

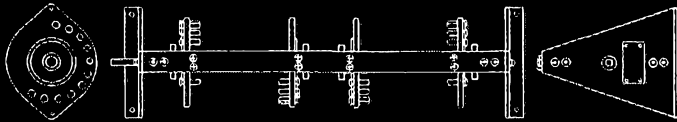
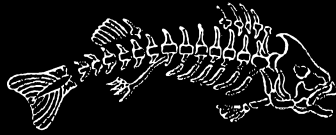
QST

amateur radio

HAMFEST



In This Issue - Latest In Amateur U.S.R. Gear



*

Perdix, Mechanical Engineer

Perdix, if you will remember your mythology, was an ingenious chap.

¶Inspired by the structure of a fish's spine he invented the saw, and by connecting two pieces of iron at one end with a rivet he made a pair of compasses. Sounds pretty crude now. But in his day it was truly remarkable. ¶Similar is the spirit of innovation that has made Collins world famous for the mechanical

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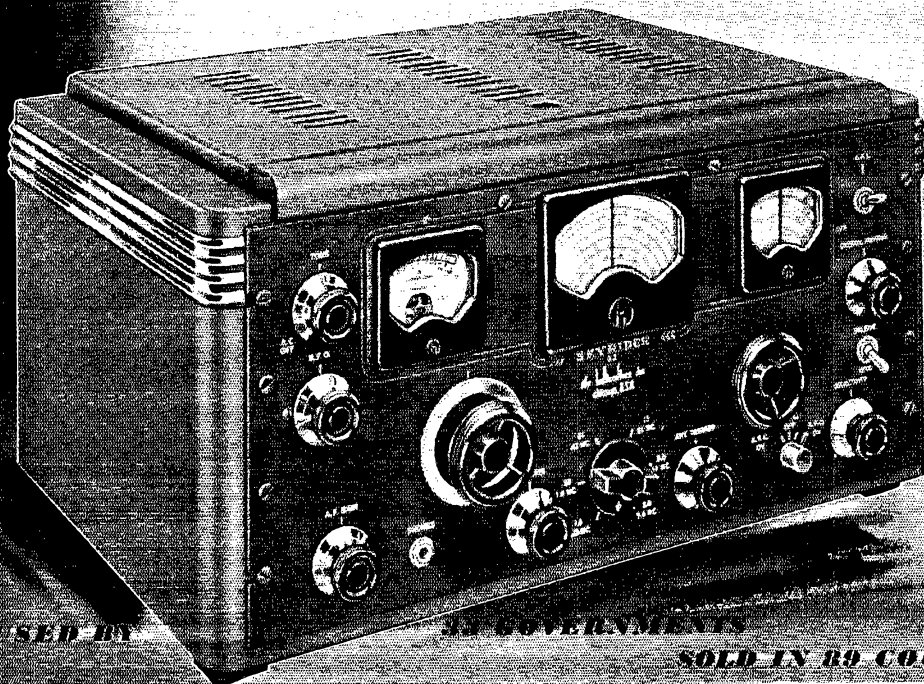
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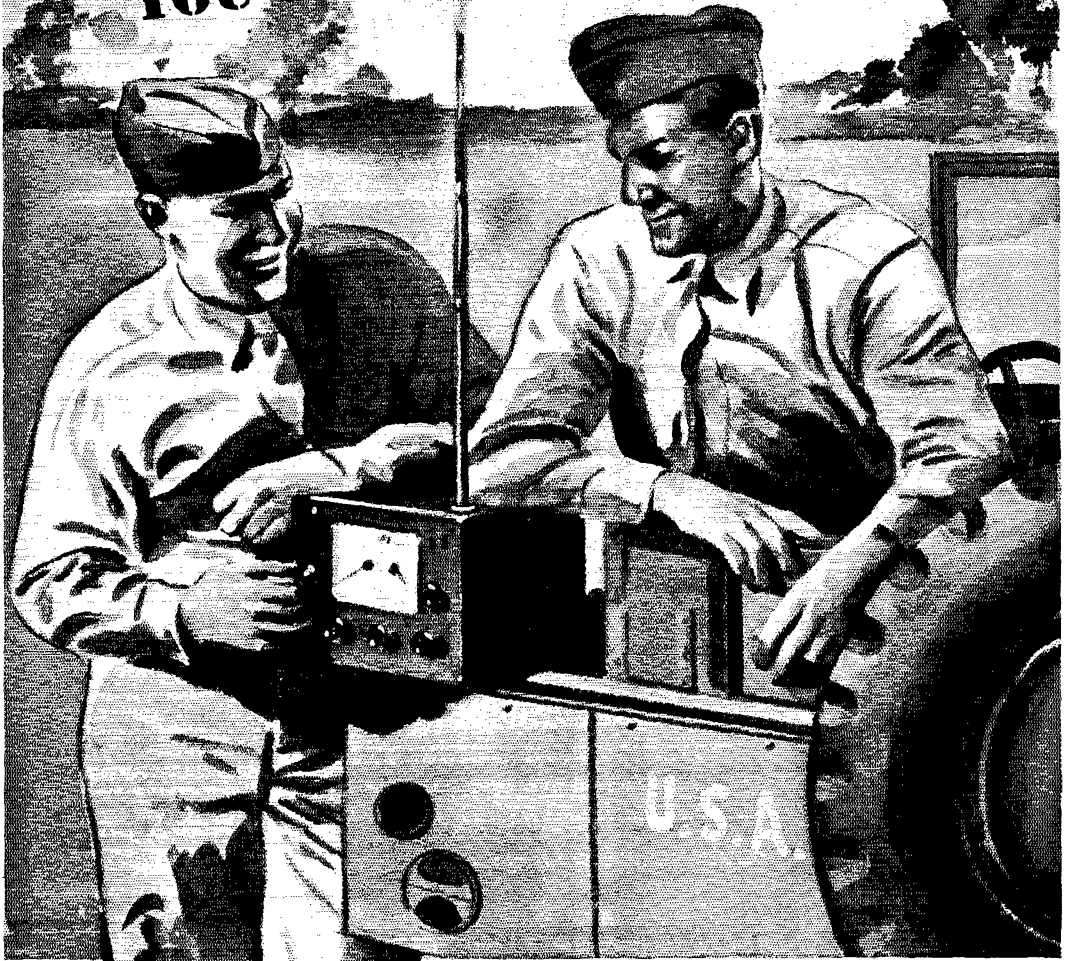


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AUGUST 1941

VOLUME XXV

NUMBER 8



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QST

devoted entirely to

AMATEUR RADIO

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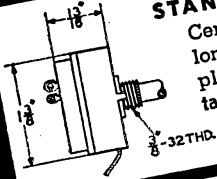
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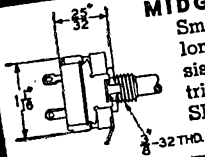
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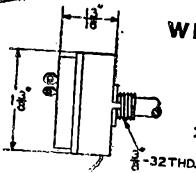
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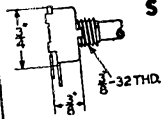
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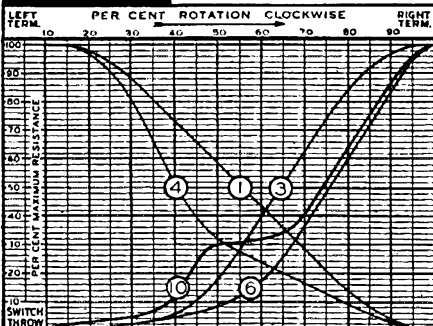
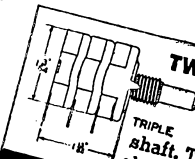
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It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors. The League is 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.



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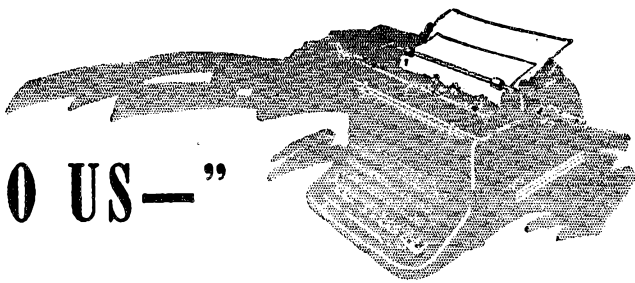
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"IT SEEMS TO US—"



THE "RADIOLOCATOR"

URGENT military needs have a habit of giving great impetus to technical development. The last war vastly accelerated the unfolding of the radio art by giving us the first good vacuum-tube transmission and reception — "hard" tubes, the first good amplifiers, the first practicable radiotelephony, the super-heterodyne. It is inevitable that from the stimulus of the present war will come comparable radio marvels to open new vistas to the amateur.

One such comes already to light as the hard-pressed British, in sharp need of maintenance personnel, decided to release to the world the major outlines of the device they call a radiolocator, that its appeal to the imagination might implement their call for technicians. It is this device which locates oncoming planes while they are yet too far away to be seen or are lost to vision by clouds, fog or night. It operates by radiating a beam of waves which, striking a metal plane, are reflected back to the starting point and suitably detected. By measuring angles and by sending timed pulses, the altitude, direction and distance of the planes may be determined. There is nothing novel in this idea: there is a considerable literature on obstacle detection, and indeed any amateur immediately recognizes this basic functioning as patterned on the technique of ionosphere measurement — which is what first suggested it six years ago to R. A. Watson-Watt, the British physicist who has fathered its development there. What was long a guarded military secret was the vast scale on which the British, mass-producing many types of the apparatus for various uses, are employing it. Another was the success they are having with it. Jointly with the RAF fliers, it is credited with winning the first Battle of Britain. It is now a major weapon in the defense of cities from night bombing. Indeed, one form of it is installed directly in night fighters. It is reputed to be similarly effective in detecting ships at sea. Its effect on military strategy will doubtless be tremendous.

Hot on the British disclosures the War

Department announced that our Signal Corps, as the result of six years' work at Monmouth, has perfected a locator of its own, similar to Britain's, and called for technicians to receive training in the operation of the devices along our coasts and at our bases. No great imagination is now required of the average reader to see the point behind the recent solicitations of specialized radio personnel. Indeed, numerous American scientists and engineers have been silently collaborating for a long time on the improvement of the apparatus, knowing that here was a development of the first magnitude. We ourselves were aware of it and eager to suggest to American amateurs the importance of absorbing u. h. f. and cathode-ray technique. But all of us were bound to secrecy until the recent disclosures.

How much of the technical side may now be discussed? As far as we're concerned, it's only that which has already appeared in the press. Some types of locators seem to employ a sharp beam, requiring a high-gain directive antenna which must be easily steered for quick sweeping of the skies. This means that the wavelength must be very short. It must also be small in comparison with the dimensions of the object to be detected, and again to minimize the effect of ground reflections. The answer is an exceedingly high frequency, a microwave — in the centimeter range. How to generate such frequencies? A recent article in the *Saturday Evening Post*, "The Klystron Boys," indicated that U. S. technique is to use the Klystron or similar velocity-modulated tubes. But there is no indication that the British use other than the usual group-modulation method, for which satisfactory tubes do exist. The British require applicants to have a thorough knowledge of superhets, implying that much about the receivers. Articles in the press have frankly stated that the detecting device used is a cathode-ray tube, giving a visual indication. The British say nothing about antennas beyond the fact that they are complex and require maintenance; you might ask yourself what kind of microwave antennas you know about from reading *QST*. But that some of the rigs employ antennas that are fixed in at least one

plane is indicated by the statement that television technique has lent electrical scanning and synchronization, with considerable speculation on the part played by f.m. No mention of power, and range unstated except that it is far beyond visibility. Curt refusal to indicate the nature of the means that distinguishes friendly ship from enemy.

This is no time to talk military secrets. We summarize above what has already been revealed, to go as far as we can in suggesting to you the technical fields worthy of your study this summer. But do you not also thrill to the beautiful ingenuity of this development and take pride in the fact that it was our radio art which produced it? And do you not, with us, glimpse a future in which wartime developments again give immense new zest and impetus to the practice of amateur radio? Unquestionably there will be many new things some day to discuss and eagerly apply. One, we know, will be the new microwave technique.

P.S. ON "FRITZ"

LAST month on this page we mentioned the arrest in a Middle Western city of an unlicensed amateur who signed himself Fritz, and we chided amateurs of the vicinity for not having turned in such a bootlegger long before. To keep the record complete it must now

be reported that there were two Fritzes, the Illinois one apparently a sort of cheap copy. The original and genuine one, who had been going for some years, was caught in the act in New England in early June and is at present doing bunk-fatigue in a Massachusetts calaboose. This time, we are happy to say, there was notable collaboration by a group of amateurs. They kept him busy and held him on the air while the FCC's monitoring officers converged on him.

These fellows, and three others similarly arrested recently, were not amateurs and never had been. What they were doing was unimportant alongside the fact that they were operating without licenses. But licensed amateurs who flout the Commission's ether patrol are receiving similarly hardboiled treatment. In two actions taken in the month of June, the Commission suspended the licenses of nineteen amateurs for trying to sneak a foreign contact in violation of Order No. 72. There was no evidence of subversive activity in any of these cases and therefore the fellows aren't in jail, but they give graphic evidence of the futility of such endeavors. FCC now has a *hundred* monitoring stations scattered all over the country, and mostly manned by hams who know all the tricks! It just can't be done.

K. B. W.

★ SPLATTER ★

OUR COVER

Does this remind you of a hamfest you once attended? We don't know where this particular ham hodgepodge took place. In fact, any resemblance to any actual hamfest, living or dead, is purely coincidental, and only one with Gil's prodigious imagination could cook up such a brawl!

— . . . —

FEEDBACK

In the article, "Tube Keying," on page 30 of the June *QST*, the side of the key that is connected to the filament of the 80 rectifier should have shown connected to ground as well. This return is necessary to place the bias on the keyer tubes.

Rocky Mountain Division Convention

Pueblo, Colo., August 16th-17th

THE San Isabel Amateur Radio Association promises an interesting and instructive

convention to be held August 16th and 17th in the city of Pueblo, Colo. A banquet and business meeting will be held Saturday evening, followed by some sort of entertainment; Sunday morning there will be a "chuck wagon" breakfast, and a luncheon at noon. Headquarters will be at the Hotel Whitman. Registration fee is \$2.50, or \$2.00 in advance. For further information write Secretary Charles A. Lannon, 811 Veta, Pueblo.

President Bailey says . . .

General Marshall, Chief of Staff of the U. S. Army, in his speech recently at Trinity College, had this one thing to say: "The great need to-day is UNITY." Think it over. That's it — unity. 'Phone men and c.w. ops, think it over. Two rival clubs in a big city — why not have a union meeting? Two or three hams in a small town — why not all meet at somebody's house? That ham on the other side of town with whom you have not been on the best of terms — why not go over to his house? It may be that you will meet him half-way, coming to see you! Unity of effort, unity of purpose. General Marshall is right.

Signal Corps Radio School

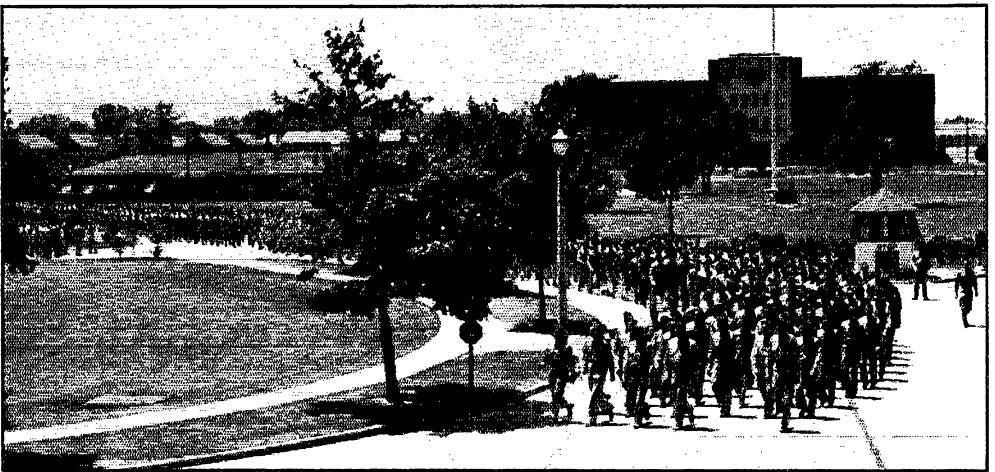
Thousands Trained Yearly at Fort Monmouth

THE Signal Corps School at Fort Monmouth is located about fifty miles south of New York on the Jersey coastal plain near Red Bank, N. J. Established during World War I as a Communication Training Center, it was at first known as Camp Alfred Vail. In 1925 the post was renamed Fort Monmouth after the Battle of Monmouth in the Revolutionary War. It rapidly earned an enviable reputation as one of the finest of the service schools, although until recently it had facilities for training only a relatively small group of students drawn from permanent Signal Corps organizations within the regular army.

To meet the needs of a rapidly growing and highly mechanized army in which signal communications has become increasingly important, the Signal Corps School at Fort Monmouth has undergone an expansion that appears to be nothing short of miraculous. In September of last year the ground was broken for the erection of buildings to house classrooms and laboratories as well as barracks for the men. In January of this year, the Signal Corps Replacement Training Center was established at Fort Monmouth to train selectees inducted into the service as Signal Corps personnel, and send them out completely trained to Signal Corps organizations in all sections of the country. While the Replacement Training Center is not an integral part of the Signal Corps school itself, it furnishes approximately half the student body for the Enlisted Men's Department of the Signal School. From Reception Centers all over the country the rookies stream in in lots of five or

six hundred. At Monmouth they are given intelligence tests and the Signal Corps Code Aptitude Test, and are classified as to their adaptability to receive and absorb specialist training. Signal Corps organizations must function as self-sufficient army units, and the Signal Corps Replacement Training Center, therefore, turns out cooks, clerks, and motor mechanics, as well as communication specialists of all kinds, within the three months time allotted for training. From the six thousand rookies trained at the Replacement Training Center every three months, roughly one thousand picked men are enrolled in the Enlisted Men's Department of the School.

Besides the rookies furnished by the Replacement Center, the Enlisted Men's Department receives an almost equal number of men from the various Signal Corps Organizations scattered throughout the army. This would make a total student body of approximately two thousand — an increase of about five-fold from the enrollment at the beginning of the year. Approximately half of these men are trained in the Wire Division as telephone specialists and receive much the same training as personnel employed along similar lines by commercial telephone companies. The other half are enrolled in the Radio Division, and are given training in any one of four specialties, namely, as field radio operators, fixed station radio operators, radio repairmen, or telegraph printer operators. When you consider the fact that this department of the School alone can turn out two thousand enlisted specialists every 15



Troops marching to school.



Fixed station radio operators and telegraph printer operators.

weeks, a total of approximately eight thousand graduates a year, three quarters of whom receive the equivalent of an apprentice engineering course, you would rate the school at Monmouth as one of the largest engineering colleges in the country. For the task its instructing staff and its laboratory facilities cannot be equalled. But the Enlisted Men's Department is only part of the School. There is an Officer's Department with an enrollment of 280 quarterly, an Officer's Candidate Department with an enrollment of five hundred, and a department for training specialists for aircraft warning organizations.

The post of Fort Monmouth, including the Signal Corps School, is under the command of Brig. General Dawson Olmstead. All departments of the School are under the command of Lieut. Colonel W. O. Reeder. The Director of the Enlisted Men's Department is Maj. Paul L. Neal. Maj. M. G. Wallington is in charge of the Radio Division, and Maj. R. G. Swift of the Wire Division.

While the Radio Division offers courses in both operating and radio theory, it is naturally impossible to train a man in both specialties within the allotted 15 weeks' time. Only students in the radio repairmen's course get radio theory, and the course they get in that is one of the toughest courses given to enlisted men in any branch of the army. It is thorough because it must be thorough. The army needs good radio maintenance men. Today every tank carries a superheterodyne receiver, and a great many of them are equipped with complete transmitting and receiving equipment. The number of radio sets in an armored division is unbelievable. Then there is the radio equipment with the infantry, the artillery and other arms. Maintenance of this equipment is the responsibility of Signal Corps personnel.

Roughly forty per cent of the men enrolled in the Enlisted Men's Department — that is about seven hundred — are given the radio repairmen's course. Many of them start from scratch without

any previous knowledge of radio and with little electrical background to begin with. They are first given a complete course in electricity and magnetism, subdivided into Principles of Electricity, D.C., and Principles of Electricity, A.C. This is elementary electricity, and the student is expected to complete this course in about four weeks. Only after he has passed alternating currents, is the student enrolled in the Elements of Radio Course. There is also a short course in basic

shopwork. Upon completion of Elements of Radio, the student is sent on to receive a month's training in the actual testing and repairing of Signal Corps radio equipment. All instruction in theory and practice is given by the "self instruction" method. Information sheets are furnished the students; these contain all the essential theory. If, after perusing their contents, the student fails to understand certain details, he asks the instructor for help. All instruction is in the hands of keen-witted non-commissioned officer personnel, who are always patient and helpful. Attached to each sheaf of information sheets (each lesson) is a review quiz which is followed by a laboratory exercise. After finishing each group of lessons, the student is given a progress test — a "P. T." By his marks in such tests, the instructor maintains a complete check on each student's progress. Thus it is evident that each student is, in effect, a separate class, and progresses, within limitation, at his own rate. The average time to complete each course has been determined, so that the instructors have a



Portable operation in the field.



Testing and repairing equipment.

definite check on each student's work. If a man should fall down in his studies, he is interviewed by the officer-in-charge, who is, in effect, Dean of the School. If, in the opinion of the O.I.C., the student does not have the qualifications necessary to make a radio repairman, his relief from school is recommended, or he may be changed to a course more suitable to his aptitude.

The Elements of Radio course alone, comprises twenty-nine lessons, most of which are supplemented by laboratory experiments. The equipment is, for the most part, all new, and of the latest commercial design. Breadboard layouts illustrate the principles of grid detection, plate detection; r.f., i.f., and audio amplification; oscillatory circuits; and the master oscillator power amplifier combination. Instruction is given in dynamic testing, using the Rider Chanalyst. There is an illuminating lesson on the use of the oscilloscope, and there are plenty of these around. If the student wishes to learn more about radio theory than is required to pass the course, he has access to a number of standard reference texts. There are also stacks of the ARRL Handbook available. Elements of Radio is the bailiwick of two experienced master sergeants, H. J. Ward and H. Elliott, who have had years of radio instruction experience in the Signal Corps.

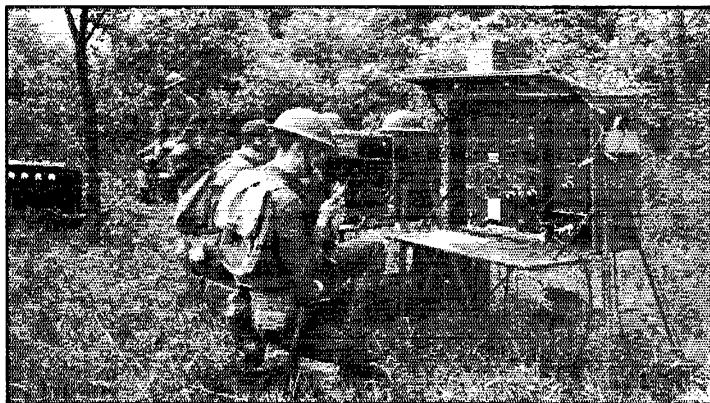
In the course in Test and Repair, the student first comes into contact with the Signal Corps sets, which are used in the field by the modern Army. Many of these are complete vehicular sets — receivers, transmitters, and

power supplies. He is taught the use of test equipment, and where to look for trouble. First Lieut. Frederick C. Shidel, assisted by Master Sergeant R. F. Ranson, is the instructor in charge of this course.

It may be readily seen that the radio repairmen's course is no pipe. There is no time for loafing or day-dreaming, and the student must make every minute count. If the student does not have an adequate background (and the school prefers high school graduates with at least a year of algebra, experienced amateurs or radio servicemen), he may find himself behind in his studies before he realizes it. However, the instructors keep tabs on his progress, and let him know how he stands. It is not unusual to find men who come through the school with an average grade of 95 or over. If the student possesses the proper personal qualifications he may be recommended for an instructorship.

The classes for operators are for the most part housed in a large airplane hangar, which is a relic of World War I days, when the "Air Corps," was "The Aviation Section" of the Signal Corps. Field station operators are taught to receive and send code, or the "International Morse Alphabet" (Continental Code), and are given courses in field procedure — handling traffic — and in the installation and operation of field nets. In three months the student must, in order to qualify as apprentice field radio operator, have attained a receiving speed of twenty words per minute, and a transmitting speed ("perfect copy") of fifteen words per minute, and must have passed procedure and qualified on the nets. All code is fed to the students by means of Wheatstone perforated tapes, and Boehme photo-electric keying heads. Each character reaches the student's ears with the same spacing it would have if it were part of a twenty-word-per-minute transmission. Thus, beginners in code practice, taking down copy at five words per minute, hear each character as it

(Continued on page 49)



Instruction in field operation.

An Inexpensive 112-Mc. M.O.P.A.

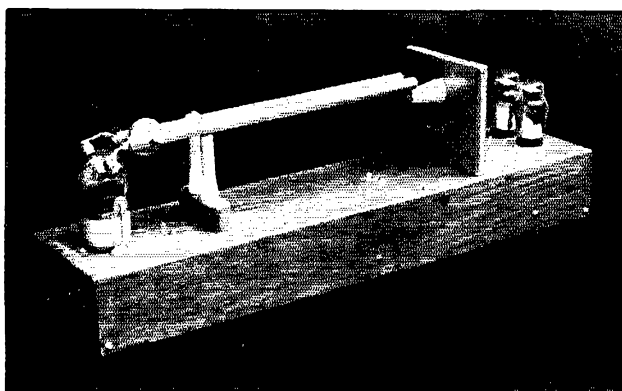
Linear Tank Circuits and an 815 Amplifier

BY WILLIAM A. JOHNSON,* W2KPB

If you're interested in a better-than-average transmitter for 112 Mc. but not the trouble of a long line of doublers working down from a crystal oscillator, here is a simple transmitter that will fill the bill. The cost, including tubes, is less than \$10.00, and the mechanical work involved isn't enough to scare off anyone.

THE interest in the 112-Mc. band is mounting rapidly, and it is to be expected that it will increase considerably during the summer months. Knowing that most of us cannot afford to build expensive equipment, I thought perhaps many would be interested in this $2\frac{1}{2}$ -meter transmitter. It is a trouble-free layout that can be constructed easily by anyone, and most of the parts can be built with very little effort. During the past few months I have tried several different types of circuits using an 815 in the final, and the one to be described was found to be the most practical. In my initial layout I tried to use the 815 without neutralization, but it was found necessary to neutralize it at 112 Mc. It is no trick, however, and no other difficulties of any kind have been encountered with this transmitter. As can be seen from Fig. 1, it uses a pair of 76's in a push-pull oscillator circuit to drive the 815 amplifier, and lines are used for the circuit elements

* Shelter Island, Long Island, N. Y.



An m.o.p.a. for 112 Mc. The 76's at the right-hand end of the chassis drive the 815 neutralized amplifier. The chassis is homemade.

everywhere except in the grid circuit of the oscillator.

Construction

The transmitter is built on a chassis 24 inches long, 6 inches wide and 4 inches high. The chassis was made at home from a piece of 24-gauge sheet iron obtained from an old sign.

As can be seen from the photographs, the isolantite sockets for the 76's are mounted on brass pillars about one inch below the top of the chassis, to give short leads to the plate rods. These sockets are rotated so that the grid prongs of the sockets face the end of the chassis. The grid coil is soldered to the prongs of the socket, and the grid leak is soldered directly to the center of the coil.

The grid rods for the 815 are cut, tapped for the tuning condenser C_6 , and mounted under the chassis on one-inch stand-off insulators, two to each rod. The leads from the grid rods to the grid terminals at the 815 socket should be made as short as possible. Next the 76 plate rods are cut and mounted on one-inch stand-off insulators mounted on bakelite strips at the bottom of the chassis. Iron or brass brackets are used to fasten the bakelite strips to the sides of the chassis, as can be seen from the photograph. The strips are mounted so as to give approximately $\frac{1}{4}$ -inch spacing between the 76 plate rods and the 815 rods and also to have the rods lap over each other for about 8 inches. The holes in the angle irons of these 76 plate-rod mounts are made oblong-shaped so that the coupling between the rods can

be varied slightly by moving them closer to or farther from the grid rods. The leads from the plates of the 76's to the rods are about $\frac{1}{2}$ -inch long and are made of stranded wire to allow enough flexibility during adjustment. The leads to the by-pass condensers at the socket of the 815 are made as short as possible.

The 815 plate rods on the top of the chassis are mounted $3\frac{3}{4}$ inches above the chassis on stand-off insulators in a position to allow quite short leads to the 815 plate terminals. The neutralizing condensers consist of small copper tabs $\frac{1}{2}$ inch by $\frac{3}{4}$ inch soldered to No. 14 wire and supported by small feed-through insulators. The plates

◆
 A view underneath the chassis shows the plate rods of the oscillator and the grid rods of the amplifier. Note the grid coil of the oscillator at the extreme right and the method of supporting the plate rods of the oscillator.
 ◆



of the 815 act as the other halves of the neutralizing condensers.

Tuning the Transmitter

The transmitter should be adjusted by first setting the oscillator to frequency with no plate or screen voltage applied to the amplifier. The shorting bar of the 76 plate rods is set to about 14 inches from the plate end of the rods and about 225 volts put on the plates of the 76's. The 76's should draw about 35 ma. The frequency can be checked by any convenient means (receiver, absorption-type wavemeter or Lecher wires) and adjusted to the desired frequency by adjusting the shorting bar. A low-current meter can be plugged in the grid-circuit jack of the 815, and the grid circuit tuned to resonance by adjustment of C_6 . The grid current to the 815 should be about 5 or 6 ma., and if the current is less than 5 ma. the coupling should be increased by moving the 76 plate rods closer to the 815 grid rods. If this doesn't do the trick, squeeze or pull apart the turns of L_1 until the 815 grid current is a maximum. If neither of these methods gives sufficient drive, it may be necessary to increase slightly the plate voltage on the oscillator tubes.

After sufficient drive has been obtained, the 815 is ready for neutralization. Using the grid

meter as an indication, tune C_7 until resonance is reached, as indicated by a dip in the grid current. Vary the distance of the neutralizing tabs from the 815 plates until no flicker in grid current is obtained as C_7 is tuned through resonance. When this is done, the tube is neutralized. It will be found very easy to neutralize the 815.

A 0-50 milliammeter should be plugged in the 815 screen-current jack and a 0-200 milliammeter inserted in the 815 plate current jack, and reduced voltage applied through the 815 plate-power terminal. Tune C_7 for minimum plate current and then couple the antenna through C_4 and C_5 to the 815 plate rods. The antenna taps are most easily made with small battery clips that can be slid along the plate rods. Caution should be exercised when tuning C_7 to resonance to insure that the screen current doesn't go too high.

The input to the 815 can be run as high as 150 ma. at 400 volts and, at this input, will require a modulator capable of delivering about 30 watts of audio.

A half-wave antenna 30 feet above the ground is used, fed by a two-inch spaced line of No. 14 delta-matched at the antenna. My location is in the open and practically at sea level, but I have worked New York City, almost 100 miles away, with reports of S7 to S9.

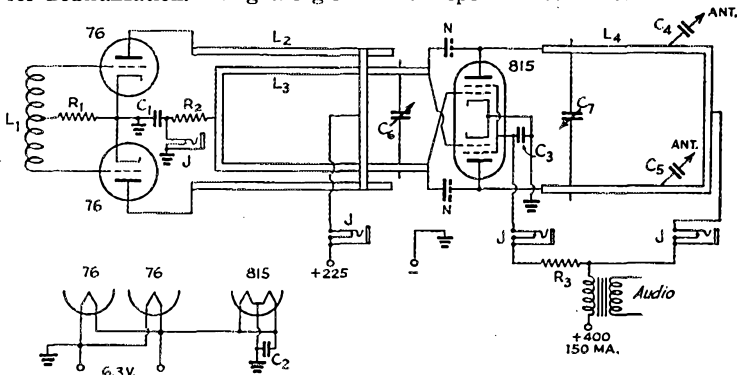


Fig. 1 — Circuit diagram of the 112-Mc. m.o.p.a.

C_1, C_2, C_3 — 500- μ fd., 500-volt mica.

C_4, C_5 — 0.001- μ fd., 500-volt mica.

C_6, C_7 — One-eighth-inch brass discs, $1\frac{1}{4}$ inches in diameter, soldered to $\frac{3}{16}$ -inch brass screws 1 inch long.

N — Neutralizing condensers. (See text.)

J — Closed-circuit jack.

R_1 — 7500 ohms, 1-watt.

R_2 — 15,000 ohms, 1-watt.

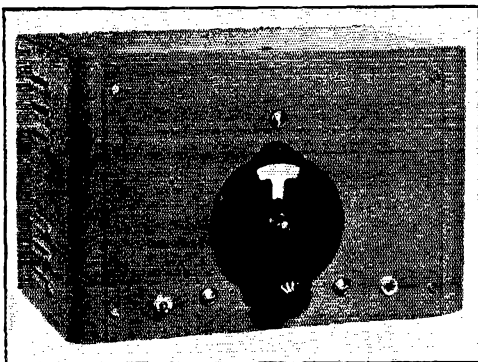
R_3 — 15,000 ohms, 10-watt, wire-wound.

L_1 — 5 turns No. 14 enam., $\frac{5}{8}$ -inch

outside diam., spaced to occupy $\frac{5}{8}$ inch.

L_2 — 15 inches $\frac{3}{8}$ -inch o.d. copper tubing, spaced $1\frac{1}{4}$ inches center to center.

L_3, L_4 — 13 inches $\frac{1}{2}$ -inch o.d. copper tubing, spaced $\frac{3}{4}$ inch center to center.



Eliminating some of the trimmings but giving full attention to fundamentals, this variable-frequency transmitter control gives a high order of stability, is easy to build, costs little. It is described for 3.5-Mc. output, but readily can be converted to 1.75 or 7 Mc. by following the principles outlined in the article.

Let's Talk E.C.O.

Getting Performance With Low Cost

BY W. J. STILES,* W2MBS, AND G. S. BLAIR**

Simplicity is the keynote of this transmitter frequency control unit. It has two stages, gang-tuned, with an output of 5 or 10 watts, depending upon the power supply voltage, and is contained in a 7 by 12 by 8 cabinet. Only the standby switch, tuning control and keying jack are mounted on the panel.

GENERALLY speaking the design and construction of amateur equipment is governed more by the dollar exchange available than the creation of, and adherence to, an idealistic concept. To obtain the maximum results under this limitation the prospective builder must choose one of three well-defined methods of procedure: Design for the ultimate performance and then cut corners to come within the cost limitations; design for rock-bottom cost and try to add only sufficient material to obtain acceptable results; or endeavor to find more efficient means for the accomplishment of each requirement. We chose the latter, and for a total cost of seventeen dollars produced the unit pictured.

Attacking the problems in the order of their relative importance, our first undertaking concerned frequency stability. Thumbing through early papers on the e.c.o. we found that the accepted standard was a large power tube of the 802 class running with low plate voltage and light loading. Its shortcomings were twofold—mechanical instability and frequency drift. The mechanical instability was practically eliminated by resorting to the smaller, more sturdily built "G" series of receiving tubes but the frequency drift remained. While the drift was no worse, with the smaller tubes, it certainly wasn't much better. Temperature compensation, a costly and painstaking job if properly done, represented the accepted procedure for dealing with this drift, but actually was a remedy and not the cure. Here we had an interesting observation. The reason for using the large tube in the first place

was to minimize element heating and yet the receiving tubes having much smaller elements and operating at the same plate voltage did not drift at any higher rate. This appeared to eliminate plate and grid heating as major elements in the drift problem. There remained but two alternatives: tank circuit heat distortion and filament heating. The former was nullified by the intelligent placement of parts and the use of conductors of the proper size. Thus, by the process of elimination, attention was focused on filament heating as the culprit.

The most obvious way of dealing with this unwanted heat was to resort to tubes of the 50- and 60-mc. filament types. While tubes of this type had been successfully used by W2JT and W2GT they had three shortcomings that made them undesirable where low cost was the governing factor. Their low output, d.c. filament requirements, and microphonic characteristics were entirely out of keeping with the financial situation involved. The next best series was the 150-ma. type, of which the 6G6G was the most suitable for our needs, since it required only 150 ma. at 6.3 volts and was built ruggedly. In actual practice the frequency drift on 14 Mc. was extremely low, even taken over 30 minutes from a cold start.

Voltage Stabilization

Several considerations contribute to the stability with changes in voltage. These are, in the order of their importance, cathode coil adjustment, tank capacity, grid-leak resistance, screen-supply adjustment, and operating plate voltage.

The adjustment of the cathode coil, while of utmost importance, is not complicated, because the coil is a separate winding as shown in Fig. 1 and its size can be altered much more easily than a conventional tap can be changed. The optimum adjustment is determined by first selecting an arbitrary size and then varying the plate voltage

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** 77 Williamson Ave., Bloomfield, N. J.

over a range of say 50 to 75 per cent. If the frequency increases with a decrease in plate voltage the coil is too large; conversely, a decrease in frequency with a decrease in plate voltage indicates too small a cathode coil. In the unit pictured the frequency changes less than 100 cycles (at 14 Mc.) with a plate voltage variation from 135 to 350 volts.

Silvered mica condensers are used for the oscillator tank circuit lumped capacity. They are cheaper and more convenient than air condensers and their temperature coefficient is low enough to be negligible. The value of the lumped capacity, 350 $\mu\text{mfd.}$, was selected as the minimum value that would provide the desired stability, and should not be lowered.

The large value of grid-leak resistance employed is a compromise between maximum stability and maximum output. The 1-megohm value provides a far superior frequency/voltage ratio, without greatly reducing the oscillator output, than the 50,000-ohm leak commonly employed. Raising the value still further adds but little improvement and seriously limits the output.

Oscillator screen voltage variations affect the frequency much more than plate circuit changes. The series-parallel circuit, first introduced by W6CUH,¹ proved to be superior to everything

¹ Perrine, "An Answer to the E.C.O. Problem," *QST*, September, 1939.

else tried. Under no conditions should an attempt be made to stabilize the screen separately from the plate. To do so will introduce a serious drift that is very difficult to remedy.

Original plans called for the use of a VR-150-30 to stabilize the oscillator plate voltage within the unit itself. (This tube is shown in the pictures but not in Fig. 1.) Subsequent tests showed the frequency/voltage ratio to be so favorable that this tube may be eliminated except when high output is desired.

The actual applied plate voltage should be the subject of some consideration. Generally speaking the voltage change of a supply furnishing 400 volts will be twice the change experienced if the supply delivers only 200 volts, all other conditions remaining constant. Therefore if electronic voltage regulation is to be avoided the operating plate voltage should be as low as is consistent with proper oscillator action and the desired power output. With a 200-volt supply the oscillator operates very near maximum efficiency and the output stage delivers approximately 5 watts. Should higher output be desired the power supply voltage can be raised to 350 volts, which should be applied directly to the 6L6 stage but dropped, by means of a series resistor and a VR-150-30, to 150 volts for the 6G6G. This gives a power output of 10 watts while all other characteristics remain unchanged.

The question of using a transformerless power

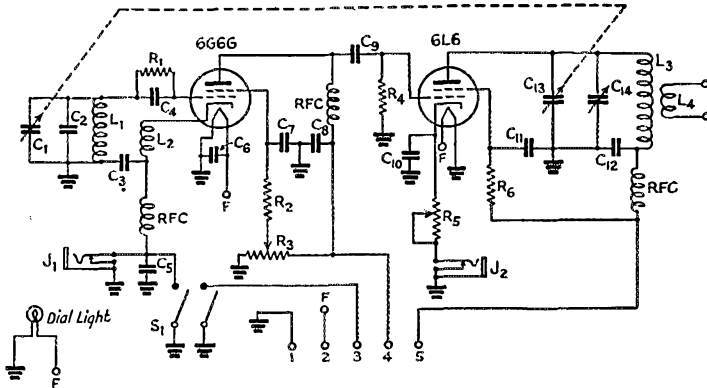
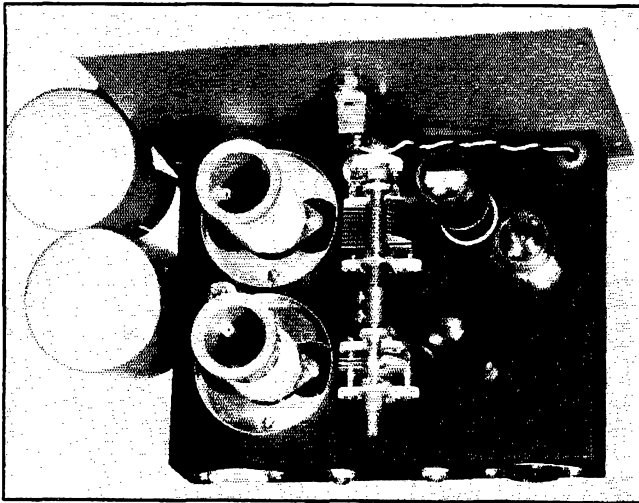


Fig. 1 — Circuit diagram of the variable-frequency transmitter control unit.

- C₁ — 140- $\mu\text{mfd.}$ variable (Hammarlund MC-140-S).
- C₂ — 350- $\mu\text{mfd.}$ silvered mica.
- C₃ — 0.01- $\mu\text{mfd.}$ mica.
- C₄ — 100- $\mu\text{mfd.}$ silvered mica.
- C₅, C₆ — 0.01- $\mu\text{mfd.}$ paper.
- C₇ — 0.001- $\mu\text{mfd.}$ mica.
- C₈ — 0.01- $\mu\text{mfd.}$ paper.
- C₉ — 100- $\mu\text{mfd.}$ silvered mica.
- C₁₀, C₁₁ — 0.01- $\mu\text{mfd.}$ paper.
- C₁₂ — 0.006- $\mu\text{mfd.}$ mica.
- C₁₃ — 35- $\mu\text{mfd.}$ variable (Hammarlund MC-35-S).
- C₁₄ — 75- $\mu\text{mfd.}$ variable (Hammarlund MC-75-S).
- R₁ — 1 megohm, 1-watt.
- R₂ — 10,000 ohms, 1-watt.
- R₃ — 50,000 ohms, 25-watt, with slider.
- R₄ — 75,000 ohms, 1-watt.

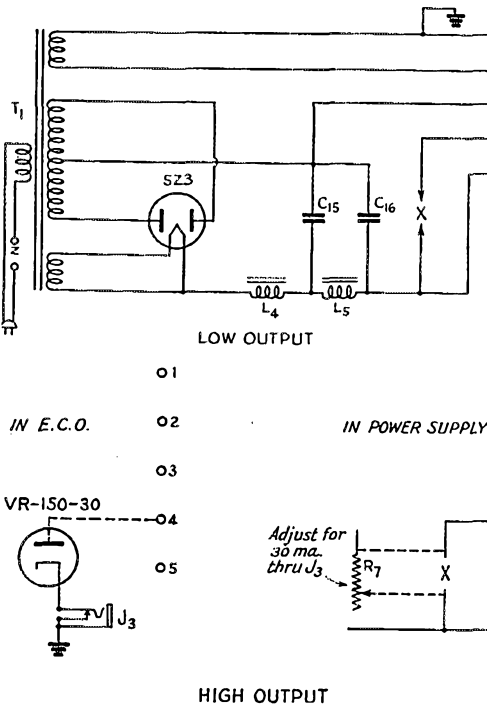
- R₅ — 1000 ohms, 10-watt, with slider.
 - R₆ — 1000 ohms, 1-watt, for low output; 15,000 ohms, 2-watt, for high output. See Fig. 2.
 - RFC — 2.5-mh. r.f. choke.
 - S₁ — D.p.s.t. toggle switch.
 - J₁, J₂ — Closed-circuit jack.
 - L₁ — 26 turns No. 22 d.c.c., length 2 inches, diameter 1½ inches.
 - L₂ — 7 turns No. 20, interwound with L₁ at ground end.
 - L₃ — 27 turns No. 22 d.c.c., length 1½ inches, diameter 1½ inches.
 - L₄ — 4 turns No. 20, wound on same form with L₃, at ground end.
- Coil data for oscillator on 1.75-Mc. band, output on 3.5 Mc.



A top-of-chassis view, with coil shields removed. The output circuit pad-der, C_{14} , is just visible behind the nearer coil. The bakelite socket is for the power cable plug, the isolantite socket for r.f. output. The chassis measures 7 by 9 by 2 inches.

supply is bound to be raised in connection with such a low-voltage low-cost unit. While space and other considerations prevent a lengthy explanation it is the opinion of the authors that a transformer supply is preferable.

The cathode resistance in the 6L6 output stage



is adjusted so that the no-signal plate current is equal to the operating plate current plus the oscillator's combined screen and plate current. With 200 volts available the oscillator draws 9 to 11 ma. (cathode current) and the 6L6 about 50 ma.

Construction Notes

The coil specifications given will permit the amplifier plate tank to track well over the entire tuning range. While this information is for 3.5-Mc. output there is no reason why similar results cannot be obtained on 1.75 Mc. or even 7 Mc. The important consideration is that the oscillator always should be operated on half the output frequency. Output on 14 Mc., with the oscillator on 7 Mc., is practical only after some experimenting with the oscillator plate choke and is not recommended. Assum-

ing all capacity values are followed as given the bandwidth will be approximately 90 dial divisions between 3500 kc. and 4000 kc.

A study of the frequency change encountered with mechanical vibration showed the variable air condenser to be a major offender. While it is not practical to eliminate such condensers entirely only one, the tuning condenser itself, is employed. The use of fixed padding condensers makes the original coil adjustments somewhat more critical but pays large dividends in the completed unit.

Oscillator keying is employed for c.w. operation and the note is remarkably free from chirps, lags or other distortions. Observation on an oscilloscope showed the keyed wave form to be superior to that of a conventional crystal oscillator.

Switch S_1 is located on the front panel and

Fig. 2 — Power supply details. The circuit is the same for either 5- or 10-watt output except for the additions shown below in the case of high output. The VR-150-30 regulator tube is not needed with low voltage, but is installed in the e.c.o. unit with a high-voltage supply. Resistor R_7 is added at "X" for high voltage; with low voltage terminals 4 and 5 are connected together. The values below will give output voltages of approximately 200 for low output and 350 for high output.

C_{15} , C_{16} — 16- μ fd., 450-volt electrolytic.

R_7 — 7500 ohms, 25-watt, with slider.

J_3 — Closed-circuit jack.

L_4 , L_5 — 30 henrys, 80 ma.

T_1 — Low output: 275 v. each side c.t. at 80 ma.; 6.3 v. at 1.5 amp.; 5 v. at 2 amp.

High output: 425 v. each side c.t. at 100 ma.; 6.3 v. at 1.5 amp.; 5 v. at 2 amp.

Z indicates connection to jumper inside VR-150-30, used only for high output.

serves the double purpose of applying plate voltage to the unit and shorting the key. This permits the frequency of the e.c.o. to be set with no additional stages of the transmitter in operation. In normal operation this switch is not used, its power contacts being shorted by a relay in the transmitter which is excited in parallel with the high-voltage power-transformer primary.

Power is brought to the unit from the power supply by means of a 4-wire shielded cable. The shield is the only direct ground connection for the e.c.o. cabinet.

R.f. output is taken from the unit by means of a flexible concentric cable terminated in a five-prong plug. This plug fits the isolantite socket at rear of the chassis.

The cabinet shown, while requiring slightly more desk space than absolutely necessary, is highly recommended because of the excellent ventilation provided. In operation a sponge rubber kneeling pad (25¢ at any dime store) is placed under the unit to absorb shocks. Installation precautions such as the use of a shielded microphone cable for the keying leads, the rubber pad mentioned above, and the physical isolation of the entire unit from strong r.f. fields spell the difference between just another e.c.o. and one the boys talk about.

Code Proficiency Award Schedules

Last Chance to Get Certification Essential to Participation in September 12th, 13th, 14th, 19th, 20th, 21st CP Frolic

INVITATION is extended to every FCC licensee to qualify for an ARRL Code Proficiency Award at *some* speed above government requirements for an amateur license. The certificate and sticker awards are made available in a continuing program. The aim is to give proper recognition to *each* amateur who has the requisite interest and capabilities!

Besides this operating achievement award for which there are two opportunities for qualification each month, the thousands of U. S. radio amateurs holding ARRL certificates will be eligible for participation in a September "Code Proficiency Frolic" full details of which will be announced in next *QST*. This will be a simple, enjoyable radio activity with a scoring system . . . some operating fun for the group holding Code Awards based on W1AW runs at any speed whatsoever. For those not yet having qualified for a certificate, the August W1AW-qualifying-runs will represent the last opportunity to get one as the ticket of admission to the September activity.

Qualifying Run Dates

The next W1AW Qualifying Runs for getting the League's Code Proficiency Certificate Award or the Silver Endorsement Sticker for demonstrating increases from the original certified word speed, are as follows:

July 20th (Sun.) 9:45 P.M. EST (Text at 10 P.M. EST)
 Aug. 3rd (Sun.) 1:30 P.M. EST (Text at 1:45 P.M. EST)
 Aug. 18th (Mon.) 9:45 P.M. EST (Text at 10 P.M. EST)

Copy the test text at the best speed you can. Underline the *full minute* of perfect copy necessary to qualify at any speed. Tell us if you copied by ear without help except for your pencil or mill, mentioning which was used, and *if you are working for certificate or first endorsement, etc.* Send in copy and statement and ARRL will check your paper with the official transmission, advising you of success or failure within about thirty days from the date of the qualifying run with any appropriate award due you.

Code Practice — Frequencies Used

Code Practice is sent nightly except Friday from W1AW simultaneously on the following indicated frequencies, at the starting time indicated:

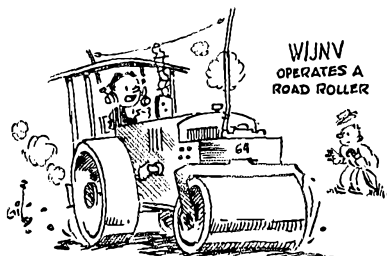
9:45 P.M. EST (8:45 P.M. CST, 7:45 P.M. MST, 6:45 P.M. PST) — 1762, 3825, 7280, 14,253 28,510, and 58,970 kcs.

Approximately ten minutes' practice is sent at progressive speeds of 15, 20, 25, 30, and 35 words per minute. Besides this special practice material ARRL official messages are sent by tape "to all radio amateurs" at 8:30 P.M. and midnight EST at one of the three lower speeds which gives opportunity for additional practice for those interested.

— F. E. H.

Strays

An auto-starter switch makes a good foot-operated safety switch for the high-voltage supply. The spring is strong enough so that the weight of the foot alone will not keep it closed. Additional pressure is necessary. — W9FWN.



— AND HAS CARRIED ON QSO'S FROM IT!

A Modulator and Power Supply for the Inexpensive 56-Mc. Transmitter

Completing the Low-Power Five-Meter Outfit

BY VERNON CHAMBERS,* WIJEQ

THE modulator and power supply units which are the subject of this article were designed as companion pieces to the low-power 56-Mc. transmitter described in June *QST*.¹ The circuits, while perfectly straightforward, have several features which will be useful to those interested in the transmitter, and the construction, on chassis of identical size, makes for uniformity of appearance.

Probably the most important feature is the fact that 6A6 tubes are used in all stages of the speech amplifier and modulator, which means that a single spare tube can be used to replace any tube in either the r.f. or audio line-up. The power supplies, using broadcast-receiver replacement transformers and electrolytic filter condensers, are inexpensive. The speech amplifier and modulator unit will accommodate single- or double-button carbon microphones as well as the crystal type. A meter switching system which makes a single milliammeter take care of either r.f. or modulator is provided. The cost of the audio gear, including microphone battery, chassis, switches, sockets, etc., will be approximately \$15.00, plus another \$3.00 or so for the tubes. The cost of the microphone is entirely up to the individual, with prices ranging from a few dollars for a carbon or cheap crystal mike to twenty dollars or more for the better crystal jobs.

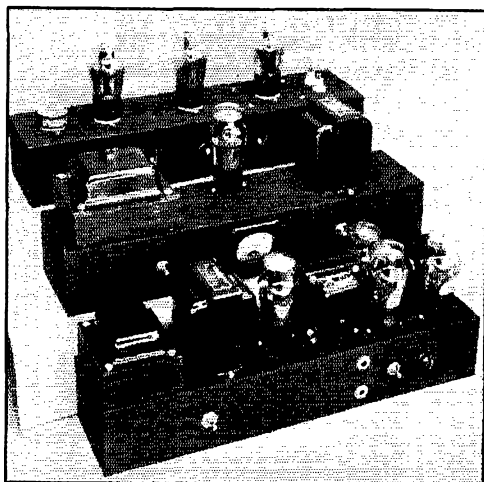
The Audio Circuits

Fig. 1 shows the circuit diagram of the speech amplifier-modulator. The first 6A6 tube is wired so that one section can be used as the input amplifier for a crystal microphone. When this type

* ARRL Technical Information Service.

¹ Chambers — "An Inexpensive 56-Mc. Exciter or Transmitter," *QST*, June, 1941.

The two units described in this article supply all the power, d.c. and audio, needed to put the low-power five-meter transmitter described in June *QST* on the air. The modulator, which has an output of slightly more than ten watts, can of course be used with other low-power transmitters.



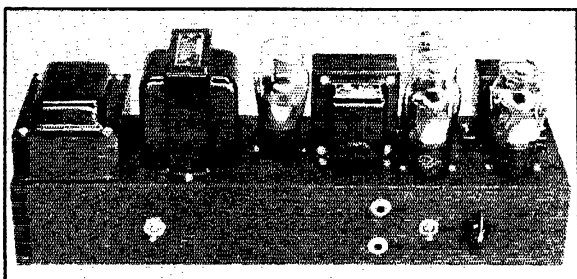
The complete 56-Mc. station consists of three units, r.f., modulator and r.f. power supply, on identical-sized chassis. The r.f. section was described in June *QST*.

of microphone is used the second half of the tube serves as a second speech-amplifier stage. With carbon microphones less gain is needed, so the first section of the tube is not used; it is made inoperative by removing the microphone plug from J_1 , thus grounding the grid, and the output connection is broken by means of Sw_1 . Plate voltage is left on the stage so that the same bias voltage will be developed across the cathode resistor, R_2 , whether both sections of the tube are in use or not.

Carbon microphones are transformer-coupled to the second section of the first 6A6. The type of jack shown at J_2 in the circuit diagram must be installed if a double-button microphone is to be used. On the other hand, J_2 may be the same type of jack as J_1 if a single-button microphone is to be used exclusively; in that case, however, some provision must be made for opening the battery circuit when the amplifier is not in use. Removing the microphone plug from the jack will open the battery circuit with the arrangement shown in the diagram.

The gain control is connected in the grid

The audio unit is complete with power supply. Three double triodes provide a four-stage amplifier with Class-B output. Any of the popular types of microphones may be used.



circuit of the second section of the first tube. The plate of this section is resistance coupled to the driver grid circuit. The driver tube, also a 6A6, has its two sections connected in parallel. Cathode bias is used, and the tube is transformer-coupled to the Class-B stage.

The modulator circuit requires no biasing arrangement since the 6A6 is a zero-bias tube when working Class-B. The modulation transformer is designed to work between 6A6 plates and a 6500-ohm load, which is an approximate impedance match for the transmitter previously described. A milliammeter can be connected across R_1 to measure the Class-B plate current; a switching arrangement will be described later in connection with the transmitter power supply circuit.

A circuit diagram of the modulator power supply also is shown in Fig. 1. The supply is of the simple condenser-input type and will deliver 350 volts at 90 ma. A switch, Sw_2 , in the transformer center-tap lead is used for turning the plate voltage on and off without affecting the filament supply.

Construction

The front-view photograph shows how the parts are laid out on a chassis measuring 4 by 17 by 3 inches. The power transformer is sub-mounted at the left end with its short sides facing the front and back of the base. The rectifier tube is located 8 inches in from the left end of the chassis. L_1 , the filter choke, and T_3 , the modulation transformer, are to the left and right of the

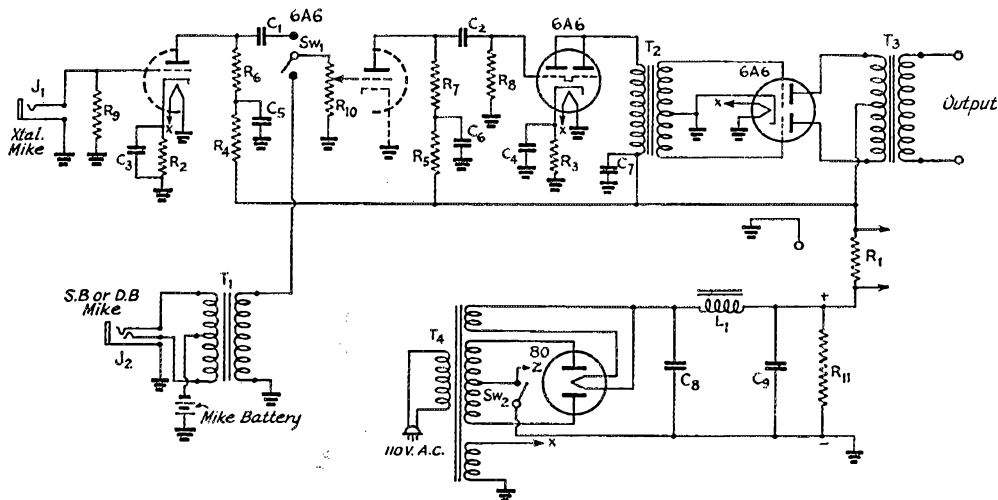
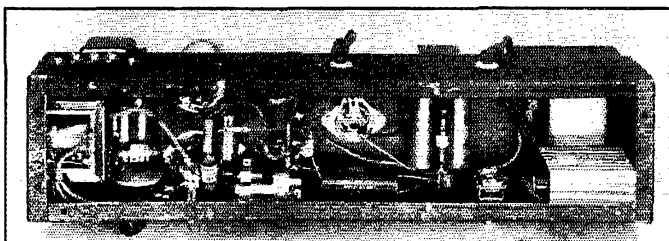


Fig. 1 — The complete audio system.

- C_1, C_2 — 0.1- μ fd., 600-volt paper.
- C_3, C_4 — 10- μ fd., 50-volt electrolytic.
- C_5, C_6, C_7, C_8, C_9 — 8- μ fd., 450-volt electrolytic.
- R_1 — 25 ohms, $\frac{1}{2}$ -watt.
- R_2, R_3 — 900 ohms, 1-watt.
- R_4, R_5 — 50,000 ohms, $\frac{1}{2}$ -watt.
- R_6, R_7 — 0.25 megohm, $\frac{1}{2}$ -watt.
- R_8 — 1 megohm, $\frac{1}{2}$ -watt.
- R_9 — 5 megohms, $\frac{1}{2}$ -watt.

- R_{10} — 500,000-ohm volume control.
- R_{11} — 25,000 ohms, 10-watt.
- Sw_1 — S.p.d.t. toggle switch.
- Sw_2 — S.p.s.t. toggle switch (see text).
- J_1 — Closed-circuit jack.
- J_2 — 2- or 3-wire jack for s.b. or d.b. mike.
- T_1 — S.b. or d.b. microphone transformer (Stancor A-4351).
- T_2 — Driver transformer, parallel

- 6A6 plates to 6A6 Class-B (Stancor A-4216).
- T_3 — Output transformer, 6A6 Class-B to 6500-ohm load (Stancor A-3845).
- T_4 — Power transformer, 700 volts at 90 ma., c.t.; 5 v. at 3 amp.; 6.3 v. at 3.5 amp.
- L_1 — Filter choke, 5 henrys, 200 ma., 80 ohms (Thordarson T-67C49).



The below-chassis wiring is visible in this view of the modulator unit. It is advisable to keep the microphone input leads short in order to reduce hum pickup.

rectifier. The driver tube socket is mounted $1\frac{3}{4}$ inches in from the right end of the base and the speech-amplifier tube socket is $4\frac{1}{4}$ inches in from the same edge. T_2 , the driver transformer, is at the rear of the driver tube and the Class-B tube is to the rear and in line with the speech-amplifier tube. For convenience in wiring the audio tube sockets should be mounted with the filament prongs facing the right end of the chassis.

The plate voltage switch is on the front of the chassis $4\frac{1}{4}$ inches from the left edge. A heavy-duty toggle switch should be used, since an ordinary low-voltage toggle may break down. (The type shown in the photograph is made by Cutler-Hammer; it is available only in the double-throw type with neutral position.) The microphone switch is $4\frac{1}{4}$ inches in from the right-hand end of the chassis, with the gain control to its right and the microphone jacks to its left; J_1 is mounted near the top and J_2 directly below.

The bottom-view photograph shows the layout for the components mounted below the chassis. T_1 is mounted at the left end with the primary taps accessible. Wiring to the driver tube socket and the transformer secondary winding should be completed before the transformer is bolted in place, as it is difficult to reach the connecting points with a soldering iron afterwards. Short leads between the gain control, microphone switch, and the tube socket can be obtained by making the gain-control contacts face toward the switch as shown. The remaining connections in the unit require no special wiring precautions.

The microphone battery specified in the parts list can be held securely in place without the assistance of any brackets or clips if it is wedged in between the bottom of the power transformer and the lips on the bottom of the chassis. A 3-

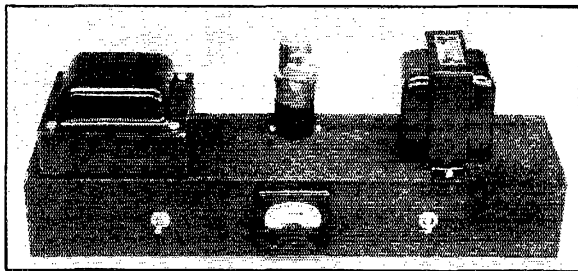
volt battery is sufficient for most carbon microphones, and low current will frequently give better speech quality. It might be, however, that a 6-volt battery will be needed to get enough output with some of the very cheap microphones. The 115-volt a.c. and meter lines (rubber-covered lamp cord) enter the chassis through rubber grommets. A three-contact terminal strip is located at the right end of the base (left end in the bottom view). One of the contacts is for an external ground connection and the other two are connected to the modulation transformer output winding. The locations of the cord holes and the terminal strip correspond with those on the r.f. chassis.

Operation

When the audio equipment is ready for testing a 0-150 milliammeter may be connected to the modulator meter leads. A 20- or 25-watt slider type resistor adjusted to 6500 ohms makes an excellent test load. A pair of headphones should be connected across approximately 500 ohms of the total load.

When a.c. is first applied to the power transformer primary the plate switch, Sw_2 , should be in the "off" position until the tube filaments warm up. On closing Sw_2 the milliammeter should register 60 ma., which is the total no-signal plate current taken by all stages. To check the individual stages it is necessary to remove tubes one at a time. For instance, the current will fall to 10 or 12 ma. after the modulator tube has been taken out, and will decrease 7 or 8 ma. more when the driver tube is removed. The plate voltage should measure 350 or 360 volts under full load and rise to 430 or 440 volts with the modulator tube removed. The rise in voltage under these

The r.f. power supply chassis also houses the single milliammeter which serves for all plate current measurements in the transmitter.



conditions causes the plate currents of the preceding tubes to be higher than normal, but the values given above will serve for checking purposes.

The microphone may next be connected to the proper input jack and Sw_1 set to the right position. With the gain control at about half scale, talk into the microphone and observe the plate current. At full output (with ordinary speech, not a tone or whistle) the current should rise to approximately 80 ma., and the gain control should be set so that this is the value obtained on peaks when talking normally. The quality of the modulator output may be checked by listening in the headphones. A loudspeaker cannot ordinarily be used to replace the headset because of howls caused by acoustic feedback from the speaker to the microphone.

This simple test procedure will give a fairly good indication of the performance of the equipment since such things as obvious distortion, high hum level, and other common faults will be shown up readily by the headset. The hum should be at a satisfactorily low level at the gain control setting which gives full output at normal speech intensity; it will be higher, of course, at full gain, but this simply represents an excess of amplification. Best microphone technique is to talk close to the microphone so that the gain can be kept to the lowest value for satisfactory operation, since this will minimize the effect of room echoes, hum, and other extraneous noises which detract from the clarity of the transmitted speech. Reports received from other amateurs when the complete transmitter is put on the air will give a final check. The overall characteristics of the unit may of course be measured with more

elaborate equipment such as an audio signal generator and cathode-ray oscilloscope, the construction and use of which are described in *The Radio Amateur's Handbook*.

The measured output of the unit shown in the photographs was 11 watts at the point where distortion just began to be noticeable on the oscilloscope. This power is ample for modulating the 56-Mc. transmitter described last month, or in fact for any low-power outfit running 20 watts or so to the final stage.

Transmitter Power Supply

Fig. 2 shows the circuit diagram of the power supply for the transmitter previously described. The circuit is similar to that of the audio supply circuit, but the unit is capable of somewhat higher output because of the heavier transformer and rectifier tube used. The supply delivers 365 volts at 150 ma. The voltage at the plates of the modulated amplifier drops to about 350 because of the d.c. resistance of the modulation transformer secondary winding.

A milliammeter and meter switch are mounted on the power supply chassis. Although these components are not actually part of the supply, the supply chassis provides a convenient location for them. The meter terminals are connected to the center contacts of the d.p.d.t. switch. Meter leads from the r.f. section and modulator are connected to the end contacts of the switch so that the meter may be switched to either unit.

The power-supply photograph shows how the parts are mounted on the 4 by 17 by 3-inch chassis. The spacing of the switches mounted on the front panel corresponds to the switch spacing on the audio chassis. The 115-volt line cord and the meter cables run through rubber grommets in holes drilled through the rear wall of the base. The three-contact terminal strip is also at the rear. Construction at the rear matches up with the other units. Two positive terminals are provided to simplify connecting the separate positive high-voltage leads that run to the exciter and final stages of the r.f. section. A direct connection should be made between one of these terminals and the exciter stages in the transmitter (left-hand + 350 terminal in Fig. 1, page 14, June *QST*), while the output winding of the modulation transformer connects between the remaining terminal and the right-hand + 350 terminal in the June diagram.

The audio and r.f. power supply diagrams are marked to indicate how the two "B" on-off switches should be tied together. Connecting the switches in parallel simplifies operation of the complete transmitter because the r.f. and

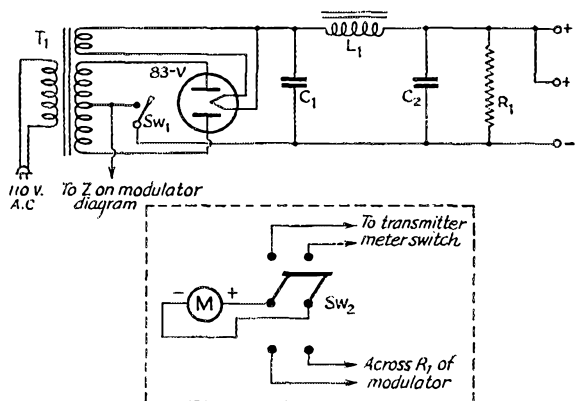


Fig. 2 — Wiring diagram of the transmitter power supply.

C_1, C_2 — 8- μ f., 450-volt electrolytic.
 R_1 — 25,000 ohms, 25-watt.
 Sw_1 — S.p.s.t. toggle switch (see text).
 Sw_2 — D.p.d.t. toggle switch.
 M — 0-150 milliammeter.

T_1 — Power transformer, 750 volts at 180 ma., c.t.; 5 v. at 3 amp. (Thordarson T-13R09).
 L_1 — Filter choke, 5 henrys, 200 ma., 80 ohms (Thordarson T-67C49).

audio equipment can be turned on and off simultaneously by either switch.

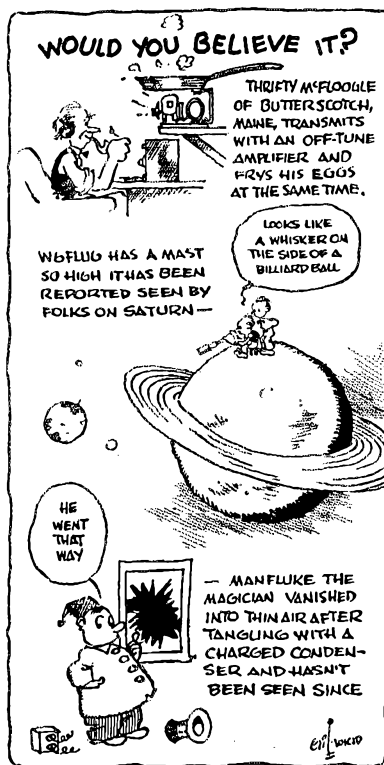
Provided the simple test as outlined previously has shown the modulator to be working satisfactorily, no difficulties should be encountered in getting the r.f. and audio units to work in combination. The loading on the final r.f. amplifier should be adjusted to give a plate current of 55 to 60 milliamperes, which will represent a satisfactory load resistance for the modulator. At voice levels which give full audio output on peaks (80 ma. as indicated by the milliammeter in the modulator circuit) the r.f. plate current should show no variation from its unmodulated value. If an oscilloscope is available it may be used as described in the *Handbook* to determine the value of modulator plate current at which 100% modulation occurs; the exact value will vary somewhat with different voices, and the figure above represents an average. After the preliminary testing is finished, the meter may be left in the modulator circuit to serve as a modulation indicator in normal operation.

Relay-rack panels were not made up for the complete transmitter because it was planned to place the gear on a shelf, table, bookcase, or one of the many other places where it could be fitted in easily. The units readily could be panel-mounted, of course, but there is no objection to installing the equipment out in the open because the units are practically enclosed, so far as positive high-voltage points are concerned. The terminal strips at the rear of the chassis are the only accessible "hot" points — but we aren't going to operate with the tuning controls toward the wall!

Strays

ANOTHER P.S. ON "FRITZ"

In our July editorial, mentioning the mid-western "Fritz," we said that he had "led the government authorities a merry chase for several months while he played tag on War Department frequencies." At that time, of course, we didn't know that there were two Fritzes and that the Punk from Peoria was but a cheap imitator. Actually he had a very brief life in his Fritz mantle. He first came to government notice on April 17th when an unknown station, later identified as he, crashed the net of FCC itself for a few minutes. On April 19th the Army reported this station on their 6990 frequency. On Monday, the 21st, as the result of long-range d.f. bearings, FCC dispatched mobile units to the area of Peoria. On the 22d the block of houses in which he operated was established, and on the 23d the actual house was spotted. They then QRX'd a few days while FBI investigated. On April 30th he was arrested, held in \$2000 bond, and on May 1st, at a special session of the Grand Jury, was indicted for violations of Secs. 301



and 318 of the Act. Considering the duration of the periods of operating by Fritz No. 2, actually *only six hours* of activity were required by FCC to locate his station and take him into custody. Our compliments to FCC's National Defense Operations Section — that's moving!

Silent Keys

It is with deep regret that we record the passing of these amateurs:

- Justus C. Allen, ex-W9NBI, ex-Downers Grove, Ill.
- F. R. Beech, ZL2CC, Picton, New Zealand
- Morgan W. Brantlinger, W9PQU, Oaklandon, Ind.
- Charles Goudy, Jr., W2GTK, Glen Rock, N. J.
- W. M. Manley, VK2XH, Gladesville, N. S. W.
- Lt. Warren P. Rece, ex-W5DOR, ex-Dallas, Texas
- G. J. Shorten, G2SQ, Croydon, England
- H. D. Simonsen, ZL2KY, Wellington, N. Z.
- Lindsay C. Wolfe, W4EPV, Tampa, Fla.

Five-Meter Wave Paths

BY MELVIN S. WILSON,* W1DEI

In Two Parts — Part I**

THIS summer the many former short-wave DX men who are on the five-meter band are finding thrills perhaps greater than those experienced on the ordinary short waves. To realize the full opportunities of the band, however, an operator must have a solid foundation of fundamentals. Contacts can be made occasionally without special equipment or technique, but for consistent work the phenomena must be understood. Since two openings are rarely exactly the same each skip presents a challenge to the DX man, and the only way to meet it is to recognize, interpret, and visualize the various conditions suitable for DX work. Since five-meter skip is never constant and a good period lasts but a short time, opportunities for making unusual contacts often slip by unless anticipated.

All five-meter contacts can be classified within one of five groups, and it is a distinct advantage to be able to distinguish between them. These groups with their approximate range and major differences are:

1. Local; up to about 50 miles with moderate power from ordinary locations.
2. Lower tropospheric bending; 50-400 miles. Refraction space close to the earth's surface and essentially continuous over the contact distance.
3. Sporadic *E*-layer skip; 400-1250 miles. Refraction space at base of ionosphere and very small in size.
4. Aurora-type skip; 0-15 degrees. Scattered and diffused reflection from highly ionized concentration in polar region formed during ionospheric disturbances.
5. *F*-layer skip; up to 2400 miles. Refraction space within Appleton layer. No data for analysis.

* 131 Beacon St., Natick, Mass.

** Part II will appear in a forthcoming issue.

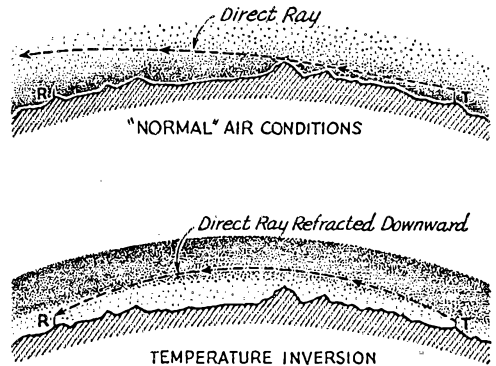


Fig. 1 — The effect of a temperature inversion in the lower atmosphere (troposphere) in bending u.h.f. waves towards the earth. Under normal air conditions — temperature decreasing with height above ground — the small amount of refraction present is not sufficient to enable the direct ray from the transmitter at *T* to be heard at the receiving point *R*. When the temperature of the upper air increases with height the refraction is considerably increased and the direct ray from *T* can be heard at *R*.

A little time and thought given to a study of each of these groups will repay the operator many times in increased enjoyment of the band. For best results special equipment and technique are required for each group. The last group, *F*-layer skip, is extremely rare, and probably occurs only when the normal layer is ionized to an unusual extent during peaks of sun-spot activity. Local contacts, of course, can be made with almost any type of equipment and very little knowledge of the fundamentals, but the DX man by definition is interested in establishing communication over greater distances.

The How and Why of 56-Mc. DX

Of interest to every five-meter man, this article not only helps explain some of the puzzling phenomena of 56-megacycle DX — it will also lead to better results because it indicates the equipment and methods most suitable for the various types of propagation. During the past several years the author has devoted a great deal of time to the study of long-distance five-meter work, and here offers explanations of the observed effects. To make the picture complete, other types of transmission also are reviewed, although sporadic-E refraction is given chief attention.

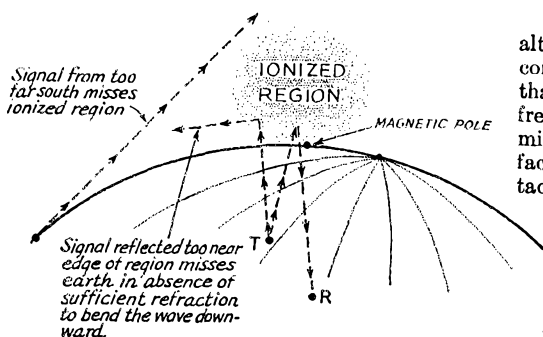


Fig. 2 — Possible signal paths when reflection takes place from a highly ionized "curtain" near the magnetic pole. This is known as "Aurora" type transmission because the extremely high ionization is accompanied by Auroral displays. Since comparatively little is known of what happens in the Auroral region, the shape of the ionized mass as shown in the drawing should not be taken too literally.

Air-Mass Bending

The second group, or those contacts made possible by lower tropospheric bending, requires an understanding of the phenomena as well as proper equipment. The cause of the bending has been well described by Ross Hull a number of years ago,¹ and a system of prediction offered.²

The equipment necessary for this type is a sharp low-angle beam and a sensitive receiver. The polarization of the antenna system should be the same as that used at the other end of the contact. The choice of polarization depends upon the amount of bending present and the distance of the contact. Vertical polarization seems to be bent more than the horizontal for any given condition of the troposphere, and thus is to be preferred for regular work. However, when a great amount of bending is present maximum distance can better be reached using horizontal polarization.

¹ Hull, "Air-Wave Bending of Ultra-High-Frequency Waves," *QST*, May, 1937.

² Wilson, "UHF and the Weather," *Radio*, January, 1940.

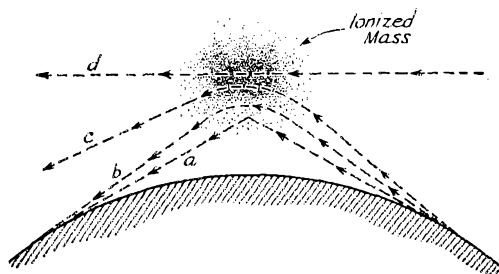


Fig. 3 — Simple wave paths involving reflection or refraction in a highly-ionized section of the Heaviside layer. Path *a* is mirror-type reflection; *b* and *c* refraction (the latter showing the case of a wave not bent enough to return to earth); *d* indicates a wave passing through without being refracted.

In this type of propagation the actual bending, although much greater than under "normal" air conditions, is still quite small in comparison to that which takes place in the ionosphere at lower frequencies. Therefore the heights of the transmitting and receiving locations are important factors, just as they are in the case of local contacts over reasonable distances. A hilltop location, well above the surrounding territory, will do much toward insuring successful work with this type of transmission.

"Aurora" DX

Group 4 type of contact, or aurora type, is so named because the aurora borealis can usually be seen while the condition lasts. In this type all signals must be sent to and received from a northerly direction since the reflection space is near the magnetic polar region. The wave path is not refracted but is weakly reflected from a "vertical" curtain of turbulent ionization which merges the ionospheric layers during a disturbance. This curtain is very unstable, causing the various wave paths to combine and cancel. The change in absorption and dissipation at different frequencies causes the garble in modulated signals, and the use of c.w. is usually necessary.

This type of DX is measured in degrees rather than miles, since the actual great circle distance between stations in contact is meaningless. The maximum distance south which can be reached is determined by the height of the curtain, the amount of ionospheric refraction, and the north-south component of lower tropospheric bending. Although the effect has been noticed as far south as Georgia and Texas, the extreme rarely falls below about 35 degrees of latitude.

The maximum DX, or degrees of longitude, it is possible to cover is not known, and until more observers are placed at proper distances, this maximum can only be guessed. The maximum reported to date has been about 15 degrees, and since refraction would be necessary for more turning, this is probably the limit. Very little of this type of DX has been done, and the possibility of international contacts makes it most interesting.

E-Layer Skip

Sporadic *E*-layer³ skip is perhaps the most confusing of the possible methods of propagation on five meters, and since the easiest way to understand it is to form a picture of the wave paths, we will begin with the simplest possible case, gradually expanding to include complications arising from the mechanics of refraction, tropospheric influences, and multiple ionospheric refractions. This discussion is based on observations and analyses of contacts and conditions within the conti-

³ Conklin, I. R. E. *Proc.*, January, 1939. Bureau of Standards, "The Ionosphere and Radio Transmission," *QST*, March, 1940.

mental United States during the period 1935-1940.

Five-meter signals are never reflected or refracted from the normal Kennelly-Heaviside layer, but only from relatively small patches of abnormal ionization. The energy causing most sporadic ionization seems to arrive mostly from the sun (a few cases may be attributed to energy from space) and is not of constant magnitude but seems to arrive in bursts. The cause of this triggering action is unknown, although there exist very definite periods of appearance and in the case of the energy from the sun these are closely related to other phenomena. After the energy is absorbed (but not yet dissipated) in the *E* layer it appears to travel as a disturbance within the layer. The speed of the disturbance seems to be constant, but its direction is continually changing. The average change of position relative to the earth is from west to east, although the effect is not always very apparent. However, a realization of this trend is

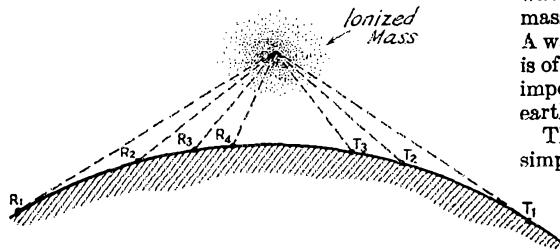


Fig. 4—Illustrating various wave paths possible with different densities of ionization in the mass.

most important to those interested in double and multiple skip, being of more value when attempting contacts to the east.

A sporadic *E*-layer mass is limited in size and therefore must be thought of in three dimensions. The normal *E* and *F* layers are continuous and have no "edges." All radio waves must penetrate these layers from the bottom. Five-meter wave paths, however, can enter a sporadic mass from the edge or side as well as the bottom. Of course the mass is not like a box, and "edge" and "side" are used only to emphasize the three-dimensional picture. An actual mass is very irregular, and naturally has no sharp corners. From a qualitative analysis only, it appears that these masses are usually longer in one direction, and have appreciable thickness of usable ionization. Since little reflection takes place, except at very small angles, it can be assumed that the discontinuity formed by the mass is not perfect, although the rate of change of density must necessarily be of high order to refract five-meter waves back to earth.

By visualizing the mass in three dimensions and applying the laws of refraction a theoretical picture of various possibilities can be built, which, if not absolutely correct, can be very useful in attempting to understand the phenomena of five-meter skip. Fig. 3 shows a wave path *a* which is

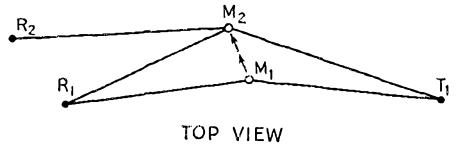


Fig. 5—The effect of a shift in the position of the sporadic-*E* cloud with respect to a given transmitting station.

reflected from the bottom of the mass at some possible well-formed discontinuity. The angle of incidence equals the angle of reflection, and from simple geometry it can be shown that the smallest angle possible is about ten degrees, assuming a ray tangent to the earth and a layer height of about 70 miles. Wave path *b* enters the mass and is bent at the discontinuity, refracted by any change of density within the mass, and bent again upon emergence from the mass. This is the usual wave path. Wave path *c* enters the "edge" of the mass and is refracted in the same way as type *b*. A wave path entering the exact plane of the mass is of course not bent, as in *d*, but this would be an impossible wave path from any point on the earth's surface, or from any other mass.

The single refraction, or one-hop skip, is the simplest and most common encountered during five-meter skip DX. The bending for this case takes place in a small "cloud" or mass of very dense ionization, approximately half way between the transmitting and receiving locations. Previous discussions⁴ have shown how these wave paths are bent and returned to earth for this simple case, and the picture is no doubt familiar to everyone. The distance limitations, however, must be kept well in mind. The maximum great-circle distance a five-meter signal can travel is, of course, determined by the tangent to the earth from the height of the reflecting layer, but because of absorption this distance is ordinarily reduced to about 1250 miles. The minimum great-circle distance is determined by the density of ionization, and can theoretically become zero for pure reflection. The elimination of a skip zone would require tremendously high ionization and probably will never occur, but it is well to keep in mind that there is no definite minimum skip distance. The shortest great-circle distance of this simple skip ever reported was about 450 miles, and this took place during the high peaks of ionization a few years ago. Signals are said to be from the shorter skip if they originate from locations distant 800 miles or less. The longer skip zone falls between 800 and 1250 miles.

56-Mc. Wave Paths

Fig. 4 illustrates a few simple wave paths. The three points, transmitting location, abnormal

⁴ For example, "The Ionosphere and Radio Transmission," *QST*, March, 1940.

ionization mass, and receiving location, roughly determine a plane, and this will be called the *wave-path plane*. For the simple case this plane is perpendicular to the earth's surface. If the mass is such as just to bend the wave path enough to return the signal to the earth, the band is called "open." This condition would be suitable only for maximum great-circle skip distance, since it represents the tangent case, or a line drawn from the core of ionization tangent to the earth's surface. As already mentioned, the actual maximum great-circle distance is ordinarily somewhat shorter than this mathematical tangent.

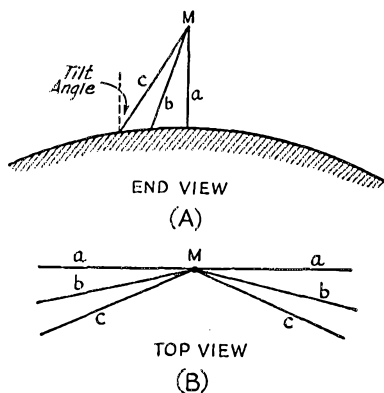


Fig. 6—End and top views of wave-path planes for various positions of the ionized mass. The wave-path plane becomes tilted when the mass is to one side of the direct line between transmitting and receiving stations.

The density and size of the mass determine the transmitting and receiving areas. As the density increases within the mass the great-circle skip distance decreases because of greater bending. In the figure the mass just bends the signal transmitted from T_1 back to earth at R_1 ; thus T_1 to R_1 is the maximum distance possible. As the bending increases the transmitter at T_1 can be heard at R_2 , and a transmitter at T_2 , not heard before, can now be heard at R_1 . Further ionization will enable transmitter T_1 to be heard at slightly shorter distance, while the signal from transmitter T_2 sweeps from R_1 to R_3 . Extremely high ionic density will enable T_3 to be heard at R_4 and this represents the minimum skip possible. The only factor altering the distance given above in this simple case would be the height of the layer, which could change the maximum distance as much as one or two hundred miles; but this becomes of little importance as the ionization increases. Until data are available on the height of a given mass an average must be assumed.

The ionized mass does not always have to be half way between the transmitting and receiving locations. For the simple case of maximum skip the mass must be within a few miles of the exact center, but at smaller distances the relative posi-

tion of the mass can change. In Fig. 4 the mass is half way between T_1 and R_1 , but as ionization increases T_1 can be heard at R_2 and the mass is no longer half way between the two contacts.

Besides a change in ionization causing this effect, the actual position of the mass changes in accordance with the disturbance. This results in changing the wave-path-plane tilt for contact between two given points. Fig. 5 shows a wave path from transmitter T_1 bent by the mass at M_1 and received at R_1 . As the position of the mass shifts to M_2 the same bending will carry the signal to R_2 , and more bending is required to continue the contact with R_1 . Thus the wave-path-plane tilt changes with movement of the ionized mass, and also depends on the relative positions of the transmitting and receiving points.

It is apparent that to understand five-meter skip these paths must be visualized in three dimensions, since waves can penetrate the edges as well as the bottom of the mass. When the wave-path plane becomes tilted many new possible wave paths appear. Fig. 6-A represents the "end view" of skip, and the lines represent the edges of various possible wave-path planes. Wave-path plane *a* is normal to the earth's surface, and only in this position is it possible to work maximum distance without the help of some other influence. If the mass is off to one side the plane becomes tilted as at *b*, and the locus of the tangent representing the refracted ray sweeps closer to the transmitting location, shortening the great-circle distance than can be covered. Although the plane theoretically could be tipped to a tangent position, pure reflection would be required and there would be no skip zone. This condition can exist at lower frequencies, but the ionization has never been high enough for five-meter reflection and probably never will be. From an analysis of all reported five-meter contacts it appears that actually the projection of the tilt angle upon the earth's surface seldom exceeds 34 degrees.

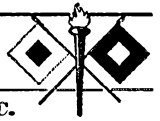
The top view of tilted skip is shown in Fig. 6-B. The bending occurring within the mass is still within a plane, although relative to the surface of earth the bending has horizontal and vertical components. From this point of view it can be seen that the horizontal component of bending must be increasingly greater than the vertical as the tilt angle of the wave-path plane becomes larger, since the limiting factor is the tangent to the earth. Fortunately, the mass is usually longer and wider than it is deep, and thus it is possible to obtain the greater amount of bending necessary for the horizontal component.

The angle of radiation is very important when attempting an analysis of conditions, and the limitations should be kept well in mind. This angle should not be confused with the tilt angle. The latter is determined solely by the wave-path plane, while the former depends entirely upon the

(Continued on page 88)



ARMY-AMATEUR RADIO SYSTEM ACTIVITIES



War Department, Office of the Chief Signal Officer, Washington, D. C.

QUIZ CONTEST

AN AARS Quiz Contest on Army radio procedure for members of the Army-Amateur Radio System was started on July 7th. This unique contest will run during the summer months as a further means of continuing the training of AARS members and other interested amateurs in Army radio procedure.

The nine Corps Areas will compete against each other. Scores will be based upon the number of correct answers submitted and the Corps Areas' activity percentage. This competition will comprise a series of questions on Army radiotelegraph and radiotelephone procedure which will be included in the weekly ZCVA messages transmitted from Army-Amateur net control station WLM/W3USA, Washington, each Monday, on the following schedule:

EST	Station Call	Frequency
4:00 P.M.	W3USA	7010 kc. and 14,280 kc.
5:00 P.M.	WLM	3497.5 kc. and 6990 kc.
7:00 P.M.	WLM	3497.5 kc. and 6990 kc.
10:00 P.M.	WLM	3497.5 kc. and 6990 kc.

Army Amateurs participating in this contest will send their answers by radio to their net control station. Each NCS will consolidate the replies received from his net stations and forward the summary through channels to his Corps Area Signal Officer for scoring.

ARMY QUESTIONNAIRES

MORE than 42,000 of the WD OCSigO Form No. 170 questionnaires have been filled out and returned by amateur radio operators. This is about 72% of the number mailed out (to every licensed amateur radio operator in the United States). It is indicative of the enthusiastic support given to this national-defense statistical study by the American amateur. The work of coding and tabulating the data is now in progress in the Office of the Chief Signal Officer.

ZCB LOCATION CONTEST OPENS SUMMER SEASON

THE ZCB Location Contest held on June 2nd, inaugurated the continuation of AARS operations throughout the summer months. From 5 P.M. to 3 A.M. of the following day, the amateur channels, especially the 3.5-Mc. and 7.0-Mc. bands, were literally filled with Army-Amateur stations sending "ZCAA", meaning "Calling any Army-Amateur radio station." Contacts only with other Army-Amateur stations were counted in this contest. Participants were required to send a message in the standard AARS (same as the ARRL) form to each station worked, giving the city, state and corps area location of their station. Points were credited as follows:

Each contact with another AARS station 2 points
Transmission of location data to station contacted 4 points
Reception of location data from station contacted 4 points

Thus, an Army Amateur scored a maximum of 10 points for each contact made if location messages were exchanged. In addition, there were multiplication factors allowed in scoring to give extra credits for distance and scope factors. These included additional points for working the different states, corps areas and overseas departments outside the continental limits of the United States. As an example, assume that an Army Amateur worked and exchanged location messages with 51 different AARS stations; 48 of them located in all the different states and therefore the nine corps areas; one in the Panama Canal Zone, one in Hawaii and another in the Philippine Islands. His score would be as follows:

For stations worked and location messages exchanged:
51 × 10 = 510 points
Multiplied by 48 different states worked:
510 × 48 = 24,480 points
Multiplied by 9 different corps areas worked:
24,480 × 9 = 220,320 points
Multiplied by 3 different departments worked:
220,320 × 3 = 660,920 points
(TOTAL SCORE)

(Continued on page 36)



Chief Signal Officer Mauborgne and other persons participating in the Army Amateur-Veteran Wireless Operators Association program that was broadcast over the NBC Red network on May 30th, in connection with the presentation of the Marconi Memorial Award for Code Proficiency to William B. Hollis, W5FDR/WLJR, the winner of the 1941 Annual AARS Code Speed Contest.

★ WHAT THE LEAGUE IS DOING ★

CHANGES IN 10-METER BAND

At the request of the ARRL Board of Directors, FCC on July 9th changed the portion of the 10-meter band open to 'phone to read 28,100 to 30,000 kc., by amending Sec. 12.115 of our regs. Thus 'phone may now be used in all but the lowest 100 kc. of the band. Our first chance to use f.m. on a band possessing (sometimes!) DX characteristics also comes with the opening of 29,250-30,000 kc. to this mode of transmission by an addition to Sec. 12.117. Let's see what you fellows can do with it!

CALLING AND SIGNING

As we forecast some time back, FCC on July 9th amended the first sentence of Sec. 12.83 to read as follows:

An operator of an amateur station shall transmit the call letters of the station called or being worked and the call letters assigned the station which he is operating at the beginning and end of each transmission, and at least once every 10 minutes during every transmission of more than 10 minutes' duration. In the case of stations conducting an exchange of several transmissions in sequence, each transmission of which is of less than 3 minutes' duration, the call letters of the communicating stations need be transmitted only once every 10 minutes of operation in addition to transmitting the call letters, as above, at the beginning and at the termination of the correspondence.

This is important; get it right. In ordinary change-over operation, you must show the calls of both stations both at the beginning and again at the end of each transmission, and insert both calls every ten minutes if a transmission lasts longer than that. If you're working either break-in or "simplex" in very brief bursts, so that you're sure no single transmission goes over three minutes, you show both calls both at the beginning and at the end of the *whole-QSO* and then need drop them in (both calls) only every ten minutes of contact. But not over ten. Purpose, of course, is to facilitate government monitoring. Don't get cited for failure to comply with this new rule.

REMOTE CONTROL

Sec. 12.63 requires both the station location (i.e., antenna location) and control point to be on premises not controlled by an alien. Sec. 2.53 requires an operator to be on duty at the transmitter location unless special authority has been granted for remote control. Some amateurs have installed remote control without authority. To make the requirements plain, FCC on July 9th added the following to Sec. 12.63:

Authority to operate by remote control will be granted only upon the filing of a proper application, and supported by a showing of the applicant's legal control of the control point, the means employed to control emissions, the equipment and method for monitoring, and the precautions

adopted to prevent access to the premises by unauthorized persons.

I.e., if you want to change to remote control, you must apply for modification and make the required showing — most of which is provided for on the application form itself.

TEMPORARY CHANGES IN LOCATION

Sec. 12.93b of our regulations was amended June 10th to put a minimum term of fifteen days on temporary moves of a fixed station from one permanent location to another with intention to return to the first location in time to avoid modification. In addition to notifying the district inspector when such a move occurs, we must now also notify Washington, and such notices must also be filed upon return to original location. The rule now reads as follows:

(b) The licensee of an amateur station who changes residence temporarily and moves his fixed station equipment thereto or the licensee-trustee for an amateur radio society which changes the location of its fixed amateur station may operate from the new location provided that such new residence or location is to continue for a period of at least fifteen days and not to exceed four months; and provided further, that the following requirements are fulfilled:

(1) Advance notice in writing shall be given by the licensee or licensee-trustee to the Commission's office in Washington, and the Inspector in Charge of the district in which such fixed station is to be operated.

(2) A notice as above shall be required for each change in residence or location, and a move to the original, former, or new location shall require additional notice before engaging in operation.

(3) A station operating under this Section shall employ the calling procedure specified in Sec. 12.83, using the fractional bar character followed by the number of the amateur call area in which the station is then operating.

Some amateurs had abused the earlier language as a dodge to get around Order 73 for a couple of days. In excess zeal to prevent such abuses, some inspectors were preventing amateurs from enjoying normal rights in a bona fide temporary move, and further confusion was contributed by a ruling that a club station could not be moved temporarily because it was an inanimate thing without a residence. Chief feature of the amendment is that we are no longer permitted to move a fixed station from the licensed location to a temporary location (without applying for modification) unless the duration is to be at least fifteen days.

Note the following carefully to avoid confusion. This new language on temporary change of fixed location now requires only one notice for a period of up to four months, but with a copy to Washington. Sec. 12.93a (permanent move awaiting modification) still requires a notice every thirty days, but only to the district inspector concerned.

EASY RENEWALS FOR SERVICE MEN

THE government hopes that amateurs will maintain their licenses. Those in temporary service with the Army and Navy find it difficult to comply with the formal FCC requirements for obtaining blanks, etc. To make it easier, FCC on May 28th adopted its Order No. 81 by which:

It is ordered that, until further order of the Commission, amateur radio operator and station licensees, serving with the armed forces of the Nation, who desire to renew outstanding licenses may submit to the Commission, by letter, an informal application for renewal in lieu of formal application required by the Commission's rules; provided, however, that such informal application for renewal by letter must set forth the fact that the applicant is serving with the armed forces of the Nation and must be accompanied by a signed statement of the applicant's immediate commanding officer, verifying that fact.

Beyond being immediately helpful to the amateurs concerned, the League considers the enactment of this order as a good sign of confidence in the American amateur.

REGISTER YOUR AVAILABILITY

YOU see a lot of defense jobs offered in our department "U.S.A. Calling." In addition, scarcely a day goes by that ARRL headquarters does not receive calls to find people for positions in radio defense work, all the way from a single expert for a particular desk up to hundreds at a crack for some service need. If you are available for service needs, or would consider a change in civilian radio employment, pull down your copy of *QST* for February and clip out or copy the questionnaire appearing on page 25 and file it at once with ARRL headquarters.

MOVING INTO A CLASS B CIRCLE?

SEC. 12.45 of our regs requires a Class C amateur moving into a Class B circle to qualify for Class B within four months or lose his license. Sec. 12.93a permits him to operate up to four months in the new location while awaiting modification. But modification now involves reissuance for a new term of three years and Sec. 12.45 does not require FCC to reissue a license until the amateur has passed the Class B exam. Net result is that amateurs who wait until late in the four months' period to take the qualifying exam cannot hope to receive their modified licenses before their authorized operating period is over, and must go off the air. Such amateurs will therefore be exceedingly well advised to take the examination as early as possible after moving. Another advantage is that if they fail the examination, there will still be time in the four months' period to try it again.

AMATEUR LICENSING

FCC'S LICENSING of amateurs again is in a pretty satisfactory state, despite the fact that we are showing a definitely healthy growth. For the week ended June 21st, 725 new amateur licenses were issued, by far the greatest number

ARE YOU LICENSED?

When joining the League or renewing your membership, it is important that you show whether you have an amateur license, either station or operator. Please state your call and/or the class of operator license held, that we may verify your classification.

ever issued in a week. In several recent weeks the issuances of new licenses were higher than in any week last year, and for the first half of this year are as great as for that period last year, showing that the difficulties of proving citizenship and the temporary restrictive orders have not affected our growth. In fact, for the last several months the number of amateur examination papers received at Washington for grading has been materially higher than in the corresponding months of last year.

DISTRICT BOUNDARIES

W7 AMATEURS should note the following changes in FCC districts:

The counties in northern Montana formerly part of the 15th District, with headquarters at Denver, were transferred May 27th to the 14th District, Seattle, so that all of Montana is now under the Seattle office. In the state of Washington, the counties of Wahkiakum, Cowlitz, Clark, Skamania and Klickitat were transferred from the 14th District, Seattle, to the 13th District, Portland. The remainder of Washington remains under the Seattle office.

DEFENSE COMMUNICATIONS BOARD

NO ANNOUNCEMENTS have yet come out of DCB but its committees continue work. Both DCB and the new Office of Civilian Defense have appointed subcommittees for liaison between those organizations. While they will have close relations, it is understood that all the communications aspects of OCD plans will be dealt with by DCB.

Are you ever asked whether there are any amateurs in the Amateur Radio Committee of DCB, which suggests plans for amateur participation in defense work? Just look over the following list: ARRL President G. W. Bailey, W1KH; Major H. L. Caveness, W4DW; Ensign W. A. Green, W5BKH; K. T. Hill, W2AHC; J. L. McCargar, W6EY; FCC Engineer L. C. Quaintance, W3JQ; Lieutenant-Commander John L. Reinartz, W3IBS; Lieutenant-Commander F. H. Schnell, W9UZ; Dr. B. T. Simpson, W8CPC; ARRL Secretary K. B. Warner, W1EH. ARRL has also named as an expert adviser in its ARC work H. E. Pomeroy, assistant national

(Continued on page 88)

Further Developments in the Foolproof Rig

Simple Improvements Including Expansion to Push-Pull

IN THIS department of *QST* for June, a two-stage transmitter for the beginner was described in which an inverted amplifier was used. This arrangement differs from the usual form in that the output of the oscillator is coupled between grid and ground, rather than between grid and ground. With the inverted arrangement, positive feedback through tube capacities is eliminated and, therefore, no neutralization with triodes or incompletely-screened tetrodes is required. Feedback through the plate-to-cathode capacity, which corresponds to the grid-to-plate capacity of a non-inverted amplifier, is degenerative, rather than regenerative and, while this effect is relatively small, it is augmented by the degenerative effect of the coupling inductance in series with the cathode. The result is a simple,

but highly stable, amplifier. Its only disadvantage is that degeneration increases the driving voltage requirements but, since the additional power can usually be obtained without exceeding the capabilities of the oscillator in a low-power transmitter, the advantage of better stability seems to make the simpler inverted arrangement well worth while.

In the original transmitter described in the June issue, every effort was made to reduce the circuit to the simplest-possible form. The amplifier tube was connected as a high- μ triode to eliminate biasing problems as well as those of screen supply. Subsequent tests have shown, however, that the efficiency of the amplifier can be increased materially by using the tetrode connection. At the same input (100 ma. at 450 volts),

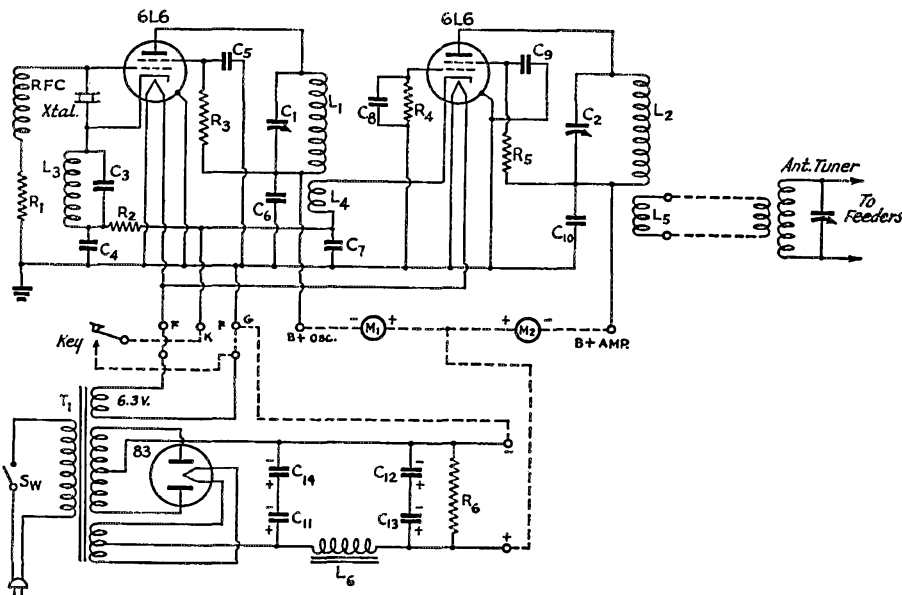


Fig. 1 — Circuit diagram of revised fool-proof transmitter with single-tube amplifier.

- C₁, C₂ — 150- μ fd. variable (National ST150).
- C₃ — 250- μ fd. mica.
- C₄, C₅, C₆, C₇, C₈, C₉, C₁₀ — 0.01 μ fd.
- C₁₁, C₁₂, C₁₃, C₁₄ — 8- μ fd. electrolytic, 450-volt working.
- R₁ — 0.1 meg., 1-watt.
- R₂ — 500 ohms, 2-watt.
- R₃ — 50,000 ohms, 10-watt.
- R₄ — 25,000 ohms, 1-watt.
- R₅ — 25,000 ohms, 10-watt.
- R₆ — 50,000 ohms, 10-watt.
- RFC — 2.5-mh. choke.
- Sw — Toggle switch.
- M₁ — 150-ma. scale (see text).
- M₂ — 200-ma. scale (see text).

- L₁ — 24 turns No. 18 enam., 1 $\frac{1}{4}$ inches long, 1 $\frac{1}{2}$ -inch diam.
- L₂ — For 3.5 and 7 Mc. — 26 turns No. 18 enam., 1 $\frac{1}{4}$ inches long, 1 $\frac{1}{2}$ -inch diam.
For 7 Mc. — 14 turns No. 18 enam., 1 $\frac{1}{4}$ inches long, 1 $\frac{1}{2}$ -inch diam.
- L₃ — 12 turns No. 18 enam., 1 $\frac{1}{4}$ inches long, 1-inch diam.
- L₄ — 9 turns No. 22 enam., close-wound below L₁.
- L₅ — See text.
- L₆ — 10-henry, 150-ma. filter choke.
- T₁ — 400 volts each side of center, 150-ma. d.c., with 6.3-volt and 5-volt filament windings (UTC S-39 — use low-voltage taps).

output is increased from between 20 and 25 watts to between 30 and 35 watts. Only the minor additions of a screen dropping resistor, grid leak and three by-pass condensers are required, so that those who have already built up the original model may easily take advantage of the improvement obtainable.

The revised circuit diagram is shown in Fig. 1. It will be noted that the screen voltage-dropping resistor, R_5 , and by-pass, C_6 , have been added. Grid-leak bias has also been introduced as a result of the tetrode connection. Since the plate current will not now fall to a low value when excitation is removed, as it would were the tube connected at a high- μ triode, both stages are keyed simultaneously in the cathode returns.

Fig. 1 includes the circuit diagram of a suitable power supply and shows the connections between the power supply and the transmitter. If two plate milliammeters are not available, a single meter with a scale of 200 ma. may be used, switching it back and forth between the two circuits with a well-insulated switch. Dial lamps may be used as a fairly satisfactory substitute for meters. These lamps give a rough indication of current variation by change in brilliance. The 60-ma. type (No. 48, orchid bead) should be used in the oscillator circuit and the 150-ma. type (No. 40 brown bead) for the amplifier.

When power is applied and the key closed, both tubes will draw high plate current. C_1 should be adjusted until the plate current dips. It will be noted that a dip in plate current will be obtained both near maximum and near minimum capacity. The dip near maximum capacity indicates resonance at the fundamental frequency of the crystal, while the dip near minimum capacity indicates resonance at the crystal harmonic at 7 Mc.

As soon as the oscillator has been tuned, the amplifier plate tank circuit should be tuned to resonance. Here, again, plate-current dips will be found near either minimum- or maximum-capacity settings of C_2 , depending upon whether the plate circuit is tuned to the harmonic or fundamental of the crystal frequency, respectively. The key should not be held closed for long periods until both circuits are tuned to resonance. When operating the oscillator at the fundamental frequency of the crystal, it may be necessary to tune the oscillator plate circuit slightly to the low-capacity side of resonance for most satisfactory keying. When operating at the crystal harmonic, the oscillator plate circuit may be tuned to exact resonance. With a plate voltage of 450, the oscillator plate current will run about 30 ma. when the oscillator plate tank circuit is tuned to the crystal frequency and about 40 ma. when tuned to the crystal harmonic.

Dimensions for a separate amplifier coil for 7 Mc. are given. A coil of lower inductance for this band may be required with certain antenna arrangements to facilitate coupling.

The output link, L_5 , is for the purpose of coupling to an antenna tuner. The values to be used in the antenna tuner will depend upon the type and dimensions of the antenna system. With an antenna 136 feet long, fed at the center with 67-foot tuned feeders, parallel tuning may be used on both bands. The condenser should have a capacity of 300 $\mu\text{fd.}$ or more and may be a small receiving-type condenser or one from an old b.c. receiver. The coil for 3.5 Mc. should have 13 or 14 turns No. 18 enamelled wire on a $1\frac{1}{2}$ -inch diameter form spaced to occupy a length of $1\frac{1}{2}$ inches. The coil for 7 Mc. should have about 8 turns of the same diameter and length. The link winding should be wound at the center of the coil as shown in Fig. 1.

When the antenna tuner is coupled to the output link and the antenna feeders connected, tuning of antenna tuning condenser should cause the amplifier plate current to increase to a maximum at one point in the range of the condenser. If this does not occur, the length of the feeders should be altered, or a change made in the dimensions of the antenna tank coil, until the increase is obtained. If the amplifier plate current peaks at a value below 100 ma., the size of the link windings may be increased a turn at a time until it does. If the current peaks at a value above 100 ma., the number of link turns should be reduced. It is always advisable to start in with only a few link turns and gradually work up to proper amplifier loading.

After all adjustments have been made, the proper antenna tuning procedure is, first, to tune the final amplifier tank circuit to resonance, while the antenna tuning condenser is set at minimum capacity, and then tune the antenna circuit to the point of maximum plate current. This procedure will result in minimum detuning effect upon the amplifier plate circuit. The last act of tuning, however, should be to try retuning of the amplifier tank circuit to make sure that it is set at a point where tuning on either side causes the plate current to increase.

A plate current of 100 ma. indicates about optimum loading when the plate voltage is 450. At 350 volts, the plate current should be limited to about 75 ma.

While a single-tube amplifier probably represents the best balance between power output and power-supply cost, two tubes may be used in push-pull. Fig. 2 shows the circuit diagram. The diagram includes an antenna tuner as well as a metering system. Aside from these features, the two circuits are similar. The cathode coil is tapped at the center to provide out-of-phase voltages for the amplifier input circuits and a split-stator condenser is used in the plate circuit of the amplifier.

The antenna tuner is link coupled to the output of the amplifier. The terminals A , B and C should be of the jack-top type so that the leads marked

D and *E*, which terminate in insulated banana plugs, may be plugged into the proper terminals to provide for either series or parallel tuning. One feeder is always permanently connected to the terminal marked *C*. For parallel tuning with low capacity, lead *E* is plugged into terminal *C* and the loose feeder is connected to terminal *A*. For parallel tuning with high *C*, lead *E* is plugged into terminal *A*, lead *D* into terminal *C* and the loose feeder connected to terminal *A*. For series tuning, lead *E* is plugged into terminal *A* and the loose feeder connected to terminal *B*. The high-*C* tank circuit may be required with certain feeder lengths to facilitate coupling to the amplifier. When high *C* is used, the antenna coil for the next higher-frequency band should be used, i.e., the 7-Mc. coil for the 3.5-Mc. band. The smaller coil will also usually be more suitable when series tuning is used. For the antenna previously mentioned, parallel tuning should be used.

A power supply designed for heavier duty will be required for this transmitter if it is to be operated at the input which it is capable of handling. A 250-ma. transformer delivering 550 volts each side of center will give just about the required

450 volts d.c. output at full load through a double-section filter with choke input.

Tuning procedure should follow that previously outlined for the single-amplifier transmitter. The oscillator plate current may run somewhat higher and the amplifier may be loaded until the plate current reaches 200 ma. With a 450-volt plate supply, the output at full load should be between 55 and 65 watts.

— D. H. M.

BRIEF

Give W1AW a call for an accurate frequency measurement, to communicate with any department of A.R.R.L., to rag-chew when time permits, or to pass a message to ham friends, making use of the Headquarters station's multi-band facilities.

W6EFC claims to be the only ham who has operated an amateur station from four states simultaneously. He set his portable rig on the geological survey post which locates the northeast corner of Arizona. This is the only point in the United States which is common to four states, namely, Arizona, Colorado, New Mexico and Utah. Several contacts were made from the location.

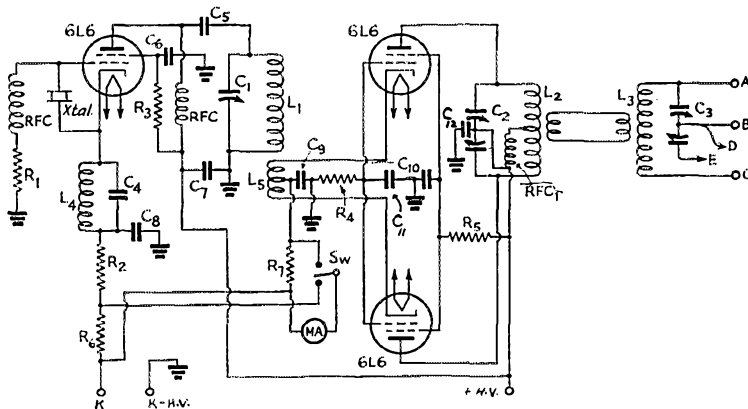


Fig. 2 — Circuit diagram of the push-pull version.

- C₁ — 250- μ fd. variable (National TMS250).
- C₂, C₃ — 250- μ fd. per section (Hammarlund MTC-D-250C).
- C₄ — 100- μ fd. mica.
- C₅ — 0.001- μ fd. mica.
- C₆, C₇, C₈, C₉, C₁₀ — 0.01- μ fd.
- C₁₁ — 0.001- μ fd. mica.
- C₁₂ — 0.001- μ fd., 1000-volt mica.
- R₁ — 0.1 megohm.
- R₂ — 500 ohms, 2-watt.
- R₃ — 50,000 ohms, 10-watt.
- R₄ — 25,000 ohms, 1-watt.
- R₅ — 12,000 ohms, 10-watt.
- R₆, R₇ — 25 ohms, 1-watt.
- RFC — 2.5-mh. r.f. choke.
- RFC₁ — 1 mh., 300 ma. (National R300).
- MA — D.c. milliammeter with 300-ma. scale.
- L₁ — 1.75- and 3.5-Mc. bands — 36 turns No. 20 d.c.c., 1½-inch diam., close-wound.
- 3.5- and 7-Mc. bands — 20 turns No. 18 enam., 1½-inch diam., 1¾ inches long.

- 14-Mc. band — 10 turns No. 18 enam., 1½-inch diam., 1½ inches long.
- L₂ — 1.75-Mc. band — 55 turns, No. 22 d.s.c., 1½-inch diam., close-wound, 70 μ hs. (B & W 160 JCL).
- 3.5-Mc. band — 26 turns, 1½-inch diam., 1½ inches long, 7 μ hs. (B & W 40 JCL).
- 7- and 14-Mc. bands — 14 turns, 1½-inch diam., 1½ inches long, 4.6 μ hs. (B & W 20 JCL).
- Links wound over center of coil with insulated wire.
- L₃ — Same as L₂.
- L₄ — 1.75-Mc. crystals — 32 turns No. 22 d.s.c., close-wound.
- 3.5-Mc. crystals — 10 turns No. 22 enam., 1 inch long, 100- μ fd. mica condenser mounted inside coil form and connected across coil.
- 7-Mc. crystals — 6 turns No. 22 enam., ¾ inch long.
- All coils for L₄ wound on 1½-inch diam. forms.
- L₅ — 1.75- and 3.5-Mc. bands — 20 turns No. 24 enam.
- 3.5- and 7-Mc. bands — 14 turns No. 24 enam.
- 7- and 14-Mc. bands — 8 turns No. 24 enam.
- Above coils wound on form below L₁, tapped at center.

Trainee Traffic Grows

Get in This Amateur Radio Opportunity; Do Your Part

BY F. E. HANDY,* WIBDI

MARCH QST outlined "a defense job for every amateur." The subject of handling of trainee messages was also bulletined to ARRL officials. Now progress can be indicated and some new methods of procedure detailed. The many camps, cantonments, and training schools are well filled, spelling opportunity for continued expansion of amateur radio message and training service to the nation.

In the camps and schools the high spirits and well-being essential to success require freedom from worry about the folks left at home. Those at home must have good contact to be constantly aware of the well-being of soldier or sailor. Maintenance of morale is a first essential. Without high morale nations are defeated before they start! By our amateur message handling we can contribute usefully on this important defense front! Radio communication is our hobby and an accepted defense job. This is to ask each amateur to do his share in this program. Incidentally, traffic handling is one of those things that besides being good fun, returns direct satisfaction in the accomplishment of results, and results in increasing operator keenness, efficiency and proficiency.

Stations in and Near Camps

A goal to be realized is the establishment of an amateur contact point for the origination and delivery of amateur radio traffic in or near every post. Numerous stations are reported in operation. Few military commanders in the continental United States but place a high value on the morale-maintaining possibilities of amateur radio, once they are explained. Security considerations rank higher in remote bases and island territories but even when near-by amateur facili-

* Communications Manager, ARRL.

Letters from many amateurs show a general desire to make their operating efforts most useful to the nation, most productive of training to themselves, most in line with the defense needs of the nation. Here is your answer to all such expressions. ARRL cordially invites your participation in Section organizations and in that number one job, the efficient handling of an increasing volume of morale building trainee traffic.

ties instead of a station in the military establishment itself are concerned, a message box placed in the canteen and handled by the camp recreational officer can bring results. Such collection boxes should carry a concise typed explanation setting forth the use of the facilities and possible results of the unguaranteed, uncompensated, non-competitive service that is amateur radio.

Contact with the officer in charge or his representative usually is all that is necessary to arouse interest and assure some message originations. A clear picture of the limitations and advantages of amateur radio should be given. Following the idea of discussing arrangements with the O-in-C after getting the approval of the SCM to represent him, successful plans have been developed for several commanders. W2JZX, for example, made a visit to the base morale officer at Mitchel Field and was met with enthusiasm. The C.O. located an enlisted amateur who will now be permitted to have a station at the field and keep daily skeds. Trainee traffic is reported growing daily.

Here follows a short list of amateur stations operating at certain camps. We shall be glad to

HAMS—GET IN THIS!

Amateur Radio Traffic from Uncle Sam's Trainees is already on the air. It is increasing. A small part of the originating stations are listed herein. This is an amateur radio job to help the morale of our soldiers and sailors and trainees for the air service. Your assistance, please. It is amateur radio fun and self-training to keep every frequency possible busy with the traffic.

Get in touch with your SCM (see p. 4) to get into a net or to accept an organizing post if RM-PAM vacancies exist. Use the daily time known as the General Traffic Period (6:30-8:00 P.M. local time) for unscheduled message swaps to get trainee messages from outside organized nets into the nets and develop new schedules helpful to the general plan to move traffic effectively by Amateur Radio.

You know where your local boys are in training. Do your part by working with the ARRL officials in your territory to keep them in touch with folks at home by amateur radiograms. Keep some schedules for handling traffic daily, or on two or three nights per week as a minimum. Get in this. Do your part.

Get the new booklet *Operating An Amateur Radio Station* (free on request to ARRL members, 10¢ to others) for information on message handling and the different field organization posts.

supplement this by further *QST* listing, if those operating similar trainee-amateur stations will send us a postal card addressed to the Communications Department giving their call, address, frequency, hours, operators and other data of interest.

W1GX Y	Ft. McKinley, Portland, Maine
W1JYE/1-	
WUA	Ft. Devens, Mass.
W1LDR/5	Camp Hulen, Texas
W1LEV-	
W1LLQ/4	Camp Blanding, Fla.
W1LOZ/4	Camp Blanding, Fla.
W3DKB	Fort Dix, New Jersey.
W3EZH/K4	Borinquen Field, P. R.
W3HZK/4	Fort Benning, Georgia.
W4HHG/4	Camp Forrest, Tenn.
-----	Mitcheil Field, L. I., N. Y.
-----	Fort Jackson, S. Carolina.
W8LJD/3	Fort Dix, N. J.

A special caution to amateur operators at camps: Besides getting proper authority from the responsible camp commander before amateur equipment may be installed and operated, you are still personally responsible to the FCC for full observance of government regulations. You must notify the inspector in charge of the radio district in which you are located (per FCC Sec. 12.92) before you may engage in any low frequency amateur band operating. Written notice can cover only 30 days, and such notices must be sent at intervals up to four months or application made to FCC for modification of license if you will operate for a longer period. *Responsibility* must be exercised, to see that the call is fully signed and properly, station records kept properly, transmissions properly supervised to make them reflect favorably and with proper dignity on the service, to refuse and censor traffic in accordance with security requirements unless you wish to invite a complete prohibition of camp amateur operations for yourself and perhaps others.

Two or three draftees have asked us about shipping their amateur radio equipment ahead of them to the camp. In each case we have advised against it, suggesting that the equipment be packed and held ready, but that full permission and arrangements with commanding officers

must be forthcoming ahead of any station-establishment! What if *every* trainee took his individual equipment! In one barracks midget broadcast receivers are tolerated, for example, but strict rules prohibit more than one of the animals being used for entertainment — and even when an amateur station has been authorized for a camp it does not mean that a dozen of the same will be equally welcomed in the close quarters that often must prevail. At any rate, get permission first, and avoid heartaches.

To build up a traffic service one experienced and leading traffic man (W3BWT) uses letters with “deliveries” to trainees to complete the understanding and good will for amateur radio. Excerpts from one of his letters:

“Glad to send the messages for you and any other fellows at the Fort. Each one should be written on a separate sheet with full name and address at the top of the party to whom the message is to be sent. The text should usually be held to 15 or 20 words. Messages should be in plain English with names or unusual words printed for clarity.

“Our organization, the American Radio Relay League, is made up of amateur radio operators all over the country. Relay networks cover the 48 states and possessions. There is no charge for sending the messages, nor can there be a guarantee of delivery, but we are especially glad to send word from men at the many posts to wives, sweethearts and families. Also from the home folks back to them. I trust we may be of continued service to you and your buddies at the Fort. Many who are too busy to write use amateur radio frequently to send a word or two back home. . . .”

In connection with the work of another active traffic amateur a local newspaper printed a sample message form, inviting readers to send messages to them to be turned over to the amateur for radio handling to camp! In still another locality, W3GCU arranged a solicitation of trainee traffic to be portrayed on the screen of the local theater. A proper precaution in such instances is to see that the amateur schedules for handling are set up first, or the solicitation limited to points for which adequate radio performance is reasonably certain.

All Members Help, Please

The handling of traffic from trainees wherever they may be located and the origination of traffic to those trainees is an important service to the nation. If you know members in the services, start the ball rolling by sending them a message by amateur radio. Make it a point to make what your station can do in this line of activity known to others . . . especially to the families of those with men in the service in different parts of the country.

This summer is one in which to expand our



amateur activity and our networks. Section Managers, Route Managers and 'Phone Activities Managers are all called upon by ARRL to expand and reshape networks connecting points in their states or sections so that these may contribute to this program of assisting the services, and so that the radio operating groups will have increased coverage to contribute to civilian defense measures. ARRL Section Communications Managers are asked to complete appointments at once for the conduct, organization, and leadership of organized delivery and connecting city-to-city defensive networks. Three qualified Route Managers are needed in each Section to maintain and expand (1) a 3.5-Mc. band c.w. net (2) a 1.75-Mc. band c.w. net (3) a 7-Mc. c.w. net. Three live wire 'Phone Activities Managers are likewise needed by each SCM for (4) a 1.8-Mc. 'phone net (5) a 3.9-Mc. 'phone net and (6) a u.h.f. network. Where vacancies exist for these specific appointments SCMs will make early appointments from among those in their territory advising of availability and interest and in the light of their qualifications of course.

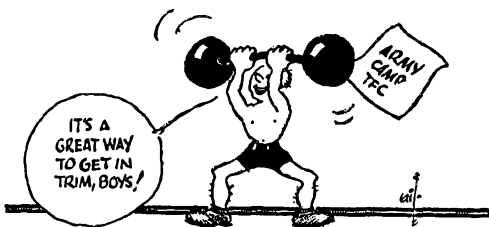
Quite a number of RM, PAM, and net vacancies are being created as many top-notch men go into some branch of defense radio work. It is an opportunity and challenge to the remaining members of the amateur body to take over operations and even expand the ARRL-organized coverage of the nation by radio. The civilian morale and defense front is the most important front in any emergency, and this is a call to do your part by learning how to handle record traffic and work in organized self-disciplined fashion — right on the job of relaying and originating and delivering messages for the men in service training too.

If you have never held a post in ARRL organization before, get into the swim of amateur radio right now. Send us a postal card today for a copy of the new booklet "Operating an Amateur Radio Station" which explains each of the different field organization posts, and contains an application blank to be sent to the SCM in getting lined up for appointment. In all sections three months successful participation in regular net training will earn a new man who rates it one of the ARRL Section Net certificates.

The way to get to be tops in operating is to learn by doing. Make a regular practice of operating certain nights and times. Don't make this just a haphazard business. Fix up some regular planned schedules with the more reliable operators that you hear. Participate in the networks organized by your Section Manager, RM, and PAM!

A Word to Network Leaders

All ARRL officials (RM's or PAM's) and NCS (net controls) should be careful that networks are *not* isolated operating units by themselves even though the function of supplying communities of an entire territory with communication may be a prime motif. By assignment of *special jobs* to spe-



cial net members, a net's value can be doubled and trebled, and the interest of the individual in the network tremendously advanced too!

Every netter should do some additional operating besides that in the net period if full network potentialities are to be realized. There should be individual schedules of net members to get traffic off and on nets. (The General Traffic Period is important, and *every* network ought to have at least one member assigned to be active in general work throughout the entire period, thereafter reporting back. Cover more than a single band if possible, too.)

ARRL suggests dedicating efforts particularly to the handling of camp trainee (cantonment) traffic to and from people in *each* of the cities represented by a net membership. Here is the system of establishing a real service. It is a major job for the individual netter, and *his assignment*, to find, make and keep schedules with a station in or near a particular Army camp, or with the network that gives a direct delivery to such a station. Once made, each such schedule can take care of the traffic for *several* cities in your locality and the traffic "to and from" can be routed appropriately via the individual network member who has the schedule. A second netter takes another camp as his specialty, and services as outlet to *that* point for all net stations. The RM, PAM, NCS, etc., may well start by making a survey of net members, giving them a day to respond to a general message or letter. After some planning, analysis of the distribution of trainees to different points, as known from local officials, newspapers, etc., individual allocation of the remote points in accordance with exact local needs can proceed, and traffic to back up the whole scheme can start rolling.

Consulting the "Station Activities" section of *QST* and the call book is a valuable help in identifying the activity of stations in other sections. Correspondence direct with the mentioned ARRL Section officials is most helpful in finding out stations best fitted to handle schedules to camps, schools, etc., for their localities. To make our "home front" most effective and useful to the nation, this calls on SCMs to add networks where needful — and on network organizers (who receive special instructions as appended) we urge expansion of facilities by invitation to additional operators, and the addition of organized planned-operating in line with the paragraph above.

Individual amateurs: Here is an invitation and a challenge to your ability right in line with your desire to do the most useful job to be done in the defense picture. Get started along the suggested lines and contribute your bit to trainee traffic handling. Start now.

President Bailey says . . .

Keep pounding brass! Keep the dust off the mike! Don't let up! Don't pay any attention to rumors you hear on the air — or off! The League will keep you posted — listen to WIAW. What we want is activity. Living here in Washington, I know how great is the need for radio men, both in the armed forces and right at home. Keep active!



U. S. A. CALLING



NAVY COMMISSIONS FOR ELECTRONICS SPECIALISTS

LAST month on this page we reported that ARRL President George W. Bailey, as chairman of the radio section, Office of Scientific Personnel, National Research Council, is looking for qualified specialists for immediate appointment to the grade of second lieutenant, Signal Corps, U. S. Army, for work with "devices which employ high-frequency apparatus of an extremely complex nature." It doesn't take much guessing to figure what this is about. The offer is still open. Those interested in the Signal Corps' "Electronic Battalion" should consult last month's *QST* and communicate at once with Mr. Bailey.

But now comes along the Navy, wishing to procure through Mr. Bailey's office a limited number of specialized officers for precisely the same sort of task. Their conditions are considerably more elastic and may serve to interest men who could not qualify under the Signal Corps offer. In the first place, the Navy offers original appointment in the rank of ensign, lieutenant (jg), lieutenant or lieutenant-commander, depending upon age, experience and other considerations. Where the Signal Corps will take men only between the ages of 21 and 36, the Navy will take them up to 45. Where the Army accepts only unmarried candidates without dependents, the Navy has no such restrictions. Candidates must have a college degree (or its practical equivalent) in electrical engineering and have specialized in communications or electronics physics. The average amateur is not qualified for this work — it requires specialists — but in our ranks are doubtless many who are professionally qualified. Appointment in this service gives com-

plete exemption from the draft, and qualified men already drafted and in camp can be released for this commissioned service. Candidates must agree to serve outside the United States, if necessary. Full particulars may be had by writing immediately to George W. Bailey, National Research Council, 2101 Constitution Avenue, N.W., Washington.

CIVILIAN TECHNICAL CORPS

BRITAIN calling this time: With the full blessing of our government, the British have issued an urgent appeal for radio servicemen and amateurs to come help them in the maintenance of the marvelous microwave "radiolocators" discussed on our editorial page. In mass production, they are desperately short of personnel, particularly for servicing and maintaining. For these and other needs they have formed what is called the Civilian Technical Corps, members of which are *noncombatant* technical workers performing under a civil contract, accompanying and servicing units of the British Army, Navy or RAF but not subject to military law or discipline, no oath of allegiance, no loss of U. S. citizenship. Our government also says it is to the benefit of the U. S. that some of our citizens receive training in this new technique, and Britain agrees to release the men instantly if the U. S. needs them.

The radio mechanics assigned to this special duty must be practical technicians, able to shoot trouble rapidly in the most elaborate superhets, thoroughly adept of soldering and the use of tools, and with sufficient knowledge of theory to master the special two-months' course of instruction that will be given. Educational requirements will be overlooked for the thoroughly-proficient mechanic. Men with two years' high-grade service work are specially wanted, as are practical amateurs of long experience. Age limits, 18 to 50; physically fit. Normal pay is \$24.12 per week, rising to \$38.65 per week for chief foremen, plus free board, quarters, distinctive clothing, medical care, two weeks' vacation, transportation abroad and back to one's home town, 30 days' pay upon discharge, same disability and death benefits as RCFC. Married men may allocate 50% of their pay to dependents in this country; single men, 25%.

Britain says she needs up to 25,000



Scene inside an RAF radio detection post "somewhere in England." Many girl operators of the Women's Auxiliary Air Force take part day and night in plotting the maneuvers of enemy aircraft.

Americans to help in the locator service. A man with good knowledge of radio requires eight weeks' training before becoming useful in this new branch. Later this schooling will be given in Canada, but for the present it's in England—via Montreal. The locator technique will doubtless find many peaceful commercial applications, so that knowledge of it would also be valuable later. Those itching for travel and adventure overseas in a new kind of radio work may obtain full particulars and forms by writing the CTC in care of the British Consulate General, 25 Broadway, New York, or by applying to the nearest office of the Radiomarine Corporation of America.

AIR CORPS COMMUNICATIONS

THE Army Air Corps offers opportunity for enlisted men in the field of communications. A comprehensive course for radio operators and mechanics, of some months' duration, is given at Scott Field, Belleville, Ill. They maintain communications between plane and ground and between ground bases, not only operating but including the installation and maintenance of gear. No flying instruction, but opportunity to get into the air for test flights and operating.

Men desiring enlistment in the Air Corps should communicate with the nearest Army Recruiting Office. Applicants must be single and without dependents, between 18 and 35 (written consent of parents for those under 21), have four years of high school or its equivalent. A year of radio experience or training will count for a year of high school, but all applicants must be fully proficient in arithmetic.

CIVIL SERVICE JOBS

WE HAVE a handful of announcements of U. S. Civil Service examinations for various types of engineers and technicians connected with radio work. They offer a wide variety of opportunity. Numerous government agencies (for instance, the Signal Corps Laboratories at Fort Monmouth, N. J.) draw their civilian personnel from the Civil Service list, and the range of duties, qualifications and salary is so great that there is something likely to appeal to any person wishing civilian employment in communications. Information and the necessary forms are to be obtained from the Secretary, Board of U. S. Civil Service Examiners, at any first- or second-class post office except in a few major cities where the Civil Service has district offices.

Illustrative of some of the fields in which applications are now being sought are six grades of electrical engineering aide with salaries lying between \$1260 and \$2600, to perform subprofessional engineering work under professional guidance; five pay grades of electrical and radio engineers, to perform or supervise professional engineering work, with salaries running from

\$2600 to \$5600; junior communications operator for high-speed radio equipment, \$1620; junior engineers in any branch of engineering, \$2000; senior radiosonde technicians at \$2000; assistant communications operator for ground-station work in the air navigation service at \$1620, with junior c.o.'s at \$1440 and under c.o.'s at \$1260. If possible, call and ask to see the announcement of the particular jobs that interest you; it will contain full particulars. Amateurs particularly interested in the engineering aide jobs at the Signal Corps labs may communicate direct with Capt. F. B. Valentine at Ft. Monmouth.

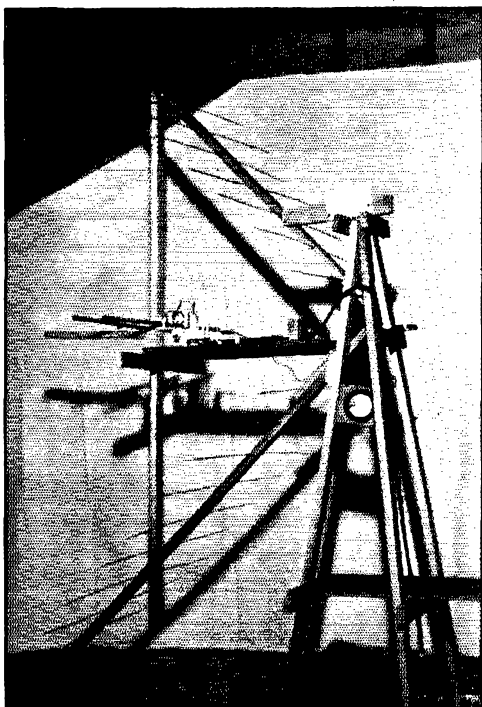
Field Day Scores

THE following are high claimed scores reported for the ARRL Field Day, June 7th-8th. These are all subject to cross-checking and grouping by number of simultaneously operated transmitters used at each station. Complete F. D. results will be presented in a later issue.

Jersey Shore Amateur Radio Association. W2AER/2	12348
York Radio Club..... W9KA/9	8829
Northwest Amateur Radio Club..... W9POP/9	7716
St. Paul Radio Club..... W9KYC/9	7263
Cuyahoga Radio Association..... W8URA/8	7083
Wisconsin Valley Radio Association.... W9RQM/9	6957
Delaware Valley Radio Association.... W3AQ/3	6075
South Hills Brass Pounders and Modulators..... W8UK/8	4842
Non-club group, 16 operators..... W9ERU/9	4793
Amateur Transmitters Ass'n of W. Pa... W8KWA/8	4293
Schenectady Amateur Radio Association. W2ACB/2	4050
Warren County Radio Club..... W8BOZ/8	3879
Non-club group, 5 operators..... W2IYQ/3	3744
Harrisburg Amateur Radio Club, Unit 2. W3IGU/3	3607
Non-club group, 4 operators..... W1EH/1	3542
Dells Region Radio Club..... W9HHR/9	3492
Non-club group, 9 operators..... W5BB/5	3227
Non-club group, 4 operators..... W9WGL/9	3087
Non-club group, 2 operators..... W5DV/5	3011
Manchester Radio Club. W1DJC/1, 2979; Toledo Amateur Radio Association, W8DV/8, 2925; Suffolk Amateur Radio Club, W2US/2, 2781; Non-club group, 2 operators, W1HJI/1, 2664; Ponca City Amateur Radio Club, W5ASQ/5, 2564; Non-club group, 4 operators, W6BAM/6, 2430; Non-club group, 3 operators, W2JBQ/2, 2358; Canton Amateur Radio Club, W8MWL/8, 2286; Non-club group, 3 operators, W5HIP/5, 2282; Radio Club of Arizona, W6CMP/6, 2241; Trico Radio Club, W8IBU/8, 2223; Tri Town Radio Amateur Club, W9MWJ/9, 2133; Starved Rock Radio Club, W9MKS/9, 2043.	

Strays

Ham convention committees will be interested to know that Lieutenant-Commander John L. Reinartz is still frequently available as a speaker at amateur conventions. Requests for his appearance may be addressed either to the Director of Naval Communications or to John, care of the Director, Navy Department, Washington.



The 227-Mc. rig at W1AIY uses an HK24 ultra-audion oscillator built into a square-corner reflector antenna system. The entire framework is mounted on rubber-tired casters and can be easily rotated.

Most of the amateur $1\frac{1}{4}$ -meter work is in the hands of a faithful band of experimenters, limited in numbers by the work required to make equipment work well on the band and by the short range normally obtained. However, each section of the country has its group of men working on the development of gear for the frequency, and W1AIY, the station of Alfred Winchell of Waterbury, Conn., is a typical example of how far the technique has advanced. In seven years of attention to the band (sandwiched in between activity on 56 and 112 Mc.), the equipment has gone through many stages of evolution.

The present $1\frac{1}{4}$ -meter transmitter at W1AIY uses an HK24 in the "good old" ultra-audion circuit, and the only departure from convention is in the use of concentric filament lines instead of the more usual filament chokes. Although not the very latest circuit, it has been found to give excellent efficiency and it is very easy to adjust. The series-tuned plate tank is inductively-coupled to a single turn at the center of a half-wave di-

The 227-Mc. Rig at W1AIY

pole made of $\frac{1}{2}$ -inch diameter copper tubing. Normal input to the tube is 65 ma. at 400 volts, and the oscillator is modulated by a 6N7 modulator for both voice and m.c.w.

As can be seen from the photographs, the oscillator is built into a square-corner reflector which has dimensions identical to those given in *QST*.¹ The reflector elements are made of No. 10 brass wire, and a single director is used ahead of the driven dipole. The entire framework of the square-corner reflector is made of 1- by 2-inch strips, and it is mounted on rubber-tired casters so that it can be readily rotated. The station is located in the attic of the house.

The receiver uses a stage of 954 t.r.f., a 955 superregenerative detector, a 7A4 quench oscillator, a 7A4 first audio and 7B5 output. The receiving antenna is 8 half-waves in phase, horizontally polarized and rotatable.

The best $1\frac{1}{4}$ -meter DX is W1HDQ at Wilbraham, Mass., a distance of slightly less than 50

¹ Kraus, "The Square-Corner Reflector Beam Antenna," *QST*, November, 1940.

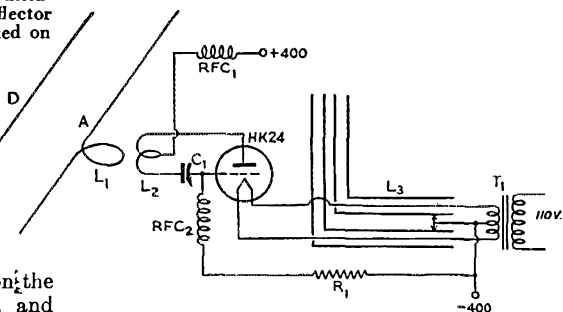
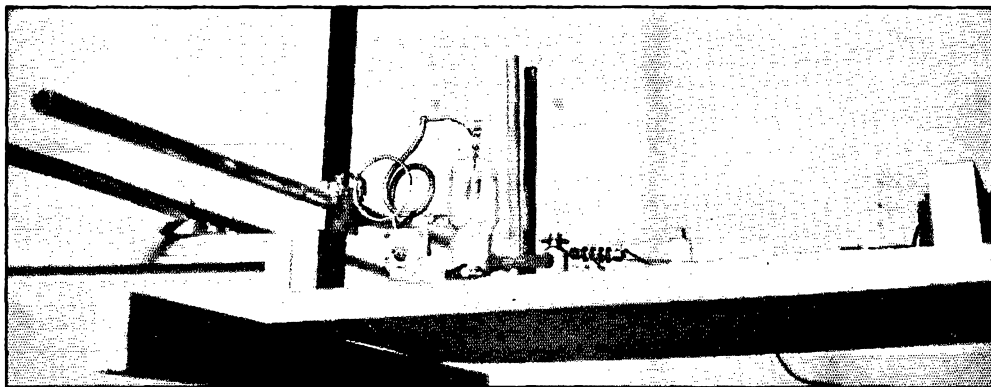


Fig. 1—The 227-Mc. transmitter at W1AIY.

- C₁ — 10- μ fd. variable (Cardwell Trim-Air double-spaced with 2 stator and 3 rotor plates).
- R₁ — 2200 ohms, 10-watt, wire-wound.
- RFC₁, RFC₂ — U.h.f. chokes.
- T₁ — 6.3-volt filament transformer.
- L₁ — 1 turn No. 6 copper wire, $1\frac{1}{2}$ -inch diam.
- L₂ — Approximately 2 turns $\frac{1}{4}$ -inch copper tubing, $1\frac{1}{4}$ -inch diam. Plate end is flared out to make short lead to plate of tube.
- L₃ — Filament lines of $\frac{3}{8}$ -inch copper tubing. Horizontal portion is $9\frac{3}{8}$ inches long; vertical portion is $6\frac{1}{2}$ inches high. Filament leads through lines are No. 14 rubber-covered wire. The filament shorting-bar adjustment is noncritical.
- A — $12\frac{1}{2}$ inches of $\frac{1}{2}$ -inch diam. copper tubing each side of L₁.
- D — $22\frac{1}{4}$ inches of $\frac{1}{2}$ -inch copper tubing spaced 4 inches ahead of A.

An Example of Present U.H.F. Practice



A close-up view of the oscillator shows the method of coupling to the antenna and also the director element to the left of the antenna. The antenna coupling is varied by sliding the entire oscillator assembly back and forth in the antenna framework.

miles, with S9 signals at both ends. However, considerable time has been spent trying to put a decent signal into W1HDF at Elmwood, Conn., at a distance of only 18 miles but over a considerably more difficult path. So far the best report has been S5, but high-gain antennas and the use of horizontal polarization have brought the signal

up to that level from complete inaudibility. That the path is not an easy one can be readily realized by a profile map of the route, which shows that slightly over half of the optical path is obstructed by hills and peaks that rise as much as 300 feet above the line of sight.

—B. G.

25 YEARS AGO THIS MONTH

THE National Guard has been mobilized. "We are told that the Army wants radio operators badly . . . the demand exceeds the supply at this writing . . . any of us who want some experience could not do better than communicate with the War Department at Washington and offer their services in the radio department of the Signal Corps." Thus Tuska, in the August, 1916, issue of *QST*. Even the cover illustration is of a Signal Corps field set — spark, of course.

The chief technical article of the issue is the first part of Paul F. Godley's famous "Applications of the Audion," a Radio Club of America paper. This paper is destined to become a *QST* classic, Paul Godley being out front in the practical application of Armstrong's circuits to amateur wavelengths, his work leading to the famous Adams-Morgan line of apparatus. The lead position, however, is given to Professor A. Hoyt Taylor's "Transmission Variations," reporting the work of the University of North Dakota on wavelengths between 500 and 1500 meters and establishing Dr. Taylor as a very early worrier over night variations, skip and fading. The Old Man, in "Rotten Luck," entertainingly reports a fruitless hour of frantic work

trying to keep a schedule to send code practice to the National Guard.

S. Kruse, 9LQ, later to be technical editor of *QST*, protests the general tendency to abandon relay work in the summer because of unfavorable conditions. In an article on "Summer Working" he points out that technical requirements are more exacting in summer than in winter and gives numerous practical pointers. Not much is doing on the trunklines, though, the managers contenting themselves with listing the routings so far agreed upon and soliciting applications to fill the gaps by the time activity resumes in the autumn. A correspondent, one K. B. Warner of Cairo, Illinois, criticizes the laying out of trunklines through major cities, holding that they have too much QRM to be successful and that the system would work much better if laid out between League stations already in successful operation in small towns having less electrical interference and less local QRM.

Phone gets perhaps its first mention in *QST*. The Marconi wireless telephone had its first public demonstration on June 12th when an experimental station at Aldine, N. J., talked to the S.S. *Bunkerhill* at distances up to sixty miles, the apparatus being in the charge of David Sarnoff. Orville Wright and Alexander Graham Bell are much impressed. The same issue reports the availability of the deForest radiotelephone transmitter employing a tubular "Oscillon" and having a range of from one to five miles.



IN THE SERVICES



A WARM word of greeting from Eric Holden, VO1H, secretary of the Newfoundland amateur society, says, "We have enjoyed entertaining the ham members of the U.S.A. forces here. The tribe runs about the same all over. They are now attending our meetings regularly. Let others who may be coming know that the NARA has a wide welcome for them." Our hearty thanks, OM.

Eddie Dieckmann, 2NDZ, on board the *Borie*, wants us to say, "It would be a great help if you fraters and sorosis of the amateur organization cooperated by building up a QSO party via mailgrams with our service members. There must be a wealth of material to exchange with the members who are serving with the military forces. Cuba, Hawaii, Panama, China, and the multitude of Man-o-War vessels that are cruising about the blue green waters of the tropical seas, all afford to exchange many colorful pieces of correspondence with you brass pounding home guards. . . . What could be better than to keep in touch with your old OM's and YL's than by letter? Let's keep the spirit of friendship at a high standing amongst American amateurs, now and forever."

We are under a handicap in printing addresses of hams in active service, as 2NDZ requests, particularly in the cases of Navy personnel since we cannot divulge the location of any ship. But Army addresses can be used as mentioned in these columns, and a letter addressed to your Navy friend, in care of his ship mentioned herein, routed care of the New York or San Diego postmaster, will eventually reach him.

Amateur radio's own Johnny Reinartz of 1QP-1XAM fame, now Lt.-Comdr. J. L. Reinartz, 3IBS, is stationed at Washington in the office of the Director of Naval Communications. In charge of NCR operations up to the time the reserve was called into active service, he handles the continuing relations between Naval communications and the amateur body. Former FCC engineer Cecil Harrison, 3HZY, is now CRM in the Navy office. Edwin Lovejoy, formerly of the FCC amateur section, is a Lt.-Comdr. now taking a special training course at Bowdoin College, Me. Lt.-Comdr. Harry Dobbs, 4ZA, former director of the Southeastern Division, is now on active duty as district facilities officer of the 6th Naval District at Charleston (S. C.) Navy Yard. Fred MaDan, 2CUD, is being commissioned as Ensign and awaits an assignment to duty.

We find these amateurs in far-flung ports of the Air Corps: Sgt. Bennett, 9IUA, bombardment group operator at Anchorage, Alaska; Pvt. Ernst, 9LOZ, receiving schooling at Jefferson Barracks, Mo.; Lt. Martin, 8JSS, located at Mitchel Field, N. Y., and in charge of communications for Northeast Air District; Lt. Stafford, 9KWP, doing more flying than radio work at Will Rogers Field, Okla.; P1c Burch, 9NFX, riding the back of a B-18 over Lowry Field, Colo.; Pvts. Horowitz, 3IBR, Williams, 5JNP, and Nearhood, 9TKK, learning the ropes at Scott Field, Ill.; Sgt. Nurse, 9YNK, at Selfridge Field, Mich.; and Capt. Clarke, 5DZ, post signal officer at Ellington Field, Texas. The 108 Observation Squadron at the Chicago Municipal Airport has sent to active duty Tech. Sgts. Delighter, 9CBI, and Barger, 9WBP; Sgt. Herndobler, 9RNY, and Pvts. DeLapp, 9TOI, and Vore, 9QBJ.

More lieutenants in the Signal Corps: Culbertson, 9CSY, who promises us a picture of the new ham station at Fort Monmouth; Janes, 9KS-BX, in charge of the message center at Ft. Leonard Wood, Mo.; Colvin, 6AHI, head man at WVY in San Francisco. Ed Long, 7ENC, reports that other Signal Corps men in Fairbanks, Alaska, are: McPherson, K7HIE; Vaughn, K7GIN; Brown, K7IGA; Cobb, K7EMS; Slack, K7GRF; Rosascoe, 6OAV, and Doyan, 7HUF. Mullings, 5BVF, teaches code to the boys at Ft. Crockett, Texas. Pvts. Krupp and Bradley, 9BMC, and Sgt. Yeates, 5GNT, pound brass at Ft. Lewis, Wash. Sgt. Clemens, 3DZR, and P1c Richardson, 3GUV, handle the AARS nets from WLM. P1c Gaudreault, 1LLE, works in the WAR Net from the Canal Zone. Draftees Sgt. Wilson, S8XG, and Pvt. Calvin, 8LEE, are learning Army ropes at Ft. Monmouth. CRM Corbett, 8DVP, has two sons in service: Howard (no call), at Ft. Monmouth, and Harold, 8HKV, at Ft. Hayes, O. P1c Hathaway, 9YWS and KAIGH, takes care of the Army's transmitters at Fort Mills, P. I.

Cpl. Unger, 6PQR, in the radio section at Camp Haan, Calif., Cpl. Peterson, 8VGC, chief operator at Ft. Custer, Mich., and Pvt. Day, 9INP, at Ft. Riley, Kans., are three fellows who have found their AARS training invaluable. Cpl. Stippick, 9BLB, is in the 50th Sig. Bn., Camp McCoy, Wis., along with Pvt. Strelczyk, 9ANK. Cpl. Bigger, 5GBR, instructs at Ft. Sam Houston, Tex. P1c Fenn is getting 9EPU modified to Ft. Benning, Ga., so he can operate in his spare time, too. Pvt. Stoll, 9YPA, has AARS duties at Ft. Omaha, Nebr. Capt. Jeffrey, 8GDC-9ZDH, com-

mands a light tank company at Ft. Knox, Ky., where is also located Paul Russnak, formerly at K5AE. Draftee Cass, 7FCK, is at Ft. Benning, Ga., and Reichenbach, 2KIF, at Ft. Dix, N. J. The Ft. Warren, Mass., mailman, when looking for Pvt. "Wijci" found he was actually Waldo Clark, W1JCI! which reminds us to say it is just as well not to include amateur calls on mail going to your friends in Army camps.

At Ft. Bragg, N. C., we find Privates Brasted, 8FAL, McCurdy, 9PID, Sgt. Finger, 9EIZ, and P1c Toben, 9OAO, in communications work. Ft. McClellan, Ala., boasts P1c Hobling, 2MMP, Wood, 8UCO, and Jacobs, 2JGC, among those handling radio duties. Staff Sgt. Watson, 8SBR, is another Camp Shelbyite. Staff Sgt. Knappenberger, 8OWX, commands a radio detail at Ft. George Meade, Md., where is also located Pvt. Emerich, 8MCX. At Ft. Jackson, S. C., are Staff Sgt. Nilsson, 4ALW, and Pvt. Greene, 4HAE. Staff Sgts. Barbeau, 1MNY, and Kaufman, 11FH, instruct at Camp Edwards, Mass.; a third guardsman on active duty there is P1c Atkinson, 1MYH.

RM1c Riddle, 3IVT, has finished a course of instruction at Washington's Radio Materiel School. Lt. McRae, 4GP, has extensive personnel duties with the Navy's New Orleans office. RM2c Oefinger, 1GUP, and RM3c Burt, 5EGX, are two reservists on active duty at Key West, Fla. RM3c Rives, 4FUV, pounds brass on the sub *R-3*. Yeo2c Kephart, 8SHN, is at the district staff headquarters, Philadelphia. RM3c Bartholomew, 8QWL, and DeSandro, 8SXB, are operating buddies on the *UP-25*. After two months at Great Lakes, radiomen Knaust, 9TGN, Martin, 9QJP, McAdams, 9YZX, and Samuelson, 9OIL, have been assigned to the hospital ship *Solace*. RM1c Jones, 8LYZ, works Navy radio at San Juan, P. R. RM3c Cavallini, IRR, enjoyed his month's training at Norfolk, where is he now awaiting active duty.

The *Semmes* radio personnel includes: Lt. Engleman, 1LOC, Lt. (jg) Bruckman, ex-2AOV, and radiomen Miller, 2MQB, Gardner, 1MJY, Revilee, 1MVA, Rodman, 1MUZ, Parrott, 1MVM, and Christie. RM3c Roberts, 5HRA, is finishing his training at Charleston, S. C., Navy Yard. RM2c Baker, 9FIN, has been called to serve on the *Kilauea*. RM1c Guile, 1EBO, and RM2c Wessenberg, 1HVF, left commercial radio for service at the Navy's Port Blakely, Wash., radio station. RM3c McCormick, 4GWX, operates on the *Oglala*. RM3c Petersen, 6FDL, studies at Los Angeles, and awaits an assignment. RM2c Silva, 6CAX, is stationed at the Mare Island Research Lab. RM3c Fugate, 9IJT, is aboard the *Hammann*. RM3c Mrocicka, 8UHN, has been recovering from an illness at the San Diego Hospital. Muskegon, Mich., has sent to active service Ens. Warren, 8BRT, and radiomen Brill, 8QT, Shante, 8UBO, and Votaw,

8VHX. Burlington, Iowa, reports S1c Bischoff, 9DVP, on the *Brooks*, and Lt. (jg) Jeffrey, 9UDR, at Washington, D. C., message center. RM3c Meyer, 2GHK, operates on the sub chaser, 102. S2c Conover, 4GIX, is on the *Arkansas*. RM3c Dodge, 7BTV, has shore duty at the Bremerton, Wash., naval station radio.

Staff Sgt. Brandt, 8GQZ, is expecting a discharge from his duties with the 32nd Division Signal Co. Tech. Sgt. Antenucci can be heard operating 2KFQ/4 at Camp Stewart, Ga. Pvt. Dorsey, 9COR, operates WCKY at Cincinnati. Cpl. Lemon, 6DOU, gives radio instruction to trainees of the 143rd F.A. at San Luis Obispo, Calif. Staff Sgt. Johnson, 9QAK, is radio section chief in the 147th F.A., Fort Ord, Calif. Staff Sgt. Robertson, 7FEQ, designs portable u.h.f. units at Ft. Stevens, Ore. P1c Peters, 7HPB, operates with the 218th F.A. at Camp Murray, Wash. P1c McCoun spends evenings in trainee traffic handling from 2HWS/1 at Ft. Devens, Mass. Cpl. Lakatos, 8SOP, and P1c Antinolfi, 1KSH, pound brass for the 62nd C.A., Ft. Totten, N. Y. Pvt. Holt, 5GZR, volunteered for radio work with the 189th F.A. at Camp Berkeley, Texas.

Some guardsmen on active radio duty: John Robertson, 2KCV, 244th C.A., Camp Pendleton, Va.; Staff Sgt. McNeill, 9HZG, 124th F.A., Camp Peay, Tenn.; Mstr. Sgt. Bulger, 3GYQ, 198th C.A., Camp Upton, N. Y.; P1c Lantz, 9IFN, 185th F.A., Camp Claiborne, La.; Lt. Dexheimer, 3ELG, 157th F.A., Ft. Dix, N. J.; Cpl. Page, 4DVJ, 167th Inf., Camp Blanding, Fla.; Sgt. Van Houten, 7JC, 163rd Inf., Tacoma, Wash. "Army not bad at all," says Guardsman Marsh, 3ELA, with the 246th C.A. at Cape Henry, Va. Sgt. Walker, 5GQF, expects transfer to a new Army field at Tucson, Ariz., with the 46th Bomb. Sqdn. Mstr. Sgt. McBournie, 1GRA, pours code at trainees of the 241st C.A., Ft. Andrews, Mass.

Our thanks to RM2c Harry Butler, 9OVF, for the following list of radiomen who have been serving with the U. S. fleet, Hawaiian area. All have completed one year of active duty and were among the first to volunteer for active duty at the beginning of the present emergency:

M. V. Stout, 9JTY, Indianapolis, Ind.; R. Barker, 9VZS, Chicago, Ill.; C. F. Gombar, 9UYF, South Bend, Ind.; J. H. Wieting, 9YDZ, Norfolk, Nebr.; J. W. Pimlott, 8CGK, Cambridge, Ohio; O. M. E. Ransom, 9TPH, Joplin, Mo.; J. V. Neal, 9MRY, Madison, Wisc.; W. R. Pueschel, 9SJB, Chicago, Ill.; M. O. Kangas, 9ZBF, Chisholm, Minn.; E. A. Mattsen, 9OBA, Hibbing, Minn.; F. Geltz, 8OEF, Canton, Ohio; B. Krusniak, 9ZBK, South Bend, Ind.; H. I. Lundmark, 9MGS, Evanston, Ill.; W. Kreyler, 8HZI, Cleveland, Ohio; H. C. West, 9PXJ, Greenview, Ill.; E. J. Gallian, 6KJQ, Brisbane, Calif.; W. F. Bullman, 6NQL, Los Angeles, Calif.; T. S. Barrett, 6QYB, Hollywood, Calif.; A. J. Borngen, 8MWS, Cleveland, Ohio; L. R. Supek, 8QQY, Cleveland, Ohio; Wm. Samuelson, 7EOD, Great Falls, Mont.; R. S. Landing, 7HEH, Portland, Oregon; V. Abele, 9VUD, Waukegan, Ill., and A. C. Diggs, 7GGL, Portland, Ore.



ON THE ULTRA HIGHS

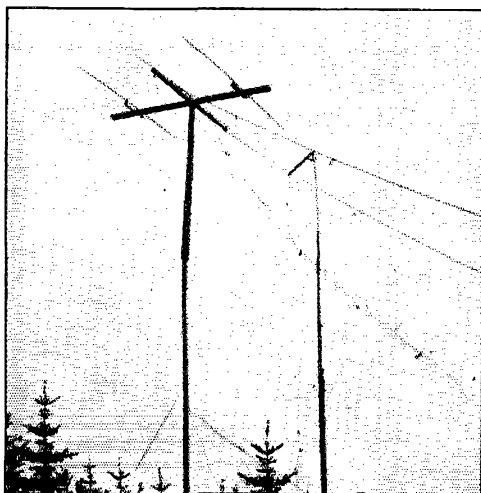


CONDUCTED BY E. P. TILTON,* W1HDQ

WORKING skip DX on Five is always packed with thrills. Signals pop in from almost anywhere, weak fading carriers one minute and receiver-blocking roars the next. "Sporadic" is the word for it! We feel certain that things are going to pop open — and the band leaves us high and dry. Another night we say that there will be nothing doing — and almost immediately our ears are pinned back by a rush of signals from some distant section of the country. But when ionization develops at several widely scattered points simultaneously — then five-meter enthusiasts have something to tell their grandchildren!

Such a condition prevailed on June 5th and 28th. This "double-hop" business used to be a rare occurrence. Not that the condition did not develop, but because of limited activity in many sections of the country the ionization had to be in just the right spots in order to produce multiple-hop contacts. But with only North and South Carolina, Mississippi, North Dakota, Utah, and Nevada now missing, the picture is quite different; and work on Five beyond 1500 miles is showing up more frequently all the time. Were we to list all the skip-DX contacts reported for these two dates alone there would be room for nothing

*329 Central St., Springfield, Mass.



Antennas at W1MEP/1, Glastenbury Mountain, Vermont. Located six miles from the nearest power line and five miles from the nearest road, State Fire Warden Mallory has a QTH to dream about! Chet's rig has an HY-114 in the final, running 3.5 watts input on 57486. Antennas include a 3-element rotary, a vertical extended double Zepp, and a "V" beam aimed west.

else in this month's column, so here are a few highlights.

June 5th: W3ASD, Crum Lynne, Pa., worked W6BRO, Los Angeles, Cal., 2400 miles. W6OVK, Tucson, Ariz., worked W1's AEP, HDQ, and EKT, and heard W2KLZ, W1DLY, and W1KLJ. W6SLO, also of Tucson, worked W1's AEP and HDQ. W5JGV, Hurley, New Mexico, worked W1's AEP, EKT, DLY, and W2KLZ. It is interesting to note that the stations worked by W5JGV, W6SLO, and W6OVK, while spread over a stretch of 150 miles east to west, are in an almost exactly straight line. Stations 20 miles north or south of this line were completely out of the picture!

W5HYT, Amarillo, Texas, was busy at this same time, working 43 W8's and W9's in the course of the evening. Last, but not least, Vermont's lone representative on Five, W1MEP/1, Glastenbury Mt., worked his first skip DX. With less than three watts input, Chet worked W9ZHB, Zearing, Ill., and W9NFM, Solon, Iowa, for an all-time high in miles-per-watt for 56 Mc. From reports it appears that this June 5th opening was an all-day affair, running from 10 A.M. to midnight.

The affair of the 28th is too recent to permit complete reporting. This is, in fact, being compiled on the "morning after," so we can only include our own observations and guess at what may have happened. Big news was the first appearance of a signal from W7 here in the East. W7ACD, Shelley, Idaho, was heard by W1's LLL, KLJ, and CGY/1, that we know of — and worked by W1AVV, Stamford, Conn., and possibly several other East Coast stations. W5JGV, Hurley, New Mexico, was in there again, working a bunch of W1's, including W1CGY/1, Cape Cod, and your conductor. W5HYT and W5WX, Amarillo, Texas, had their first contacts with W1's. All Call Areas except W6 were heard by a number of W1's. W6's were apparently out of this one, though several were being called at times. Several W9's were looking for W6 in order to complete a WACA in *one night!*

As for the rest of June, it followed the familiar early summer pattern — hot days and cool nights, with fine temperature inversions and consequent extension of the local range, interspersed with frequent bursts of skip to keep the gang on their toes. The "sunset inversion" (which results when air, heated by the day's bright sun, rises and is replaced by cooler air pulled in from the ocean, a nearby lake or river, or even from large areas of forest land) is at its best in this season of the year.

Operators on all u.h.f. bands should make an effort to be active during the two hours around sunset, as signals are often 10 db stronger during this period than later in the evening or during the early afternoon hours. Early morning hours are also excellent, if activity can be promoted between 5 and 10 A.M.

HERE AND THERE:

HORIZONTAL antennas are showing up in ever-increasing numbers, with the 4-element "W6QLZ Beam" getting the big play at the moment. These have recently appeared at W1KZU, W2BYM, W5HTZ, W5DNN, W6ANN, W7ERA, W7AMX, W7DNB, W8KKD, W8KQC, W9ZQC, W9PMQ, and W9PK, to name a few. Two high-gain horizontals, at opposite ends of a 200-mile hop, can make a tremendous improvement in signal strength as compared with vertical antennas of the "Q" or extended double-Zepp variety, but we plead with all workers to figure in all the factors before going overboard for either vertical or horizontal polarization.

Remember WGI, Medford Hillside, Mass., one of America's earliest broadcast stations, with the woman announcer back in the early Twenties? That same voice, Eunice Randall's, may now be heard on Five from W1MPP, Watertown, according to W1DJ. Arthur reports more than 70 stations now included in the New England Net, with upwards of 30 reporting in for the weekly roll-call on Thursday nights—a swell chance to see who is on and to give the new ones a chance to get acquainted.

Go home for lunch? Five will bear watching around noon at this time of year. Several of the gang have been snatching a contact between bites of lunch this summer. This is a break for those heretofore who work nights and have been out of the picture heretofore. Several nice noon-time openings for work between the Middle West and East were reported during June.

We have said this before, and we repeat that there is no place in the country where five-meter signals cannot be heard. The splendid work of W5HTZ, Cromwell, Okla., W5JGV, Hurley, New Mexico, W7IFL, Cheyenne, Wyo., W7ACD, Shelley, Idaho, and many others bears this out. Working all Call Areas on Five, not so long ago an almost impossible task, is now being done by many operators in the Middle West. First WACA outside of W5 or W9 went to W8CIR, Aliquippa, Pa., who worked W7IFL on June 23rd. Ed had been waiting for four years for that W7! Now it's a 56-Mc. WAS. This is not at all impossible—if everyone will bear down on the fellows we work in those hard-to-get states on other bands. We believe that W9ZHB is in the lead in this department. Ed got all the W7 states on the 23rd of June and now is but a mere five or six states short of a WAS on five!

W5VV wound up his activities "for the duration" in a blaze of glory on June 5th. Wilmer is now on active duty in Washington as a captain in the office of the Chief of Air Corps, Communications Section. That kilowatt will be sorely missed, but there should be no lack of hamming around Washington, D.C., these days!

W5AJG worked W7GBI, Great Falls, Montana, on June 5th. Leroy reports GBI as the loudest W7 signal ever heard, peaking just before the W8's and W9's started to break through. W5AJG worked more than 40 of the latter—another of those poor evenings when the band was not so good!

W5WX reports openings for the Amarillo trio, W5's HYT, CHG, and WX, on May 30th, June 1st, 5th, 9th, 12th, 18th, and 23rd. Most of the work was to W8 and 9, though HYT worked W7GBI and several W4's and W6's. With the spurge of the 28th, HYT must now have WACA easily. That an antenna can make a difference is demonstrated by the outstanding signal of W5HYT. John is using a converted 4-element 28-Mc. rotary array. On Five it is now two halfwaves in phase with two reflectors and four directors. Parasitic elements are also phased.

Another pretentious array is that of W9YKX, Woodbine, Iowa. Bill has 12 elements, horizontal; four halfwaves in

FLASH

As a result of the wild excitement of the multiple-hop opening of June 28th, there have been many conflicting reports as to who worked W7ACD on Five. Here is the correct dope, straight from W7ACD's log. Louie worked W9's IFB, OLY, NFM, YKX, ARN, RGH, HAQ, ZHB, CLH, W2BYM, W9's BDL, IOD, W8CLS, W9's RRX, and PK, in that order, between 6:22 and 8:28 P.M. MST. W1AVV heard W6QAP, W1SI heard W6OVK and W1NF logged W7IFL.

Another late report adds W8RKE, Grand Rapids, Mich., to the list of those outside the 5th and 9th Call Areas who have worked them all. W8RKE worked W7GBI on June 23rd, less than two hours after W8CIR had worked W7IFL to become the first W8 to make WACA.

—W1HDQ

phase with quarter-wave-spaced reflectors and directors. Many reports from widely separated points tell of the signals of W9YKX and W5HYT as the steadiest and strongest on the band in every opening—the first to be heard and the last to go out. Those extra driven elements help in horizontal arrays, too!

Being in active service has not kept W3FJ, W4ELZ, or W9BJV off the band. W3FJ, formerly of Richmond, Va., is a Captain, 176th Infantry, Fort Meade, Md. Ted reports that W4ELZ is an Ensign on special duty at the Naval Academy, and is on Five regularly. Lt. S. L. Burghardt, 34th Sig. Co., Camp Claiborne, La., was W9BJV, Watertown, S. Dak. Stan now has W5JXS and, as such, is ready to give the gang a Louisiana contact on Five.

How do these W5's get their wives interested in u.h.f. work? W5JGV, formerly W6GUQ of Douglas, Ariz., is assisted in his task of keeping New Mexico on the five-meter map, by Mrs. Hester, who is now W5JZQ. Also in Hurley is the OM-XYL team of W5ICD-W5JXL. This pair were expecting to be on Five, but JGV tells us that ICD is laid up in the hospital at present.

W6OVK, Tucson, Ariz., reports Five open 15 days between May 31st and June 23rd, with DX every day for eight in a row, June 5th–12th! Most of the openings are to the W7's, and improved activity up there has helped to make things very lively in comparison to former years when Jim and W6QLZ used to have to listen to the commercial harmonics in order to hear anything on Five when they thought it should be open. W6SLO "pulled a blitz" on the W8's June 1st at noon. Neal worked W8's CIR, CLS, OPB, CZA, QXV, QQP, and W9QCY, in a snappy bit of lunch-hour activity. All these are in the golden territory over 1500 miles! OVK had a bunch of 160-meter boys out to demonstrate the reliable character of communication between Phoenix and Tucson. Signals are better on Five than on 160 over this 107-mile mountainous path, and the DX worked by both QLZ and OVK on Five exceeds the fondest dreams of most of the gang on 160—to say nothing of the freedom from QRM. Come on down, boys, the water's fine!

W6QAP has taken over W6PCB's QTH for the summer. A "W6QLZ Beam" has been installed, and six halfwaves in phase, horizontal, is going up. Bud was able to work W8CIR from his home location on June 1st, while using only a 6L6 doubler. He comments on the frequent openings to W7 and wonders if they are in some way associated with unusual wind movements to the northwest, resulting from changes in the Japanese Currents. Openings frequently coincide with sharp drops in temperature. This belief in the possible correlation between weather and skip is something for all of us to work on, Bud.

U.I.F. MARATHON

Fourth Period Winner: W6ANN — 470 points

Call	Contacts Through				Score	States in 1941
	56	112	224	400		
W1AEP	78				746	16
W1AVV	64	34			413	9
W1BCT		30			128	2
W1CGY	18				92	4
W1DJ	92	58			534	6
W1DLY	40				254	9
W1EHT	52				309	3
W1EKT	87				576	13
W1ELP ¹	67				296	4
W1HDQ ²	177	45	4		1503	21
W1IJ	23	24			257	4
W1IJR	24	48	2		307	5
W1K1J	124	39			934	20
W1LCC	9	7			40	5
W1LFI	7	96			416	5
W1LL	95	49			967	18
W1LSN	47				292	3
W1MBS		185			670	3
W1MEP/1	16				153	5
W2ADW	1	16			160	2
W2AMJ	109				707	10
W2BYM	104	4			626	19
W2COT	87	18			413	5
W2DZA		204	2		726	4
W2FJQ	53	35			369	11
W2LAL	82	6			399	5
W2LXO		137			449	3
W2MBS		45			124	3
W2MEU	52				251	5
W2MGU		104			431	3
W2MQF		52			212	2
W3ABS	50				195	5
W3ACC	83	3			507	11
W3AXU	81	19			460	11
W3BZJ		145			696	3
W3CGV	61	6			396	11
W3GJU	50				216	9
W3HOH	87	179			1052	9
W3IIS	45				428	12
W3RL	4				59	2
W3FJ/3	12				63	6
W4FBH	24				200	9
W4FKN	7	1			40	3
W5AJG	91				909	20
W5DNN	12				119	5
W5FSC	16				166	7
W5JGV	23				408	11
W5VV	64				650	15
W6ANN	49	125			1057	11
W6IOJ	16	34	1	1	256	1
W6OVK	41	6			836	16
W6QG	41				446	9
W6QKM	4	69	1		266	1
W6QLZ	39	5			201	12
W6RVL		129			472	1
W6SLO ³	28				692	13
W7CIL	13				205	4
W7ERA	15				90	6
W7RT		4			24	1
W8CIR	81	10			1371	16
W8KKD	66	34			599	8
W8MHM	2	10			42	1
W8QCS	29				290	8
W8RUE	33	9			310	8
W8TDJ	14				169	4
W8UUY		7			109	1
W9AB	3				25	2
W9ANH	18				339	7
W9ARN	46				552	10
W9BDL	30				525	8
W9FHS	2	17	1		67	1
W9LLM	36	26			342	5
W9PK	57				426	14
W9PNV		76			441	2
W9RLA		42			216	2
W9YKX	35				536	15
W9ZHL	29				396	7

¹ Frequency Modulation used exclusively at W1ELP.
² Not eligible for award.
³ Ten contacts beyond 1500 miles brought the score of W6SLO up to 616 points — apparently high for the Fifth Period.

Most of the DX worked this year from W9ZQC, Brookings, S. Dak., has been the work of W9NLR. Now Curly is going into the Army, and Fred promises to keep things hot. The record of W9NLR-ZQC is WACA and 26 states. Rig is a single T-40, cathode modulated, at 120 watts. Two horizontal arrays are used, a 3-element close-spaced job, and a 4-element "W6QLZ Beam." Curly sends along some W7 frequencies: FLQ 57014, AXR 57.4, HEA 56.6, FFE 58.1, ERA 57.0, FDJ 57.1, CIL 57.08, ACD 57.3, IFL 57.15. Another W9 leaving for the Army is UTZ, Lisbon, Iowa. His rig is now being used by W9SBU at Mt. Vernon.

W9PKD, Salina, Kansas, reports a session with the same list of W8's as were contacted by W6SLO on June 1st — proof of the double hop involved. Signals were up to 30 db over S-9, while signals on Ten were not over S-7 at any time. Other Kansas W9's include QPK at Russell (who has a 7-element horizontal array), QZS, Great Bend, WQN, White City, and VWU, Topeka. PKD would like to promote a huddle of the operators in that part of the country who are interested in improving activity on Five.

W6QLZ turns in some heard reports on the June 5th opening which are of interest: Clyde reports W3HFX (all morning) and W3IIS, W2??J, W1LSN, W1HDQ, and numerous W8's and 9's. Apparently W6QLZ was on the northern edge of the territory from which signals were coming into the First Call Area this time, in exact contrast to last year on July 23rd, when Clyde was working the East Coast and the Tucson stations were unable to do business. This skip DX, especially multiple-hop, frequently takes place over very small areas at any one time. Two stations, even only five miles apart, may report almost entirely different results. The opening of June 5th was apparently of poor quality at W7IFL, Cheyenne, Wyoming, also.

W7CIL, Salem, Oregon, says that the thrill of skip DX on Five exceeds anything in his long experience in amateur radio. Even the first QSO in early spark days, the contacts with VK's in 1926, or the first contact with England on 20-meter 'phone never caused "Bake" to shake all over and break out in a cold sweat as did his first QSO with W6OVK on Five. "There is something to this five-meter stuff, and no foolin'!"

The boys in Michigan and Ohio are the buffers in the polarization controversy, with horizontal to the West and vertical to the East. W8QXV and W8CIR solve this problem by using both simultaneously. There seems to be no harmful effect when working either type at the other end, and much jumping around is thus avoided. Repeated checks have been run between the two stations, and between W8QXV and the Detroit area, some 200 miles. On a few occasions CIR and QXV have noted a gain of 8 to 12 db with dual polarization, but this is not true consistently. Skip-DX work with dual polarization has been quite successful. W8QDU has been testing his horizontal array sufficiently to establish the fact that when two horizontal arrays are used in extended local work it really hops things up, Fred believes, as we do, that equivalent gain in two vertical arrays would produce the same result. But a horizontal of any sort must be rotated so a horizontal might just as well be a high-gain beam; whereas, for vertical, most of the gang have been content with a simple dipole. With increased activity the unidirectional characteristic of the horizontal array does not present as strong an argument against the use of horizontal polarization as it once did, and someday QRM may even make unidirectional work advisable, as it is on the lower frequencies.

That 12-element array at W9YKX helps on extended-local work, too. Bill has worked W9ZHB, Zearing, Ill., 350 miles, without help from the E Layer. These boys are working out on skip when there is little sign of activity on Ten. W9NFM, Solon, Iowa, worked W7FLQ, Spokane, Wash., on June 14th, when 28 Mc was apparently open only to W5.

All last summer the Ozark Net concentrated on working a W7 without success. But now along comes W7ACD, and W9's GHW, NYV, NKW, and WAL, made the grade on June 5th, for WACA.

112 MC.:

Just too late to be reported last month, an attempt at breaking the 112-Mc. record was made by W1KSF, with the cooperation of W2GPO, W2DZA, W3HOH, W3BZJ,

W8CIR and your conductor. At 6 A.M., Memorial Day, W1KSF/1 took off from Norwood Airport, near Boston. The idea was to contact W1HDQ who would then pass the contact along to W2GPO, and so on down the line until a new record was established. Due to poor flying conditions, most of the ship's fuel supply was exhausted before reaching 10,000 feet. W2GPO was worked successfully at this point, with signals 8-9 each way, but lack of fuel forced a return before the program could be carried out. Further similar attempts will be made later in the summer, with a higher-powered plane, in an attempt to work from higher altitudes. W1KSF reports that the super-regen rush disappears from the receiver at 10,000 feet. He has had this experience with two different receivers and would appreciate hearing from any others who have tried u.h.f. work at high altitudes (with respect to ground, not sea level). Local signals drop off after the first few thousand feet of altitude, whereas signals beyond 100 miles show a tremendous increase above 9000 feet. Ability to reach 15,000 feet and maintain this altitude should make it possible to work beyond 250 miles under good conditions.

W6MUF reports some 112-Mc. DX work by members of the Marin County Radio Club of Sausalito, Cal., on June 1st. From the summit of Mt. St. Helena, near Santa Rosa, W6FVK/6 contacted W6BIP/6 in the Santa Cruz Mountains, a distance of 190 miles. Mobile transceivers were used at both ends.

On Memorial Day, W6SON and W6TBA, operating TBA's transmitter from the summit of Mt. Palomar, heard W6QKJ of Sacramento, a distance of more than 350 miles! A higher-powered rig is in construction at W6TBA, along with a 3-element beam, to be used in a further attempt to make contact over this long path. Much of this distance is over the San Joaquin Valley, scene of the record work of W6KIN-W6BJI last summer; and it is just possible that the use of efficient rigs at each end, together with a fortunate combination of a good temperature inversion and low local activity might result in two-way work beyond 300 miles.

More 112-Mc. DX in the mountains of California is reported by W6LQM. Journeying to Mt. Frazier on the morning of June 8th, he arrived on the summit at 9:45 to find W6OPM already there, and in contact with W6OIN/6 at Lyons Point, near San Diego, a distance of 170 miles. W6LQM worked W6OIN also, followed by several contacts in the Los Angeles Area. At 2:53 P.M., W6QKB/6 on the highway near the Nevada state line, in the Mojave Desert Country, was worked, the distance being around 235 miles! W6QKB reported reception of W6ANN at San Pedro, about 200 miles, but no contact resulted.

And in the East, W9AOB/2, recently transplanted from Harvey, Ill., is operating from his "hand-picked QTH" atop a knob overlooking Raritan Bay, at Middletown, N. J. He reports reception of W1LSA, 200 miles, but this has not been confirmed as yet. "Mid," a radio engineer at the Signal Corps Laboratories at Ft. Monmouth, has a concentric-line receiver made from a French "75" shell.

W9FHS claims the record for tube lineup in a 112-Mc. rig. His narrow-band phase-modulated job starts off with a 160-meter crystal, 6K6-G, a pair of 6SA7's buffer-modulators, and a string of 6V6 and 6L6 doublers and quadruplers, driving an 815 in the final, eleven tubes in all! Any competition?

U.H.F. Round-Up — Get in It

August 9th-10th

Summer All Out U.H.F. Test May Produce Transcon—8th U.H.F. Activity has Simplified Score Plan—Don't Miss It

The Round-Up Period: August 9th (Saturday), 3 P.M. local standard time (EST CST MST PST) to April 27th (Sunday), 7:59 P.M.—local standard time.

Purpose: To round up all u.h.f. amateurs and all u.h.f. equipment available for a grand, good operating time; to round up more results for everybody by a mass attack on the wide-open spaces and u.h.f. DX; to round up some new states and marathon points for good measure. Local round-up time is any old time. The U.H.F. Round-Up gives us a national round-up time, so each of us has the greatest possible chance at DX contacts and nationwide u.h.f. results! Each quarterly test has brought us closer to that goal of seeing a message go ALL THE WAY transcontinental or coast-to-coast during the test. Any ham with u.h.f. gear has a *chance* to be in on it if alert and on deck and one is *sure* of other round-up virtues. See you in this Round-Up.

All amateurs with u.h.f. gear are invited to start short test messages to go across the country *entirely by u.h.f.!* This test has all the advantages of the summer season. A few words from those in ARRL's April u.h.f. doings may have interest:

"Activity . . . was at its highest peak. "More MCW being used to get accuracy and DX than I ever heard on the band before." . . . "I feel certain Arizona can be worked from this range of mountains." . . . "Had fun, and met many new friends. . . . "Two cars full of equipment on Bear Mt. We may have missed some calls, our four half-waves in phase was so directive for reception." . . . "Sunday morning contacted W2JB. Worked Vince every hour in P.M. and took msgs fm California, but conditions were not then good to the east." . . . "The big kick was the W6ANN-W9ZJB contact." . . . "Great fun, lets have another real soon."

Scoring Contacts: List all different stations worked in the contest period. Show the *location* of the stations obtained as you work them for the claimed points. In a given band, a fixed or portable station may be worked but *once* for contact credit regardless of location. Show the band your transmitter was on for each contact or group of contacts.

Credit yourself with *1 point* for every such different contact with stations under 100 miles, and *2 points* credit for stations at distances of 100 miles or over.

Message Credits: To the sum of points computed as above, add points for message copies submitted with your point summary.

For *originating* and sending a test message of approximately five to ten words, specifically addressed or "to any amateur" in remote sections of the county and submitting copy *with handling data* * (but one such message per station will be credited) 10 points.

For *relaying* such messages away from the starting point toward destination and submitting full copies (1 for receiving by radio, 2 for relay onward) 3 points. Reply messages relayed, with

(Continued on page 74)

* The *handling data* is the call of the station from which message was received, call of station to which the message was sent by radio and the time and date of *acknowledgments of receipt* between stations. The call of the reporting amateur should be on each message for identification.

August 1941

45

Results, Fourth A.R.R.L. Member QSO Party

BY J. A. MOSKEY,* WIJMY

BIGGER and better than ever — that, we think, quite adequately describes the Fourth Annual ARRL Member QSO Party held in January. In this latest yearly two-day operating jamboree, which is becoming second to the November SS in popularity, 541 League members submitted reports of activity. More successful than any of its predecessors, the party proved that the American amateur is right up in the top brackets insofar as operating capability is concerned!

To the Winners — Congratulations!

To the highest scoring members in each of the 62 ARRL Sections (out of a possible 64, no reports having been received from Arkansas or P. I.) reporting, attractive certificates have been presented. The following are recipients of the Section awards: *W1BFT, W1BIH, W1FSV, W1GKJ, W1KJO, W1LYG, W1MEK, W2EQS, W2EWD, W2IOP, W3BAQ, W3BES, W3FQZ, W3IWM, K4HEB, W4AUW, W4BSJ, W4BYF, W4CYC, W4DMZ, W4FDT, W4GXB, W5AQE, W5CJP, W5FZD, W5HQN, W5JII, W5KCC, K6PAH, W6BMC, W6CLZ, W6CW, W6HZZ, W6LMZ, W6PBV, W6PCE, W6RBQ, W6RMT, W6SID, K7CZY, W7AKP, W7BCE, W7GOZ, W7KL, W8DZC, W8IXJ, W8NDS, W8OFN, W8UNH, W9BBS, W9DM, W9FS, W9GBJ, W9GKS, W9KBL, W9PKW, W9QDF, W9RQM, W9SJT, W9VBQ, W9VKF, W9WUU*. Congrats, gang! The calls of winners listed in italics are those who have led their Section in one or more previous ARRL Parties. Of particular note were the performances of W8OFN, W9RQM and W9VKF. These gents possess the rare honor of having won the award for their Section in each of the parties thus far held.

Comments

"My first Annual Member Party. . . I'm all for 'em." — W6SN. "I really enjoyed this contest and promised myself that I would never miss another." — W4BSJ. "Worked two new states on 80 c.w." — W3IHN. "Had big kick taking part in ARRL Member QSO Party . . . only wish this type of contest came more often." — K6PAH. "All in all, it was some QSO party, and I only heard one rotten e.c.o. note. All the rest were F.B., and the gang is to be congratulated." — W7KL. "Enjoyed my first participation in an ARRL QSO Party, although I have been a member off and on for twelve years." — W1HA. "Sorry I couldn't be on longer, but enjoy meeting the gang year after year." — W9CVL.

* Assistant to the Communications Manager.

"Perhaps the biggest kick I got out of the whole contest was when on contacting K4HEB he called me by name, asked pertinent questions that indicated he knew me well, etc. Inquiry developed that it was none other than the fifteen-year-old son of old K4KD. I worked with K4KD ten years ago and knew his family well." — W2KZN. "The contest was a very fine one and I enjoyed operating in it very much." — W5JII. "I sure enjoy the ARRL QSO Party more than any other contest we have. I had a swell time in this one, and am sure looking forward to the next one." — W3FQZ. "The finest thing that I can say for those whom I worked is that it was necessary to ask for repeats in only one instance and that was definitely due to QRM." — W8TOJ. "I certainly had a swell time in the twelve hours I was able to operate. Am really looking forward to the next one." — W6RGQ. "For years I have been looking forward to contacting New Mexico for my 80-meter WAS. At last the long sought after State was raised during this Contest." — W2EQS. "It was a swell party and I enjoyed every minute of it. Worked all districts and K4 on 80 meters before turning in on Saturday night. Hope to be in there pitching on the next one." — W9GFU. "I was able to contact at least one member on each of the eight assigned amateur bands from 1¼ through 160 meters." — W8QDU. (NOTE: ARRL President, George W. Bailey, W1KH, also worked on all bands from 1.75 to 224 Mc. — Ed.) "The contest gave me very much fun, not to speak of a few new states that were contacted. I used my AEC radio gear for the entire contest. The transmitter was run at 30 watts input on three bands. All districts plus a K4 were contacted on 3.5 Mc. in six hours." — W3BAQ.

Star Performers

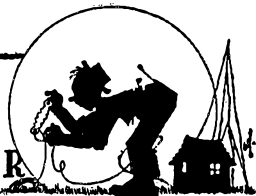
The highest score for the whole shindig was that of our old Kentucky contest hound, Bert Brown, W9FS, who topped the 1940 record of W3BES by finishing up with 56,974 points. Right behind Bert we find W3BES with 54,240 points. The third best total, 50,264, was made by another old-timer, W1TS, who is accused of having the drop on other contestants because, 'tis said, he never sleeps! Honors for fourth place are shared by W2IOP and W6HZZ who, coincidentally, made 45,704 points each.

Among other high scores worthy of mention are: W3DGM, 44,840; W3FQZ, 41,552; W9RQM, 41,400; W9PKW, 41,382; W6PCE, 40,560; W8NDS, 40,208; W9TH, 39,720; W9DIR, 39,

(Continued on page 78)



HINTS AND KINKS FOR THE EXPERIMENTER



A SIMPLE FILTER FOR ELIMINATION OF B.C.I.

W3QY is in the "under-100 watts" class, a group which should normally be exempt from b.c.i. difficulties. However, located in a row-house district in Philadelphia, we encountered an aggravating form of b.c.i., even though we were using a mere 60-watts input to an 809 on 10-meter 'phone. The next-door neighbor had a Philco a.c.-d.c. set which picked up our transmission all over the dial regardless of the setting of the volume control. Another, two doors away, suffered the same trouble on a Farnsworth which is also of the "transformerless" type.

After going through the pages of several *QST*'s we decided against taking any of the almost heroic steps found therein and for some time merely ceased operating. Recently, when we discovered our signal about R9+ on one of our own little a.c.-d.c. midgets, we decided to do something about it, somehow or other, in order to be able to go on "ten" once in a while.

If we had been using a kw. input, we would have expected b.c.i. trouble, but with a puny little 60 watts we were rather dismayed about it all. In looking about for the trouble, we first became aware that our antenna was practically parallel to and some 15 feet away from the light lines which run along the backs of the houses in the row. It seemed probable that pick-up through these light lines might be responsible for the trouble, since the tuning function of the receivers in question didn't enter the picture in any way.

Since there was no possibility of moving the antenna or shifting the directivity, we decided that some sort of filter to keep the carrier out of the b.c. sets was in order. We first tried an r.f. filter in the power line to the transmitter, but this had no effect upon the interference, thus strengthening our belief that the line pick-up was directly from the antenna. Further tests also showed that there was no interference when the

antenna was disconnected and the rig operated with a dummy load.

The second idea tried out proved to be the most satisfactory and it consisted simply of interposing two self-tuned coils in the a.c. leads going to the b.c. receiver as shown in Fig. 1. On the midget set which we had in the house, the addition of these two coils completely squelched the pick-up, so a unit was built for the next-door neighbor. It consisted of two coils of No. 16 wire, each having about 16 turns wound on a 13/8-inch diameter form. The coils were mounted in a small wooden box which was painted a cream color to match the woodwork in the house. A short cord with an attachment plug on the end was connected to one end of each coil, while the other ends were connected to a receptacle mounted in the opposite end of the box.

When the filter was installed next door, it was as effective as the one we tried on our own receiver and the neighbor was overjoyed. The use of this sort of filter removed the necessity of tinkering with the b.c. set, a procedure which we wished to avoid if at all possible.

Obviously this arrangement will not take care of those situations where the transmitter field is strong and the signal gets into the receiver by way of the air. For those cases where it comes in through the light lines, however, it should be generally effective. Whether the scheme would work on another frequency is not known. In our own particular case we do not contemplate using 'phone on any band but 10, so this does not become a problem. — *E. E. Pearson, W3QY.*

THE SW-3 AS A PRESELECTOR

RECEIVERS of the regenerative-detector and r.f.-amplifier type, which have been retired from service with due honors are often recalled to work as pre-selectors ahead of superhet receivers where they usually do excellent jobs.

In the usual arrangement, a tuned circuit and link are required in coupling the output of the preselector to the input of the receiver. Fig. 2 shows an arrangement which has worked out successfully in which the need for the tuned circuit and link is eliminated by using the audio tube in the regenerative receiver as a low-impedance coupling tube. Only a few changes are necessary in converting the National SW-3 to suit the new requirements. The audio coupling impedance between the detector and audio am-

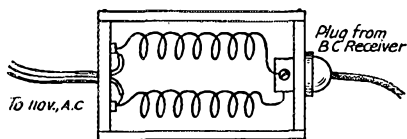


Fig. 1 — 28-Mc. line filter used by W3QY to squelch b.c.i. Coils each consist of 16 turns No. 16 enameled wire on a 1 3/8-inch diameter form.

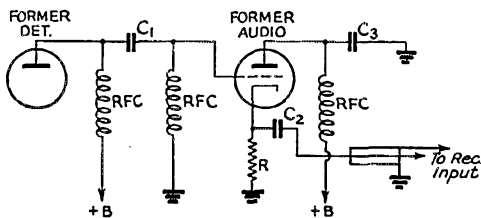


Fig. 2—W3COG's arrangement for using audio amplifier as low-impedance coupling tube when using an 5W-3, or similar receiver, as a preselector. C_1 and C_2 are each 500 $\mu\text{fd.}$, C_3 is 0.02 $\mu\text{fd.}$ R is 1000 ohms.

plifier is removed. The plate of the former detector is then coupled to the grid of the former audio amplifier through a 500- $\mu\text{fd.}$ mica condenser and the grid connected to ground through an r.f. choke. The plate of the former audio amplifier is by-passed to ground and the plate voltage fed to it through an r.f. choke. The audio cathode resistance and by-pass condenser are removed and a 1000-ohm resistor to ground substituted. The output of the preselector is then taken off across this resistor with a 500- $\mu\text{fd.}$ condenser in series as shown in the diagram. The link to the input of the receiver should preferably be shielded. It might also be well to substitute an isolantite or other low-loss socket for the bakelite socket in the audio amplifier circuit. — Louis N. Seltzer, W3COG.

CONNECTING DISSIMILAR PLATE TRANSFORMERS IN SERIES

ROY WHEADON, W6KTY, suggests the circuit shown in Fig. 3 to solve the problem of connecting unlike transformers in series to obtain higher plate voltage. When identical transformers are connected in series, no problem is involved, since a center tap is easily obtained at the junction of the two identical secondaries. When dis-

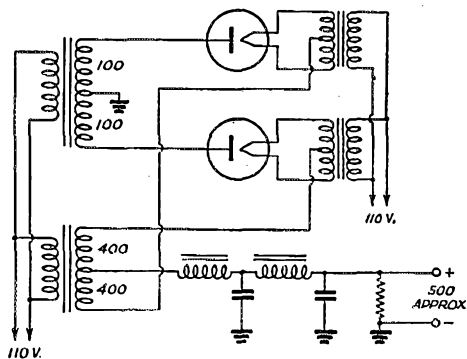


Fig. 3—Circuit for obtaining symmetrical output with combination of dissimilar transformers in series to obtain higher voltage. Insulation of secondary of transformer connecting to filter must be sufficient to withstand total voltage.

similar transformers are used, a center tap is impossible and the only means of using such a combination has been by use of the bridge-rectifier system which requires no center tap but does require four rectifier elements.

In the system suggested by W6KTY, only two rectifier elements are required, but each filament must be insulated from the other. Double rectifiers, like the type 83, may be used by connecting plates in parallel and using a separate tube for each element shown in the circuit diagram. Balanced output is obtained by connecting one of the transformer secondaries in the rectifier return leads and using both center taps. As with any series arrangement, the transformer on the positive side must have sufficient insulation to take care of the additional voltage. Correct polarization of the primary windings will be required. This can be determined by trial. Incorrect polarization will result in bucking voltages.

HINTS ON IMPROVING THE FB-7 RECEIVER

FROM the experience I have had with an FB-7 receiver, which I purchased a short time ago for five dollars, I believe one or two improvements I have made would be worth-while to anyone using this type of receiver.

To begin with, the input selectivity can be improved by reducing the number of turns in the antenna coil. I have found that three turns for the 160-meter band, two turns for the 80-meter band and one turn for the 40- and 20-meter bands is about optimum for use with a 25-foot receiving wire. Some slight variation from these figures might be better for antennas of different lengths.

With the primaries altered as described, it may be necessary to readjust the trimmer condenser inside the coil form. It should be adjusted with the receiver connected to the antenna with which it is to be used.

Harmonics of the high-frequency oscillator are sometimes responsible for spurious responses in the amateur bands. It has been found possible to reduce these harmonics by lowering the oscillator plate voltage. This also has the effect of lowering

Northwestern Division Convention Olympia, Wash., August 23rd-24th

THE sixteenth annual convention of the Northwestern Division will be held at Olympia, Wash., August 23rd and 24th. Headquarters will be at Hotel Olympian. A good time is promised all attendants, and there will be many features such as emergency equipment demonstrations and contests. Registration fee is \$4.00, or \$3.50 before August 10th; YL's and XYL's fee, \$2.00. For additional information write Convention Chairman O. U. Tatro, W7EPN, 513 North Central St., Olympia.

the hiss level appreciably. A most convenient way to make this alteration is to replace the two-thousand-ohm resistor in the plate circuit of the 24A with one of fifty thousand ohms. A wire-wound resistance is recommended to avoid possible drift.

After making the above changes, I found that the old FB-7 compared favorably with most modern receivers and it has proven more than satisfactory for general amateur and traffic work. — Chas. F. Rockey, W9SCH.

Signal Corps Radio School

(Continued from page 11)

would sound if sent at a twenty-word rate — there is then a considerable pause equivalent to somewhat over four characters duration — then he will hear another character sent at the twenty-word speed. Thus he learns the sound of characters sent at normal operating speed, and not by counting dots and dashes. The student is always taught to print, not write, on paper, what he hears. Writing the characters down will not do. Army transmissions are for the most part sent in code or cipher groups, and all characters must be perfectly legible not only to the operator but to those who may be called upon to decode or decipher the copy. Twenty words per minute is generally the upper limit that an operator can attain in pencil printing.

Operators with previous experience may be given the fixed station operators course. This includes elementary instruction in touch typing, and the student gradually increases his speed from five words per minute on the mill (typewriter) until he qualifies as a thirty-five-word-per-minute operator. He is likewise given practice with the bug. Thirty-five words is not the upper limit, however, if he has the ability he may work up to any speed that is possible for him to attain. Fixed station operators are taught the so-called "War Department" procedure, which is very similar to commercial procedure. Chief of the code instruction is Master Sgt. Reuben Abramowitz (known to thousands as "Abe"), who has been training radio operators for seventeen years. He claims that there is no limit to the training an operator can get at Monmouth.

Being enrolled as a student in the Signal Corps School does not mean that the enlisted man is relieved from the daily tasks that are part of the duties of all soldiers. He must take his turn at K. P., and with the various fatigue details to which he may be assigned. On Saturday mornings he stands inspection with his own organization. After 1:00 P.M. on Saturdays his time is usually his own. He may find recreation at any one of the various beaches along the Jersey Shore; Long Branch and Asbury Park are only a few miles away. There is convenient bus and rail transportation to New York City.

On the post, each organization has its own baseball team, and there are other organized athletics. There is also an active theatrical group here with a considerable amount of Hollywood and Broadway talent, and there are movies at the War Department theatre every night.

All men who are radio amateurs, or who have had radio experience of any kind, or who have the desire to learn theory or operating, belong in the Signal Corps. Should you be drafted, *be sure to request the authorities, at your induction center, to send you to Fort Monmouth.* The opportunities offered you here are without parallel, and it can be truly said that a soldier learns while he earns, when attending this school.

★ New Receiving Tubes ★

RCA ANNOUNCES two new receiving-tube types. The 5Y3/5Y3G is a new full-wave, high-vacuum rectifier having the same characteristics as the 5Y3G which it supersedes. It employs GT-type construction and is directly interchangeable with the 5Y3G.

The 12SL7GT is a new single-ended, high- μ twin triode with separate cathodes. It is recommended for use in resistance-coupled circuits as a voltage amplifier or phase inverter. Operating data are as follows:

Heater voltage	12.6
Heater current (amperes)	0.15

Values for Each Section

Plate dissipation (watts)	1
Plate voltage	250
Grid voltage	-2
Amplification factor	70
Plate resistance (ohms)	44,000
Transconductance (umhos)	1600
Plate current (ma.)	2.3

Base connections are the same as for the types 12SN7 and 6SN7 (Diag. 8BD).

SYLVANIA announces the following revisions of ratings given on page 74 of *QST* for the types 6AH7GT and 12AH7GT: At a normal plate voltage of 180, the recommended biasing voltage is 6.5. Transconductance is now given as 1900 umhos, normal plate current 7.6 ma. and plate resistance 8400 ohms.

NEW TRANSMITTING RECTIFIER

RCA announces a new mercury-vapor, half-wave rectifier designed primarily for transmitter use. Its dimensions are such that it requires less than half the space of the type 866/866A. Its ratings are the same as those for the 866/866A except that the peak inverse voltage should be limited to 5000 and the peak plate current to 500 ma. The average plate-current rating for the tube is 125 ma. per tube or 250 ma. for a pair in a full-wave rectifier.



CORRESPONDENCE FROM MEMBERS

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

A BOUQUET FROM MR. FLY

Federal Communications Commission,
Washington, D. C.

Dear Mr. Warner:

Thank you for your courtesy of June 16th in sending me a copy of the June issue of *QST*.

The latter is no stranger to me, for each issue finds a welcome place on the reading table in my office. However, your letter affords me a long-desired opportunity to personally hand an orchid to The American Radio Relay League, and to that great fraternity—the “hams”—in general.

Our experience here has been one of pretty consistent understanding and cooperation on the part of the amateurs. This loyal spirit is now reflected to a marked degree in the proceedings of the Defense Communications Board. The Government, I am sure, is fully cognizant of the value of such patriotism and collaboration in the present emergency.

As for the ARRL, I am personally appreciative of its exemplary operation, not only in the interests of the amateurs themselves but also in behalf of the advancement of radio itself. I am particularly impressed by its effort to picture broad issues, as well as stressing basic principles. Its continued caution that “hams” adhere to regulations dictated by the emergency is most helpful to all concerned.

Also, I want to express my personal appreciation of your own individual service to Government and amateur alike. I might add that I hear this same sentiment expressed by Commission keymen who have to do with the amateur field.

Most sincerely,

James Lawrence Fly, Chairman

CODE PROFICIENCY

3521 Burton St., Fort Worth, Texas

Editor, *QST*:

... I would like to take the opportunity to express my sincere appreciation and gratitude for the very attractive Code Proficiency award which you sent me following my correct copy at 20 w.p.m. in the May 14th qualifying run. Believe you me, I'm proud of it and have it framed in an honored place in my den. ... I am studying for my ticket now, and hope to have a rig of my own on the air soon. The technical information in *QST* is aiding me wonderfully, and my ARRL *Handbook* contains all that I could ever hope to need in amateur radio information. ...

— *Billy M. Lyerly*

Editor, *QST*:

5 Hanson Court, Woburn, Mass.

... I just turned ham last month and this is my first try at the Code Proficiency award. I raised my speed (25 w.p.m.) through the nightly ARRL code practice, and I appreciate this very much. ...

— *John Daley, W1NGB*

Editor, *QST*:

579 Eastern Ave., Lynn, Mass.

... I want to thank and commend you for your fine work in connection with this code proficiency program. I could barely copy 15 w.p.m. before I started using the practice transmissions a month ago. Since then my speed has increased to the present 25 w.p.m.—and I haven't been listening every night, either. If it weren't for this program I'd still be copying a measly 15 per. So thanks a meg. ...

Just don't discontinue the program before I get my 35 w.p.m. sticker!

— *Edmond Manna, W1NFP*

R.F.D. 3, Corapolis, Pa.

Editor, *QST*:

... This copy (25 w.p.m.) was made with no practice for a great many years. Although I've been active as a ham for over 20 years, I have rarely ever actually copied anything since the spark days. For the past four or five years I've been on 'phone, so have had very little code practice.

I think your program on code proficiency is a splendid idea and worthy of the attention of all amateurs. Personally, I intend to keep after it until the top is achieved. ...

— *H. L. Sairs, W8LW*

6546 Cornelia Ave., Chicago, Ill.

Editor, *QST*:

This is the first afternoon transmission I have attempted to copy, and it sure is fine business on your part. Some of our brotherhood could be better sports and try copying your transmission instead of tuning up their rigs right on top of you, however. ... Some of this QRM would do well to listen to some good sending. ...

— *Elmer J. Trent, W9NGA*

4226 Valley Road, Cleveland, Ohio

Editor, *QST*:

It is maddening the way the local QRM piled up on W1AW right smack in the center of the 35 w.p.m. transmission. ...

— *Robert Wrase, W8UZJ*

1002 State St., Beardstown, Ill.

Editor, *QST*:

... I don't wish to be a chronic grouch, but ... I work nights and it was through the efforts of my fellow workers that I got to be home this short while, and then to have interference—well, it was kind of aggravating. Can't we have a little more cooperation?

— *Charles E. Bailey, W9HUX*

CODE PROFICIENCY AND APPOINTMENTS

612 West Joppa Road, Towson, Md.

Editor, *QST*:

Somehow or other I just can't get my mind off the squib which appeared on page 12 of the last ORS/OPS Bulletin, showing the results of an impromptu poll on the subject of making the ARRL Code Proficiency Certificate a requirement for ORS, OPS and EC appointments. Some of the officials actually didn't think this should be done! ...

It seems to me that, in these times, it might pay us to think a little on this subject in terms of fundamentals. Let's not forget that we don't define an amateur. The FCC does, and its definition is that an amateur is a U. S. citizen who has taken and passed an examination in radio-telegraphy at a speed of 13 w.p.m., in radio theory and law, etc., and who has been issued an amateur license to operate for public benefit. It wouldn't be a bad idea for some of us to write that definition on a card and stick it somewhere on the operating desk, just as a reminder. ...

(Continued on page 68)



OPERATING NEWS

F. E. HANDY, WIBDI, Communications Mgr.

J. A. MOSKEY, W1JMY, Asst. to the Coms. Mgr.

Warning. Fifteen Amateur Licenses Suspended. Because they violated the FCC emergency order prohibiting communication with points in foreign countries, fifteen amateurs' licenses have been suspended . . . thirteen in June, plus a W8 and a K6 on July 1st! The Commission reports no evidence of subversive activity, but stipulates that the licensees were clearly violating Order No. 72, and that these suspensions are "exemplary of emergency requirements and demonstrate the futility of trying to flout the ether patrol." Those suspended suffered a 60-day suspension. In the June issue we identified an out-and-out *revocation* for this offense!

Space prohibits our identifying all these operators. If the fifteen thought they were getting away with something, their simple reasoning has been found at fault. The penalty was prompt! FCC means business, and the lesson will not be lost on all amateurs interested in staying on the air. ARRL again urges upon amateurs the thought that violations of this order must *completely cease*. Besides the personal risk of incurring the most severe penalties, as the radio security of the country takes on increasing international importance, the irresponsible DXer is wantonly destroying the faith and trust of the government in the responsibility of radio amateurs as a class. All good amateurs should watch for and prevent any violations of FCC orders, should be vigilant against deception while themselves operating, and quick to report promptly to ARRL or FCC any observed violation!

There is scant amateur sympathy for any licensee who loses his ticket for violation of the order prohibiting foreign communication. The view is becoming general that the sooner violators are turned over to the government for attention, the safer and sounder amateur radio privileges will be made for the rest of us amateurs, who are doing all we can to show responsibility and to prepare ourselves for defense work and public service. The answer of so many of those caught calling and working contrary to Order 72 that "it sounded like a W prefix" caused some of the government officials to politely "regret" the circumstances, but perhaps with the tongue-in-cheek. Even the smartest alibis didn't save licenses!

U.H.F. Round-Up Coming Aug. 9th-10th. The nation's u.h.f. enthusiasts are to have a mid-summer round-up on the air. The basic point

scoring system has been simplified so it is the same for work on any u.h.f. band. Multipliers take care of the ability to work portable, use c.w., or cover different bands. Besides the chance of getting in on a transcon, there's fun and marathon points guaranteed for all. See details elsewhere in this issue, and tune up on u.h.f.'s, August 9th, everybody.

Code Rhythm. The ear is a forgiving organ. Once one views a tape recording of what *sounds* like pretty passable stuff, glaring defects in spacing become apparent. By mental adjustment we quickly recognize and "read" passable code, once we have our habitual responses trained by practice, and more practice, in reception and transmission of Continental. What a wonderful sensation it is to run into an operator now and then who really has highly-developed code rhythm, who can skillfully put emphasis and expression in his rhythmic sending. A lot of amateur sending lacks "poise." We earnestly hope a two-part *QST* article starting soon on *good fists* will help thousands interested in the CODE PROFICIENCY PROGRAM to arrive at the ability to make the good old key really talk. The experienced way in which he slings Continental is the mark of the real amateur!

We hear that many are using the daily-except-Friday W1AW practice sessions, as had been suggested for *sending* practice. Therefore, we continue to give the listing of subject material for three of the six weekly practice runs each month in *QST*. To get *sending* help, hook up your own key and buzzer (or oscillator), turn to the *QST* material, tune in W1AW, and attempt to send right in step with the tape signals. It will help you to adjust your spacing in the direction of automatic or ideal sending as no visual record can.

Got Your Ticket to the Code Proficiency Frolic? This major ARRL September operating fun is to be September 12th-13th-14th, 19th-20th-21st. No details here. The September issue will have the brief, simple outline. This is only a reminder . . . a last call for those who need to get into the group of those having ARRL Proficiency Awards on the currently announced runs for qualification. Many thousands of amateurs having the proficiency certificates will be taking part, and *you will want to be one of them!* Look up all dates of qualifying runs and be in on this big September event. To wait until September will make you too late.

Invitation. If not already lined up, and if you have a good amateur station, we invite you to help in expanding our ARRL Section networks for handling messages to and from those men in the services. Each SCM, RM and PAM is working for additional city and town coverage in creating interconnecting city-to-city defensive networks in which you should seek a place if you are a licensed transmitting amateur wishing to combine radio operating training and practical service to the nation. Your Section Manager, whose address appears on page 4 of this *QST*, will gladly take care of your application for ORS or OPS posts which can be earned by consistent operating and reporting to the SCM. Networks for both c.w. and voice operators are being built up. A special organizing effort is being made by the leaders in each Section, starting with a survey by leaders by radiogram during July 26th/27th activities. Whether your interest is in expert c.w. or voice operating, ask your SCM to line you up with his networks if possible. Give him your operating frequencies and brief station-operator details, so he can put you in touch with the proper RM or PAM.

New Booklet Free to Members. A new edition of the 20-page *Operating an Amateur Radio Station* has added sections on Code Proficiency and network organizing and a tabulation of the new special FCC Orders. Any amateur may receive this booklet by sending 10¢ to ARRL to cover mailing charges, and any League Member may get it free on request as part of his membership service. Since part eight of the booklet has several pages of detailed information about the field organization appointments, duties of officials, etc., every operating amateur, especially those interested in becoming part of the defensive networks of amateur radio, should secure this publication that explains the different appointments and League Awards to radio amateurs.

— F. E. H.

BRIEFS

Add family schedules: Bob Cobble, W4BWN, and Jim Cobble, W4RM, of Chattanooga, Tenn., have a brother, Jerry, in Covington, Ga. Each evening they all get together for a three-way rag chew on c.w.

— * * * * *

Just before noon on May 20th, W1IUI received a call from the Forestry Department and the State Police of New Hampshire that a communications emergency existed at the scene of a forest fire in Stoddard, N. H. The telephone service for that territory being a private arrangement, the Forestry Department was unable to get a special line, the nearest being four miles distant. W1IUI contacted the Exeter and Hampton Electric Co. who released W1LSN. Together these two amateurs proceeded to the scene of the fire with 56-Mc. mobile equipment. There, in spite of a path very unfavorable to u.h.f. signals due to mountainous terrain, the gap between fire headquarters in Stoddard and the nearest 'phone in Antrim, N. H., was bridged and 100% contact maintained until the fire wardens no longer had need for the circuit at 6:30 P.M. the following day. Total time of operation via this amateur radio emergency communication setup was seventeen hours.

ARTICLE CONTEST

The article by Mr. George W. Martin, W6STT, 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!

Notes on Receiver Usage

BY GEORGE W. MARTIN, W6STT*

THE advent of the electron-coupled oscillator as a reliable means of excitation for amateur radio transmitters has introduced a multitude of advantages with which most of us are familiar. It is the purpose of this article to discuss briefly the cause, effect and remedy for one of the few disadvantages that has arisen from e.c.o. operation. Specifically, this lies in an increasing tendency on the part of amateur radio station operators to limit the scope of their receiver tuning either to the exact frequency to which their own transmitter is adjusted, or, at best, to a few kilocycles each side of this frequency.

Happily, the disadvantages that e.c.o. operation has introduced are so overwhelmingly in the minority, that even the "die-hards" must admit that this welcome addition to our family of gadgets is here to stay. For this very reason, we must consider diligently whatever disadvantages may arise from its operation, lest we lose sight of them altogether in our contemplation of the vast improvement it has made. Furthermore, it is not the way of the progressive amateur to overlook any disadvantages — even apparently insignificant ones. We have learned that it is in just such matters that our patience and diligence pay best dividends, that our perseverance in quest of the solution to a difficult problem is usually rewarded by the development of an effective remedy.

A few hours spent in listening on any of our active bands will convince most of us that, while there are a few exceptions, the average American amateur does not move his receiver tuning dial very far to either side of "zero beat" with his transmitter signal from one week to the next! In seeking the cause for this situation, an analysis would seem to indicate that, since an operator can make highly satisfactory contacts almost at will and never move his receiver tuning far from his transmitter frequency (because answering stations shift by e.c.o. to his frequency), it is only natural for him to conclude that it is poor practice to *ever move the dial at all!*

We all know that this is certainly not true. Yet, one might believe after listening for a while, that there are FCC regulations which prohibit a station on, let us say, 3600 kc. from contacting one on 3700 kc., or a station on 7100 kc. from answering a "CQ" he has heard on 7200 kc. without first shifting his transmitter to the latter frequency. We surely

*345 "C" Avenue, Coronado, Calif.

do know that such regulations do not (and never should) exist.

It must follow, that an effective remedy for such a deplorable state of affairs will depend, as usual, upon the rank and file of U. S. amateurs. Upon you and me. Upon our determination to develop an habitual receiver operating practice whereby our hours of station operation are characterized by constant vigilance within the channel we choose, not only in the narrow confines of five or ten kilocycles each side of our transmitting frequency, but outward therefrom to the very edges of the band. In the universal adoption of this (or equivalent) procedure, and in this alone, can we hope to achieve the highest standards of alertness, efficiency and intelligence in receiver usage, as a function of our communication activity.

The pilot of a vessel would not consider navigating his craft through a narrow channel wearing "blindlers" that would limit his vision forward to a scope of, let us say, ten or fifteen degrees. By no means! He would insist upon removal of the "blindlers"—upon being able to see not only forward, but also to either side, so that he could do his job intelligently. By the same token, we should constantly strive to broaden our vision of the radio-frequency channel we would negotiate. For unless we take soundings at every depth (listen at all points on the band), how shall we discern the shallows and the shoals of that channel?

An amateur who has held his ticket for over five years recently stated during a QSO that he was "new to the high end of the 7-Mc. band" (most of his previous work having been in the vicinity of 7100 kilocycles). He spoke as though he were blazing new trails. He was like a lost wanderer far from the familiar landmarks of a narrow realm beyond which he had not dared to venture; but having done so, he was having a whale of a time!

Relatively few of us can ever experience the same emotions that thrilled Columbus when he first beheld the New World, of Balboa as he scanned first the mighty Pacific, or of Amundsen and Byrd as they crossed the earth's poles. But we can know the downright joy of achievement in our own right—the joy that comes from a thorough vision of the radio-frequency channels that have been assigned our service. To this end, it behooves all of us to spend a preponderance of our station operating time in a systematic process of listening, so designed that the net result will be the final elimination of all superfluous transmissions.

How to accomplish this?

Firstly, we must listen carefully *before* we call "CQ." By doing this, we can be sure that our signal will be "in the clear" when and if we make contact, and that a "QRM" report will not mar its perfection. Better still, perhaps we will hear a call from the very station or locality we desire to contact. If not, then, and only then, is it logical to transmit our "CQ."

Needless to say, we should comb the band thoroughly after each general call. But it is surprising how many otherwise efficient operators will toy around with their key knobs, bug adjustments, log entries, call book data, cigarettes and other diversions during that all-important time for listening. If they would truly know the channel they traverse, those dawdling hands must come to life—must deftly adjust the vernier tuner so that even the faintest signal, from one limit of the band to the other, will be heard, will be nursed into cognizability by the proper finer adjustments to preselector, gain control, noise limiter, crystal filter and (sometimes) rotary beam.

This routine of receiver usage, simple though it may be, is one that, along with other approved station operating standards, might well be the goal of every radio station operator, and especially so, in the light of present-day operating trend, influenced as it is by our otherwise helpful e.c.o. exciter units.

BRIEFS

We've all heard of stringing up antennas for portable operation by tying the end of a piece of wire to a rock and heaving it over the limb of a tree. Here's a new wrinkle: In charge of FD arrangements for the Cuyahoga Radio Assn.,

Brass Pounders' League

(May 16th-June 15th)

Call	Orig.	Del.	Rel.	Extra Del. Credit	Total
W7EBQ	85	160	1730	148	2123
W4FL	15	36	1374	28	1453
W6PGB	265	394	385	382	1426
W6LUJ	359	479	3	468	1309
W5OW	177	119	944	45	1285
W3BWT	96	117	769	111	1093
W6ROZ	106	90	774	80	1050
W3FJU	217	49	709	37	1012
W6FWJ	81	59	759	52	951
W9JMG	10	56	874	6	946
W6DH	56	85	691	43	875
W3GKO	11	40	780	31	862
W5FDR	105	149	424	102	780
W6RWW	38	174	356	163	731
W3CIZ	22	38	635	33	725
W6IMI	136	232	92	160	620
W5MNI	52	136	302	115	605
W2MNT	32	43	478	37	590
W2BO	33	30	470	44	577
W6IOX	13	35	468	34	550
W6BMC	73	64	406	2	545
K7HZM	0	0	523	0	523
W4DD	0	0	514	0	514
W9OZN	16	8	480	4	508
W9ILH	21	87	372	26	506
W9ESA*	41	131	226	102	500

MORE-THAN-ONE-OPERATOR STATIONS

Call	Orig.	Del.	Rel.	Extra Del. Credit	Total
KAIHR	1730	1158	14	1132	4034
W3CXL	153	54	927	54	1188
KAIHQ	221	197	220	182	820
W9KXR	261	293	36	0	590
W9NFE	221	122	130	68	541

These stations "make" the B.P.L. with total of 500 or over. One hundred deliveries—Ex. Del. Credits also rate B.P.L. standing. The following one-operator stations make the B.P.L. on deliveries. Deliveries count.

W8KWA, 382	W6IG, 148	W2BWC, 119
W2MLW, 230	W2KI, 144	W6RQ, 118
W7APS, 228	W6LW, 139	W5DD, 113
W8SCW, 220	W6LW, 136	W9AWP, 111
W2CGG, 210	W5DWW, 135	W6RBO, 110
W2CGG, 208	W2BGV, 127	W9JO, 107
W6CFN, 194	W6ZX, 126	More-than-one-opr.
W7GVH, 154	W5BN, 124	W1AW, 271
	W6OIF, 123	

A.A.R.S.

Call	Orig.	Del.	Rel.	Extra Del. Credit	Total
WLMH (W6CDA)	8	21	900	15	944

MORE-THAN-ONE-OPERATOR STATION

Call	Orig.	Del.	Rel.	Extra Del. Credit	Total
WLM (W3CXL)	299	178	2041	178	2696

A total of 500 or more or 100 deliveries—Ex. D. Cr. will put you in line for a place in the B.P.L.

* April-May.

W8AOK carefully laid out lengths of fish line on a table at the field location. He then tied sinkers to one end of each line. Fitting said sinkers into an old-fashioned slingshot, he proceeded to aim at tall trees near-by. Presto! Antennas up all over the place!

We have recently received many inquiries at Hq., from people who had asked us to forward QSL cards to the representatives of KC4USA/B/C, regarding the possibility of obtaining confirmation of contact with Little America. Those who sent their cards via ARRL will be pleased to know that Elmer Lamplugh, who operated KC4USC,

dropped in on us a short time ago and picked up all the cards we had on hand for KC4. Your Little America card should be coming along any day now.

For the benefit of beginning amateurs, W8RVO, of Springfield, Ohio, is conducting code practice daily except Saturday at 2:00 P.M. EST on 1900 kc.

SS correction: The winner for Western Pa. is not W8OKC as listed in June QST. This station was incorrectly listed; it should have been included in the Eastern Pa. scores. W8KUN is the rightful winner and has been awarded the certificate award for his Section.

On May 17th last, the amateurs of the Crystal Radio Club of Blauvelt, N. Y., participated in the Third Annual Mock Disaster Mobilization of the Rockland County Emergency and First Aid Council, Inc., under the auspices of the American Red Cross at Memorial Park, Nyack, N. Y. It was assumed that a disaster had taken place at the park in Nyack and that all types of equipment were needed to rescue the injured and restore order. W2BGH, operating at this location, on 112 Mc, issued a call for the N. Y. Tel. Co. and the Rockland Light and Power Company trucks, so that communications and light service might be restored. This was followed by calls for fire trucks, rescue squads and ambulances. Assisting in the working of the local Emergency Net were W2IRA, W2ITE, and W2FMI, with W2HVR in Tarrytown standing by in case assistance was needed from Westchester County. Meanwhile W2FVJ was cruising over the county in an airplane with a transceiver and standing by for orders. An interesting highlight of this phase of the mock disaster was the simulated rescue of a man and baby who had gone overboard from a canoe in Hudson River. Supposedly spotted by the plane, W2FVJ relayed the information to W2NIL, stationed aboard the Sea Scouts boat in the river. The boat effected the rescue and W2FVJ summoned an ambulance to the scene by working W2ITE at the Nyack Hospital. Shortly following all stations were released from duty after a thoroughly convincing demonstration to the public of the potentials of amateur radio communication during time of local emergency.

W1AW Operating Schedule

OPERATING-VISITING HOURS:

2:00 P.M.—2:00 A.M. EST daily*, except Saturday-Sunday.

* Exception: During an Operators vacation, that is between dates of September 4 to September 19 inclusive, station hours will be 7:00 P.M.—1:00 A.M. EST since in that period one attendant, instead of the customary two station attendants will be available.

Saturday and Sunday — 7:00 P.M.—1:00 A.M. EST.

OFFICIAL BROADCAST SCHEDULE (for sending addressed information to all radio amateurs).

Frequencies

C.W.: 1761-3825-7280-14,254-28,510-58,968 kc. (simultaneously)

NOTE: Effective July 25th, the 7-Mc. frequency will be changed from 7150 to 7280 kc.

	Starting Times (P.M.)			Speeds (WPM)							
	EST	CST	MST	PST	M	T	W	Th	F	Sat	Sun
8:30		7:30	6:30	5:30	20	15	25	15	20	—	20
Midnight		11:00	10:00	9:00	15	25	15	20	15	15	—

PHONE: 1806, 3950.5, 14,237, 28,510, 58,968 kc.

Each code transmission will be followed in turn by voice transmission on each of the above frequencies.

CODE PRACTICE:

Besides the OBS times and word speeds given above, W1AW will adhere to a schedule for sending code practice transmissions at progressively increasing speeds (15 to 35 w.p.m. in 5 w.p.m. steps) daily except Friday, starting at

9:45 P.M. EST. The Proficiency Certificate Award qualifying runs, after a 15-minute advance notice at 9:45 P.M. EST, start at 10:00 P.M. EST, August 18th and September 20th. Daytime runs for qualification, after notice at 1:30 P.M. EST., start at 1:45 P.M. EST on August 3rd and September 6th.

GENERAL OPERATION:

Besides specific schedules in different bands, W1AW devotes the following periods*, except Saturdays and Sundays, to GENERAL work in the following bands:

Time EST	Frequency
3:30 P.M.—4:00 P.M.	7150-kc. c.w.
4:30 P.M.—5:00 P.M.	14,237-kc. 'phone
6:00 P.M.—6:30 P.M.	14,237-kc. 'phone
6:30 P.M.—7:00 P.M.	14,253-kc. c.w.
8:00 P.M.—8:30 P.M.	14,253-kc. c.w.
9:15 P.M.—9:45 P.M.	3950-kc. 'phone
12:45 A.M.—1:15 A.M.	1806/1760-kc. 'phone/c.w.
1:15 A.M.—2:00 A.M.	3825-kc. c.w.
7:00 P.M.—8:00 P.M.:	Schedules on 3500-kc. band
9:45 P.M.—11:00 P.M.:	Code Practice, all c.w. freqs.
11:00 P.M.—Midnight:	National Trunk Line Net NCS

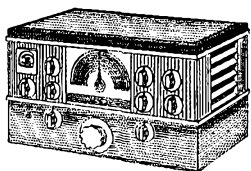
At other times, and on Saturdays and Sundays, operation is devoted to the most profitable use of bands for general contacts and to participation in special week-end operating activities. The station is not operated on legal national holidays.

W1AW SENDING-PRACTICE SUBJECTS AND QUALIFYING RUNS

July 20th to September 1st., Sunday, Tuesday, Thursday
(Daily, except Friday, practice starts at 9.45 P.M. EST)

Date	Subject of Practice Text from July QST.
July 20.	Evening qualifying run instead of practice. Unannounced copy.
*July 22.	A Transmitter Frequency Control Unit, p. 45.
*July 24.	Eleventh A.R.R.L. Sweepstakes Results, p. 49.
*July 27.	Hints and Kinks, pp. 56-57.
*July 29.	Op. News (Revoked. Copying Ability), p. 63.
*July 31.	Minutes of 1941 Annual Meeting, pp. 35-36.
Aug. 3.	1.30 P.M. EST, W1AW daylight qualifying run. Unidentified copy.
Aug. 3.	It Seems to Us (Frits. Clippings), p. 8.
Aug. 5.	A Versatile Portable Emergency Transmitter, p. 9.
Aug. 7.	Op. News (Emergency, Fall Activities, Copying Behind), p. 43.
Aug. 10.	Apartment Size 100 Watt Transmitter, p. 12.
Aug. 12.	New Membership Rules. New ARRL Treasurer, pp. 16-17.
Aug. 14.	Mexican Amateurs in Colima Earthquake, p. 22.
Aug. 17.	A Sensitive Absorption Wavemeter, p. 19.
Aug. 18.	Evening qualifying run instead of practice. Unannounced copy.
Aug. 19.	In the Services, p. 27 and 68.
Aug. 21.	U.S.A. Calling, p. 32.
Aug. 24.	Optimum Q and Impedance of R. F. Inductors, p. 28.
Aug. 26.	W9BSP Paley Award Winner, p. 26; Ionosphere Predictions, p. 24.
Aug. 28.	Hints and Kinks, p. 40 and p. 86.
Aug. 31.	Notes on UHF Antenna Heights, WWV Schedules, pp. 38-39.

* June '41 QST.



It is by now an old story to most of our customers that the defense program is curtailing the use of certain materials in consumer products. Like nearly all manufacturers, National is faced with the necessity of re-designing products to meet these requirements.

Such being the case, we have decided to make a virtue of necessity. Whenever it has been necessary to abandon an old construction, we have engaged in intensive development to find a new and better way for which the necessary materials were available. This work has been going on for some time, and you may expect to hear about it from time to time on this page.

We can give you an example of one such change. Some years ago when the NC-100 was introduced, we used a condenser-input filter on the power supply, because such a filter gives the least hum per dollar of cost, and because the load current was so constant that there was no need for the better regulation of the choke-input filter. However, the filament of the Type 80 rectifier heated more rapidly than the cathodes of the output tubes, so that there was a brief period during which the B-voltage reached an abnormally high value. So to protect the filter condensers, we employed a certain type of self-healing wet electrolytic condenser in the filter output. Such a condenser provides a first-class voltage regulator, because the leakage current rises very abruptly whenever a certain voltage is exceeded. In fact, the only reason why these condensers do not make ideal regulators for general purpose work is their inability to dissipate energy fast enough to make them suitable for continuous duty. Over short periods of time they are thoroughly reliable and in this application, highly effective. Consequently, this same filter was used in the NC-200.

These condensers can be made only in aluminum cans, and are now no longer available. So the current NC-200's have been equipped with an excellent choke-input filter whose regulation is inherently good enough to keep the voltage where it belongs at all times. To this we added a special r.f. filter in rectifier output circuit, so that the hum level is, if anything, lower than before. (For all practical purposes the hum was zero with either system, so that this is really splitting hairs.)

Of course, improvements not prompted by the exigencies of the defense program are still being made. There is now, for instance, an audio input jack on the front panel of the NC-200, so that it can be used with phonographs or FM tuners. This is "by popular demand": — for the audio channel of the NC-200 is flat within 2 db from 40 to 15,000 cycles. Another item of improvement is in the mechanism of the coil carriage which now shifts much more easily.

But the main thing we wanted to say is that the defense program will not result in a deterioration of National's quality. There will probably be inconveniences and delays for these we cannot help. But quality we will maintain. The cloud does have one silver lining. The intense research prompted by the defense program is resulting in great technological improvements. Some day we will reap the benefit in the form of finer equipment than we have ever known in the past. Let's hope that day will come soon.

JAMES J. FREELEY





No matter how hot it gets, Mallory Condensers stand up—that is the secret of their popularity. There are temperature limits which must be observed for any type of condenser. When the operating temperatures are near these limits it is essential condensers with extra durability be used to insure satisfactory performance and freedom from break-down.

Mallory Condensers have an added factor of safety—special constructional features which provide longer life. You benefit from this extra, deluxe quality—yet thanks to modern production methods, Mallory Condensers cost no more.

Amateurs, servicemen, and experimenters are urged to discuss their condenser problems, whether for original application or for replacement service. The advice of Mallory Condenser experts is yours for asking. Address, Application Engineering Section, Wholesale Division.

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Hamfest Schedules

July 27th, at Mackinaw Dells, Ill.: The Central Illinois and Peoria Amateur Radio Clubs will co-sponsor a hamfest to be held July 27th at Mackinaw Dells Recreation Park, halfway between Peoria and Bloomington on Route 150. Free beverages and ice cream will be served. A meeting place for each of the Illinois nets will be provided. Exhibits of portable equipment, u.h.f. gear, games, and speakers will feature the day's program and a 112-Mc. transmitter hunt is tentatively scheduled. Registration is \$1.00 for the OM's, 25¢ for the ladies, and children will be admitted free. Secretary H. M. Matthews, W9UQT, of the CIARC will be glad to furnish further details.

August 2nd, 3rd and 4th, at Big Springs, Idaho: The Ninth Annual WIMU Hamfest (Wyoming, Idaho, Montana, Utah) will be held August 2nd, 3rd and 4th, at Big Springs, Idaho, which is located in Targhee Forest, 17 miles south of the west entrance to Yellowstone Park and may be reached via U. S. Highway 191. Accommodations at reasonable rates are available at the location. For reservations write to Manager, Big Springs Inn, Big Springs, Idaho. A public camp ground in a clean and beautiful place, complete with stoves, tables and fire wood, is situated just south of Big Springs for those who wish to set up their own accommodations. Amateurs are urged to bring their families to enjoy the scenery, fishing and various other pastimes. For more information write or radio Lial D. Branson, W7AMU, 1002 E. 15 St., Casper, Wyo.

August 3rd, near Savannah, Ga.: The Amateur Radio Club of Savannah announces a hamfest to be held on August 3rd at the Gold Star Ranch, located three miles south on the White Bluff Road. Registration starts at 2 P.M. The program will consist of two short speeches, various games, including a soft ball game for the men and a Bingo game for the ladies. Refreshments will be served before the games and a banquet afterward. All amateurs are cordially invited to attend this gala affair. Fee: \$1.00 per person.

August 10th, at Trenton, N. J.: The Delaware Valley Amateur Radio Association will hold its Fifth Annual Outing and Hamfest, Sunday, August 10th. The place: Trenton State Fair Grounds, Trenton, N. J. Admission: Adults, \$1.50; children, 75¢. The program starts at 10 A.M., continuing all day, and will include various outdoor sports, games and all the refreshments you can eat and drink. Further details obtainable from Chas. Kayser, W3IOK, General Chairman, 73 Brook Lane, Trenton, N. J.

August 10th, at Shrewsbury, Mass.: The Worcester Radio Association announces its Annual Hamfest will be held on August 10th at Edgemere Lodge, on beautiful Lake Quinsigamond, Route 20, Shrewsbury, Mass. Registration starts at 2 P.M., and the admission fee is \$2.50. The activities for the day will include a 112-Mc. treasure hunt, swimming, boating, YL beauty contest, a special talk for the women, soft ball game, followed by a real good chicken banquet and dancing to an all-girl orchestra. Reservations are limited. Write J. J. Lyons, W1LBU, 94 Lovell St., Worcester, Mass., for additional information.

August 15th, 16th and 17th, at Cincinnati, Ohio: The Greater Cincinnati Amateur Radio Association will co-sponsor a hamfest with the Grand National SWL Club, the International DX'ers Alliance, and the International Round Table of St. Louis, on August 15th, 16th and 17th, in the Hotel Netherland Plaza in Cincinnati. A banquet will be served Saturday. Price: \$1.75. Registration for the hamfest only will be \$1.25. For further details communicate with W8TPZ or W8VBG.

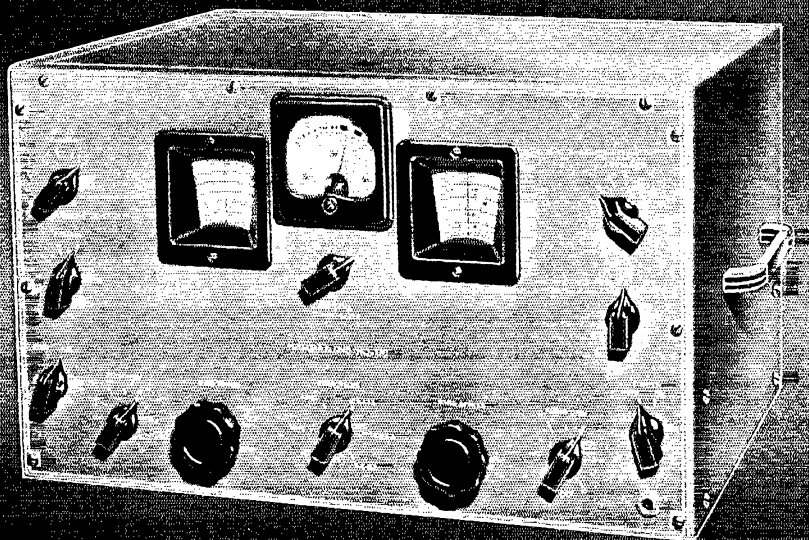
August 30th and 31st, at Chicago, Ill.: The Hamfesters Radio Club announces its First Annual Hamfester Jamboree, to be held August 30th and 31st at the Knickerbocker Hotel in Chicago. A big program is planned, including a hidden transmitter hunt, ultra-high frequency contest, B.C. network show, net meetings, topped off with a banquet. Registration: \$2.50. (No tags or Annie Oakleys.) Additional information may be obtained by simply addressing RADIO-KNICKERBOCKER HOTEL, Chicago, Ill.

ELECTION NOTICES

To all A.R.R.L. Members residing in the Sections listed below:

(The list gives the Sections, closing date for receipt of nominating petitions for Section Manager, the name of the present

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CODE PROFICIENCY AWARDS mean higher operating speed for the amateur. During a high speed QSO there is little time for *fussing* with the receiver. The "HQ-120-X" is free of those operating "bugs" which are a constant menace to high speed operating. Voltage regulation prevents detuning during power line surges; freedom from interlocking prevents strong stations from pulling the receiver off the station you're copying, and an excellent crystal filter permits changes

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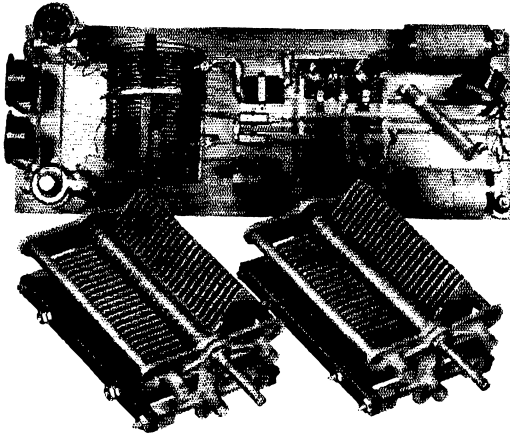
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These two fore-runners of the popular XT-440-PS were used in this transmitter, which established first two-way transatlantic amateur radio communication on November 27th, 1923.

Built and operated by Fred H. Schnell, then 1-MO, (now Radio Supervisor, Chicago Police Department) this transmitter was heard by Leon Deloy, F8-AB, who called Schnell, 1-MO, saying, "R R QRK UR SIGS QSA VY ONE FOOT FROM PHONES." Deloy then called Reinartz, 1-XAM, whose transmitting circuit was used at all three stations and they also worked. Transmission was on 100 meters and consummated a year's constant and unremitting effort by these three pioneers.

CARDWELL produced the first "low-loss" condensers years before these vital points of superiority were recognized and adopted as standard methods of construction.

Close scrutiny will reveal that there have been few additional major improvements in this basic patented design. It is a flattering tribute to the soundness of CARDWELL engineering.

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incumbent and the date of expiration of his term of office.) This notice supersedes previous notices.

In cases where no valid nominating petitions have been received from A.R.R.L. members residing in the different Sections in response to our previous notices, the closing dates for receipt of nominating petitions are set ahead to the dates given herewith. In the absence of nominating petitions from Members of a Section, the incumbent continues to hold his official position and carry on the work of the Section subject, of course, to the filing of proper nominating petitions and the holding of an election by ballot or as may be necessary. Petitions must be in West Hartford on or before noon of the dates specified.

Due to resignations in the Northern New Jersey and San Joaquin Valley Sections, nominating petitions are hereby solicited for the office of Section Communications Manager in these Sections, and the closing date for receipt of nominations at ARRL Headquarters is herewith specified as noon, Friday, August 1, 1941.

Section	Closing Date	Present SCM	Present Term of Office Ends
No. New Jersey	Aug. 1, 1941	Edward Gursky, Jr. (resigned)
San Joaquin Valley	Aug. 1, 1941	Edwin A. Dresser (resigned)
Philippines	Aug. 1, 1941	George L. Rickard	Oct. 15, 1938
Kentucky	Aug. 1, 1941	Darrell A. Downard	Apr. 15, 1940
Western Florida	Aug. 1, 1941	Oscar Cederstrom	Apr. 15, 1941
New Mexico	Aug. 1, 1941	Dr. Hilton W. Gillett	Apr. 15, 1941
No. Texas	Aug. 1, 1941	Lee Hughes	June 15, 1941
Sacramento Valley	Aug. 1, 1941	Vincent N. Feldhausen	June 15, 1941
Hawaii	Aug. 15, 1941	Francis T. Blatt	Feb. 28, 1941
So. Carolina	Aug. 15, 1941	Ted Ferguson	Aug. 25, 1941
Eastern Penna.	Aug. 15, 1941	Jerry Mathis	Aug. 28, 1941
Md.-Del.-D. C.	Sept. 2, 1941	Hermann E. Hobbs	Sept. 17, 1941
Eastern Florida	Oct. 1, 1941	Carl G. Schaal	Oct. 15, 1941
Missouri	Oct. 1, 1941	Letha Allendorf	Oct. 19, 1941
Nevada	Oct. 15, 1941	Edward W. Heim	Nov. 1, 1941
Oklahoma	Oct. 15, 1941	R. W. Batterton	Nov. 1, 1941
Eastern N. Y.	Oct. 15, 1941	Robert E. Haight	Nov. 1, 1941
West Virginia	Nov. 3, 1941	W. D. Tabler	Nov. 21, 1941

1. You are hereby notified that an election for an A.R.R.L. Section Communications Manager for the next two-year term of office is about to be held in each of these Sections in accordance with the provisions of the By-Laws.

2. The elections will take place in the different Sections immediately after the closing date for receipt of nominating petitions as given opposite the different Sections. The Ballots mailed from Headquarters will list in alphabetical sequence the names of all eligible candidates nominated for the position by A.R.R.L. members residing in the Sections concerned. Ballots will be mailed to members as of the closing dates specified above, for receipt of nominating petitions.

3. Nominating petitions from the Sections named are hereby solicited. Five or more A.R.R.L. members residing in any Section have the privilege of nominating any member of the League as candidate for Section Manager. The following term for nomination is suggested:

(Place and date)

Communications Manager, A.R.R.L.
33 La Salle Road, West Hartford, Conn.

We, the undersigned members of the A.R.R.L. residing in the Section of the Division hereby nominate as candidate for Section Communications Manager for this Section for the next two-year term of office.

(Five or more signatures of A.R.R.L. members are required.) The candidates and five or more signers must be League members in good standing or the petition will be thrown out as invalid. Each candidate must have been a licensed amateur operator for at least two years and similarly, a member of the League for at least one continuous year, immediately prior to his nomination or the petition will likewise be invalidated. The complete name, address, and station call of the candidate should be included. All such petitions must be filed at the headquarters office of the League in West Hartford, Conn., by noon of the closing date given for receipt of nominating petitions. There is no limit to the number of petitions that may be filed, but no member shall sign more than one.

4. Members are urged to take initiative immediately, filing petitions for the officials of each Section listed above. This is your opportunity to put the man of your choice in office to carry on the work of the organization in your Section.

— F. E. Handy, Communications Manager

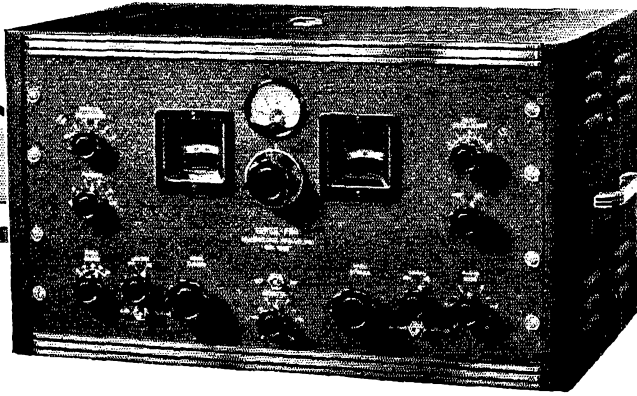
ELECTION RESULTS

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

East Bay	Horace R. Greer, W6TY	May 26, 1941
Vermont	Clifton G. Parker, W1KIG	June 2, 1941
Maine	Ames R. Millett, W1BAV	June 7, 1941
North Dakota	Don Beaudine, W9RJP	June 14, 1941
No. Minnesota	Armond D. Brattland, W9FUZ	June 15, 1941
So. New Jersey	Lester H. Allen, W3CCO	June 22, 1941
Iowa	Ray L. Martin, W9CTQ	July 3, 1941
San Francisco	Kenneth E. Hughes, W6CIS	July 3, 1941

In the Washington Section of the Northwestern Division, Mr. Carl F. Hofmann, W7EPB, and Mr. A. D. Gunston, W7GP, were nominated. Mr. Hofmann received 134 votes and Mr. Gunston received 53 votes. Mr. Hofmann's term of office began May 27, 1941.

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The "SUPER-PRO"

THERE is hardly a place on this planet, where communication equipment is used, that can't boast of a "SUPER-PRO." From Alaska to Antarctic — New York to Shanghai — everywhere "Super-Pro" receivers are doing justice to their fine reputation. Services for which they are used include: military, news, rebroadcasting, diplomatic, and remote pickup.

Engineers have found in the "Super-Pro" two qualities which have long made it famous — RELIABILITY and FLEXIBILITY. Its reliability is a matter of record, its flexibility is the result of sound engineering. No matter what the requirement may be, you'll find as others have, the "Super-Pro" the one receiver most likely to do the job.

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2½ METER PORTABLE—MOBILE—FIXED STATION DK-3 TRANSCEIVER



THE DK-3 features INDUCTIVE ANTENNA COUPLING, continuously variable and controlled from a special coupling knob on the front panel. This enables use of maximum power while the transmitter is in operation and permits a wide degree of receiver control. Weak signals, lost under ordinary conditions, can be worked. Effective range varies from 2 to 30 miles, depending upon terrain.

SPECIFICATIONS

● **FREQUENCY:** Covers the amateur 2½ meter band (112 to 116 mc.) ● **For PORTABLE or MOBILE battery operation:** Three 45 volt B batteries (Eveready No. 482 or Burgess M30) and four 1½ volt batteries (Eveready No. 742 or Burgess 4FH) ● **For FIXED STATION, 110-volt AC operation:** Use an AC power supply giving 135 to 180 volts DC output ● **INDUCTIVE ANTENNA COUPLING:** Variable antenna coupling knob on front panel permits maximum power in transmit position and enables flexible receiver control for both weak and powerful signals ● **ANTENNA:** For portable operation; two pieces of copper or aluminum tubing approximately 17 inches long or an adjustable vertical antenna. For fixed station operation; most standard antennas will work with the DK-3 variable inductive coupling ● **ONLY TWO INEXPENSIVE TUBES:** 6G6C as Audio Amplifier (to receive) or as modulator (to transmit); 6J5GT as Super Regenerative Detector (to receive) or as Oscillator (to transmit) ● **MICROPHONES and HEADPHONES:** Use any good single button 200 ohm carbon mike and any standard headphones. Handsets should incorporate 200 ohm microphone and high impedance phone ● **SIMPLE OPERATION:** One volume control, with on-off switch, for both receive and transmit positions; microphone and headphone jacks; variable antenna coupling knob; ceramic antenna insulators; transmit and receive switch; large easy-tuning knob.

DK-3 Transceiver for 2½ meter operation. Completely self-contained, battery operated, ultra high frequency radio-telephone transmitter or receiver. Compact, grey wrinkle finish metal case with sturdy leather handle. Removable back panel for easy access to batteries and tubes. Size, 11" x 11" x 4½". Shipping weight, 11 pounds. List price, less batteries and tubes. **\$32**
(Subject to Amateur discount)

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The Month in Canada

Well, fellows, this column is getting bigger and better each month, and it is just beginning to be known. When the chaps Overseas start sending in their reports, I am afraid the Editor will have to increase the size of *QST*.

What a grand report last month — and from reports I am receiving this column will be for Canadians the most popular pages of our magazine. A little more news from central and western Canada would make a complete job of the Dominion.

Keep up the good work!

— Alex Reid, VE2BE

IF THE personal items appearing in this page seem to be concerned mostly with members of the service units, there is good reason for it. We have it on the best of authority that at least 1700 of the 3380 individuals holding VE ham tickets at the outbreak of war are now in active service. When it is considered that the 3380 total includes all ages, almost every civilian occupation and every kind of physical condition, the showing becomes a truly extraordinary one. And when on top of that it is stated that of these 1700 more than half are commissioned officers (the majority of them in the RCAF), the performance almost passes belief.

Yet those are the facts. They tell a story of which every one of us can be deeply proud. FB, VE's, and carry on!

MARITIME—VEI

L. J. FADER, 1FQ, our indefatigable Nova Scotia recordist (both on wax and paper!), contributes another collection of VE1 doings gathered in his wanderings around the district with the Concert Parties Division:

EY is with the Canadian Navy (exact location unknown). FE, with the Avon Power Co. at Windsor, N. S., at the outbreak of war was about ready to try out a model yacht to be radio-controlled on five meters. FY is with the Dept. of Transport at Halifax. Previously he was with the Western Union Cable Co. as wireless operator on the cableship *Lord Kelvin*. GC is with the Telephone Co. at Halifax. He was previously in charge of maintenance work at their Lunenburg office. HG, brother of EP, is still attending college. GD is with the Dept. of Transport, located at St. Paul's Island off Nova Scotia. GK is at Truro with the Canadian National railways.

GR is still watching the film feed a projector at the Garrick Theatre in Halifax. HF and JL are on the staff of station CBA at Sackville, N. B. IB is with the Maritime Tel. and Tel., located at Truro. ID is still located at Berwick where he is associated with his father in a flour and feed business. IK is with the Medical Corps of the Canadian Army, stationed at Halifax. IL is at Moncton, N. B., where he is connected with the Royal Canadian Mounted Police. IQ is now at Ottawa with the Civil Service Commission. NS is on the staff of the Atlantic Fisheries Experimental Station in Northern New Brunswick.

JV, KJ and OM are attending college at Halifax. All are members of the college band and dance orchestra. NW is doing service work for T. Eaton Co. at Halifax. OO is a Wireless Air Gunner with the RCAF now serving in England. AW conducts a radio service business in Halifax, with OB as his assistant. KH is with the RCAF at one of the Training Centres in Western Canada. KB is doing radio service work in Halifax. LF and MN, the Stevens brothers, are with the RCAF.

AA, now with the Dept. of Transport, was on the staff of Douglas Aircraft in California. ET is with the Dept. of Transport, having served up north for eighteen months in a govt. wireless station. BV is with the Dept. of Transport as travelling maintenance man with headquarters in Halifax. JK, formerly with the Canadian Marconi Co., is with the

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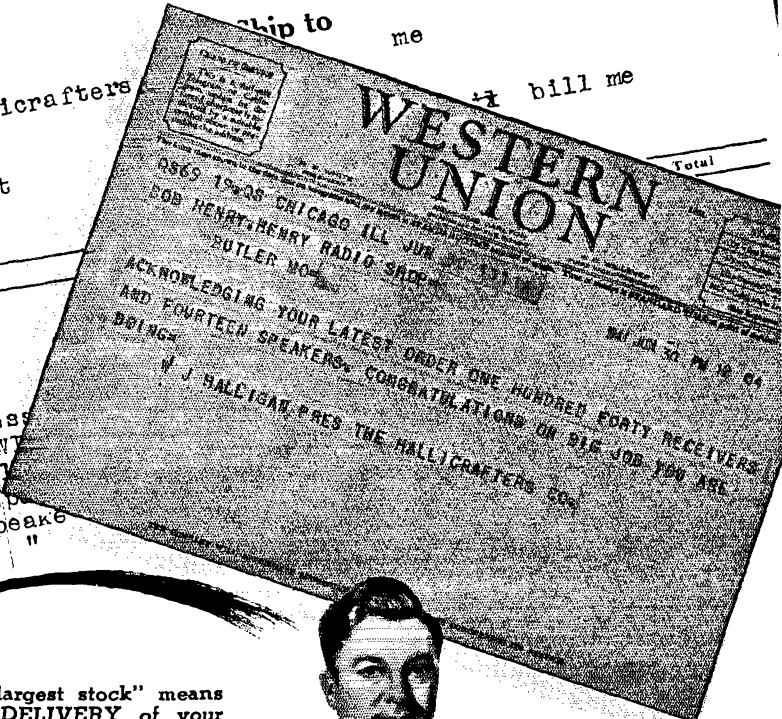
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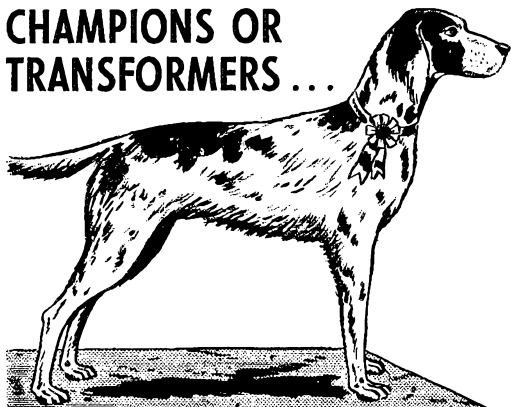
The "world's largest stock" means **IMMEDIATE DELIVERY** of your short-wave receiver. No waiting when you deal personally with Bob Henry. In addition you get a liberal trade-in allowance on your old receiver . . . easy, rock bottom or "charge account" terms . . . and a ten-day free trial! Write me — I will help you get the best receiver and I will cooperate with you to see that you are 100% satisfied. I guarantee you can't buy your equipment for less or on better terms anywhere else.



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CHAMPIONS OR TRANSFORMERS ...



Pedigree Counts



THERE are lots of folks to whom any dog looks pretty much the same as another. But the champion that takes the grand prize at the Bench Show is the one with the pedigree. . . .

And there are people to whom one transformer looks pretty much like another. The same kind of case, the same general specifications, the same ratings. But what a difference there can be!

Smart buyers of transformers do not rely upon appearances. They buy them on the basis of Reputation and Prestige (which is just another way of saying "Pedigree").

Kenyon transformers have that reputation for quality which is truly outstanding. They're found in Radio receivers, transmitters and electronic equipment bearing the name of America's foremost manufacturers.

You're always assured of "Blue Ribbon" performance when you KENYONIZE your equipment.

NEW 1941 CATALOG READY

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KENYON TRANSFORMER CO., Inc.

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NEW YORK, N. Y.

Cable Address: "KENTRAN"—New York

Dept. of Transport. TV is with the Dept. of Transport in the Halifax Office. IH is with the Canadian Army in Ontario. HH is with the Dept. of Transport at Charlottetown.

JC (ex-5HY) is located in Nova Scotia as an electrical maintenance man with a mining concern. JF conducts a radio service business. HJ, the T. L. station for Halifax previous to hostilities, is attending college at Halifax. KY is located at St. John, N. B., in charge of the radio service dept. of the General Electric Co. MW is with the RCAF somewhere in Canada. MZ conducts a shoe repair business in Halifax. NB is with the Canadian Army. He is also a boxer of no mean ability. NI is with the Dept. of Transport and is at present doing isolation duty in the far north. NK is attending college at Halifax. MA is with the Canadian Army, stationed at Halifax. KG is in the Canadian Navy.

DD, one of Canada's pioneer radio amateurs, is station director of CHNS at Halifax. NN is at Bedford, N. S., in charge of the CHNS transmitter. JH is foreman in a chocolate dipping room of Moirs chocolate factory at Halifax. DB is doing radio service work in Halifax. MF is with the RCAF in Ontario. HV conducts a radio service business in Halifax. Ex-AQ is with the Signal Corps in the Canadian Army, located at Halifax. The present AQ is with the Canadian Navy. He was formerly with the Canadian Westinghouse Co. at Halifax and held a VE2 call. EU is with the Signal Corps of the Canadian Army located at Halifax. He was formerly with the Northern Electric Co. here. BC, in the radio service business in Halifax, has one of the most up-to-date service shops east of Montreal. BH is with the Western Union Cable Co. at his old hunting ground in eastern Nova Scotia. BK, formerly one of the great VE1 DX boys, is with the Canadian Army. BP is now in Ottawa with the National Research Council in the radio Labs. BT conducts an electrical business at Berwick, N. S.

— . . . —

ONTARIO—VE3

FROM Len Mitchell, 3AZ, we hear:

IW has accepted a position with the Foreign Exchange Control Board. EH was recently married and is now wire chief for the Canadian National Telegraphs at Kapuskasing. NR has accepted a commission as lieutenant in the Royal Canadian Navy. SG has been spending a great deal of his spare time teaching code to recruits for the Signal Corps. KA is now assigned to the Third Division Signals, in camp in New Brunswick.

According to 2OL of Asbestos, Quebec, last news from AU of Unionville, Ont., now in government employ in Ottawa, was in the form of a wedding announcement—mailed from London (England) early this year.

ADU left Toronto in the spring of '38 for the Northwest Territories as operator for a mining company. While on the Arctic Coast he used a portable under the call 5CV, working 4NX on regular sked. On returning to civilization he joined Trans-Canada Airlines, operating for them first at Calgary and later at Winnipeg. Now he is first officer on a Lockheed 14. While at Winnipeg ADU introduced RT and LZ to airline operating—both of whom use their calls as personal sines on the airlines c.w. network.

— . . . —

BRITISH COLUMBIA—VE5

SCM C. O. SAWYER, 5DD, leads off this month with a clipping from the B. C. Electrical Employees Magazine for April, 1941: It represents a quotation from a letter from BI, now in England with the RCAF:

"Arrived here after a rough trip. We were not in convoy so we made fairly good time, and with the exception of one night when we were chased, there were no unusual incidents. It was a rather small boat of 4000 tons and a very poor sea boat so far as comfort was concerned. . . . On arrival we received a few days' leave, so I spent considerable time in London and was agreeably surprised to find not nearly the damage the headlines had led me to expect, although many districts, no doubt, have suffered badly. Since this is my first visit to this part of England I am really enjoying the sights.

"We were fortunate enough when on a tour of Windsor Castle, to meet Her Majesty, and had the great luck to be invited to have tea with Her Majesty and the two princesses. We chatted for over an hour.

9, Cherry Orchard,
LICHFIELD,
Staffs.

24th May, 1941.

Dear Sirs,

I would like to place on record my appreciation of a most pleasant transaction and add that I am delighted with the Receiver. During the last eight years I have owned various models of well known Communications Receivers, about ten in all I think, some bad, some good, but not one has come anywhere near to the H.R.O. in performance.

The money spent during this period would have bought several H.R.O. Receivers and it is only when one has used an H.R.O. that one realizes what a shocking amount of money is wasted in looking for something good and cheap, it simply does not exist. The H.R.O. is worth every penny spent and is first class value.

Yours faithfully,
(signed) JOHN M. FOGGO

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MALDEN,  MASS.

Top Performance in U.H.F. with THORDARSON TRANSFORMERS



Warm summer days beckon the amateur to the open country with his U.H.F. portable rig. The thrill of operating on ultra high frequency only can be appreciated with equipment that gives trouble-free operation. Be sure of top performance by using Thordarson Transceiver Transformers throughout. The open frame types are compact and lightweight, designed especially for this application.

Capable engineering and meticulous manufacturing methods have given Thordarson the reputation of being an exacting producer of quality transformers—a policy that has kept Thordarson a leader in its field for over 46 years.

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TRANSFORMER SPECIALISTS SINCE 1895

"I'm beginning to find my way around in the blackout now, although it's far from pleasant in the city. I was at a show the other night until about 8 o'clock. It was dark when I came out, and I walked right past the tube entrance several times before I found it. I'm getting quite used to packing my gas mask and tin helmet, and feel quite undressed without them."

The same magazine devotes a page to the activities of NL. He recently received recognition for designing a new type of gas furnace and also has designed a special gas rivet heater which is used in the construction of corvettes in a West Coast shipyard.

FM was recently married. He is reported progressing favorably. US recently migrated from Wells, B. C., to Chilliwack. CB, now in Montreal at the RCAF wireless school, was joined by his XYL who left Victoria recently.

A severe lightning storm kept JF busy dodging flashovers and exploding insulators when the storm hit most of Vancouver's high tension lines and disrupted service for a short spell.

— . . . —

Here is a letter from David Scholes, 5DY, of Victoria, B. C., that will be of interest to a good many of those present at this month's meeting of the VE clan, and so we reproduce it in full:

"Seeing the Canadian section in *QST* made me try to round up some dope about the local gang, but it is not so easy. To begin with, I myself am on active service, and only by good fortune am stationed in my home town. Secondly, so many of the boys here have joined the various services that meetings of the Victoria Short Wave Club have had to be called off for the duration. An annual meeting of some sort will be held, and the incumbent officers will probably be reelected to preserve the club's identity. . . . However, here is the dirt, for what it is worth.

"The following hams are at present serving under war authorities around here. Since I don't know all their names, I will mention them by their pre-war calls: 4MN AMK AEY ASD AFH AAR AFD AGQ ZC AFG BH FK AFT FG 5AGN AGJ UL AIY ACA HO DS DY AFG EB AIZ AAI LX. All of these can be reached (by name, which can be obtained from an old call book) c/o Fleet Mail Officer, HMC Dockyard, Esquimalt, B. C.

"The following are in the RCCS: 5NR KZ AIV (2 ops, R. M. and J. W. Pye) SP AFH FB AFN RM NS JZ. They can be reached at Work Point Barracks, Esquimalt, B. C. (by name, of course). ABV is also in the RCCS, but don't know his address. Fred D'Altroy, another Victoria ham, is with the PPCLI and is overseas somewhere.

"Here are some of the Victoria gang in the RCAF: 5AIM ACE PX AHJ DN QF AJM EC. The latter and 5PX are overseas.

"Ron Hodgson, 5BY of Alberni, B. C., was reported by CBC as being radio operator of a plane which lost both ailerons when being ferried across the Atlantic. Art Stark, 5AE, is also engaged in this work.

"Jim Heppburn, president of the VSWC (5HP) has teamed up with 5BR, of Savary Island, and gone into business in Vancouver.

"Wally Riddle, 5JZ, resigned as treasurer of the VSWC when he joined the Signal Corps.

"Geoff Playfair, 5IP, of Campbell River, B. C. is a Flying Officer with the RCAF overseas.

"To demonstrate the conditions at the VSWC, the grass at the clubhouse is feet high. Yours truly has leased the place and is keeping bees there!

"That pretty well covers the situation here. I recently paid a visit to the R. I. and he told me he had a letter from his chief in Ottawa saying that ham bands are being preserved intact, and that call signs were being kept for those to whom they have been assigned should they want them again."

— . . . —

CU next month.

— C. B. D.

LICENSED AMATEUR RECEPTION RECORD?

Dave Wingate, W2KEZ, "NX" of Press Wireless' New York City staff, recently hung up what you might consider a record for tape reception of Continental. On June 26th, from 7 to 8 P.M. EST, Dave copied 19,500 official words from Moscow, this equivalent to 325 words per minute.

(Continued on page 74)

W8RHZ (Harry L. Steffan) with a pair of Eimac 250T's gets R9 Sigs in 45 states, R9 - in Kent, England

"...I think Eimac Tubes are the best on the market...and when I build my 10 meter rig it certainly will have Eimacs in it."



← *Close-up view showing the Eimac 250th's in full operation. Note plates are running at extreme temperature yet tubes do not "gas out."*

● W. A. S. as early as Feb. 1939 and then went out to get R9's from 45 states for the repeat performance. 43 of the 45 states report R9- as well as nine separate R9- confirmed reports from Kent, England. That's the record set up by Harry L. Steffan W8RHZ. Harry says: "There is a certain feeling of confidence when a fellow has Eimacs in his transmitter and it seems that the most consistent stations that I have contacted, all use them."

The "confidence" of which Harry speaks is probably contained in the fact that Eimac tubes consistently turn in superior performance, even under adverse conditions...and...that they are the only tubes on the market which are unconditionally guaranteed against premature failures caused by gas released internally.

Put Eimacs in your transmitter and enjoy this better, safer performance.

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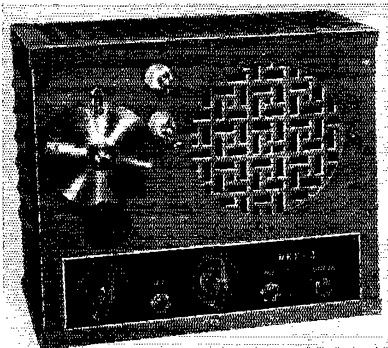
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for defense . . . emergency . . . or amusement
HIGH POWER-2½ METER
 MOBILE or FIXED STATION
MRT-3 TRANSCEIVER



AN EXCEPTIONALLY LOW PRICED — HIGH POWER transceiver, rugged and compact, that is ideal for use in automobile, truck, boat or airplane. Built to withstand the shocks of rough handling, the MRT-3 incorporates careful engineering design and painstaking, precision craftsmanship. Simple to install and operate, the MRT-3, with 20 watts input, functions from either vibrator or AC power supply; for mobile or fixed station operation respectively. While some actual tests have demonstrated working ranges up to 85 miles, we rate it at a conservative operating range of approximately 5 to 50 miles, depending upon terrain and type of antenna employed.

SPECIFICATIONS

- **FREQUENCY:** Covers the 2½ meter band (112 to 116 mc.)
- **20 WATTS INPUT:** Approximately 6 or 7 times that of ordinary portable types
- **FOR MOBILE OPERATION:** Any standard 300 volt, 100 MA vibrator power supply with filter added
- **FOR FIXED STATION OPERATION:** Any good AC power supply having an output of 300 volts at 100 MA and 6.3 volts at 3.5 amperes
- **ANTENNA:** The antenna coupling coil is mounted on a Polystyrene rod and can be easily varied by pushing in or out. Front panel has two lead through insulators. For MOBILE operation: a short 2 foot radiator in combination with concentric feeder. For FIXED STATION operation: a half wave antenna with 2 inch open line
- **TUBE FUNCTIONS:** (with switch in transmit position) HY-75 — Oscillator; 6C5 — Audio; 6L6 (or 6V6) — Modulator (with switch in receive position) HY-75 — Super Regenerative Detector; 6C5 — First Audio; 6L6 (or 6V6) — Power Audio
- **MICROPHONE:** Any good single button carbon microphone
- **SIMPLE OPERATION:** One volume control with on-off switch; ceramic antenna insulators; jacks for microphone, modulator current measurement, oscillator current measurement; receive-transmit switch; vernier tuning dial and knob.

MRT-3 Hi-Power TRANSCEIVER — for 2½ meter operation. Compact, 9" x 8" x 4" in size, with self-contained P.M. Dynamic speaker. List price, less tubes and power supply (Subject to Amateur Discount) **\$49.00**

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Correspondence Dept.

(Continued from page 60)

This leads to the second fundamental thought: "For what purpose does the ARRL issue these certificates and appointments?" The answer there is obvious — to designate an amateur of better-than-usual accomplishment. Logic leads to the conclusion that the person receiving these appointments should be a better-than-usual amateur in all phases of amateur activity. The type of appointment is a designation of the special branch of amateur operations the station desires and is best fitted to perform.

After all, an ARRL Code Proficiency Certificate can be secured for 15 w.p.m. That's only 2 w.p.m. over the FCC examining speed! Certainly that is not too much to ask of any station desiring recognition as an amateur of more than average accomplishment. And it *does* make those certificates mean something!

— Frank E. Lyon, W3HAL/WLQA

CODE PROFICIENCY AND THE NAVY

U. S. Naval Training Station,
 San Diego, Calif.

Editor, QST:

Your code proficiency campaign is a real contribution to the U. S. preparedness program. However, I think we have placed too much emphasis on speed. Speed in radio traffic is very nice, but it should be placed secondary to accuracy. I qualified for the thirty-five word certificate on W1AW's first transmission in the proficiency program, and naturally was proud to think I was a fast operator. Since being on active duty in the Navy, however, I have found that one hundred per cent accuracy at a slow speed is much more valuable than fast operating.

What the average amateur operator needs is more accuracy. We have all gone along chewing the rag or copying straight press for practice. We should have picked out the mixed code groups or some kind of encrypted messages for practice. The sort of code used in the Copying Bee, only more mixed up, is what we need if we are going to be of much value as military operators. I realize it is not as much fun to copy seemingly meaningless code groups as straight code at higher speeds, but I think you can sell the idea to the amateur who is really interested in doing something for our nation. . . .

U.S.S. Barney, Key West, Fla.

Editor, QST:

. . . The speed runs have been copied by many of our ops while down in Panama. Your sigs were RST489X until the South American hams came on the air with a plus 9 signal. . . .

It is too bad that Navy operators are overlooking your daily skeds in plain language, for I sincerely believe that it would help greatly, since everything is code stuff. Not belittling the navops ability at copying code, but codes are sent at a comparatively slower speed than plain stuff. . . .

— E. A. Dieckmann, RM (USN), W8NDZ

IN RE WIKUY

Los Angeles, Calif.

Editor, QST:

Never before, in my 12 years as an active amateur on all bands, have I penned a note for the Correspondence department. However, the letter of W1KUW's in the May issue of QST has finally convinced me that I have blood in my veins. (My XYL swears it's just a transfusion from an unwary mosquito.)

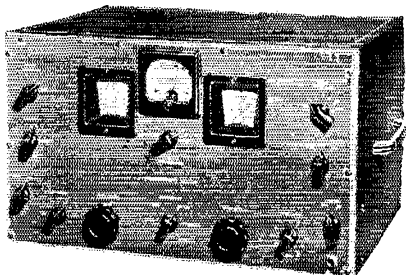
Yes, Mr. Allen, we are all in this greatest of all hobbies for the relaxation we get, but it is just your type, F. A., that would "squa-w-k" the loudest if an emergency were to exist. What if you, for instance, were high and dry but your loved ones were in an area hit by a catastrophe which left it isolated from the outside world? Would you be anxious for their safety? Would you wonder if they were "carrying on"? . . . Would you care to entrust messages for your loved ones with an operator who had never handled traffic before? By the time one reached its destination, if the operator at the other

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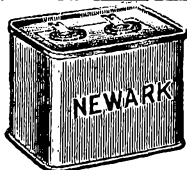
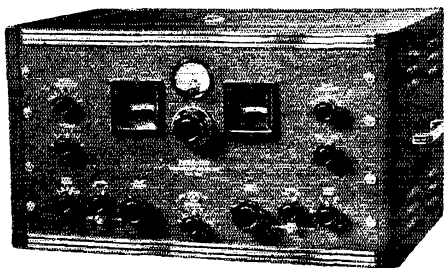
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The famous HQ-120-X . . . dual stabilized with voltage regulation and drift correction! Strictly up to the minute with the kind of performance demanded by the exacting professional, amateur, or short wave listener. Special high gain RF stage with antenna compensator; 3 IF stages with silvered mica condensers and permeability tuned transformers. Covers 9.7 to 555 meters \$138.00 in 6 bands. Cash price, including tubes, 10" PM Dynamic speaker and crystal \$138.00

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18.3	1000		2.15
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DISPLAY YOUR CALL LETTERS

Your call letters in GOLD on your ham shack door or auto window will look mighty fine!

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

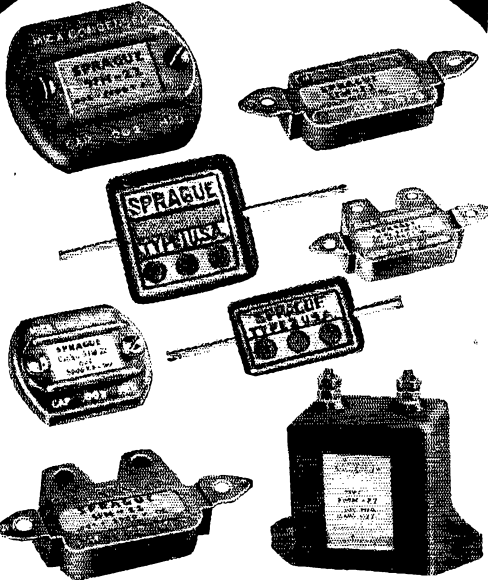
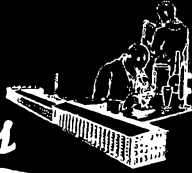
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end had hung on without giving in to poor sending, no number, no filing time, no check, rotten spelling, etc., it might probably convey an entirely different meaning than when originated. Yes, me lad, the answer to that is a good net, whether it be 'phone or c.w. Rag-chewing is a wonderful safety valve — but I think if I were that ham, I would want to know if the message was ever going to get there. It seems to me that you have never discovered the truly wonderful part of ham radio. . .

I have nothing against 'phone — possess a Class A ticket. . . . Most good 'phone men work c.w. too, and when asked "pse QSP" they don't come back with that old one about "QRM getting you down pse QSV" — they take that dard-burned message. It's no sin to be a moron, but it is a sin to be a liar.

I don't get the time now, so I think I'm ineligible to join one of the truly good nets. However, I'm on spot frequency, and my friends in other nets know how to locate me when I'm not working during the traffic period. I have yet to refuse a message — even if it means I pay a telephone toll charge if I can hear the guy at all. . . .

If you want to hear some beautiful operating procedure, me lad, just tweak your dial to 6990 kc. and give a listen to the AARS boys banging away. One of my finest friends from San Francisco is a member, and they handle plenty of traffic. I envy 'em. Would give a lot to "get in" — but my working hours are such that I would have to miss all schedules one week out of three. Not so good. But at least I can copy 'em and get good practice in laying it out on a mill "ten to a line." Can you do this? Maybe you know how to type. So do I — I can type 90 words per minute, but believe me, I'm having a (censored) time putting down 20 from ear to mill. Try it.

Yes, me lad, we are in ham radio for the amusement and relaxation it affords. But if you will read the editor's note at the bottom of your "gas," you will see that the FCC only issues licenses "if public interest, convenience and necessity will be served thereby." That means, little chum, that neither you nor I nor any other ham licensed by these United States may take it upon himself to ignore his duty. . . .

These boys in the AARS haven't forgotten how to rag-chew, but they believe that a man should tend to business first, then pleasure afterwards. They work as hard as some commercial stations, but after their hooks are clear then they really go to town. At times there are four or five of 'em in it at a time, but with break-in keying and good operating, everything goes along at a nice, fast clip. . . . Indeed, if you listen to them, you will have a doubt in your mind as to whether you know how to rag-chew. . . .

Perhaps you, too, need a transfusion — but not from a mosquito. From Uncle Sam!

— Warner R. Wilcox, W6EJZ

94 Clarendon Ave., Chicopee, Mass.

Editor, QST:

Just finished reading W1KUU's lament on your March editorial.

I suggest that he be sent back to the "old country."

— Norm Cartmill, W1LHY

A FEW WORDS TO QST

Radio WAR, Fort Myer, Va.

Editor, QST:

Just a few words to QST and its many readers. As I read in QST about hams from coast to coast, a thought struck me. Why not tell the hams and QST about the hams here at WAR?

If you fail to work WAR, why not give one of us a shout? You will find some one on some band from 160 to 10 almost every day.

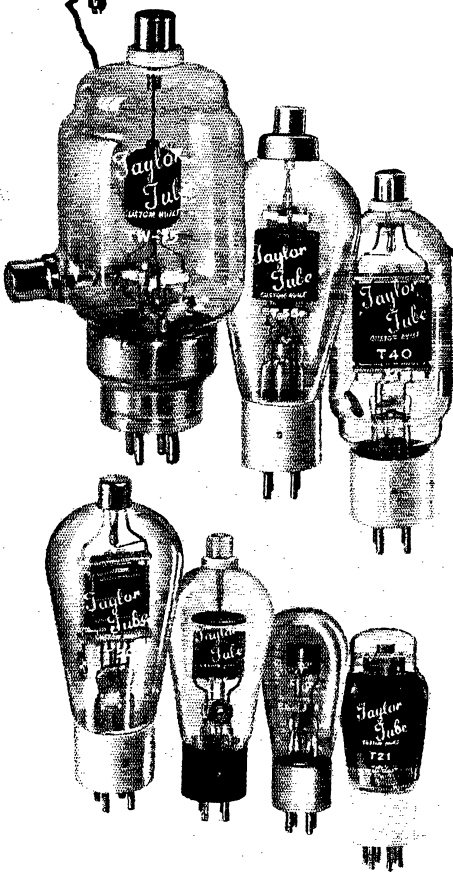
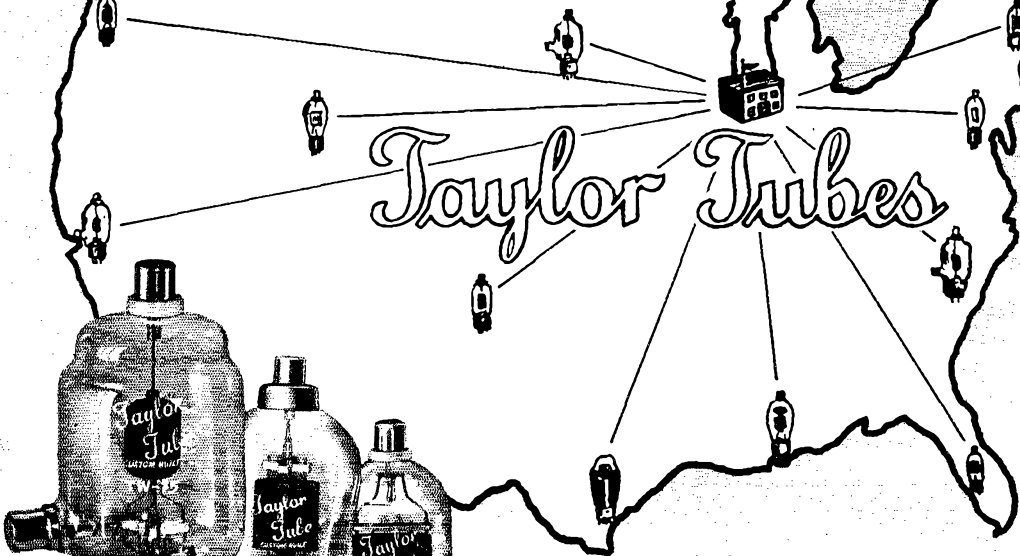
W3JGU works on 40 c.w. W3JIE works 40 as well as 80 c.w. W3JHF (ex-W5HML) works on 160 and 75, while W3JHG (ex-W5GRL) calls away on 20 and 10. (By the way, what has happened to 10?)

We may not put out sigs like WAR, but what chance has Mickey Mouse against Superman?

— Sgt. Jack Bowden, W3HJG

(Continued on page 70)

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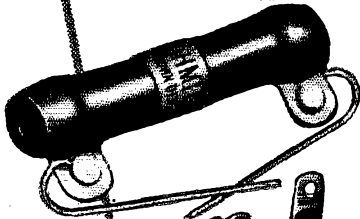
*QST ADVER. — APRIL 1939.

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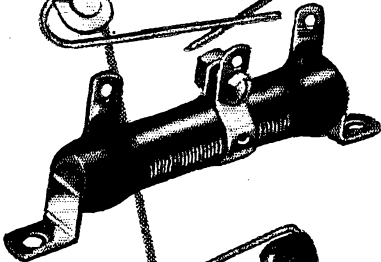
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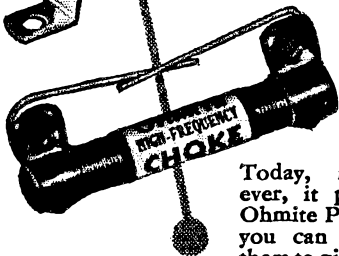
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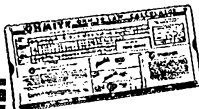
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QST—Aug. '41

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THE POCKET TRANSMITTER IS IN THE ARMY NOW

Republic of Colombia,
 Ministry of War, Bogota, Colombia

Editor, QST:

I have pleasure in sending you . . . two photographs in which can be seen the "pocket transmitter" unit described in the January, 1941, issue of QST and with which we have obtained truly astounding results in communicating at a distance of approximately 600 kilometers (QSA 5 R 7) with a 7100 kc. crystal.



Captain Laverde and Captain Alvaro Roldan S., Chief Signal Officer of Colombia, with the pocket transmitter described in QST for January, 1941.

Also we believe that this transmitter, in the not too distant future, will be giving reliable service in the Signal Corps of our Army where communication between units is over relatively short distances.

— Capt. Alvaro Roldan Salsedo,
 Chief Signal Officer, War Dept.

New Midget Tubes

THE types 9001, 9002 and 9003 are receiving tubes of a new series recently announced by RCA. They are designed for u.h.f. applications. They combine the bulb and base structure of the miniature receiving tubes with electrode structures similar to those of acorn tubes. Two cathode leads are provided in each type to permit the completion of the plate and screen r.f. circuits with a minimum of circuit inductance common to the grid circuit. Electrically, the 9001, 9002 and 9003 correspond to the types 954, 955 and 956 respectively.

Strays

For some years, Don C. Wallace, W6AM, has been carrying a portable ham station with him on his travels, communicating with many amateurs from the various hotels at which he stayed. One of these, the Whitcomb Hotel of San Francisco, had a broadcast station operating from the roof, with harmonics which interfered with Don's operating while he was there. The broadcast station has now moved out, and the hotel manager informs Don that he is welcome to use the 250-foot towers on the hotel for his portable. San Francisco hams, beware!

The Advantages of
CUSTOM BUILT
ALSiMAG
with Controlled
Physical Characteristics

A TYPICAL HIDDEN APPLICATION OF ALSiMAG. The ceramic condensers at left, employing ALSiMAG as the dielectric medium, are familiar to all radio operators. The American Lava Corporation pioneered this type of dielectric in America and each year supplies millions of condenser tubes to manufacturers.

lation problem, not only as to material but also as to form. More than 15,000 ALSiMAG designs are produced every year. Production runs into millions of pieces a day. This is possible because efficient manufacturing methods and equipment produce custom built ALSiMAG insulators at costs competitive with standard mass production costs.

In many instances it is found that custom built ALSiMAG pieces cost less than the most nearly satisfactory standard pieces available. In other instances, reduced assembly costs and savings in space and in complementary materials will pay the entire cost of custom-built ALSiMAG pieces.

When you use equipment insulated with ALSiMAG you can be sure that the insulation has the controlled physical characteristics and the form, shape and size best suited for that use.

HIGHER power output, increasing operating frequencies, the tendency to more compact design and the demand for improved safety factor have placed new responsibilities on insulation.

ALSiMAG has kept abreast of these demands by constant research and laboratory development of new ALSiMAG ceramic compositions with controlled physical characteristics.

Furthermore, to meet successfully the requirements of difficult insulation applications, special sizes, shapes and forms had to be evolved. Almost every ALSiMAG piece is the custom built answer to a special insu-

This advertisement is one of a series designed to give you a better understanding of the advantages of ALSiMAG insulation. It is not a solicitation of business. Custom made ALSiMAG is sold direct to the manufacturers.

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Station Activities



NEW ENGLAND DIVISION

CONNECTICUT — SCM, Frederick Ellis, Jr., W1CTI — WITD, EC for the New Haven Railroad Net, has announced the deferring of the semi-monthly test schedules during summer months. The net will resume early in September. KQY has closed the Nutmeg Net for the summer. 3640 kc. is still a popular spot on the band, and CN Net will resume operations right after Labor Day. BHM has been operating all over the 3.5-Mc. band with his e.c.o. He sold his Harvey 200R and is building a new job with 814 final. BFS, Seaman 1st Class, reported for physical examination and is now waiting for assignment to active duty. 1HYF-2NLQ got his first-class 'phone and second-class telegraph tickets May 26th. KKS visited the gang at Camp Blanding, Fla., on his motorbike. DJC/1 worked 180 stations in FD including K4. MVE and MVH received qsl cards from K7. LTZ completed WAS. FMV's sky wire came down in a recent storm. AGT and KQY visited Hq. and W1AW. KYQ visited KQY. GB/1 worked 370 stations on FD. WR is back from a month's tour of South and West. KFN writes from Long Branch, N. J. His roommates GRF and NBY are on 112 Mc. They have 200 watts on other bands. NLS is the call of the Bristol High School Radio Club. CBA held their 11th annual dinner June 5th. UE was guest of honor. BDI and JMY attended from Headquarters. Lieut. F. B. Tutthill of the Naval Radio School at Noroton Heights was the principal speaker. CBA/1 worked 100 stations on FD. Most contacts were made on 3.5 and 7 Mc., using an e.c.o. exciter. The following are the results of the April 12th-13th Conn. QSO Party: WITS 3720 (55 QSO's, 31 towns), LOP 3480 (55; 29), KQY 2250 (40; 25), FMV 2024, TD 1440. UE 1054, KIO 972, CTI 928, JPE 900, BIH 728, JFN 644. EAO 462, BYW 408, ASO 340, KKS 324, LTB 84, APA 88. WITS used 3.5-Mc. c.w. and 1.75-Mc. 'phone. LOP used 3.5-Mc. c.w., 1.75- and 3.9-Mc. 'phone, and is awarded the prize for highest total score since TS, a Hq. staff member, is deemed ineligible for awards. The prize for the highest c.w. score goes to KQY, who used only 3.5-Mc. c.w., and the award for high 'phone score is made to ASO, who used 3.5 and 112 Mc. JMY, JTD, CJD, JWG, ex-AFB, 9NFL and 1BDI/1 at Jobs Pond, Portland, for swell time on FD!

Traffic: W1AW 398 (WLK 7) TD 202 BDI 43 UE 41 KQY 26 EAO 20 KUK 18 NCV 16 CTI 14 GB 11 BHM-CBA-MEM 10 FMV 4 JHN 2. (April-May: W1UE 188.)

MAINE — SCM, Ames R. Millett, W1BAY — Thanks, gang, for the splendid reports. The boys turned out in fine shape for FD. BTG and Spill operated NGV/1 from Great Pond in No. Belgrade. VF and LRQ did plenty of experimenting with emergency equipment at BTY/1, located at Hiram Hill. They found time to contact KTN/2, Tony, who is working at G.E. in Schenectady and sends his best to the gang. The PAWA went out to South Portland and rolled up the finescore of 1329 with 109 contacts, using four individual set-ups manned by CRP, LNI, JRS, LOA, GHT, LZI, with FBJ and EWN filling in on rest periods for the boys. They had a couple of swell rewind gas-driven a.c. jobs out there. MBR and AUC are building these a.c. plants. GJK and some of the gang from Old Orchard Beach dropped in on the boys at KV1/1, late Saturday evening, and gave FBJ a hand with the cows. NKM is new ham in West Scarborough. On 1.75 Mc. you can hear MXT with a new rig. Bob Babas, an ex-Army operator, has been given the call NHG in Portland. KVK has taken ops job at WABI. LMM is still banging 'em out on 7 Mc. MNR is building new rig for 3.5 Mc., and would like some schedules in order to get his code speed up. TO is still active on 3.5 Mc. LKP has a new 3.5-Mc. zepp that goes fb, and has a new shack nearly finished. A1 and GMD are still giving their fine support to the Sea Gull Net. Believe me, that is a peach of a 'phone aggregation, well worth a listen any night except Sat. and Sun. at 6.15 P.M., around 3960 kc. LIP is on 3.5 Mc. week-ends, when at home, and will be on 14 Mc. soon with a new Stancor job. The club at Quoddy is being reorganized. LYK is a new granddaddy. MZI has built a new e.c.o. IIE is working as electrician in shipyard. GXY will leave his school work and take up his usual duties in the Bath shipyard for the summer. Ex-W1GIE, who is a radio engineer in NYC, was a recent visitor at Damariscotta and Thomaston. LBT is reported as being an officer in the

Army. LHM is building a fine new home, and doing all the work himself. HX was a recent visitor at IIE, and brought along a dx log that fairly made Hal's head swim. The PTN has closed down for the summer, but we will all be looking for old reliable GOJ, the Chief RM of PTN, to start things off with a bang, good and early this year. GE is operating from his camp at Highland Lake for the summer. FJP, who has been confined to his bed, is on the air now, occasionally, and is on the mend. KOU sticks at it so consistently that he has had to replace a tube in that receiver of his. RU, MFK and LNI are active on 56 and 112 Mc. LOA finished his job with LNI on Russ's new 809 final, and is going after 112 Mc. in a big way. The Rockland gang sure did things up brown at their picnic, July 6th, from all reports. INW paid a fine visit to GOJ on his way through Portland, recently. We want to cover all the angles here in the State and satisfy the entire gang, so any suggestions will certainly be appreciated.

Traffic: W1LNI 6 IIE 7 GMD 16 LKP 5 TO 29 GKJ 3 BTY 4 NGV 10 BAV 44. AARS: WIAMR 45 CFO 23 EFR 7 FAP 88 FJP 4 GE 24 GERT 7 GVS 97 JIF 47 IST 75 KOU 122 LML 148 TO 4.

EASTERN MASSACHUSETTS — SCM, Frank L. Baker, Jr., W1ALP — Sorry to have to announce the resignation of DTP as our REC. Bill is moving to Florida in the fall. Luck, and we will miss you. EHT took over as new REC. New EC's: LAD for Brookline; AGX for Peabody; LYH for Everett. New OPS: MME, MJK. New ORS: HX, MJK. Congrats to Waltham Club, which is now affiliated with ARRL. Welcome to NKW in Lynn. An old-timer back on again; he was PAY-APY in the 1920's. South Shore Radio Club elected the following at its annual election: pres., LZW; vice-pres., IHA, DPI; sec'y, CCL; treas., LVR. The club had the annual banquet with prizes, dancing, etc. Lowell Radio Op's Club elected the following: pres., ABG; vice-pres., OQ; secy-treas., KMY; exec. board, ATX, QM. NM is now in Phila. Naval Hospital. AKE is at Newport, R. I. NBC is father of a son. Congrats, Bill. MKX got his Class A, and has been on 14-Mc. 'phone. KMY is now member of Yankee Network. If you hear NHE on 112 Mc., don't let his W4 accent fool you. He is a W1. MCR has been keeping JAS in touch with his son through 4GBV. Fb, Jim. HIL had qso with K68SW on 14-Mc. 'phone, and his rig on 1.9 Mc. is working fb. HUP is working on code speed. LXQ is Chairman of Communications for Civilian Defense. MDN is on 56 Mc. most of time, and has new dipole. He worked 112 Mc. on FD. LO and BDM are mobile on 112 Mc. NIC is now on 28 Mc. MGQ has new Meissner Signal Shifter. MMD was called to Naval Station in R. I. MYO is on 56 Mc. GFW-KZD moved to Southbridge, Mass. A lot of hams attended the AARS Convention in Boston. BMO says old-timers of this Section are having a get-together on July 26th at Nahant. Write him. All welcome. It's free! LVZ was appointed LNCS of No. Shore AARS 28-Mc. Net. More hams in active service: HRE, YLG, LNN, JOW with Army, HFJ and FWQ with Navy. Lots of luck, fellers, and let's hear from you. LSA was appointed NCS of 1.75-Mc. 'phone AARS. NBM is working on 3-element rotary for 28 Mc. BDM is planning a 14- and 28-Mc. rotary. MBB is building an e.c.o. for 14 Mc. MJK worked KD4HOC on 14 Mc. MZF enlisted in Army Air Corps. Luck to you, Don. HA moved to Everett. WI wants a 7-Mc. Vermont qso. MDV is going on e.c.o. on 7 Mc. WV has new Equable automatic electric key, a joy for easy sending, says Miles. The following clubs went out on Field Day: Eastern Mass., Lowell Op's, Parkway, T9, Hi-Q, South Shore and lots of others that did not report. Several clubs want another FD in the fall. If interested, write to ARRL and tell them how many from your club would take part. FJN, DPI, JNX, BKE and MYO are all back on 56 Mc. EKT worked 8th, 9th, 5th and 6th districts on 56 Mc. on June 5th, and has qsl from 60VK in Arizona. FB, Whit. KZU and LRE are getting out on 56 Mc. also. GJZ has new qth at Conimicut, R. I. AKD worked 56 Mc. at Pack Monadnock, and worked KJL on 112 Mc. at Bristol, Conn. MYO is working AP at Mt. Washington after midnight on 56 Mc. EKT also worked W4RPM in Georgia on June 9th. GAG will be on 112 Mc. and also on 3.5-Mc. c.w. IIC and AHP are sending code from WSAR. JMJ and NBE want contacts from the Vineyard on 112 Mc. Fall River Club meet every Thurs. night. Visitors are invited. LIK and LIE are working for Pan American in Miami. More hams in the Army: MSG, MWC, JZZ, IUUL, DHC and LJD. KWL is in the Navy. Fall River Club raffled two radio sets to raise money for equipment. BOO is Chairman of the Defense Committee on Communications. AHP is coaching

Boy Scouts in code to help them get tickets. ALP had a visitor from England — George Evans, 2AVV. Lot's of luck to you, and glad to have met you. BXC is new RM for 14-Mc. c.w.

Traffic: W1BDU 358 JSM 260 BXC 241 AAR 214 LWH-BMO 197 AKS 171 KXU 157 JCK 133 (WLGV 38) LYG/1 113 LSA 99 FSL-JCK 97 KCT 76 EMG-HWE 49 AGX 32 AAL 24 MJK 21 MDU-MZF 17 KTE 15 EKT-HA 13 WI 12 MDV 9 NkW-MMM-KKO-WV 2 EHT 1. 2 1/2 AARS Net: W1BHL 55 EYR 100 LWI 124 MBS 16 MIF-MMY 11 MON 231 MQH 80 NBT 18 QD 24. North Shore 10 fone AARS Net: W1AGX 32 HWE 36 JFS 49 KMQ 25 LVZ 94 MQE 16. Other AARS Nets: W1HIL 18.

WESTERN MASSACHUSETTS — SCM, William J. Barrett, W1JAH — W1BIV is making a habit of leading the scoring parade each month. Nice work, Pres. IOR and LTA visited AJ and 2MIY over Memorial Day. AZW, BVR, LNH, LJE, MKR, KXS, FNY, LUA, MJP, AJ, MIM, MVE, IOR, BIV, JZE, AUN and JAH, among others, attended annual convention of First CA AARS in Boston. At least seven separate groups in West. Mass. were active in FD. Nice going, fellows. DUZ had to pass up AARS meeting, due to eye injury. KRX moved to Grafton. KZU reports that AZ, KK, LRE, AEP, HDQ, DNT and KZU with xyl's attended Horsetraders Banquet at Saybrook, Conn., June 15th. MND and MVF are new ORS. That's the story for this time. If interested in joining an active net, just listen in on 3760 evenings at 7 and Sunday mornings at 11. For dope on AARS get in touch with any of the net members. 73.

Traffic: W1BIV 158 (WLN 35) IOR 157 (WLGJ 26) AZW 122 (WGLD 64) LUA 117 MIM 95 JAH 80 (WLGH 20) BXF 50 BVR 48 (WLG A 84) KZS 40 AJ-HNE 38 MJP 29 FNY 21 DUZ 17 MKR 9 FOI 48 MYZ 16 MBT 11 MSR 24 JWV 9 JFA 11 LHW 16.

NEW HAMPSHIRE — SCM, Mrs. Dorothy W. Evans, W1FTJ — With the hot summer weather upon us, we can see a lapse of activity, but we sincerely hope that throughout the summer months you will continue to communicate with your SCM, letting her know of your activities, traffic handled, etc. She appreciates your cooperation. NIU is new ham in Gorham. HFO had a dandy vacation down with the W4's. LSN was active FD, with JK and IUI operating from salt marshes of Hampton Beach. They used 75 watts input to 801's PP, and a 750-watt a.c. generator. On May 20th and 21st, LSN and Emergency Coordinator IUI assisted in forest fire at Stoddard, N. H., at request of Forestry Dept. They furnished contact between fire headquarters and nearest telephone in next town. They report many messages were handled under the direction of fire wardens. FB, boys. For the rest of the summer, NH Net meets on Mon., Wed. and Fri. nights under control of IP. IP hopes that all stations with traffic who would like to break in, will do so. BFA was on during FD from Garrison Hill. NGK is new ham in Laconia. JKH is now out of hospital after operation. Hope you come along FB, Sully. NFY is new ham in Dover. The Farmers' Net held their annual get-together on June 22nd. About 45 members together with their families, making a group of 100 or more, met at CEA's home. From there they went to Wallis Sands for picnic lunch, and bathing. They then returned to CEA's where a most enjoyable "chinfest" was held until late afternoon. All the New England states were represented. NFU is new ham in Concord. NEI is now a member of the RCC. He was active on FD, contacting 101 stations from home station. He has worked Canal Zone and Puerto Rico with 25 watts on 7 Mc. NGK is graduating from high school this month, and, when his new crystal arrives, expects to check in on NH AARS. Many NH hams who knew GJH when he was in this state will be glad to know of his graduation from the University of Maine, and his recent marriage. He has taken a position as Production Engineer with Western Electric. More power to you, Chip. KIN left for Miami to take examination for new position. We all wish you lots of luck. AI. The Manchester Radio Club was active on FD, holding their get-together at MUW's summer qth in Henniker. There were 6 operators at the station, namely, HFO, IVU, MLO, MOI, MUW and 3FFM. New ham in Manchester is NEC. MLO has a new Signal Shifter. IVK is now on the air quite a bit, being operated mostly on 1.75 Mc. and 3.5- and 7-Mc. c.w. 3FFM/1 is now located at Manchester Air Base. Emergency equipment of DMD is in the process of being set up at FTJ's, and should be ready for operation soon. LIN has left for active duty with the Navy and is stationed at the Winter Harbor D/F station in Maine. AWU has recovered from his recent illness and is back on duty with the Navy. NEI has his 30 wpm Code

Proficiency Sticker. In case you fellows don't know, NEI is only 14 years old and has had his license only a few months.

Traffic: W1GEY 124 BFA 54 ICT 43 MMG 40 IP 33 IWW 23 NEI 21 KEX 16 JKH-HFO 8 LSN 1.

RHODE ISLAND — SCM, Clayton C. Gordon, W1HRC — The NAARO made 153 contacts during FD, and a good time was had by KOG, KYK, MJL, MQF, and LWA, who were the operators, with LWA also serving as cook and picture taker. The combined radio clubs outing was held at No. Smithfield, with about 75 attending. NJZ is a new Westerly ham on 3.5-Mc. c.w. MTE, Westerly Radio Club, participated in FD, with nine operators turning out for the event. Power was furnished by two gas-driven generators. LZD, MVL, IEF and AGJ were on the committee for the annual hamfest of the Westerly Radio Club, held July 20th. Herb Smith, ex-ICJN, of Westerly, is now brushing up and is going after a ham ticket. INN is quite busy these days, but manages to get some operating done on 1.75 and 3.5 Mc. Cy Ashworth did a nice job on the antennas for FD. JNO and BVI went to the Framingham Hamfest. JNO won an HK-24 there, and is using it crystal-control on 112 Mc. while experimenting with rebroadcasting of his signals from BVI. JFF is on 112 Mc. MNX and BVI are helping JNO and getting warmed up to the 112-Mc. idea. MWK left for Northern Illinois, where he will be fixed portable. Good luck, OM. CPI was married June 7th. Congrats, OM! The PRA gang participated in FD with more than double their last year's contacts. Operators were MEK, LDL, DDY, LCH, LCS, KKE, MBM, HRC, JEZ and LYE. Using a gas-driven generator, about 140 contacts were made. Food was taken care of by Harold Bloominberg, who brought his trailer along, with its ice-box. Ex-GTN was there to take pictures and shout encouragement. We understand AQ had about 75 contacts, but no official report was received. Let's hope everybody was satisfied with the results.

Traffic: W1LWA 129.

VERMONT — SCM, Clifton G. Parker, W1KJG — WINDL is reporting some work on 112 Mc. in Barre and Montpelier. NLO is new call assigned to Burt Dean at Burlington, who is now on 7106 kc. Burt has been active for some time as secretary of the BARC, and we are very glad to welcome him to the rank of "ham." LHX and MOI were recent visitors at MKM. MKM is now working mostly on 7- and 14-Mc. c.w., and is reported as being heard and worked from the West Coast. ND has an electric organ well shaped up, and reports interesting results. CGX is being heard occasionally. MVX is installing a new antenna since the heavy wind in June. MZO completed his 15-watt portable emergency rig. NHJ is working on a larger rig. AZV is active on 3.9-Mc. 'phone, and reports many enjoyable contacts. AEC registrations recently received include MMU, LYA, MJU, FGO, MMV and LJZ. If you have not registered with AEC within a year, please do so now. Blanks may be obtained by dropping a card to the SCM or to ARRL. LRV, formerly of Medford, Mass., is operator at WWSR with Paul, KWB. Paul has acquired a "jalopie" and hopes to see some of the gang around Vermont this summer. NDL is doing some operating on 112 Mc. using 5 watts input to a 76 long lines rig. EKU spent FD with his outfit on Spruce Knob, near Plainfield, Vt. CGV was at Burke Mountain. MMV, with KUY, MJU, MLJ and NDB as operators, set up near the CCC camp at Hero, Vt., with "Herm" Marston as general assistant. MFL received his Master's degree at the University of Vermont and has position with the G. E. Trans. Dept. at Schenectady. Congratulations of the Section members are extended to LWN and xyl, who are the proud parents of a daughter who arrived on June 9th. GM of Rhode Island was recent visitor at MET and LWN. BNS was a visitor at GAE. GAE is being heard occasionally after long absence. 8VVZ/1, INIO, GAN and LWN operated during FD at NLO's shack with their generator equipment for a power source. 8VVZ/1 and CLE are now at Fort Ethan Allen. GAN has his now famous Gammatron on 7 Mc. Burlington gang are working on 56-Mc. rigs. W1BZS, Portland, Me., is on 3.5-Mc. c.w. with e.c.o., and anxious for vt. schedules. KVV enjoyed recent furlough from Camp Blanding. He is a Sgt. and instructor in the division radio school there. KOO is also a Staff Sgt. and instructor there. TJ reports fine visits from BJP and AVP. Thanks for the nomination as SCM. Will try to attend to the work, and remember reports of your activities are a great help.

Traffic: W1NDL 5 MCQ 4 KWB 1 FSV 4 JVT 2 KJG 22.

(Continued on page 76)



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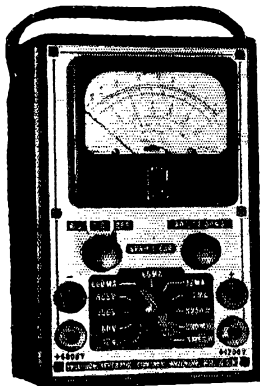
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U.H.F. Contest

(Continued from page 45)

copies submitted, also count as just explained, but for originating stations, but 1 point.

Multipliers: Points may be multiplied in turn by multipliers designed to credit (a) ability to use more than one ultra-high frequency band; (b) ability to use c.w. or m.c.w. as well as A-3 (voice) emission; (c) ability to work from field locations under portable designation.

(a) If one or more contacts are made, with contestants transmitter fundamental on 56-, 112-, 224-, or 448-Mc. assignments, the sum of scoring points may be multiplied by the number of such bands on which work is thus demonstrated (not to exceed four).

(b) Points made with your transmitter using c.w. or m.c.w. (both for contacts and message credits) may be multiplied by two before other multipliers are applied. (C.w. aids identification at distant points and this also credits demonstration of ability in its use.)

(c) Stations under portable indicator, may multiply all points made while actually operating portable or portable mobile by two.

Answering some questions: The band your transmitter is on is the band on which the contact is counted in your report. If your transmitter is on c.w. and the man contacted uses voice, you report your work for c.w. credit; he reports his as 'phone. A buzzer keyed in front of a mike produces m.c.w. If a message is sent using c.w. or m.c.w., both contact and message credit may receive the multiplier (b). If all operation is in a portable status and using c.w. or m.c.w., it is convenient to use multipliers after all the contact and message points have been added. If part of the work is in a portable status, or only part use is made of c.w., only those parts of the total score may be given the appropriate multiplier. If you transmit in different u.h.f. bands, the same station may be worked more than once to count in the contact score.

After you get your test message off, the aim is to work as many as possible and push other test communications on their way in a responsible manner.

Be sure we get your report, with claimed score and message copies, promptly. Do not use marathon forms in reporting results.

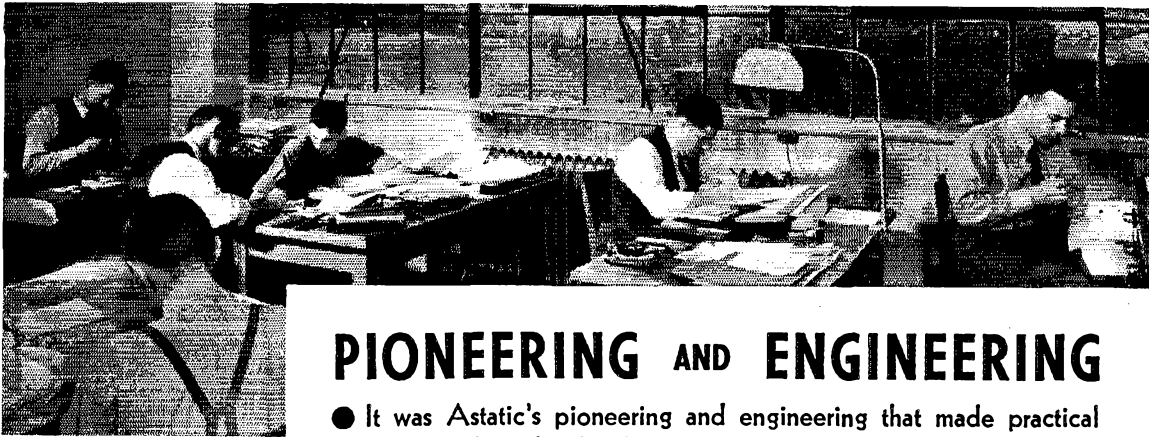
— F. E. H.

RECORD?

(Continued from page 64)

For the sake of accuracy in reporting, however, it must be recorded that the messages were all BOOK FIVE. For the benefit of the uninitiated, a book of five messages refers to five messages sent to five separate addressees, all with identical texts, one original and four carbons of each text, all running up the officially recorded wordage, while the radio circuit rate was, after all, only 85 w.p.m. Dave tells us that it is not unusual in handling books to run 40,000 words per hour. In working commercial circuits, ACCURACY COUNTS, but there isn't any Proficiency Award Certificate.

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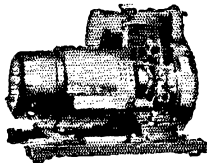
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(Continued from page 73)

HUDSON DIVISION

EASTERN NEW YORK — SCM, Robert E. Haight, W2LU — EQD is active in AARS on 3545, 3561 and 3600 kc. EQD reports UL still rebuilding and getting prepared to take a YL for an Rd. KWG is doing swell job with traffic, and doing his bit in the U. S. Army. JRG reports LMH, VJ, JRG and EGI working portable mobile on 112 Mc. MEC operates regularly on 14,240 kc. He experienced a thrill talking with his son and daughter-in-law in Honolulu, thanks to KGCAS. The Schenectady Amateur Radio Ass'n, under the leadership of EC ACB, aided by Ass't EC's, did a swell job in F'D. LU visited W1VD, who is still pounding out on 3.5 Mc. ENY bids bon voyage to 2HZJ, who is now located at USN Radio Station at Cheltenham, Md. Your SCM requests all members who have joined the Services to drop him a card so we can know how things are going.

Traffic: W2EQD 200 KWG 119 JRG 22.

NEW YORK CITY AND LONG ISLAND — SCM, Ed. L. Baunach, W2AZV — IXZ is now ORS. FPC is out for ORS. LZR is now CANS with call WLNK. BO is NCS for the 7-Mc. AARS, using the call WLNK. DBQ reports a terrific increase in AARS membership due to the recent War Dept. questionnaire. AYJ cancelled all schedules except the AARS, due to summer activity. MIY is now in the Army and will send his reports from camp. ITX reports from Nevada, where he spent a day televising Grand Canyon (for the first time we know) in all sorts of weather, from sunshine through snow. LRU and JAU had a swell time in F'D. LR and CKU had a good time operating FD in Amityville, while MZB and LGK did their FD operating in Babylon. DOG and the Riverhead gang did their FD operating out of the town limits. FJV and the NNWA are taking it easy after a strenuous FD. MEM gets a lot of benefit from the WIAW code transmissions. NYC is a new reporter from Brooklyn. JBL is back home from college and is headed for the Signal Corps or business. A new arrival is reported at MSS. Congratulations, OM. BGV is AARS. NCS of SNY 80 with the call WLNZ, DZH changed QTH. HGO is new member of the Basic AEC. BCS says that 23-Mc. band is so dead that the gang is going on 14 Mc. While on vacation VG visited USNR Radio School at Noroton, Conn., and WIC at Tuckerton, N. J. KTA reports NXR a new station in Brooklyn. AV holds Sunday morning schedules on 14-Mc. 'phone so the folks in Garden City can talk with their boys at camp in Savannah, Ga. IXZ is using a small e.c.o. for 3710 kc. MHD is new member of the Section Net. LYC spends 50 per cent of his time handling traffic. The bulk of JZX's traffic is from Army camps. The Section Net is operating regularly throughout the summer. The following members can be heard and worked to clear Section traffic: CKU, DBQ, DW, LBI, LR, LGK, MT, MZB, and many more who are on at least once a week. At this writing (late June) we have listed in the AEC approximately 108 members in the Section. This is a very low average for such a large number of active stations. We urgently request more active stations to join the AEC and help in preparation for any emergency that may arise where amateur radio can be of assistance.

Traffic: W2BO 577 BGV 287 AYJ 270 DBQ 196 KI 189 MZB 186 LZR 147 (WLNK 22) JZX 129 DW 109 AZV 90 MEM 77 MRL 70 FPC 68 EYS 54 LGK 40 MT 39 GP 38 LGK 25 LYC 24 BGO 23 LR 17 FF-DOG 10 NHD 9 FAQ-FJV 8 CET 7 BCS-MHD 6 CKU 5 IXQ-IXZ-JAU 4 EC-AV 3 AA-BIV 2 HGO-NLQ-LID 1. (April-May: W2 BWC 192.)

NORTHERN NEW JERSEY — SCM, Edward Gursky, Jr., W2LMN — RM's: BZJ, CGG, IYQ. PAM: LXI. Section Net: 3630 kc., 8:30 p.m. to 9:30 p.m. DST, daily except Sunday. MRX has new antenna for 28 Mc. GW is recently out of hospital, after trouble with his appendix. JME has a battery-operated transceiver for 112 Mc. HXI has been building e.c.o.'s to while away his spare moments. GYY joined the State Guard. EXY likes to contact fisherman hams and arrange fishing trips. Any of you fellows like to play with worms and fishhooks? If so, get in touch with EXY. The Raritan Bay Radio Club gave a testimonial dinner to the club president, ASB. HZR will again work portable from Honesdale, Pa., this summer. MRJ, BUX, BKO and MTO recently demonstrated portable equipment at the Emerson High School (Union City, N. J.) Parent-Teachers Ass'n exhibition. Complete emergency power was used, and two units were mobile. NCY received his active appointment from AARS. He also has a new Signal Shifter.

The Livingston Radio Club has three 50-foot masts erected, and is ready to operate on all bands. The family got Pop (CGG) a new Abbot 112-Mc. transceiver for Father's Day. MLW has schedule with 4EIV/4 in Ft. Jackson, S. C., and will be glad to take any traffic for men stationed there. KSR built a vacuum tube keyer. HZY has been on 3.9-Mc. 'phone. He and JCT have been experimenting with direction finders. JKH has a new 15-watt transceiver on 112 Mc. MIG is using e.c.o. on 1.8 Mc. and 3.5-Mc. c.w. and 3.9-Mc. 'phone. At a recent meeting of the Freehold Amateur Radio Club, the following officers were elected: Theo. Morris, trustee and honorary president; Walter Hampton, pres.; Boris Zukowsky, vice-pres.; Edward Spuler, secy., and Edward Mohr, treas. The members of the club are building a new transmitter, and expect to have it finished shortly. The club holds code practice every week, and will soon begin theory classes. Anyone wishing more information, contact Edward Spuler, P. O. Box 24, Freehold, N. J. From reports so far received, a good time was had by all on FD. IGT, IYQ, JUU, MAX and MNT operated with two transmitters from Princeton, N. J., and made 226 contacts. GW/2 had eleven transmitters powered from four gas-driven generators. LMN/3 with AVO, CMY, CNO, ITW, IQG, JT, LMN, LVF, MBS, MLW, NCY, NYY and 8RFP operated near Vernon, N. J. Power was from a 2½-kw. gas-driven generator, and 281 contacts were made. The Kiloeyce Club of Columbia High School (Newark, N. J.) has been active on 1.75-Mc. 'phone, using the call MZE. LGQ is the call of the Weequahic High School Amateur Radio Club. DOR, BOE, ALK and FDL are also on 1.75 Mc. FL was recently host to a group of hams at his lake home near Denville, N. J. In the group were FB, HYV and HZR. CCI is at the Naval Radio Training Station at Newport, R. I. MAB is a radioman on the U.S.S. *Texas*. IQX has a new receiver. LSX is one of the c.w. ops at the Flushing (L. I.) airport. TP has put 500 watts on 1.75-Mc. 'phone. NWJ is ex-3HJR and 8NWJ, and is in Caldwell. The election notice for SCM of this Section, which was supposed to be in June QST, did not appear. It will appear in this issue, so W2LMN will continue as SCM until the election is held.

Traffic: W2MNT 590 (WLNK 64) MLW 344 CGG 326 MKW 198 ANW 141 IYQ 109 (WLNK 22) MHJ 96 NJE 86 KSR 83 JUU-MNO 66 NCY 47 MRJ 27 HCO 22 GHQ 23 HZY 20 EKU 16 LAT 8 BNU 7 JKH-LMN 5 CJS 4 MIG 2. (April-May: W2CGG 368 LXI 7 BNU 22.)

ATLANTIC DIVISION

EASTERN PENNSYLVANIA — SCM, Jerry Mathis, W3BES — W3AQN must rate out York way by the looks of the newspaper publicity (and photos) he got during the Field Day tests. 8ATF has been appointed to his local defense council as a result of his e.c. activities. He has the use of ½-kw. emergency power. 3CDY operated in FD with two transmitters c.w. and 'phone. ILK is building a new 200-watt rig which we hope will be an improvement over his 30 watts. IOU joined AARS. GKO is making plans for a picnic in August for the AARS exclusively. FJU is now WLQH and NC-2 'phone c.w. nets. FRY was the main-spring in the Frankford Radio Club's FD section. 3BXE spent his vacation visiting members of the Eastern Pa. Net. AGV and CHH did yeoman FD duty at 3EDP/3 of the FRC. GQW is catching up on sleep lost on FD, and is looking forward to the next ORS Party. GHM pounded a mean key at 3BKX/3 on FD. The Chester Radio Club signing W3DRQ/3 did well on FD under the able leadership of DGM. The Beacon Radio Club developed carburetor trouble which ruined an otherwise bright prospect for FD. 3GAG/3, the Phila. Wireless Ass'n, and W3IU/3, the York Road Radio Club, had their share of troubles on FD. IKW, HFD, DMQ and BES kept 3BES/3 of the FRC on the air. AOC received a visit from 2MIY, who stopped by on her way to Washington to take a job with the War Dept. FMF has nearly completed a new battery-operated emergency rig for all bands. 8UQM took part in the AARS ZCB contest. The Mayfair section of the FRC signed 3GKO/3 for the Field Day contest. BRZ is rebuilding and increasing power. 3CHH jumped off the deep end recently.

Traffic: W3FJU 1008 3GKO 852 3ASW 31 8UQM 19 3FMF 46 3FPC 4 3AOC 244 8EU 28 3EON 60 3ADE 27 3BKX 7 3HFE 3 3BES 20 3FRY 3 3ILK 4 3HCT 11 3DRO 17 8ATF 21 3AQN 229 3CDY 6.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA — SCM, Hermann E. Hobbs, W3CIZ — AXP now is instructor in the Air Corps, and was recently married. The best of everything, and good luck. 2MIY is with the AARS

in Washington, D. C. 1KH is also in D. C. 3CIZ is building a 240 forty-meter rig. FPK's antenna is down due to a recent storm. FTD has a Johnson "Q" on 14 Mc. 3FE completed ten years of hamming, and says he feels like a pretty well seasoned "Rotten Young Squirt." You will pass, Joe, and good work. Keep going. FFN now has a second-class radio-telephone ticket, and celebrated by going on a vacation in New England. JHW operated portable W8 in FD and has moved to 3628 Horner Place, which looks like a good QTH. WLM is in operation from 5 p.m. to 1 a.m. daily except Sunday. CKL is now in operation from 12:30 p.m. to 1 a.m. daily except Sunday on 3.5 and 7 and 14 Mc.

Traffic: W3BWT 1093 CIZ 728 CXL 1188 (WLM 2696) FE 39 FFN 3 HWJ 9 JHW 2 OZ 23 CIQ 15.

SOUTHERN NEW JERSEY — SCM, Lester H. Allen, W3CCO — Ass't SCM and AARS Liaison RM, W3ZI — Regional Coördinator in charge of Emergency Coördination, W3BAQ — RM's: 3BEI, BYR, ITU — P.A.M.: EUH. Section Net Frequencies: OPS, 1980 kc. (Thurs. at 8 p.m. EDST); ORS, 3700 kc. (Tues. and Sat. at 8 p.m. EDST during summer months); ORS 7280 kc. (Wed. and Fri. at 8 p.m. EDST). Gossip around the Section this month has been about the DVRA's 5th Annual Hamfest and Outing. Two baseball games of importance will be held, one between the 2nd and 3rd Districts and the other between the ORS and OPS men. Here's hoping I will see most of you personally at the outing.

W3AVJ reports net attendance good. ITU and HAZ are experimenting on 112 Mc. with Abbott DK2's. IMY is experimenting with 112 Mc.. Jack also took Class A. GCU is getting his pipe ready to swing the big antenna back up in the air. Ray's message center beginning to take shape and is producing some nice traffic. GMY will schedule K4GQO during the summer. ACC is on 112 Mc. IZT has a local 'phone net started with 11 members. The boys call it the Mosquito Network Inc. Anyone around the southern part of the State interested in this net, contact IZT. JBU was one of the operators at 3IKG/3 during FD. Karl is applying for AARS appointment. CKY worked a KA on 14-Mc. 'phone. Frank received a Public Service Certificate for outstanding traffic handling during recent Wisconsin flood. ABS had a good time working FD stations. 3JJX is new amateur in Hamilton Square. Congratulations, Chick. AQ received Public Service Certificate for meritorious relaying of important death message on 1.75-Mc. 'phone. AXU received WAS after doing the job on 28-Mc. 'phone. CKY was recently appointed Assistant EC for Mercer County. 3VE/4 is back on the air again with new call 4HOE. 3CCC has been transferred to the U. S. Naval Radio Station at Manassquan. Good luck, Eddie. ZI is celebrating his 25th Anniversary of active membership in ARRL! FB, Ed. IOW is now in Panama with the U. S. Army. FBC is in the Army and stationed at Fort Jackson, S. C. LT is working portable in Trenton after being away for a couple of years. JAX reports for the first time. He has been 2 1/4-metering, but doesn't like it nearly as well as 1.75 and 3.5 c.w. HYT was one of the operators with 3GKO/3 working in Field Day, and reports his FD rig working FB. HKO has temporarily moved from our Section to accept a job at Fort Monmouth. Sorry to lose you, Bud. EUH is starting to rebuild his transmitter, and expects to have about 100 watts. GCU is doing an fb job as editor of the DVRA News. CCO worked about 60 stations in 3 days during the short skip period on 28 Mc. BBU has a very fb signal on 28-Mc. 'phone. EOP is rebuilding, and will have 1 kw. when finished. Keep the reports coming, fellows. IOK, general chairman for this year's DVRA outing and hamfest, wishes to remind the boys that August 10th is the date for the big shindig this year. They are expecting the largest turnout of all times, so let's not miss this gala event and turn out 100%. Pass the word along to your friends. Until next month, 73.

Traffic: W3AVJ 151 3ZBX 98 3EWK 94 3HAZ 94 3ZI 79 3OQ 70 3INF 53 3AQ 48 8LJD/3 46 3IMY 38 3GCU 34 3ITU 30 3ATF 29 3GMY 13 3HPX 19 3AEJ 16 3ACC 15 3GHR 13 3BEI 9 3HYT 8 3ITZ 6 3CWG 5 3JBU 3 3ABS 2 WLNf 12.

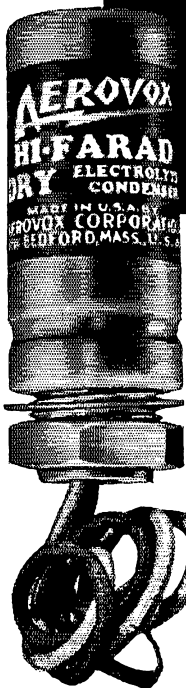
WESTERN NEW YORK — SCM, Fred Chichester, W8PLA — The big events of the month were the AARS ZCB Location Contest and the ARRL Field Day. In the Army contest it is expected that SBV, of Elmira, will take first place in the Section. Conditions on 3.5 Mc. were halfway decent, and there was a good turnout. In FD, Western N. Y. was very well represented, various clubs and quite a number of individual operators taking part. Mem-

bers of the Batavia Club operated from a cottage at Silver Lake, using NXX's call. A number of fellows in Central New York operated under RKM's call at McGraw. In this set-up most of the preparation was made by CSE and RKM with the following taking part in the test: CYD, NWZ, REI, BOA and GZW. A gas engine-driven motor generator was run constantly for the whole period, with the exception of time out for refueling; 135 contacts were made. The Utica Mike and Key Club also participated in FD under the direction of PPY. Others in the club who took part were ADM, UYS, EOL, NEI, MBK, CBK and MBW. Niagara County Emergency Net was quite active, with four complete emergency-powered stations operating. KWS says, "Our first experience, and we sure learned plenty." BGV, IX, FEJ, BG, GBY and HGR visited several of the FD set-ups. KXR is back on 1.75 Mc. after a long absence. CBK is changing to new QTH. BOA has a new 200-watt final. RCJ has new QTH. AOR has new Howard receiver, and will be looking for traffic all summer. VQO, a new ham in Rochester, has been contacting his uncle, GBE, regularly. USX and JZT, working together from Alma Hill and using a gas-driven generator, made 74 contacts in 15 hours of operation. LMO has a new Super Defiant receiver. With one exception, all the hams in Allegany County are in the oil-gas business. The following are officers of the RARA elected for the ensuing year: Pres., BCP; vice-pres., RGA; secy., FNT; treas., DOD, MC, DKN, TEX, JIC and UPH were elected to the executive committee at the last meeting of the club. ATH and CWW demonstrated their four-foot, radio-controlled, model boat, which is a huge success. DOD and his wife, TUQ, are vacationing in the South. TEX and TRC are doing some nice work with portable 56-Mc. equipment. DFN has been working portable week-ends with his emergency-powered 1.75-Mc. rig. He has also just completed his new six-foot rack. MC is also rebuilding, but is still on the air, using the small rig and the portable job, with "Helen" doing most of the operating. BCP is just putting the finishing touches on a new rig. The Rochester gang is finally becoming AEC-conscious and is doing a mighty fine job with a 2020-Kc. 'Phone Net, Sundays, at 1 p.m., and a 3850-Kc. C.W. Net, Mondays, at 7 p.m. High frequency nets are also coming up fast. The AARS Net, which has been operating on 3520 kc. for some time on Monday nights, has grown to such proportions that the membership has been divided so as to cover each night of the week except Sunday. USX, DII and RMR are the latest recruits to the AARS ranks in the 3.5-Mc. Net. FCG, the State Radio Aide, has been kept busy sending out application blanks to would-be members, and it is expected that we will soon have a very respectable representation in this Section.

Traffic: W8USF 12 AOR 62 JIW 187 KWS 16 RTX 55 RGH 41 SFD 159 DSS 49 AOR 54 UXT 85 RKM 214 MVB 17 EBR 21 FCG 99 RZX 30 AQE 88 PLA 342. (April-May: W8SMI 34 DSS 41 DBR 133 SFD 200.)

WESTERN PENNSYLVANIA — SCM, E. A. Krall, W8CKO — Ass't SCM in charge of ORS activities, W8KWA. Ass't SCM in charge of Emergency Coördination, W8AVY. Chief RM, W8NCJ. RM's: W8TOJ and KUN. Chief PAM, W8BHN. NCJ reports that TTD is a new member of the W. Pa. ORS Net. UKL has reported a few times. We hope other stations interested in traffic work will take advantage of our net facilities. The net meets each night except Saturday on 3750 kc., and Sunday at 6:30 p.m. DST, with TOJ as RM and NCJ as alternate RM. KWA again wins the honors for having handled the most traffic in the Section. MJK is one of our reliable stand-by stations. TOJ took part in FD activities at Warren and also participated in RM Nite, June 14th. BOZ has been playing around with 112 Mc. PX handles all his traffic on 3.9-Mc. 'phone, and does a good job of it. RIS says that W5GUJ is operating fixed portable at Wilkinsburg. CMP is still the one station who never fails to report. FB, Doc. OKK regrets that he cannot check into the early net, but promises to do so when conditions permit. RAT uses a burned-out 20-watt fluorescent lamp as a modulation indicator, and says it is the berries. TWI is home from Penn. State and is operating his own rig again. IOH is a reliable contact on the W. Pa. Net. UQX has succeeded in putting Grove City on the radio map, due to his ORS and AARS activities. TTD is a new EC at Export, Pa. VYO will operate the RAJ at Twin Echo Scout Camp for the summer. The PARCC held its monthly meeting at Altoona, and had a marvelous time.

Traffic: W8KWA 475 NCJ 314 MJK 240 CKO 203 TOJ 127 PX 61 CMP 53 OKK 27 RAT 12 TWI 11 IOH 10 TTD 9 BOZ 7 NDE-UT 6 VYO 1.



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Results Member QSO Party

(Continued from page 48)

424; W8OFN, 38,976; W8KUN, 38,280; W5KC, 37,962; W3IWM, 36,288; W9BRD, 35,280; W9VKF, 34,680; W5FZD, 33,110; W3GHM, 32,224; W4CYC, 31,460; W5DBR, 31,376; W9GBJ, 31,350, W4GXB, 31,304; W2EQS, 30,793; W1BIH, 30,240; W9QFS, 30,195.

Leaders in number of member-contacts: W9FS 442, W3BES 427, W1TS 387, W6HZT 373, W2IOP 369, W3DGM 355, W3FQZ 346, W9PKW 338, W8NDS 334, W9DIR 327, W9RQM 320, W6PCE 315, W8OFN 311, W5KC 308, W9TH 306, W8KUN 305, W3IWM 299, W9BRD 290, W3GHM 279, W5FZD 275, W5DBR 272, W3BXE 270, W3EML 270, W2EQS 268, W8IXJ 266, W9VKF 266, W4CYC 261, W9GBJ 260, W4GXB 257, W1BIH 256, W9BQJ 256, W2HXI 254, W3HUM 251, W9QFS 251.

Leaders in number of sections worked: W1TS, W9FS 61, W3BES, W6PCE, W9RQM, W9TH, W9VKF 60, W3DGM 59, W2IOP, W6HZT, W8KUN, W8OFN 58, W5KC, W9BPU, W9PKW 57, W3FQZ, W3IWM, W4GXB, W8NDS, W9BRD, W9DIR, W9GKS, W9RLB.

Another ARRL Member QSO Party is tentatively included in the calendar of activities for next January. Here's hoping we'll see you there for another grand get-together!

Scores

Fourth "A.R.R.L." QSO Party, January, 1941

(Scores are grouped by Divisions and Sections. . . . The operator of the station first-listed in each Section is winner for that Section. . . . Asterisks denote stations not entered in contest, reporting to assure that stations they worked get credit. . . . Listings show score, number of A.R.R.L. members worked, number of Sections worked. . . .)

ATLANTIC DIVISION		W3AHZ	4560-70-24
E. Pennsylvania		W8ADE	4150-58-25
W3BES	54240-427-60	W8UQM	3744-58-24
W3DGM	44840-355-59	W8OML	3696-63-21
W3GHM	32224-279-53	W8HKS	2176-43-16
W3EML	29590-270-55	W3ITW	1484-28-14
W3BXE	29500-270-50	W8EU	840-17-10
W3CRW	27324-228-54	W3HHS	520-26-10
W8OKC	21604-224-44	W8RKZ*	490-15-13
W8SNA	20020-203-44	<i>Md.-Del.-D. C.</i>	
W8RJV	14616-174-42	W3FQZ	41552-346-56
W3HZV	13221-167-37	W3HUM	27400-251-50
W3ILK	11550-140-35	W3DRD	17664-150-48
W3FXZ	10880-136-40	W3F8P	17100-165-45
W3ITZ	10260-135-38	W8JTT/3	17014-156-47
W3HXA	9438-121-39	W3FFN	11016-128-36
W3INH	8550-118-30	W3ISF	10492-97-43
W8QV	6750-100-27	W3HTK	7828-103-38
W3EUC	6500-125-28	W3CVA	7524-79-36
W3AOC	4925-74-25	W3AQW/3	4370-70-23
W3ATR	4770-81-23	W3ECP	4175-59-25

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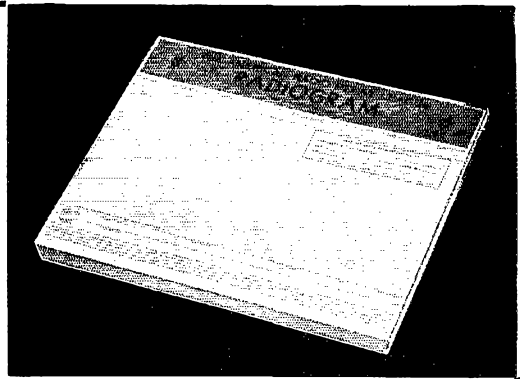
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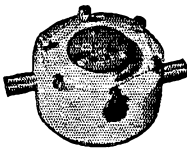
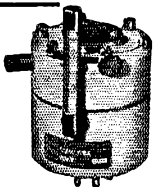
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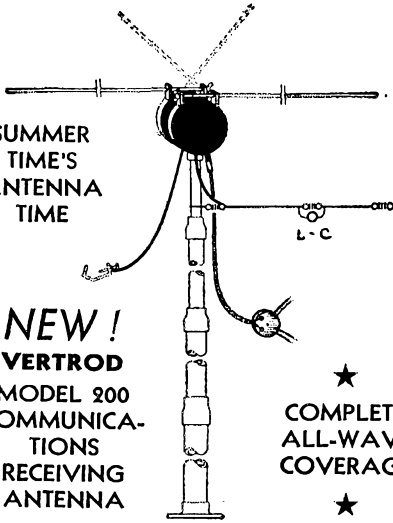
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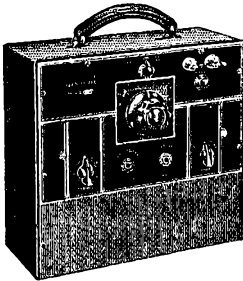
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SUN RADIO and hams go all out in their praise for this antenna. Just out and already a smashing hit. Actually 3 antennae in 1! Covers complete short wave, broadcast, F-M, and Television bands — 550 to 5 meters — in one unit. Features 2 adjustable ϕ rods, antenna and set matching transformers, new, patented L-C resonator, 50' lead-in and 50' horizontal antenna. Individually adjustable elements for vertical and horizontal polarization and discrimination against reflections. *Nothing like it ever before!*
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W3DOG	1429- 34-21
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W3CDQ	162- 4- 4

So. New Jersey

W3BAQ/3	14320-154-40
W3CBB	10329-132-33
W3CWF	9200- 90-40
W3HAZ	8512- 87-38
W3HVM	7458- 89-33
W3LFT	6090-105-29
W3FBM	2268- 38-18
W3ZI	1484- 28-14
W3FXV	1440- 40-18
W3HDK	1332- 37-18
W3EWH	1188- 29-11
W3GHR	858- 14-11
W3ACC	360-15-12
W3AQ	176- 11- 8
W3ABS	8- 2- 2

Western New York

W8DZC	19350-200-43
W8CJN	17440-146-51
W8PCN	13148-148-38
W8EUP	9680- 96-40
W8ALP	8512-112-38
W8RKM	7200- 95-30
W8NEY	5742- 74-29
W8IOT	5510- 70-29
W8SFD	3910- 60-23
W8DTV	2772- 38-22
W8JIW*	300- 5- 5
W8RUM	112- 3- 2
W8TEP	112- 3- 2

W. Pennsylvania

W8NDS	40208-334-56
W8KUN	38280-305-58
W8SFW	18720-155-52
W8MTO	12180-120-42
W8TJO	11400-125-38
W8NCJ	10500-100-42
W8RWJ	10062-104-30
W8HKU	2144- 42-16
W8DLG	1760- 40-22
W8AVY	1068- 20-12
W8TTD	511- 12- 7
W8BWP	126- 10- 7
W8TWT*	40- 5- 4

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Illinois

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W9TH	39720-306-60
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W9VOQ	26400-215-55
W9NDA	25493-216-53
W9YZN	24062-202-53
W9BPU	23598-182-57
W9GFF	22542-221-61
W9MUX	21420-185-51
W9AQB	18500-160-50
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W9YTV	16896-152-48
W9IPT	13984-127-46
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W9ERU	9956-106-38
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W9TKN	8280- 90-36
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W9TDJ	6072- 67-33
W9GY	4592- 57-28
W9EBX	4424- 54-28
W9FAQ*	4416- 67-24
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W9JYF	3024- 47-21
W9ADO	2860- 40-22
W9CEO	2760- 35-23
W9NTU	2520- 36-21
W9HZG	2226- 28-21
W9EUL	2052- 32-18
W9ACU	1980- 30-18
W9ZEN	1456- 31-13
W9REC/9	1344- 23-14
W9TZQ	1092- 17-13
W9GBT	792- 19- 9
W9HQH	462- 8- 7
W9PNV	420- 21-10
W9BIN	360- 11- 5
W9QJL	315- 7- 5
W9MBI	210- 15- 7
W9BRY	52- 1- 1
W9WVG	18- 3- 3

Indiana

W9KBL	24000-216-50
W9HUV	15980-145-47
W9EGQ	11220-120-38
W9AB	8772- 77-43
W9DGA	5704- 67-31
W9INU	5616- 79-28
W9BKH	5120- 55-32
W9NXU	2880- 48-20
W9QLW	2816- 39-22
W9AMM	1504- 23-16
W9SVH	1012- 21-11
W9RZS	600- 20-15
W9ABB	570- 19-15
W9EHT	2- 1- 1
W9HKR*	- 74- -

Kentucky

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W9ZWR	22278-212-47
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W9CNE	6200- 75-31
W9YQN	3360- 60-28
W9NYW	1998- 81-18
W9YHD	1224- 34-18

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W8IXJ	28518-246-49
W8SCW	25584-221-52
W8TAH	7728- 74-39
W8TRN	7344- 83-34
W8FTW	4176- 62-24
W8UTC	4056- 53-26
W8QQF	3952- 51-26
W8SAY	3834- 46-11
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W8UFD	2860- 40-22
W9YYA	2714- 34-23
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W8TBP	2080- 27-20
W8QDU	1886- 41-23
W8UQR	1564- 21-17
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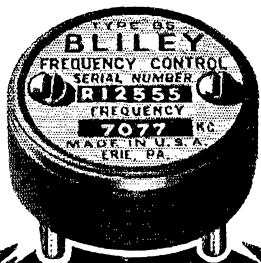
Ohio

W8OFN	38976-311-58
W8GD	26834-234-52
W8TDN	25300-205-55
W8TMT	21573-206-47
W8KO	20-46-168-53
W8ROX	20102-195-46
W8CXN	18240-165-48
W8UWU	17155-157-47
W8BTI	16856-147-49
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W8DAE	11029-110-41
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W8NLY	2386- 56-26
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W8HS	1320- 19-15
W8NDN	1088- 32-17
W8CBI	760- 16-10
W8FSK	600- 20-15
W8BSR	560- 20-14
W8BEW	546- 21-13
W8QJL	504- 11- 7
W8JFC	497- 11- 7
W8KHM	116- 4- 2
W8TSP	50- 5- 5
W8UZJ*	- 12- -

Wisconsin

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W9DIR	39424-327-56
W9QFS	30185-251-55
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W9KXK	11088-101-44
W9RLB	9968- 64-56
W9LDK	2520- 35-21
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W9IRN	1260- 17-15
W9DNO/9	990- 20-11
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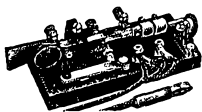
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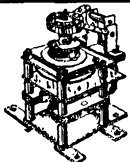


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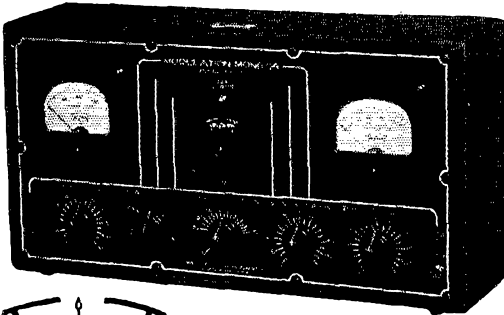
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Kansas City, Missouri

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EFFICIENCY



TRIPLETT MODEL 1696-A

YOU'VE solved your problem of getting maximum efficiency from your transmitter when you invest in a Model 1696-A Modulation Monitor.

And . . . better yet . . . it saves you money by increasing your range without the added expense of remodeling your transmitter. (Amateur experience has shown that a properly modulated 10-watt rig can be as efficient as a 50% modulated 40-watt transmitter.) The Model 1696-A is easy to use. Plug it into your A.C. line — make simple coupling to the transmitter output and the monitor shows:

- CARRIER REFERENCE LEVEL
- PER CENT OF MODULATION
- INSTANTANEOUS NEON FLASHER (no inertia) indicates when per cent of modulation has exceeded your predetermined setting. Setting can be from 40 to 120 per cent.

Use of the monitor permits compliance with FCC regulations. Two RED ● DOT Lifetime Guaranteed Triplett instruments. . . Modernistic metal case, 14½" x 7½" x 4½", with black suede electro enamel finish. Black and white panel.

Modulation Monitor Booklet — regular purchase price \$1.00 — Furnished FREE with each Model 1696-A. Tells you what you want to know about this monitor, and includes details, including diagrams, for operation of Model 1696-A.

Model 1696-A. Amateur Net Price (U.S.A.) **\$38.34**

For More Information—Write Section 258, Harmon Drive

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W9DM	504-21-12	W2JFY	14364-146-42
<i>South Dakota</i>			
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W9ZWL	5580-65-31	W2LMN	13650-150-39
W9YEZ	3978-52-26	W2LYQ	12444-158-34
<i>N. Minnesota</i>			
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W9RTN	4002-62-23	W2JUU	9077-135-29
W9DNY	2310-30-21	W2MLW	3128-102-32
W9QCP	1040-15-13	W2MMA	7104-71-37
W9WUQ	592-12-8	W2MHJ	4892-102-23
<i>S. Minnesota</i>			
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W9BQJ	29224-256-52	W2MAX	1508-33-13
W9CVH	20800-200-52	W2MNT	1012-21-16
W9QDE	13230-133-42	W2ASY	972-21-16
W9DOB	4752-65-27	W2CJW	560-28-10
W9ZAD	976-11-8	W2FCO	482-8-7
DELTA DIVISION			
<i>Louisiana</i>			
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W5DWW	16876-165-44	W2NGY*	176-11-8
W5HNW	494-19-13	W2MRK	144-9-8
W5BPL	220-11-10	Midwest Division	
<i>Mississippi</i>			
W5JII	13932-137-43	<i>Iowa</i>	
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W5JDR	5950-85-35	W9LDH	15210-144-45
W5EGE	3450-50-22	W9LDF	3362-88-37
<i>Tennessee</i>			
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W4PL	4550-65-35	W9MQY	6208-82-29
W4GLL	1260-17-15	W9DTB	1862-48-19
W4DLK	360-18-10	W9JIS	1122-26-11
W4GLP	192-12-8	W9TGG	864-23-9
HUDSON DIVISION			
<i>Eastern New York</i>			
W2EWD	20102-195-46	<i>Kansas</i>	
W2DLJ	14008-181-34	W9VBQ	27242-232-53
W2NCG	3888-56-24	W9CVL	15134-136-47
W2NIY	3640-66-20	W9NKM	6336-63-36
W2HVR	1290-19-15	W9WIN	5828-69-31
W2MIY	1118-18-13	W9TVU	1260-20-14
W2HXQ	540-18-15	<i>Missouri</i>	
W2LSD	280-14-10	W9GBJ	31350-260-55
<i>N. Y. C. & L. I.</i>			
W2IOP	45704-369-58	W9AEJ	27500-225-55
W2KZN	23400-200-62	W9QMD	25312-201-56
W2NDQ	19750-175-50	W9BQZ	11424-111-42
W2LPL	19580-178-55	W9YZH	4794-71-34
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W2MXP	8712-96-36	W9GLD	480-24-10
W2KKU	8401-111-31	W9OUD	128-8-8
W2NFP	7936-100-32	W9WVQ	112-9-7
W2GPF	7680-95-32	<i>Nebraska</i>	
W2BGV	7232-89-32	W9BBS	24804-209-53
W2EC	5980-90-26	W9OKQ	5704-67-31
W2LLE	5180-70-37	W9INR	5301-61-31
W2LRI	5046-62-29	W9GDB	4440-60-30
W2MOY	4600-75-23	W9MGV	3267-62-27
W2EGG	3168-47-22	W9BZF	672-17-8
W2AHC	3036-44-22	W9LEF	616-19-7
W2KYV	2600-50-26	NEW ENGLAND DIVISION	
W2AJL	2268-29-21	<i>Connecticut</i>	
W2JGF	2185-58-19	W1BIH	30240-256-54
W2LBI	2176-39-17	W1KQY	23424-219-48
W2MZZ	2100-45-15	W1FMV	13884-153-39
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W2CTP*	18-3-3	W1ON	4316-58-26
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W2HXI	27342-254-49	W1LQK	2500-50-25
W2JKH	22260-240-42	W1CTI	1680-31-15
<i>Wisconsin</i>			
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W9NFK	14496-126-48	W1KAT	198-8-3
W9NFM	14364-146-42	W1DLN	180-15-6
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W9NFP	13650-150-39	W1LVQ	16770-190-39
W9NFS	12444-158-34	W1NFF	9240-115-33
W9NFT	8594-119-41	W1UE/1	2128-58-19
W9NFW	9077-135-29	W1BDI	858-14-11
W9NFX	3128-102-32	<i>Maine</i>	
W9NFY	7104-71-37	W1GKJ	19082-197-43
W9NFG	4892-102-23	W1KYT	14640-159-40
W9NFB	4900-67-25	W1CRP	9030-104-35
W9NFA	1508-33-13	W1MFK	8008-129-26
W9NFD	1012-21-16	W1LML	2660-45-19
W9NFE	972-21-16	W1IBR	2436-33-21
W9NFF	560-28-10	W1TO	1204-18-14
W9NFG	482-8-7	W1BUZ	952-34-14
W9NFH	240-15-8	W1ILE	720-15-9
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- 6000 Volts ● 600 MA
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★ All ranges self-contained — NO EXTERNAL multipliers or batteries. ● 6 AC — 6 DC — 6 output voltage ranges — 12/60/300/600/1200/6000 V. ● 1000 ohms per volt ● 4 current ranges — 1.2/12/60/600 mills ● 3 resistance ranges — 0-5000/500 M/5 Megs ● 6 DB ranges from -10 to +70 DB ★ All measurements from ONLY TWO pin jacks except 1200, and 6000 volts ★ New type, extra large, easy reading 400 microampere rectangular meter ★ 1% multipliers and wire wound bobbins. ★ Overall size only 7" x 4 1/2" x 3".

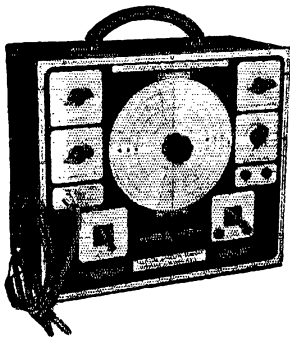
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● Not only an unsurpassed Signal Generator for purposes of receiver alignment (A.M., F.M., and Television), but also SPECIFICALLY DESIGNED as the key to "Servicing by Signal Substitution" Nevertheless priced within the easy reach of every progressive radio service engineer.

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103 WEST 43rd STREET · NEW YORK, N. Y.

CABLE ADDRESS: "HARADIO"

<i>E. Massachusetts</i>	
WILYG	26129-223-53
WIKXU	21462-194-49
WIWV	11825-113-43
WIEPE	10872-126-36
WIJEA	7372-72-38
WIMQR	5220-62-30
WIMAN	4956-93-21
WIHA	4032-71-21
WIBDU	2760-44-20
WIKB	2360-34-20
WIALP	2106-34-18
WIKH	1742-41-13
WIMPT	1512-39-12
WIKTE	990-20-11
WIEU	756-21-18
WILEA/1	232-4-4
WIAAR	174-4-3

<i>W. Massachusetts</i>	
WIKJO	15738-158-43
WIDCH	4056-54-26
WIKOS	2482-49-17
WIFAA	2024-44-23
WIBPN	1792-31-16
WIAJ*	2-1-1

<i>New Hampshire</i>	
WIBFT	10920-105-42
WIMLO	5600-75-28
WIHFO	2109-37-17
WIMMG	1736-37-14
WIKLV*	342-17-9

<i>Rhode Island</i>	
WIMEK	10850-130-35
WILWA	8100-137-25
WILWB	2288-53-22

<i>Vermont</i>	
WIFSV	6372-93-27
WIKJG	72-6-6

NORTHWESTERN DIVISION

<i>Alaska</i>	
K7CZY	234-13-9
W7DIS/K7	176-11-8

<i>Idaho</i>	
W7GOZ	192-12-8

<i>Montana</i>	
W7BCE	14220-133-45
W7FMV	11256-109-42
W7GSU	4620-53-30
W7GDB	384-7-6
W7GLM	112-3-2
W7CPY	62-6-1

<i>Oregon</i>	
W7KLL	6976-84-32
W7CYU	5576-57-34
W7BOH	3484-42-26
W7GNJ	2356-37-19
W7GPP	1900-38-25
W7HHH	1352-27-13
W7EHT	912-24-19
W7GUP	72-6-6
W7HHQ	60-6-5
W7IHK	2-1-1

<i>Washington</i>	
W7AKP	17136-169-51
W7HMQ	6300-89-36
W7HZG	1632-26-16
W7GZB	1188-33-18
W7GVH	1032-18-12
W7ETO	768-24-16
W7KK	532-20-14
W7HVS*	24-4-3
W7GVG	18-3-3
W7EVV	2-1-1

PACIFIC DIVISION

<i>Hawaii</i>	
K6PAH	13674-134-43
K6CGK	7104-96-37
K6OLU	1302-43-14

<i>Nevada</i>	
W6CW	3074-53-29
W6GSB	2929-51-29

<i>Santa Clara Valley</i>	
W6PBV	14880-155-48
W6IWS	5994-56-37
W6SSA	3864-44-28
W6LCS	3168-47-22
W6QLO	48-6-4

<i>East Bay</i>	
W6LMZ	13024-123-44
W6EY	8640-83-40
W6IPQ	7448-99-38
W6RQG	4800-55-30
W6DHS	3120-40-24
W6EJA	624-20-16
W6RRH	168-12-7
W6ITH	40-5-4

<i>San Francisco</i>	
W6RBU	18865-169-49
W6AHI	6090-62-35
W6QL*	1752-38-24
W6RH	600-20-15
W6OOC	96-8-6

<i>Sacramento Valley</i>	
W6RMT	21008-177-52
W6DBB	11004-131-42
W6PAR	4752-72-33

<i>San Joaquin Valley</i>	
W6CLZ	4500-50-30
W6AFH	3900-50-26
W6MHZ	1974-22-21

ROANOKE DIVISION

<i>North Carolina</i>	
W4GXB	31304-257-56
W4GXA	11880-141-36
W4DCQ	10400-130-40
W4DLX	5336-72-29
W4DGU	1140-30-19

<i>South Carolina</i>	
W4UAU/4	10980-122-45
W4CZA	4650-68-25

<i>Virginia</i>	
W3IWM	36288-299-56
W3EHN	4560-70-24
W3HWJ	3266-48-23
W3AIS	460-23-10
W3IWS/3	192-7-3

<i>West Virginia</i>	
W8UNH	15050-150-43
W8JM	11802-119-42
W8CSF	6612-89-29
W8DFC	6138-74-31
W8HUK	2704-52-26
W8VKF	1176-17-14

ROCKY MOUNTAIN DIVISION

<i>Colorado</i>	
W8SJT	4760-60-28
W8CAA	4560-51-30
W8HFC	1800-25-18
W8QEC	1408-19-16
W8YFJ	740-12-10
W8CDP	672-17-8
W8TDR	210-11-10

<i>Utah-Wyoming</i>	
W6SID	3744-48-26

SOUTHEASTERN DIVISION

<i>Alabama</i>	
W4DMZ	16148-159-44
W4FSZ	9072-101-36
W4HAL	6386-78-31
W4FZG	6270-70-33
W4GBV	6262-32-23
W4DS	2508-32-22
W4GOX	1440-20-16
W4AUP	1365-21-15

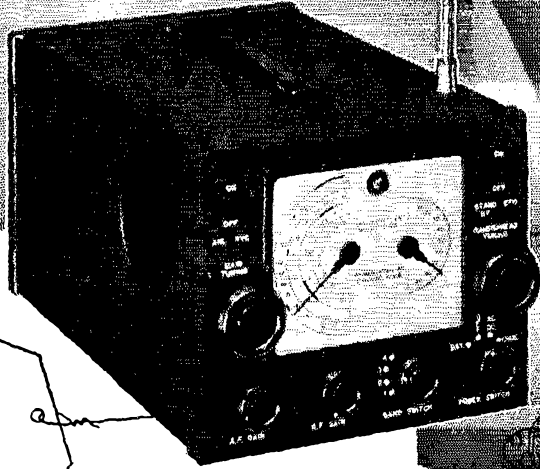
<i>Eastern Florida</i>	
W4BYF	20265-201-45
W4FZV	10602-115-38
W4FRE	6996-81-33
W4DQW	6768-75-34
W5BUH/4	1808-32-16
W4DDB	248-6-4

<i>Western Florida</i>	
W4BSJ	23618-216-49
W4AXP	1600-25-16

<i>Georgia</i>	
W4CYC	31460-261-55
W4FJF	23976-197-54
W4GPD	9102-98-37
W4AOB	7823-91-33
W4FDJ	232-4-4

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Filling Every Need!



\$59.50
*Easy Terms to
 Suit your Budget*

S-29 •

In the field — at home
 — on the water —

high in the clouds — rolling along the highway, you will find this portable model S-29 Hallicrafters communication receiver answering your every requirement.

A GRAND COMPANION

Covering all bands from 30.5 mc to 542 kc, this 9-tube receiver possesses all of the modern engineering features — noise limiter — band spread — AVC — band switching, all combined in a portable cabinet measuring 7" x 8½" x 13¼", weighing only 18 lbs. Flip the switch and you are ready to go on batteries that are self-contained. At home plug it into 110V AC or DC, and it is ready to go.

More value and utility for your money. Down payment \$5.95, balance in equal monthly payments of \$7.10 over a period of 8 months.

Your Receiver Taken in Trade

HALLICRAFTER	6 Monthly Payments	8 Monthly Payments	12 Monthly Payments
SX-28 ...	\$15.95		\$12.68
S-29	5.95	\$7.10	
S-27	17.50		13.92
SX-25 ...	9.95		7.91
SX-24* ...	6.95	8.29	
S-20R ...	4.95	5.90	
S-19R ...	4.43	\$4.43	
S-22 ...	6.45	7.69	
HT-6 ...	9.90		7.87
HT-9 ...	19.95		15.86
EC-1 ...	3.95	4.24†	
EC-2 ...	4.95	4.42†	
EC-3 ...	4.95	7.95	

* Less speaker
 † For four months

The RADIO SHACK
 167 WASHINGTON ST., BOSTON, MASS., U.S.A.



SPECIAL OFFER

*During
July and August Only*

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MEMBERSHIP
QST
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\$3.00

\$3.50 U. S. Possessions; \$4.00 elsewhere, U. S. funds. Only direct orders to A.R.R.L., West Hartford, Connecticut, U. S. A., can be handled at these special rates. This offer applies to new entries, renewals and extensions

AMERICAN RADIO RELAY LEAGUE

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<i>West Indies</i> K4HEB	8680-115-31	W6RGY W6NKM W6CHV W6SRK	7178- 72-37 4263- 49-29 2166- 32-19 106- 2- 2
SOUTHWESTERN DIVISION		WEST GULF DIVISION	
<i>Los Angeles</i> W6HZT W6IOJ W6QKB W6AM W68N W68PQ W6QGM W6ETJ	45704-373-58 26676-247-54 22200-197-50 15400-152-44 7770-105-37 5084- 67-31 2025- 38-27 384- 7- 6	<i>Northern Texas</i> W5HQN <i>Oklahoma</i> W5AQE W5FFW W5FMM	19846-184-47 15360-135-48 16036-179-42 2576- 31-23
<i>Arizona</i> W6BMC W6DFE W6CVV * W6GBN W6NRI W6RWW W6LXC W6OLF	7878- 76-39 3536- 43-26 2496- 48-26 1080- 20-12 120- 10- 6 108- 2- 2 24- 4- 3 24- 4- 3	<i>Southern Texas</i> W5FZD/5 W5DBR W5ITA W5IGJ W5HZT/5 W5JAJ	33110-275-55 31376-272-53 6510- 68-35 5376- 64-42 2814- 42-21 1908- 29-18
<i>San Diego</i> W6PCE W6BAM	40560-316-60 25704-227-51	<i>New Mexico</i> W5CJP W6QQT/5 W5ZU/5	9984-103-39 3650- 48-25 1530- 20-17

* W6QAP, opr.

Army-Amateur Radio System Activities

(Continued from page 27)

The contest logs of participating members were checked by their Corps Area Signal Officers to verify the scores claimed. As this was a competition between the nine Corps Areas, the total points of each Corps Area were multiplied by its activity percentage to arrive at the final score. This percentage was based on the ratio of participating members to the total Corps Area membership. Detail results of this contest will appear in the next issue.

WAR-AMATEUR SCHEDULES

THE daily WAR schedules on 6990 kc. will be continued during the summer months. WAR, Washington, may be heard on 6990 from 9:00 P.M. to 10:00 P.M. EST, every night except Sunday, calling "CQ ZCAA" to contact interested amateur stations on the 40-meter band. WAR also uses 4020 kc. each Saturday night from 7:00 P.M. to 8:00 P.M., EST, to work interested amateurs on the 80-meter band. The 7:45 to 8:00 P.M. portion of this period is used by WAR to listen for amateur 'phone stations on the 3.9-Mc. band. The special WAR QSL card will be sent to all stations successfully contacting WAR who first submit their own card.

W3USA

EFFECTIVE June 24th, the FCC authorized the assignment of call letters, W3USA, to Army-Amateur Net Control Station WLM, Washington, for use on the amateur frequency bands. This will replace the former call, W3CXL, which had been in use since 1929 when the Army-Amateur Net Control Station was moved from Fort Monmouth, N. J., to Washington, D. C., in connection with the expansion of the Army-Amateur Radio System. Call letters W3USA, which stand for "United States Army," will serve to more readily identify the Army-Amateur Net Control Station in Washington, in case of emergencies.

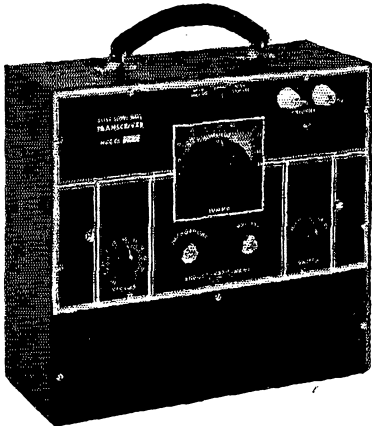
**New ABBOTT 2½ Meter
TRANSCEIVERS
In Stock — at Terminal!**



**New ABBOTT MRT-3 —
Net Price \$28.81**

A real high-powered transceiver! 20 watts of input delivers 6 to 7 times more power than ordinary 112-116 mc. transceiver. Compact, for easy installation in any automobile.

Tube kit: 1Y75, 6C5, 6V6.....\$ 4.60
Universal Hand Microphone..... 5.88
Vibrator power supply for car..... 12.61
AC power supply for home use..... 12.45



**New ABBOTT DK-3 —
Net Price \$18.82**

Includes many features to satisfy every requirement for truly portable 2½ meter operation. Range is 2 to 30 miles!

Tube kit.....\$.96 Handset.....\$5.88
Battery kit..... 4.21 Antenna..... .60

**Order from this ad or visit us in
New York City**

TERMINAL Radio Corp.

68 West 45th St. • 80 Cortlandt St.
2 stores in NEW YORK CITY
Vanderbilt 6-5050 • Cable: TERMRADIO

What the League Is Doing

(Continued from page 29)

director of disaster relief of the Red Cross. While DCB has made no releases of its plans, you may be sure that these committee members are all working for the amateur.

Five-Meter Wave Paths

(Continued from page 26)

great-circle distance from the ionized mass to the antenna location. When the mass is 600 miles away, low-angle radiation is necessary for all contacts regardless of tilt angles. As the ionization center approaches, the useful angle of radiation increases, slowly at first, then rapidly. From an analysis of past conditions the maximum useful angle of radiation appears to have approached about 28 degrees as a limit for a single refraction skip. The determination of this angle is not easy, and is not necessarily found by tilting a beam antenna. Antenna propagation characteristics are so altered by height, ground conditions, impedance matching, polarization, reactance off resonant frequency, etc., that a measurement of the exact angle of radiation or reception is a highly technical problem.

(The second and concluding part will appear in a forthcoming issue.)

Strays

To replace a nut on a screw which can be reached only with the tip of the finger pushed between several wires and around a corner, just put a piece of Scotch tape over the end of the finger, adhesive side out, binding it to the finger with a second piece wrapped around the finger. The nut will stick to the end of the finger. — W2LLU.

“While working portable on 160-meter 'phone at Mt. Sinai, L. I., I heard W1ASK, Bridgeport, Conn., calling CQ. I called and worked him on 160 meters, and after a QSO of 30 minutes he mentioned that he would like to change bands once in a while and work 20-meter 'phone, but that he had had enough trouble in keeping his rig on 75-meter 'phone. On my next transmission I asked him if he ever worked 160 meters. ‘No,’ he replied, ‘I have never been on the 160-meter band.’

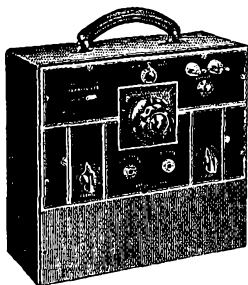
“Well, I use a good receiver and you are S8 on 160 meters now! I said. After each of us had listened to the other on both bands, I reported W1ASK S8 on 160 meters and S9+ on 75 meters; receiving in turn a report of S9 on 75 meters and S9+ on 160 meters.” — W2KJY.

Sleet can be removed from an antenna by throwing a rope, cord or wire over the antenna and dragging the length of the antenna. — Edmond Manna.

2½ is "HOT"

More and more amateurs are meeting on the 2½ meter band . . . not only "open" for portable and mobile operation, but great for FUN and, if needed, for emergency. Get one or both of the sets below . . . We can ship AT ONCE from stock on hand.

New ABBOTT DK-3 PORTABLE MOBILE TRANSCEIVER for 2½ METERS



\$18.82

less accessories

Range 2 to 39 miles. Size 11 x 11 x 4½. Self contained battery operated model in carrying case.

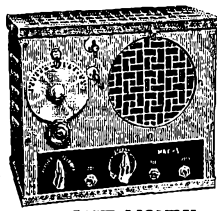
- * Set of tubes, 6G6G and 6J5GT, RCA \$1.13
- * Set of fresh Burgess Batteries \$4.31
- * Universal 820 receiver-mike handset . . . \$5.88

ABBOTT MRT-3 For mobile or fixed station. 30 w. input, lots of "sock." Only 9 x 8 x 4. Built in speaker. Less tubes and power supply **\$28.81**

* Tube kit HY75, 6C5, 6V6, \$5.35

* Mallory Vibropack, 300 v. 100 MA, with tube . . . \$13.06

ORDER NOW PRICES ARE ADVANCING RAPIDLY



... SAVE MONEY

NEWARK ELECTRIC COMPANY

323 W. Madison St., Dept. Q, Chicago, Ill.

RADIO TRAINING



FOUNDED IN 1909

PORT ARTHUR COLLEGE, a non-profit-making educational institution, offers a practical radio operator's course at the lowest tuition price in its history. Each radio graduate receives two months' actual operating experience at the college's commercial broadcasting station KPAC. This station is equipped with the latest type 1000 watt high fidelity RCA transmitter — 1250 kc. — directional antenna system. KPAC operates in new modern studios located on the campus.

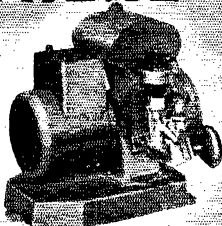
The college has never advertised jobs or positions in lieu of education. Today it is well known there is a shortage of radio operators in every branch of radio; therefore, we believe it is good common sense to mention that Port Arthur College is the sole radio school in America which owns a commercial broadcasting station with commercial advertising representatives in New York, Chicago, San Francisco, and many of America's leading cities, with active membership in the National Association of Broadcasters, and Broadcast Music Incorporated. Through these contacts the college receives from the broadcast industry alone a great many more calls for student radio operators than it is possible to supply.

AUTHORIZED TO TEACH RCA TEXTS
If interested, write for Bulletin R

PORT ARTHUR COLLEGE PORT ARTHUR (World-Known Port) TEXAS

ELECTRIC POWER ANYWHERE

with 
BLUE DIAMOND POWER PLANTS



Pincor Hi-power Blue Diamond power plants provide a PORTABLE electric generator of high output ratings. Available in various models to meet any requirements. 450 watts 110 volts, 60 cycles A.C. . . . PLUS . . . 6, 12, or 32 volts D.C. in various wattages; for charging batteries; for direct operation of electric lights or appliances. Sturdy, light weight, easily portable for use anywhere. Send for complete information today.

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Cable: SIMONTRICE, New York

PINCOR Products

FOR AIRCRAFT • SOUND • POWER SUPPLY USES

READ AND SEND CODE

Learn Easily at Home
This Quicker Way



No experience needed. Beginners read code quickly, copy accurately. If already an op, speed up your wpm with this approved, amazing, all Electric Master Teleplex Code Teacher. Only instrument ever produced which records your sending in visible dots and dashes on specially prepared paper tape — then sends back your own key work at any speed you wish. Fascinating, fool-proof — get results because you learn by HEARING as well as SEEING. That is why thousands agree this method is surest and quickest. While not designated standard equipment, Teleplex is used at many U. S. Army Posts, Naval Training Stations. We furnish Complete Course, lend you the New All Electric Master Teleplex, and personal instruction with a MONEY-BACK GUARANTEE. Low cost, easy terms. Write today for folder Q-8, no obligation.

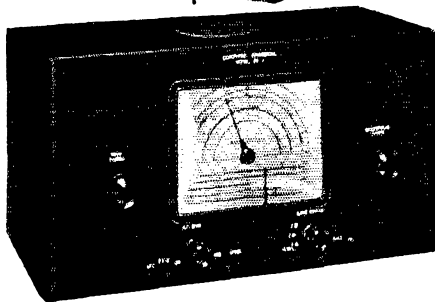
“HAM” SPECIAL

Standard Teleplex — a highly efficient code teacher using heavy specially prepared waxed paper tape, having two rows of perforations. Write for Free folder "Q.T.8."

TELEPLEX CO. 107 Hudson St. Jersey City, N. J.

Tops in Performance

-LOW in Price!



Model EC-1. Six tubes. Three bands covering from 545 kc. to 30.5 mc. (550 to 9.85 meters). Electrical bandspread on all bands. Beat frequency oscillator. Self-contained PM dynamic speaker. AC/DC operation — 115/125 volts. Good selectivity and exceptional sensitivity. Every necessary feature for tip-top communications receiver performance.....

\$19⁹⁵

Model EC-2. 8 tubes; 3 bands; covers 545 to 2100 kc. — 2.1 to 8.1 mc. — 7.9 to 30.5 mc.; built-in 5" PM dynamic speaker; preselection on all bands; calibrated bandspread scale on 80/40/20/10 meter amateur bands; automatic noise limiter; electrical bandspread at all frequencies in the tuning range; operates on 115/125 volts AC/DC. Now, for the first time you can have all these features at this low price.....

\$29⁹⁵

Model EC-3. 10 tubes; 3 bands; covers 545 to 2100 kc. — 2.1 to 8.1 mc. — 7.9 to 30.5 mc.; Electrical bandspread; Crystal filter (4 position variable selectivity) calibrated bandspread; automatic noise limiter; preselection on all bands; 2 stage IF amplifier; fly-wheel tuning; separate 6" PM speaker; CW Monitor; operates on 115/125 volts AC/DC.....

\$49⁹⁵



Echophone
COMMERCIAL

"The Ears of the World"

Echophone Radio Co.

201 East 26th Street, Chicago, Illinois

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, Albums. Free samples. Theodore Porcher, 7708 Navahoe, Philadelphia, Pa.

CALLBOOKS — Summer 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, W3ATV, 6540 Washington Blvd., Tulsa, Okla.

QSL'S — Brownie, W3CJI, 1725 Frankenfield Ave., Allentown, Pa.

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

QSL'S, SWL's. 100 — 3 color — 75¢. Lapco, 344 W. 39th, Indianapolis, Ind.

1000 watt G.E. transformers 1100-2200-4400 volts each side c.t. Guaranteed \$13.50. Dawson, 5740 Woodrow, Detroit, Mich.

CRYSTALS, AT cut, 160-80 in attractive, heat dissipating, dust proof holders, \$1. R9 Crystals, 338 Murray Ave., Arnold, Pa.

QSL'S — A new deal. Samples. 24-hour service. Edw. Reider, Pleasant Hill, Mo.

SELL — 8X17 receiver \$75. Cash. W3HWB, Lynchburg, Va.

TRANSMITTING headquarters on latest Stancor, Thordarson and other kits — commercially wired at low cost. New 70 watt transmitter kits complete only \$35 — speech amplifier modulator up to 80 watts at \$25 — up to 150 watts \$49.50. Genuine Utah ham transformers at less than 1/2 original cost. New HY25's at 99¢, New HY51's at \$2.95. Easy terms. Write Leo, W9GFQ, today.

CRYSTALS: famous P.R., mounted in latest Alsmag 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 70¢. Wholesale Radio Labs., Council Bluffs, Iowa, W9GFQ.

QSL'S. Finest. Samples. Maleco, 1805 St. Johns Place, Brooklyn, N. Y.

SELL, five stage, 1627 (810) final, 400 watt phone-CW transmitter. Commercial construction in two three-foot Parmetal cabinets. W4EPC, P. O. Box 473, Miami Springs, Fla.

FIVE meter DX receiver for sale — price reasonable — all inquiries answered. W1GJJ.

SELL Sargent receiver Model 11MA. ten to three thousand meters. Like new. \$25. W8QIX.

QSL'S? — SWL's! America's finest. Free samples? W8DED, Holland, Mich.

POWERFUL PR crystals: 40, 80 and 160 meter bands, genuine Alsmag 35 holders, \$3. Unmounted 40 meter, \$1.85; 80 and 160 meter, \$1.65. Quick service. Cooper Supply Co., Quincy, Ill.

WANTED: March, May, and June, 1916 issues of QST. Charles D. Fraits, W1MUH, 9 Newfield Ave., Lakewood, R. I.

NATIONAL FB-7A receiver with built-in power supply. Complete with tubes, speaker and 80, 160 meter coils. \$20. W2IMZ.

SELL power supply 32 volt input, output 400 volt 100 ma. W9NYI, Farwell, Minn.

SACRIFICE — QST's from 1916, singly or lot cheap. 4 new 831's \$45 each, never out of cartons. New and used tubes, meters, transformers, condensers, etc. Quick sale prices. Stamp for list. Consider good gun in trade. R. B. Ladd, Kingman, Ariz.

DOUGLAS 100 watt Universal modulation transformers \$7.75 a pair postpaid. Only 15 pair at this low price. W9LXR, Box 349, Rice Lake, Wis.

FIRST four Rider Manuals for sale — \$16. Ralph Hunter, Catskill, N. Y.

SPOT frequencies, 80 and 160 bands, low drift, \$2.75. The Crystal Shop, Barre, Vt.

SELL never used Hammarlund PA300 amplifier, pair unused T20's, eighty different QST's. Make offer. W9OSC, Ventura, Iowa.

SELL — Hallicrafter Model SX-25 and heavy duty speaker. Like new. Latest model demonstrator. \$90 or make offer. B. Grinker, 139 N. Clark St., Chicago, Ill.

LEO, W9GFQ, offers the hams more and better deal always. Lowest terms without red tape on all new and used equipment. Free trial, personalised service. Write for free big ham bargain catalog and used receiver list. Wholesale Radio Labs., Council Bluffs, Iowa.

QSL'S — SWL's. Colorful, economical. W9KXL, 819 Wyandotte, Kansas City, Mo.

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PAGES 86 and 87



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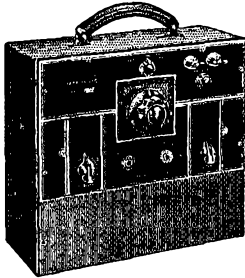
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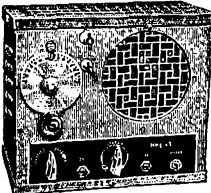
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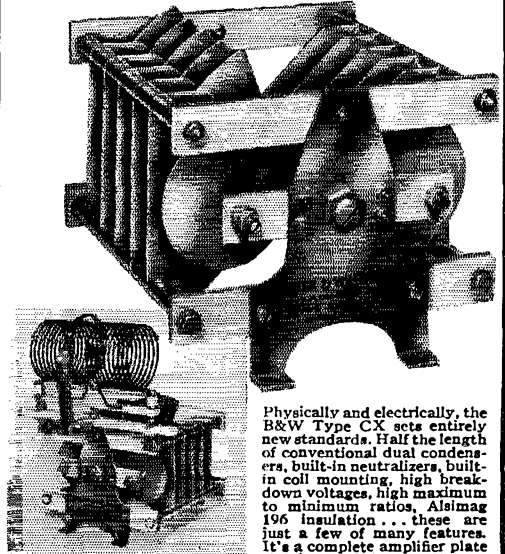
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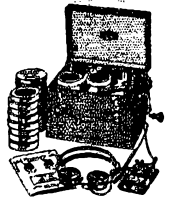
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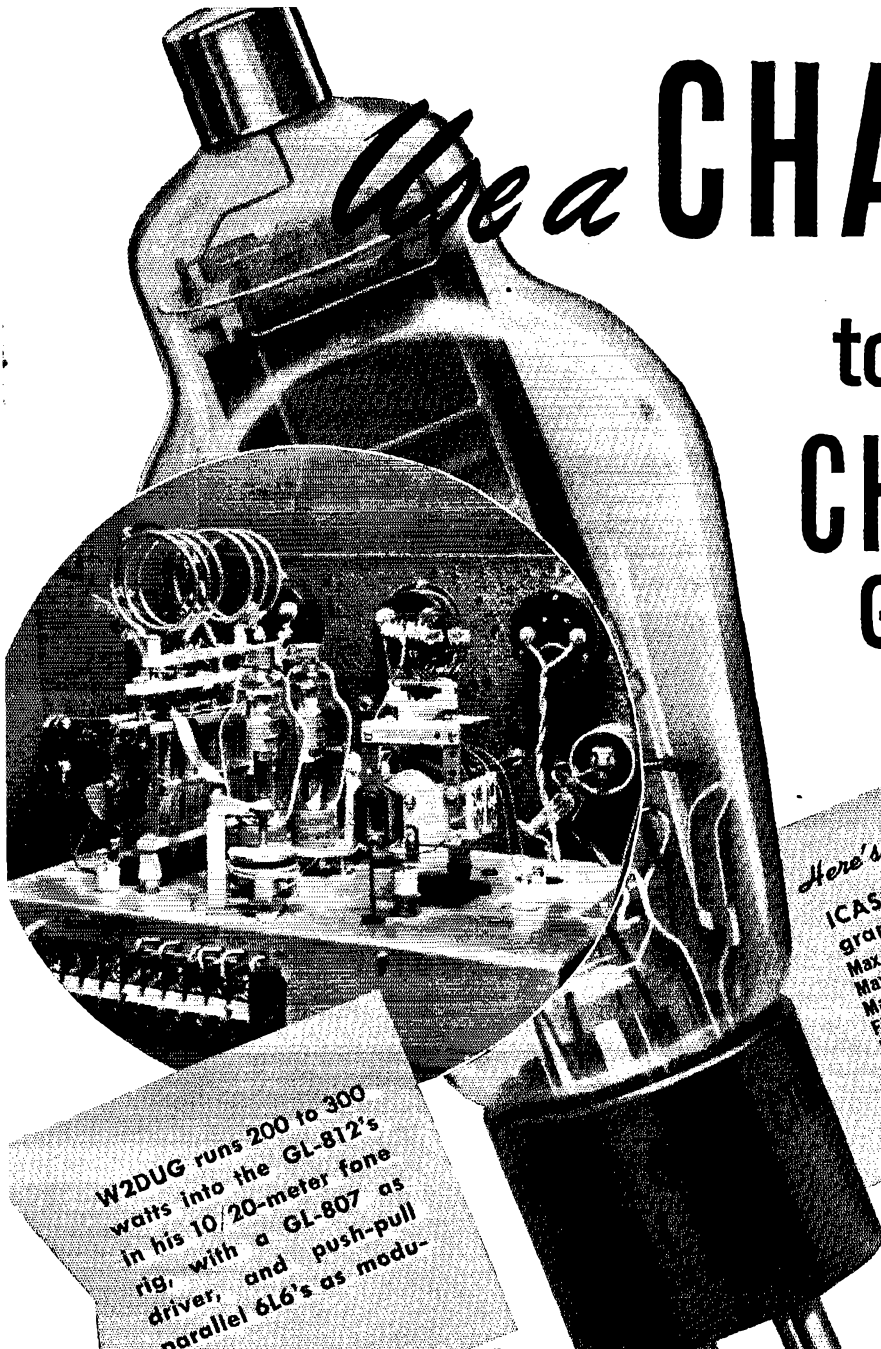
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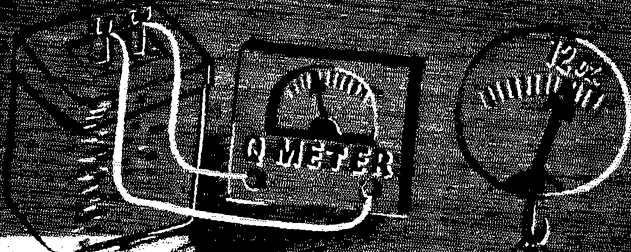
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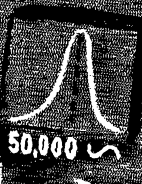
GENERAL ELECTRIC

BELIEVE IT OR NOT



One of the greatest difficulties in producing high Q coils of compact construction lies in the variation of inductance with applied voltage. Considerable research at UTC has licked this problem. A good example is a solution to one customer's problem on a 1.5 Hy. coil having a Q of 85 at 2,000 cycles. While this coil weighs only four ounces, the change of inductance from 0 to 100 applied volts is only 1/4 of 1%.

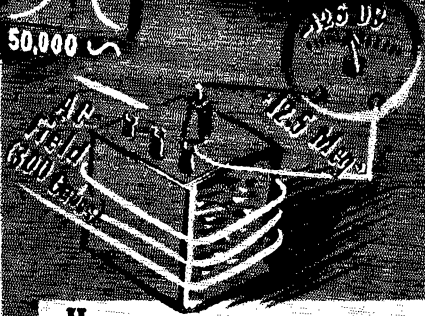
Light weight is one of the greatest problems in aircraft equipment. A typical UTC development along this line is an aircraft unit consisting of four complete band pass filters with a total weight of only 12 ounces.



One of the greatest problems in high Q coils is that of obtaining high inductance at high frequencies. The nature of one customer's application, however, led UTC to the development of a 1 Hy. coil having such low distributed capacity that the natural resonance frequency is 50 Kc. The Q at 10 Kc. is 150.



Few people realize the degree of safety factor in some submersion type transformers. One UTC test specification reads: The unit is submerged under hot salt water at 65 degrees C. This is followed by a submersion under cold salt water at zero degrees C. Following this it is submerged at room temperature for twenty-four hours. This cycle is completed five times. At the end of the week, the unit is cleaned off and the insulation resistance between windings must exceed one billion ohms.



High gain transformers with low hum pickup are a difficult problem. UTC developed a unit for one customer's application which is phenomenal in this respect. The transformer developed has a 500:1 ratio with a 50 ohm primary (secondary impedance 12,500,000 ohms). With this tremendous ratio and a rather compact structure, the hum pickup in a field of 300 gauss is limited to -125 DB.

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NC-45

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THE NC-200

- Sensitivity better than one microvolt.
- Series valve noise limiter.
- Improved crystal filter with rejection ratios as high as 10,000 to 1.
- Stability 3 parts in 100,000 for 20 volt line fluctuation.
- AC line or portable operation.
- Speaker in matching cabinet.

Amateur Net Price \$159.50
without speaker

THE NC-45

- Series valve noise limiter with automatic threshold control.
- Improved AVC Circuit.
- Eight tube superheterodyne circuit.
- Full vision dial with separate band-spread condenser.
- Tone control.
- CW Oscillator.
- Four range coil switch, 550 KC to 30 MC.
- Three models for batteries, for AC-DC and for AC only.

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including speaker and tubes

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HALF-WAVE MERCURY-VAPOR RECTIFIER

\$1.00
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Actual-size illustration of the RCA-816 Gas compared to the famous RCA-866-A/866.

"JUNIOR OF THE FAMOUS RCA-866-A/866"
RCA-816 RATINGS

Filament Voltage (A.C.)	2.5	Volts
Filament Current	2.0	Amperes
Peak Inverse Voltage*	5000 max.	Volts
Peak Plate Current	500 max.	Ma.
Average Plate Current	125 max.	Ma.
Tube Voltage Drop (Approx.)	15	Volts

*For supply frequency up to 150 cycles and for a condensed-mercury temperature of 20 to 60° C.

- Designed and priced for real economy plus truly outstanding dependability in medium-power transmitters of 400 watts input or less.
- Small as a receiving tube—but handles a peak inverse voltage of 5000 volts, and peak plate current of 0.5 ampere!
- Two RCA-816's in a full-wave circuit can deliver a rectified voltage of 1600 volts at 250 ma. with good regulation, with exceptional life—and at a total rectifier tube cost of only \$2!
- Famous RCA edgewise-wound filament of new alloy material assures big emission reserve and long life.
- Top cap construction eliminates electrical strain on filament stem.
- The rectifier tube you've been asking for—at a price within easy reach of all.

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