735–45–183	W9MRQ	7486–38–137
W3IEN	12690–47–230	W9CDP	7310–43–150
W1KIO	12236–46–216	W6BAM	7296–38– 92
W8TOJ	12169–42–183	W2JDC	6840–30–128
W8UZJ	11739–43–223	W1UE	6666–33–102
W2LPJ	11475–51–225	W8JIW	6588–36– 83
W8OKC	11440–44–160	W3DVC	6360–40–129

[1] HQ's staff member; not competing. [2] W8TWP, opr. [3] New Haven Amateur Radio Assn. W1TD, opr.

* Assistant to the Communications Manager.

W2BZB	6335–35–181	W1NNG	1408–16–38	W9DNO	63– 7– 9	W9ZIF	36– 6– 6
W9OZL	6327–37–141	W2ASY	1364–22– 52	W1GB[3]	56– 7– 8	W8HS	25– 5– 5
W9EUT	6324–34– 86	W2KVL	1342–22– 61	W4AOB	54– 6– 9	W1ALP	20– 4– 5
W9IBU	6273–41–103	W8USM	1330–19– 40	W8MCB	54– 6– 9	W3GHW	20– 4– 5
W8AVH	6080–38–100	W9TVU	1276–22– 38	W3GSM	40– 5– 8	W1CQN	16– 4– 4
W8BKE	5973–33– 91	W9CEY	1224–24– 51	W3JGS	40– 5– 8	W9NON	16– 4– 4
W1JSM	5964–28–113	W1KFV	1248–16– 28	W1MOF/7	39– 3– 3	W7HZI	15– 3– 5
W6CLZ	5889–39–101	W9EUT	1155–21– 45	W3CDY	36– 6– 6	W6MYT	9– 3– 3
W7RT	5863–41–103	W2HXI	1081–23– 47	W8CJF	36– 6– 6	W9IML	9– 3– 3
W3JGJ	5776–38–152	W8WEJ	1040–20– 52				
W8KPL	5730–30– 91	W9LTR	1027–13– 39				
W8UTC	5676–33–142	W4GLL	987–21– 47				
W8RYP	5643–27–109	W9GJX	960–20– 48				
W6LMZ	5628–42–124	W7HRM	924–22– 42				
W6MUF	5577–39–103	W4GRL	902–22– 41				
K6PAH	5371–41–111	W8CBI	882–18– 39				
W9IJB	5280–33–116	W2NVV	880–20– 44				
W1MJK	5220–30– 84	W9WJH	805–23– 35				
W9WUU	5187–39– 93	K4GSG	800–20– 30				
W1FGC	5130–27–103	W9KHB	792–12– 16				
W9TKN	5092–38–134	W1MZO	779–19– 31				
W4FZW	4961–41–121	W9CDS	777–21– 37				
W9HNH	4698–27– 74	W8UVE	759–23– 33				
W2NNB	4396–28– 77	W8QJL	748–17– 44				
W1AOO	4368–26– 88	W5DWO/5	714–21– 34				
W8VTF	4250–34–115	W1NEI	704–16– 44				
W2CNC	4176–24– 74	W2LRI	703–19– 27				
W3FFN	4142–38–109	W9NYU	697–17– 31				
W9AHG	4128–32– 79	W8IEH	640–20– 32				
W2LFR	4100–25– 94	W1MZE	595–17– 35				
W9VAV	3993–33–101	W4FSZ	594–18– 33				
W8DTV	3978–34–117	W9REC	589–19– 31				
W8SQE	3924–36–109	W9QWM	560– 7– 10				
W2IOP	3737–37–101	W3IWF	540–15– 36				
W9AEJ	3552–24– 48	W3JBU	540–14– 40				
W8NCJ	3535–35–101	W9UWE	540–15– 26				
W1TD	3520–22– 60	W6PAR	532–19– 28				
W9MMY	3432–24– 68	W1ZR	518–14– 17				
W6EY	3408–24– 42	W8SFD	504–14– 26				
W1MFK	3360–28– 80	W8TJU	490–16– 30				
W9TJR	3328–32– 74	W3HBE	480–15– 32				
W8QVK	3200–32–100	W9OMW	480–12– 20				
W8TKW	3162–31–102	W9OPH	480–12– 40				
W8CSF	3052–28–109	W4HXO	468–18– 26				
W3IRO	2970–27– 80	W8FDA	450–18– 25				
W6KMM/6	2925–39– 75	W8LAP	442–17– 26				
W5CJP	2905–35– 83	W4CDB	432–16– 27				
W2NWA	2898–21– 78	W5FMF	432–16– 27				
W6RWW	2850–38– 75	W9QLW	432–18– 24				
W2MRL	2800–25–112	W8UNA	396–12– 33				
W5JKW	2793–21– 33	W4HYB	375–15– 25				
W2LMO	2736–36– 76	W9TLH	342– 9– 18				
W6STX	2726–29– 54	W8KEV	336–14– 24				
W1APA	2686–34– 79	W9KJC	327– 3– 9				
W4GEE	2673–33– 81	W8WEG	322–14– 23				
W2NEC	2639–29– 71	W9RTA	315–15– 21				
W9GLU	2432–32– 76	W9QPC	280–14– 20				
W9AQU	2370–30– 49	W2MON	264–12– 22				
W3GOL	2350–25– 84	W9DBO	253–11– 23				
W8LOF	2336–32– 73	W9DTE	240–12– 20				
W9LDK	2304–24– 66	W7GLF	208–13– 16				
W4HHK	2200–20– 40	W9KHQ	195–13– 15				
W8TIK	2146–29– 74	W1BTY	187–11– 17				
W3ALF	2000–25– 70	W3GCU	170–10– 17				
W2LXI	1998–27– 74	W3FXZ	165–11– 15				
W9IQW	1920–32– 60	W7IJQ	156– 6– 6				
W6CIS	1876–28– 47	W9EHT	156– 6– 6				
W8MQC	1860–31– 60	W8VMF	140–10– 14				
W8VKF	1809–27– 67	W9WUQ	140–10– 14				
W9EYM	1740–30– 58	W9MCX	100–10– 10				
K4HEB	1729–19– 31	W1LOS[2]	99– 9– 11				
W1KOS	1710–19– 60	W5JET	99– 3– 3				
W8WIF	1664–26– 64	W7DP	99– 9– 11				
W1BDI[1]	1586–13– 22	W3GHR	96– 8– 12				
W9DGA	1500–25– 60	W5IGP	96– 8– 12				
W1APA	1482–26– 57	W1MXP	88– 8– 11				
W9RSI/9	1484–28– 53	W2NKT	72– 3– 4				
W1MQR	1475–25– 59	W2LGK	66– 6– 11				
W9HKR	1456–26– 56	W2HCO	64– 8– 8				
W3GZF	1449–21– 59	W1LUA	63– 7– 9				

F.C.C. Disciplinary Actions

For various violations of the rules governing amateurs, the F.C.C. revoked the amateur radio station license of Robert J. Lowe, W9YJL, of Minot, N. D., and suspended for the remainder of their terms the amateur radio operator licenses of Lowe, John C. Yednock of Greensboro, Pa., and Robert Hart of Scarsdale, N. Y.

—•••—

Got your WAS yet? Now is a good time to look through all those cards to see if you can qualify. The award rules require that forty-eight cards, one from each state, confirming two-way communication, be submitted. Sufficient postage must be sent with the confirmations to insure their return. Address all applications and confirmations to the Communications Department, ARRL, 38 LaSalle Road, West Hartford, Conn.

—•••—

Meet the SCMs

W9FUZ

Armond D. "Army" Brattland, SCM of Northern Minnesota, is a real old timer in amateur radio. He first became interested way back in 1911 and was active as 9EA in 1914. "Army" has since held the calls W9DGL and W9ITJ. Commercial radio took him to the West Coast in 1920. Prior to the war he was active on all bands from 1.75 through 28 Mc. with band-switching c.c.o. transmitter ending up in a pair of 812s and used a Breting 14 receiver. SCM Brattland was a member of the AARS and the Minnesota Section Net and is very active in club work, being president of the St. Paul Radio Club and a member of the Bemidji Radio Club, North Minn. Amateur Radio Association of Affiliated Unit Clubs. His other hobbies include hunting, fishing, dog-training and reading. He participates actively in target shooting, trap shooting, skating, skiing and swimming. Profession: Practicing lawyer.

WE BELIEVE IT was J. P. Morgan who, when asked for a tip on the stock market some years ago, gave the simple answer "Never sell America short!" That is still good advice. We should like to add to it, "Don't sell amateur radio short, either!"

Amateur radio will come through with flying colors. It has by tradition always met every local or national emergency with skill, resourcefulness and patriotism. Now that amateur radio is faced with its greatest emergency and its greatest opportunity, it is unthinkable that it will fail. It will do the job well, just as surely as a grateful nation will not forget it when peace comes.

It is not an easy job. No one yet knows exactly what services the amateur will be called on to perform, but everyone expects him to be ready when he is needed. No one knows just what the final regulations will be, yet he must anticipate them by proving his discretion as he has already proved his resourcefulness and skill. There will be disappointment too, for many amateurs who do all of these things may never be called upon. Yet the mere fact that they are ready and waiting to serve is itself a great service to the Nation, and to amateur radio.

Waiting does not mean hibernating. K. B. Warner was right last month when he said that this was a marvelous time to take up some things for which we never had time before. *QST* is staying on the job and incidentally, we are staying with *QST*. It may be your luck to be off the air for the duration. Perhaps you will not be able to buy the deluxe parts you would like to use rebuilding the rig in the meantime. At least you have the satisfaction of knowing that the parts are being well used, and that when you do get your parts they will be better parts than now exist. The radio industry is not only building fast, it is learning fast.

Maybe you have saved up to buy a new receiver and are disappointed to find that you cannot get it. Well, at first glance a Defense Bond may not look much like a communication receiver, but when the war is over you will find that the bond has what it takes to get good signals. It is better than money in the bank, and dealers dearly love a cash customer.

In the meantime, we have a job to do!

W. A. READY

Press Frequencies

THROUGH the courtesy of Mr. Phil Zurian, chief engineer, Press Wireless Inc., New York, we list here the frequencies of commercial stations whose transmissions we recommend for code practice. See page 70 of January *QST* and page 33 in the February issue for other press frequencies. Addressed information may not be divulged except to the addressee. Keep anything you may copy to yourself.

	New York	*Los Angeles*
4715	WCR	KGT
4720	WBG	
4725	WCS	
5350	WCD	
5355	WCF	
5360	WCH	KGT-2
6920	WEE	KGT-3
7340	WBG-3	KJE-5
7355	WBS	KJE-6
7510	WDD	KGT-4
7615	WBG-2	
7620	WBG-7	
7625	WDQ	KGT-5
7820	WBG-4	KJE-7
7850	WCX	KCI-8
7955	WHI	KCI
8810	WJP	KGT-6
9390	WCL	KJE-8
10010	WJQ	KJT-7
10340		KCI-2
10750	WHL	KJE-9
11460	WHL-2	KJN
11640	WPJ	KCI-3
13185	WPK-2	KJN-2
13790	WBG-8	KJN-3
13840	WPK	KGT-8
14635	WPU	KJN-4
15565	WCP	
15580	WCB	KGT-9
15610	WBG-5	KJN-5
15640	WBG-9	KJN-6
15700	WJS	
15730	WCA	KCI-4
15825	WBC	KCI-5
15850	WCW	KJE
15880	WBG-6	
15910	WRK	KCI-6
17440	WHJ	KJN-7
18510	WHL-3	KCI-7
18560	WRM	KJN-8
19470	WDH	KJE-2
19850	WBE	KJE-3
20800	WRP	KJN-9
22780	WBH	KCI-9
23450	WBK	KJE-4

—•••—

Attention amateurs near Boston, Mass.: If you are an amateur license holder between the ages of 21 and 50, in a deferred draft classification, fairly well physically fit, not in Federal service, and want to volunteer a little time toward serving your State, you are eligible to join the Second Division Signal Company of the Massachusetts State Guard which is seeking radio operators for its radio section. Further information may be obtained from Miles W. Weeks, W1WV, 1st Lieut., Radio Section, Second Division Signal Company, M.S.G., by calling BEAcon 2975 or LAFayette 5700 or by appearing at Commonwealth Armory, 925 Commonwealth Avenue, any Tuesday evening after 7 P.M., and asking for Lt. Col. Boyden, Capt. Davies or Lt. Weeks.

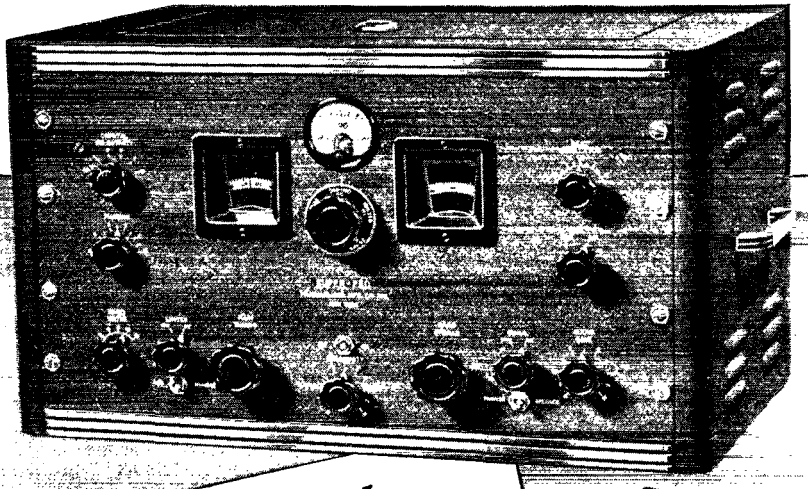
—•••—

Headquarters Staff Note: Robert C. Morwood, W9QMD, who recently replaced James R. Buckler, W1NKC, on our Communications Dept. staff is off to the Dark Continent, having accepted a position as radio operator in the Pan American Airways African system.

—•••—

The American Radio Institute Radio Club with headquarters at 1123 Broadway, New York City, is issuing ARRL Club Code Proficiency Certificates. Tests are held twice monthly. Sending is done with automatic equipment and

RADIO AT ITS *Best!*



The NEW "Super Pro"

THE Series 200 "Super-Pro" is not just another receiver created in the Sales Department first and then engineered to sell at a price. It is the result of years of research and engineering moulded into a single unit designed to satisfy the demands of the critical communications engineer whose only impasse is explained as "due to conditions beyond our control." Amateurs are more and more demanding commercial performance and the new Series 200 "Super-Pro" is the answer to that demand. The economy in owning a "Super-Pro" lies in the fact that it is built for years of service. As one owner puts it, "it is cheaper to buy one 'Super-Pro' than trade in an ordinary receiver every year." We might add that even trading for a new receiver every year would still not give him "Super-Pro" performance. Ask your dealer to demonstrate the full-range variable selectivity of the new "Super-Pro" which covers every band width from single signal to nearly 16 kc. for high fidelity. Investigate the adjustable "S" meter, the efficient noise limiter, the variable crystal filter and its many other features and you will agree that it pays to own a "Super-Pro."

SEND FOR BOOKLET

HAMMARLUND MFG. CO., INC. Q-3
424–438 W. 33rd St., N. Y. City
Please send New "Super-Pro" Data.

Name.....

Address.....

City.....State.....

PRECISION PRODUCTS FOR BETTER RADIO

Canadian Office: 41 West Ave. No., Hamilton, Ont.

HAMMARLUND

non-members are cordially invited to participate. The next runs are scheduled for March 10th and 24th at 1 P.M. and 8 P.M.

—···—

The Detroit Amateur Radio Assn. recently conducted part of a meeting by "c.w. only." Each member brought along his own bug or hand key and fifteen feet of wire. A different sized resistor in series with each key furnished a variety of differently pitched notes. A fine was levied on any member who spoke a word during the session. The gang report having a fine time and also learned a little something about controlled-net procedure!

What Do We Do Next?

(*Continued from page 11*)

porting progress in *QST* whenever possible. These leaders will be fellows who show particularly keen interest in a project and are willing to take on the responsibilities, and we expect that those qualities will make themselves manifest after we get under way. To get moving, however, we're appointing temporary group leaders in a number of cases, they to carry on until each project shapes up.

Yes, there will be plenty to do in wartime. The trouble is going to be to find the time, not to find things to keep us busy!

Wired Wireless

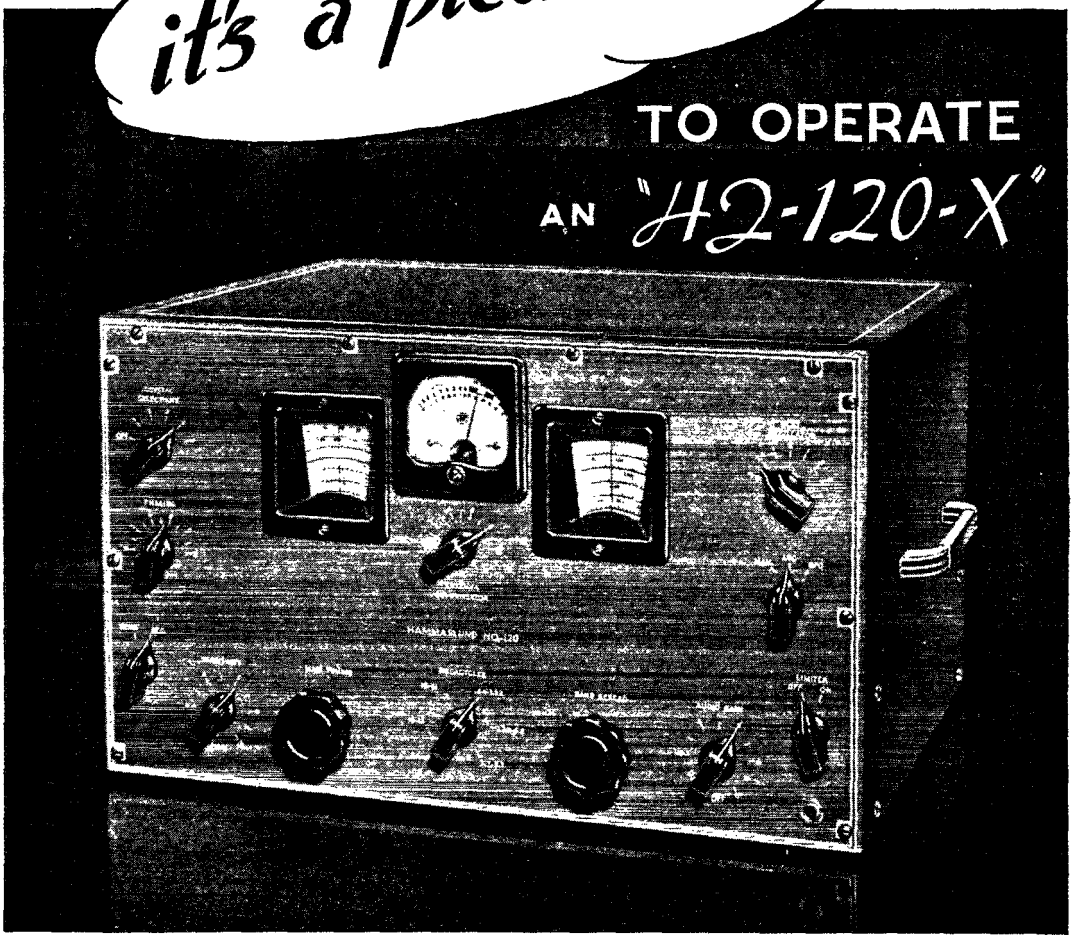
(*Continued from page 15*)

together the old reliable "detector and one step," but this has several disadvantages that make its construction unwise. In the first place, the frequency is likely to be pulled around a bit by someone turning on a light in another room, thus necessitating some retuning. Further, regenerative detectors at these low frequencies are likely to be *too* selective and, since one must tune off-frequency slightly with a regenerative detector to obtain the proper beat note, it is not possible to realize full signal strength except with rather low beat notes. On the other hand, a converter for the 175–200 kc. range that will feed into a communications receiver costs no more than the regenerative receiver, and it has the advantage that any noise-limiting devices on the communications receiver can be utilized. The noise at these frequencies that comes in on the 110-volt line is rather high, particularly in localities where there are a number of oil-burning furnaces (with electrical ignition) and similar sources of electrical noise. The converter to be described is a simple affair, and it can be used to copy long-wave stations for code practice and general snooping as well as for the reception of amateur "wired-wireless" signals.

The circuit of the converter is quite conventional (Fig. 2). It consists of a 6SA7 mixer tube with the output on 1950 kc., so that it can be hooked into any communications receiver which will tune to 1950 kc. The grid circuit tunes the range 150 to 200 kc. and, in order to give the output frequency of 1950 kc., the oscillator tunes from 1800 to 1750 kc. The oscillator could also be made to tune from 2100 to 2150 kc., but by

it's a pleasure!

TO OPERATE AN "HQ-120-X"



SUPERIOR PERFORMANCE and ease of operation have made the "HQ-120-X" outstanding among amateur receivers. You don't have to "fight" the "HQ-120-X" in order to pull in weak DX stations, its controls are smooth and accurate. Tuning knobs are at wrist-level height eliminating "tuner's cramp," and the dials are accurately calibrated for instant logging. There are no delicate or critical adjustments necessary when searching for DX, maximum sensitivity is always available. The variable selectivity crystal filter cuts through the worst QRM, either phone or CW, with remarkable results. Automobile ignition interference is reduced to a negligible level with an improved noise limiter system. Other features include, calibrated band-spread, antenna compensator, and calibrated "S" meter. Ask your dealer to demonstrate the smooth and dependable performance of amateur radio's most complete moderately priced receiver — the "HQ-120-X."

WRITE FOR BOOKLET!

HAMMARLUND MFG. CO., INC. Q-3-42
424-438 W. 33rd St., N. Y. City
Please send 16-page booklet.

Name.....

Address.....

City.....State.....

Canadian Office: 41 West Ave. No., Hamilton, Ont.

PRECISION PRODUCTS FOR BETTER RADIO

HAMMARLUND

using the former range it can be checked on a communications receiver which only covers the amateur bands.

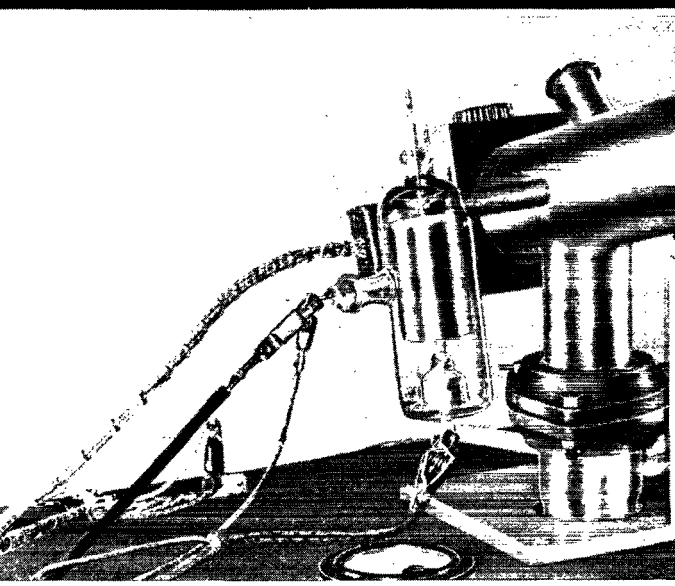
The converter is built on a 7- by 7- by 2-inch chassis, and only a few points need be mentioned because the arrangement of parts can be seen in the photographs. The tuning condensers are bolted to the chassis in a position that will allow the panel to be supported by the panel bearings of the condensers. The toggle switch and the screw holding the oscillator coil also hold the panel to the chassis. The mixer and oscillator padding condensers, C_2 and C_4, are fastened to the sides of the chassis under their respective tuning condensers, and C_5, the output circuit tuning condenser, is mounted on the chassis directly behind the 6SA7. The output coil, L_3, is fastened to the chassis near its tuning condenser. Both L_2 and L_3 are wound on 1-inch bakelite forms (Millen 4500). L_1 is a winding from a 175-kc. transformer. The particular one we used came wound on a piece of dowel which could have been used to mount it except that we used up the dowel in another experiment, so the winding was slipped over a polystyrene stand-off insulator (Millen 30001) which was cemented to the chassis. However, the dowel will serve just as well.

The primary winding for L_1 is put on after two layers of cellophane scotch tape have been wound over L_1 to serve as insulation. The primary can then be wound on and cemented with coil dope or Duco cement.

The converter is put into service by connecting its output to your communications receiver and plugging in the line cord of the converter. While both the converter and receiver are warming up, set the receiver to 1950 kc. Then adjust the output trimmer C_5 for maximum noise from the receiver. Next the converter oscillator range can be checked by setting the oscillator tuning condenser, C_3, to minimum capacity and the receiver to 1800 kc. It should then be possible to tune in the converter oscillator signal by adjusting C_4 until the signal is heard. Check the range of the oscillator by setting C_3 at maximum — if it can be tuned in at 1750 kc. on the receiver your range is right on the nose. If the range is too great (oscillator is lower than 1750 kc. at maximum capacity) it indicates that fewer turns are required on L_2, and vice versa. It is not critical, of course, since the converter is not ganged. The receiver can now be reset to 1950 kc. and C_1 and C_3 set to the middle of their ranges. Then adjust C_2 for maximum noise (with S_1 closed) and the converter is lined up for action. It will be found that the mixer tuning control is not too sharp and will only need attention after the signal has been tuned in with the main tuning control, C_3. Remember that C_3 tunes backward to the usual way — it is tuning the converter to 150 kc. when it is at minimum capacity and to 200 kc. when it is at maximum capacity, the reverse of the mixer condenser action.

The coupling switch, S_1, is included so that the converter will not be pumped full of r.f. during transmission periods, and it should be used to

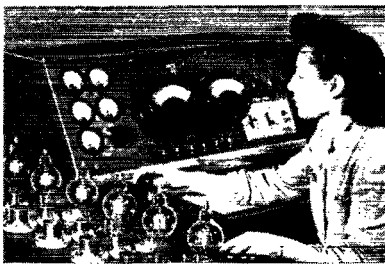
ELECTRONS IN ACTION!



With the aid of this Electron Microscope, one can actually observe the action of electrons being emitted from a heated filament. Like a moving picture, the emission characteristics of a filament are projected on a lens - like screen. Observations thus made, enable Eimac engineers to maintain the enviable record of dependability and superior performance enjoyed by Eimac tubes.

Before filament assemblies are sealed into the tubes they are placed under a temporary vacuum and heated to much higher temperatures than normal. This vital test enables technicians to weed out faulty parts before tube is actually pumped.

Hard vacuum is essential to preserve peak filament emission. Special pumps are built in the Eimac laboratories to fit the exact requirements of Eimac tubes. During the pumping process, plate dissipation is run up to ten times normal. Tubes that cannot stand this abuse never leave the factory.



Here is a special Emission Tester which enables laboratory men to ascertain the actual performance capabilities of filaments after the tubes are completed. Under this test filaments are made to perform much more difficult tasks than could possibly be required under normal operating conditions.

MAXIMUM FILAMENT EMISSION ASSURED IN EIMAC TUBES

All Eimac tubes are unconditionally guaranteed against tube failures resulting from gas released internally. No other tube carries such a guarantee. This guarantee plus the fact that leading engineers throughout the world use and recommend them provides ample reasons for you to consider Eimac tubes for your application.

Follow the leaders to

Eimac TUBES

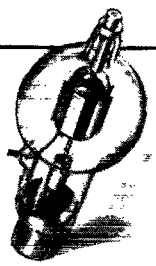
Eitel-McCullough, Inc., San Bruno, Calif., U. S. A.

Foreign Division

FRAZAR & CO., LTD.

301 Clay Street, San Francisco, California, U. S. A.

Eimac's unusual performance capabilities are receiving the enthusiastic acceptance in all branches of the service ARMY, NAVY, AIR CORPS.



EIMAC 450T

(In use by practically every major airline in the U. S. A.!)

Filament Voltage	7.5 to 7.7 Volts
Filament Current (approx.)	12 Amperes
Maximum Plate Voltage	6000 Volts
Continuous Plate Dissipation	450 Watts
Power output at 75% efficiency	1350 Watts

disconnect the converter from the line whenever the transmitter is being keyed.

General

Any group of hams within several miles of each other in a city and up to ten or more in the country will find they can have plenty of fun and operating practice with wired wireless. We suggest that they keep to around 165 kc., to reduce the chances for radiation, and that the power be kept low — one or two 6L6s will give plenty of output. On several occasions we noticed a difference in signal strength, very probably caused by different routing or loading of the line, and it may work out in some instances that 24-hour communication is impossible or unreliable.

Above all, however, remember to keep away from other services and from interfering with broadcast receivers — continued wired-wireless operation will depend upon our staying in our own backyards and not getting in anybody's hair.

The Panoramic Spectroscope

(*Continued from page 18*)

from one end of the band to the other, simultaneously with the horizontal deflection of the cathode-ray tube. The result is that the whole band is portrayed on the full width of the calibrated screen as described above, with the signal to which the receiver is tuned appearing in the center.

The sweep width may be varied to increase or decrease the width of the band under simultaneous view. When it is cut to zero, the cathode-ray tube acts as a normal oscilloscope showing the modulation envelope of any signal tuned to the 0 point on the screen.

Several important and interesting uses of the radio spectroscope have been tested, and photographs were taken of the cathode-ray screen. Tracings of these are shown in Fig. 2 and are described briefly below:

1. Carrier modulated with 3000 cycles, sweep-width 70 kc. The sidebands are clearly separated on each side of the carrier.

2. Same signal as in No. 1. Sweepwidth reduced to 25 kc. The sidebands are spread further, i.e., the resolution is better.

3. 14-Mc. amateur 'phone band. About six modulated 'phone stations are visible.

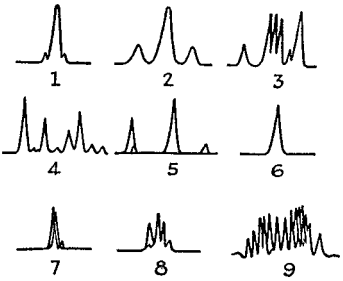


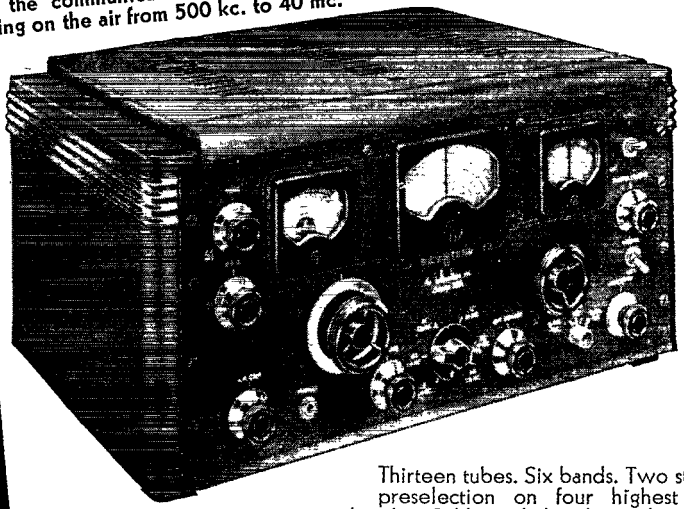
Fig. 2 — **Typical patterns illustrative of different types of signals. The patterns are explained in the text.**

AVAILABLE NOW... and you can get it for only $37.50 DOWN!

HALLICRAFTERS SX-32

8 MONTHS TO PAY BALANCE PLUS 6% CARRYING CHARGE

The new Skyrider 32 for 1942 embodies many noteworthy engineering advancements in the communications field. Covers everything on the air from 500 kc. to 40 mc.



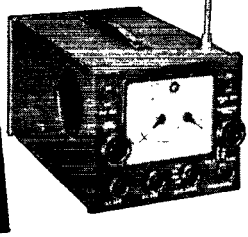
Thirteen tubes. Six bands. Two stages preselection on four highest frequency bands. Calibrated bandspread inertia controlled. Micrometer scale tuning inertia controlled. The new Skyrider 32 has been engineered by Hallicrafters to produce superior communications receiver performance at a moderate price. SEND DOWN PAYMENT AND CREDIT REFERENCES WITH YOUR ORDER.

Cash Price

$149.50

Complete Less Speaker

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★



S-29 ***hallicrafters Sky Traveller*** **$69.50**

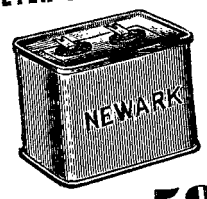
$17.35 Down . . . Balance in 6 easy monthly payments, 6% carrying charge.

Whether you stay in town, go to camp, or move back to the farm . . . the Universal Portable receiver will always be at your service! Operates on 110 volts AC or DC, or from self-contained batteries. Tunes from 542 kc to 30.5 mc (553 to 9.85 meters). Self-contained antenna. One stage preselection on all bands. Electrical bandspreading. Complete with tubes, battery and speaker.

Other Hallicrafters models may also be purchased on Newark's Easy Terms. 25% down, balance monthly

SPECIAL

OIL FILLED – OIL IMPREGNATED FILTER CONDENSERS



As Low as 59c

Mfd.	Volts DC.	Size	Price
1	1000	5 x 3⅜ x 1½	$ .59
2	2000	4⅞ x 3⅛ x 1¾	1.50
8	2000	5 x 3¾ x 3½	2.75
4	3000	5 x 3½ x 3⅞	3.75

The lowest price NEWARK has ever featured . . . on a condenser value that already has made thousands of friends for us! Quality-built by reliable maker. Guaranteed at rated voltage.

Remember—BUY DEFENSE BONDS and STAMPS!

SEND NOW FOR THIS

FREE CATALOG

Thousands of bargains, sets, parts, accessories, supplies, of best known makes. Hundreds of illustrations. This book belongs in every "ham" shack, ready for instant reference. Helps you plan your new rigs, figure costs, learn sizes and specifications before you start construction.

YOUR CALL LETTERS IN GOLD — 10c

Big, shadowed decalcomania letters nearly 2" high. Send dime for yours today. Don't forget to give your call letters.

NEWARK Electric Company

323 W. MADISON ST.
Dept. Q CHICAGO, ILL.

4. A portion of the broadcast band. Stations are distributed at every 10 kc.

5. Three automatic telegraph stations. Because of the rapid keying the deflections appear closed at the bottom. On the left side a "key click" appears.

6. Frequency modulated carrier during period of silence.

7. Same with very little modulation.

8. Same with increased modulation.

9. Same with heavy modulation.

This new tool is coming into use at a time when receivers, rather than transmitters, are the heart of the amateur operating room. Although transmitters are closed down, no restrictions have been placed on receivers, and a new and interesting field is open for war-time amateur activity. Receivers already in use can be easily equipped with the separate adapter unit as described above, thereby increasing enormously their field of usefulness.

Happenings of the Month

(*Continued from page 21*)

sponsibility for the whole system. The latter will appoint as his radio aide our Emergency Coördinator or, in his unavailability, his equivalent amongst local amateurs, who will assist in planning the assignment of amateurs to posts of duty. That can be done by direct acceptance of the desired amateurs into the personnel of the local Control Headquarters, without reference to the local Volunteer Office — registration in our AEC is sufficient.

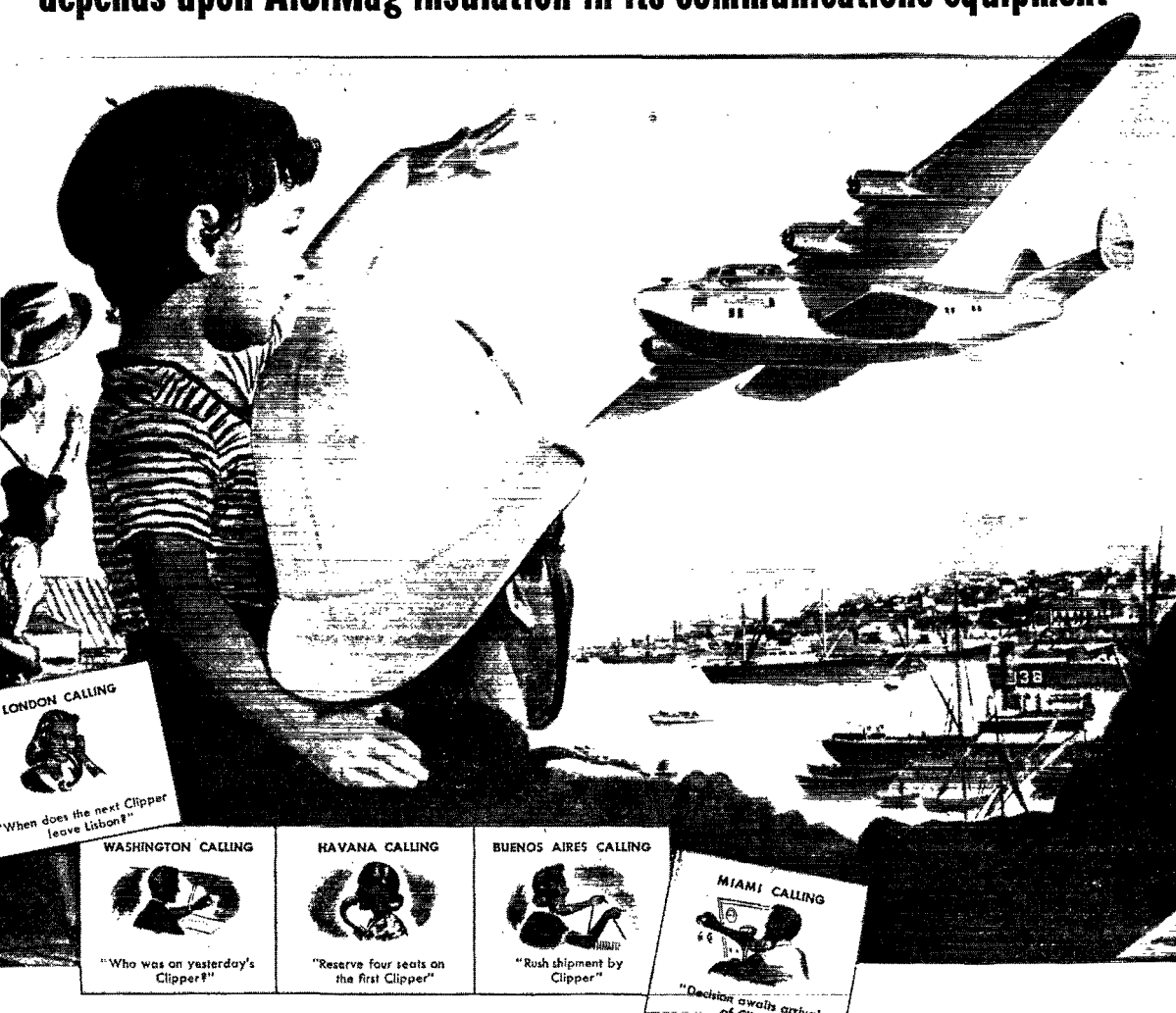
JANUARY CLOSING ORDERS

SO THAT the chronicle in *QST* may be complete for record purposes, let us report the orders in the "second closedown" of January.

About the end of the year, DCB asked FCC to hold up on the issuances of further reactivations until DCB could study the situation and arrive at more definite policies for the future of amateur radio. FCC had issued 1689 reactivations through January 1st and had applications for another thousand or so on hand but thereafter discontinued and stood by. The halt came about through uneasiness in DCB, particularly in the War Department, over the looseness of reactivating procedure and the looseness of the subsequent control. It was said that in too many cases there was little evidence of well-conceived plans and considerable evidence of "politics" and that the procedure was palpably getting out of hand. As the result of its studies, DCB on January 8th asked FCC to wash out everything up to date, it being understood that consideration would be given a completely new deal if a federal agency stepped forward with a definite request for amateur services. OCD immediately started work on such a plan. Meanwhile FCC acted on the DCB request and on January 9th cancelled all special authorizations by means of a brief order and announcement. W1AW transmitted the word un-

THE MOST WATCHED-FOR SHIP IN THE WORLD

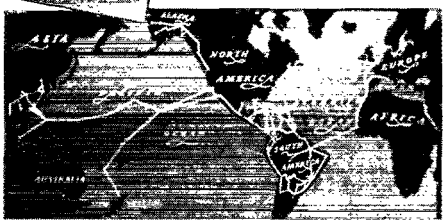
depends upon AlSiMag insulation in its communications equipment



AT THIS VERY MINUTE in half a hundred far-flung countries, Pan American Clippers are helping to shape history. They carry the hopes of democracy everywhere that war permits.

Upon their prompt arrival hinge decisions and events of world importance. Flying Clippers speed their vital cargo of men, mail, materials and merchandise along 86,893 miles of scheduled routes. Under wartime conditions, speed and certainty of communications is, more than ever, vital to this far-flung network. Only the best in insulation will suffice. Every conceivable climatic condition is faced in Pan American Clippers linking the United States and Europe—binding Alaska, North and South America together — bringing the distant Orient and Australasia within days of our shores.

American Lava Corporation is proud that the performance of ALSIMAG has led it to be the preferred insulation in all communications equipment throughout the Pan American Airways System.



America's Merchant Marine of the Air is a DAILY PROVING GROUND for ALSIMAG INSULATION

ALSIMAG

Trade Mark Reg. U. S. Pat. Off.

FROM CERAMIC HEADQUARTERS

AMERICAN LAVA CORPORATION • CHATTANOOGA • TENNESSEE

CHICAGO • CLEVELAND • NEW YORK • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • BOSTON • PHILADELPHIA • WASHINGTON, D. C.

til midnight of the 9th, then ceased operation. Here are the documents. Although the order mentions a meeting on the 8th, no announcement was made until the afternoon of the 9th.

ORDER NO. 87-A

At a session of the Federal Communications Commission held at its offices in Washington, D. C., on the eighth day of January 1942;

Whereas considerations of national defense require the complete cessation of all amateur radio operation;

IT IS ORDERED, That all special authorizations granted pursuant to Order No. 87 BE, AND THEY ARE HEREBY, CANCELLED.

By order of the Commission.

NOTICE TO ALL AMATEUR LICENSEES

On December 8, 1941, the Commission ordered (Order No. 87) the *immediate suspension* of all amateur radio operation in the continental United States, its territories and possessions except as may be authorized thereafter by the Commission. In a public notice of the same date to all amateur licensees, the Commission advised that where amateur radio operation is deemed to be required in connection with the National Defense, appropriate authorization to engage in such operation would be issued, but only upon application by a duly authorized federal, state, or local official made to the Defense Communications Board.

Numerous requests from proper officials have been received for authorization to permit certain designated amateur licensees to engage in radio operation in connection with National Defense. Many were approved by the Commission upon recommendation of the Defense Communications Board. However, in the light of events since December 8, 1941, and based upon military security requirements, the Defense Communications Board and the Commission, after thorough study and reconsideration of the entire problem, have decided that all amateur radio operation shall be suspended, and that all authorizations previously issued in accordance with Order No. 87 be cancelled.

Telegrams were sent to 200-odd agencies on behalf of whom amateurs had been reactivated, and copies of the order and notice were mailed amateurs concerned with a brief letter stating that "Under this Order the special authorization issued to you on ..... to resume operation of your amateur station is cancelled effective immediately. You are, therefore, advised that no further amateur radio operation by you is permissible."

Meanwhile OCD started its plan for DCB's consideration and the new study began.

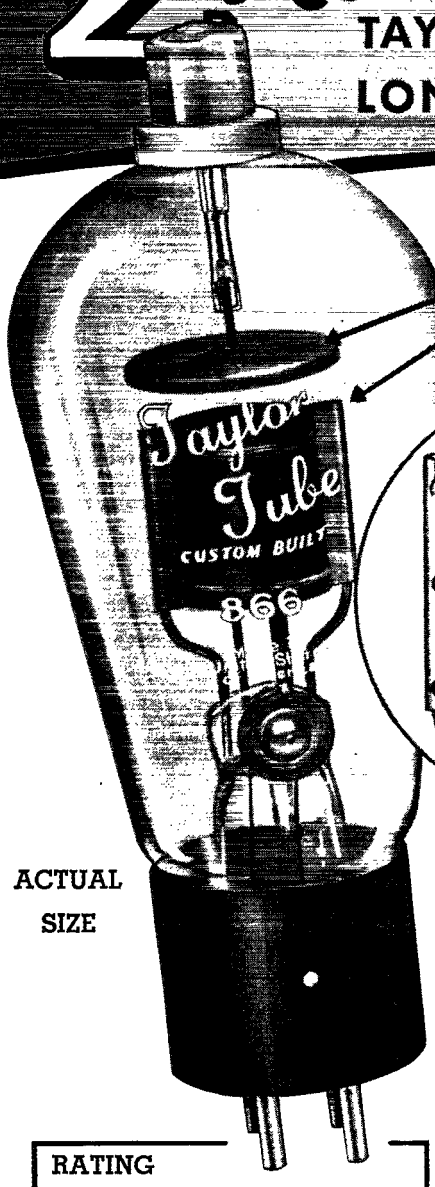
ABBREVIATIONS

IF THE "alphabetical soup" in these items ever puzzles you, here is a directory:

DCB — Defense Communications Board.
FCC — Federal Communications Commission.
NDO — National Defense Operations of FCC.
OCD — Office of Civilian Defense.
CDC — Citizens' Defense Corps, local organization of citizens under OCD auspices for
ARP Services — Air Raid Precautions services: wardens, auxiliary fire and police, first aid, etc.
CCO — Chief Communications Officer for ARP services, appointed by local Commander CDC.
CP — General term for civilian-protection work.
AEC — The ARRL Emergency Corps.
EC — Local ARRL Emergency Coördinator.
CAP — Civil Air Patrol of OCD.
FSA — Federal Security Agency.
OE — Office of Education, an agency of FSA.

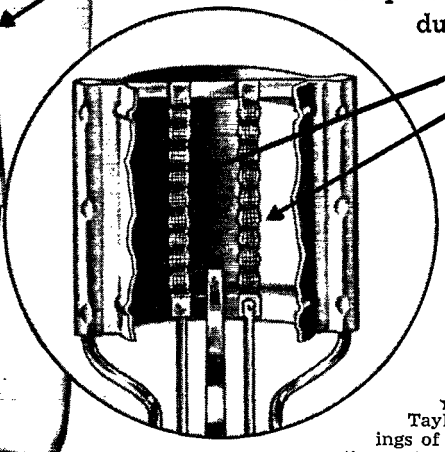
2 Reasons Why—

TAYLOR 866/866A's★ HAVE LONGER LIFE AND HIGHER RATINGS



ACTUAL SIZE

1 The shield and anode of Taylor's 866/866A are made of pure Svea metal which eliminates any possibility of filament poisoning due to loose carbon.



2 The cathode of the Taylor 866/866A is a multi-strand (mesh) filament which has approximately twice the emitting area of the ribbon type.

★ For the past 3 years, Taylor's 866 has had the ratings of an 866A. See QST advertisement—April 1939.

RATING	
Fil. Volts	2.5
Fil. Amps.	5.0
Max. Inverse Peak Plate Volts	10,000
Average Plate Amp.	0.25
Peak Plate Amp.	1.0

Only $1.50

OVER 125,000 SOLD!

SEE YOUR PARTS DISTRIBUTOR TODAY FOR TAYLOR TUBES

"More Watts Per Dollar"

Taylor HEAVY CUSTOM BUILT DUTY Tubes

TAYLOR TUBES, INC., 2341 WABANSIA AVE., CHICAGO, ILL.

ESMDT — Engineering, Science & Management Defense Training program of OE.

KEEP UP YOUR LICENSE!

YOU are earnestly urged to keep your amateur licenses in force, both operator and station. You're likely to need them for participation in ARP work; we can't tell what else will break in which you may need them. And they help in getting radio employment or in securing radio assignment in the services. FCC is continuing the renewing of licenses and their modification for change of address in the same old manner. Write your Inspector-in-Charge for amateur application form for either renewal or mod, fill out in the usual fashion, send with your old license to FCC at Washington. Don't let your licenses lapse!

Amateur exams for new licenses are being given as usual (schedule in last *QST*). None has been actually issued since war began but it is expected that op licenses will be released soon, and perhaps station tickets where needed for a defense purpose.

SELL YOUR TRANSMITTER?

THE military services cannot get delivery on fixed transmitters fast enough and are appealing to ARRL Hq. to find amateurs who possess standard manufactured transmitters they are willing to sell. There is as yet no interest in homemade jobs, however good, but you can get a good fair price for a transmitter of 100 to 1000 watts input, of such a standard make as Collins, Hallicrafters, RCA, RME, Temco, etc., capable of working anywhere in the 2000–6000 kc. range.

ARRL gladly centralizes this information. If you're willing to sell your "boughten" transmitter, drop a letter or card to ARRL, West Hartford, Conn., giving following data: (1) Your name, address, call. (2) Make of transmitter, model number, power rating in watts in or out, 'phone or c.w., frequency range. (3) Whether rig has been altered by you. (4) Date acquired, cost, your selling price at your shack.

Uncle needs help. Are you willing?

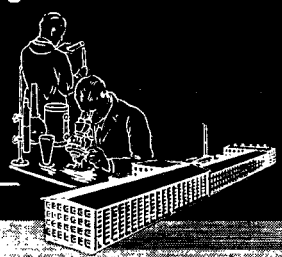
An Acoustic System

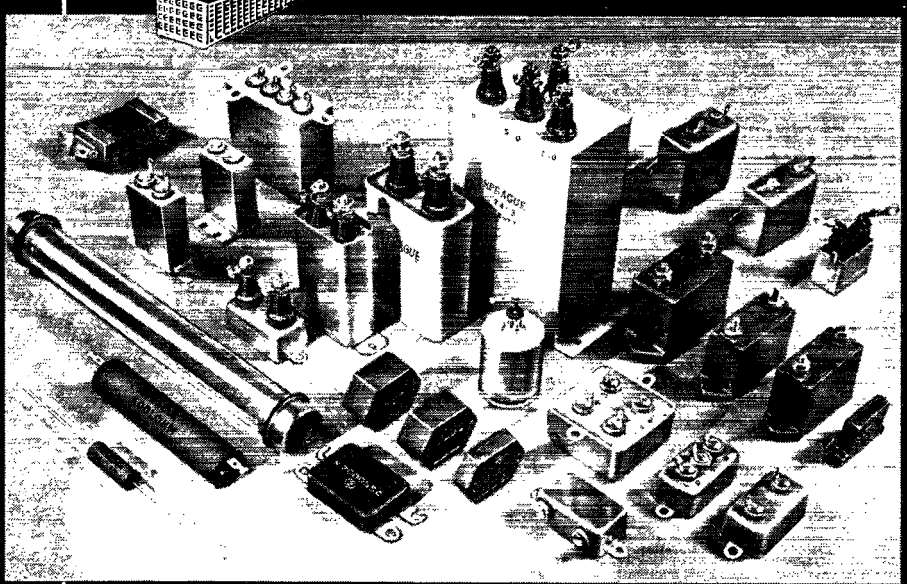
(Continued from page 24)

various types of screens have been designed to protect the microphone from the wind and yet provide ready transmission of sound waves. However, in this case, we have the additional problem of weather-proofing the microphone. One type of weather-proof housing is shown in Fig. 2. While it may not be as efficient as others which might be designed, it is of simple construction. The upper portion consists of a square box supported on legs at each corner. The side walls of the box should be made of heavy material to prevent vibration. The joints should be sealed against rain and the whole thing given a coat or two of weather-resistant paint. A strip of silk may be wrapped around the four legs to reduce

The ability to design and produce so many specialized types in a short time is important. It is, however, only a secondary consideration in the selection of Sprague Condensers for Defense applications. Far more important is the assurance of utmost dependability for each and every unit given by Sprague's long record of performance as a leading supplier to the Radio Trade. . . . .

Although new condenser mechanical arrangements are sometimes made overnight, basic condenser section design and resulting dependability are not.





SPRAGUE

CONDENSERS—KOOLOHM RESISTORS

Quality Components • Expertly Engineered • Competently Produced

SPRAGUE SPECIALTIES COMPANY, NORTH ADAMS, MASS.

wind noise. The microphone should be provided with a suspension of rubber bands or springs. If the housing is mounted on a flat surface, sound waves striking the flat surface will be reflected upward into the box. The microphone and the speaker must be separated some distance to prevent feedback howls. It will probably be more economical to mount the amplifier with the microphone and extend the power and speaker leads, rather than to extend the microphone cable.

Tests which were made with the simple unit described showed very successful results. Even in a poor location in the center of a traffic section of town it was possible to detect the presence of aircraft quite as readily as with the unaided ear. In a quiet location without the blare of automobile horns and exhausts of truck motors, it should do a real job. Experience has shown that an acoustic system is much more dependable than a system which depends upon sighting the aircraft. In cloudy weather, the acoustic system is indispensable. During tests, there were numerous instances when it was utterly impossible to see aircraft immediately overhead, although the weather was not too cloudy for flying. Yet the receiving room was filled with the roar of motor noise. Similarly, aircraft anywhere in a wide area between the sun and the observer cannot be seen. Even in slight haze, it was found possible to detect the approach of aircraft much more quickly with the acoustic system than with the eye, particularly with the aircraft at high altitude.

Navy Day

(Continued from page 59)

W8REP. **Eighth Naval District:** W3FPA/5, W4CRP, W4GLL, W9OFN, W4GOX, W4GYR, W4HZI, W4OS/5, W5EXD, W5FNA, W5HA, W5HAV, W5HBZ, W5HGL, W5HQN, W5IBU, W5IGJ, W5VQ, W6QWQ/5, W9JRC/5, Russell R. Burnett, C. T. Cirk, P. A. Norris, Charles Raczkowski, Griffith Sechler. **Ninth Naval District:** W8BKM, W8FX, W8HIG, W8HS, W8HQZ, W8IAM, W8JXY, W8OCC, W8QC, W8RKM, W8ROX, W8RSW, W8SJF, W8SQE, W8TGU, W8TKW, W8WE, W9AKP, W9AQU, W9ARH, W9BED, W9BLK, W9DIR, W9DOB, W9DTX, W9EGQ, W9FWS, W9GFL, W9HGZ, W9HHJ, W9HKB/9, W9HOA, W9HUV, W9INU, W9JWJ, W9KUI, W9LEF, W9LIH, W9NDA, W9NPI, W9NYU, W9OMW, W9OUD, W9OZR, W9PUL, W9PYF, W9QLA/9, W9QMD, W9RQR, W9RVW/9, W9SCW, W9UHT, W9VDY, W9VFM, W9VOD, W9WAY, W9WTT, W9YQX, W9YYA, Stephen Gasparovitch, W. J. McGuffage. **Tenth Naval District:** K4EYP, K4HEB, K4HLP, K4KD. **Eleventh Naval District:** W5ZM, W6ALK, W6BQO, W6BXV, W6CHV, W6CLY, W6DAN, W6EME, W6IOX, W6JTN, W6MWS, W6NRP, W6OFJ, W6OTY, W6PCX, W6PQR, W6QLF, W6QNV, W6RKP, W6RNB, W6RWW, W6SGX, W6SLI, W6SLU, W6SOJ, W6SOK, W6TYF, W6UEA, W8GXQ, W9ZJC, William Brantley, Melvin W. Christian, J. H. Craddock, F. L. Klinger. **Twelfth Naval District:** W6GAC, W6IWU W6LMZ, W6QQU, W6QYC, W6NRM/6, W6QBQ, W6SJH, W6RH, W7BCT, W9JWC, W9QDC, W6RPI, W6TSU, George Cambetes, Claudio Casari. **Thirteenth Naval District:** K7CZY, W3FYK, W7AVM, W7BVH, W7CAP, W7CWN, W7DP, W7GLF, W7GP, W7GUP, W7HBH, W7HPE, W7HSL, W7IML, W7IXN, W7LT, W9DVP, W9RLX, Ralph M. Row, Jr. **Fourteenth Naval District:** W1NJH, W7BYK, W9MFH/K6, W9GPZ, W9VEH, Thomas Mitchell, Russell Reig. **Fifteenth Naval District:** Arnold Pincus, Bernard Shonebarger. **Miscellaneous:** W6FWK, W8TAR, E. E. Stymus.

DEPENDABILITY

...to Match Today's Needs

One after another, almost since the beginning of Radio, IRC has pioneered and perfected leading fixed and variable resistor developments. The natural result of this leadership is a line of resistance products for practically every application, which not only matches today's most exacting requirements but that frequently sets the standards by which other resistors are judged.

INTERNATIONAL RESISTANCE COMPANY

401 North Broad St., Philadelphia, Pa.

IRC

MAKERS OF RESISTANCE UNITS OF MORE TYPES, IN MORE SHAPES, FOR MORE APPLICATIONS THAN ANY OTHER MANUFACTURER IN THE WORLD.

Station Activities

NEW ENGLAND DIVISION

CONNECTICUT — SCM, Edmund R. Fraser, W1KQY — Your new SCM wishes to express sincere thanks and appreciation for the splendid coöperation being shown by the gang. Nineteen new EC appointments bring the total to 28. Complete list of officials: Asst. SCM, CTI; PAM, LTZ; EC's: W1BW, Branford; APA, Bridgeport; KGE, Darien; LWZ, E. Hartford; NGQ, E. Haven; AJO, Greenwich; JQK, Hamden; KDK, Hartford; WR, Litchfield; FSH, Manchester; DBM, Middletown; DGG, Milford; BQS, New Britain; BCG, New Canaan; BHM, New Haven; QV, New London; DWP, New Milford; NRV, Norwalk; JXP, Old Lyme, Lyme, Essex, Saybrook; ON, Putnam; EFW, Southington; FXS, Stamford; BIH, Torrington; KSJ, Waterbury; TD, West Haven; MRP, Westport; JFN, W. Hartford; KYQ, Willimantic. ECs reporting. FSH Manchester-Reactivation was obtained by Geo. Waddell of the Defense Council for BAX, CBG, DEP, NJB, DJC, MCO, BEQ, LMK, KKS, FSH, LXH, NNV, EDL and GZV. A 112-Mc. mobile network was used for patrolling public facilities and furnishing communication between ARP Communications center and each ARW district. Tests were held Nov. 4th, 25th and Dec. 2nd. Messages were picked up by mobile units in various parts of town and transmitted back to control station. Use of a town-owned building next to the Municipal Bldg. was secured; radio equipment was installed and code practice table set up for code class. LWZ E. Hartford — Twenty amateurs are coöperating with local defense council. Meetings are held every Thursday night at 8 P.M. in the Public Library. Reactivation was applied for and plans completed for a 112-Mc. fixed net. EFW Southington — Reactivation of W1AKI, BGJ, BTU, EFW, FPM, GSP, GVT, GVZ, GYA and GTH was reported. Six TR-4's, one DK-3, with vibropacks and a 450 watt a.c. generator was secured with a town appropriation. A 112-Mc. net was formed and the first test held Dec. 29th. BIH Torrington — Defense Council wants to purchase ten transceivers for fixed 112-Mc. net, but a shortage of operators exists. BIH and KXB were reactivated and three men have taken exams. Code classes are conducted two nights a week at Town Hall. Twenty-five, including four YLs, are attending. KSJ Waterbury — A 112-Mc. net, organized prior to his appointment, functioned very satisfactorily. This network consists of 22 stations. Reactivation was secured and a code class is being held. Asst. SCM CTI reports for So. Fairfield County, which has 67 hams in Stamford, Westport, East Portchester, Norwalk, Darien, Greenwich, New Canaan and Wilton. Committee for this group is: KTF, Norwalk, general chairman; KEC, Norwalk, secy.; FXS, Stamford, radio aide to Major Pierson, head of Defense Council, So. Fairfield County; CTI, Norwalk, general coördinator; 3AOH/1, Norwalk, chairman of the technical committee. Stamford is control center for these towns. The station there will be manned 24 hours. An auto-alarm system will be used to inform hams when their services are required. A 56-Mc. channel was to be used for auto-alarm system, but will be changed to meet new requirements. 112-Mc. nets in each town are to operate portable under direction of sub-control stations. Reactivation was applied for. Having attended two meetings of this group, I can offer only the highest of praise for the excellent coöperation and performance witnessed. DGG Milford, TD West Haven, BHM New Haven, APA Bridgeport, BIH Torrington and DBM of Middletown are coöperating with local defense councils. Reactivation has been applied for. ON Putnam, QV New London, BW Branford, KDK Hartford, JQK Hamden and BQS New Britain have hams organized and plans made but are awaiting the new reactivation plan.

MAINE — SCM, Ames R. Millett, W1BAV — W1KYT has been on active duty in the Navy since last May and in September received commission as ensign in radio engineering. FB, Buster. EEY, aside from doing a swell job of organizing for civilian defense communication, is teaching communications to a unit of the local State Guard. KEZ, new emergency coördinator for Millinocket, has established a grand 112-Mc. net with portable mobile gear included. They had received reauthorization and had made several tests before the shut down. FBJ has developed a very complete set-up for local defense needs here in Portland and has had splendid coöperation from the entire gang. The need for u.h.f. equipment is becoming more apparent day by day. From all reports, the gang throughout the state are still building gear that will fit into the picture in time of need. There is certainly enough to be done along these lines to furnish all the ham radio necessary for some time. MGP is in the Air Corp and doing very nicely for himself; he has been pounding brass for the army and sure enjoys it. He also wants to be remembered to all the gang. LOA has completed a modulator for some 112-Mc. gear. LRL is now a captain in the Army. TO has been doing a lot of emergency organizing and liaison work there in the state capitol. GOJ and KOH are still down Georgia way drinking up plenty of sunshine. A few activity reports and some dope that we could pass along to the gang would be appreciated from all the gang.

EASTERN MASSACHUSETTS — SCM, Frank L. Baker, W1ALP. New ECs: MP for Wellesley, NIT for Gloucester. We are sorry to learn of the death of JUK, who was killed in a plane crash in Florida in Dec. Congrats to BVL and XYL, who are the proud parents of a new baby YL. Norfolk County Radio Club held their annual banquet and election. Following are new officers: Pres., W2JER; vice-pres., IXI; secy.-treas., NFQ. GDY, the Boston EC, has the following assistants signed up to help out: MWD Charlestown, GEJ South Boston, NAV Roslindale-West Roxbury, KSA Dorchester–Mattapan, LDG Hyde Park, ILR Allston–Brighton, NQA Back Bay–City, MZD East Boston, MMY Roxbury, NPE Jamaica Plain. UU is EC in Beverly and has appointed MIF and LWH as assistants. NF is radio officer for Beverly. BB, EC for Winthrop, is doing a nice job and has a nice set up, also a nice report in the town paper. The following hams all lined up: BDU, BTM, CCG, DJ, DRO, GGP, JKF, JOH, KPV, LMO, MSH, MQB, NGY, NQM. NKW has a new NC45. HIL has 110/6 a.c.-d.c. power supply delivering 300 volts at 100 mils., TR4 and port 112-Mc. transceiver. DIR has been in the hospital since October. EVJ and KCE down on Nantucket Island hope to get on for defense work. DMF in Wenham hopes to have a couple of stations JEP NLK on in his Town. KTG, our Cambridge EC, is still going to hold meetings. KYX hopes to have all the hams in Somerville ready for defense work. JGQ, Lynn EC, had a meeting of the hams at police station; he has 49 signed up in the Corps. LTP, Marblehead EC, has his gang all lined up, with 14 operators ready to help out. JIS is serving as instructor for radio licenses for the C.A.R. What say, gang, let's have some news for this column? Even if we can't do any operating, let's know what you are doing and keep in touch with each other through this column. AKD gave a talk and showed his 112-Mc. f.m. receiver at the South Shore Club. NJL gave a nice talk on 112-Mc. antennas at the Eastern Mass. Club. Belmont was fully organized and reactivated on Dec. 12th with five stations, one at the Report Center and one at each area commander's headquarters. Tests from each location proved their 112-Mc. gear to be completely satisfactory. In a communications rehearsal, the ham's transmission of messages was much speedier (by stop watch) than those handled over the land wires. Sets are kept in the Police Armory and only the designated hams, accompanied in person by a police officer, have access thereto.

Traffic: (Nov.–Dec.: W1MKX 31 NF 26)

WESTERN MASSACHUSETTS — SCM, William J. Barrett, W1JAH — New registrations in AEC, with a noticeable increase in the emergency powered division, continue to pour in. With the future as confused from day to day as it has been this month, planning is pretty difficult, but the only way open for us is to continue our preparations and organization, so that if and when we again get the go ahead sign, we will be ready to do our part. New EC appointments include NJZ in Northampton, FNY in Great Barrington, BVR in Westfield. Reports from various ECs have been necessarily sketchy due to the constantly changing situation. Some of our authorizations came through in time to be countermanded but the majority were blocked before issuance. The Pittsfield Radio Club has permanent club rooms in same building with local OCD Report Center. Code classes are conducted once a week in an effort to make more operators available to man equipment for 24-hour watches. Adams hams received authorization and were all set to furnish any necessary 112-Mc. communication when the authority was cancelled. This operation was first definitely planned in 1938 and was included in the emergency

plan for the community. Most of the functions of the original plan have been taken over by OCD, but the communications setup is still basically the same. Similar plans were under way in North Adams, Northampton hams are organized under the direction of NJZ. Each individual ham is requested to register in the AEC, and if your community has no EC, send your recommendation to me. Only by knowing every operator and piece of emergency equipment available can we make our best showing. Let's still keep plugging away.

NEW HAMPSHIRE — SCM, Mrs. Dorothy W. Evans, W1FTJ — Amateur radio in New Hampshire is getting in line for defense activity just as fast as plans can be formulated. On Dec. 29th a meeting was held at the Manchester Radio Club with 42 hams from all over the state in attendance. A Mr. A. C. Hudson gave a short talk on work of firemen in relation to their defense work and a Mr. Francis Lloyd gave a very interesting talk on Air Wardens and their duties. Defense work was discussed at length and AVJ has been selected as State Emergency Coördinator to work in coöperation with the Governor and the Defense Council. CNX, BST, GEY and CMR are chosen as Emergency Coördinators for their respective communities. The Governor is very coöperative with the amateurs and AVJ has been appointed by him to serve on the Defense Council in regard to radio matters. On Jan. 9th a meeting of the Concord amateurs was held at AVJ's house and plans were made for local work in the defense set-up. CNX was chosen as EC for Concord. A Civilian Air Patrol is being organized and it is requested that amateurs assist in this work. On Jan. 17th the Nashua Mike and Key Club held their annual meeting at The Brick House. JMY, Asst. Comm. Mgr. of ARRL was present and gave a timely talk on conditions as they were at that time. AVJ gave a short talk on defense work done so far in this state. GEY was chosen as EC for Nashua. FFL is expected home from England before long. We understand that AVG is now in England. The Nashua Mike & Key Club is working on 112-Mc. equipment and plan to tie in with the telephone company. It is with a great deal of pleasure that we announce the engagement of MUW to JMY of ARRL Headquarters staff. We are sure that all the N. H. gang wish Norma much happiness and extend congratulations to Joe. NMM applied for membership in the Supporting Division AEC. KLV has been working with a code class of 26 members and predicts that quite a few will be able to come through and get their licenses. NKE wants to get active on amateur defense work up Hanover way. NEI has his 35 w.p.m. code proficiency sticker. FB, Les. It is a great satisfaction to your SCM to see the fine manner in which our boys are taking hold in defense work. We have lost a great many of our N. H. hams to the Army, the Navy and to various training schools and it is just up to the rest of us to buckle down and do what we can here at home. Please don't hesitate to write to me at any time when you may have suggestions regarding state or local activities. The Governor is coöperating with us closely, and if there is any way in which existing conditions can be bettered, we will be glad to hear your ideas. You will be doing me a favor if you write in to me often. I will be glad to hear from you all and will welcome your suggestions. Keep 'em coming!

RHODE ISLAND — SCM, Clayton C. Gordon, W1HRC — From East Greenwich BEH reports that, on the request of the President of the Town Council, BFB, NCX, CJH, MDW, NES, NKX and himself were authorized to reopen their stations before the second shut-down. They were to operate on 112 Mc. A club was organized called the Green Witch Radio Club and a special room was set aside for them in the report center. The Town Council appropriated money for the purchase of equipment for the report center and vibrapack units for each amateur station. A radio school with an enrollment of 11 was started on Jan. 7th; classes meet in Varnum Armory on Wed. and Thurs. nights. All hams take their turn at instruction in code and theory, including Mrs. Francis McGiveney, W1MDW. The Westerly Radio Assn. elected following new officers for 1942: Pres., MAE; vice-pres., John Marshall; secy., MVL; treas., AGJ; librarian, James Gregory; steward, Cyril Ashworth; board of directors, BDS, LZD and Norman Hustwit. Their 112-Mc. equipment is in working order and they have a radio school in operation. On Jan. 5th the East Providence group met at Howard Russell's house and formed the "Amateur Radio Operators of East Providence," with MAV as pres., MSD vice-pres. and QR as secy. They plan code classes three nights a week in the Town Hall. While this group has the most friendly relations with the W1AQ club group, it is their desire that it be known they are a separate group and are composed, for the most part, of those hams which did so much testing and charting of East Prov. on 112 Mc. prior to the close-down. The Newport group is known to be very active and to have laid plans to be helpful to their community. However, it has been brought to our attention that a feeling exists there that ARRL, thru your SCM, has failed in the past to give them sufficient credit for their work, and this is supposed to be the reason for their coolness towards ARRL-sponsored activities. Since I do not know the group there nor in Woonsocket, the following will explain it all, boys. News items that appear in this column originate almost entirely from the corresponding secretaries of various organized club-groups throughout the state who take the time and interest to write me monthly of what is going on in their section. These news letters are extremely helpful in preparing this report. Now, I do not believe these writers are any more friendly or helpful or any better hams than anybody else, but they do have the relations of their group with ARRL at heart and do their part by keeping us in touch with what goes on in their community, and let us know who they are so that we can keep them posted about what goes on at ARRL. Why don't you fellows who feel ARRL does not coöperate start now to give us a try by writing the SCM with a monthly letter dated the 16th of the month, telling who you are, what you have done and giving the name, address and telephone number of the correspondent for your group. We have nothing but friendliness for you, and all it takes to find that out, is for you to make yourselves known to us at a cost of 3 cents postage, monthly. The SCM receives no salary or expense money, and cannot possibly finance trips all over the state trying to ferret out the bashful guys. We have neither the time, the money, nor the detective ability. The PRA re-elected for 1942 with the result that HRC is now president, AFO is vice-pres., KKE treas. and LYE secy.; LCS and CNJ are on board of directors. JXA is chairman of radio school committee which starts soon.

ATLANTIC DIVISION

EASTERN PENNSYLVANIA — SCM, Jerry Mathis, W3BES — The Philadelphia area radio clubs have assembled the men and material for large scale emergency communications work should their services be required for defense. Any club or group not yet represented on the Board of Directors of the Phila. Area Amateur Radio Council should take steps to do so at once. Contact W3AKB, secretary, for details. Appointee stations having nothing to report are not required to send in activity reports. Failure to report will not be held against you when renewal of appointment is requested. However, we should like to hear from the gang whenever they have anything of interest. W3GYK, well known ORS, lost his life recently in a motorcycle accident. While there are many well-formulated plans for defense communication, their sponsors feel it not advisable to make them public at this time. REMEMBER K6, KB6, KC6 and KA.

SOUTHERN NEW JERSEY — SCM, Lester H. Allen, W3CCO. Asst. SCM, Ed G. Raser, W3ZI. Regional Coördinator in charge of Emergency Coördination, Ted Toretti, W3BAQ. Emergency Coördinators: Atlantic City, W3EFM; Camden, W3KW; North Plainfield, W3CGU; Vineland, W3GMY; Somerville, W3EBC. Since the FCC order of Dec. 7th several letters have come to the SCM asking the same question, "Where and how can I help in Civilian Defense?" Here is the set-up for the state of New Jersey. The New Jersey Defense Council set up a five-man committee with three men representing the commercial and engineering side of the picture and W3BAQ and W3CCO to represent the amateurs. It was the duty of BAQ and myself to set up a plan aimed at defense and emergency measures utilizing amateurs. After a few days of research work the following plan was adopted: The state would use a network of stations on 1980 kc. Towns to be included were: Paterson, Morristown, Washington, Newark, New Brunswick, Asbury Park, Trenton, Camden, Hammonton, Bridgeton and Atlantic City. The following towns were to be set up in case the above-mentioned towns were not enough to give good coverage: Cape May, Toms River, Montague and Phillipsburg. Each of the towns mentioned would have a rig set up on 1.75 Mc. to tie into the master control at Trenton. These same stations would tie into a local 112-Mc. net in their nearby communities. At the present time we are waiting for a national plan to come out of Washington. When this hap-

(*Continued on page 76*)

WWV Schedules

THE standard frequency service of the National Bureau of Standards station WWV has been extended to include another carrier frequency (15 megacycles). Temporary equipment is still in use while a new transmitting station is being built. The broadcast is continuous at all times day and night from 1-kilowatt transmitters, and carries the standard musical pitch and other features. The radio frequencies are:

5 megacycles (= 5000 kilocycles = 5,000,000 cycles) per second
15 megacycles (= 15,000 kilocycles = 15,000,000 cycles) per second.

The standard musical pitch carried by the broadcasts is the frequency 440 cycles per second, corresponding to A above middle C. In addition there is a pulse every second, heard as a faint tick each second when listening to the 440 cycles. The pulse lasts 0.005 second, and provides an accurate time interval for purposes of physical measurements.

The 440-cycle tone is interrupted every five minutes for one minute in order to give the station announcement and to provide an interval for the checking of radio measurements based on the standard radio frequency. The announcement is the station call letters (WWV) in telegraphic code (dots and dashes).

The accuracy of the 5- and 15-megacycle frequencies, and of the 440-cycle standard pitch as transmitted, is better than a part in 10,000,000. Transmission effects in the medium (Doppler effect, etc.) may result in slight fluctuations in the 440-cycle frequency as received at a particular place; the average frequency received is, however, as accurate as that transmitted. The time interval marked by the pulse every second is accurate to 0.000 01 second. The 1-minute, 4-minute, and 5-minute intervals, synchronized with the seconds pulses and marked by the beginning and ending of the announcement periods, are accurate to a part in 10,000,000. The beginnings of the announcement periods are so synchronized with the basic time service of the U. S. Naval Observatory that they mark accurately the hour and the successive 5-minute periods; this adjustment does not have the extreme accuracy of the time intervals, but is within a small fraction of a second.

The service from the temporary transmitters will continue for some months. It will be continuous except for such breakdowns as may possibly occur because of the use of temporary apparatus. As rapidly as possible the Bureau is establishing a new station to provide more fully than in the past standard frequencies reliably receivable at all times throughout the country and adjacent areas.

Communications VITAL TO VICTORY!

Dependable Transformers VITAL TO COMMUNICATIONS!

THORDARSON

ELECTRIC MFG. CO.
500 WEST HURON STREET • CHICAGO, ILLINOIS

Transformer Specialists Since 1895

(*Continued from page 75*)

pens the state of New Jersey will parallel this plan and immediately go into action. You will be notified by postal card or form letter as to the set-up and a state-wide meeting will be called in Trenton where all amateurs will be invited to come and sit in. When the new plan is adopted it no doubt will require 24-hour operation so please organize accordingly particularly for operating personnel. I ask your coöperation. Rest assured that BAQ and myself will do everything possible to have amateur radio represented in the State of New Jersey. New calls added to the AEC files this month: GZS, JAQ, FMR, JNZ, ETL, IZT, EET, IKG, JBU, CVM, INO, JTR, NZM, HDJ, JVS, FO, JOL. If your call was not listed, why not send in your application. The South Jersey Radio Assn. held their annual election and results were as follows: President, FBZ; vice-president, FDF; treasurer, IAS; recording secy., Robert Boehme; corresponding secy., Harry Bennett; directors, IIC, CYM, AKI, KW, George Harrold, TL and GPU. Congratulations to CWG. Jack is proud papa of a baby boy, Donald William. IWF reports for the newly-formed Merchantville Amateur Radio Assn. and tells us that they are following the 3-point program that ARRL has advocated for some time. The club also has a 112-Mc. network all set to go for Civilian Defense work. FMR is a member of the Defense Council on communications for Zarephath. JBU reports that the Phillipsburg gang is all set for Civilian Defense and have adequate 112- and 56-Mc. transmitters to cover their respective area. Karl also mentions that he is still practicing his c.w. Ev Battey, W1UE, was recent visitor in Trenton and after his official business visited the Delaware Valley Radio Assn.'s club house and transmitter W3AQ. He later was entertained by BAQ, CCO, EUH and EEQ. More Emergency Coördinators are needed throughout the SNJ Section and I sincerely urge all local leaders to apply for appointment. Don't forget the AEC applications. Keep sending in information for this column so that we can keep it going. Until next month, 73.

WESTERN NEW YORK — SCM, Fred Chichester, W8PLA — Ensign Battey, W1UE, formerly Assistant Communications Manager at Headquarters, visited several Western New York cities on recruiting duty recently. At Syracuse about 50 hams and radio service men were on hand to greet him and had arranged an informal dinner party for him. At Rochester a like number turned out at the Rochester Museum. ENF, Syracuse, has been put in charge of all communication matters of the Central New York group of the recently organized "Civil Air Patrol." SZB and RCJ have 112-Mc. equipment ready to go. The city of Tonawanda has a civilian defense set-up organized under SJV. The personnel consists of SJV, MCP, OWT, UOQ, WHK and WRD. Nearly all have 112-Mc. equipment. STD has been appointed coördinator for Onondaga County. BAL, UYD, DRW, SEF, QAP, JUG, LYJ and STD all have u.h.f. equipment and have made plans for an emergency net. They have offered the services of the net to the Chief of Police of Syracuse if and when FCC permits. New officers of the Central New York Club are: STD, pres.; DRW, secy.-treas.; QXS, coördinator for Ontario County has ten fellows lined up for emergency work when needed. UVF has completed u.h.f. equipment. LIY, RTX and SGX were among those who received reactivation. During a blackout Dec. 26th W8TPY, W8RTA, W8SEX and W8CDM were on the air and handled traffic for their city. New officers of the Batavia Radio Operators Club are: NXX, pres.; SOW, vice-pres.; WGI, secy.; CUY, treas.; HVO, communications manager. KWS has rebuilt and is ready to go. In Hornell an organization has been built up to operate in an emergency. It is in charge of the police department and consists of LFM, OAL, DHQ and IBW. To furnish the additional operators needed a school has been started with about 50 members. Prof. Craig, of Alfred University, is teaching theory and LFM is handling the code instruction. If the FCC does not see fit to use ham operators, the school will have at least turned out more operators for the armed services.

WESTERN PENNSYLVANIA — SCM, E. A. Krall, W8CKO — Asst. SCM in charge of Emergency Coördination, R. M. Francis, W8AVY. Another month has passed by with only three reports coming in. TTD, HKU and RBI receive the honors for being on the job. TTD is a member of the local defense council at Export and intends to continue his ARRL membership throughout our layoff. After long waiting he has been awarded his WAS. HKU sends in his report for Warren County. He states, "We have two 2½-meter rigs which are usable and two more in process of assembly. We have worked with the local OCD chairman and are now working under their communications chairman. There is talk of defense radio school groups, but no definite information as yet. There is also talk of the local gang getting third-class commercial licenses so as to be able to operate the police radio and thus relieve the regular officers for more important work." Thanks for the info, HKU. WJK married WKD and they spent their honeymoon in Virginia. ORS and OPS are requested to send in reports so that we may be able to continue to know what is happening in their districts. It is also necessary for EC's to report to the SCM monthly. Southwestern Pa. is fairly well organized, but we have no definite information on the northern portion of the Section. A PARCC committee adopted the following, to be submitted to the defense coördinator of the nine Southwestern Pa. counties: All amateurs should be authorized to be on the air but only permitted to operate when directed. Zone amateur aides should be appointed as needed for coördination. All amateur activity shall be under direct direction of ARW. All amateurs in zone be directed by ARW as best geographically suited to serve in an emergency. All amateurs to be permitted to test as directed by ARW for a total of not more than fifteen minutes daily. Selected frequencies shall be requested for assignment by Defense Communication Board for amateur use. Emergency transmissions may be to other amateur stations, direct to police if specifically so directed and to Army stations. No imposition of time requirement of operation shall be permitted and operation shall be for duration of immediate emergency only. The present emergency will not last forever. Why not start that rebuilding job that has been hanging fire? Get to work on the u.h.f. apparatus instead of just reading the articles published in *QST*. It is permissible to test with a dummy antenna, but, be sure your testing device is really a dummy and that no coupling takes place to your regular antenna or that the power lines are radiating through some feed-back arrangement. Remember to send in those monthly reports.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA — SCM, Hermann E. Hobbs, W3CIZ — Chief RM, W3BWT. Regional EC, W3ZD. The u.h.f. gang are experimenting and collecting a line of apparatus against the time they are allowed to work on the air, not only c.w. and 'phone but also in the television and u.h.f. field. W3JCR has been appointed Asst. Emergency Coördinator for the Potomac Valley in Western Maryland u.h.f. Net, W3CGV the same for Wilmington, Del., and vicinity. G. Franklin Montgomery is Asst. EC for Washington and vicinity. The Maryland State Guard is still looking for net members to cover the state. The Guard had authorization from FCC before the last close down and probably will again when things are cleared up. If interested, write Lt. Caskey, Fifth Regiment Armory, Baltimore, Md. It is understood that OCD will request priorities for material needed to construct u.h.f. apparatus for emergency work. The Argument Radio Club and the Washington Radio Club hold their meetings regularly every two weeks and hope to continue for the duration. The Argument Club is experimenting with airplane spotting amplifiers and the Washington Club with recorders and television.

HUDSON DIVISION

NORTHERN NEW JERSEY — SCM, Edward Gursky, Jr., W2LMN — Surprisingly few reports were received this period even though there has been a great deal of defense activity throughout the Section. Once again, ECs and leaders of defense groups, etc., are urged to send monthly reports to the SCM and let the rest of the fellows know what is going on in your town. W2NCY finally garnered cards from the 48 states for WAS. ESO and OLB are back home again. At a recent meeting, the Raritan Valley Radio Club of New Brunswick elected its officers for 1942. The results were as follows: Pres., IBF; vice-pres., GID; secy., COG; treas., IAT. At the present time, the club's main activity is building u.h.f. units for defense communication. At a recent meeting of the L/C Radio Club of Jersey City, an election was held and the following officers installed: Pres., KFE; vice-pres., LST; secy., MXH; treas., GKE. KFE keeps his rotary beam in trim by rotating it for the XYL on washdays. TCRA has been building u.h.f. rigs for defense work. In Rahway, the fellows used the following setup: The city was divided into two zones, each zone being patrolled by one mobile station which was directed by a station located at defense headquarters. Another mobile station is held in reserve to assist in either of the two zones. In Roselle, reauthorization was requested for CQV, COD, EAM, EUI, JKH and MLA. The Raritan Bay Radio Club

of Perth Amboy have constructed 15 112 Mc. outfits. They conducted code classes four nights per week and radio theory and algebra classes are under consideration. 1942 officers elected recently are as follows: Pres., ASB; vice-pres., AUI; secy., NLH; sgt.-at-arms, CNP. Clifton and Passaic, operating jointly, had 18 stations authorized. Tests were held every Monday, Wednesday and Friday with mobile units being sent to various parts of the town on orders from the control station located at Passaic City Hall. CIZ reports the East Orange Emergency Radio Club has a committee working on a standardized transmitter and receiver design to be installed in cars and outlying firehouses. The city recently purchased six 300-volt vibrapacks and two dynamotors for emergency use. Authorization was requested for five amateurs in North Haledon during late December. The Clifton Radio Club is holding code and theory classes for beginners and also theory classes for members who wish to obtain commercial licenses. Authorized in Kearny were BRD, HRO, HXO, JBN, LSH, LTI and NUX, operating as the radio squad for the police reserve. Six identical and interchangeable 112-Mc. units were built.

DELTA DIVISION

ARKANSAS — SCM, John R. Sanders, W5GNV — Due, no doubt, to the complete ban placed on our operations a few days before this reporting time, no reports were received from the several groups and clubs working toward defense nets in this Section. Now that we have virtually been assured of the reopening of 112 Mc. and up to the properly authorized groups, activity along this line will likely be resumed by most of our Section groups, and by next month I hope to have a fairly complete picture of the work being attempted. The Little Rock Club has affiliated with the League and has financed the building of the first 112-Mc. transmitter and receiver for use in the club station. Construction of individual units will begin as soon as a standard design has been worked out. All groups working on defense setups *please* report your activity to me, so that the other Section groups may know the position of the general net planning in the state through this column. More next month. 73.

LOUISIANA — SCM, W. J. Wilkinson, Jr., W5DWW — The boys are all working hard endeavoring to get emergency equipment in readiness. Those who recently have departed for the armed forces are W5IDI, HSH and BPL. EX-FGN is now second operator aboard the Transport J. W. McAndrew. AGM has gone to Washington on an important mission. The State Emergency Net is awaiting permission for operation. Authorities have approved the setup. Local and district nets are to be organized as soon as possible after we are again allowed to operate in the defense system. Let's have the dope from all of you every month. What are you doing? Also advise when any of the gang from your area leave for active service or schooling. Will see you next month. 73 and . . . —

TENNESSEE — SCM, M. G. Hooper, W4DDJ — W4FCU reports that Helen, W4GFO, his XYL, is holding a code class for men expecting to enter armed services. Sixty-six attended the first night with more attending on second night's class. Sure fine work, Helen! FCU and GNR are assistant instructors. IFM received his ticket and along with it Order 87. GMX has succeeded in registering a number of hams in the Emergency Corps. PL had a schedule with K6TOP on Dec. 7th. CXY has come to life and is getting in harness as secretary of the Knoxville Club. Glad to hear from you again, Mark, and appreciate your offers of service. FDT says: "All equipment intact, antennas up. Emergency power plant OK. Am collecting Defense Bonds as a hobby." Suggests, "Does ARRL give WAS for 48 Defense Bonds???" Let us emulate Harvey in keeping equipment in shape and ready for the call. Not only is Harvey buying Defense Bonds, his son, Harvey, Jr., W4GIX, is safe and well serving in the U. S. Naval forces. So Harvey has double reason for buying Defense Bonds. Let us buy Bonds, too. GOR has been appointed Asst. Emergency Coördinator. Fellow hams of the Tennessee Section: Now is the time to perfect emergency plans. Let us all enroll in the Emergency Corps and have a Coördinator for each and every County in our Section.

Traffic: Nov.-Dec.: W9MHU/4 3391.

ROANOKE DIVISION

VIRGINIA — Acting SCM, Thomas S. Jones, W3BZE — Virginia just wasn't mentioned here last month and you can blame it on me. Yours truly having just heard of the appointment let the report go by in the excitement. You do remember! It shan't happen again. My apologies! The number of hams registering in the AEC has been encouraging. However, I am certain there are more of us who could and should be placed on the roll. If you haven't sent in your application yet, ask ARRL for "Form 7" and show that you mean business *but* with facts! There are rumors and some news of the organizations being formed to aid in the work of our Defense Council, but not enough! Please keep your SCM informed of any plans on actions being taken by the various communities in this work. And don't forget; the SCM has the latest and most authentic information available. A state-wide emergency net has been planned and well worked out. "2½" seems to be the order of the day, so follow *QST* and "keep building." Here's Good News! W3GWQ expects his work to let up enough very shortly for him to take over the SCM job once again; so please continue your loyalty and support him as in the "good old days." W3CLD reports excellent results using a rewound transformer à la *QST* in his emergency power supply. Incidentally, his supply cost but $0.76 in cash! Ask him about it. Sit tight, fellows. Read *QST* and keep in touch with your SCM and *really* find out what you *can* do. Best regards to all and thanks for this brief span of glory.

WEST VIRGINIA — SCM, Kenneth M. Zinn, W8JRL — Huntington Radio Club's new officers: W8AFB, president; SDU, vice president; QFN, secy.-treas.; RGB, director. They have completed their new room and are now holding code classes. KGT, former officer of MARA, visited hams in Clarksburg. BWK moved to Norfolk, Va. BTV and DYB have jobs in Washington, D. C. ZW was appointed chairman of Civilian Radio Defense in Wheeling territory; his assistant is HD. KWL and MJJ just finished building 112-Mc. portable equipment. QJS has three transmitters, all portable powered. TDJ won 1941 u.h.f. marathon of West Virginia by contacting 43 stations. Our sympathy to NEP, whose father recently died. SCM report from the state shows approximately fifty 112-Mc. transmitters already assembled and several more under construction. Nice going, boys. Thirty-three attended the state-wide meeting held at Clarksburg for civilian defense. Lt. Saunders of the U. S. Navy gave a talk on Radar, resulting in four enlistments in that field. MARA voted to purchase a portable electric plant for use in emergencies. MARA is sponsoring a code class in Clarksburg and expected about 20 enrollment, but got 500 instead. The class is progressing very nicely. My sincere appreciation to the boys who have been and are coöperating with me in the listing of their equipment and availability for Civilian Defense in our state. Let's keep up the good work. 73.

SOUTHEASTERN DIVISION

ALABAMA — SCM, James F. Thompson, W4DGS — W4ECI reports the Birmingham gang going forward with u.h.f. rigs. FNL also reports his section of town ready to test some u.h.f. units. FTS was visitor at WMPM and reports ultra-high rigs ready at Greensboro, too. Mobile, Selma and Montgomery all have u.h.f. projects under way. There is as of this writing no news on the Alabama State Guard's urgent request to the DCB and FCC to authorize the 3622, 3991 and 1954 nets to operate on an emergency basis to connect the Guard units. This is being pushed. All Alabama amateurs holding Emergency Coördinator appointments are urged to call meetings of the amateurs in their districts and make some plans for ultra-high emergency powered units. If you don't know the EC in your areas, please drop me a card and I'll give you his name or appoint you if there is none already at work. CVM's rig has been on the air, being operated by an Army unit nearby. I have heard from so many members of the armed services who are Alabama hams away from home that space won't permit a listing. Thanks, fellows, and by now every one of you should have received a personal letter from me. Write every time you will. The following Alabama hams are sincerely thanked by your SCM for their openly declared patriotism backed up by that which means far more than talk—*action*. Each of them and many other Alabama hams know why I list them. Heartfelt thanks to: AUP, GBV, GSQ, FUM, GVO, HVD, FL, HGJ, HVP, HVY, GDU and APJ. After the war is over and won I hope to be able to do something really worth while for each of these.

U. S. A. Calling

(*Continued from page 26*)

work probably can do so without reduction in income. Address correspondence to Office of the Chief Signal Officer, Washington, attention Colonel Hugh Mitchell.

NAVY RADAR TECHNICIANS

WE remind our readers of the Navy's urgent need reported on page 29 of February *QST* for some thousands of amateurs to receive training in the maintenance and operation of the radiolocator. Candidates must be high school graduates, 17 to 50, Class A or B amateur experience, or skilled in service work or the design and operation of h.f. gear; code knowledge not required. So important is this work that original enlistment is offered in the rating of radioman second class, up four pay grades above the usual enlistment basis. An RM2C receives $72 a month and everything found, plus $34.50 if married or having dependents. Eight months of very special u.h.f. training, with eligibility then for promotion to RM1C at $84 or CRM at $99. For particulars, call at your nearest Navy recruiting station.

MECHANICS FOR THE CARIBBEAN

THE Caribbean Defense Command naturally has a sizeable communication establishment. Radio mechanics are wanted in considerable quantity for the installation and maintenance of all sorts of radio gear. If you're looking for a late winter West Indies cruise, here it is.

Service may be either by enlistment in the Signal Corps or as a civilian under Civil Service. For guidance in enlisting in the corps, write the Office of the Chief Signal Officer, Washington, mentioning mechanic and Caribbean. If you prefer Civil Service, see C.S. Announcement 134 at your post office, as reported in *QST* on page 28, November: five pay grades, depending upon abilities, $1440 to $2300; but write also to the above address so that arrangements may be made to get you assigned to the Caribbean service.

ENLISTED OPERATORS AND MECHANICS

ALL the services need operators and mechanics.

ARRL has received information that vacancies exist in the Army Air Corps for both aerial and ground radio operators, mechanics and technicians. Amateurs with a code speed of 15 w.p.m. or better, living in the *northeastern* section of the United States, who intend to enlist in the Army in the near future and are interested in filling these vacancies, are asked to notify the League at West Hartford, Conn., to receive additional information. Give name, address, call and experience.

Here's something to think about: Ordinarily a man cannot enlist in the Signal Corps itself, at least not for radio work. An exception is made in

Emergency!

"FB" reports that keep coming in, tell us that the TR-4 is measuring up to the most rigid and exacting requirements of many of our country's communications services.

ABBOTT TR-4, 2½ METER *TRANSMITTER-RECEIVER*

A compact, efficient unit, designed for either fixed station or mobile operation. Transmitter and receiver sections are completely separated. The 5-inch PM speaker is self-contained. Single interconnected switch permits use of a common antenna for both transmitter and receiver. The TR-4 requires a 6-volt battery or 110 volt, 60 cycle AC power supply. Receiver radiation is necessarily reduced to a minimum.

• FREQUENCY: 112 to 116 MC. • RANGE: Varying from 5 to 75 miles, depending upon terrain. Contacts up to 150 miles have been completed in field tests • TUBES USED: One each of Hytron HY-615, Hytron HY-75, 7F7, 6V6 or 6L6 • MICROPHONE: Any good single button microphone.

TR-4 — Overall size 9" x 8" x 4½", less tubes and power supply, list price, subject to amateur discount..... **$65.00**

ABBOTT INSTRUMENT, INC.
8 WEST 18 STREET • NEW YORK, N. Y

the case of operators possessing an amateur (or commercial license. Display of this license at an Army recruiting office will enable an amateur to get into the Signal Corps, the only way he can volunteer and be assured of radio work in that branch.

Navy also seeks operators. As you know, the draft does not feed men into the Navy. Only way you can get salt in your hair is to volunteer. If you prefer Navy brasspounding to radar maintenance, see the Navy recruiting officer.

ARMY ELECTRONICS TRAINING

YOU are reminded that the Electronics Battalion of the Army Signal Corps is not only going great guns but is vastly expanding, so that applicants are still wanted by the hundreds for commissioning as second lieutenants in this all-important radiolocator activity.

Applicants must be between 21 and 36, without dependents, physically sound, possessing a degree in electrical engineering or electronic physics or the equivalent in special experience. Those under 30 must be unmarried. Amateur license helps a lot. Qualified candidates are immediately commissioned and given active duty, receive brief training on this side, and then go to England for instruction — about three months at school, five in the field observing the operation of the apparatus. Upon returning to this side, their duties probably will involve instructing and supervising Army personnel in this complex field of work. Second lieutenants receive allowances above the $125 base pay which yield a total of $183 per month, and while in England will receive an additional $4 per diem. (There may be some openings for men who do not wish to go to England.)

Particulars may be had from ARRL President George W. Bailey, chairman of the radio section, Office of Scientific Personnel, National Research Council, 2101 Constitution Avenue, Washington.

On the Ultra Highs

(Continued from page 44)

and the "raising" was scheduled for December 7th!

And this is the sum total of news received by this department since the preparation of last month's column. As all operating activity will henceforth probably be on the Ultra-Highs, the reporting of such activity is now to be taken over by the Communications Department. There is the light-beam communication angle — several of the u.h.f. gang have evinced interest in this field — but it is almost entirely experimental in nature, and so is being handled in another section of *QST*.

All of which leaves this department facing a rather barren prospect for the duration! After more than two years of being at our wits' end trying to squeeze all the reports into each month's column, we now face the prospect of running out of material. Do you of the u.h.f. fraternity wish this section of *QST* to continue? If so, let's have your suggestions as to ways in which we may best serve your interests.

Radio and Atom Smashing

(Continued from page 28)

too distant future, for uranium 235 can already be cracked and made to yield enormous amounts of energy, relatively speaking. The difficulty lies in the scarcity of uranium **235.** If such power does become available in considerable amounts men will no longer fight for oil fields and similar natural resources. Energy will be so easily obtained, and in such concentrated forms, that it will revolutionize much of our living. If men still choose to have wars they will be fought more fiercely, for modern wars are fought with such materials as gasoline and high explosives, which are very concentrated forms of energy. Atomic energy will be 5000 times more concentrated than gasoline.

The Experimenter's Section

(Continued from page 45)

stance. One practical application of this system which suggests itself is that of providing a link for bridging streets, etc., in a "back-yard" tone-telegraph circuit. Wire telegraph circuits were popular among amateur experimenters before the days of radio and may again come into use for keeping up the old fist.

Project D — Temporary group leader — Clinton B. DeSoto, W1CBD, ARRL Headquarters, West Hartford, Conn.

Communication by means of low-frequency radio induction fields.

This is also an entirely new field. The FCC has set up a formula by which radiated fields, the use of which is now forbidden, and inductive fields, which *may* be employed, may be divided. The ruling which has heretofore been applied principally to "wireless" record players and remote-control systems, states that the field may be considered inductive when the field strength at a distance from the transmitter of $\frac{157{,}000}{f}$ does not exceed 15 μv. per meter, where f is the frequency in kilocycles and the distance is in feet. At a frequency of 30 kc., for example, this means that a field strength of 15 μv. per meter would be permissible at a distance of 5233 ft., or just about a mile from the transmitter.

Project E — Temporary group leader — Don Mix, W1TS, ARRL Headquarters, West Hartford, Conn.

Acoustic system for aircraft detection.

An article on this subject appears in this issue. It is a project with plenty of room for development — one in which we can make a contribution to national defense. The means of obtaining increased ranges, noise reduction and the development of simple, fast-operating, directive systems are interesting problems to be solved.

Project F — Temporary group leader — Clark C. Rodimon, W1SZ, ARRL Headquarters, West Hartford, Conn.

Communication by means of supersonic waves.

Obviously we can't shout to each other for distances of several blocks by means of amplifiers

and loudspeakers. But how about the use of super-audible frequencies? It's a subject on which we are decidedly in the dark. Perhaps some accommodating member who has worked in supersonics will be in a position to step forward and tell us what the chances are, if any.

This, therefore, constitutes the beginning of the rejuvenation of the Experimenter's Section. Its success or failure will depend upon the response by the individual amateur. If you are interested:

1. Enroll by sending your name and address to the group leaders in the projects in which you are in a position to carry on some work, or contribute some information. (Enrollment in not more than two projects is suggested, unless you have lots of spare time.)

2. If you have had any previous experience in the chosen subject, so inform your group leader.

3. If you have the interest, apply for appointment as group leader in one of the projects chosen.

4. Get to work as soon as possible.

5. Report progress (or lack of progress) to your group leader monthly, if possible. Your report should reach him by the first of each month to enable him to summarize the work of his group for publication in the succeeding month's issue of *QST*.

Let's go, experimenters!

Correspondence

(*Continued from page 49*)

VR-TUBE RATINGS

RCA Mfg. Co., Inc., Harrison, N. J.

Editor, *QST:*

The vacuum-tube voltmeter circuit as published in the December issue of *QST* offers some very interesting features for both the amateur and experimenter. However, in reading over the material on calibration, I wonder if the information on the VR-150 is not somewhat misleading.

Our production records on this regulator type indicate that individual tube may read as high as 160 volts at a load of 30 ma., although the average of a large number of tubes will run close to 150 volts.

While the bulk of our product does center quite closely around the 150-volt value, the user runs the risk of checking with a marginal tube which shows a larger variation.

A voltage variation may also be expected during the life of the tube. We mention this because we believe the 1% figure indicates an accuracy of control that we cannot maintain in all tubes. A better figure would be a positive variation of 5%. . . .

— *R. E. Lawrence*

EDITOR'S NOTE. — Checks of a number of VR-150's in the *QST* laboratory before publication of the article indicated close adherence to the 150-volt rating. However, in view of the possibility of securing an off-rating tube, some other form of calibration check is recommended where high precision is necessary.

MISTAKEN IDENTITY

332 "I" Chula Vista, California

Editor, *QST:*

I'm not kicking, understand. Anybody can make a mistake — even a ham. (However, some of them only make one!)

But when the boys start whistling at me over the air, try to date me up and even question the XYL on the side, call me Helen (and without apologies to *the* Helen), then I begin to wish I'd stayed on c.w. In fact, I think I'll have to go back on forty — but even there will soon be 'phone.

Anyhow, the boys on 2½ hereabouts have not let me forget that on page 80 of *QST* for October, 1941, one Helen, W6QOJ, is plenty on 10 meters with the YL's. Not that I wouldn't like to have the fine reputation they have built for themselves, but when 50 of them start checking in with me a certain XYL wants the particulars!

— C. Clayton Bullen, W6QOJ

EDITOR'S NOTE. — *QST* and Authoress W8TAY apologize to both W6QOJ and W6QOG — the latter the real Helen, 6th District YLRL chairman, XYL of W6MBD. It was under the OM's call that she acted as NCS of the 10-meter YLRL net.

We understand the padlock has since been removed from the doghouse in Chula Vista.

CTC

Somewhere in England

Editor, *QST:*

As one of the first lot of radio men who have arrived across the pond on the new radiolocation work, it was my thought that some sort of word could be passed along to the gang back in the States.

Some of you may know that a considerable amount of red tape was used in the steps taken to get us off to England. Those of us who survived this period of waiting are now obtaining ten weeks of the most valuable and startling kind of radio training. It is well worth the risk and uncertainty that possibly may come up in crossing over.

Several active hams are among the first radio group now in training. More are on the way. Those now here in camp are: W2IYA, W2JUJ, W4GKR, ex-W2PL, ex-W9ADG, ex-W7FHZ and myself.

After a few weeks more at this school we shall be placed out at various points. Not much information can be sent as to the equipment or the radical technique employed, but it is most interesting and amazing to see the results obtained.

We who have come here would like to see more hams take the step and see for themselves just what wonders are performed. Men are needed who have radio training, and our American hams can easily adapt themselves to this work. We are attached to the RAF.

As is natural under war conditions, some inconveniences are to be expected. However, we are all healthy and in fact some of us are gaining in weight. . . .

The British Government should by now realize the great value that experienced amateurs have in times of stress, and I think the amateur status over here may be better after the war.

I would like to hear from some of the old New Jersey AARS gang and only wish that a few of them were along with us. Our locations are not to be used for mail purposes but mail may be sent either to C.T.C., Montreal, Canada, or c/o ARRL for forwarding. . . .

— *Roy L. Richardson, W3ETX*

APPRECIATION

Federal Communications Commission
Washington, D. C.

Gentlemen:

You are advised that the special auto-alarm and voice intelligibility tests being conducted for experimental purposes on 2072 kilocycles by the Federal Communications Commission with the coöperation of the U. S. Coast Guard between Cleveland, Ohio, and Marblehead, Ohio, are to terminate September 28, 1941.

The commission desires at this time to express its appreciation to the American Radio Relay League for the splendid coöperation of the large number of individual amateurs participating in these tests. It is expected that the data thus obtained will be very useful in ascertaining the transmission characteristics of this frequency. — *T. J. Slowie, Secretary*

"MODERN DESIGN"?!

16 Gulmer St., Mattapan, Mass.

Editor, *QST:*

I have just heard a radio broadcast of the "First Nighter" in which a sketch called "Dynamo Dan" was presented. . . .

During the course of events the hero and heroine chanced to be marooned upon an island with no means of communication with the outside world. The hero was a cartoonist who drew a popular comic strip of the "superman" type called "Dynamo Dan, the Invincible."

Where to buy it

A directory of suppliers who carry in stock the products of these dependable manufacturers.

hallicrafters SX-28

ALBANY, N. Y.	Uncle Dave's Radio Shack	356 Broadway
ATLANTA, GEORGIA	Radio Wire Television Inc.	265 Peachtree Street
BOMBAY, INDIA	Eastern Electric & Engineering Company	
BOSTON, MASS.	Radio Shack	167 Washington Street
BOSTON, MASS.	Radio Wire Television Inc.	110 Federal Street
BRIDGEPORT, CONN.	Hatry & Young, Inc.	177 Cannon Street
BRONX, N. Y.	Radio Wire Television Inc.	542 East Fordham Rd.
BUFFALO, N. Y.	Dymac, Inc.	1531 Main Street
BUTLER, MISSOURI	Henry Radio Shop	211–215 N. Main Street
CHICAGO, ILL.	Allied Radio Corp.	833 W. Jackson Blvd.
CHICAGO, ILL.	Radio Wire Television Inc.	901–911 W. Jackson Blvd.
CINCINNATI, OHIO	United Radio, Inc.	1103 Vine Street
DETROIT, MICH.	Radio Specialties Co.	325 E. Jefferson Ave.
DETROIT, MICHIGAN	Radio Specialties Co.	11800 Woodward Ave.
HARTFORD, CONN.	Radio Inspection Service Company	227 Asylum Street
HOUSTON, TEXAS	R. C. & L. F. Hall	1021 Caroline Street
INDIANAPOLIS, INDIANA	Van Sickle Radio Supply Co.	34 West Ohio Street
KANSAS CITY, MO.	Burstein-Applebee Company	1012 McGee Street
NEW HAVEN, CONN.	Hatry & Young, Inc.	1172 Chapel Street
NEW YORK, N. Y.	Harrison Radio Co.	12 West Broadway
NEW YORK, N. Y.	Radio Wire Television Inc.	100 Sixth Ave.
NEWARK, N. J.	Radio Wire Television Inc.	24 Central Ave.
READING, PENN.	George D. Barbey Company	404 Walnut Street
SCRANTON, PENN.	Scranton Radio & Television Supply Co.	519–21 Mulberry Street
WASHINGTON, D. C.	Sun Radio & Service Supply Co.	938 F Street, N. W.
WATERBURY, CONN.	Hatry & Young, Inc.	199 South Main Street

TRIPLETT INSTRUMENTS

ALBANY, N. Y.	Uncle Dave's Radio Shack	356 Broadway
ATLANTA, GEORGIA	Radio Wire Television Inc.	265 Peachtree Street
BOSTON, MASS.	Radio Shack	167 Washington Street
BOSTON, MASS.	Radio Wire Television Inc.	110 Federal Street
BRIDGEPORT, CONN.	Hatry & Young, Inc.	177 Cannon Street
BRONX, N. Y.	Radio Wire Television Inc.	542 East Fordham Rd.
BUFFALO, N. Y.	Dymac, Inc.	1531 Main Street
BUTLER, MISSOURI	Henry Radio Shop	211–215 N. Main Street
CHICAGO, ILLINOIS	Allied Radio Corp.	833 W. Jackson Blvd.
CHICAGO, ILL.	Radio Wire Television Inc.	901–911 W. Jackson Blvd.
CINCINNATI, OHIO	United Radio, Inc.	1103 Vine Street
HARTFORD, CONN.	Hatry & Young, Inc.	203 Ann Street
MINNEAPOLIS, MINNESOTA	Lew Bonn Company	1211 LaSalle Avenue
NEW HAVEN, CONN.	Hatry & Young, Inc.	1172 Chapel Street
NEW YORK, N. Y.	Radio Wire Television Inc.	100 Sixth Avenue
NEWARK, N. J.	Radio Wire Television Inc.	24 Central Ave.
READING, PENN.	George D. Barbey Company	404 Walnut Street
WASHINGTON, D. C.	Sun Radio & Service Supply Co.	938 F Street, N. W.

Listings on this page do not necessarily imply endorsement by QST of the dealers or of other equipment sold by them.

He happened to find a piece of quartz, and remembered a former adventure of his brainchild, Dynamo Dan. In this escapade the invincible one was stranded in a quartz mine and rigged up a "quartz-crystal sending set" (so called in the script) with which he reached help.

Our hero, the marooned cartoonist, connected the piece of quartz in some mysterious circuit with a piece of wire and a battery and proceeded to emit distress signals on *'phone*

When they were picked up, their rescuer informed them that the signals from their rig were so strong that it was impossible to receive anything else on *any* band!

To summarize: In the words of the script, the rig was made from a piece of quartz, some wire and a battery. There were no oscillating tubes, nothing to tune the circuit, and no microphone or modulator — yet this creation put out a *'phone* signal which was so strong that it drowned out everything else on the air!

As *QST* said several months ago in describing an aerial mast "suspended 110 feet above the ground," it's a nice trick if you can work it!

— *Benjamin L. Toy*

STRANGE COINCIDENCES

104 West Jackson Blvd., Chicago

Editor, *QST:*

The other evening I was listening to a broadcast radio play. The young gentleman was saying tenderly something of this sort:

"She held me close, and I could hear her heart beating, and it sounded just like this —"

At that very instant a stray ham station heterodyne came beating into the momentary silence as the radio actor paused. The beautiful, musical little note said:

"Dah dit dah dit ‖ dah dah dit dah ‖‖ dah dit dah dit ‖ dah dah dit dah."

Only a ham could half appreciate the humor of that rare coincidence.

— *H. A. Fanckboner, W9BPS*

P.S. Why not tell you of two other strange coincidences? Although not having to do with amateur radio, they would be interesting to any radio listener.

While listening to an Atlantic SOS and the distress traffic that followed on 600 meters one night, a nearby Chicago broadcasting station was continuously in the background. While the speedy wireless signals from the ship in distress and other vessels in the vicinity were flashing their story of shipwreck and efforts at rescue, a chorus in the background was singing the familiar song about the "rockin' road" and the "rollin' rockin' rhythm of the sea." That made drama, fellows — real drama!

Again, in Omaha, several years ago I was listening to a radio play concerning the flight of the famous locomotive "The General" during the war of the states. The Yankees who had stolen the locomotive were being hard pressed by the Confederates who were pursuing them on a hand car. One of the Yankees in the locomotive cab had just exclaimed, "We've got to stop for water, or the boiler will blow up!"

At that moment, there was a terrific explosion in Omaha, about a half mile from my hotel. From the window I saw a great cloud of smoke and steam rising from the vicinity of the Union Station, intermittently lighted up by flashes from broken electric wires.

By one of those strange coincidences, at the very time the actor in the radio play was warning of a locomotive explosion, the locomotive on the crack Burlington passenger train which was at the moment entering the station had blown up! The engineer and firemen in the cab were killed, together with a red-cap on the station platform, and many were injured. Such a thing as that could happen only "once in a lifetime."

— *W9BPS*

Strays

W9IBC advises that the Tri-Town Radio Amateur Club is providing paid-up ARRL memberships for the duration, to all club members who enlist or are drafted into the services.

HE BOUGHT AN ECHOPHONE EC-1!

Echophone Model EC-1

6 tubes, 3 bands. Tunes from 550 kc. to 30 mc. Beat frequency oscillator. Bandspread logging scale. Self-contained speaker. Electrical bandspread on all bands. AC/DC. 115-125 volts.

$24.50

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 15¢ 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 non-commercial 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 takes 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 15¢ rate. Provisions of paragraphs (1), (2), (4) and (5) apply to all advertising in this column regardless of which rate may apply.

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 advertised

* * * * *

Gear is short. You can sell your old and extra gear through Ham-Ads.

* * * * *

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.

QSL's. Cartoons. Free samples. Theodore Porcher, 7708 Navajo, Philadelphia, Pa.

CALLBOOKS — Winter edition now on sale containing complete up-to-date list of radio hams throughout entire world. Single copies $1.25. Canada and foreign $1.35. Radio Amateur Call Book, 610 S. Dearborn, Chicago.

COMMERCIAL radio operators examination questions and answers. One dollar per element. G. C. Waller, W5ATV, 6540 Washington Blvd., Tulsa, Okla.

TELEPLEXES, Instructographs bought, sold. Ryan's, Hannibal, Mo.

ICONOSCOPE tube wanted, new or used. Will swap new General Electric Television set, or cash. William B. Still, W2GJR, 107-51 Merrick Rd., Jamaica, N. Y.

WANTED: HQ-120X or equivalent receiver from near Boston. Write Box 273, Medway, Mass.

SWLs printed by W2AEY, 338 Elmora, Elizabeth, N. J.

SELL radio parts. Send stamped self-addressed envelope for list. W9SXS, Henry Heckert, Red Oak, Iowa.

WANTED: 250 watt modulator complete with speech amplifier, driver, mike, tubes, and all power supplies. Describe fully in first letter. All answered. W3AJO, Rutledge, Pa.

PRINTING for hams, radio service, SWLs. Quotations, samples free. W8DED, Holland, Mich.

WANTED: 4 lbs. No. 17 single cotton enameled. 3 lbs. No. 15 single cotton enameled. Dean Wallace, W8RAI, 436 Genesee St., Owosso, Mich.

OUTPUT transformer wanted. 3000 ohms, Thorardson T-15S91 or better. Jack Shabeck, 152 Arnold Ave., Edgewood, R. I.

WANT HRO broadcast coils. McCouch, Harvard, Cambridge, Mass.

AVAILABLE communications receivers wanted. Sell your receiver for cash. In writing specify date of purchase, if with crystal, model number, serial number, if speaker is in cabinet or not, if speaker is factory unit, color, your opinion of condition. Oscillographs wanted. Volt-ohmmeters wanted. Be complete. If you have a price in mind, please state it. Prompt reply. Hatry and Young, Hartford, Conn.

RADIO headquarters — tremendously large stock of receivers (over 200 on hand), transmitters — all sizes, transceivers — over five different models, radio parts of all kinds. Write to Leo, W9GFQ, for that big bargain catalog and reconditioned receiver list today. Wholesale Radio Laboratories, Council Bluffs, Iowa.

CRYSTALS: famous P.R., mounted in latest Alsimag 35 holders — 40, 80 meter PR-X, 160 meter PR-Z $3; 40, 80 meter PR-Z (low drift) $3.50; 20 meter PR-20 $4.50; unconditionally guaranteed. Immediate shipment. Quality blank 75¢. Wholesale Radio Laboratories, Council Bluffs, Iowa. W9GFQ.

BEST reasonable offer takes TMV122B RCA 3" oscilloscope and/or RCA 150 oscillator; probably used less than ten hours. W1FJP.

FOR sale — new NC-200, immediate delivery; also new Thordarson T-19P68 transformer. W5HKY, 2710 Virginia Court, Ft. Worth, Texas.

WANTED: receiver, SX-28, 490, or NC-200. Also RME-LF-90 frequency inverter. Jack Wallace, Lutheran Sanitarium, Wheatridge, Colo.

CRYSTALS: Eidson crystals are on the job and will continue to play their part in the defense program. Eidson low drift commercial crystal units meet FCC requirements and satisfaction is guaranteed. Wire or write us your needs. Eidson's, Temple, Texas.

WANTED, test equipment, transmitting parts. Holstein, 246 E. 148th, N. Y. C.

BOB Henry, W9ARA, can make immediate delivery of Hallicrafters, Hammarlund, National, Howard, RME receivers and other radio supplies. You get lowest prices, best 6% terms (financed by us), best trade-in, ten day trial. Write, telegraph, telephone. Henry Radio Shop, Butler, Mo., or 2335 Westwood Blvd., W. Los Angeles, Calif.

RECONDITIONED guaranteed communications receivers and transmitters. All makes and models cheap. Free trial. Terms. List free. Henry Radio Shop, Butler, Mo.

WE pay cash for used communications receivers. Get our offer. Code machines rented and sold. Henry Radio Shop, Butler, Mo.

WANTED factory built 500 watt and 1 kw. input transmitters with no home modifications; 160; State Highway Police. Send model description; age; weight; price f.o.b. Art Sowle, W6CW, Box 890, Reno, Nevada. Supervisor of State Police Radio.

A.C. plant, Kato Diesel model 85A, 5kva., 110 volts. Used 100 hours. W9LZS, London, Ky.

HRO, black relay-rack panel model, late issue T-147, perfect condition, matched Cinaudagraph PM speaker, Brush crystal phones, Nat. power supply, best cash offer above $150. Dumont 3" cathode-ray oscillograph, type 164, serial No. 996, perfect condition, $50. 1000 watt transformer, 2000 v. — 1500 v. each side c.t., Amperex HF300 used about 150 hours, best cash offer. T. M. Ferrill, Jr., 6 Clare Rd., East Hempstead, N. Y.

WANTED: Bargains in transmitters, receivers and parts, etc.; also laboratory apparatus, etc. What have you? W5KD, 215 N.W. 19 St., Oklahoma City.

COLIN Kennedy 220 receiver two stage amplifier — working condition. QST 1930 inclusive 1939. Make offers. W9DUD.

SELL: transmitters, receiver, preselector, Vibroplexes; power tools, Kernzradio, Fulton, New York.

WANTED: radio operators for Merchant Marine, must have commercial license, wages $200 to $325 monthly. Radio Officers' Union, 265 West 14th St., New York, N. Y.

Your Nearby Dealer Is Your Best Friend

Your nearby dealer is entitled to your patronage. He is equipped with a knowledge and understanding of amateur radio. He is your logical source of advice and counsel on what equipment you should buy. His stock is complete. He can supply your needs without delay. His prices are fair and consistent with the high quality of the goods he carries. He is responsible to you and interested in you.

One of these dealers is probably in your city — Patronize him!

ATLANTA, GEORGIA
Radio Wire Television Inc.
265 Peachtree Street
"The World's Largest Radio Supply House"

BALTIMORE, MARYLAND
Radio Electric Service Co.
3 N. Howard St.
Everything for the Amateur

BOSTON, MASS.
Radio Wire Television Inc.
110 Federal Street
"The World's Largest Radio Supply House"

BUFFALO, NEW YORK
Radio Equipment Corp.
326 Elm Street
W8PMC and W8NEL — Ham service and sound equipment

BUFFALO, NEW YORK
Dymac, Inc.
1531 Main Street — Cor. Ferry — GA. 0252
One of the Largest Ham Supply Houses in Western New York

HARTFORD, CONNECTICUT
Radio Inspection Service Company
227 Asylum Street
What do you want? We have it. Radio exclusively

HARTFORD, CONNECTICUT
Hatry & Young, Inc.
203 Ann Street
Stores also in Bridgeport and New Haven

HOUSTON, TEXAS
R. C. & L. F. Hall
1021 Caroline Street (C 0721)
"Specialists in Amateur Supplies"

NEWARK, N. J.
Radio Wire Television Inc.
24 Central Avenue
"The World's Largest Radio Supply House"

NEW YORK, N. Y.
Radio Wire Television Inc.
100 Sixth Avenue
"The World's Largest Radio Supply House"

NEW YORK, N. Y.
Harrison Radio Company
12 West Broadway
Harrison Has It! Phone WOrth 2-6276 for information or rush service

PHILADELPHIA, PENNSYLVANIA
Eugene G. Wile
10 S. Tenth Street
Complete Stock of Quality Merchandise

PROVIDENCE, RHODE ISLAND
W. H. Edwards Company
85 Broadway
National, Hammarlund, Hallicrafter, Thordarson, Taylor, RCA

SCRANTON, PENNSYLVANIA
Scranton Radio & Television Supply Co.
519–521 Mulberry Street
Complete Stock of Quality Amateur Supplies

WATERBURY, CONNECTICUT
Hatry & Young, Inc.
199 South Main Street
Time Payments for Connecticut Hams

YOU CAN BE SURE WHEN YOU BUY FROM

QST

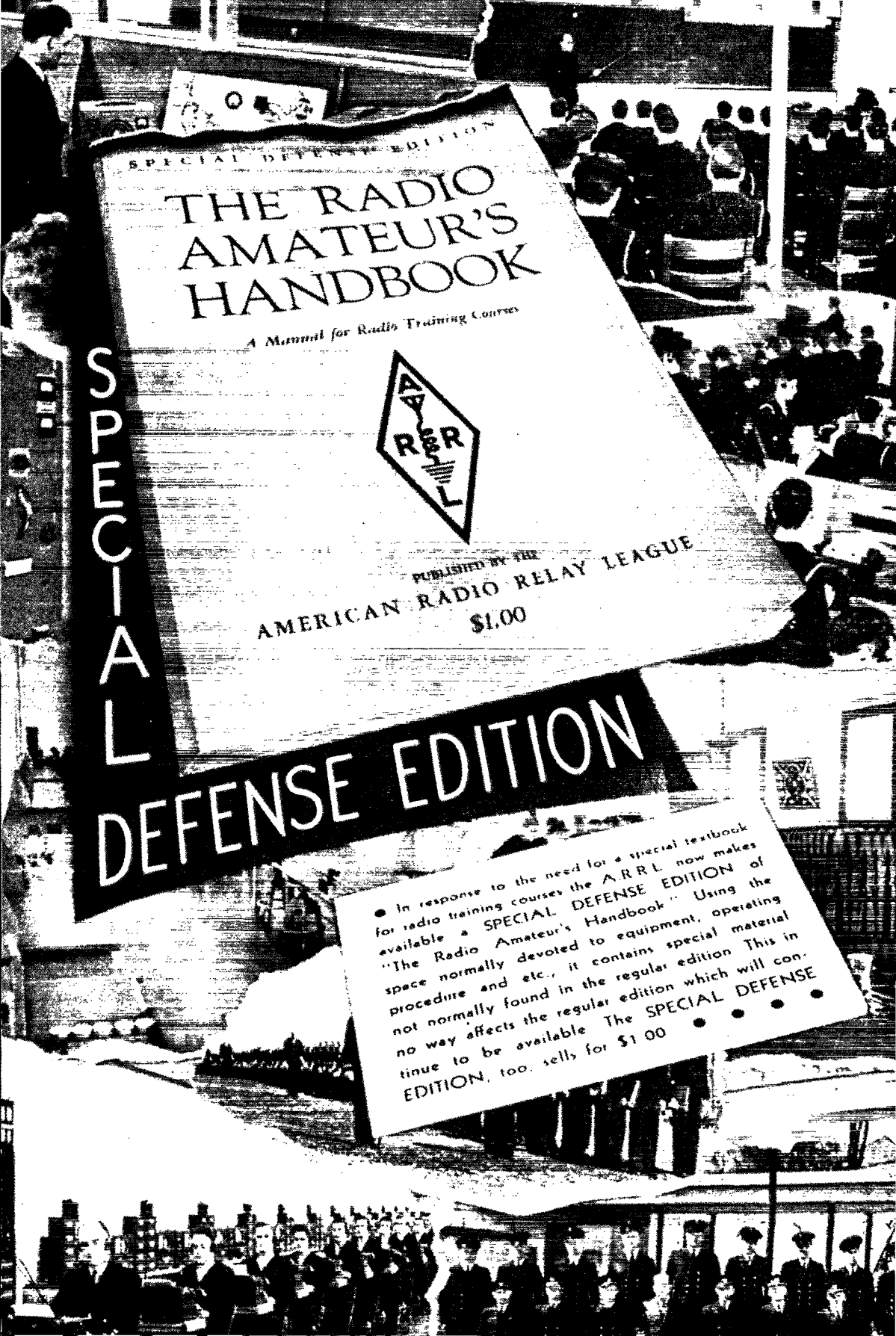
ADVERTISERS

"Advertising for *QST* is accepted only from firms who, in the publisher's opinion, are of established integrity and whose products secure the approval of the technical staff of the American Radio Relay League."

Quoted from QST's *advertising rate card.*

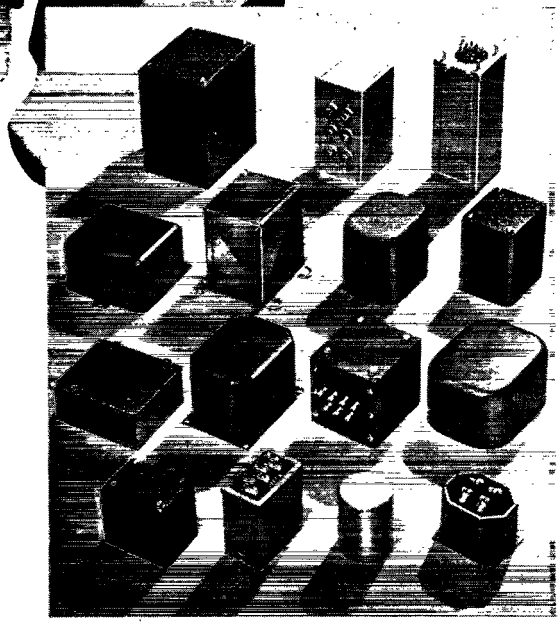
Every conceivable need of a radio amateur can be supplied by the advertisers in QST. *And you will know the product has the approval of the League's technical staff*

Index to Advertisers


SPECIAL DEFENSE EDITION
THE RADIO AMATEUR'S HANDBOOK
A Manual for Radio Training Courses
PUBLISHED BY THE
AMERICAN RADIO RELAY LEAGUE
$1.00
SPECIAL DEFENSE EDITION
● In response to the need for a special textbook for radio training courses the A.R.R.L. now makes available a SPECIAL DEFENSE EDITION of "The Radio Amateur's Handbook." Using the space normally devoted to equipment, operating procedure and etc., it contains special material not normally found in the regular edition. This in no way affects the regular edition which will continue to be available. The SPECIAL DEFENSE EDITION, too, sells for $1.00 ● ● ●

TOUGH?

Not when YOU'RE EQUIPPED TO HANDLE THEM



In addition to the electrical characteristics, many customers' application problems are related to the physical appearance and dimensions of their transformer components. Fortunately, the UTC sheet metal division supplies practically all the housings, laminations, brackets, and other devices which control the mechanical characteristics of UTC units. Instead of restricting designs to specific cases, the sheet metal division can run off a special case to more closely fit the final transformer dimensions, or to effect the particular mounting provisions required by the application.

Illustrated are a few (just a very few) typical cases as supplied for some special applications

The sheet metal division has drawing, forming, and other press facilities to cover the entire gamut of transformer housings from tiny transformer channels, to large oil tanks for broadcast and industrial service. Since these housings are produced at UTC, fast service can be given.

If YOU have a special problem, may we have an opportunity to cooperate?

UNITED TRANSFORMER CO.

Write: COMMUNICATIONS DIV. ★ 150 VARICK ST. ★ NEW YORK, N. Y.

EXPORT DIVISION:— 100 VARICK STREET NEW YORK, N. Y. CABLES: "ARLAB"

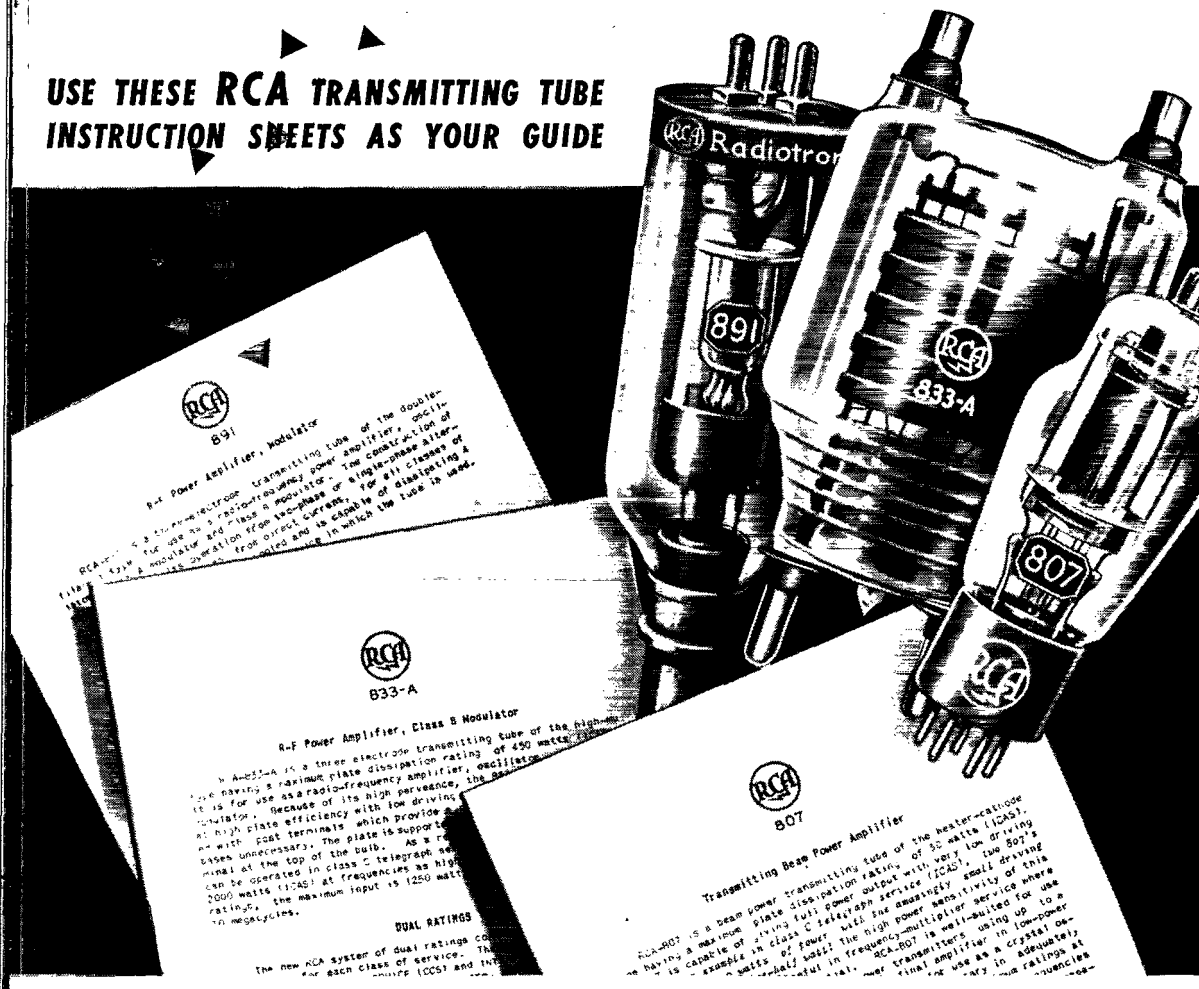
PRINTED IN U. S. A.
RUMFORD PRESS
CONCORD, N. H.

SEMPER FIDELIS

When the going is tough and there is a man's job to be done, old friends of proven dependability are doubly welcome.

NATIONAL COMPANY, INC., MALDEN, MASS.

USE THESE RCA TRANSMITTING TUBE INSTRUCTION SHEETS AS YOUR GUIDE



INSURE LONGER LIFE

FOR TUBES THAT MAY BE DIFFICULT TO REPLACE!

FOR LONGER TUBE LIFE—

For types using pure tungsten filaments, a reduction in filament voltage greatly lengthens tube life.

For types using thoriated-tungsten filaments, maintaining filament at rated voltage results in longer life. Operation either under or over normal voltage may result in shorter life.

For types using oxide-coated cathodes, maintain filaments at rated voltage.

For all types, reduce dissipation in grids and plates to a minimum to avoid overloading and to obtain materially longer life.

Many new Transmitting Tubes for commercial and civilian uses may become even harder to obtain because of the tremendous War-purpose demand. It is, therefore, not only a patriotic duty, but sound business policy as well, for tube users to conserve tube life by observing special care and operating practices which may add thousands of hours of life to tubes now in operation.

It is an old story that RCA Transmitting Tubes are built to withstand plenty of abuse — so much so that abnormal operating conditions are frequently accepted as "normal." Even though tube life has been entirely satisfactory under such conditions, it is by no means as long as might be obtained, simply by careful, conservative use of the tubes as outlined in the Instruction Booklet packed with each one.

In short, these are days when it is essential to give tubes all the care you can give them. Maximum life now becomes far more important than optimum performance. RCA welcomes the opportunity to cooperate in helping RCA Transmitting Tube users extend tube life to its fullest!

If you do not have Instruction Booklets on the RCA Tube types in your transmitter, write Commercial Engineering Section, RCA Manufacturing Co., Inc., Harrison, N. J., for free copies. Be sure to mention type number.

RCA *Transmitting Tubes*

RCA MANUFACTURING CO., Inc., Camden, N.J. • A Service of The Radio Corporation of A

In Canada: RCA Victor Company Limited, Montreal