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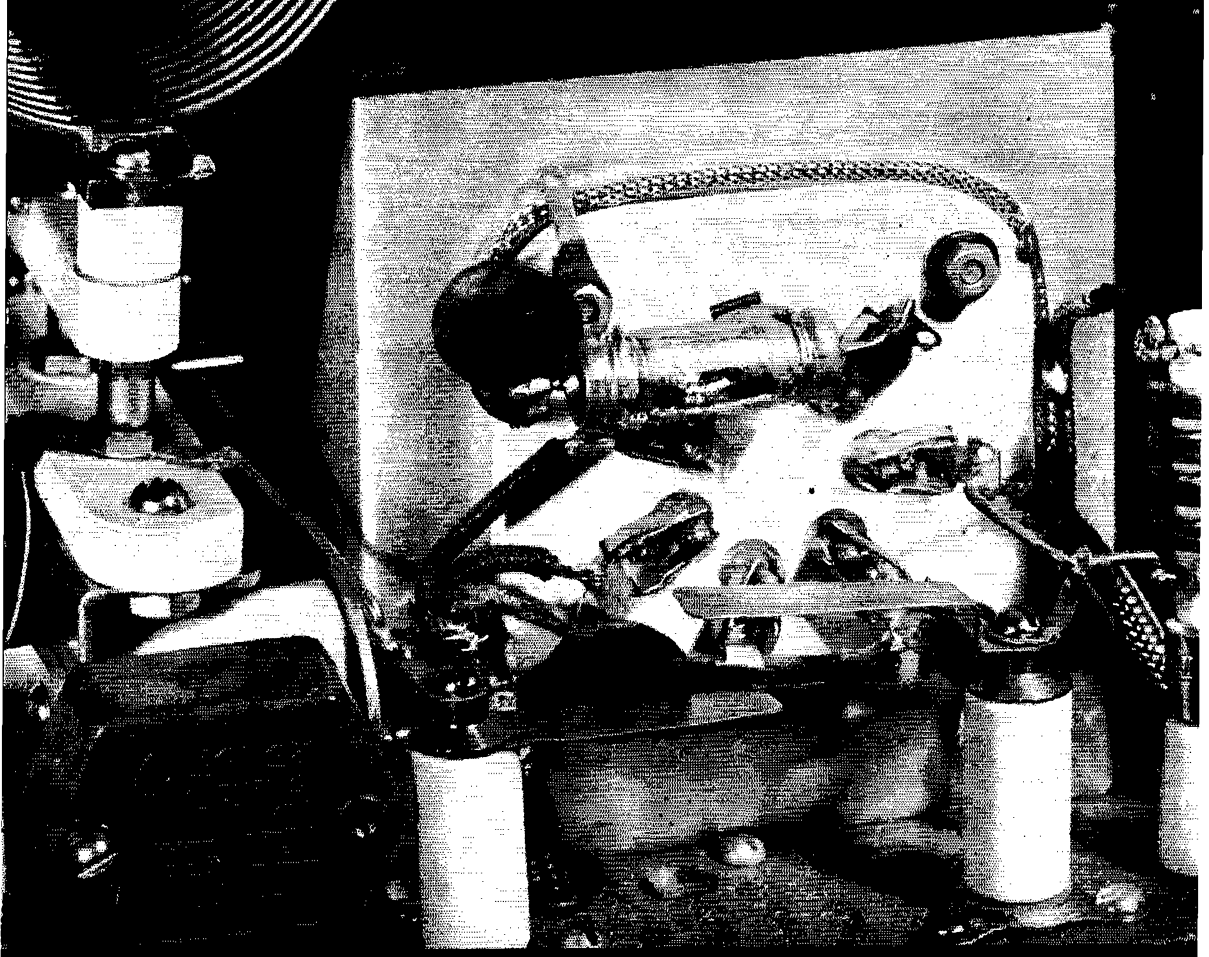
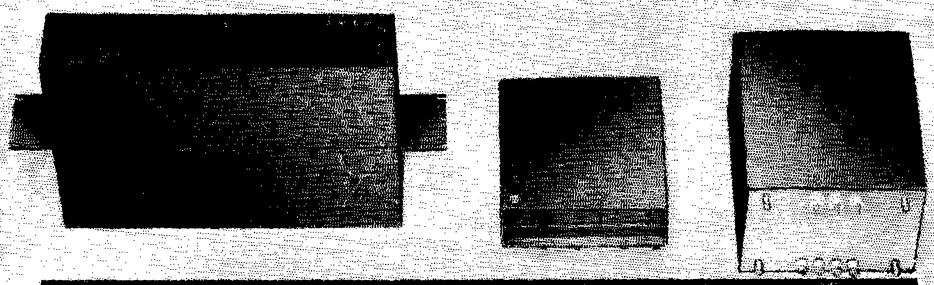
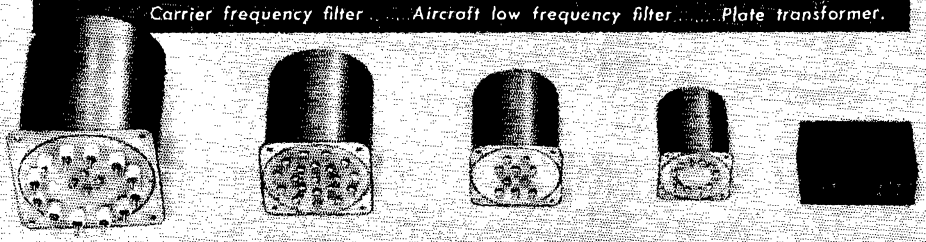


PUBLISHED BY THE AMERICAN RADIO RELAY LEAGUE

UTC was the largest supplier of transformer components in World War II. Present UTC production is on a similar basis. Illustrated below are a few of the thousand military types in UTC 1950 production.

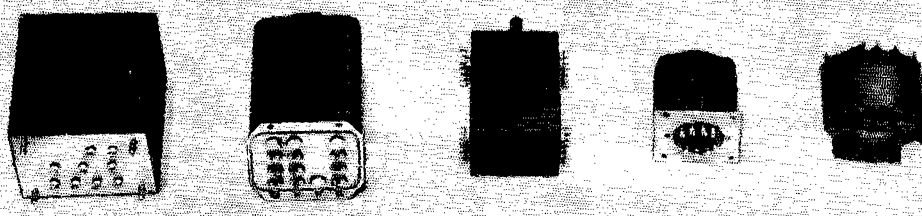


Carrier frequency filter . . . Aircraft low frequency filter . . . Plate transformer.



Typical hermetically sealed power transformers for 60 cycle service.

Hermetically sealed audio and pulse transformers.



60 cycle and 400 cycle components hermetically sealed and fosterized.

Miniaturized audio units, magnetic amplifiers, etc.

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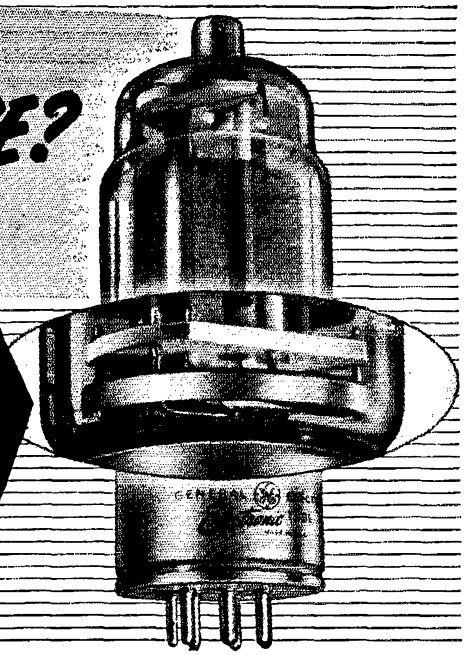

GL-813 BEAM POWER TETRODE

Filament voltage	10 v
Filament current	5 amp
Max plate voltage	2,250 v
Max plate current	225 ma
Frequency at max ratings	30 mc

Its large ground-plane barrier is an example of the superior shielding in General Electric's GL-813. By adding the customary short external base shield, you have as fine protection from feedback as may be obtained.

G. E., therefore, gives you an 813 which is so thoroughly shielded that you can go to the higher frequencies, such as 10 meters, with every chance to avoid neutralizing. This means a simpler circuit . . . puts you in the select group of amateurs who congratulate themselves that the neutralizing job—often bothersome—is the other fellow's, not theirs.

Besides its superior shielding, the GL-813 shows, from cap-terminal to base-pins, the evidence of G-E engineering that always strives to make a good product still better . . . of G-E precision manufacture satisfied with nothing less than top quality in every tube that is built, tested, cartoned, and shipped.

When installed, the GL-813 proves itself not only a grand performer, but a tube that needs minimum drive—meaning *economy.* For example: using only 8 w of driving power, two tubes in Class C Telegraphy service will give you 750 w output!

Study General Electric's great GL-813 at your nearby G-E tube distributor. Ask for full details about its outstanding performance. Or write *Electronics Department, General Electric Co., Schenectady 5, N. Y.*

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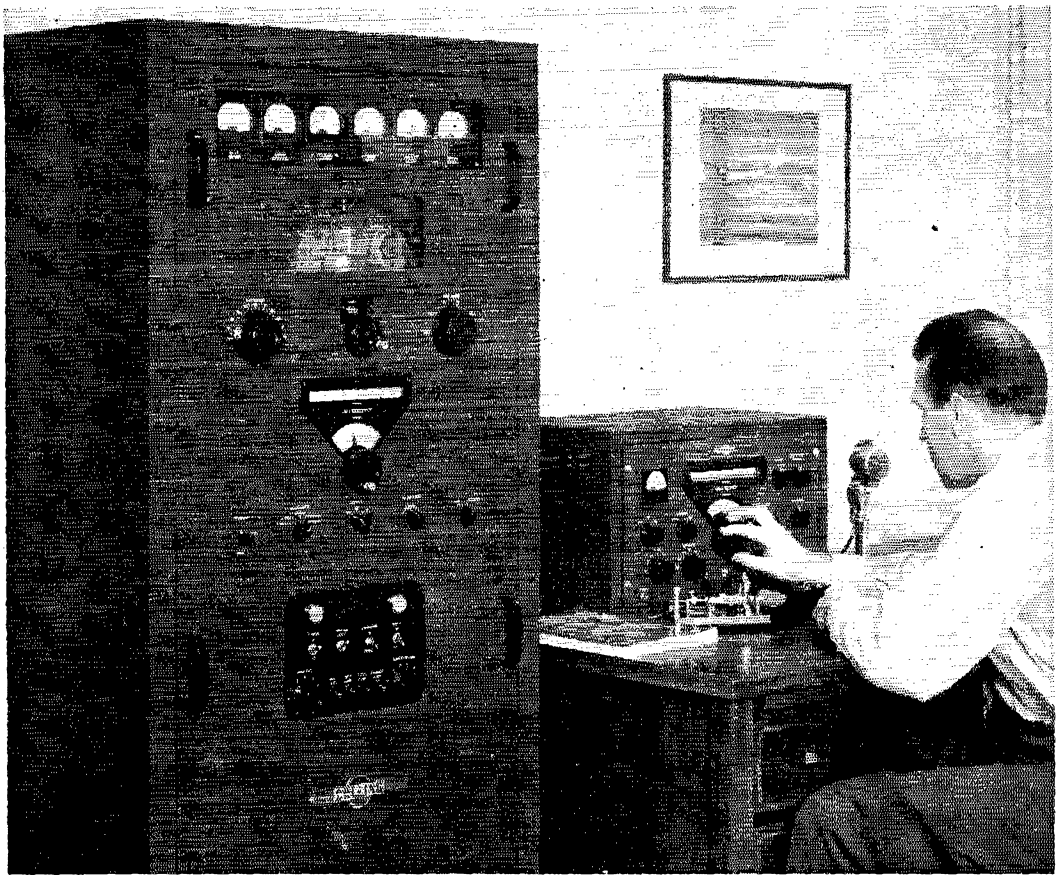

PROGRESS REPORT ON THE KW-1

Since the KW-1 one-kilowatt amateur transmitter was announced, the engineering model has been subjected to a series of operational shakedowns by Collins engineer-amateurs.

In actual daily service as a ham communications transmitter, the rig has proved basically sound and a joy to operate. Amateurs we have worked have spontaneously remarked on its power — seemingly greater than kilowatt — and its excellent audio.

Continuous use has suggested several improvements, which have called for minor changes in engineering design. These changes are nearing completion as this message goes to press.

All materials were ordered months ago. Delays in delivery to us of some components, notably transformers, have been encountered. Suppliers of these components believe they can make delivery within six months. KW-1 production will commence as soon as all materials are received. We hope to be able to start shipments to Collins distributors next fall.

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

COLLINS

COLLINS RADIO COMPANY, Cedar Rapids, Iowa

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

QST

APRIL 1951

VOLUME XXXV • NUMBER 4

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

OFFICES

38 La Salle Road
West Hartford 7, Connecticut

TEL.: 3-6268 TWX: HF 88

Subscription rate in United States and Possessions, $4.00 per year, postpaid; $4.25 in the Dominion of Canada, $5.00 in all other countries. Single copies, 40 cents. Foreign remittances should be by international postal or express money order or bank draft negotiable in the U. S. and for an equivalent amount in U. S. funds.

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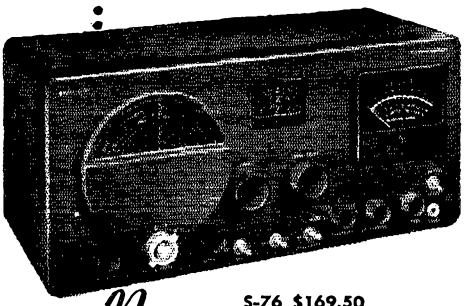

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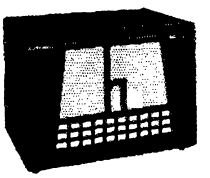

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Reports Invited. All amateurs, especially League members, are invited to report station activities on the first of each month (for preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio Club reports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

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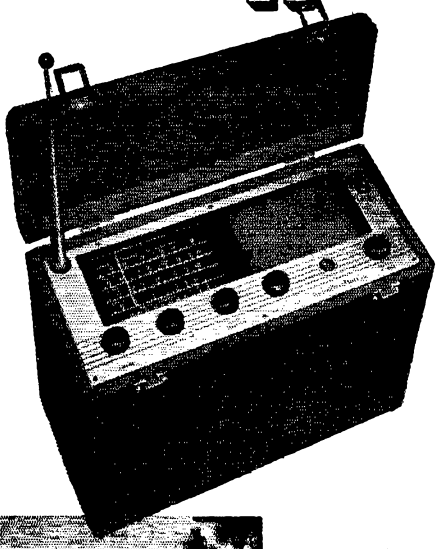

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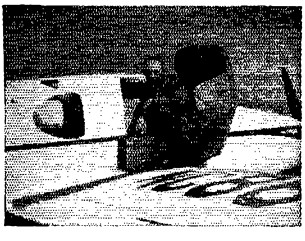
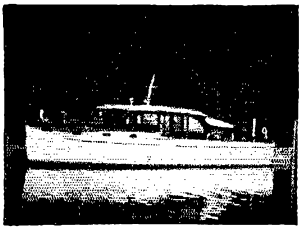


Long wave model gets airport towers and ranges—ideal for plane owners.



Long wave model gets marine beacons, gives rough "DF" bearings if ever needed.

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THE AMERICAN RADIO RELAY LEAGUE, *INC.*,

is a noncommercial association of radio amateurs, bonded for the promotion of interest in amateur radio communication and experimentation, for the relaying of messages by radio, for the advancement of the radio art and of the public welfare, for the representation of the radio amateur in legislative matters, and for the maintenance of fraternalism and a high standard of conduct.

It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors. The League is noncommercial 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, although full voting membership is granted only to licensed amateurs.

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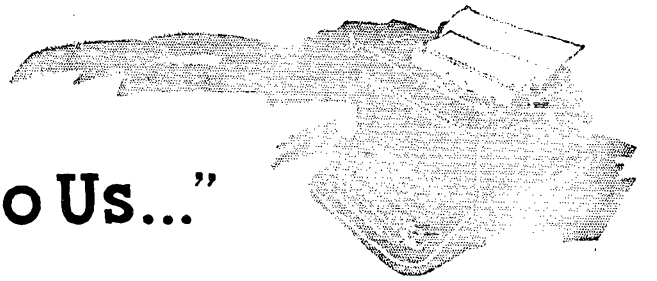

"It Seems to Us..."

DOCKET 9295

As March *QST* related in considerable detail, the Commission has issued a report and order in Docket 9295, which during the last two years has become the most-discussed regulatory matter in amateur radio's entire history. Normally this would end the subject. Yet there is still one major problem of considerable adverse effect on many amateurs: while present Class A amateurs may renew their privileges as Advanced Class, FCC is establishing an Amateur Extra Class license with a 20 w.p.m. code test and a written examination in advanced techniques, with privileges as yet unspecified but indicated for the future as something in addition to Advanced Class. Of course we don't know what the Commission has in mind. It may be a portion or all of the present restricted 'phone bands; it may be voice privileges on the new 21-Mc. band; it may be something else . . . but the point is that *some* separate privileges apparently are contemplated for the Extra Class license which will not be available to former Class A men without passing the new examination and code test. Consequently, while the former highest class of license afforded the licensee *all* amateur privileges, those who are now Advanced Class (Class A) may at some time in the near future find certain privileges denied them — the privileges which will be restricted only to Extra Class licensees. In other words, the Advanced Class operator (Class A) drops a notch, is pushed back a grade in the amateur license structure. And by this demotion — and that is precisely what it is — the Class A old timer loses the privilege formerly associated with that license: unlimited amateur operation.

This aspect of the regulations has received more vehement amateur opposition than perhaps any other. The League has argued and argued and argued the point with the Commission — by detailed statements, at informal conferences, and in oral argument. Commissioners Hennock and Sterling in their dissent to the FCC majority action showed keen perception and understanding of the problem, and amateurs everywhere have taken heart at their expressions. The matter is of such considerable import that the League, in one more attempt to protect the privileges of the Class A licensees, has filed a petition for reargument relating only to the Extra Class license. We think you will be interested in the points made.

FEDERAL COMMUNICATIONS COMMISSION

IN THE MATTER OF AMENDMENT OF PART 12, "RULES GOVERNING AMATEUR RADIO SERVICE"	DOCKET 9295

PETITION FOR REARGUMENT IN PART

I.

The American Radio Relay League, pursuant to §405 of the Communications Act of 1934, as amended, and §1.390(e) of the Rules and Regulations of the Commission, requests reargument upon the adoption or amendment of §§12.20, 12.21, 12.23, 12.42 and 12.43 by Report and Order of the Commission in Docket 9295, released January 31, 1951.

Reargument is requested on the aforementioned rules *only as they concern the creation of the Amateur Extra Class license and the concomitant prospective diminution of the stature and derogation of the privileges of the present Class A licensee.*

The League wishes to express its belief that no delay need be occasioned in effectuating, on March 1, 1951, the establishment of the Technician and Novice classes of amateur license in allowing reargument in part. The Amateur Extra Class license will not become available until January 1, 1952, thus there is ample time to reconsider the desirability of establishing this new class before it actually comes into being.

II.

According to the Commission's Report accompanying Docket 9295, ". . . the Amateur Extra Class of license is provided eventually to replace the Class A in the belief that the logical grade of license beyond the General Class should be one which will afford an incentive to all amateurs to become highly proficient in all phases of the radio art". In order to effectuate this purpose it is provided that the applicant for an Extra Class license must meet a code speed requirement of twenty words per minute and pass an examination on advanced radio theory and operation. However, the successful applicant will not be entitled to any additional privileges as the Rules are presently constituted.

The League believes that the Commission has, in effecting its stated purpose of increasing the licensing requirements for maximum operating privileges, approached the problem in an not entirely logical manner. No new or additional privileges to be enjoyed by the Extra Class licensee have been tendered, yet the Commission says that that is what will provide the incentive to the amateur to increase his all-around proficiency. The code speed requirement would be increased, yet there is no indication that this would have any relation to what might be provided as an additional operating privilege. The advanced radio theory and operation examination element has no rational basis until a causal

(Continued on page 116)

Radiological Monitoring

Part I—Nuclear Energy and Radiation

BY STEPHEN S. FRIEDLAND,* W8PKI

In this article an attempt is made to introduce the readers of *QST* to phases of nuclear physics that are essential for an intelligent understanding of the problems of modern civilian defense and in particular to methods of radiological monitoring.

It will be clear, from considerations outlined later, that no relief forces such as fire, police, Red Cross, etc., should be allowed to enter a bombed area until it has been surveyed with the proper instruments to determine the radiation level. The personnel employed for the monitoring work will necessarily have to be well trained to operate the instruments, interpret the readings, and to protect themselves from bodily harm. Since the instruments are delicate and electronic in nature it will be necessary to have adequate maintenance men for the instruments in the field. For this reason a member of a survey team doing radiological monitoring should be an electronics man. Furthermore, since all readings will have to be transmitted by radio to headquarters the communication equipment will also be an essential part of the team's equipment. It is felt that the amateur, because of his knowledge of electronics

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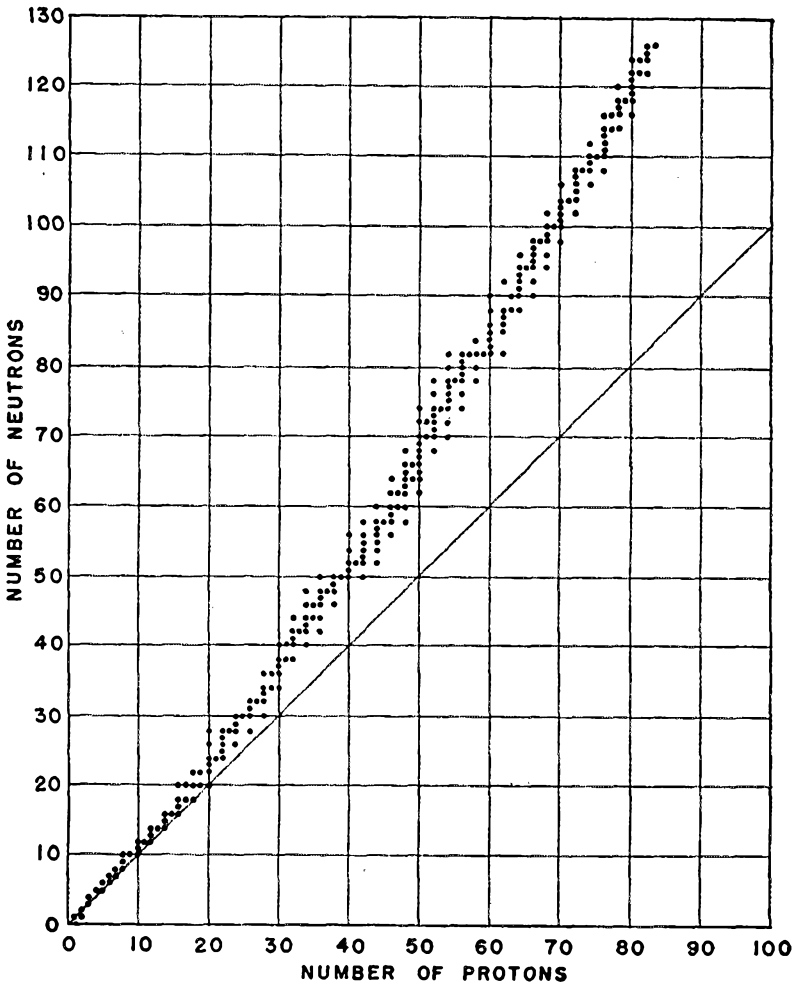

Fig. 1 — Numbers of neutrons and protons in stable nuclei. (*Chart reproduced from "The Effects of Atomic Weapons," U. S. Government Printing Office*)

and his spirit of coöperation in times of emergency, is particularly qualified to function effectively as a member of a radiological survey team.

Structure of the Atom

Let us examine a piece of matter, say the paper upon which this is printed. If we could break it up into its constituent parts we would find it to be composed of a number of different elements. If we examined all types of matter about us, we would find a total of 92 elements. Examples of some of the elements are oxygen, carbon, nitrogen, hydrogen, gold, silver, tin, uranium, and lead. The scientist has recently been able to manufacture elements not found in nature. One of these, plutonium, is used in the atom bomb.

The smallest possible quantity of an element that we may talk about is called the atom. The physical picture of an atom is the same as that of the solar system — a sun in the center and planets revolving about. However, the "sun" for the atom is called the nucleus and the "planets" are called electrons. All electrically neutral atoms of the same element always have the same number of electrons revolving about the nucleus. Neutral atoms of different elements always have different numbers of planetary electrons. The chemical and physical characteristics of the elements are determined by the number of electrons.

Before we examine the nucleus, let us recall two fundamental laws of electricity: First, like charges repel; second, unlike charges attract. The nucleus consists of two types of particles. One, called the proton, has a mass of 1.672×10^{-24} gms or 1.00759 "atomic mass units" (a.m.u.). The other, called the neutron, has a mass of 1.675×10^{-24} gms or 1.00898 atomic mass units. The proton carries a charge of 1.6×10^{-19} coulombs whereas the neutron is electrically neutral. The electron carries a charge of -1.6×10^{-19} coulombs. Since an atom in its normal state is electrically neutral and the proton and electron have equal but opposite charges, there must be the same number of protons in the nucleus as there are planetary electrons.

We immediately wonder why a nucleus stays together if it is packed full of repelling protons. Evidently there must be some other strong cohesive force. This gives us a hint as to the rôle of the neutron. The neutron is the nuclear glue that binds the protons together. We never find more than one proton in a nucleus without the presence of some neutrons. Let us consider a few examples.

Hydrogen, the first and simplest of all the elements, consists of one proton in its nucleus and one planetary electron. Helium, the second element, has two protons and thus two electrons, but also has two neutrons. Carbon has six neutrons, six protons and six electrons. Oxygen has eight neutrons, eight protons and eight electrons. As we go to heavier elements, those consisting of more particles, we find that there are more neutrons than protons in the nucleus. Evidently, nature needed more glue to hold the nucleus together as the repulsive forces of the protons began to accumulate. Thus we find in potassium 20

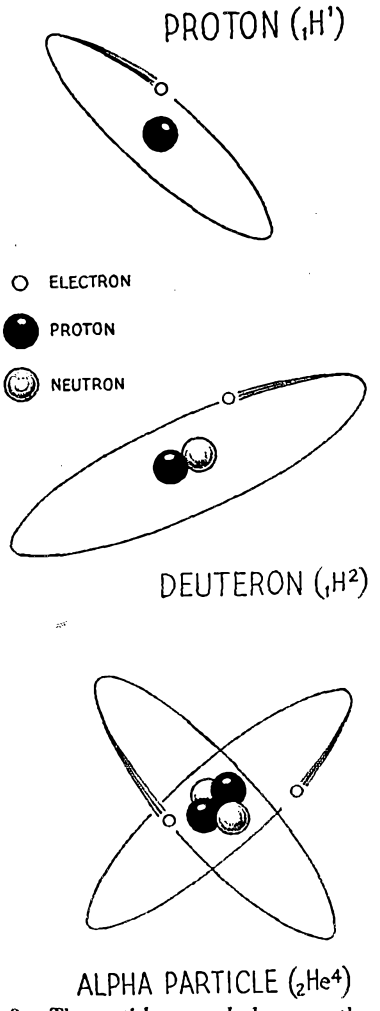

Fig. 2 — The particles named above are the nuclei of hydrogen and helium atoms. Protons have a positive electric charge equal to the negative charge of an electron. The deuteron is heavier than the proton because it includes a neutron as well as a proton, but the total charge is the same as that of its proton constituent. Neutrons have no net charge. The alpha particle, the nucleus of helium, has two protons and two neutrons. (*Figs. 2, 3 and 4 of this article based on Westinghouse "School Service Charts"*)

neutrons, 19 protons and 19 electrons. Iron has 30 neutrons, 26 protons and 26 electrons. Silver has 62 neutrons, 47 protons and 47 electrons. Uranium, the heaviest natural element, has 146 neutrons, 92 protons and 92 electrons.

We find in nature atoms of the same element that have different masses. When we examine their nuclei we observe that they have the same number of protons (they must since they are of the same element) but have different numbers of neutrons. Atoms that belong to the same element but have different numbers of neutrons are called isotopes. Hydrogen, for instance, has three isotopes. Normal hydrogen has 1 proton and no neutrons. Deuterium, a second form of hydrogen, has 1 proton and 1 neutron. Tritium, the third

form of hydrogen, has 1 proton and 2 neutrons. The three forms of hydrogen behave exactly the same chemically and the only physical difference is their weight. Uranium has many isotopes. One form of uranium has 141 neutrons and 92 protons; a second has 143 neutrons and 92 protons; a third has 145 neutrons and 92 protons.

Instead of giving each isotope of every element a different name they are described in the following manner:

$$_1H^1;\ _1H^2;\ _1H^3;\ _{92}U^{233};\ _{92}U^{235};\ _{92}U^{238}.$$

The symbols H and U stand for hydrogen and uranium, respectively. The number in the lower left is set equal to the number of protons in the nucleus and the number on the upper right is set equal to the total number of particles in the nucleus, that is, the number of protons plus the number of neutrons. Thus, the difference between the larger and the smaller number is the number of neutrons in the nucleus.

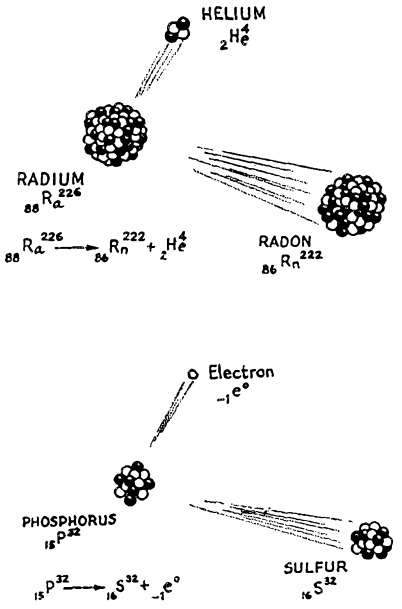

Fig. 3 — The nuclear reactions shown symbolically in the text. This splitting up of atoms occurs spontaneously in such elements as radium and radioactive phosphorus.

The number of protons in the nucleus is called the atomic number and given the symbol Z. The total number of particles is called the mass number and given the symbol A.

Figure 1 shows a plot of all the nuclei known to date. The horizontal axis is a plot of the number of protons Z and the vertical axis is the total number of particles A minus the number of protons Z, or the number of neutrons.

All nuclei found on any one vertical line are isotopes. All nuclei found on one horizontal line, those having the same number of neutrons, are called isotones.

Nuclear Energy

As stated earlier, the proton has a mass of 1.00759 a.m.u. and the neutron a mass of 1.00898 a.m.u. Helium $_2He^4$ with two protons and two neutrons should therefore have a mass of

$$\begin{aligned} 2 \times 1.00759 &= 2.01518 \\ 2 \times 1.00898 &= \underline{2.01796} \\ &= 4.03314 \text{ a.m.u.} \end{aligned}$$

However, when its mass is determined on a nuclear scale balance, called a mass spectrometer, it is found to have a mass of 4.00390 a.m.u. There is, therefore, a loss of mass of

$$\begin{aligned} &4.03314 \\ -\ &\underline{4.00390} \\ &0.02924 \text{ a.m.u.} \end{aligned}$$

Einstein showed in 1905 that

$$E = Mc^2$$

where E is energy, M is mass and c is a constant equal to 3×10^{10} cm./sec. It would take an amount of energy given by Einstein's formula, using for M the mass loss given above, to separate the nucleus into protons and neutrons. The ability of the scientist to control the transformation of mass into energy is the story of the atomic bomb.

Fission and the A Bomb

In 1939 it was discovered that when a $_{92}U^{235}$ atom was struck with a neutron it split into two large fragments and a few neutrons. The two fragments carry with them large amounts of energy in the form of kinetic energy. It is this release of energy that gives the bomb its thermal and blast power. The fragments are new elements that are usually radioactive and thus introduce radiation waves along with the thermal and pressure waves.

This process is called fission. If the neutrons released in the process could be made to strike other $_{92}U^{235}$ nuclei then another fission could take place, more energy released, more neutrons released and the process continued. If the process is made continuous, we call it a chain reaction.

The reaction will not be sustained unless a sufficient quantity of uranium is about to insure that a neutron liberated in a fission process will strike another $_{92}U^{235}$ atom. The mass of pure $_{92}U^{235}$ necessary to obtain a sustained chain reaction is called the critical mass. In an atom bomb, two pieces of subcritical masses are brought together to obtain a chain reaction. As soon as the quantity of $_{92}U^{235}$ becomes less than the critical amount the reaction of the bomb stops.

Radioactivity

Neutrons can transform themselves into protons, and in so doing release an electron. The probability of their doing so depends upon what other neutrons and protons are in the immediate surroundings. When a neutron in a nucleus changes into a proton, the nucleus becomes a member of a new element because it has a different number of protons; thus, if a neutron in tritium, $_1H^3$, becomes a proton it would no

longer be tritium but an isotope of helium $_2He^3$. Such a nucleus is said to be radioactive. The electron that comes out of the nucleus is moving with a high speed and is called a β (beta) particle. Usually, after a β particle is ejected there is a shift in the energy of the nucleus and the excess energy is radiated out in the form of very, very, high-frequency electromagnetic radiation called γ (gamma) rays. Gamma radiations are the same as radio waves but of much higher frequency. They are penetrating and can do bodily harm. Some nuclei spontaneously emit a particle that is the same as the helium nucleus $_2He^4$ which is then called an α (alpha) particle.

To describe radioactivity a term called the half life is introduced. If given a mass of a radioactive element, the time necessary for half of the nuclei of the original element to emit their characteristic radiation is called the half life. The range of half lives for all nuclei known to date varies from fractions of millionths of a second to many millions of years.

Examples of reactions taking place in a radioactive nucleus are as follows:

α activity: $_{88}Ra^{226} \longrightarrow {}_{86}Rn^{222} + {}_2He^4$

β activity: $_{15}P^{32} \longrightarrow {}_{16}S^{32} + {}_{-1}e^0$

γ activity: Nucleus remains the same

Penetrating Properties of α, β, γ Rays

The γ ray, which is high-frequency electromagnetic radiation, can pass through most materials quite easily but may be absorbed eventually by sufficient thickness of concrete, lead, and other dense materials. The β particle is readily absorbed by walls, glass, and heavy clothing. The α particle, a helium nucleus, is quite large and thus has difficulty penetrating matter. All alpha particles can be stopped by a piece of paper or light clothing.

The A-Bomb Blast

An A-Bomb blast offers a triple threat as compared with the double threat of a regular TNT bomb. The A Bomb, like the TNT bomb, will cause severe damage by heat radiation and pressure waves. However, the fission fragments, which are the ashes of the A Bomb, are radioactive. Thus, even after the A-Bomb blast is over, the deposition of fission fragments can offer a hazard to man. Furthermore, the radiations of the fission fragments are sometimes capable of making surrounding materials radioactive, which introduces another radiation threat. It is therefore of importance to keep track of the debris of the bomb, and to be certain that the radiation level has fallen below certain critical values.

Radiation Units

Two types of units are required for an adequate description of radiation and its effects. The first, called the curie, is a measure of the number of atoms disintegrating per second and is defined as follows: A curie is that mass of a radioactive element such that 3.7×10^{10} atoms disintegrate per second.

The second unit, the roentgen, is defined as that amount of X-ray or gamma radiation that will produce 2.08×10^9 ion pairs per cm.^{3} of air. The principal effect of radiation as it passes through matter is the production of ions. When an atom has had one or more of its electrons removed from its orbits and is thus left with a net positive charge, it is called an ion. Together with the separated electron it is called an ion pair. The process in which the radiation ejects the electron from the ion is called ionization. Instruments that are used to detect radiation are capable of detecting only the ionization produced by the radiation.

Effects of Radiation

The effect of radiation on living tissues depends not only on the total amount absorbed, but also on the rate of absorption and on the region of the body exposed. Some effects of radiation, such as genetic effects, are essentially independent of the rate of delivery, and are determined only by the total dosage. In most cases, however, the biological effect of a given dose decreases as the rate of exposure decreases; thus, 600 r would

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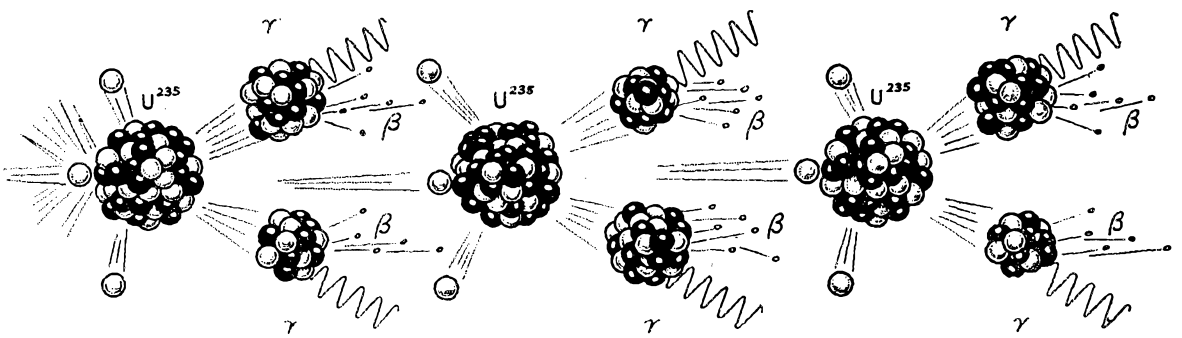


Fig. 4 — Nuclear fission, showing the chain reaction that occurs when U^{235} is bombarded by a neutron. Two or more neutrons are released from the nucleus and in turn smash other nuclei, so that under the proper conditions the fission is self-sustaining. The fragments of the uranium nucleus may be any of a large number of elements and are radioactive, giving off gamma rays and beta particles.

By-passing for Harmonic Reduction

Series Resonating for Minimum Impedance

BY GEORGE GRAMMER,* W1DF

A RECENT article by Phil Rand [1] mentions a point that comes up every now and then — the inherent inductance of by-pass condensers. Condenser plates have appreciable dimensions and therefore possess some inductance; so do the internal leads to the terminals. The condenser is consequently not a "pure" capacitance, but is a circuit consisting of capacitance and inductance in series.

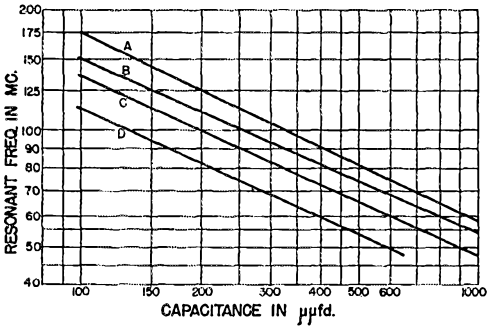


Fig. 1 — Resonant frequencies of transmitting-type mica by-pass condensers. *A* — case type CM-45 with terminals short-circuited by metal plate; *B* — case type CM-55 with terminals short-circuited by metal plate; *C* — case type CM-55 mounted with 1/8-inch spacers on metal plate; *D* — case type CM-55 shorted by shielded wire approximately 0.1 inch in diameter (Belden No. 8885).

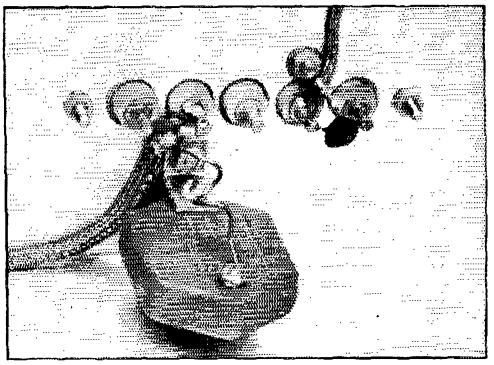
As in any other such circuit, there will be a frequency at which the inductive and capacitive reactances are equal, and at this frequency the condenser is "resonant." It is of considerable interest to know the frequency at which this occurs, since it may have an important bearing on the effectiveness of the condenser as a by-pass.

The measurement of true series resonance in a condenser requires a rather elaborate set-up and involves specialized equipment. However, an approximation can be obtained by short-circuiting the condenser terminals and thereby transforming it into a parallel-resonant circuit that can be checked with a grid-dip meter. This method may give results that are quite far from the truth unless the inductance in the "short" is negligible compared with the internal inductance of the condenser. On the other hand, if suitable precautions are taken it may be more representative of the performance of the condenser in an actual circuit than a truly accurate measurement would be.

The curves of Figs. 1 and 2 show the results of measurements made on various types of mica condensers. Curves *A* and *B* in Fig. 1, and curve *A* in Fig. 2, were obtained by making the connections between the condenser terminals and a metal plate just as short as was physically possible. The "postage-stamp" micas in curve *A*, Fig. 2, were checked by trimming a pair of soldering lugs off at the height of the wire terminals (right at the condenser) when the condenser was flat against the plate, so that in effect the condenser was connected directly to the plate through about 3/32 inch of lug. These three curves probably represent the highest resonant frequencies that it would be possible to obtain in a practical installation. The remaining curves approximate various mounting conditions that might obtain in practice. It is fairly obvious that the lead length *external* to the condenser is of great importance in determining the resonant frequency.

The curves are useful as a guide, but should not be taken literally to the last megacycle, because small variations in capacitance from the marked value will naturally have some effect. A number of samples of different makes were tested, and while there was some spread in the values for a given marked capacitance, the resonant frequencies actually did not vary more than 5 per cent (for a given case type) from the mean value.

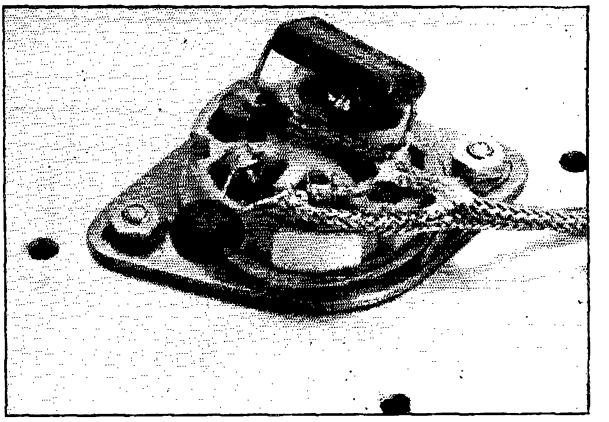
An interesting point that the checks brought out was that in all cases the resonant frequency was highest when the condenser was flat against



By-passing at power connection terminals. With the ceramic condenser the method is the same as at the tube socket, the lug lengths being included in the inductance. The high-voltage (CM-55) condenser, 100 μμfd., is resonated at 70 Mc. by adjusting the wire length and shape of the "coil" it forms. In both cases the shield on the wiring should be carried close to the actual output connection.

* Technical Editor, *QST*.

[1] Rand, "Don't Pamper Your Harmonics," *QST*, February, 1951.



Proper methods of installing series-resonant by-passes for filament and screen circuits on a tube socket. The mica unit, 220 $\mu\mu$fd. in this case, utilizes the inductance of the shield between one condenser terminal and the open end as part of the 70-Mc. series-resonant circuit. This is less desirable than the method of connection used with the ceramic (470 $\mu\mu$fd. resonant at 70 Mc.), but connecting the wire leads directly to the ends of the shield and inner wire would necessitate a reduction in capacitance. The same methods can be used with high-power tubes, since filament and screen voltages are generally within the ratings of small condensers.

the plate, even when raising it from the plate did not change the total path length. The presence of the large metal surface close to the "works" of the condenser reduces its internal inductance in much the same way that a close-fitting shield reduces the inductance of a coil.

What Is a By-pass?

The fact that a condenser has inductance is no special cause for alarm. Inductance may be very bad if its presence is ignored, but it may do a world of good if it is properly utilized.

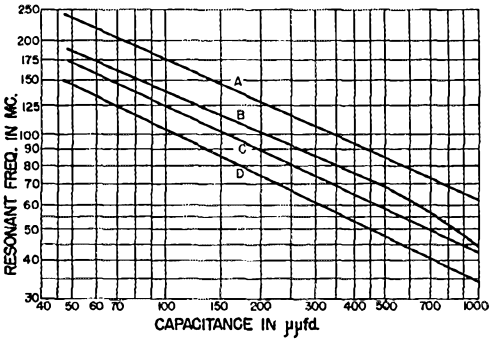
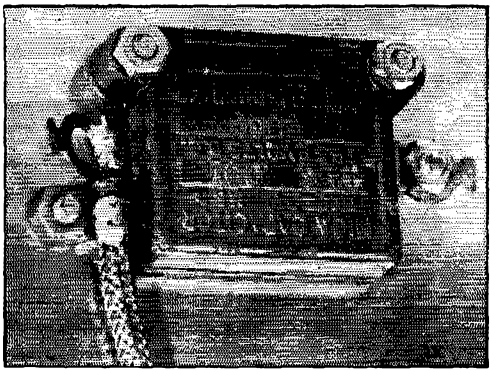


Fig. 2 — Resonant frequencies of postage-stamp mica condensers. Approximate dimensions 3/4 by 3/8 by 3/16 inches for all capacitances except 1000 $\mu\mu$fd., which is 3/4 by 3/4 by 3/16 inches. *A* — mounted flat on metal plate with shortest possible lug connections to wire terminals at point of leaving case; *B* — shorted by shielded wire; *C* — as in *A* at one end, but with 5/8-inch lead parallel to metal plate at the other; *D* — with 1/4-inch leads shorted by metal plate. In *B* and *D* the wire leads were bent at right angles to the flat surface of the condenser (see photograph).

The purpose of a by-pass is to provide a low-impedance connection between two points. In most cases it matters very little whether the impedance is capacitive, inductive, or resistive; it is far more important that the impedance be really *low*. The lowest possible impedance will be secured when the by-pass circuit is series-resonant, and it is well worth the trouble to take advantage of series resonance when trying to keep v.h.f. harmonics from flowing in supply leads. As an example, a pure capacitance of 100 $\mu\mu$fd. has a reactance of 26.5 ohms at 60 Mc. If an inductance of the same reactance is connected in series with the capacitance the total reactance in the by-pass circuit becomes zero. The only remaining impedance is the resistance in the circuit. The resistance is determined by the Q of the series-resonant by-pass circuit. The Q cannot be measured with simple equipment, but judging from the quite pronounced resonance indications on the grid-dip meter it is high enough, with mica condensers, to bring the resistance down below one ohm.

At frequencies somewhat away from resonance the Q of the by-pass circuit is of little importance and the by-pass is almost purely reactive. It is capacitive below resonance and inductive above resonance. The impedance of the by-pass is *lower* than the reactance of the capacitance alone at all frequencies below resonance, so series-resonating a by-pass circuit improves the by-passing at all frequencies below resonance. This behavior is most marked at frequencies near the resonant frequency, but even at one-half the resonant frequency the effect is the same as though the by-pass capacitance had been increased by one-third.

Above resonance the impedance increases, instead of decreasing as it would if the by-pass were pure capacitance, and at $\sqrt{2}$ times the resonant frequency it has the same numerical value that the condenser alone would have at that frequency. At all frequencies below 1.4 times the resonant frequency, therefore, the by-pass circuit is better than the capacitance alone would be. Above this frequency the impedance is greater than would be the case with capacitance alone. If the inductance in the by-pass circuit is kept as low as possible — i.e., if the largest possible capacitance that will resonate at the desired frequency in the 54–88 Mc. region is used — the increase in impedance with frequency is not rapid. And if the largest possible capacitance is used the chances are that the inductance will all be in leads that have been made as physically short as possible — which means, simply, that a lower-inductance by-pass could not have been obtained at high frequencies anyhow. Of course, if the only TV channel of concern is in the 176–216 band, then that is where the by-pass can be made resonant. However, since the in-



A 0.001-μfd. or 470-$\mu\mu$fd. high-voltage mica condenser of the CM-45 type is an excellent TVI by-pass when installed as shown. If the by-pass is used at a connection block the "hot" terminal should be soldered directly to the connector. If this cannot be done the lead length should be kept as short as is physically possible, to prevent stray pick-up following the by-pass.

ductance is irreducible the only way this can be done is by using a small capacitance. This in turn decreases the effectiveness of the by-pass at low frequencies.

Fig. 3 shows the variation in reactance of a circuit series-resonated at 70 Mc., the geometric center of the 54–88 Mc. band. Several *LC* ratios are shown, together with the reactance of a pure capacitance over the same frequency range. The improvement resulting from using larger values of capacitance is clearly shown. The improvement in the 54–88 Mc. region resulting from series-resonating the by-pass circuit is most marked. The reactances in the four cases indicated in Fig. 3 would be approximately as follows at 200 Mc.:

100 $\mu\mu$fd. series-resonant at 70 Mc. — 57 ohms
200 $\mu\mu$fd. " " " " " — 28 ohms
500 $\mu\mu$fd. " " " " " — 11 ohms
1000 $\mu\mu$fd. " " " 60 Mc. — 8 ohms

The last two are still pretty effective by-passes even though the frequency is far above resonance.

Disc Ceramics

The high-*K* disc ceramics are of particular interest, because of their small size and lead arrangement, in applications within their voltage rating. As might be expected, a given capacitance in a disc condenser can be made to resonate at a higher frequency than is possible with mica units. However, the characteristics of the condensers are such that they cannot be held to as close capacitance tolerances as mica units, and the actual capacitance may deviate considerably from the marked value. For example, a batch of condensers marked 0.001 turned out, on measurement, to average about 0.002 μfd. On the other hand, a batch of 470-$\mu\mu$fd. units actually averaged the marked value. If this variability is typical, it becomes difficult to offer very specific suggestions as to sizes to use for series resonating — except that a 470-$\mu\mu$fd. disc ceramic obviously can be adjusted to resonate anywhere from 54 to 88 Mc. by trimming its leads to the proper length and checking with the grid-dip meter.

The fact is that when miniature (¼-inch diameter) condensers of this type are used to by-pass shielded leads as described below it does not matter much whether the by-pass circuit is series-resonated or not. If the lead length is reduced to zero, which can easily be done, the path from the shield braid to the inner conductor is as good a short circuit as could be obtained by a direct connection, at any frequency of interest from the TVI standpoint, provided the capacitance of the condenser is at least 0.001 μfd.

How To Install a TVI By-pass

By-passing is frequently an uncertain thing because it is difficult to determine whether the condenser really is across the circuit to be by-passed. This is particularly so when an attempt is made to series-resonate by-pass, because if there are alternative paths for current flow it is seldom possible to be sure that the by-pass is resonant between the proper points. Fortunately this is no problem if the object of by-passing is to prevent harmonics from getting out to external supply leads.

The answer is to use shielded wiring. Because such wiring acts like a coaxial transmission line, and because its terminals — that is, the shield and the inner conductor — can be very close together, it is possible to know very definitely just

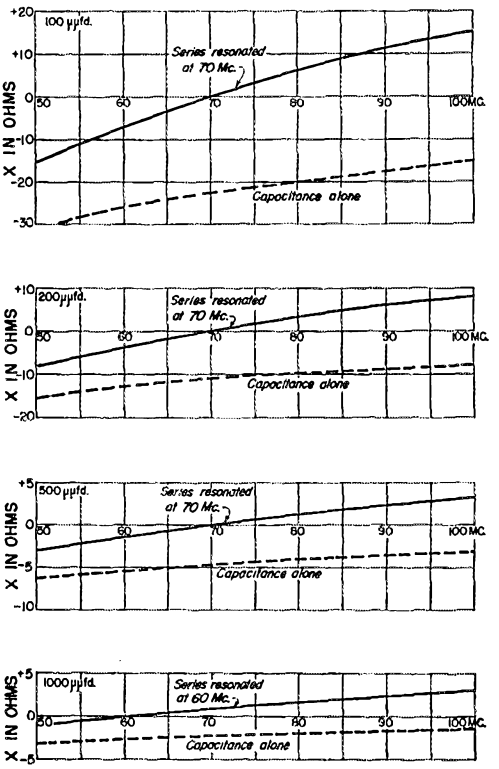
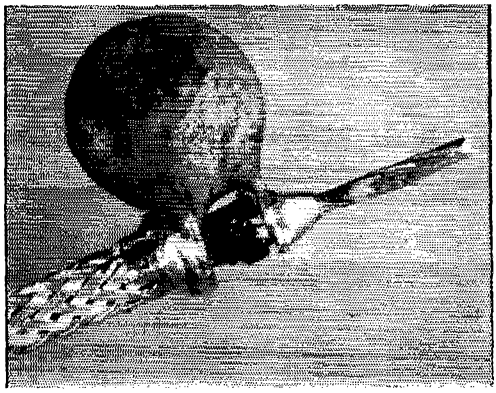


Fig. 3 — Reactance of series-resonant circuits of several *LC* ratios.

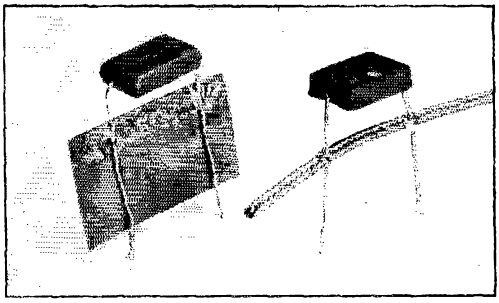
how to install the by-pass and how to series-resonate it.

The photographs show the technique. One terminal of the by-pass circuit is connected to the very end of the shield braid, and the other to the inner conductor. The distance between these two points need not be, and should not be, any greater than is necessary to avoid voltage breakdown. An eighth of an inch is ample for low voltages, and a quarter inch is plenty for a few thousand volts. The frequency at which the by-pass circuit resonates is easily checked, again with the grid-dip meter, by shorting the inner and outer conductors to form a parallel-resonant circuit. The short should be directly between the end of the shield braid and the point where the by-pass connects to the inner conductor.

For high-C by-passing, the best type, the ceramic condensers offer the best possibilities, but are limited in voltage rating. The CM-45 type high-voltage mica is just about as good when handled as shown in one of the photographs. With flat mounting to reduce internal inductance, and with the shield braid grounded as close to the "hot" condenser terminal as possible, the by-pass circuit will be series resonant at the same frequency as when both condenser terminals are bolted directly to the chassis.



By-passing shielded wire with a high-K disc ceramic. The condenser is attached to the braid and inner conductor through leads of practically zero length, before installing the lead in place in the transmitter. This photograph is about four times actual size.



A set-up like this can be used for determining the approximate lead length required for resonating a post-age-stamp mica condenser at a given frequency. Soldering to a small copper plate, with the distance between leads at the edge equal to the distance between the points to be by-passed, will make the by-pass circuit series-resonant when installed. Soldering to shielded wire closely approximates the actual series-resonant frequency when the condenser is installed as shown in the tube-socket photograph.

A number of samples of the CM-45 type with marked capacitances of 0.001 μfd. and 470 $\mu\mu$fd. were checked. In every case a 0.001 condenser installed as shown in the photograph resonated in Channel 2, while the 470-$\mu\mu$fd. size resonated in Channel 6. Since these two channels always are of most concern in ten-meter operation (but seldom simultaneously) the "right" capacitance to use will depend on your local TV channel set-up.

We have considered here only the question of getting a good by-pass in the TV range. By-passing has a number of ramifications — particularly when two or more condensers are used on the same circuit — that may have a very important effect on the over-all performance. We hope to discuss some of these in a later article.

Strays

While driving along the Northern Pacific Railroad tracks near Becker, Minn., WØNPP came abreast of a freight train with a blazing hotbox. Pulling up even with the engine, he sounded out the word "hotbox" on his automobile horn in code. The engineer slid back his window, leaned out, and looked back along the line of cars. Then the engine whistle blasted out "OK," also in code. WØNPP is now trying to figure out a way to get a QSL for this QSO. — *WØCWM*

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W6DNH is receiving congratulations for a hole-in-one achieved while playing in a foursome that included W6UCN and W6HG. John made the rare shot with a No. 7 iron on the 152-yard 10th hole at Western Avenue Golf Course, Los Angeles.

The QSL Bureau business is dropping off. W2SN, manager for the Second District, handled only 91,000 cards in 1950, a decline of 15,000 from the previous year.

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Anent the footnote on page 47 of February *QST:* W2DOG informs us that the price of the U. S. weather map has been doubled. Subscriptions to this service are now 60 cents per month, $7.20 per year, and are available from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

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Springtime repairs on that beam or mast can be made easily if you use lighter fluid to loosen the rusted studs and bolts. — *W2MQB*

17th Sweepstakes Contest

Part I: Final Results — C. W. Section

On November 18 and 19, 1950, the Seventeenth ARRL Sweepstakes appeared destined to go down in amateur history as another record breaker for outstanding operating performances. Activity proceeded at a rapid pace. The various bands, both c.w. and 'phone, were filled with stations busily engaged in racking up contacts. Every indication was that old score and contact records would go by the board and that new records would be discernible after the smoke of battle had cleared. An unlucky stroke of fate intervened, however, to upset the SS applecart. During the second week-end period, November 25th and 26th, wind, snow and rain descended upon northeastern United States and southeastern Canada. Ham antennas came down, power failed and normal communications facilities were disrupted in countless areas. Many SS contestants were forced off the air. Those fortunate enough to be able to continue operation put aside their Sweepstakes ambitions in order to assist in the more important task of providing emergency communications in the public interest. The story of their achievements was recounted in February *QST*. Those SSers in areas unaffected by the atmospheric storms faced another kind of storm — ionospheric! Needless to say, these pranks of nature didn't help participants to set any records. Despite the handicaps, however, 1950 SS contestants showed they could take the bad with the good and came up with excellent scores in the face of trying conditions.

Award Winners

Under the SS rules, competition for awards is among amateurs in each ARRL section. Entries were received from 803 c.w. contestants and individual awards are being made in 70 ARRL sections. A considerably larger number of entries undoubtedly would have been received if the storms had not interrupted the activities of so many participants. The award winners are those first-listed in each section tabulation under the heading *SCORES*. We feel certain that all Sweepstakes contestants join us in extending hearty congratulations to the winners. Theirs was certainly a hard-won and well-deserved victory!

Highlights

To several entrants, the prevailing poor conditions were no deterrent to working all sections. The following brasspounders each managed to snag contacts with all 72 League sections: W1EOB, W3KT (assisted by W3OVV), W4KFC, W6CUF, W6GHM, W6IFW, W9RQM, and WØPNQ. Only one section was missed by W1JYH, W2IOP, W3BES, W3CPS, W3EQA, W3FQZ, W4DWB, W5OWG, W6MHB, W9OLU, WØTKX.

In order to give each participant an idea of how he stacked up against the leader in his geographical area, and to credit the top scores, the tabulation below shows the highest score reported from each licensing area:

W1AWX	122,150	WØPNQ	132,300
W2BXA	115,316	KH6IJ	57,888
W3BES	158,419	KL7PI	37,973
W4KFC	171,900	VE1CU	21,784
W5USN	130,988	VE2NI	70,290
W6IFW	167,040	VE3AWE	84,010
W7KEV	138,000	VE4SC	40,722
W8OYI	113,160	VE5QZ	54,285
W9RQM	159,930	VE6EO	45,305
	VE7EH	59,976	

Standings in the club competition, and the 'phone results, along with photographs of outstanding contestants, both 'phone and c.w., will be published in our next issue.

SCORES

Seventeenth Sweepstakes Contest

Scores are grouped by Divisions and Sections. . . . The operator of the station first-listed in each Section is award winner for that Section unless otherwise indicated. . . . Likewise the "power factor" used in computing points in each score is indicated by the letter A or B. . . . A indicates power up to and including 100 watts (multiplier of 1.25), B indicates over 100 watts (multiplier of 1). . . . The total operating time to the nearest hour is given for each station and is the last figure following the score. . . . Example of listings: W3BES 158,419–893–71–A–39, or, final score 158,419, number of stations 893, number of sections 71, power factor of 1.25, total operating time 39 hours. . . Stations manned by more than one operator are grouped in order of score following single-operator station listings in each section tabulation: calls of participants at multi-operator stations are listed in parentheses.

ATLANTIC DIVISION

Eastern Pennsylvania

W3BES	158,419–893–71–A–39
W3DGM	145,590–844–69–A–40
W3EQA	101,974–575–71–A–36
W3GHM	95,910–556–69–A–37
W3BXE	91,425–530–69–A–32
W3FUF	91,200–570–64–A–32
W3HRD	91,080–552–66–A–37
W3CPV	89,110–532–67–A–35
W3FLH	85,680–504–68–A–37
W3DVC	81,180–493–66–A–36
W3CPS	78,278–441–71–A–37
W3ALB	77,000–440–70–A–26
W3BIP	62,700–380–66–A–36
W3OCU	61,350–409–60–A–18
W3LVF	47,040–336–56–A–21
W3IXN	47,038–355–53–A–32
W3ISE	42,488–302–55–A–20
W3ADZ	40,950–260–63–A–23
W3NOK	39,528–325–61–B–28
W3AIZ	38,793–263–59–A–27
W3BTP	36,890–264–56–A–25
W3KDF	31,175–215–58–A–25
W3CHH	28,688–226–51–A–16
W3LN	27,298–179–61–A–25
W3CLT	27,225–184–60–A–18
W3ORU	23,782–254–47–B–14
W3UKI	20,185–184–44–A–23
W3ENH	17,738–165–43–A–16
W3GRS	17,250–150–46–A–11
W3QLI	14,940–167–36–A–16
W3ADE	14,720–184–40–B–13
W3JN	13,225–115–46–A–12
W3EAN	13,195–190–35–B–13
W3NOH	10,823–111–39–A–10
W3OZV[1]	10,725–130–33–A–18
W3GHD	9130– 83–44–A—
W3JBC	8585–101–34–A– 7
W3NHX	7462–100–30–A–20
W3DFJ	5445– 66–33–A–13
W3PTG	4500– 75–30–B– 7
W3JSA	4320– 89–24–A– 7
W3RCD	3960– 70–24–A–17
W3PUO	3540– 60–30–B–12
W3PNL	2179– 43–21–A–14
W3EVW	1420– 27–21–A– 2
W3KFK	1105– 26–17–A– 8
W3OVV	413– 15–11–A—
W3FZQ	383– 17– 9–A– 6
W3SSU	3– 1– 1–A– 1

W4JAA/3 2- 1- 1-B- 1
W3KT(W3OVY)
91,620-510-72-A-30

Md.-Del.-D. C.

W3EIS 132,998-771-69-A-39
W3JTK 125,650-718-70-A-39
W3FQZ 120,700-681-71-A-35
W3GRF 115,920-672-69-A-39
W3VES 111,738-639-70-A-36
W3FQB 109,288-625-70-A-40
W3AEL 105,625-650-65-A-40
W3JTC 103,850-620-67-A-34
W3KDP 96,163-551-70-A-38
W3IYE 88,375-505-70-A-35
W3GAU 81,270-516-63-A-22
W3WV 73,616-440-67-A-36
W3MCG 63,220-437-58-A-37
W3NOE 60,600-404-60-A-37
W3JKO 55,935-339-66-A-22
W3MFJ 49,555-375-53-A-32
W3FDJ 44,520-374-60-B-35
W3KHU 48,757-297-66-A-29
W3FYS 40,725-272-60-A-15
W3LUL 38,590-228-68-A-24
W3BEN 37,881-311-61-B-34
W3LVJ 34,368-234-59-A-19
W3CDZ 32,635-215-61-A-28
W3PRT 31,165-270-46-A-26
W3LZM 31,800-240-53-A-22
W3STT 30,380-250-49-A-23
W3WU 27,540-204-54-A-28
W3PQF 26,849-234-47-A-24
W3SEI 26,609-226-59-B-16
W3DRD 26,055-193-54-A-12
W3JO 21,978-204-54-B-23
W3OFU 20,586-195-43-A-17
W3IL 19,610-148-53-A-18
W3AWS 17,220-170-41-A-32
W3FSP/3 17,015-166-41-A-21
W3HTK 16,770-156-43-A-12
W3MCD 15,390-135-38-A—
W3HMH 15,105-159-38-A-15
W3OQO 12,865-118-47-A-28
W3FY 11,200-145-40-B-13
W3GUS 9435-102-37-A-10
W3OYX 5588- 80-30-A-18
W9HMU/3 2525- 51-20-A- 8
W3IBX 1549- 30-21-A- 5
W3FPQ 870- 29-12-A- 8
W3RAH 438- 20-10-A-15
W3QOM 282- 13-11-A- 4
W3JTZ[2] 80- 8- 4-A- 1
W3ADO (W4OXX W8s FOK YNZ) 1869- 46-21-B-10

Southern New Jersey

W2PWP 71,825-442-65-A-20
W2ZVW 42,700-305-56-A-14
W2ORS 7480- 88-34-A- 8
W2YSP 718- 21-14-A- 3
W2PAZ 240- 12-10-B—

Western New York

W2BXZ 84,398-514-66-A-39
W2EMW 73,485-426-69-A-39
W2PJM 44,840-304-59-A-17
W2CCR 40,820-319-52-A-31
W2WZQ 36,570-276-53-A-23
W2UUX 33,696-316-54-B-37
W2FBA 28,500-228-50-A-12
W2COU 23,580-262-36-A-24
W2PVG 20,956-169-62-B-23
W2SVC 18,700-171-44-A-20
W2ZRC 15,750-150-42-A-11
W2RHQ 15,480-144-43-A—
W2RJJ 14,850-132-45-A-13
W2KFN 4514- 61-37-B—
W1RKR/2 2750- 50-22-A-12
W2DGV 1975- 47-25-B- 6
W2PYC 1200- 30-16-A- 4
W2PFI 220- 11- 8-A- 1

Western Pennsylvania

W3GJY 81,593-473-69-A-37
W3NRE 74,245-479-62-A-33
W3ODU 31,005-235-53-A-27
W3PWN 19,440-216-36-A-18
W3NCD 11,900-140-34-A-14
W3HOS 7400-100-37-B-10
W3DLI 5863- 67-35-A- 6
W3NCJ 5115- 62-33-A-10
W3UDD 3371- 48-29-A-11
W3QOS 1639- 35-19-A-14

CENTRAL DIVISION

Illinois

W9OLU 149,633-843-71-A-40
W9NII 120,750-690-70-A-40
W9WFS 102,465-606-69-A-32
W9FAU 95,224-569-67-A-38
W9OAT 62,080-338-64-A-32
W9PVA 50,500-337-60-A-26
W9AMP 46,500-300-62-A-21
W9VTI 42,160-341-62-A-29
W9YTV 28,487-215-53-A-20
W9PNE 27,755-214-52-A-10
W9ANY 27,668-217-51-A-30
W9NJZ 27,390-249-44-A-30
W9TCK 26,558-272-49-B-20
W9DOQ 22,288-202-56-B-25
W9EDH 19,760-190-52-B-24
W9EET 18,535-170-44-A-21
W9FFR 15,792-166-48-B-12
W9EBX 13,892-151-46-B-14
W9TMU 13,152-138-48-B- 9
W9FNR 11,070-108-41-A-14
W9TAL 8715- 83-42-A- 7
W9QBI 7840- 98-40-B-20
W9WIO 6123- 79-31-A- 7
W9JTM 4950- 60-33-A- 5
W9LGC 3273- 60-22-A-18
W9IRR 3080- 56-22-A-28
W9EVV 2070- 36-23-A—
W9LWD 1235- 52-19-A—
W9FDY 523- 21-11-A- 6
W9YTS 400- 20- 8-A- 3
W9LMC 293- 13- 9-A-20

Indiana

W9NH 81,851-475-69-A-40
W9VDB 63,000-400-63-A-31
W9BHR[3] 53,708-350-62-A-35
W9KYM 40,950-265-63-A-32
W9GQL 34,553-273-51-A-25
W9ERH 33,206-242-55-A-35
W9SFR 27,560-212-52-A-27
K9NR[4] 24,698-233-53-B-18
W9CNG 19,635-154-51-A-14
W9QLW 16,000-160-50-B-10
W9GFS 10,458-125-42-B-21
W9ZBK 7960-101-32-A-12
W9YDP 6080- 81-38-B-10
W9DCM 2146- 38-29-B—
W9NXU 1232- 28-22-B- 2
W9DGA 432- 18-12-B- 3
W9JYF/9 375- 15-10-A- 2
W9NVY(W9GQM) 26,125-218-50-A-30

Wisconsin

W9RQM 159,930-890-72-A-40
W9WEN 103,096-616-67-A-38
W9KZZ 79,860-490-66-A-31
W9CBE 67,646-435-63-A-26
W9GKK 63,868-433-59-A-28
W9KXK 59,963-389-65-A-35
W9FXA 49,200-328-60-A-18
W9HDZ 41,473-313-53-A-30
W9FZC 38,589-339-57-B-19
W9ERW 35,175-239-60-A-35
W9GKO 27,030-204-53-A-36
W9GUR 25,440-193-53-A-19
W9JQP 24,440-188-52-A-40
W9IQM 20,400-160-51-A-19
W9ONY 13,340-116-46-A-13
W9BCC 13,120-129-41-A-22
W9RLB 11,990-109-44-A-10
W9RKP 10,098- 99-51-B-14
W9DPN 9430- 92-41-A-18
W9HFV 6938- 75-37-A-13
W9WJH 6679- 70-39-A- 6
W9HDJ 5040- 72-28-A-10
W9GFH 3578- 55-27-A-25
W9CFL 3450- 60-23-A-11
W9OVO 2166- 57-19-B- 5
W9KUG 2000- 50-20-B-24
W9JSE 1615- 39-17-A- 8
W9HDH 1600- 40-16-A- 8
W9HRX 1425- 41-15-A-12
W9HHE 1350- 30-18-A- 4
W9LUC 1313- 25-21-A—
W9IZE 1100- 23-20-A- 4
W9RSR 399- 15-11-A- 2
W9HUW 250- 13- 8-A- 8
W9HEX (W8ELR W9s FSU GJX HWV HXV IRJ JRW YCV Edward Gruel and William Techtmann) 25,480-229-56-B-30

DAKOTA DIVISION

North Dakota

WØARB 39,330-278-57-A-40
WØBJG 38,558-299-53-A-25
WØCAQ 11,902-104-46-A-13
WØLHS 7123- 77-37-A-20
WØGSR/Ø 699- 22-13-A- 9

South Dakota

WØPHR 106,425-645-66-A-37
WØGFG 30,088-212-58-A-33
WØFOQ 10,750-101-43-A-20
WØRRN 7800-101-39-B-14
WØPIG 2185- 39-23-A- 3

Minnesota

WØPNQ 132,300-735-72-A-35
WØTKX 128,510-724-71-A-36
WØFID 79,120-495-64-A-27
WØAIH 71,774-436-67-A-30
WØRZQ 47,351-315-61-A-33
WØBRA 18,368-164-56-B-19
WØBPI 5880- 78-32-A-16
WØEPJ 4875- 65-30-A- 5
WØDNY 3600- 48-30-A-10
WØVIP 880- 22-16-A- 2

DELTA DIVISION

Arkansas

W5DRW 71,825-423-68-A-29
W5ONL/5 56,780-421-68-A-32
W5QKZ 4373- 51-24-A- 6

Louisiana

W5USN[5] 130,988-756-70-A-35
W5NGN 99,365-588-68-A-39
W5QFC 83,688-524-65-A-40
W5LTX 79,200-480-66-A-38
W5MWE 62,042-469-67-B-37
W5MCT 59,556-369-65-A-32
W5KTD 59,365-384-62-A-24
W5BI 31,080-222-56-A-20
W5RIQ 28,350-210-54-A-19
W5PZI 23,370-205-57-B-32
W5LUU 21,813-175-50-A-11
W5PBW 20,406-182-57-B-18
W5NDV 17,214-147-47-A-23
W5NMS 6284-135-45-A- 9
W5PXW 4710- 79-30-B-28
W5GKA 4373- 53-33-A- 4
W5KC 1320- 33-16-A—

Mississippi

W5ZD 107,713-618-70-A-40

Tennessee

W4BAQ 69,388-428-65-A-33
W4OGG 43,428-300-58-A-35
W4KH 28,656-302-64-B-13
W4OOA 33,000-279-60-B-36
W4GX 25,559-211-61-B-23
W4VOS 20,125-175-46-A-29
W4CXY 14,155-149-38-A-16
W4RPT 8150- 83-40-A—
W4LUH 6750- 75-36-A-10

GREAT LAKES DIVISION

Kentucky

W4ZWR 57,188-375-61-A-25
W4NKQ 51,075-341-60-A-29
W4WWT 50,160-380-66-B-19
K4WBG[6] 18,414-178-54-B-14
W4VP 7790- 83-38-A- 6

Michigan

W8CCJ 65,033-451-58-A-40
W8SCW 48,128-376-64-B-24
W8ZHO 43,070-365-59-B-28
W8GQB 40,235-310-65-B-24
W8EXZ 33,568-232-58-A-16
W8DQL 24,720-207-48-A—
W8OAF 23,313-188-50-A-19
W8YKC 22,050-180-49-A-16
W8WOV 21,726-216-51-B-34
W8GP 18,731-167-45-A-17
W8BWS 17,360-155-56-B-28
W8TKW 16,560-139-48-A-34
W8DDR 12,825-115-45-A-17
W8UQR 12,810-122-42-A-17
W8ZZ[7] 9713-111-35-A-15
W8MGQ 9116-106-43-B- 8
W8SS 7622-103-37-B-13
W8FGB 7560- 98-32-A-18
W8SZS 7250-100-29-A- 8
W8DSE 5150- 52-40-A- 8
W8EGI 4800- 60-32-A-10
W8DXM 2050- 41-20-A- 6
W8FSZ 829- 28-13-A- 8
W8WVL 715- 22-13-A- 6
W8YNY 468- 17-11-A- 2

Ohio

W8OYI 113,160-656-69-A-33
W8YJE 93,013-534-70-A-37
W8ZJM 75,820-450-68-A-28
W8EXI 71,840-402-68-A-35
W8LFE 57,615-334-69-A-24
W8DAD 53,723-379-57-A-40
W8LHV 52,297-370-57-A-33
W8LQA 48,125-356-55-A-29
W8EBC 47,171-300-63-A—
W8DAE 46,255-320-58-A-27
W8KMP 41,752-294-57-A-32
W8QYI 40,870-268-61-A-21
W8DWP 35,670-248-58-A-33
W8YGR 32,760-208-63-A-25
W8VQI 30,740-233-53-A-30
W8AMH 30,500-244-50-A-31
W8PYX 30,318-262-49-A-23
W8BWC 29,415-222-53-A-14
W8LOF 26,813-145-55-A-15
W8AVT 24,581-219-45-A-20
W8AL 23,418-247-38-A-30
W8PM 23,100-168-55-A-20
W8BRA 19,253-151-51-A-15
W8KJZ 18,980-148-52-A-24
W8FRD 18,803-157-49-A-29
W8UPB 18,585-177-42-A-11
W8YNH 17,763-145-49-A-16
W8YPT 16,215-142-46-A-10
W8MXO 15,856-148-43-A-20
W8LAG 15,211-146-53-B-16
W8YCP 15,040-128-47-A-10
W8VM 12,465-139-36-A-18
W8SFI 12,402-122-41-A- 9
W8MOH 12,350-130-38-A-16
W8PCS 10,150-102-40-A- 9
W8FPA 9400- 95-40-A-22
W8HFE 9250-100-37-A- 7
W8DFD 9065- 99-37-A-13

W8QHV 7935-138-23-A—
W8TNF 6640- 83-40-B- 8
W8OAC 6552-156-42-B-17
W8BFH 5752- 59-39-A-13
W8DYZ 5652- 84-36-B-15
W8HOX 5520- 92-24-A- 9
W8EIV 4760- 60-32-A-10
W8ZJQ 4050- 60-27-A- 6
W8ET 2300- 40-23-A-10
W8CSY 1995- 88-21-A- 6
W8OPG 1734- 37-19-A- 3
W8EAR 975- 27-15-A- 6
W8EOW 881- 25-15-A- 7
W8BNC 731- 20-15-A- 3
W8BUM 570- 19-12-A- 3
W8CZT 420- 15-14-B- 2
W8FU 338- 15- 9-A- 7
W8BZX 8- 2- 2-B—
W8URD (W8s FKO ZQD ZQH) 22,231-247-47-B-19
W8ZQD (W8ZQH) 8738-123-30-A- 9

HUDSON DIVISION

Eastern New York

W2JBQ/2 69,383-421-66-A-32
W2BZO 9265-109-34-A- 9
W2CJM 8550- 95-36-A-18
W2LDS 5280- 96-22-A-14
W2BRS 3508- 62-23-A-15
W2GFP 2048- 39-21-A- 6
W2WSS 1445- 37-17-A-15

N.Y.C.-L.I.

W2IOP 113,334-642-71-A-22
W2KPA 85,340-502-68-A-36
W2LRI 53,025-354-60-A-36
W2LPJ 42,625-310-55-A-26
W2AOD 40,973-304-54-A-34
W2VDT 40,635-301-54-A-30
W2PVV 39,150-270-58-A-31
W2GXC 37,570-292-52-A-38
W2GGN 34,493-257-54-A-21
W2OWX 34,178-280-49-A-37
W2ZVT 24,063-195-50-A-39
W2OBU 18,870-222-34-A-15
W2ETT 15,180-136-46-A-16
W2GP 14,784-154-32-A—
W2VNJ 11,050-130-34-A-12
W2VL 11,022-167-33-B—
W2ZV 7863- 85-37-A- 9
W2GTL 7524- 66-57-B- 8
W2AWH 6706- 73-37-A-10
W2CKQ 5438- 75-29-A—
K2BH 5193- 67-31-A-11
W2HAQ 3584- 64-28-B- 6
W2AJI 3538- 61-29-B-10
W2JSV 3063- 49-25-A-10
W2FNE 2805- 51-22-A-14
W2VBT 1700- 34-20-A- 3
W2MDM 1656- 36-23-B- 4
W2TUK 1613- 43-15-A- 3
W2CXQ 1523- 32-21-A- 5
W2DUN 413- 15-11-A- 4
W2DBI 270- 12- 9-A- 4
W2LGK 50- 5- 4-A- 1
W2MJO 8- 4- 1-B- 2

Northern New Jersey

W2BXA 115,316-673-69-A-36
W2CWK 88,960-582-62-A-36
W2TPJ 73,775-455-65-A-33
W2EWZ 67,650-451-60-A-39
W2OOC 54,740-323-68-A-26
W2MPP 25,425-170-60-A-27
W2LQP 19,296-180-43-A-10
W2CAH 17,600-160-44-A-14
W2JME 16,445-150-55-B-15
W2VYB 13,050-116-45-A-15
W2YLS 10,350-104-40-A- 7
W2GUM 9063-125-29-A-12
W2ABL 6235- 86-29-A- 7
W2NIY 5565- 80-28-A- 7
W2CFW 4500- 72-25-A-11
W2YMP 3380- 52-26-A- 4
W2GKE 2128- 40-23-A- 5
W2BU 2088- 36-29-B- 4
W2CVW 1850- 40-20-A-18
W2EIK 1488- 37-17-A—
W2WFK 800- 21-16-A- 2
W2ZEP 750- 20-15-A- 2
W2AIY 140- 8- 7-A- 4

MIDWEST DIVISION

Iowa

WØNCS 95,824-557-69-A-36
WØBQJ 93,670-551-68-A-35
WØATA 82,159-499-67-A-40
WØFZO 81,600-528-64-A-34
WØFGW 62,764-462-68-B-35
WØRTI 59,245-369-68-A-40
WØEQN 47,486-370-63-B-24
WØYRN 17,172-163-53-B-22
WØQAO 8500-100-34-A- 8
WØHDX 1800- 30-24-A- 6

Kansas

WØDJE 83,475-535-63-A-39
WØKRV 58,789-387-61-A-33
WØIUL 57,746-394-59-A-40
WØAWB 44,835-303-61-A-25
WØBYV 43,092-342-63-B-25
WØDYX 25,220-194-52-A-14
WØTOD 17,900-187-40-A-22
WØIIJ 11,495-105-44-A-14
WØYFE 11,288-105-43-A-19
WØMUY 9555-123-39-B-13
WØTNW 4689- 61-31-A-10
WØBJX 1170- 40-12-A-17
WØBIO 1116- 24-19-A-13

Missouri

WØDEA 17,400-174-50-B-11
WØGUV 9280-116-40-B-18
WØKIK 263- 15- 7-A- 5
WØMCX 60- 6- 5-B- 1
WØEEE (W1SJR W0s BPE BQF BZK ERW EVW WVN. Mrs. O. Thompson, Cecil Ashburn, R. Ruch, L. Hofer.) 30,562-259-59-B-25

Nebraska

WØCIO 53,451-351-61-A-28
WØMZF 32,063-242-54-A-39
WØIJK 11,443-100-46-A-20

NEW ENGLAND DIVISION

Connecticut

W1TS 80,500-462-70-A-31
W1BIH 72,013-413-70-A-25
W1RWS 41,928-271-62-A-17
W1IJT 36,722-303-61-B-33
W1FTX 36,480-256-57-A-22
W1MTR 27,198-256-43-A-28
W1RY 22,475-155-58-A- 9
W1CEG 21,935-214-41-A-15
W1DF 14,976-144-52-B—
W1RFJ 6820- 88-31-A—
W1JTD 6560- 82-40-B—
W1DJC 6144- 96-32-A- 6
W1GVK 4629- 81-23-A- 4
W1LV 3600- 72-20-A- 7
W1AW 3075- 62-25-B—
W1BDI 748- 24-13-A- 2
W1IKE 715- 22-13-A- 2
W1LVQ 714- 21-17-B- 1
W1HYF 618- 19-13-A- 2
W1LIG 413- 15-11-A—
W1NGQ 375- 15-10-A- 2

Maine

W1CV 60,991-416-59-A-38
W1NXX 33,020-254-52-A-15
W1MDF 27,298-223-50-A-30
W1NGV 6360-106-30-B- 6
W1GKJ 338- 15- 9-A- 3

Eastern Massachusetts

W1AWX 122,150-700-70-A-39
W1BOD 78,952-479-66-A-37
W1AQE 56,643-398-57-A-26
W1ALG 56,000-400-56-A-24
W1LYL 55,875-373-60-A-35
W1IAP 42,504-323-66-B-27
W1MX 41,856-327-64-A-30
W1ALA 33,330-303-55-B-29
W1NXY 30,740-235-53-A-22
W1PEG 29,323-253-59-B-37
W1ONP 23,166-216-43-A-17
W1RXB 21,218-185-46-A-16
W1JYC 20,500-203-51-B-21
W1RSR 11,509-140-33-A-22
W1NS 10,804-101-43-A-14
W1OMI 10,188-142-36-B-11
W1GCJ 5625- 75-30-A-22
W1PLJ 5480- 70-32-A-18
W1SVL 5363- 83-26-A-13
W1BDF 5250- 75-28-A- 9
W1MQX 4004- 72-28-B- 9
W1PH 3800- 72-20-A- 5
W1QZO 2484- 54-23-B—
W1STW 1485- 33-18-A-15
W1NKW 1000- 25-16-A-13
W1TEY 525- 18-12-A- 6
W1EMG 420- 14-12-A- 2

Western Massachusetts

W1JYH 113,600-640-71-A-32
W1EOB 66,456-463-72-B-23
W1RKB 39,485-300-53-A-20
W1RZG 13,252-173-31-A-13
W1SOT 13,213-151-35-A-13
W1BEF 12,397-120-49-B-16
W1JR 5475- 73-30-A- 6
W1RHU 4125- 66-25-A- 4
W1ASU 3762- 58-33-B- 7
W1BDV 2338- 55-17-A- 5
W1DGT 2070- 36-23-A- 8
W1BVR 468- 17-11-A- 2

New Hampshire

W1AOQ 94,150-538-70-A-30
W1CRW 79,395-474-67-A-27
W1BFT 63,998-371-69-A-22
W1NHJ 36,580-236-62-A-26
W1QYZ 22,320-186-48-A-19
W1IJB 7425- 99-30-A- 6
W1EIQ 2256- 47-24-B-11
W1FTJ 646- 24-11-A- 2
W1EWF 63- 5- 5-A- 1

Rhode Island

W1BIL 69,225-429-65-A-32
W1KNE 67,830-485-56-A-37
W1CJH 64,418-409-63-A-30
W1BBN 62,729-375-67-A-34
W1AWE 13,328-136-49-B—
W8TRX/1 3031- 49-25-A-12
W1PXI 1000- 25-16-A- 4
W1RNN 440- 16-11-A- 4

Vermont

W1FPS 23,668-196-61-B-25
W1MCA 18,951-195-39-A-15
W1SPK 1148- 27-17-A- 4
W1QXU 90- 6- 6-A- 1

NORTHWESTERN DIVISION

Alaska

KL7PI 37,973-250-61-A-22
KL7WC 369- 21- 9-B- 3

Idaho

W7FBD 90,115-546-67-A-40
W7MOU 46,905-321-59-A-23
W7EMT 2340- 45-26-B- 3

Montana

W7KVU 75,725-466-65-A-34
W7FLB 47,916-367-66-B-39
W7KGJ 20,025-128-45-A-15
W7LER 18,360-153-48-A-27
W7JFR 15,435-128-49-A-23
W7FEE 13,824-130-54-B-11
W7NZJ 9506-100-39-A-20
W7KGF 9000-100-36-A-11
W7NRJ 8930- 94-38-A-11
W7COH 3055- 48-26-A- 9

Oregon

W7LNG 28,160-258-55-B-24
W7OHX 16,290-201-36-A-33
W7LT 12,090-124-39-A-33
W7NOJ 3880- 50-32-A-12
W7BOH 2730- 52-21-A-12

Washington

W7KWC 66,844-493-68-B-40
W7GUV 65,205-378-69-A-30
W7NLI 53,219-329-65-A-27
W7JC 24,323-207-47-A-30
W7MVC 22,356-184-49-A-20
W7DGN 10,285-122-34-A-17
W7HAD 8740- 92-38-A-17
W7ETO 3136- 56-28-B-11
W7EW 480- 20-12-B- 3
W7CWN 468- 17-11-A- 4

PACIFIC DIVISION

Hawaii

KH6IJ 57,888-402-72-B-25
KH6WW 855- 29-15-B- 7
KH6ADY 90- 9- 4-A- 2

Nevada

W7KEV 138,000-803-69-A-40
W7CX 17,649-167-53-B-17

Santa Clara Valley

W6VDG 59,547-432-69-B-34
W6YHB 33,852-273-62-B-29
W6UTV 28,320-236-48-A-25
W6WMO 16,043-140-46-A-15
W6NBD 15,180-165-46-B-15
W6ZZ 8740- 96-46-B-14
W6WMM 3762- 50-38-B-10
W6IUV 1750- 50-14-A-18
W6JIA 420- 14-12-A- 5

East Bay

W6MHB 66,030-465-71-B-39
W6JOH 28,783-198-58-A—
W6TT 20,160-180-56-B- 9
W6HHX 12,100-110-44-A-17
W6EJA 11,592-126-46-B-12
W6IDY 5396- 71-38-B- 4

San Francisco

W6EYY 38,276-261-59-A-21
W6PGY 21,836-208-53-B-25
W6YC 6930- 77-36-A- 8
W6ZYI 2161- 46-19-A-10
W6JRH 40- 4- 4-A- 1

Sacramento Valley

W6HUC 5865- 69-34-A-15
W6GUX 1876- 42-19-A-10
W6WLI 1121- 30-19-B- 4

San Joaquin Valley

W6GUR 20,935-158-53-A-26
W6QXF 18,364-125-59-A-33
W6HJQ 9300-120-31-A-12
W6KRO 8500-101-34-A-23
W6GJP 3500- 50-35-B- 5
W6EFV (W6s ARI BRP BVM BYH IDZ) 74,630-443-68-A-37

ROANOKE DIVISION

North Carolina

W4AKC	80,155–472–68–A–39
W4FDV	20,034–192–53–B–17
W4PRL	13,230–127–42–A—
W4SAL	12,653–121–42–A–31
W4JPZ	6825– 80–35–A– 7

South Carolina

W4NQP	10,080– 84–48–A–28
W4DCE	3960– 66–30–B– 8

Virginia

W4KFC	171,900–956–72–A–40
W4KFT	133,960–788–68–A–40
W4IA	124,863–714–70–A–40
W4VE	92,225–527–70–A–33
W4LRI	91,970–541–68–A–37
W4WI	76,883–459–67–A–32
W4NH	75,000–500–60–A–32
W4FF	69,930–444–63–A–32
W4PNK	63,438–440–58–A–40
W4JUY	61,418–435–57–A–30
W4CC	61,120–382–64–A–22
W4KVM	56,786–399–57–A–22
W2EHU/4	47,275–306–62–A–33
W4EMJ	46,970–309–61–A–32
W4LAP	37,363–245–61–A–18
W4SYJ	34,730–302–46–A–28
W4JUJ	31,078–204–62–A–25
W4RXP	22,620–174–52–A–23
W4LK	22,032–204–54–B–16
W4BLE	20,640–172–48–A–22
W4SR	19,800–198–40–A–23
W4NQV	18,550–186–40–A–11
W4KMG	14,136–132–43–A–15
W4RH	10,150–116–35–A–11
W1RYR/4	5600– 80–28–A–14

West Virginia

W8RCN	23,345–203–46–A–15
W8UMR	22,121–174–51–A–21
W8UYR	16,958–140–61–B–23
W8DJQ	5760– 76–32–A–17
W8CDV	3589– 50–29–A–14
W8CKW	969– 29–17–B– 3

ROCKY MOUNTAIN DIVISION

Colorado

WØIC	40,950–260–63–A–15
WØANW	40,826–290–57–A–40
WØSJT	35,525–246–58–A–38
WØJPI	21,063–169–50–A–18
WØFZI	18,437–151–49–A–14
WØKHQ	5550– 60–37–A–18
WØACM	4638– 53–35–A–22

Utah

W7MWR	29,498–220–54–A–28
W7BSE	357– 13–11–A– 3
W7OWR	323– 12–11–A– 3

Wyoming

W7HRM	60,320–467–65–B–31
W7LE	30,073–244–61–B–18

SOUTHEASTERN DIVISION

Alabama

W4RAL	53,219–333–65–A–27
W1SMU/4	35,035–270–65–B–31

Eastern Florida

W4BRB	122,937–705–70–A–39
W4ILE	107,169–664–65–A–37
W4CKB	102,610–671–62–A–40
W4IZ	99,756–734–68–B–38
W4DGW	91,613–543–70–A–39
W4RWE	73,280–462–64–A–38
W4RTX	44,914–306–59–A–39
W4RWA	35,280–301–48–A–34
W4COB	25,140–215–60–B–24
W4TH	20,706–203–51–B–32
W4OGI	20,458–167–49–A–27
W4QED	20,318–191–43–A–23
W1TU/4	18,900–164–45–A–19
W4CNT	11,476–153–38–B–11
W4HKJ	11,233–121–47–B—
W4FXM	10,631–122–35–A–14
W4IYT	9540–106–45–B– 7
W4BHG	5819– 67–35–A–14
W4IQV	4392– 61–36–B—
KL7AAY/4	4250– 85–20–A– 5
W4POF	4193– 65–26–A–12
W4GAU	3479– 61–23–A–27

Western Florida

W4TL	59,881–362–67–A–39
W4QB	25,955–180–58–A–21

Georgia

W4POO	52,605–391–63–A–33
W4KSZ	17,423–152–46–A–13
W4PLD/4	3488– 78–18–A–16

Canal Zone

KZ5CW	30– 6– 2–A– 1

SOUTHWESTERN DIVISION

Los Angeles

W6IFW	167,040–933–72–A–39
W6CUF	103,140–574–72–A–28
W6JFJ	101,915–600–68–A–38
W6GHM	93,600–533–72–A–30
W6GEB	73,030–441–67–A–37
W6NKR	60,792–449–68–B–31
W6FIT	31,124–253–62–B–31
W6ZOL	25,173–206–49–A–20
W6LON	23,718–180–53–A–24
W6JQB	20,776–212–49–B–13
W6GRZ	9538–110–35–A–11
W6LVQ	4118– 72–29–B–10
W6HWK/6	(WØSZU/6) 21,813–180–50–A–25

Arizona

W7MLL	54,095–352–62–A–32
W7NSJ	14,410–131–44–A–18
W7MGP	12,750–125–51–B–17
W7OED	9120–103–38–A–20
W7MNU	454– 17–11–A– 3
W7SX	90– 8– 6–B– 2

San Diego

W6NEC	31,320–277–58–B–27
K6AM	23,490–221–54–B–21
W6OEO	18,806–148–51–A–25
W6BYC/6	5920– 64–37–A–19
W6GTM	1054– 28–19–B—

WEST GULF DIVISION

Northern Texas

W5BLU	100,650–617–66–A–40
W5IHM	75,285–479–63–A–39
W5UMI	65,325–410–65–A–37
W5GDH	60,288–471–64–A–36
W5QDF	39,550–287–56–A–19
K5WAT[8]	8209–101–41–B– 6
W5QWK	508– 15–14–A– 8
W5QXK	495– 17–12–A– 4

Oklahoma

W5OYP	54,272–427–64–B–30
W5EGO	43,772–355–62–B–35
W5OWG	39,192–276–71–B–20
K5NRJ[9]	39,000–303–65–B–26
W5CKT	25,200–225–56–B–19
W5BDX	23,896–206–58–B–11
W5EMY	10,763–104–42–A–12
W5RIT	536– 17–13–A– 5

Southern Texas

W5FNA	104,535–606–69–A–40
W5GEL	92,548–687–68–B–28
W5NQI	79,390–472–68–A–40
W5EMA	62,040–378–66–A–36
W5AQE	51,000–340–60–A–33
W5FXN	29,568–225–66–B–15
W5NIY	23,115–135–69–A–17
W5IPT	14,850–132–45–A–12
W5LGG	10,750–100–43–A– 4
W5PM	10,127–124–41–B—
W5EUK	10,036–110–37–A–20
W5HMO	9165–100–47–B–11
W5RBW	465– 16–12–A– 6
K5NRG	(W5s PM QKF UPC WØTCU) 52,992–416–64–B–32

New Mexico

W5DWB	109,945–618–71–A–38
W5FVO	100,081–604–67–A–37
W5CA	97,031–568–69–A—
W5PXN	45,140–296–61–A–39
W5KWP	42,494–262–65–A–32
W5RMJ	37,834–280–57–A–31

CANADA

Maritime

VE1CU	21,784–196–56–B–29
VE1WN	19,500–200–39–A–32
VE1AAY	18,275–172–43–A–32
VE1KM	18,095–158–47–A–21
VE1WB	13,725–123–45–A–23
VE1CM	12,150–136–36–A–19
VE1OM	7752–102–38–B–12
VE1TF	5412– 86–33–B–28
VE1DB	4658– 69–34–B– 9
VE1RP	1872– 39–24–B– 6

Ontario

VE3AWE	84,010–542–62–A–32
VE3ACR	72,500–500–58–A–32
VE3BBR	69,300–441–63–A–39
VE3JJ[10]	59,125–430–55–A–32
VE3AGX	57,420–398–58–A–37
VE3DHC	52,605–334–63–A–32
VE3BL	46,763–323–58–A–34
VE3ACB	44,320–277–64–A–29
VE3EAM	43,348–339–51–A–40
VE3MI	35,573–287–51–A–36
VE3ASD	32,760–252–52–A–33
VE3DDM	26,173–281–38–A–26
VE3AMK	26,010–271–51–B–36
VE3AIL	25,909–221–47–A–26
VE3BPE	25,786–215–49–A–24
VE3BVR	25,523–249–41–A–28
VE3DH	15,941–164–39–A–13
VE3DU	14,000–160–35–A–16
VE3DN	13,358–137–39–A–27
VE3BXI	10,455–125–34–A–14
VE3BUR	9888–113–35–A– 9
VE3YV	7600– 80–38–A–12
VE3DIX	6713– 90–30–A–22
VE3BXF	5110– 73–28–A–19
VE3RM	4720– 60–40–B–12
VE3BSW	2616– 47–23–A–11
VE3API	570– 20–15–B– 4

Quebec

VE2NI	70,290–427–66–A–40
VE2OK	29,653–205–58–A–23
VE2JL	13,553–140–39–A–22
VE2WA	12,510–142–45–B–18
VE2ADW	6860–100–28–A–20
VE2OL	5458– 59–37–A– 7
VE2ADE	4420– 87–26–B–15
VE2BB	2093– 47–18–A– 6
VE2AKJ	660– 22–12–A– 7

Alberta

VE6EO	45,305–356–65–B–37
VE6BU	21,285–194–55–B–12
VE6MA	14,298–133–43–A–29

British Columbia

VE7EH	59,976–441–68–B–38
VE7JO	48,825–315–62–A–35
VE7XA	43,650–295–60–A–38
VE7YR	19,800–165–48–A–30
VE7ALE	6240– 80–32–A– 5
VE7GG	450– 20–10–A– 2

Manitoba

VE4SC	40,722–310–66–B–28
VE4NS	6992– 92–38–B–13
VE4HS	6525– 75–36–A–14

Saskatchewan

VE5QZ	54,285–329–66–A–25
VE5DW	22,128–173–53–A–22
VE5LV	14,160–120–48–A–29
VE5EH	2048– 42–21–A– 9

[1] W3MQC, opr. [2] W3OQJ, opr. [3] W3OWR, opr. [4] W9AKP, opr. [5] W5LNU, opr. [6] W8ZKK, opr. [7] W8FX, opr. [8] W5LIU, opr. [9] W5PCL, opr. [10] VE3AJU, opr.

CANADA WIDENS 75 'PHONE

At press time we receive word that the Department of Transport has, effective March 1st, widened the 75-meter 'phone band in Canada another 25 kc., making it now read 3725–4000 kc. VE hams are also given radioteletype privileges in the 11-meter band, and in the 50-, 144- and 235-Mc. bands.

The ingression of Canadian 'phones into a portion of the 80-meter band earmarked in the U. S. for Novice operation will of course cause serious problems in this country, and the subject will undoubtedly receive full discussion at the Board meeting in May.

A Bandswitching Converter for 144 to 21 Mc.

Novel Circuitry Provides Improved V.H.F. Reception

BY F. E. LADD,* W2IDZ

• May we suggest that before you start reading this article you study the schematic diagram on the following page carefully. There are some odd-looking circuits to be found there, and *ideas*, too. One of several experimental models built by the author in the course of the development of the converter described here was tested in the ARRL Lab. Even this early model was superior in both sensitivity and stability to any bandswitching converter we've seen that covers 144 Mc. The author will supply construction details [1] at cost.

IN DESIGNING a multiband converter some thought should be given beforehand to what is wanted. First, since most communications receivers have poor image rejection on amateur bands above 14 Mc., it will be advantageous to have the converter cover the 21-Mc. band and as many higher bands as can be handled effectively. Second, the converter should perform well in all respects, providing good image rejection, freedom from cross-modulation by strong signals, enough gain to work well with any receiver that may be used as the i.f., a low noise figure, and an oscillator that will stay put. Third, the converter should be versatile and convenient to use. This means bandswitching and a direct-reading dial with a single knob control. These things should be accomplished without sacrifice in performance and the converter should be reasonably small, neat in appearance and mechanically sound. The converter described in this article meets all these requirements.

In the course of experiments preceding the final form some definite conclusions were reached. The first of these is that bandswitching can be at least as efficient as most plug-in coil schemes. It can even be as good as single-band devices with coils permanently mounted. Second, if a good pentode r.f. amplifier is given a fighting chance, it will have a good noise figure, and it will take some doing to beat it by very much, even with multistage triode amplifiers. There is little need for more than one r.f. stage provided that this stage is doing a good job. A pentode mixer with grid injection will give a lot of gain, and it need not be excessively noisy. In any event, the gain of a good r.f. stage will mask the mixer noise fairly well.

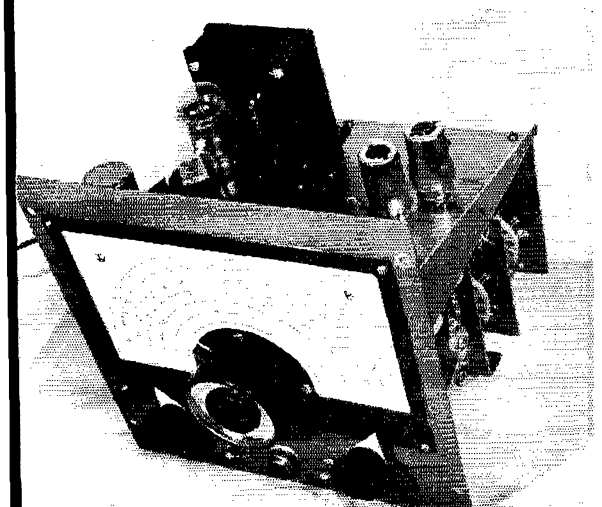
Switching 144-Mc. Circuits Effectively

Referring to the schematic (Fig. 1), it will be noted that the two-meter grid coil L_2 is wired from the r.f. grid to the wiper of S_2. (The bandswitch is shown in the two-meter position.) The tuning condenser C_1 and the antenna trimmer C_5 are also wired to the wiper of S_2. At first glance it appears that these condensers are shorted out. Actually, the switch has inductance, as does the ground lead from Terminal 1 of S_2. Thus, the tuning condenser is, in effect, tapped up part way on the coil. By adjusting the length of this ground lead the tap can be moved up or down as a tracking adjustment. If this is done L_2 must be changed somewhat as the total inductance changes. By using this method of switching, C_1 and C_5 are not hanging on the grid of the tube at 144 Mc., and the grid coil can be larger than could be used even in a single-band converter tuned in the normal way. On 144 Mc. the wiper of S_2 is at a low-impedance point, and the lead lengths to C_1 and C_5 become reasonably noncritical. The mixer grid circuit is handled in the same way. By this method of tuning nothing is lost on any lower band, and a very real improvement over conventional L/C tuning methods is made on two meters. Our pentode stages are given a chance to do their best.

♦

* 311 Central Ave., Westfield, N. J.

[1] The author has prepared detailed layout drawings and instructions for wiring and assembling that will permit an experienced receiver constructor to duplicate the design exactly. This information, too lengthy to be used in *QST* in its entirety, will be supplied by the author for $3.00 per set.



Front view of the four-band converter designed by W2IDZ. Each band, from 21 to 144 Mc., covers a major portion of the dial scale. The two other knob controls are the antenna trimmer, *left*, and the bandswitch.

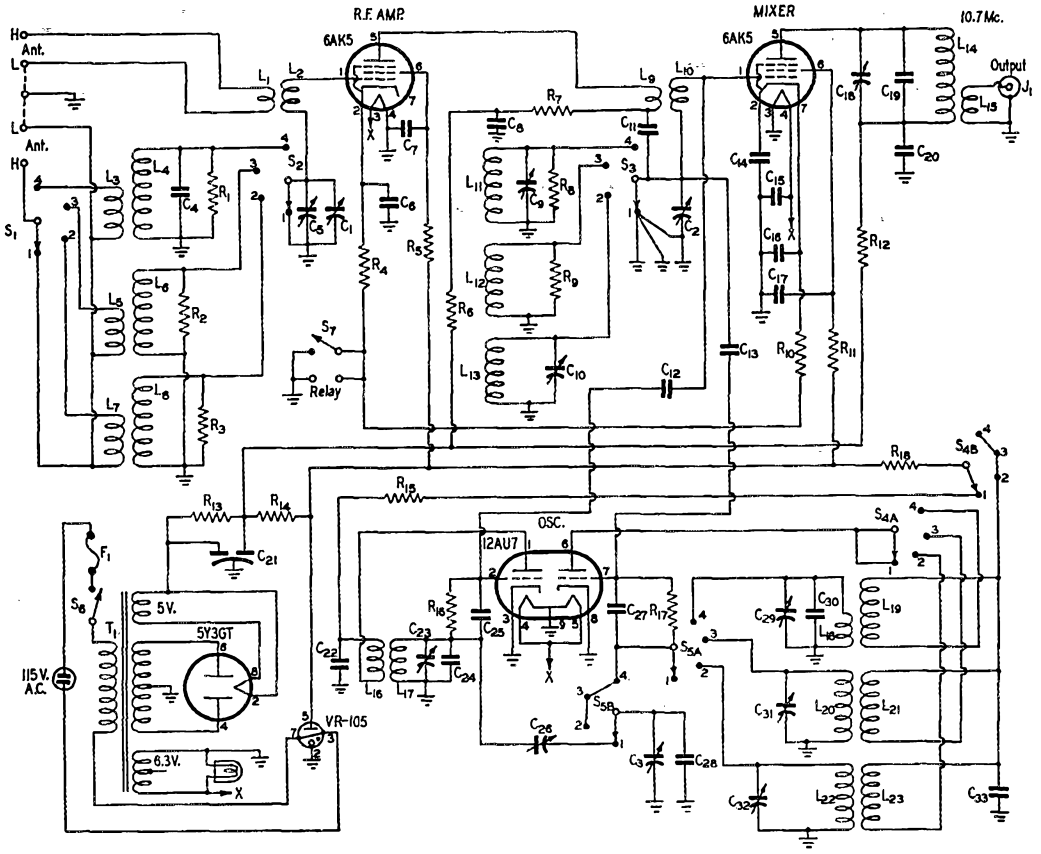


Fig. 1 — Circuit diagram of the W2IDZ converter.

C_1, C_2, C_3 — Millen 22035, reduced to one rotor and two stator plates.
C_4 — 33 $\mu\mu$fd. ± 10 per cent, mica.
C_5 — 35-$\mu\mu$fd. variable (Millen 22035).
C_6, C_7, C_{14}, C_{15}, C_{17}, C_{22} — 500-$\mu\mu$fd. button (Centralab 830S or Erie 370FF).
C_8, C_{33} — 470-$\mu\mu$fd. mica.
C_9, C_{18} — 7- to 45-$\mu\mu$fd. ceramic trimmer (Erie TS2A, N500).
C_{10}, C_{26} — 3- to 12-$\mu\mu$fd. ceramic trimmer (Erie TS2A, NPO).
C_{11}, C_{19}, C_{25}, C_{27} — 50-$\mu\mu$fd. silver mica.
C_{12} — 1 μfd. (Centralab CC20Z).
C_{13} — 2 μfd. (Centralab CC20Z).
C_{16}, C_{20} — 0.003-μfd. mica.
C_{21} — 20-20 μfd., 450 volts (Cornell Dubilier 2245).
C_{23}, C_{32} — 25-$\mu\mu$fd. trimmer (Hammarlund APC 25).
C_{24}, C_{28} — 2 $\mu\mu$fd. (Centralab CC20N).
C_{29} — 50-$\mu\mu$fd. trimmer (Hammarlund APC 50).
C_{30} — 70-$\mu\mu$fd. silver mica.
C_{31} — 35-$\mu\mu$fd. trimmer (Hammarlund APC 50 with two rotors and two stators removed).
R_1 — 15,000 ohms, ½ watt.
R_2, R_8 — 12,000 ohms, ½ watt.
R_3 — 33,000 ohms, ½ watt.
R_4 — 220 ohms, ½ watt.
R_5, R_{11} — 2700 ohms, ½ watt.
R_6, R_{12} — 2200 ohms, ½ watt.
R_7 — 20,000 ohms, 1 watt.
R_9 — 10,000 ohms, ½ watt.
R_{10} — 1000 ohms, ½ watt.
R_{13} — 560 ohms, 1 watt.
R_{14} — 10,000 ohms, 10 watts.
R_{15} — 820 ohms, ½ watt.
R_{16}, R_{17} — 47,000 ohms, ½ watt.
R_{18} — 1200 ohms, ½ watt.

L_1, L_7, L_{16}, L_{18}, L_{23} — 2 turns.
L_2 — 2¾ turns.
L_3, L_{21} — 3 turns.
L_4 — 8 turns.
L_5, L_{20} — 4 turns.
L_6 — 11 turns.
L_8 — 3½ turns.
L_9 — 1 turn.
L_{10} — 1¾ turns.
L_{11} — 9 turns.
L_{12} — 12 turns.
L_{13} — 3¾ turns.
L_{14} — 18 turns.
L_{15} — 5 turns.
L_{17} — ½ turn.
L_{19} — 5 turns.
L_{22} — 4¼ turns.

All coils above, except L_{14} and L_{15}, are made from B & W Miniductor, No. 3003. L_{14} and L_{15} are No. 3007. Coil assemblies having coupled windings are made by cutting one turn of the Miniductor and peeling back ½ turn in each direction, so that the leads come off the same insulating strip. Coil sizes, particularly for the two higher bands, are approximate, unless the original design is being followed in exact detail.

F_1 — 1-amp. fuse.
J_1 — Coaxial jack (Jones S-101).
S_1, S_2, S_3 — 1-pole 11-position shorting-type switch sections (Centralab Type U).
S_4, S_5 — 2-pole 5-position shorting-type switch sections (Centralab Type R).
S_6, S_7 — S.p.s.t. toggle switch.
All switch sections mounted on Centralab K-123 index assembly.
T_1 — Small receiver-type power transformer (Stancor P-4076).

Positions 2, 3, and 4 on the bandswitch are 50, 28, and 21 Mc., respectively. The two-meter coil is still in series, but C_1 and C_5 are then across the major portion of the inductance in use, and the tuning on these bands is conventional. C_5 is brought out to the front panel, so that the r.f. stage can be made to resonate regardless of the reactance introduced by the antenna. If the antenna is cut to the band in use, the circuit will track after C_5 is once peaked.

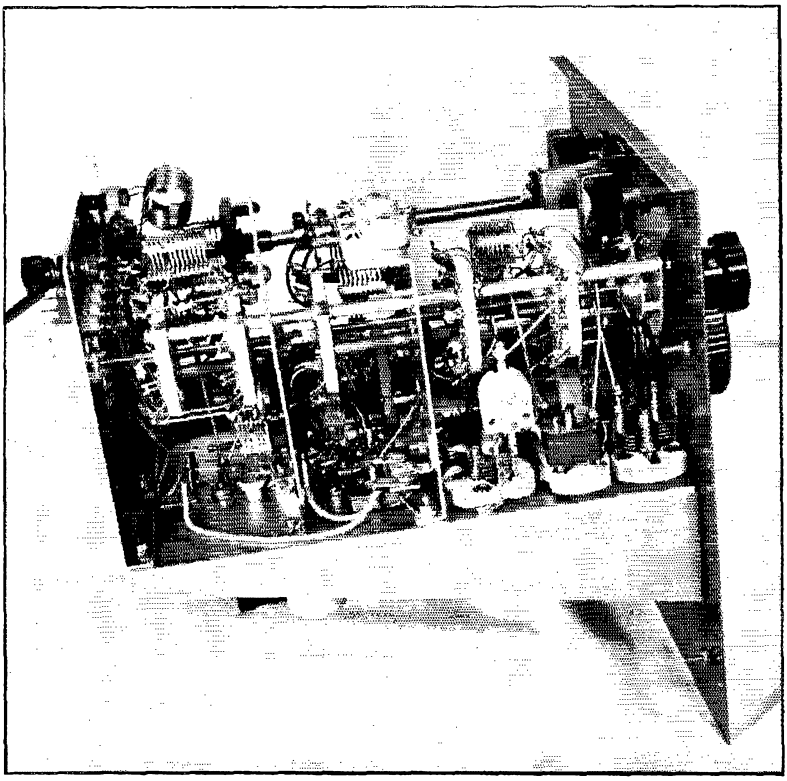
The antenna inputs are switched for 6, 10, and 15 meters, but the 2-meter input is brought out to separate terminals. The r.f. amplifier is operated at near maximum ratings and at full gain to get as much out of it as possible at 144 Mc. Under these conditions the gain is so great on the lower bands as to cause excessive regeneration, and it thus became necessary to reduce gain somewhat on these bands. Voltages could be lowered on the r.f. stage, but this would hurt performance on 144 Mc., so the Q of the lower-frequency coils was reduced with shunt resistors. This was also done on the 10- and 15-meter mixer grid coils. The gain on these bands was lowered to tame it only after all extraneous interstage coupling had been eliminated.

Interstage Coupling and Decoupling

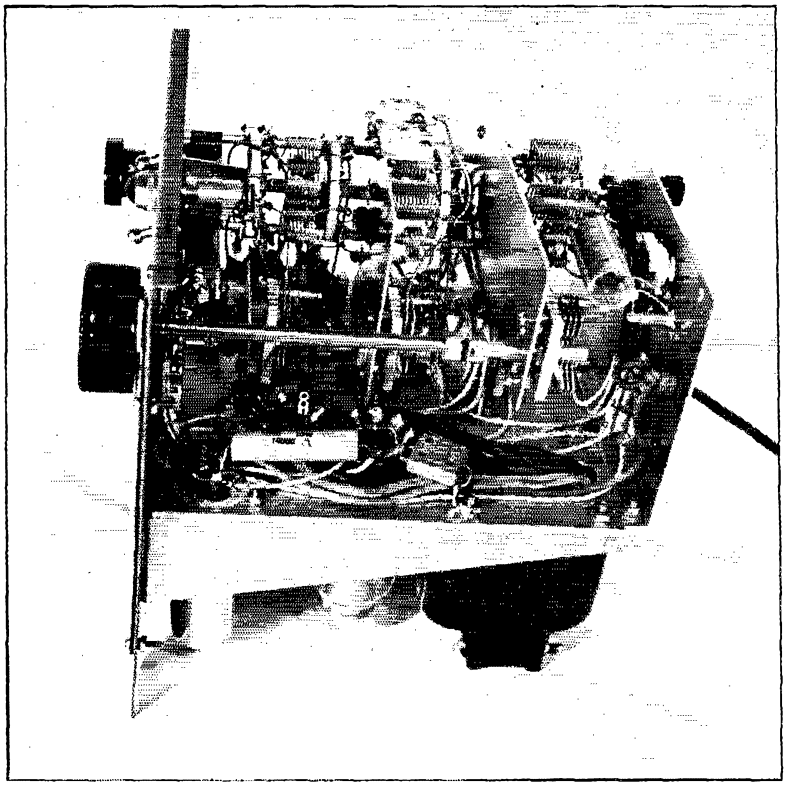
The high-frequency r.f. by-passing on the cathodes of both 6AK5 tubes is done with button condensers on Pin 2, rather than on Pin 7, as the internal suppressor connection is to Pin 2. Button-type by-passes were used wherever practical and the decoupling used is more than adequate. The layout is such that the wiring is kept clear of coils, and decoupling resistors have their cold ends as clear of fields as possible.

The coupling between the r.f. stage and mixer looks very peculiar at first glance, but upon further inspection the fog begins to lift. Transformer coupling is used on 144 Mc. to avoid as much capacity loading on the grid coil as possible, and to give more gain. C_{11} by-passes the cold end of L_9 to a low-impedance point. (The wiper of S_3 is very near ground potential.) R_7, C_8, and R_6 all become a decoupling network on two meters. On 50, 28, and 21 Mc. the added complication of transformer coupling would buy nothing, so capacity coupling is used and C_{11} becomes the coupling condenser. (The wiper of S_3 is at a high-impedance point now.) R_7 is a shunt-feed resistor; C_8 and R_6 are B+ by-pass and decoupling elements respectively. The multiple grounds shown on Terminal 1 of S_3 are just that. The L/C ratio on two meters was such that the inductance of S_3 and the shortest possible ground path were already too much inductance for proper tracking. This was reduced with multiple grounds from Terminal 1 to different points on the chassis.

It will be noticed that there is no trimmer condenser on the 10-meter mixer grid coil. This was omitted because the minimum C across L_{11}, L_{12}, and L_{13} is greater (due to strays from coupling of the r.f. stage and oscillator) than in the case of the r.f. grid coils. C_2 and L_{12} were made to self-



Bandswitch side of the W2IDZ converter. The oscillator section is nearest the front panel, the mixer in the middle and the r.f. amplifier section at the rear.



Interior of the bandswitching converter, viewed from the power-supply side. The coil assembly at the upper right is the mixer output transformer.

resonate and track on ten meters. Thus the maximum of C_2 is small enough so that tracking may be had on 50 Mc. without C_{10} becoming excessively large.

The h.f. and the i.f. signal both exist from the cathode of the mixer to ground and both frequencies must be effectively by-passed. C_{16} is the i.f. by-pass and C_{14} is the h.f. by-pass.

Separate 144-Mc. Oscillator

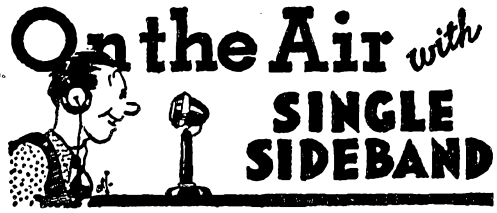
The high-frequency oscillator for such a converter presented the major problems of stability and reset accuracy. Too many converters shift frequency in the order of hundreds of kilocycles on 144 Mc. when the bandswitch is operated. This has been completely overcome by using a separate oscillator for this range.

One half of the 12AU7 (Terminals 1, 2, and 3) is the 144-Mc. oscillator. The tank is wired in place permanently, and the only switching is done by S_{4B} and S_{5B}. S_{4B} switches plate voltage from one oscillator to the other and is at r.f. ground potential, so no reset problems enter at this point. S_{5B} switches the oscillator tuning condenser C_3 from one oscillator to the other through the 144-Mc. bandspread adjusting trimmer, C_{26}. The major circulating currents of the 2-meter tank do not flow through this path, and switching here causes no reset difficulty. R_{18} is a decoupling resistor to prevent oscillator voltage from feeding back into the power supply. This resistor is mounted through the shield partition which is between the oscillator and mixer, so that its cold end is out of the field of the oscillator coils. This decoupling was adequate on lower bands but R_{15} was also needed on 144 Mc.

The other half of the 12AU7 (Terminals 6, 7, and 8) is the oscillator for the other bands, and is switched in a conventional manner. A large tickler winding is necessary because of the high-C design; also, the feed-back is not as much as it looks. The coupling between the tickler and the grid winding is not nearly as great when both windings are made of B & W Miniductor as is the case where the tickler may be interwound in one end of the grid coil. Excellent stability may be had using Miniductor coils in this manner. The Q is good, and the small amount of insulation gives less heat drift than any other method of support. They are stable enough mechanically to eliminate microphonics even at 144 Mc. C_{24} and C_{23} are negative temperature coefficient condensers to compensate for thermal drift.

The problem of injection from two different oscillators without additional switching was met by the method shown. C_{12} is a small injection capacitor for 144 Mc. C_{13} is the injection capacitor for 50, 28, and 21 Mc. Had C_{13} been connected to the mixer grid, it would have caused detrimental capacity loading on two meters. The wiper of S_3 is near ground potential at 144 Mc., so no harm is done. On lower bands it is at a high-impedance point, so we have proper injection on these bands. Do *not* use a pair of wires twisted together.

(Continued on page 118)



MOST of the dope this month is from England, where the faithful are continuing to do a good job. **G3FHL** and **G3FDG** have been quite helpful in getting new stations started, and they went to the trouble to mimeograph pertinent dope on the **W1JEO** crystal-filter job, for distribution among interested Gs who had no opportunity to see the original article. FHL has a new all-electronic voice-control system working, and **G3BQQ** and **G3AYJ** are two of the latest arrivals on s.s.b. **G3CU** has worked all of the active Gs he knows of, and also **OZ7T** and **SM5QV.** The phasing rig is still in use, but a W1JEO-type crystal job is currently under construction.

S.s.b. gets across the pond on 75 quite well, but it seems to be a one-way proposition so far. **G3CWC** reports hearing **W1GR, W2AZW, W2HMA, W2JJC, W2JN, W2SNQ, W3ASW, W3MBY, W4MXL, W9OHM, W9OUT,** and **W9PHV.** A check through the log at W2JN showed that the peak input power at the time he was logged in England was all of *1 watt!* G3CWC also reports that Norwegian **LA6J** is active on s.s.b.

Tom Holtby, **VE7VP,** spent a little time compiling statistics from his log for the past year, and learned that his bandswitching 75-, 20- and 10-meter s.s.b. rig had done fairly well. During 540 contacts he worked five countries on 75, twenty on 20, and six on 10. He had 28 QSOs with **VK2CP** and 5 with **VK7DH,** and says that VK2CP had over 600 contacts in 30 countries. And he ends his letter with a plea for more beat oscillator and more audio gain in receivers, so that they will do a decent job on single-sideband reception.

W2JJC, who passed along the dope from G3CWC, says that he has been on s.s.b. for almost a year, starting on 20 but moving up shortly to 75 and the voice-control gang. The rig is patterned after that of **W6DHG,** with some modifications for audio balance, and p.p. 813s in the final are run at a kw. peak. His voice-control system involves a quarter-wavelength stub that is shorted out during transmit and opened during receive, to permit using the same antenna for send and receive. (Along the lines of the article by Heihle, W2SO, in the November, 1949, *QST.*) Another relay in the screens of the 813s applies bias and kills the thermal noise in the amplifier. All continents have been worked on s.s.b., and the high-level a.m. modulators are collecting dust — it's single-sideband across the board now.

— *B. G.*

WWV-WWVH SCHEDULES

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

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

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

April 1926

. . . To interest broadcast listeners in amateur radio, Assistant Technical Editor John M. Clayton describes a simple 210-type transmitter that can be built for $24.50.

. . . One of the problems now facing amateurs is the development of satisfactory "wavechanging switches," according to J. K. Clapp.

. . . Loren G. Windom, 8GZ-8ZG, has worked from Ohio to Australia using a UV-199 in the transmitter!

. . . F. E. Handy, 1BDI-1XH, has been named ARRL Communications Manager, succeeding Fred H. Schnell who has resigned to join the C. F. Burgess Laboratories. Clark C. Rodimon, 1BIZ-1SZ, has joined the *QST* staff as assistant to Managing Editor F. Cheyney Beekley.

. . . Clayton Tanner, 9DCR, recommends using ammonium phosphate instead of borax in electrolytic rectifiers.

. . . The properties of a "unique" insulating material called "Isolantite" are reviewed by Austin C. Lescarboura and Technical Editor Robert S. Kruse.

. . . The Modesto (Calif.) Radio Club has built and dedicated a 20 × 40-foot clubhouse.

. . . At its annual meeting, the ARRL Board paid tribute to former Traffic Manager Fred H. Schnell, considered plans for a Hq. station and lab, and increased annual dues from $2.00 to $2.50.

. . . Peaked audio amplifiers are a boon to c.w. reception, states Technical Editor Robert S. Kruse.

. . . "The Making of a Single-Control Receiver" is the apt title of a forward-looking article by A. S. Blatterman.

Auditory Test Equipment

Measurement Techniques for the Blind Amateur

BY ROBERT W. GUNDERSON,* W2JIO

• Although presented primarily to assist blind amateurs and technicians, this article is jam-packed with test equipment short-cuts and ideas that can be applied profitably in any normal-sighted ham's shack.

THE lack of measuring equipment and technical literature in Braille has been the greatest obstacle in making amateur radio and other phases of electronics available to the blind. Within recent years the test equipment problem has been almost completely solved, and with such success that sighted technicians are evincing considerable interest in this equipment.

Measuring techniques for the blind involve the use of auditory methods, replacing the visual indications employed by sighted persons. In other words, voltage or current variations must be converted into nulls (absence of sound) or increases and decreases in the pitch of an audio-frequency signal produced in a headset. Our test equipment based on this principle now includes an ohmmeter, voltmeters for a.c. or d.c., milliammeter, field-strength meter, grid-dip meter, impedance bridge for measurement of capacity and inductance, other types of capacity-measuring devices, an electronic stroboscope, vacuum-tube voltmeter, r.f. ammeter, volume-level meter, carrier-shift indicator, and a modulation monitor.

The Ohmmeter

Our auditory ohmmeter, Fig. 1, is nothing more than the conventional Wheatstone bridge, using precision resistors as the "knowns" and a linear variable resistance as the calibrated control. The galvanometer, which is ordinarily the null indicator, has been replaced by a headset connected in series with the breaker points on a standard 2-volt synchronous vibrator. This vibrator serves merely as the interrupter, chopping the d.c. flowing through the 'phones so that the null may be noted. If precision components and a linear control are employed, the ohm scale will be linear, which is certainly an advantage when one observes the scale on the average d.c. ohmmeter.

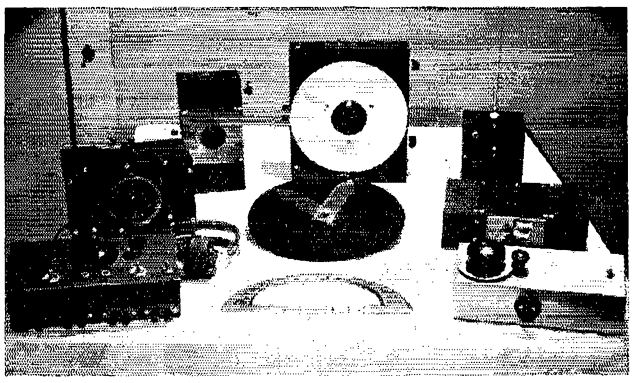
*980 Waring Ave., New York 67, N. Y.

The known resistors (used for R_3) are chosen in multiples of 10; i.e., 1, 10, 100, 1000, 10,000, 100,000, 1 megohm, 10 megohms, etc. They should be precision resistors. The dial of the variable arm on R_1 is divided into 10 equally-spaced divisions around the full rotation of the control. Therefore, if the null occurs at No. 5, and if the known resistor is 100,000 ohms, then the value of the unknown is 50,000 ohms.

In Fig. 1 R_2 is shown as a variable resistor. It could be a fixed resistor, of course, if it is exactly the same as the potentiometer, R_1. The proper setting of R_2, if it is a variable unit, can be determined by selecting two resistors of *exactly* the same value and connecting one of them in the R_3 position and the other across the terminals normally used for the unknown resistor to be checked. The setting of R_2 should then be adjusted for a null, with R_1 set at its maximum position.

D.C. Voltmeter

The d.c. voltmeter, Fig. 2, consists of a potentiometer and a multiplier, and may be designed to have any desired sensitivity, from a hundred ohms to values greater than 100,000 ohms per volt. The circuit is so arranged that there will be 1 volt across the entire potentiometer, R_1, and this voltage is tuned against the voltage across part of a multiplier. For example, if the sensitivity of the unit is to be 20,000 ohms per volt, the multiplier might have a 20,000-ohm resistor, plus 80,000 ohms connected across a voltage of



These devices make ham radio practical for the blind. Reading around the semicircle from left to right, they are a 2000-ohm-per-volt general-purpose volt-ohmmeter, a precision capacity checker reading down to 1 $\mu\mu$fd., an a.c. voltmeter, a volt-ohm-milliammeter with 100,000 ohm-per-volt sensitivity, a field-strength indicator, an r.f. ammeter, and a grid-dip meter. In the center are a Braille slide rule and a protractor.

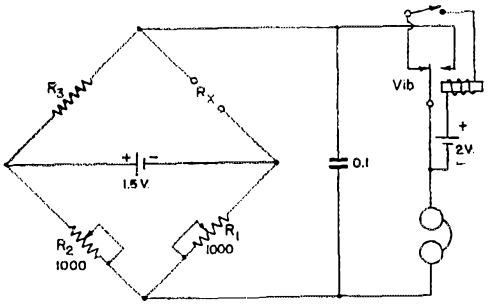


Fig. 1 — Ohmmeter. Known resistor values are inserted at R_3; see text.

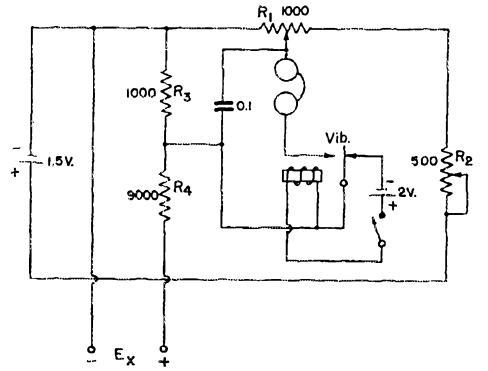


Fig. 2 — D.c. voltmeter. Values given are for a sensitivity of 1000 ohms per volt. R_3 and R_4 are precision resistors.

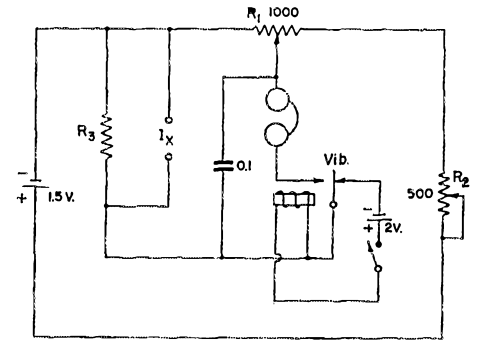


Fig. 3 — D.c. milliammeter. Value of R_3 depends on current to be measured.

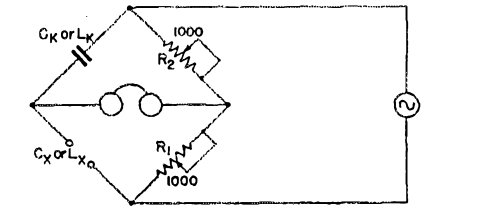


Fig. 4 — Capacitance or inductance checker. C_X or L_X is a capacitance or inductance standard.

5 volts. This means that 1 volt will be dropped across the first 20,000 ohms. This 1 volt is tuned against the voltage across the potentiometer, using the same null indicator as described previously. If there is a voltage of only 2.5 volts across the entire multiplier of 100,000 ohms, there will be only 0.5 volt across the first 20,000 ohms, and the null will occur with the arm of the potentiometer at the midpoint on the resistance element. The dial of the potentiometer, as before, is calibrated in 10 equally-spaced divisions around the full rotation of the pot, so that this midscale reading would be read as 2.5 volts, in terms of the total voltage across the multiplier. These two basic circuits are really not at all new; in fact they serve as the basis upon which your meter movements are calibrated.

D.C. Milliammeter

The d.c. milliammeter, Fig. 3, is much the same as the voltmeter. It, too, involves the tuning of the voltage drop across a known resistor against that of the potentiometer. If the potentiometer is so arranged with a series resistor across a battery, the voltage across it is 1 volt, and if the current through a 1000-ohm resistor is 1 ma., then the voltage across the resistor will null at the full-scale setting of the pot. Similarly, 10 ma. through 100 ohms, 100 ma. through 10 ohms, 1 ampere through 1 ohm, etc., will produce the same result. The null indicator here is also the vibrator and 'phones.

Inductance or Capacity Checker

The d.c. ohmmeter may be modified as in Fig. 4 to measure inductance or capacity by replacing the fixed resistors with a standard coil or condenser, and using an audio oscillator as the source of energy for the bridge. The null indicator is switched out, and the 'phones are simply connected center to center.

SCHEMATIC DIAGRAMS OF

Terminals for the unknown units are indicated by the sub
tentiometer, the indicating device carrying a Braille dial. Where

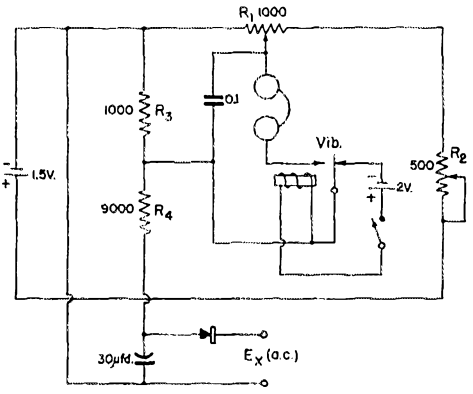


Fig. 5 — A.c. voltmeter (circuit of Fig. 2 adapted for a.c.). Use 1N34 for up to 25 volts; selenium unit for higher voltages.

A.C. Measurements

The d.c. voltmeter and ammeter may be adapted to read a.c. through the use of a diode or crystal rectifier connected between the a.c. source to be measured and the input of the voltmeter, as in Fig. 5. The output of this rectifier also works into a large condenser, so that the peak voltage of the line will appear across it. This means that the meter will become a peak-reading a.c. voltmeter. However, the meter can be recalibrated to read r.m.s. voltage by increasing the voltage across the pot through the decrease in the size of the series calibrating resistor between the potentiometer and the battery.

The rectifier may be a crystal diode, such as the 1N34, for voltages up to 25. For higher voltages a selenium rectifier should be used.

R.f. voltmeters and ammeters have been built up using full-wave bridge-type and single half-wave rectifiers, and they perform extremely well. The advantage with this particular system lies in the fact that the scale reading is linear, whereas the use of a thermocouple provides an I^2R relationship.

Our vacuum-tube voltmeter is really nothing more than the standard v.t.v.m. with the exception that the meter movement is replaced by the auditory milliammeter.

Other Capacity Checkers

While the bridge circuit does nicely for measuring condensers, we have come up with a simplified capacitance checker for checking small paper, ceramic and mica condensers. This device, shown in Fig. 6, consists of a relaxation oscillator employing a neon lamp, a resistor, a condenser decade, a headset, and a 90-volt battery. If it is desired to measure an unknown mica or paper condenser, the condenser is connected across the resistor and the pitch noted in the headset. Then

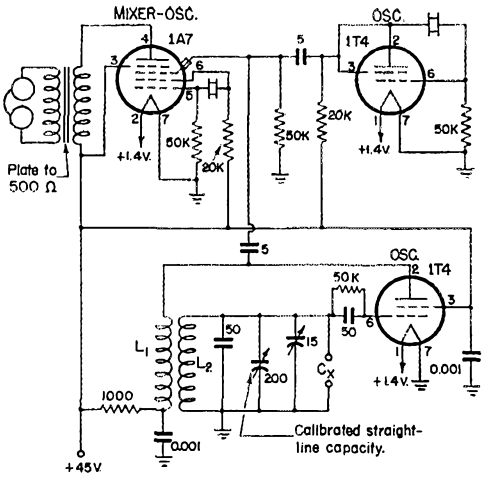


Fig. 7 — Precision capacitance checker for values up to 200 $\mu\mu$fd. The two crystals may be any frequencies about 1000 cycles apart. L_2 should resonate at the lower frequency with calibrated control at maximum.

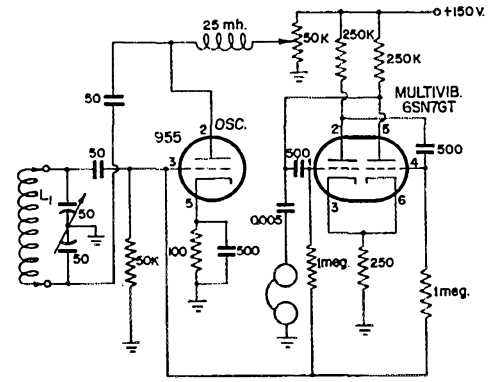


Fig. 8 — Grid-dip meter. L_1 is made plug-in for various frequency ranges.

BRAILLE TEST EQUIPMENT

script "x." R_1 in each case is a 1000-ohm linear wirewound po-
the main dial is on a variable condenser, it is indicated as C_1.

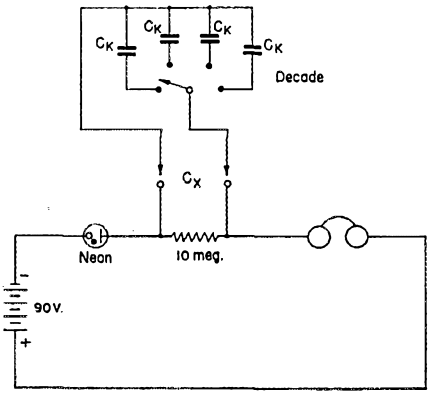


Fig. 6 — Capacity checker. Unknown is checked for pitch against a known value across terminals C_X.

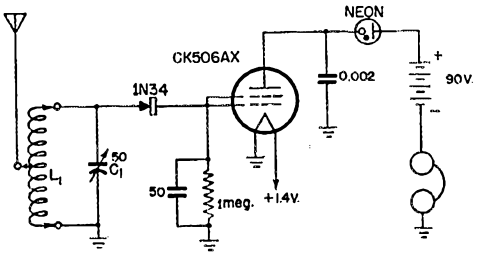


Fig. 9 — Field-strength meter. L_1 is made plug-in if more than one frequency range is wanted.

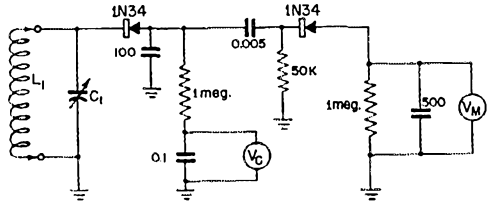


Fig. 10 — Carrier-shift and modulation monitor. Values of C_1 and L_1 depend on frequency of transmitter.

the decade is switched in, and the selector turned until the pitch nearest that of the "unknown" is found. While this will not give the exact value of capacitance, it will tell you whether the condenser has a value of between 100 and 200 $\mu\mu$fd., which is quite satisfactory for many applications. Further, leaky condensers will not oscillate, so that the device also checks for leakage resistance. This gadget will not check electrolytic capacitors.

Another capacitance checker which has been designed to measure small mica and ceramic condensers and to check their temperature coefficients is shown in Fig. 7. It consists of two crystal oscillators feeding into a common mixer, to produce an audio-frequency beat note. In addition, there is also a variable oscillator feeding this mixing circuit. The frequency of this oscillator is so chosen that it may be zero-beat with the lower-frequency crystal oscillator when the tuning condenser is practically maximum capacity. This means that a steady beat note will be produced by the two oscillators upon the higher-frequency crystal. When an unknown capacitor is to be measured, it is placed across the tank condenser, so that the capacity of the tuning condenser must be decreased by a given number of micromicrofarads equal to the unknown condenser to restore zero beat. Therefore, the tuning dial is calibrated in terms of the decrease in tuning condenser capacity in order to restore the zero-beat condition. If the condenser changes capacity, this may also be noted by a change in the frequency of the audio output signal.

The reader may ask why two crystal oscillators. The reason for this is the difficulty of observing zero beat by audio methods alone. For any accuracy it is necessary to have some visible indication, but even sighted workers find it possible to match tones with greater accuracy than can be attained conveniently with zero-beat methods.

The Grid-Dip Meter

Our grid-dip meter is not much different from that used by most amateurs except, of course, that it has no meter. The d.c. milliammeter as previously outlined may be employed, but this was discarded in favor of the arrangement shown in Fig. 8. The r.f. portion is similar to yours, but the dial on the dual 50-$\mu\mu$fd. variable is calibrated with 10 equally-spaced divisions around the 180 degrees rotation of the tuning condenser, and Braille charts of the dial readings *versus* frequency are made for the various coil sets.

The auditory indicator consists of a small multivibrator operating at some audio frequency. The bias for this multivibrator is supplied by the grid circuit of the r.f. oscillator, so that the change in the grid current of the oscillator changes the bias on the multivibrator and, therefore, varies the frequency of the vibrator, changing the pitch in the headset.

A Field-Strength Meter

The auditory field-strength meter is an invaluable gadget around any shack. As may be seen from Fig. 9, it is mainly a relaxation oscillator using a neon lamp. However, the resistance element consists of the plate-cathode circuit of a screen-grid tube, triode-connected. When using such a tube connected as a high-μ triode, with the screen and control grid tied together, the plate-cathode resistance is extremely high. This means that the pitch of the note in the headset will be very low; not more than a few beats per second. The control and screen-grids are connected to the output of a crystal rectifier and a tuned circuit, so that the rectifier will produce a positive bias on the grid. The greater this bias, the higher will be the pitch in the headset, since positive bias will decrease the resistance element in the relaxation oscillator circuit. This device will not only check resonance, loading and neutralization, but it will indicate either upward or downward modulation of the carrier of an amplitude-modulated 'phone station.

Carrier-Shift and Modulation Monitor

The carrier-shift meter and modulation monitor, Fig. 10, is really the a.c. and d.c. voltmeter associated with a tuned circuit, and a couple of rectifiers. First, the r.f. signal is rectified, and its average value is read on the d.c. voltmeter. If this voltage decreases with a sine-wave input to the speech system, we have a negative carrier shift, while if it increases, we have a positive carrier shift. The second rectifier reads the change in the audio content of the signal so that the percentage of modulation may be estimated quite closely by first measuring the voltage generated by the carrier and then the audio-frequency content across the output of the second rectifier, allowing for the slight voltage drop, of course. With 100 per cent modulation, the peak voltage will be equal to the voltage of the carrier, which means that the total voltage of the system has doubled.

An Electronic Stroboscope

Among the newest gear here at W2JIO is an electronic stroboscope, which consists of a photo cell and a light source so arranged that the only light reaching the cell is that which is reflected from the surface of the stroboscope card. The output of the cell is fed to an amplifier. When the turntable is properly adjusted, a 60-cycle note will be heard in the amplifier's output, and this is checked by beating the cell's output signal against the standard power-line frequency. If a beat exists, and if a drag applied to the turntable causes the frequency of this beat to increase, the table is slow. If the beat slows down and comes into line, the table is fast. Of course a discriminator may be used at the output of the system so that the speed may be read directly, but we have not found this to be necessary.

[EDITOR'S NOTE: The text you have just read was written by a *blind* amateur, for the benefit of those of us who can see to read it. But how would you make out with such information if you were deprived of sight? The author of the foregoing article is taking care of that, too, with his radio

(Continued on page 120)

"TVI-Proofing" the 10-Meter Transmitter

Harmonic-Reducing Techniques Brought Up to Date

BY PHILIP S. RAND,* W1DBM

In the May, 1948, issue of *QST* methods were described for TVI-proofing a push-pull 813 running at 600 watts.[1] The system has proved so successful that no changes or adjustments, even to the plate traps, have been made since about March, 1948. Here it is 1951 and the rig is still working, soldered up in its copper-screening "bird cage." The harmonic output is so low, in fact, that television programs may be watched on a 10-inch RCA Anniversary model TV receiver which is directly connected to the 10-meter r.f. feed line. The 10-meter beam is simultaneously used for both transmitting on 28.8 Mc. and receiving TV programs. Yes, reread the last sentence, "simultaneous 10-meter transmission and TV reception using one and the same 10-meter antenna." The only additions were a low-pass filter on the transmitter and a high-pass filter on the receiver!

This is mentioned simply for the purpose of pointing out that harmonic-type TVI can be licked 100 per cent, and also that the methods for doing so have been available since 1948.

In December, 1948, *QST*[2] it was pointed out that vacuum condensers were of great help in reducing the generation of harmonics in a 14-Mc., a 21-Mc. and a 3.5-Mc. transmitter. It was later discovered[3] that vacuum condensers also greatly reduced the tendency for parasitic oscillation. Many letters were received asking about the use of the then-available 50-$\mu\mu$fd. surplus vacuum condensers on 28 Mc. A transmitter using them was started in 1949 but had to be dropped when partially completed due to press of other activities. During 1950 an investigation into harmonic generation and reduction pointed an ugly finger of suspicion at conventional-type variable tank condensers, especially those that were large in physical size. This was reported in February, 1951, *QST*.[4] It was decided, therefore, to complete the vacuum-condenser rig to test these theories further. A description of this amplifier, which has since been to installed at the Norwalk Red Cross headquarters where it operates on 29,680 kc. as the control station for emergency work, follows.

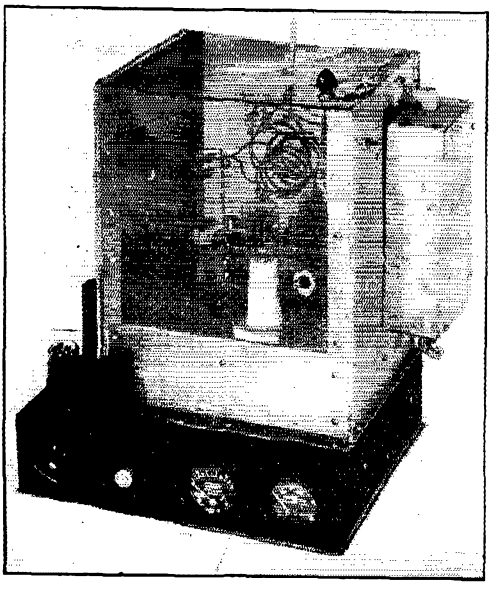
* % Laboratory of Advanced Research, Remington Rand, Inc., So. Norwalk, Conn.

[1] Rand, "TVI Can Be Reduced," *QST*, May, 1948.

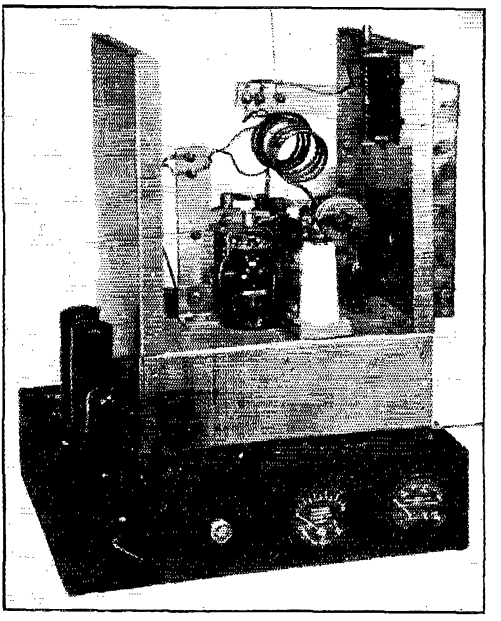
[2] Rand, "More on TVI Elimination," *QST*, December, 1948.

[3] Grammer, "Pointers in Harmonic Reduction," *QST*, April, 1949.

[4] Rand, "Don't Pamper Your Harmonics," *QST*, February, 1951.



The "TVI-proof" 10-meter rig uses a pair of 1625s in push-pull, enclosed on a screened compartment mounted on a 10 by 12 by 3 chassis. The speech amplifier and modulator are located along the left-hand edge.



The 10-meter amplifier with the screening removed. Coupling between coils is varied by means of rods that project through the shielding. The disc-type tuning condenser is similarly adjusted by an insulated tool.

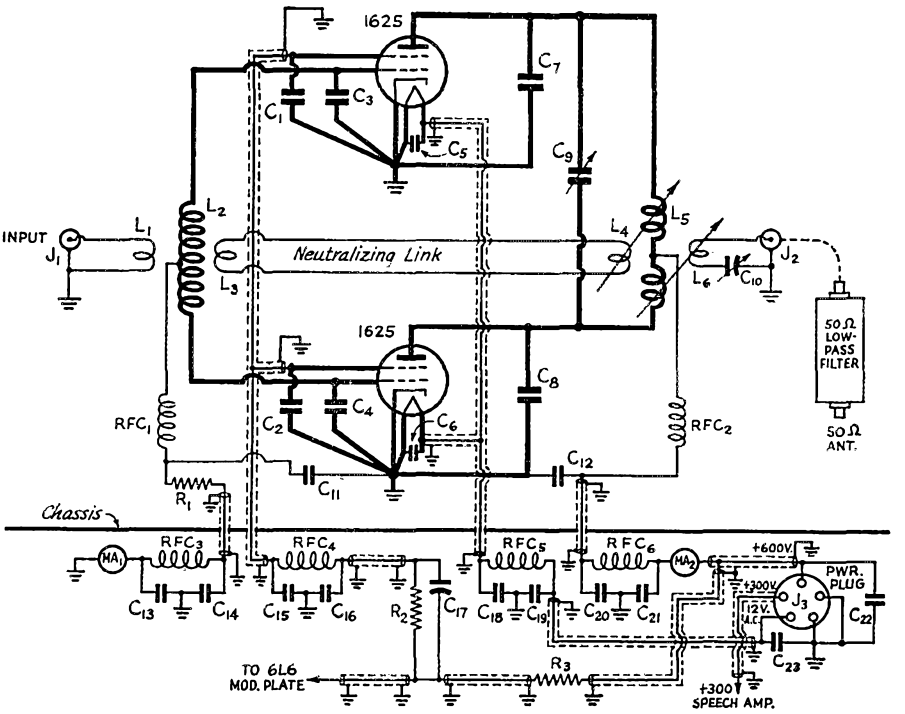


Fig. 1 — Circuit diagram of the 28-Mc. amplifier.

C_1, C_2, C_5, C_6, C_{11}-C_{16} inc., C_{18}-C_{23} inc. — 0.001-μfd. mica.
C_3, C_4 — 50-$\mu\mu$fd. mica.
C_7, C_8 — 50-$\mu\mu$fd. vacuum type.
C_9 — Disc-type neutralizing condenser, app. 1–5 $\mu\mu$fd.
C_{10} — 50-$\mu\mu$fd. variable.
C_{17} — 1-μfd. paper.
R_1 — 8000 ohms, 1 watt.
R_2 — 20,000 ohms, 2 watts.
R_3 — 10,000 ohms, 25 watts.
L_1 — 1 turn hook-up wire, diameter 1¼ inches.
L_2 — 8 turns No. 12, diameter 1¼ inches, length 2¼ inches (see text).
L_3 — 1 turn hook-up wire, diameter 1¼ inches.
L_4 — 1 turn hook-up wire, diameter 1½ inches.
L_5 — 6 turns ⅛-inch copper tubing, diameter 1½ inches, length 3 inches.
L_6 — 2 turns hook-up wire, diameter 1½ inches.
J_1, J_2 — Coax socket.
J_3 — Power socket, 5 prong.
MA_1 — 0–10 milliammeter.
MA_2 — 0–200 milliammeter.
RFC_1 — 2.5-mh. r.f. choke.
RFC_2 — 1-mh. r.f. choke.
RFC_3-RFC_6, inc. — 7-μh. r.f. choke (Ohmite Z-50).

Circuit

Close examination of Fig. 1 will show that the actual circuit is more or less conventional, but that the layout and the particular components used are far from conventional:

1) The variable tank condenser has been replaced by a pair of vacuum condensers.

2) All wires carrying r.f. have been replaced by half-inch-wide copper strips, as short as possible.

3) All by-pass condensers have leads no longer than ¼ inch, are of small physical size, and are soldered directly between the cathode and the socket pin they by-pass.

4) Inductive link neutralization is used.

5) All wires carrying a.c. or d.c. are enclosed in individual shielding.

6) All hot r.f. circuits are kept in separate shielded compartments.

7) All leads are filtered before leaving the chassis.

8) A low-pass filter is permanently installed in the output.

9) Coax fittings are used for all r.f. connections to keep r.f. on the inside.

10) High-*C* fixed tuned circuits are used.

11) Moderate grid bias and grid drive are used.

12) Complete shielding is used.

13) All circuits were thoroughly checked with a grid-dip oscillator for spurious resonances.[4]

14) No harmonic plate traps or parasitic suppressors are used.

A study of the photographs will reveal some of the mechanical construction details. For example, the copper screening should overlap both chassis by at least one inch and should be attached with 6-32 screws spaced no more than 1½ inches apart. The four shielded leads from the r.f. chassis enter the bottom chassis through a small socket hole directly under and between the two 1625 sockets. The four lead filters are arranged like the spokes of a wheel around this hole.

The grid coil is wound with No. 12 copper wire

and soldered directly with short leads to the two grid pins. It is tuned by spreading or squeezing the turns for resonance, as indicated by a grid-dip oscillator tuned to 29.5 Mc. This allows for operation, without further adjustment, from 28.5 to 29.7 Mc., providing the grid drive is increased at the low end.

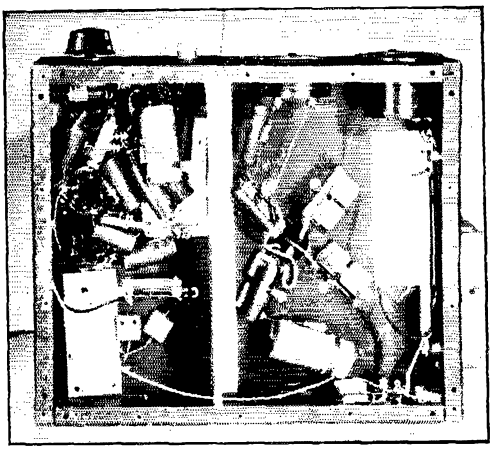
The plate coil is wound with ⅛-inch copper tubing and is supported by two ceramic stand-off insulators. It is tuned with the grid-dipper to 29.7 Mc. by squeezing the turns, with the small disc trimming condenser set at minimum capacity. It can then be tuned with this condenser all the way down to 28.5 Mc. quite easily.

Half-inch-wide copper straps are used to connect the 1625 plate caps to the vacuum condenser, the coil, and the trimming disc condenser.

The two swinging link assemblies for neutralizing and antenna coupling are made of polystyrene strips, ¼ by 1 inch, of the length necessary to fit the mechanical layout. They are provided with short lengths of ¼-inch diameter polystyrene rod for adjustment from outside the cabinet. They are hinged at one end by bolting to a small aluminum angle, and have their respective coils attached to the other end with 6-32 screws.

The small 50-$\mu\mu$fd. antenna loading condenser, used to cancel out the inductive reactance of the antenna coil, is mounted right alongside the output coax connector at the top of the cabinet.

The low-pass filter, assembled from a kit, is held in place with four 6-32 screws, two at each end, to ensure good grounding.



The speech circuits are isolated from the r.f. filters, underneath the main chassis, by a shield partition running the depth of the chassis. All supply leads to the r.f. stage are filtered at the point where they go through the chassis to the amplifier unit. The power socket also is thoroughly by-passed.

Modulation

Normally, n.f.m. is used as it has tremendous advantages so far as BCI and TVI are concerned. However, a 6L6 is provided for screen grid a.m. modulation when talking to mobiles. Fig. 2 shows the circuit diagram of a 12.6-volt filament speech amplifier/modulator. It will be noted that ample decoupling and filtering are used, not only to prevent r.f. feed-back from the 75-watt final on the

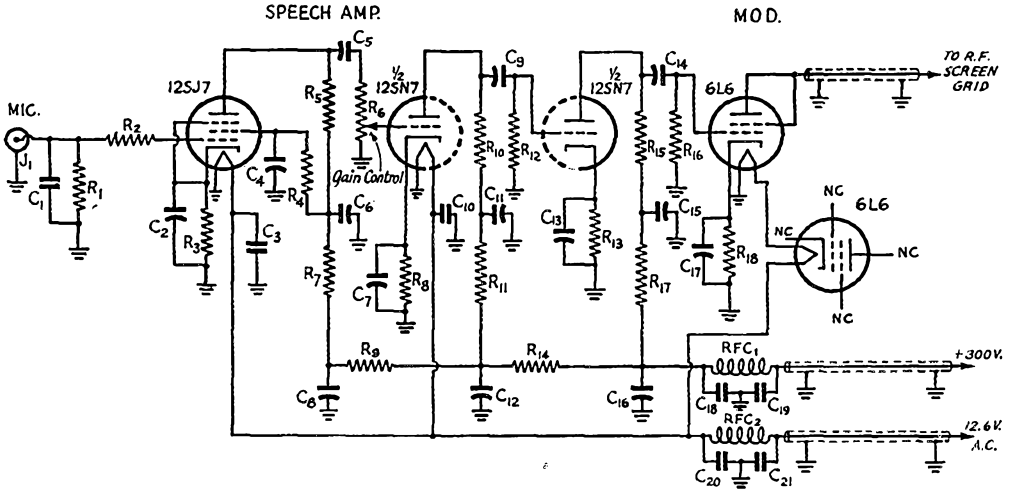
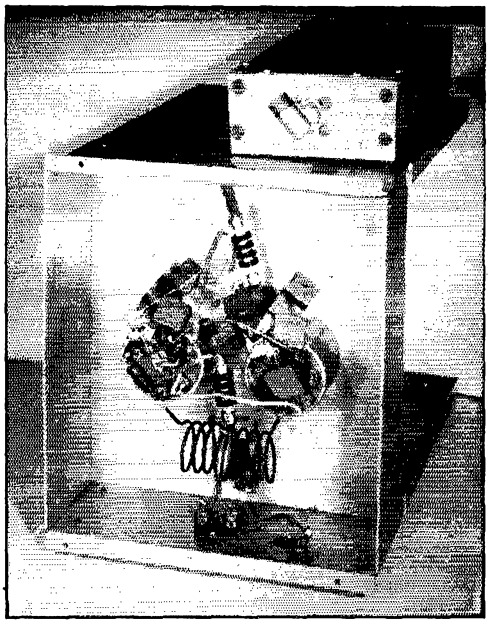


Fig. 2 — Circuit diagram of speech amplifier and screen modulator.

C_1 — 100-$\mu\mu$fd. mica.
C_2, C_7, C_{13} — 5-μfd. electrolytic.
C_3, C_{10}, C_{18}, C_{19}, C_{20}, C_{21} — 0.001-μfd. mica.
C_4 — 0.5-μfd. paper.
C_5, C_9, C_{14} — 0.01-μfd. paper.
C_6 — 8-μfd. electrolytic, 450 volts.
C_8, C_{11}, C_{12}, C_{15}, C_{16} — 4-μfd. electrolytic, 450 volts.
C_{17} — 10-μfd. electrolytic.
R_1 — 5 megohms, 12 watts.
R_2 — 75,000 ohms, ½ watt.
R_3, R_8, R_{13} — 2000 ohms, ½ watt.
R_4, R_{12}, R_{16} — 1 megohm, ½ watt.
R_5 — 0.25 megohm, ½ watt.
R_6 — 1-megohm potentiometer.
R_7, R_9 — 50,000 ohms, ½ watt.
R_{10}, R_{15} — 0.1 megohm, 1 watt.
R_{11} — 10,000 ohms, ½ watt.
R_{14} — 5000 ohms, ½ watt.
R_{17} — 1000 ohms, ½ watt.
R_{18} — 1000 ohms, 1 watt.
J_1 — Microphone connector.
RFC_1, RFC_2 — 7-μh. r.f. choke (Ohmite Z-50).



By-pass condenser leads are kept as short as the size of the condensers will permit, as shown by this under-chassis view of the amplifier.

same chassis but also to prevent a BCI type of interference from a two-meter transmitter that operates simultaneously three feet away at the Red Cross headquarters. On a previous rig, the 145-Mc. audio could be heard louder on the 10-meter circuit than the 10-meter audio. The second 6L6 was used simply to take care of 12-volt heater operation, several being available. A series resistor could be substituted for one of them if desired. For more complete information on screen grid modulation see *QST* for March, 1950.[5] This rig, of course, could be plate-modulated if desired.

Exciter

The drive requirements for this 75-watt amplifier are very modest. Grid current of about 5 ma. is recommended and is easily supplied by a single 6AQ5 running at 200 volts and 25 milliamperes. The drive should be from a straight-through neutralized amplifier with tuned grid, tuned plate and link coupled, using coax complete with the necessary fittings. It should also, of course, be free from harmonics. A good clean final amplifier can be completely ruined by the exciter, as has been pointed out so many times in the past. The exciter used to drive this final is similar to "The Little Slugger," described in February, 1949, *QST*.[6] The same general techniques are used in wiring and building the exciter as in the 1625 final, using shielded wire for a.c. and d.c. wiring, filtered leads, complete shielding, etc.

Antenna

The antenna used at the Red Cross on this rig is a vertical ground plane fed with RG-8/U coax although the rig works equally well on any antenna matched for use with 52-ohm coax. It is only necessary to measure the standing-wave ratio to be sure it is low so that the low-pass filter will work properly. When using an antenna fed with 300-ohm ribbon it will be necessary to use an antenna coupler adjusted to give a flat line between the transmitter and the coupler.[7] This latter method is used when feeding my 300-ohm 10-meter beam.

Power Supply

Almost any power supply may be used that will give between 500 and 750 volts at 150 ma. Of course, an a.c. line filter should be installed in the power supply.

Neutralizing

When using link neutralization, neutralizing is about the quickest and simplest part of tuning up. It is only necessary to couple a crystal-diode wavemeter tuned to 10 meters to the final tank and then slowly push the neutralizing link into the tank coil. If the meter reading increases, reach in and twist the one-turn link around 180 degrees and try again. The correct setting is that at which the reading is lowest. The rig described neutralizes with the link about one-tenth of the way into the tank coil. During this operation the grid drive and filaments should be on but the plate and screen voltages should be off. That's all there is to it.

[5] Technical Topics, "Clamp-Tube Modulation," *QST*, March, 1950.

[6] Rand, "The Little Slugger," *QST*, February, 1949.

[7] Technical Topics, "Adjusting the Antenna Coupler and Harmonic Filters," *QST*, August, 1949.

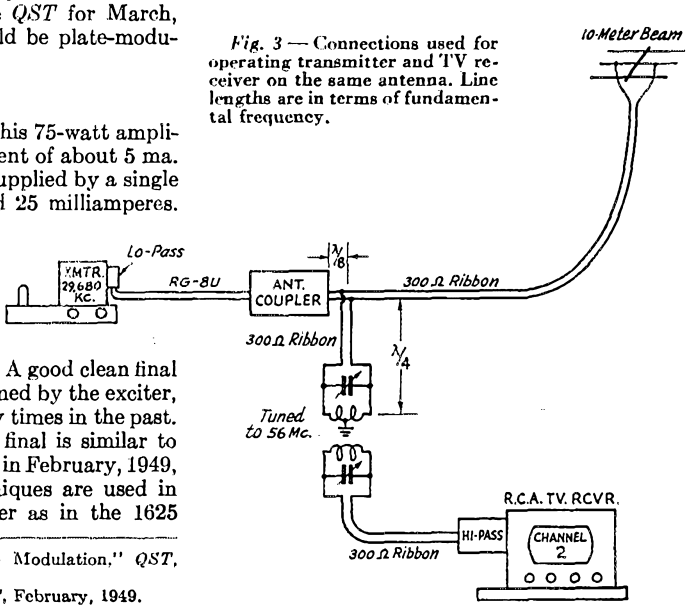


Fig. 3 — Connections used for operating transmitter and TV receiver on the same antenna. Line lengths are in terms of fundamental frequency.

♦

This picture of the TV screen was taken with the transmitter delivering full power into a 28-Mc. antenna to which the TV receiver also was connected.

♦

Tuning Up

Do not operate the transmitter without a 50-ohm resistive load on the output of the low-pass filter or you may pop something.

For initial tuning up, couple a 25-watt lamp with several turns of hook-up wire to the final tank coil. You should be able to light it brightly. Adjust the disc trimmer for exact resonance, but remember that the setting will not be the same when working into the antenna. After you are through testing, put on your copper screening, recheck the neutralization, connect the antenna, and adjust the coupling link and tuning for optimum signal strength with a field-strength meter. Touch up the final tuning and if you have a 'scope, check the percentage of modulation. For best modulation on the 'scope you may have to try several values of grid current, antenna coupling and screen voltage. Screen modulation, while more economical than plate modulation, is fussier to tune up.

Results

As for results, the photograph of Channel 2 being received on the same 10-meter antenna into which the transmitter is pouring r.f. probably tells the story better and more dramatically than ten thousand words or whatever the Chinese proverb is. As for signal-strength reports, they run only about 1 to 1½ S-units less than my 600-watt rig, which is about right at 6 db. per S-unit. Six hundred watts is only a little more than 9 db. greater than 75 watts. Fig. 3 shows the method of coupling the TV set to the transmitter feeders.

HAMFEST CALENDAR

ARKANSAS — Sunday, April 22nd, at the Armory, Little Rock — gala Hamfest. Everyone invited. For last-minute dope contact Dr. John L. Stockton, W5DRW, P.O. Box 302, Siloam Springs, Ark.

CALIFORNIA — Saturday, April 28th, at the Fresno Memorial Auditorium — annual Hamfest of the Fresno Amateur Radio Club, Inc. Dinner, entertainment, and the usual hospitality will highlight the program. Tickets, $3.75 each, available from Treasurer S. R. Weber, 3550 West Franklin Road, Fresno, Calif.

NEW JERSEY — Saturday evening, April 21st, in the grand ballroom of the Hotel Stacy-Trent, Trenton — 7th Annual Old Timers' Nite Round-up and Banquet of the Delaware Valley Radio Assn. Turkey dinner will be served promptly at 6:30 o'clock. Program includes talks by well-known radio personalities. Bring your oldest commercial or amateur tickets as awards will be made to those with the earliest dates, including a special award to the "Grand OM" in attendance. W2ZI's collection of old-time wireless gear will be on display. Reservations may be obtained before April 17th from General Chairman Ed. G. Raser, 315 Beechwood Ave., Trenton 8, N. J., at $5.00 per person. Tickets purchased at the door will be $6.00. Plan to bring as many guests as you wish; clubs and groups should request special seating arrangements well in advance. As in the past, the party will be stag.

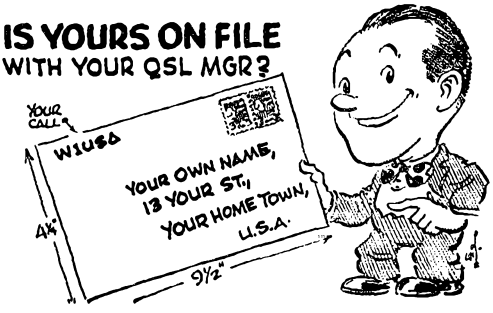
WISCONSIN — Saturday, April 21st, at the Youth Building, Wausau — annual Hamfest and Banquet of the Wisconsin Valley Radio Association. Starting at 6 P.M., a well-rounded program has been arranged, featuring an excellent banquet, entertainment, and hamfesting galore. Scheduled for 3 P.M. is a Wisconsin Section meeting of League appointees, including membership of the 'phone and c.w. nets. Please make reservations in advance to assist with meal plans. Tickets, $2.75, available from Lawrence Lapinske, W9EWM, P.O. Box 179, Wausau, Wisc.

Strays

In the expectation that a number of W and VE hams will be taking in the "Festival of Britain" this year, invitations have been extended as follows:

The RSGB London Members Luncheon Club welcomes visiting amateurs to its meetings at the Kingsley Hotel, Bloomsbury Way, London W. C. 1, starting at 12:30 P.M. on April 20th, May 18th, June 15th, July 20th, August 17th, September 20th, October 19th, November 16, and December 20th. Arrangements to attend as a guest may be made by 'phoning Secretary G2FUX at Ruislip 2763 or by contacting any RSGB or London member.

The Cardiff RSGB members are sponsoring an exhibit at the Welsh Industries Fair, Cardiff, from July 4th to 14th. Visiting amateurs are assured a cordial welcome, including sightseeing and visits to the shacks of GW hams. If interested, write Graham F. Wilson, GW3BZH, 120 Cardiff Road, Llandaff, Cardiff, Wales.



Happenings of the Month

BOARD MEETING

On May 11th and 12th, the men you fellows have nominated and elected to the Board of Directors to represent you in the government of League affairs will hold their 1951 annual meeting. The members of the Board will have received and studied the annual reports of the officers and their fellow directors; from their travel and correspondence and on-the-air activities during the past twelve months they will have gathered the opinions of members in their divisions. Around the table, League and general amateur affairs will be discussed, problems aired, solutions offered; motions will be made, to be adopted if they meet the majority approval of the Board, to be rejected if they do not. Now is the prime opportunity during 1951 for you or your club to express views on matters of the day to your director. His address is on page 8 of this issue of *QST*.

At press time we have advance notice of several proposals which will be made this year. The Great Lakes Division will move the amendment of paragraph 10 of Article IV of the Constitution to add two directors to the Executive Committee, presently composed of the five officers of the League. Director Brabb will also reintroduce his 1950 motion to amend paragraph 3 of Article IV of the Constitution to the end of denying the Canadian General Manager a voice in matters of U. S. regulations. The Midwest Division will propose that the League request FCC to open to n.f.m. all frequencies available for telephony. The Pacific Division will propose the shift of Mono County, California, from the Southwestern to the Pacific Division.

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To succeed former Director Doyle as chairman of the Membership and Publications Committee, the President has named its senior member, Director John R. Griggs, W6KW, and completed the committee with the appointment of Director Walter Bradley Martin, W3QV. To succeed former Director Key on the committee to study the advisability of three new standing committees, Director Canfield, W5BSR, has been appointed. Director Joseph Johnston, W2SOX, becomes the new member of the Constitution Revision committee in place of Director Collett, resigned.

WATCH YOUR EXPIRATION

Nearly one-half of present amateur licenses expire during 1951. Check the expiration date on yours *now* and arrange to apply for renewal sometime in the 120 days preceding expiration date. See the story on regulations in our last issue for revised renewal requirements.

MIDWEST DIVISION DIRECTORSHIP

Leonard Collett, WØDEA, director from the Midwest Division since January, 1948, has left for Wake Island to accept a new assignment with the Civil Aeronautics Administration, and as of March 1st turned over the duties and responsibilities of the Midwest Division directorship to his alternate, Alvin G. Keyes, WØKTQ, until further notice. The new Acting Director has had considerable experience in the affairs of the division; he is now serving his second term as alternate, and he was a member of the sponsoring committee for the 1947 division convention in Cedar Rapids. An attorney, he has served as president of the Iowa Junior Bar Association and on the executive committee of the state bar association. As for WØDEA, you'll undoubtedly be hearing a new KW6 call soon; but as *Midwest Clix* said, the division won't seem the same without him.

STERLING SCORES TV RECEIVERS, PRAISES AMATEURS

At an industry gathering in Cleveland in January, FCC Commissioner George E. Sterling, W3DF, delivered an address dealing with the interference problems of industrial, scientific and medical equipment, in the course of which he took opportunity to point out the Commission's awareness of the inadequacy of design and construction of TV receivers. After calling attention to the seriousness of the problem of oscillator radiation, he continued:

> But oscillator radiation is not the only interference that originates from the operation of a TV receiver. Manufacturers must do something immediately concerning the interference that results from the harmonics of 15.75 horizontal sweep frequency and video circuits. This form of interference was not serious in the earlier TV sets but has increased considerably within the year as some manufacturers cut down on shielding and filtering to meet a competitive market. Not all current models are offenders. Radiation of harmonics and hash from TV receivers interferes with airports, commercial circuits and the amateur service and sometimes even broadcast service. Tune across the standard broadcast band sometime and listen to the "beeps" and "hash" from your own or neighbors' TV receivers.
>
> One of the greatest contributions to the art and industry during the past two years in the suppression of radiation by filtering and shielding has been made by the amateurs as they sought ways and means of operating their transmitters without causing interference to TV reception. Several years ago the Commission determined that the operation of the amateur service was in the public interest, and it was only last week that the Commission in collaboration with the Director of Civilian Defense and the Military provided an allocation of frequencies for use by the amateurs for Civilian Defense.
>
> If your city or any other city in the country were attacked tonight and communication were disrupted the

amateur service would be the first to provide emergency communication as they have done throughout the Nation for years in times of floods, hurricanes and other disasters. Their frequencies and the frequencies of other services must be kept free of the hash and other emissions radiated by poorly shielded and filtered TV receivers.

If this is not done, Commissioner Sterling indicates, it may be necessary for FCC to "take drastic action."

WHAT BANDS AVAILABLE?

Below is a summary of the U. S. amateur bands on which operation is permitted as of March 1st. Any future changes will, as usual, be announced by W1AW bulletins. Figures are megacycles. AØ means an unmodulated carrier, A1 means c.w. telegraphy, A2 is m.c.w., A3 is a.m. 'phone, A4 is facsimile, A5 is television; n.f.m. designates narrow-band frequency- or phase-modulated radiotelephony; and f.m. means frequency modulation, 'phone (including n.f.m.) or telegraphy.

3.500–	4.000	— A1
3.800–	4.000	— A3, Advanced Class (Class A) only
3.800–	3.850	— n.f.m., Advanced Class only
7.000–	7.300	— A1
14.000–	14.400	— A1
14.200–	14.300	— A3, Advanced Class only
14.200–	14.250	— n.f.m., Advanced Class only
26.960–	27.230	— AØ, A1, A2, A3, A4, f.m.
28.000–	29.700	— A1
28.500–	29.700	— A3
28.500–	29.000	— n.f.m.
29.000–	29.700	— f.m.
50.0	–54.0	— A1, A2, A3, A4, n.f.m.
52.5	–54.0	— f.m.
144	–148	— AØ, A1, A2, A3, A4, f.m.
220	–225 [1]	— AØ, A1, A2, A3, A4, f.m.
420	–450 [2]	— AØ, A1, A2, A3, A4, A5, f.m.
1,215	– 1,300	— AØ, A1, A2, A3, A4, A5, f.m.
2,300	– 2,450	AØ, A1, A2, A3, A4, A5, f.m., Pulse
3,300	– 3,500	
5,650	– 5,925	
10,000	–10,500	
21,000	–22,000	
All above 30,000		

[1] Until January 1, 1952, FCC may order this band vacated in certain areas if it is required for distance-measuring equipment; in which case, amateurs in such areas only may employ 235–240 Mc. in lieu thereof.

[2] Peak antenna power must not exceed 50 watts.

In addition, portions of 1800–2000 kc. subject to restrictions as shown; either A1 or A3:

Area	*Band, kc.*	*Power (watts) Day*	*Night*
Mississippi River to East Coast U.S. (except Florida and states bordering Gulf of Mexico)	1800–1825 kc. 1875–1900 kc.	500	200
Mississippi River to West Coast U.S. (except states bordering Gulf of Mexico)	1900–1925 kc. 1975–2000 kc.	*500	*200
Florida and states bordering Gulf of Mexico	1800–1825 kc. 1875–1900 kc.	200	No operation
Puerto Rico and Virgin Islands	1900–1925 kc. 1975–2000 kc.	500	50
Hawaiian Islands	1900–1925 kc. 1975–2000 kc.	500	200

*Except in State of Washington where daytime power limited to 200 watts and nighttime power to 50 watts.

NATIONAL CONVENTION

Get out that red pencil to circle the numbers 27, 28 and 29 in your July, 1951, calendar. Those are the dates for the ARRL National Convention, which the boys in Seattle are at present hard at work planning for you. Make your vacation plans now!

BAILEY ELECTED A.F.C.A. DIRECTOR

Long interested and active in the affairs of the Armed Forces Communications Association, ARRL President George W. Bailey, W2KH, has now been elected to its Board as a national director, with a term until 1954. The President of the League was also recently honored by appointment as civilian advisor to the Director of Selective Service, to serve as a permanent member of the Special Advisory Committee in the Engineering Sciences.

PUBLICITY INCIDENT

A page one story in the February 9th *New York Times* implying U. S. amateurs were interfering with military communications in Korea was picked up by wire services and published in other newspapers throughout the country (and later in a national weekly newsmagazine). Immediate contact by Hq. with Washington disclosed that MARS officials were already investigating; shortly thereafter, the Department of the Army held a special press conference to point out that Army tank sets use channels adjacent to amateur bands and that the frequency used by the tank unit "just happened" in this instance to be in the amateur band, so that an amateur signal was heard in the receiver. The Department indicated it was not concerned over the matter. Reply to the story was sent the *Times* by President Bailey, published in the February 19th edition. Graciously, the *Times* further devoted a Sunday edition feature story to the achievements of amateur radio, its civil defense planning, etc.

HOUSING AUTHORITY RULES

Occasionally an amateur living in a housing project has run into difficulty in securing permission to erect an antenna mast. Responsive to ARRL Board instructions, the Hq. recently looked into this matter in detail in Washington, in the thought that it might be possible to issue blanket instructions from the federal agency authorizing the installation of amateur antennas on some reasonable basis. It was found, however, that the Washington agency is primarily advisory and administrative, with no particular jurisdiction over state and municipal agencies. The local authority is supreme so far as regulations are concerned. Thus the relationship between those who live in housing projects and the housing manager of local housing authority is precisely the same as between tenant and manager or owner of any apartment or dwelling.

DISASTER COMMUNICATIONS SERVICE RULES FINALIZED

As we go to press, FCC has released a report and order detailing new Rules Governing Disaster Communications Service (Part 20) effective March 21st. In accordance with many suggestions on the original proposals,* numerous changes and additions have been made in the final rules; from the standpoint of amateur interest in the service, we are happy to say that the League suggestions** (concurred in by other interested parties) have all been adopted. Of prime importance is the relaxation of rigid technical requirements such as those concerning harmonic radiation, etc., and a new frequency tolerance of 0.015% instead of the 0.005% originally proposed. Another major change was the substitution of one voice channel for seven of the originally proposed c.w. channels; there are now provisions for eight c.w. channels of 1 kc. width, and five voice channels of 7 kc. width, with a scene-of-disaster calling channel between the two and available for either mode, or A2. We print the entire text of the new rules for record and reference purposes herewith; we expect next month to discuss how this new service in 1750–1800 kc. ties into amateur preparation for emergency communications, both normally and in connection with civil defense.

SUBPART A — GENERAL INFORMATION

20.1 *Basis and purpose.* — (a) The basis of these rules is the Communications Act of 1934, as amended, and applicable treaties and agreements to which the United States is a party. These rules are issued pursuant to authority contained in Title III of the Communications Act of 1934, as amended, which vests authority in the Federal Communications Commission to regulate radio transmissions and to issue licenses for radio stations.

(b) The purpose of these rules is to provide for the licensing or authorizing of radio stations to provide essential communications incident to or in connection with disasters or other incidents which involve loss of communication facilities normally available or which require the temporary establishment of communication facilities beyond those normally available.

20.2 *Disaster defined.* — As used in this Part, the terms "disaster" or "disaster or other incident" are defined as meaning an occurance of such nature as to involve the health or safety of a community or larger area, or the health or safety of any group of individuals in an isolated area to whom no normal means of communications are available, and include, but are not limited to, floods, earthquakes, hurricanes, explosions, aircraft or train wrecks, and consequences of armed attack.

20.3 *Disaster station defined.* — A Disaster Station is defined as any government or non-government radio station able to function as a fixed, land, or mobile station and authorized, if government, by its controlling federal government agency or licensed, if non-government, by the Federal Communications Commission to operate in the Disaster Communications Service. A single disaster station may consist of more than one unit, each capable of being operated independently as a fixed, land, or mobile station.

20.4 *Associated station defined.* — For the purposes of these rules, a disaster station is considered to be associated with a licensed station in some other service when both stations are licensed to the same licensee at the same location and both stations are included in at least one coordinated disaster communications plan of the area concerned. A portable station or a mobile station in the Disaster Communications Service will be considered to be associated with the station in the other service which is located at its base of operations.

20.5 *Portable station defined.* — For the purposes of these rules, a portable station is defined as a land station in the Disaster Communications Service which is capable of being moved from place to place and is in fact, from time to time, moved to and operated at unspecified fixed locations for the purpose of communicating with other fixed, land, or mobile stations.

20.6 *Disaster communications defined.* — Disaster communications are defined as:

(a) Communications essential to the establishment and maintenance of communication channels to be used in connection with disasters or other incidents involving loss of communications facilities normally available or which demand the temporary establishment of communications facilities beyond those normally available, including communications necessary or incidental to drills and simulated disaster relief activity on the part of persons or organizations participating in the use of such communication channels; or

(b) Communications or signals essential to the public welfare, or that of any segment of the public, including communications directly concerning safety of life, preservation of property, maintenance of law and order, and alleviation of human suffering and need, in the case of any actual or imminent disaster or other such incident.

20.7 *Competent local authority defined.*[1] — For the purposes of these rules, competent local authority is defined as meaning that authority within a community or larger area which is so designated in the coordinated disaster communications plan for the area concerned, including any alternate authority who may be so designated in such plan. In the absence of the specifically designated authority, the individual in charge of the net control station, or his representative, for the organized disaster station network established in accordance with the coordinated disaster communications plan, shall be considered as competent authority for the activation of the stations of that network.

SUBPART B — STATION LICENSE OR AUTHORIZATION

20.11 *Eligibility.* — (a) A license for a station to be operated in the Disaster Communications Service may be granted to any person eligible to hold a station license under the provisions of the Communications Act of 1934, as amended, provided, that the station or proposed station is shown to constitute an element of a bona fide disaster communications network organized or to be organized and operated in accordance with a locally or regionally coordinated disaster communications plan under responsible leadership and direction.[1]

(b) Authorization for a United States Government station to operate in the Disaster Communications Service will be granted by the appropriate United States Government agency controlling that station.

20.12 *Organization of networks.* — (a) Local disaster communications networks may be organized by any responsible local group or groups that may be in a position to provide such service. In any particular area there may be several such networks and each network may be independent of the others. Whenever there is more than one network in the same area, however, they must all share the available frequencies in an efficient and orderly manner, under a single coordinated disaster communications plan. Any particular network shall be organized and set up along such lines and in accordance with such disaster communications plan that an inspection of the written records of the network will show that there is in fact a local disaster network of definitely identified stations with appropriate and responsible leadership and rules for self government that provide for an orderly and efficient service. The various networks in adjacent areas shall establish proper liaison arrangements, which will become a part of their respective disaster communications plans, to provide for efficient use of the available frequencies and that, in case of need, communications may be handled on an inter-area basis.

(b) Each disaster communications network shall establish a basic operating procedure for the type or types of trans-

* *QST*, October, 1950, p. 54.

** *QST*, November, 1950, p. 33.

[1] Duly designated civil defense officials will be considered competent local authority in the organization or operation of disaster communications radio networks and stations, and in the coordination of disaster communications plans.

mission to be employed; which operating procedure shall be based on a generally understood procedure in common use in other services for the types of communications and the types of transmissions to be employed.

20.13 *Application for construction permit and license.* — (a) Application for construction permit and new license for a station to be operated in the Disaster Communications Service shall be submitted on FCC Form No. 525, signed by the applicant, and countersigned by the competent local authority in charge of the disaster communications network in which the station is, primarily, intended to be operated. To facilitate a determination of eligibility, such application shall be accompanied by a statement describing in detail the purpose of the proposed station which shall include a copy of the locally coordinated disaster communications plan under which the station is intended to be operated unless such information has already been submitted to the Commission, in which case the application shall clearly identify that plan and the competent local authority under whose direction the station is proposed to be operated. In cases where a description of the station's antenna is required to be submitted on FCC Form No. 401-A, in accordance with the provisions of Section 20.14 of these rules, such form shall be submitted concurrently with the application for construction permit and license.

(b) Unless otherwise directed by the Commission, application for modification of station license in the Disaster Communications Service shall be submitted on FCC Form No. 525 in the same manner as application for construction permit and new license, whenever the license or the basic location of a licensed station is proposed to be changed.

(c) Unless otherwise directed by the Commission, application for renewal of station license in the Disaster Communications Service shall be submitted on FCC Form No. 525 at least 60 days prior to the date of expiration of the license sought to be renewed.

20.14 *Limitation on antenna structures.* — (a) No new antenna or antenna structure shall be erected for use by any station licensed or proposed to be licensed in the Disaster Communications Service, and no change shall be made in any existing antenna or antenna structure for use or intended to be used by any station licensed or proposed to be licensed in the Disaster Communications Service so as to increase its over-all height above ground level, without prior approval from the Commission in any case when either (1) the antenna supporting structure and/or the antenna proposed to be erected will exceed an over-all height of 170 feet above ground level, or (2) the antenna supporting structure and/or the antenna proposed to be erected will exceed an over-all height of one foot above ground level for each 200 feet of distance, or fraction thereof, from the nearest boundary of any aircraft landing area. Application for Commission approval in such cases shall be submitted on FCC Form 401-A (revised).

(b) For the purpose of this section an aircraft landing area is defined, in accordance with the provisions of Part 17 of the Commission's Rules, as any locality, either land or water, including airports and intermediate landing fields, which is used, or approval for use, for the landing and take off aircraft, whether or not facilities are provided for the shelter, servicing or repair or aircraft, or for the receiving or discharging of passengers or cargo.

(c) In cases where an FCC Form 401-A is required to be filed, further details as to whether an aeronautical study and/or obstruction marking may be required, as well as specifications for obstruction marking when required, may be obtained from Part 17, "Rules Concerning the Construction, Marking, and Lighting of Antenna Towers and Supporting Structures." Information regarding requirements as to inspection of obstruction marking, recording of information regarding such inspections, and maintenance of antenna structures is also contained in Part 17.

20.15 *License term.* — A license to operate a radio station in the Disaster Communications Service will be issued for a term of from one to five years from the effective date of grant as the Commission may determine in each case to permit the orderly scheduling of renewals, and for a renewal term of four years from the effective date of renewal.

SUBPART C — USE OF STATIONS

20.21 *Activation of stations.* — (a) All stations in the Disaster Communications Service are authorized to be operated on the frequencies and with the types of emission specified by these rules only when competent local authority either (1) determines that an impending or actual disaster or other such incident warrants their activation, or (2) schedules training operations, practice drills or tests to keep the networks and associated stations alert and efficient.

(b) Except during scheduled training operations, practice drills or tests, the Scene of Disaster Frequency shall be used only (1) by the station or stations actually located in the disaster area and those stations with which the station or stations actually in such disaster area are in direct communication, or (2) as a notification frequency, for the transmission of any authorized emission including automatic alarm signals, when a disaster is imminent or has occurred, or (3) in an impending disaster situation, as a calling frequency for preliminary contacts in establishing or alerting nets, or (4) as a calling frequency for non-net stations seeking contact with the control station of a net for disaster-related communications.

(c) Nothing in this section shall be deemed to prevent any radio station from operating on the Scene of Disaster Frequency, using such equipment and such power as may be available or necessary, and communicating in accordance with the provisions of paragraph (b) of this section at any time the safety of life or property within the area of responsibility of that station is in danger as a result of an impending or actual disaster or other such incident.

20.22 *Points of communication.* — All stations in the Disaster Communications Service, when activated in accordance with the provisions of Section 20.21 of these rules, are authorized to communicate with each other, with stations in the Amateur Radio Service, and with stations of the United States Government which are authorized by their controlling federal government agencies to communicate with stations in the Disaster Communications Service; and are further authorized to communicate with any station in any service licensed by the Federal Communications Commission whenever such station is authorized to communicate with stations in the Disaster Communications Service by the provisions of the Commission's rules governing the class of station concerned or in accordance with the provisions of Section 2.405 of the Commission's rules.

20.23 *Limitations on use.* — (a) Stations operating in the Disaster Communications Service are authorized to transmit and to receive only those types of communications set forth in Section 20.24 of these rules for:

(1) Liaison purposes for the coordination of the activities of various local or larger mutual aid organizations, between established individual or network stations authorized to operate in other services and engaged in disaster communications on their own regularly assigned service frequencies; or

(2) Direct operation as a part of a disaster communications network established for the purpose of providing disaster communications for an organization or organizations having no other frequencies available or none satisfactory for the distances or locations to be covered.

(b) Stations operating in the Disaster Communications Service are authorized to retransmit, by automatic means, authorized disaster communications being transmitted by other stations of the same disaster communications network, and to originate and transmit, by automatic means, distinctive signals, on the Scene of Disaster frequency only, for the alerting of the disaster communications network and/or for the actuation of selective signaling, calling or alerting devices; provided, that when such automatic transmission or retransmission is employed, such stations shall not emit radio-frequency energy except when actually transmitting authorized disaster communications.

(c) Nothing in this section shall be construed to prevent the operation of a station in the Disaster Communications Service for the purpose of brief tests or adjustments during or coincident with the installation, servicing or maintenance of such station; provided, that the transmissions of that station during such tests or adjustments shall not cause harmful interference to the conduct of communications by any other station.

(d) A station in the Disaster Communications Service shall not be used to transmit or to receive messages for hire, nor for communications for material compensation, direct or indirect, paid or promised.

20.24 *Permissible communications.* — Stations in the Disaster Communications Service are authorized to transmit

and to receive only the following types of disaster communications:

(a) Communications when there is no impending or actual disaster:

(1) Necessary drills and tests to insure the establishment and maintenance of efficient networks of stations in the Disaster Communications Service and other authorized services. These drills and tests may include the prearranged exchange of communications by stations of established networks with stations outside any established network where the purpose of such exchange is to provide training and practice in the establishment and maintenance of liaison and coordination between such networks and non-network stations. Such drills and tests shall not be permitted, in any way, to interfere with communications in connection with any actual or impending disaster or other such incident.

(b) Communications when there is an impending or actual disaster:

(1) Communications directly concerning:

(i) The activation of a disaster network, or

(ii) The establishment and maintenance of liaison and coordination between:

(a) the stations of one network and the stations of any other network, or

(b) any network station and any non-network station of any agency possessed of its own system of radiocommunication which is actually engaged in averting or overcoming the effects of the disaster, or

(c) any non-network station of one agency possessed of its own system of radiocommunication which is actually engaged in averting or overcoming the effects of the disaster and any non-network station of any other agency possessed of its own system of radiocommunication which is actually engaged in averting or overcoming the effects of the disaster.

(2) Communications directly concerning the conduct of service by an activated disaster network.

(3) Communications directly concerning safety of life, preservation of property, maintenance of law and order, and alleviation of human suffering and need by authorized government and relief agencies.

(4) Communications directly concerning the accumulation and dissemination of public information regarding safety of life, preservation of property, maintenance of law and order, or alleviation of human suffering and need by authorized government or relief agencies.

(5) Communications directly concerning the transaction of business essential to the public welfare.

(6) Communications concerning personal matters of individuals directly affected by the disaster.

(c) The order of priority of communications when there is an impending or actual disaster shall be as determined by the competent local authority activating the station or network, or his authorized representative.

20.25 *Station identification.* —

(a) *Call signs.* Disaster stations licensed by the Commission will be assigned distinctive call signs, consisting of four letters and one digit, in accordance with the table of geographical assignment of call signs contained in Section 2.303 of the Commission's Rules. Stations of the United States Government authorized to operate in the Disaster Communications Service will be assigned appropriate call signs by their cognizant United States Government agencies from the call signs available to such agencies.

(b) *Use of call signs.*

(1) Radiotelegraph. When transmitting by radiotelegraphy, each disaster station shall transmit the call sign of the station being called followed by its own call sign at the beginning of each series of communications with the called station, at least once each fifteen minutes of such operation, and when terminating communications with the called station. One-way transmissions intended for several stations shall be identified in the same manner except that a general call may be used in place of the call signs of the several stations intended to receive the transmissions. Test transmissions of a station making adjustments shall be identified by the transmission of the station call sign at the beginning and end of the test period and at least each 30 seconds during such period.

(2) Radiotelephone. When transmitting by radiotelephony, each disaster station shall identify itself and the station or stations being called in the same manner prescribed in this section for identification during radiotelegraph transmissions, except that, if there is no possibility of confusion, the name, location, or other designation of the station may be used in lieu of the call sign when that name, location, or other designation is the same as that of an associated station in some other service and is authorized to be used by such associated station when identifying itself on its regularly assigned frequencies.

(3) Multiple units. When two or more separate units of a station are operated at different locations, each unit shall separately identify itself by the addition of a unit name, number or other designation at the end of its call sign or other authorized means of identification. When transmitting by radiotelegraphy, such additional identification shall be separated from the call sign by use of the "slant" or fraction bar.

(4) Additional identifications. A list of all general or collective call signs, unit designators, and other authorized substitutes for or additions to assigned call signs used in each disaster station network shall be maintained at the control station of such network, and shall be made available for inspection upon reasonable request from any authorized representative of the federal government.

(c) Stations which are entirely automatic in their operation, including automatic modulation of the carrier, shall be exempt from the requirements of paragraph (b) of this section.

20.26 *Radio station log.* — (a) The licensee of each radio station licensed in the Disaster Communications Service shall keep an accurate log of all operations in the 1750-1800 kc. band, which shall include the following:

(1) Name and address of the disaster station licensee, station call sign used in the disaster communications service, date of expiration of the disaster station license, and d.c. plate power input to the vacuum tube or tubes supplying energy to the transmitting antenna system. This information need be entered only once in the log unless there is a change in any of the above items. Each change shall be entered with the date the change is made.

(2) Date and time of beginning and end of each period during which the disaster station is operated.

(3) Signature of each licensed operator who manipulates the key of a manually operated radiotelegraph transmitter or the signature of each licensed operator who operates a transmitter using any other type of emission, and the name (or signature) of any person not holding an operator license who transmits by voice over the facilities of that station other than by automatic relay of the signal of another station or stations. The signature of the operator shall be entered with the date and time at both the beginning and the end of each period during which he is manning the controls of the disaster station and at least once on each page additional to the first page covering the period for which he is the responsible operator. The signature of any additional operator who operates the station during the regular watch of another operator shall be entered in the proper space for that additional operator's transmissions.

(4) Upon the completion of each period of operation for drill, training, liaison or test purposes and each period of operation in connection with an impending or actual disaster, there shall be entered in the log a summary of such operation describing its nature and giving pertinent details.

(5) There shall be no erasures, obliterations or destruction of any part of the disaster station log. Corrections shall be made by striking out erroneous portions and initialing and dating the correction.

(b) The current portion of the log of a licensed disaster station shall be kept at the location of the control position of such station. Other portions of the log shall be retained by the licensee for a period of at least one year, at such place as he may deem appropriate and advisable; provided, that the log of a disaster station shall be made available for inspection upon reasonable request by any

authorized representative of the federal government; and provided further, that those portions of any disaster station log covering operation of such station in connection with any actual disaster shall not be destroyed unless prior approval for such destruction shall have been received from the Commission.

SUBPART D — OPERATING REQUIREMENTS

20.31 *Assigned frequencies and authorized emissions.* — (a) The following frequencies in the frequency band 1750–1800 kc are assigned, on a nonexclusive basis, to all stations in the Disaster Communications Service. The selection and use of these frequencies shall be in accordance with a coordinated local area and adjacent area disaster communications plan, [2] the specific types of emission herein indicated and the other applicable provisions of these rules:

Channel Number	*Channel Width*	*Assigned Frequency*	*Authorized Emission*
(1) Radiotelegraph channels.			
1.	1 kc.	1750.5 kc.	0.5 A1
2.	1 kc.	1751.5 kc.	0.5 A1
3.	1 kc.	1752.5 kc.	0.5 A1
4.	1 kc.	1753.5 kc.	0.5 A1
5.	1 kc.	1754.5 kc.	0.5 A1
6.	1 kc.	1755.5 kc.	0.5 A1
7.	1 kc.	1756.5 kc.	0.5 A1
8.	1 kc.	1757.5 kc.	0.5 A1
(2) Scene of Disaster channel.			
9.	7 kc.	1761.5 kc.	0.5 A1, 2.5 A2, or 6 A3
(3) Radiotelephone channels.			
10.	7 kc.	1768.5 kc.	6 A3
11.	7 kc.	1775.5 kc.	6 A3
12.	7 kc.	1782.5 kc.	6 A3
13.	7 kc.	1789.5 kc.	6 A3
14.	7 kc.	1796.5 kc.	6 A3

(b) In the foregoing table, a figure specifying the maximum authorized bandwidth in kilocycles to be occupied by the emission is shown as a prefix to the authorized omission classification. The specified bandwidth shall contain those frequencies upon which a total of 99 percent of the radiated power appears, and shall include any discrete frequency upon which the power is at least 0.25 percent of the total radiated power. Any radiation in excess of the limits specified is considered to be an unauthorized emission.

(c) When an unauthorized emission results in harmful interference, the Commission may, in its discretion, require appropriate technical changes in equipment to alleviate the interference.

20.32 *Transmitting power.* — The transmitting equipment of a radio station in the Disaster Communications Service shall be adjusted in such a manner as to produce the minimum radiation necessary to carry out the communications desired when such station is operating in the frequency band 1750–1800 kilocycles. No station in the Disaster Communications Service shall be operated on these frequencies using a direct current plate power input to the vacuum tube or tubes supplying energy to the antenna in excess of 500 watts, except when operating on the Scene of Disaster frequency in accordance with the provisions of Section 20.21(c) of these rules.

20.33 *Equipment requirements.* — (a) All stations in the Disaster Communications Service, except those intended only for the transmission of an automatic alarm or alerting signal, shall be capable of both transmitting and receiving on the Scene of Disaster frequency.

(b) The carrier frequency of each licensed station in the Disaster Communications Service shall be maintained within 0.015 percent of the assigned frequency.

(c) When the radio frequency carrier of a station in the Disaster Communications Service is amplitude modulated, such modulation shall not exceed 100 percent on negative peaks.

(d) The licensee of each station in the Disaster Communications Service which is utilized for the transmission of Type A-1 or Type A-3 emission shall use adequately filtered direct-current plate power supply for the transmitter to minimize modulation from that source.

[2] Duly designated civil defense officials will be considered competent local authority in the organization or operation of disaster communications radio networks and stations, and in the coordination of disaster communications plans.

20.34 *Operator requirements.* — (a) Except under the conditions specified in paragraph (d) of this section, one or more licensed radio operators of the class or grade specified in paragraph (b) of this section shall be on duty at the place where the transmitting apparatus of each licensed disaster station is located, or at the control position of such station if the control position is located at a place other than the location of the transmitting apparatus, and in actual charge thereof whenever it is being operated for the purpose of transmitting disaster communications, as defined in Section 20.6 of these rules, or is otherwise placed in a condition so as to produce radiation of radio frequency energy. No person shall manipulate the radiotelegraph key of a licensed disaster station for the purpose of manually transmitting radiotelegraph signals except under and in accordance with the authority of an operator license granting appropriate radiotelegraph operating privileges in accordance with the provisions of paragraph (b) of this section.

(b) Disaster stations licensed by the Federal Communications Commission may be operated, when properly transmitting in accordance with the provisions of these rules, by the holders of:

(1) Any amateur radio operator license issued by the Federal Communications Commission which authorizes the holder thereof to operate an amateur radio station in the amateur segments of the 1800–2000 kc frequency band; or

(2) Any commercial radio operator license issued by the Federal Communications Commission, provided, that the holder of such commercial radio operator license shall perform or be responsible for only those operating duties and responsibilities at a disaster station which he is authorized, under the authority of such license, to perform or be responsible for at some other class of station licensed by the Commission when using the same type of emission and method of operation on a frequency or frequencies below 25 mc.

(c) When a station of the United States Government is authorized by the appropriate United States Government agency concerned to be operated in the Disaster Communications Service, the operator requirements for that station will be determined by the authorizing agency.

(d) Stations which are entirely automatic in their operation, including automatic modulation of the carrier, shall be exempt from the provisions of paragraph (a) of this section during the course of the normal rendition of the service of such stations; provided, that all adjustments or tests during or coincident with the installation, servicing or maintenance of such stations shall be performed only by or under the immediate supervision and responsibility of a duly licensed operator whose license authorizes him to operate the station under those conditions in accordance with the provisions of paragraph (b) of this section; and provided further, that the station shall be so designed and installed as to be inaccessible to unauthorized personnel and incapable of any unauthorized transmission.

20.35 *Availability of station and operator licenses.* — (a) The original station license for a station in the Disaster Communications Service, or a photocopy thereof, shall be permanently attached to each transmitter of such station if the transmitter is readily accessible, or permanently posted at the control position of such station if the control position is located at a place other than the location of the transmitter.

(b) The original radio operator license or verification card (FCC Form No. 758-F) of the operator controlling the emissions of a licensed station in the Disaster Communications Service shall be carried on his person or kept immediately available at the place where he is operating the station.

(c) Whenever the original station license is not posted in accordance with the provisions of paragraph (a) of this section, or whenever the original operator license is not readily available at the place where the operator is on duty, such original license shall be made available for inspection upon reasonable request from any authorized representative of the federal government.

A Miniature Transmitter for 220 Mc.

3½ Watts Output in a Package Smaller than an 807

BY CLARK C. RODIMON,* W4SZ, AND JOSEPH FARAGO, JR.*

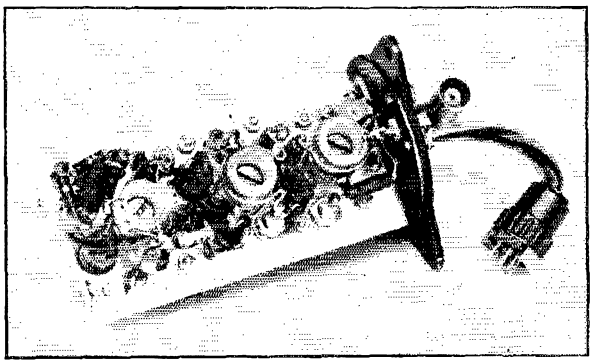
TRANSMITTER construction isn't any more fun now than it used to be, except when one is given the challenge of getting more power out of a unit in less size and weight than has been allowable heretofore. Just such an opportunity came along in the design of a unit for a Government project and engineering proceeded apace.

Seldom does a commercially constructed equipment fit directly into amateur applications. We believe the unit to be described, known as the T-1077, is an exception to the rule. Of certainty, some of the constructional ideas employed in this unit will be of interest to constructors of v.h.f. and mobile gear.

The photographs and diagram will indicate the simplicity of construction. Four Raytheon subminiature triodes (CK-5703) are used as oscillator, doubler, grounded-grid amplifier and reactance modulator. Because the grounded-grid amplifier allows its driver stage to contribute to the total power output, this little rig delivers 3½ to 4 watts output on 215 to 230 Mc., with only 180 volts on the plates. This same characteristic complicates the problem of modulation if a.m. is used, hence the f.m. A deviation of plus or minus 15 kc. is possible with approximately one-half volt from the microphone.

Plate power input for all four tubes amounts to 85 ma., or 15.3 watts at 180 volts. Filament drain is 0.8 amp. at 6.3 volts, making the total power consumption of the transmitter about 20 watts. For a power output of 3.5 watts this represents an over-all efficiency of 18 per cent, a respectable figure at 220 Mc.

The T-1077 transmitter is constructed on a piece of hard-drawn brass 3⅞ by 1⅞ by 1/16 inches thick, silver plated after drilling. Component layout was worked out very carefully for minimum size. Other layouts, to take advantage of components that might be more readily available,

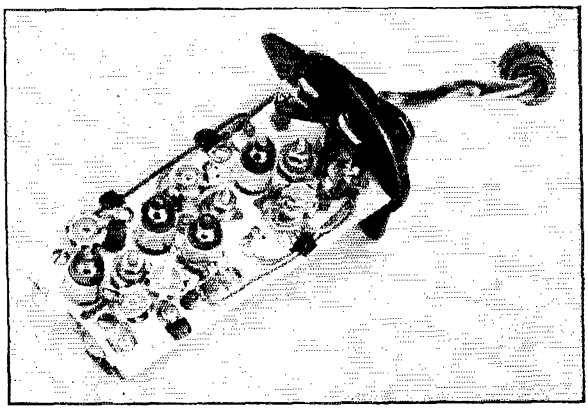


Coils and other r.f. circuit components are mounted on the bottom of the chassis. Note that tall parts are mounted down the center, with smaller ones at the sides, giving the unit an almost circular cross-section when viewed from the end. The wire leads to the tubes are connected directly to their respective circuits, eliminating sockets.

may be used, provided the leads in the r.f. circuits follow the original closely as to length.

Of interest initially, it will be noted that tube sockets are not used. Small brass clamps hold the tubes firmly in place and aid in transferring heat to the chassis. The small wire leads on the tubes go direct to stand-offs or components. Wiring on the top of the chassis is used only for the plate, heater and microphone circuits. Stray coupling between these leads and those of the r.f. portions

* % Melpar, Inc., 352 Swann Ave., Alexandria, Va.



Top view of the miniature 220-Mc. transmitter, showing tube mounts, by-pass condensers and power wiring. The chassis is a single brass plate less than 2 by 4 inches over all — for a four-tube transmitter! Tubes are, left to right, reactance modulator, oscillator, doubler and final amplifier.

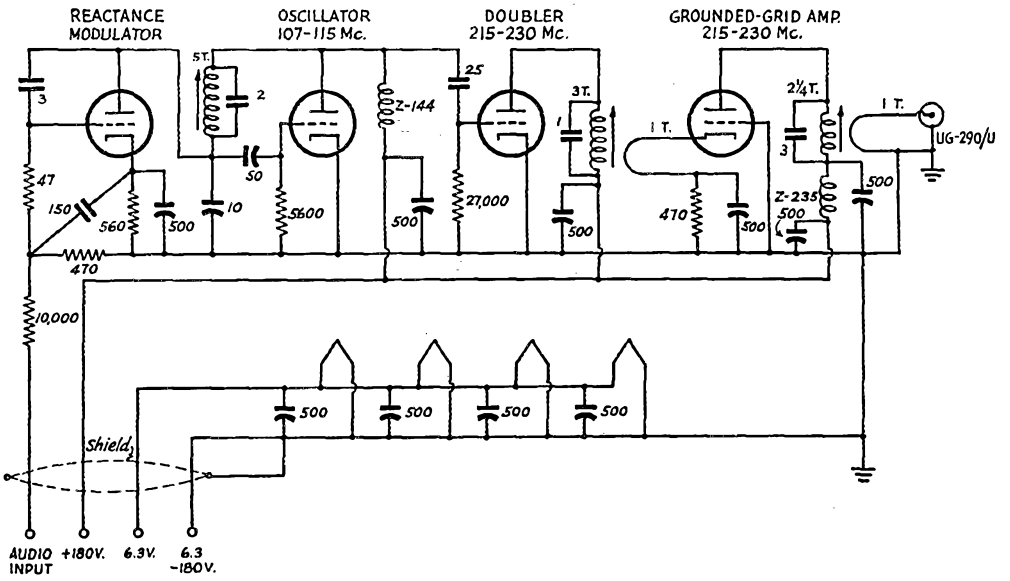


Fig. 1 — Schematic diagram of the miniature 220-Mc. transmitter. Values of all parts are given on the drawing. Button capacitors are Erie 370FF, feed-through capacitors Erie 700A, capacitors across coils Erie N750. All resistors ½-watt carbon. Tubes Raytheon subminiature CK-5703. Coils are wound with No. 22 formvar wire on Millen 69041 slug-tuned forms. Coupling loops No. 18, ⅛-inch diameter.

of the circuit on the opposite side of the chassis is thus avoided.

Components used are of standard manufacture and should be readily available from most parts jobbers, with the possible exception of the nine W. E. No. 200A stand-offs. Usable substitutes for these will be found in most parts stocks. Feed-through capacitors are used in three instances, and other by-passes are the button type with screw mounting. Keep in mind that this transmitter was designed to meet strict government specifications, including high acceleration (70 g) and a maximum temperature of 85 degrees C.

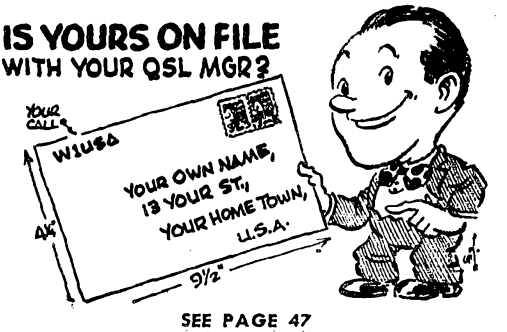
The tube clamps were made of seamless hard-drawn brass tubing, split and silver-plated. The case is 2-inch hard-drawn aluminum tubing $3\frac{15}{16}$ inches long, drilled for ventilation and for access to the tuning slugs in the r.f. coils. The rear end plate is of hard-drawn brass with the outer edge machined $\frac{1}{32}$ inch for a press fit into the case. The front plate is similar, but has three ears extending beyond the 2-inch diameter for mounting purposes. Output is coupled through a UG-290/U 51.5-ohm coaxial connector.

Tuning is straightforward, but it is simplified if a grid-dip meter is used to set the coils to approximate resonance. The unit as manufactured covers a range of 215 to 230 Mc., so no trouble should be experienced in setting it up for the amateur 220–225 Mc. band. The oscillator tunes to one-half the output frequency.

As designed, the rig is ideal for short-range work such as may often be needed in civil defense communication. For greater power the output is sufficient to drive an 829B amplifier, and this unit has been so used with an amplifier built into a case about 3 by 5 by 8 inches in size and delivering an output of 35 watts.

OUR COVER

Technical Assistant W1FTX was busily engaged drilling vent holes in the shielding of his low-drive 813-final DX Contest rig when Production Manager W1BAW and his photographer chanced to saunter through the ARRL lab. Although "caught with his shields down," Smitty graciously agreed to a close-up shot of the shielding and filtering underneath the 813. There you have it! . . . And since the rig really cuts into TVI, we're planning an early description for you.



SEE PAGE 47

All About the PE-103A Dynamotor

BY RICHARD SHONGUT,* W2QFR

ALTHOUGH a large percentage of mobile hams use the PE-103A surplus dynamotor, very little technical information on the unit is available. It is the primary aim of this article to fill the gap.

The PE-103A is a component of a military radio station primarily intended for furnish 500 volts at 160 ma. and 6 volts for filament current and auxiliary equipment. Of course, in the last-mentioned use, the unit is not the source of the power but since the battery current flows through its control circuits, the filaments and other equipment are protected from overload. The dynamotor proper, which has provisions for both 6- and 12-volt input, provides the 500-volt plate supply with which most of us are exclusively concerned.

Control Circuits

The control circuits may be briefly described as follows: All units utilize three circuit breakers, but those bearing serial numbers below 4711 do not have high-voltage protection. This is the essential difference between early and later models. The latter incorporate a high-voltage circuit breaker to protect the transmitter against overload, a low-voltage circuit breaker to protect the dynamotor armature against overload, and a third such device to guard against filament overload when filament current is drawn through the control circuits of the PE-103A.

By connecting Pin 4 of the output socket to Pin 5 (see Fig. 1), which is radio ground, the circuit through the coil of control relay *3E6* is completed. One moving arm of this relay, which is grounded (we refer to radio ground here and in all cases following, but this is usually identical with physical ground), grounds one contact on *3E3*, the high-voltage circuit breaker. The contacts of this unit and *3E4*, the low-voltage circuit breaker, are in series with each other and with the ground ends of the 6- and 12-volt starter-relay coils. Thus, the starter relay selected by the 6/12-volt switch is energized and delivers primary current to the proper low-voltage winding on the dynamotor.

The "hot" ends of the starter-relay coils receive current through the filament protective circuit breaker, *3E5*. This unit has its contacts and coil internally connected in series. Thus, if any of the three circuit breakers open, the starter relay will open and stop the dynamotor.

* 210 West 90th St., New York 24, N. Y.

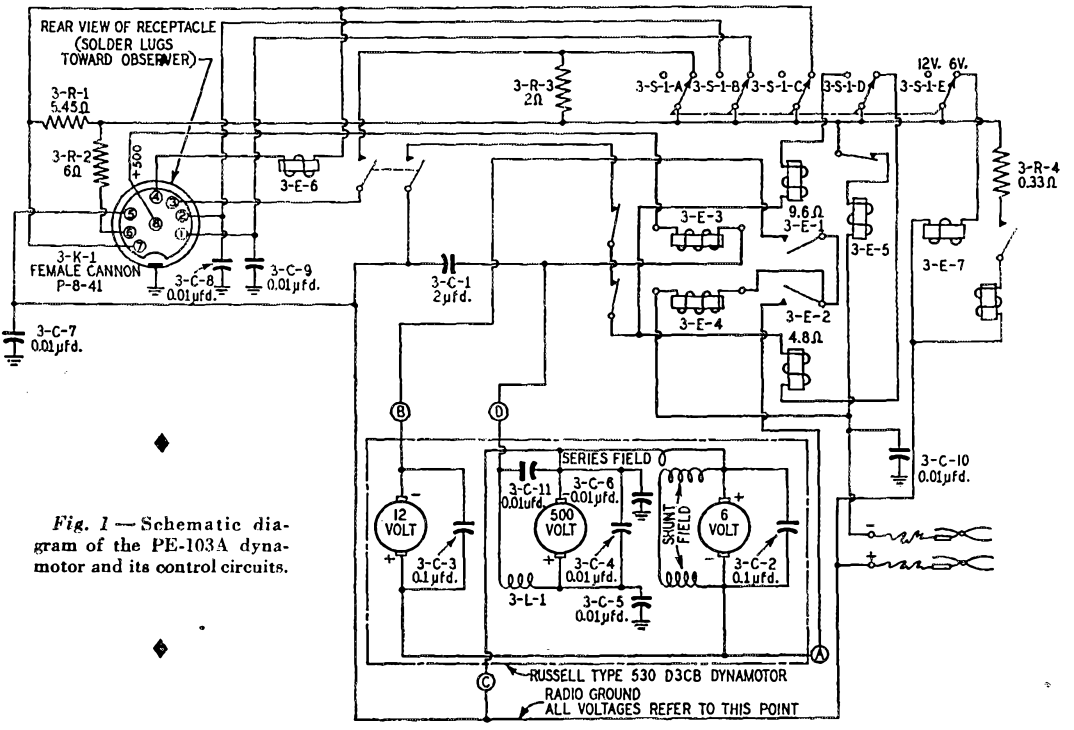


Fig. 1 — Schematic diagram of the PE-103A dynamotor and its control circuits.

The B-plus lead from the high-voltage commutator is connected in series with the coil of *3E3* and terminates at Pin 8 of the output socket. This circuit breaker is supposed to open when more than 220 ma. pass through the circuit. The "hot" primary lead of the PE-103A passes through the coil of *3E4* and then to the contacts of the 6- and 12-volt starter relays, *3E2* and *3E1* respectively. Here, a current of over 40 amperes will open the circuit breaker.

Conversion for Mobile Use

For those who first obtain these dynamotors, two conversions may be necessary or desirable.

1) Relay *3E7* may be permanently de-energized in order to prevent a steady 15-ma. drain on the car battery when the circuit breakers are left on. This relay was used to prevent accidental application of 12 volts to the 6-volt dynamotor winding. It may be "silenced" by disconnecting the heavy lead fastened to the post at which the primary lead marked "plus" terminates.

2) When used in a vehicle, the negative terminal of whose battery is grounded, the following changes should be made: Remove the larger of the two end covers on the dynamotor which exposes the 12-volt and high-voltage commutators. The latter is nearest the center of the armature. Remove all wires from the positive brush binding terminal and connect them to the negative brush.[1] Now, it is only necessary to ground the primary cable, marked positive, while the one marked negative is connected either to the positive battery terminal or the battery terminal of the voltage regulator. The latter connection allows you to observe the current drawn by the dynamotor on your dashboard ammeter.

Technical Difficulties

Three of the problems most frequently met and their remedies are discussed below.

1) Apparently, a good many of the high-voltage circuit breakers are over-sensitive and will kick out considerably below their 220-ma. rating. This can be very annoying and can kill your carrier on modulation peaks, etc. The remedy is simple. Connect a 47-ohm ½-watt resistor in parallel with the circuit-breaker coil terminals. These are the terminals to which are fastened the wires that protrude from the body of the breaker in question. Sensitivity will now be at a more useful level, approximately 250 ma.

2) The same circuit breaker mentioned above is likely to give offense in another and more serious manner. It has been my experience and that of personnel in the field that moisture often causes a short circuit between the circuit-breaker coil and contacts as a result of insulation breakdown. When this occurs, activating the control relay *3E6* causes the dynamotor to turn over very slowly with little or no high-voltage output, and it may continue to turn even when this relay is de-energized. If such symptoms develop you can be fairly certain of a short circuit as mentioned. Confirm your suspicions by measuring the resistance from the coil of *3E3* to both of its contacts. This resistance should be infinite; several hundred ohms indicates a short.

A temporary repair, eliminating high-voltage protection, may be effected by removing the circuit-breaker contacts from their series connection with the *3E4* contacts, leaving the latter alone in the circuit. Thus you will still maintain protection for the dynamotor armature. A permanent solution requires the removal of the defective unit and either its repair or replacement. To do this, unfasten all connections to the bakelite terminal board on the rear housing of the circuit breaker and remove the two screws on the switch side and the one at the base of the bakelite strip. The unit may then be slipped out. If you feel brave enough to attempt a repair, you must first remove the bakelite terminal strip. Then, to open the circuit-breaker housing, remove the two screws in back which are sometimes covered with pitch or a similar material.

3) The last common ailment likely to be encountered is a gradual diminution of high-voltage output. The probable cause is lack of lubrication, especially if this precaution has been neglected. Do not be too eager to grease the bearings since this is usually unnecessary and may do more harm than good if improperly executed. First try a few drops of oil in the two oilers, located at either end of the armature under the covers.

[1] Conversely, connect the negative brush wires to the positive brush.

Strays

Figured out yet why Ralph McQuade, W8WRL, is one of our favorite readers? Mac was issued the special *QST* plates recently as a result of Ohio's making available three-letter combinations. Active in the Amateur Radio Emergency Corps, W8WRL is a member of the Dog House Net and the Ohio Emergency 'Phone Net.

Automatic Spacing of Letters and Words for the Electronic Key

BY JACK W. HERBSTREIT,* W4JNX

SINCE the very first article appeared in *QST* describing an electronic key [1] that makes both dots and dashes automatically, the author has followed with great interest the development of advanced designs and improved circuit techniques. The most recent which has come to his attention is an extremely simple arrangement devised by G. F. Montgomery, "Corkey,"[2] which uses no tubes and yet has all of the advantages of the others: simple s.p.d.t. keying, automatic completion of characters (dots and dashes) after once initiating them, and even automatic spacing of characters within letters. The only thing left to assure absolutely perfect machine sending by hand is to provide facilities for automatic spacing between letters and words.

* Prosperity Ave., R.F.D. 2, Pine Ridge, Fairfax, Va.

[1] Harry Beecher, "Electronic Keying," *QST*, April, 1940.

[2] G. F. Montgomery, "'Corkey' — A Tubeless Automatic Key," *QST*, Nov., 1950.

The circuit described here, while not having some of the advantages of the "Corkey" (no tubes, grounded center key contact, single knob key control, etc.) does have the features of automatic completion and spacing of characters and, in addition, has facilities for automatically spacing between letters and even words.

The basic idea is simple if we consider that the secret of perfect code is to have perfectly-timed code. The definite unit of time that may be taken is the time between the start of one dot and the start of the next, and from this unit all of the perfect characters and perfect spacings can be derived. Fig. 1 shows a circuit that will do this electronically — Fig. 2A shows a series of pulses of unit spacing and 2B shows how the correct spacing between letters and words is derived.

The circuit shown in Fig. 1 uses this principle in an electronic hand-operated key. A free-run-

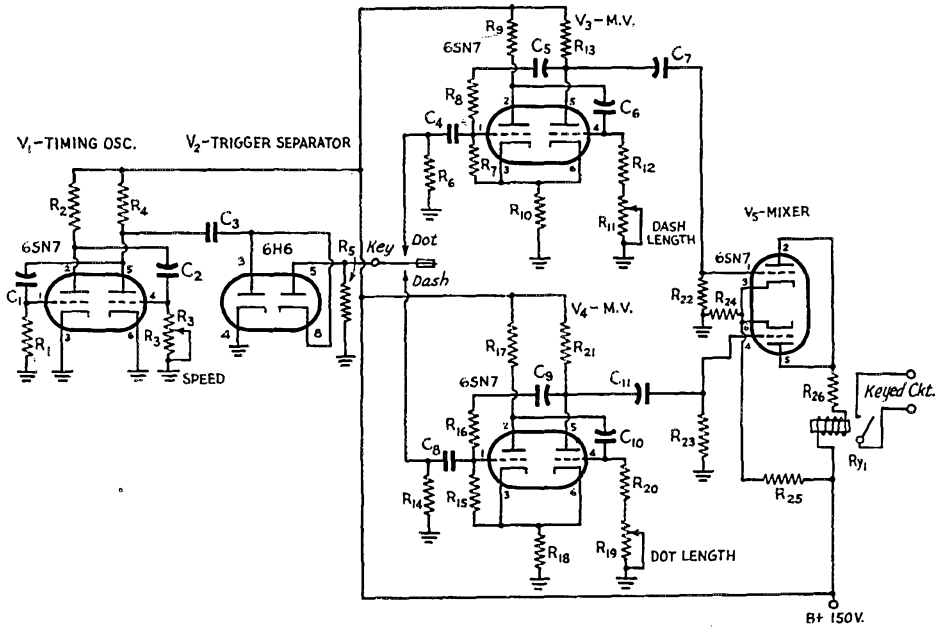


Fig. 1 — Circuit diagram of the electronic key.

C_1, C_2 — 0.05 μfd.
C_3 — 200 μμfd.
C_4, C_8 — 250 μμfd.
C_5, C_7, C_9, C_{11} — 0.1 μfd.
C_6 — 0.08 μfd.
C_{10} — 0.02 μfd.
R_1 — 2 megohms.
R_2, R_4 — 0.1 megohm.
R_3 — 0.5-megohm potentiometer.
R_5 — 0.12 megohm.
R_6, R_{10}, R_{14}, R_{18} — 10,000 ohms.
R_7, R_{15} — 3 megohms.
R_8, R_{12}, R_{16}, R_{20} — 0.2 megohm.
R_9, R_{17} — 27,000 ohms.
R_{11}, R_{19} — 2-megohm potentiometer.
R_{13}, R_{21} — 39,000 ohms.
R_{22}, R_{23} — 0.47 megohm.
R_{24} — 4700 ohms.
R_{25} — 0.1 megohm, 1 watt.
R_{26} — 47,000 ohms.
Ry_1 — Sensitive relay, 5000 ohms, 2 ma.

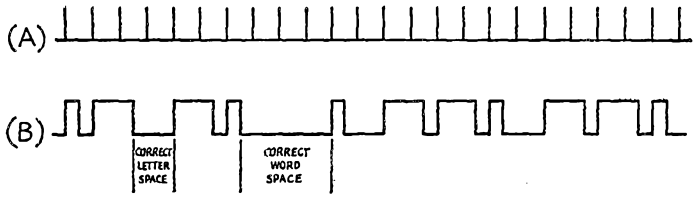


Fig. 2 — A steady string of trigger pulses (A) can be used to initiate perfect spacing of letters and words (B) as well as the more familiar dots and dashes.

ning unbalanced multivibrator, V_1, is used as the timing oscillator, the negative pulses from which are separated and differentiated in the diode circuit. These pulses are switched by the hand key to separate one-time (flip-flop) multivibrators, V_3 and V_4, one for dashes and one for dots, the outputs of which are combined in the mixer tube, V_5, which operates the keying relay. The flip-flop circuits operate whenever a trigger pulse is supplied, so that if the key is pressed in between triggers nothing happens until the trigger comes along. (Sometimes very disturbing in attempting to operate the key!) As long as the key is pressed in the right direction sometime between the time of the trigger that proceeds the correct trigger and is held until the correct trigger comes along, perfect keying including spacing between letters and words will result. Needless to say, as long as the key is held over and triggers are supplied to either flip-flop, a continuous string of dots or dashes will result.

The author had built and successfully operated a conventional electronic key. He has also built the key described here and has attempted to operate it. However, he does not feel that any but the most feverish electronic key enthusiasts will wish to build one of these infernal, maddening machines. Nevertheless, it is hoped that the idea may provide an inspiration for further development in this field.

HAWAII SECTION TO INCLUDE PACIFIC ISLANDS

All U. S. possessions in the Pacific are part of the Pacific Division as specified in the League's constitution. Section boundaries are determined by the Division Director and the Communications Manager and the ARRL Sections and their elected administrative-operating officials (SCMs) are listed on page 6 of *QST*. For some years Hawaii has included just those islands in the Hawaiian group including major points, Hawaii, Maui, Molokai, Oahu, Kauai, Lanai, Nihau and Kahoolawe.

Effective April 1, 1951, the Hawaii Section will also include all the other U. S. possessions in the Pacific, such as Guam, Canton, Baker, Enderbury, Gardner, Howland, Jarvis, Johnston, Midway, Neeker, Palmyra, American Samoa, Tutuila and Wake Id. Activity reports from that date should be sent for *QST* publication via the Hawaii SCM. League appointments, CD Party, SS competition, etc., will fall in the Hawaii Section as determined by the enlarged definition of Hawaii Section boundaries.

Silent Keys

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

W1CIO, Philip T. Brown, Cape Elizabeth, Me.
ex-1LL, Ralph Webb, Lowell, Mass.
W1NTP, Victor J. Stroncer, West Newton, Mass.
W2ETN, Saul Leibowitz, Brooklyn, N. Y., N. Y.
W2PMP, ex-HH4AS, Leslie F. Sherwood, Hollis, L. I., N. Y.
W7JN, Clarence L. Bischoff, Portland, Ore.
WØBBL, A. Frank Vowles, St. Paul, Minn.
WØFX, Thomas W. Jackson, Jamestown, N. D.
WØHJC, James C. Clarke, Fargo, N. D.
WØVYT, Sgt. Robert N. Severson, USMCR, Duluth, Minn.
WØZTZ, Clyde Dawson, Thompson, N. D.
VE3NG, George H. Hardy, Grand Valley, Ont.
KR6DU, Lieut. Frank M. Lopes
YN3CP, Harry V. Long, Mina La India

A.R.R.L. QSL BUREAU

(Bold-face type indicates recent change of address)

W1, K1 — J. R. Baker, jr., W1JOJ, Box 232, Ipswich, Mass.
W2, K2 — H. W. Yahnel, W2SN, Lake Ave., Helmetta, N. J.
W3, K3 — Jesse Bieberman, W3KT, Box 34, Philadelphia 5, Penna.
W4, K4 — William M. Rowe, jr., W4JDR, 2430 Connally Drive, East Point, Ga.
W5, K5 — L. W. May, jr., W5AJG, 9428 Hobart St., Dallas 18, Texas
W6, K6 — Horace R. Greer, W6TI, 414 Fairmount St., Oakland, Calif.
W7, K7 — Mary Ann Tatro, W7FWR, 513 N. Central, Olympia, Wash.
W8, K8 — Walter Musgrave, W8NGW, 1294 East 188th, Cleveland 10, Ohio
W9, K9 — John F. Schneider, W9CFT, 311 W. Ross Ave., Wausau, Wisc.
WØ, KØ — Alva A. Smith, WØDMA, 238 East Main St., Caledonia, Minn.
VE1 — L. J. Fader, VE1FQ, 125 Henry St., Halifax, N. S.
VE2 — Austin A. W. Smith, VE2UW, 6164 Jeanne Mance, Montreal 8, Que.
VE3 — W. Bert Knowles, VE3QB, Lanark, Ont.
VE4 — Len Cuff, VE4LC, 286 Rutland St., St. James, Man.
VE5 — Fred Ward, VE5OP, 899 Connaught Ave., Moose Jaw, Sask.
VE6 — W. R. Savage, VE6EO, 329 15th St., North Lethbridge, Alta.
VE7 — H. R. Hough, VE7HR, 1785 Emerson St., Victoria, B. C.
VE8 — W. R. Williamson, VE8AK, Box 534, Whitehorse, Y. T.
KP4 — E. W. Mayer, KP4KD, Box 1061, San Juan, P. R.
KZ5 — C.Z.A.R.A., Box 407, Balboa, Canal Zone.
KH6 — Andy H. Fuchikami, KH6BA, 2543 Namauu Dr., Honolulu, T. H.
KL7 — Box 73, Douglas, Alaska

Numerology and Amateur Radio

A New Key to Success in Your Hobby

BY MADAME EVELYN LEIGH-FALCON

ACCORDING to experts in numerology, we are governed by fixed laws set in motion by certain vibrations. The true nature of these vibrations has not been determined to the satisfaction of everyone, but from a close study of their effects it has been possible to draw certain conclusions. Numerology, one of the oldest sciences known to mankind, is a study of the *effects* of these vibrations.

Most studies of numerology have been based on the *names* of individuals and close observation of basic relationships. In numerology, each name reduces to a fundamental figure, and each has a vibration of its own that may or may not be in harmony with another person's vibrations, the vibrations of near-by inanimate objects, or even with the vibration of a particular day or hour. These circumstances account for our emotions and our "luck."

As any student of numerology might be, I was thrilled to learn that amateur radio offered an entirely new field for the application of numerological principles. I was able to obtain the kind assistance of several radio amateurs (who asked to remain anonymous) to help me in a character and success analysis. Using known principles of numerology, it became apparent almost at once that an amateur's call letters were rather indicative of his particular talents, skills and potentialities. One needs no further proof of the *amazing* power of numerology! Anyone in amateur radio who has not had the good fortune he believes himself entitled to is encouraged to analyze his call letters in the manner to be described later, while many outstanding amateurs may find that their *call letters* account for their reputations. But enough of the basic theory — any reader interested in the background of numerology can find many authoritative texts on the subject.[1]

The Science of Numerology

In ordinary numerology, a numeral corresponds to every letter of the alphabet, and each numeral has a special significance. In amateur radio numerology, one or more numbers are added to the letters, by international treaty, I believe. The call letters reduced to a simple number can tell us a great deal about amateur radio operators and other persons they associate with, or about dates and events important to them.

[1] Leigh-Falcon, "Elementary Numerology," Higgins-Digby Ltd., London.
Leigh-Falcon, "Numerology and You," Higgins-Digby Ltd., London.
Leigh-Falcon, "The Royal Road to Numerology," Higgins-Digby Ltd., London.

• By way of introduction, we would like to say that Madame Leigh-Falcon is one of the outstanding numerologists in England, and possibly in the entire world. When she first heard of amateur radio, through a friend who is interested in the mysteries of coincidence and fate as well as in amateur radio, she was intrigued by the possibility that amateur call letters might be indicative of one's abilities and potentialities in his chosen hobby. She became quite excited when her studies showed that the science of numerology applies to amateur radio call letters just as strictly as it does to names. It is a pleasure and privilege to present her findings as a feature of this issue.

The vibrational value of all of the letters in the alphabet are given in the following table. Numbers, of course, retain their integral value.

Letters	*Vib. Val.*	*Letters*	*Vib. Val.*
A-J-S	1	F-O-X	6
B-K-T	2	G-P-Y	7
C-L-U	3	H-Q-Z	8
D-M-V	4	I-R	9
E-N-W	5		

Many different methods may be used to work out a call's numerical value, and some of them are extremely complicated. Indeed, they are! Since the editors have requested that I do not make this a technical treatise, I will explain the simplest system, since it will be found to work in a large number of cases. It consists of jotting down the corresponding figures opposite each letter and number and adding them up as many times as necessary to reduce the compound numbers to a single digit.

A few examples will make this clear. Take the call G7AA, for example. From the above list, the corresponding numbers are

G 7 A A

$7 + 7 + 1 + 1 = 16$, a compound number.

By simple addition this reduces to a primary number: $1 + 6 = 7$.

For another example, take the call G7LF:

G 7 L F

$7 + 7 + 3 + 6 = 23; 2 + 3 = 5.$

Thus the calls G7AA and G7LF have vibrational values of 7 and 5 respectively. The inherent value of other call letters can be found in the same simple manner.

Having found the vibration, the second step is to consider the significance. The following table gives that information.

Number	*Meaning*
1	*At best:* Kindness. Affection. Honesty. Quiet domesticity. *At worst:* Lack of energy. Tendency toward procrastination.
2	*At best:* Courage and originality. Power to live and think independently. Vibration of the inventor, the explorer, the pioneer. *At worst:* Selfishness. Arrogance with inferiors. Lack of patience.
3	*At best:* Qualities of 1 and 2 combined plus ability to compromise when necessary. Success in undertakings. A good telegraphy number. *At worst:* Excessive use of force and violence.
4	*At best:* Good memory and sense of detail. Factual people. Like to use their hands. A strong voice number. *At worst:* Lack of vision. Gossipers.
5	*At best:* Great chances of success. Optimism. Promoting. Generosity. *At worst:* Extravagance. Restlessness. Love of change. Inconsistency.
6	*At best:* Honesty. Dependability. Love of home and peace but great fighting capacity when challenged. See things through. At best when difficulties arise. *At worst:* Unpreparedness because of peaceful disposition.
7	*At best:* Shy, poetic, imaginative people with little interest in financial success. *At worst:* Laziness. Tendency to love individuality in a crowd.
8	*At best:* Born leaders. Power, wealth, success. Strong interest in unusual frequency bands. *At worst:* Defiant and revolutionary in ideas.
9	*At best:* Similar to No. 8 plus interest in competition. Considerable talent displayed in all undertakings. *At worst:* Conceit. Pompousness. Intellectual vanity. Unscrupulous.

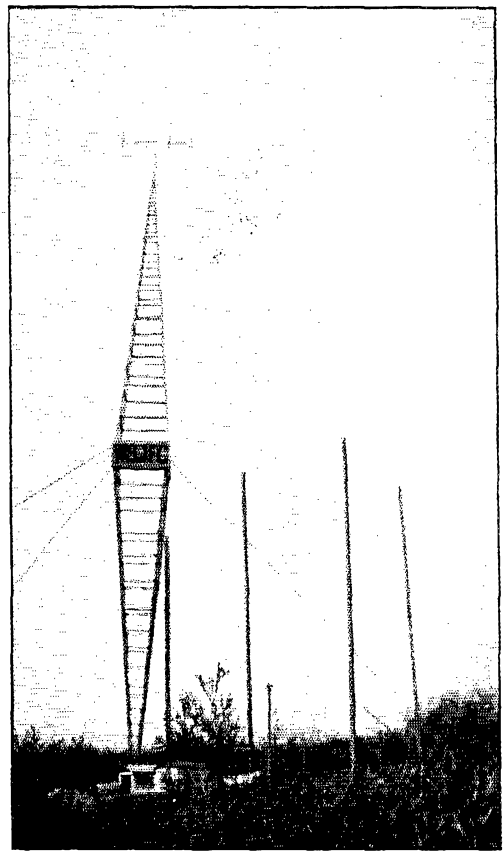
Although numerology does not use compound numbers, there are two exceptions in Nos. 11 and 22. These are normally marks of the highest intelligence. No. 11 brings to its possessor great success or great failure. No. 22 is rarely found. It is a highly mystic number and goes with the spiritual and psychic. Both numbers show extremely strong leanings toward telegraphy or voice, but not both.

Putting Numerology to Work

Using the chart, it is a simple matter to analyze yourself and see if you are following the destiny indicated by your call letters. If you have held two or more calls, find the vibrational numbers for each one and see how well they indicate your accomplishments during the tenure of each call. If you lack success, portable operation may be the answer, since the portable suffix must be added to any analysis of portable operation. In extreme cases, I'm quite certain that you can request a better call from your licensing authority.

The correct use of numerology will give you great powers. With it you can find the vibrational numbers of your friends and acquaintances, and in many cases your findings will help you to understand them better — and they to understand you.

Strays



Howdja like to have a stick like this out in the back yard to support your 4-element 20-meter spinner? We were drooling, too, until we came to the last paragraph of W8JFC's letter: "My Paul Bunyan antenna farm is the result of years of dreaming of owning such an affair; its realization was in a scale model and a bit of trick photography. The '550-foot' tower, fabricated of match sticks, scales down to 80 inches high — the house at the base measures 3 inches high."

Hints and Kinks For the Experimenter

ECONOMICAL BIAS SUPPLY

SHOWN in Fig. 1 is a system for obtaining fixed bias from an existing low-voltage plate supply at low cost. The output voltage is adjustable, depending on the size of C_1. Resistor R_2 may be omitted if desired, as it merely serves as a bleeder

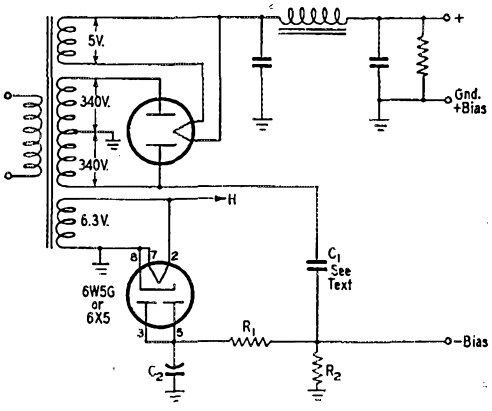


Fig. 1 — An economical bias supply that can be added to an existing low-voltage supply with a minimum of effort. Values are given below for the parts in the bias supply only.
C_1 — Value depends on desired output voltage. See text.
C_2 — 8-μfd. 450-volt electrolytic.
R_1 — 30,000 ohms, 1 watt.
R_2 — 0.1 megohm, 1 watt.

to discharge C_1. Most constructors will prefer to retain it to avoid shocks, and because its value is high it wastes very little power.

The following tabulation shows how the output voltage varies with the size of C_1:

C_1 (μfd.)	D.C. Volts
0.5	−340
0.25	−330
0.1	−240
0.05	−160
0.04	−140
0.01	−37
0.006	−23
0.002	−10.5
0.001	−7.6
0.00025	−3.2

These measurements were made with a vacuum-tube voltmeter and were for a transformer rated at 340 volts each side of center tap. The current rating of such a supply is limited by the size of the components and the ratings of the transformer and rectifiers, but it is adequate to supply bias for small tetrodes such as the 807, and is also usable as blocking bias in grid-blocked keying systems.

As an inexpensive way to get your bias requirements this system is hard to beat. It eliminates the need for large dropping resistors and dry cells, and requires so little space that it can usually be added to an existing power-supply chassis without crowding. — *Frank A. Reed, jr., W6PWQ*

SIMPLIFIED SHOCK MOUNTING

A SPONGE-RUBBER material, known as "Dortite" or "Evrtite," that is supplied in rolled strips makes excellent material for shock mounting light radio gear. It is very easy to apply, because one side of it is coated with an adhesive similar to that used in electrician's tape. Merely select the width desired (it comes in widths up to ¾ inch), peel off the coated fabric that covers the adhesive and press it on. It sticks well to almost any smooth surface. It is usually carried in retail stock by neighborhood hardware stores. — *R. L. Baldwin, W1IKE*

GANGING TOGGLE SWITCHES

ORDINARY toggle switches may be ganged by the method shown in Fig. 2. Mount the switches side by side on the panel, and then join the switch levers with a slotted length of ⅜-inch

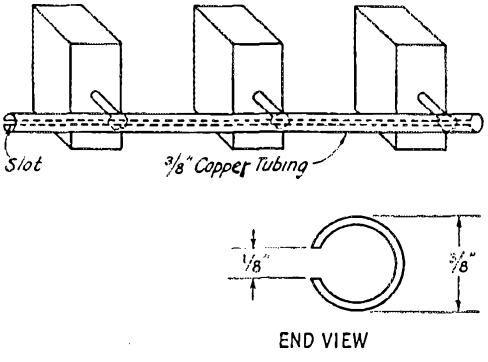


Fig. 2 — A simple method of ganging two or more toggle switches for operating convenience.

o.d. copper tubing. To do this, machine a ⅛-inch slot the full length of the tubing as shown in the end view. A hack saw will do the job, although it can be done better with more elaborate equipment. Now slide the copper tubing over all three switch levers. Fasten it by wrapping wire around the tubing on each side of the switch levers and soldering the wire to the tubing. — *Allan H. Poe, W3RGN*

The World Above 50 Mc.

CONDUCTED BY E. P. TILTON,* W1HDQ

PREVIOUS comment in these pages regarding utilization of the v.h.f. bands in civil defense communication planning was based on the possibility that the entire 2-meter band might be available for our use, in the event of a close-down of normal amateur activity. The frequencies now set aside, limiting wartime operation to relatively narrow segments of the 10-, 6- and 2-meter bands, change the picture in some important respects. We now must judge the practicality of our plans with these frequency bands in mind.

They represent no particular problem as regards the 10- and 6-meter bands. It may be that in heavily-populated areas there will be need for great care in assigning frequencies, and probably there will be insufficient channels available in some localities, but we are thoroughly accustomed to narrow-band techniques on these frequencies, so we can make good use of them. On 2 meters, however, we feel that some area plans are going to run into real trouble.

If planning for utilization of the 2-meter band has been based on the use of crystal-controlled transmitters and selective receivers the two 540-kc. segments allotted (145.17 to 145.71, and 146.79 to 147.33 Mc.) should prove adequate. But anyone who had 2-meter experience in the heyday of the modulated oscillator and the superregenerative receiver doesn't need to be told that these assignments rule out extensive use of that sort of gear. Particularly to be shunned is the overmodulated and highly unstable transmitter of the type that was so widely used in WERS days. Just one of these buzz saws will more than fill 540 kc.! The strongly radiating receiver is equally bad, though we feel that properly designed superregens have their place in 2-meter plans, particularly for mobile units.

There may be places where unstable transmitters can be put to use, but we can't help but feel that they will do more harm than good in areas where considerable numbers of stations will be required. Certainly, if equipment is being built or purchased especially for civil defense use, the modulated oscillator has no place in the 2-meter picture. This is particularly true in view of the availability of the entire 220-Mc. band. There is so little frequency difference between the two assignments that most equipment that will work on 144 Mc. satisfactorily can be made to do almost equally well on 220. The band is five megacycles wide, giving us nearly five times the available space that the 2-meter assignments offer, and for the short hauls, at least, the higher band should be equally effective.

The 220-Mc. band has been something of an orphan in the v.h.f. picture heretofore. Because of its similarity to 144 Mc., many experimenter-type hams have skipped over it in favor of 420 Mc., while the communicators have preferred to stay with 144, where there were still many interesting things left to be done. But this very similarity between 220 and 144 now works to the advantage of the higher band. No new techniques are needed to make use of it. We can use low-cost tubes and components, and even adapt much of the old-style 2-meter gear to work there. The construction of a self-contained hand-carried station for use on 220 presents no new problems, and this sort of gear should be tremendously useful in several phases of civil defense work. "It's an ill wind . . ." Civil defense communication could be the making of 220!

One locality where 220 Mc. is already being employed to good advantage is Rockland County, N. Y., on the western side of the Hudson, bordering on northern New Jersey. W2DZA reports that they have 15 mobile stations already in operation, mostly with 7F8 line oscillators and superregenerative receivers. The headquarters station also has gear working on 2 and 75 meters.

Civil defense planning is also stimulating renewed interest in 50 and 144 Mc. in many areas. Up in Arlington, Mass., there is a 53-Mc. net in operation regularly. Not only is this bringing several new calls to the 6-meter band in the Boston area, but it is building occupancy in the top megacycle of the band, a region that has been totally unused heretofore. Worcester, Mass., is gathering equipment together for group operation on 50 Mc. And from Edmonton, Alberta, VE6MJ reports that AREC organization is proceeding rapidly, with equipment in the works for both mobile and fixed-station operation on 50 Mc.

Area plans involving 144-Mc. should result in the appearance of new stations in many quarters, and cause a considerable increase in mobile operation, a phase of 2-meter work that has not had the emphasis it deserves in recent years. New York, Philadelphia, Harrisburg, Penna., and Columbus, Ohio, are four localities where extensive use of 144-Mc. gear is already under way.

The v.h.f. gang around Harrisburg, Penna., are proud of the fact that March 1st marked the beginning of the fourth year of operation by the Penn-Harris Emergency Net, consisting of members of the Harrisburg Radio Amateurs Club.

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

Active regularly on Monday nights since March 1, 1948, W3s ADE AQC CZV DJZ GEJ HVE HWN KCL MAA MBK and PKI cover the communities of Harrisburg, Progress, Lemoyne, Camp Hill, Mechanicsburg, Steelton, Middletown and Dillsburg, and they are able to tie in with York, Lancaster and Lebanon, to provide extended coverage in central Pennsylvania. There has been a scarcity of mobile equipment, but several units are now under construction, to round out the set-up for the civil defense program.

February News

There's life in the old band yet! Despite the sharp drop in sunspot numbers that has cut out much of the DX on 28 Mc. and turned the 80-meter band into a major field of DX activity, the 50-Mc. band was open to South America at least once in February. At 4:35 P.M. on the 25th, W4FNR, Ft. Lauderdale, Fla., heard the fourth harmonic of HCJB on 49.82 Mc. At 5:15 HC2OT, Guayaquil, Ecuador, was worked with S9-plus signals. HCJB faded out around 5:35, but HC2OT remained in until 6:45, in contact with W4LAW in Tampa. South American DX on 6 appears possible from at least the southern parts of the country in March and April also.

Though a number of dates when ionospheric disturbances have been predicted have passed without anything unusual turning up on the v.h.f. bands, there were at least two good aurora sessions during February, one on the 5th and another on the 26th. The 50-Mc. aurora champion, VE3AET, reports that the band was open as early as 5:30 P.M. on the 5th, continuing until after midnight. His list of stations heard and worked indicates how widespread an area was affected. His first contact was with W9VZP, Delavan, Wis., on c.w., at 7:30. W8LBII, Akron, and W8NQD, Ashland, Ohio, were heard on voice, and W4RBK, Ft. Thomas, Ky., was worked on c.w. around 8:20. The band was quiet from 9 to 10 P.M. W2MEU, Boundbrook, N. J., was worked at 10:25, W1HDQ at 11:10, and W9VZP again at 11:35. Partial contact was made with VE5NC, Boharm, Sask., between 11:50 and 12:10, and W9MBL, Newcastle, Ind., and WØTKX, Minneapolis, Minn., and several unidentified W9 'phones were heard. This spread from Connecticut to Saskatchewan represents unusual coverage for a single aurora period.

There were a few 2-meter contacts made on this one, too, though your conductor was able to find no 2-meter signals in several checks. W4AO, Falls Church, Va., worked W3QKI, Erie, Penna., and heard VE3AIB around midnight. W3QKI worked W8DUL, Ypsilanti, Mich., W9s LF, Creve Coeur, EHX, McLean, and MAL, Tazwell, Ill., and W4AO. Heard were W3LNA, W2TBD, and VE3s LU and AIB.

What was probably another widespread session took place on the evening of Feb. 26th. Reports have not had time to come in on this one as we write, but your conductor had excellent 50-Mc. communication with W2ZGP/2, Ithaca, N. Y., intermittently from 8:35 to just before midnight.

2-Meter Standings

	States	Call Areas	Miles
W1HDQ	16	6	650
W1IZY	14	5	570
W1MNF	14	5	570
W1BCN	13	5	500
W1CTW	12	4	500
W1KLC	12	4	500
W2BAV	21	7	1175
W2NLY	18	6	750
W2PAU	15	6	740
W2DFV	13	5	350
W2CET	12	5	405
W2DPB	12	5	500
W2QED	12	5	365
W2FHJ	12	5	-
W2QNZ	12	5	-
W3RUE	17	7	760
W3NKM	17	7	660
W3QKI	16	7	820
W3LNA	14	7	720
W3KWL	14	6	480
W3GKP	13	6	610
W3OWW	13	6	600
W3KBA	13	6	-
W3KUX	12	5	575
W3PGV	12	5	-
W3LMC	11	4	400
W4HHK	15	6	660
W4JDN	13	6	-
W4JFV	13	5	720
W4IKZ	13	5	650
W4JFU	13	5	830
W4LVA	13	5	400
W4MKJ	12	7	665
W4OXC	12	7	500
W4CLY	12	5	720
W4FJ	12	5	700
W5JTI	14	5	670
W5ML	8	3	725
W5ERD	8	3	570
W5VY	7	3	1200
W5CVW	7	2	560
W5AJG	7	2	450
W5FBT	6	2	500
W5FEK	6	2	500
W5IRP	6	2	410
W5FSC	5	2	500
W5JLY	4	2	650
W6ZEM/6	1	1	415
W6GGM	1	1	300
W6YYG	1	1	300
W8WJC	20	7	775
W8BFQ	20	7	775
W8WXV	18	8	1200
W8UKS	18	7	720
W8EP	17	7	-
W8WRN	16	6	670
W8RWW	14	7	500
W8WSE	14	6	620
W8FQK	13	7	-
W8CYE	12	6	-
W8BAX	12	-	655
W8CPA	12	-	650
W9FVJ	18	7	790
W9UCH	18	7	650
W9EQC	17	7	820
W9SUV	17	7	-
W9WOK	15	5	690
W9AFT	14	-	-
W9NFK	12	7	690
W9ULA	11	7	540
W9FPE	11	5	800
W9GTA	11	5	540
WØNFM	14	7	660
WØEMS	13	5	1080
WØZJB	12	7	1097
WØIHD	12	5	725
WØWGZ	11	5	760
WØHXY	8	3	-
WØJHS	7	3	-
VE3AIB	12	6	600
VE1QY	11	4	900
VE3BOW	8	5	520
VE3BQN	6	4	540
VE3BPB	6	4	525
VE3DER	6	4	450
VE3EAH	5	4	380

At the peak, around 9 to 9:25, the signal from Ithaca was about as strong as aurora signals ever get, and quick scanning of the band showed several other good signals coming through. It is felt that 144 Mc. must have been open at this time, though checks later in the evening netted no 2-meter signals.

Less sensational, but nonetheless important, the winter now coming to a close has been notable for the maintenance of several long-distance v.h.f. schedules. W8BFQ, Everett, Ohio, has been holding a nightly schedule at 8:30 with W4JDN, Erlanger, Ky., for more than a year on 144 Mc. Though this is over 200 miles contact is maintained a high percentage of the time. Margaret is now also making a once-a-week try with W4AO, Falls Church, Va. Success on this 300-mile hop demonstrates what can be done on 144 Mc. with high power and big beams. Both stations run 800 watts or so and have 32-element arrays.

W3QKI, Erie, Penna., has an 8-element Yagi (the original Yagi configuration, with three reflectors and four directors) up 90 feet in the air. With this job he now hears W4JDN during his workouts with W8BFQ. This is a 330-mile path. Herb is testing with W2NLY, Oak Tree, N. J., on Mondays, Wednesdays, and Fridays at 10 P.M. and results indicate that this 310-mile mountainous path may be worked fairly regularly, thanks to some real antennas at both ends. Remember, not so long ago, when we used to hear that two fellows 30 or 40 miles apart found it "impossible" to work on 144 Mc.?

Though it is a short hop compared to the above, your conductor has found it of interest to check regularly with stations in Schenectady, Albany and Glens Falls, N. Y., on 144 Mc. W2ACY in Schenectady is worked consistently, and W2SFK and W2ERX in Glens Falls are nearly solid. These are about 90 and 110 miles, respectively, with mountains all the way along the line.

All through the winter, W9FPE, Willard, Wis., has found it possible to work the Minnesota stations regularly. During one contact with WØHXY the temperature was reported as 40 below in St. Cloud and it was down to 50 below in upper Wisconsin, yet signals were strong and steady over this 160-mile hop. Largely as a result of the efforts of W9FPE, there is considerable 2-meter activity in northern and central Wisconsin. Ed is leaving the area, having taken a position in Chicago, but he is leaving v.h.f. affairs in good order. The extent of 2-meter activity in this region is proof that year-round v.h.f. interest need not be confined to metropolitan areas where there are large concentrations of amateur population.

Over on the Lake Michigan side of Wisconsin, W9DDG, Sheboygan, found it possible to work W9TQ and W9AFT in Milwaukee, and W9KQM in West Allis, Wis., regularly through the winter, down 50 to 60 miles of lake shore.

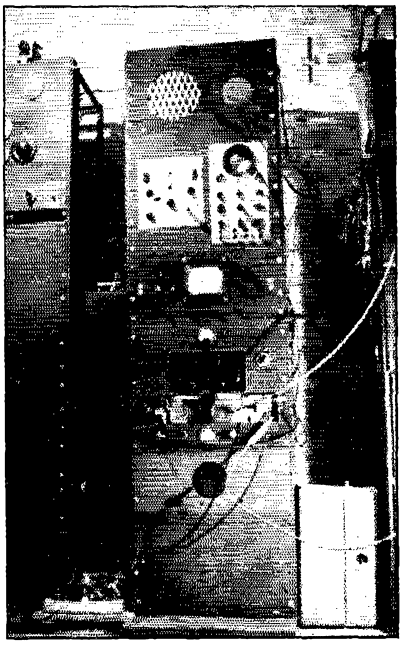
Consistent year-round activity on 144 Mc. won section awards in the Wing Trophy V.H.F. Marathon (Sept. 1950 *QST*, p. 47) for W6HZ (Los Angeles), W6BYE (San Diego), W6MHF (San Francisco), W6ZYH (Santa Clara Valley), W6EXH (San Joaquin Valley), and W6AUO (Sacramento Valley). Winner of the award based on mileage was W6BYE, and W6IHK won the expedition award.

Progress on 420-Mc. TV

Widespread — that is certainly the word for interest in amateur TV. Insertion of a few lines requesting hams interested in TV transmission to send details of their set-ups to W1BHD brought Mel letters from Pennsylvania, Florida, Texas and California. If we had A5 on 14 Mc. these fellows could save time on correspondence, but with TV confined to 420 Mc. and higher, mail service and the pages of *QST* must serve.

W3MLN writes that he is putting on TV demonstrations at Pennsylvania State College, using a flying-spot scanner, with a 5527 camera in the process of construction. For the present, only a 6J6 oscillator is used for the r.f. section, but if interest on the part of other amateurs in the area develops, more power will be provided.

Our 50-Mc. stand-by in Pensacola, Fla.,



The gear at W1BHD-TV, Everett, Mass. The camera position, left, has a pulse and sync unit on the middle tripod shelf, with power supplies on another shelf at the bottom, the whole assembly being mounted on a dolly. The rack at the right contains the r.f. units and the monitor. A Millen v.h.f. transmitter drives an 832 tripler to 420, followed by an 832 amplifier.

W4MS, is building equipment along the lines of that described in *QST* for October, 1940, modified for 60-cycle sync and 262½ lines. He is not on the air as yet. W6OFU, Bakersfield, Calif., also reported experimentation with a flying-spot scanner, but no on-the-air operation.

W5QHI, Dallas, reports that W5MSB, the club station at the Texas Trade School, is on the air daily on 435.2 Mc., Monday through Friday, from 8 to 10:15 A.M. Their station, described in this section last month, has been received at distances up to 7 miles.

TV gear at W1BHD is shown in the photographs on the previous page.

Final Results — 4th V.H.F. Sweepstakes

The 1951 edition of the V.H.F. Sweepstakes demonstrated once more that plenty of activity can be generated on the v.h.f. bands, even in the dead of winter, if there is sufficient incentive. The incentive in this case was the club awards: in this activity everyone's score counts, and several clubs made an all-out drive to get every piece of v.h.f. gear into service. Result: some tremendous club totals, and more contacts for all of us.

Outstanding coöperative effort by the York Road Radio Club of the Philadelphia area gave this group a substantial margin of victory over their enthusiastic competitors just across the river, the South Jersey Radio Association. Our sincere congratulations to the York Road gang. Your engraved silver gavel will be on the way soon.

For the first time in four years of v.h.f. SS competition the country's highest score was made on one band, Jim Kmosko, W2NLY, of Oak Tree, N. J., turning the trick on 144 Mc. With the aid of a 30-element flopover array and 24 hours of concentrated effort, Jim piled up 213 contacts in 8 sections for a score of 3400 points. Not far behind were W3KKN, Willow Grove, Penna., with 3132 points, and W2PAU, Westmont, N. J., with 2808. Ernie and Brownie will be well supplied with wallpaper, as they are section-award winners as well as high men in their respective club scores.

The tabulation to follow contains some other facts that deserve emphasis. We expect ARRL sections like Eastern Pennsylvania, Southern New Jersey, and Eastern Massachusetts to turn in some solid totals, but notice that Western New York is fourth in number of reports, closely followed by Ontario. That these sections, where the v.h.f. population is but a fraction of that of the New York, Philadelphia, Boston or Los Angeles areas, can show up well in a tabulation based on number of *reports* rather than points scored, is a credit to the efforts of clubs like the Radio Association of Western New York, the Rochester V.H.F. Group, and the West Side Radio Club of Toronto. What these groups lack in numbers they more than make up in enthusiasm.

Scores are listed by ARRL divisions and sections. The columns show the score, the number of contacts made, the section multiplier, and the bands used. A is for 50 Mc., B 144, C 220 and D 420 Mc. Club standings at the end of the tabulation give the club's aggregate score and the call of the highest scorer in the club. A handsome gavel with engraved sterling silver band goes to the York Road Radio Club as the top club in the nation. Certificate awards go to the high man in each club turning in three or more reports, and to the top contestant in each ARRL section.

ATLANTIC DIVISION

E. Pennsylvania

W3KKN	3132-174-	9-A-B
W3NXT	2160-135-	8-B
W3IBH	2128-133-	8-B
W3UKI	2080-131-	8-A-B
W3KT	1960-140-	7-A-B
W3MQU	1752-110-	8-A-B
W3QMO	1664-104-	8-B
W3BWQ[1]	1638-117-	7-B
W3LVF	1596-114-	7-A-B
W3OWA	1519-109-	7-A-B
W3OXQ	1442-103-	7-B
W3KIW	1368-114-	6-A-B
W3FSC	1320-110-	6-B
W3CXU	1190- 85-	7-A-B
W3FXG	864-108-	4-A-B
W3IAU	800- 80-	5-B
W3GRY	792- 66-	6-A-B
W3CLT	610- 61-	5-B
W3KBB	584- 73-	4-B
W3RDM[1]	552- 92-	3-B
W3BYB	544- 68-	4-B
W3NKD	474- 79-	3-B
W3OQG	468- 78-	3-A-B
W3AJF	456- 76-	3-A-B
W3RFI	450- 75-	3-B
W3WW	450- 75-	3-B
W3MZM	420- 70-	3-B
W3KQQ	400- 50-	4-A-B
W3JPP	384- 64-	3-B
W3JPI	342- 57-	3-B
W3PMU	320- 40-	4-B
W3DJ	312- 52-	3-B
W3KDH	306- 51-	3-B
W3IND	300- 50-	3-B
W3HVB[1]	282- 47-	3-B
W3GHS	240- 24-	5-B
W3OZP	180- 45-	2-B
W3QAS	180- 45-	2-B
W3EQA	174- 29-	3-A-B
W3ALB	136- 34-	2-B
W3DZD	126- 21-	3-B
W3SSU	96- 16-	3-B
W3QKZ	84- 21-	2-B
W3IMW	80- 20-	2-B
W3NSI	46- 12-	2-B
W3BZQ	42- 11-	2-B
W3EVW	24- 6-	2-A
W3KFK	22- 11-	1-B

Md.-Del.-D. C.

W3LMC	648- 54-	6-B
W3KUX	588- 49-	6-B
W3PYW	570- 48-	6-B
W3WIT	530- 53-	5-B
W3GKP	120- 20-	3-B
W3QNC	114- 17-	3-A-B
W3HJY	96- 24-	2-B
W3KWF	88- 22-	2-B
W3LJV	44- 11-	2-B
W3PKF	32- 8-	2-B
W3OTC	28- 7-	2-B
W3NH	26- 13-	1-B

S. New Jersey

W2PAU	2808-176-	8-A-B
W2REB	2248-141-	8-B
W2JAV	1628-108-	8-B
W2ADA	1484-106-	7-A-B
W2BV	1440- 90-	8-B
W2QED	1368-114-	6-B-D
W2EH	1092- 91-	6-B-D
W2BDI	1050- 75-	7-B
W2GQO	840- 72-	6-B
W2UCV	800- 80-	5-B
W2SDO	780- 78-	5-B
W2JRO	748- 98-	4-B-D
W2YT	648- 81-	4-B
W2MEU	592- 37-	8-A
W2DAJ	576- 72-	4-B
W2VX	550- 55-	5-B
W2ZEA	424- 53-	4-B
W2OSV	416- 52-	4-B
W2PFQ	408- 68-	3-B
W2AXA	360- 45-	4-B
W2APB	312- 39-	4-B
W2TM	300- 25-	6-B
W2RBF	264- 44-	3-B
W2FRJ	216- 27-	4-B
W2DMU	200- 50-	2-A-B
W2LY	188- 47-	2-B
W2EET	144- 36-	2-B-D
W2SPV	144- 36-	2-B
W2EGP	140- 35-	2-B
W2FHY	108- 18-	3-B
W2OQN	104- 26-	—
W2EWN	96- 24-	2-B
W2PNA	96- 24-	2-B
W2ZFA	92- 23-	2-B
W2DGN	88- 22-	2-B
W2NBJ	58- 15-	2-B
W2BAY	52- 13-	2-A

W. New York

W2QNA	488- 61-	4-A-B
W2TBD	460- 58-	4-B
W2ORI	432- 54-	4-B-D
W2UDD	408- 51-	4-B
W2RUC	288- 36-	4-B-D
W2OWF	280- 37-	4-B
W2UTH	228- 38-	3-B
W2UBR	180- 30-	3-B
W2ZHB	174- 29-	3-B
W2DPL	142- 38-	2-B
W2SD	140- 36-	2-B
W2WDO	104- 26-	2-B
W2VVG	80- 20-	2-B
W2ZUW	76- 19-	2-A-B
W2FCG	56- 14-	2-B
W2TSX	52- 13-	2-B
W2PPE	52- 13-	2-B
W2UXP	44- 11-	2-B
W2SJV	34- 17-	1-B
W2UAD	28- 14-	1-B
W2QY	26- 13-	1-B
W2PTC	24- 6-	2-B
W2VBH	22- 11-	1-B
W2PSD	18- 9-	1-B
W2MSV	18- 9-	1-B
W2BCL	16- 8-	1-B

W. Pennsylvania

W3LNA	120- 20-	3-B
W3KWH[2]	48- 8-	3-B
W3CJF	40- 10-	2-B
W3NCD	28- 7-	2-B
W3LST	26- 7-	2-B
W3OOF	2- 1-	1-B
W3KJM	2- 1-	1-B

CENTRAL DIVISION

Illinois

W9NW	246-	41-	3-B
W9QKM	246-	41-	3-A-B
W9NQZ	180-	30-	3-B
W9KCW	180-	30-	3-B
W9QJO	108-	27-	2-B
W9OBW	96-	24-	2-B
W9CT	92-	23-	2-B
W9ODT	60-	15-	2-B
W9WIO	48-	12-	2-B

Indiana

W9GZQ	40-	10-	2-B
W9UIA	2-	1-	1-B

Wisconsin

W9AFT	186-	31-	3-B
W9BTI	72-	18-	2-B
W9TQ	52-	13-	2-B
W9FPE	40-	10-	2-B
W9UJM	16-	4-	2-B

DAKOTA DIVISION

Minnesota

WØAAS	24-	6-	2-B
WØRQT	4-	2-	1-B

GREAT LAKES DIVISION

Michigan

W8NNF	152-	19-	4-B
W8DIV	112-	14-	4-B
W8OLD	6-	3-	1-B

Ohio

W8BFQ	1270-	70-	9-A-B-C
W8BLN	96-	16-	3-B
W8FQK	72-	12-	3-B
W8MGA	66-	11-	3-B
W8FKC	38-	10-	2-B
W8ID	28-	7-	2-B
W8LBH	10-	5-	1-A-C

HUDSON DIVISION

E. New York

W2VRE	1281-	92-	7-A-B
W2PCQ	644-	46-	7-B
W2BVU	252-	21-	6-B
W2IP	52-	13-	2-B

N.Y.C.-L.I.

W2FHJ	1600-	100-	8-A-B
W2AOD	912-	76-	6-B
W1AA/2[1]	745-	75-	5-B
W2DHB	552-	46-	6-B
W2IN	432-	54-	4-B
W2MZY	216-	27-	4-B
W2ZJJ	144-	24-	3-B
W2NZJ	144-	18-	4-B
W2KU	135-	14-	4-B
W2QAN	120-	20-	3-B
W2AUF	120-	15-	4-B
W2TUK	84-	14-	3-B
W2YSL	44-	11-	2-B
W2KMH	30-	5-	3-B
W2ODB	18-	9-	1-B
W2JBQ	8-	4-	1-B
W2CAX	4-	2-	1-B

N. New Jersey

W2NLY	3400-	213-	8-B
W2DZA	602-	43-	7-A-B-C
W2PMQ	420-	30-	7-B
W2VFN	360-	36-	5-B
W2CXE	308-	22-	7-A
W2AQG	120-	15-	4-B

MIDWEST DIVISION

Kansas

WØPKD	10-	5-	1-A-B
WØICV	2-	1-	1-B

NEW ENGLAND DIVISION

Connecticut

W1HDQ[3]	1920-	96-	10-A-B-C-D
W1HDF	504-	36-	7-A-B-C-D
W1PHR	204-	34-	3-B
W1RWS[3]	170-	17-	5-A
W1QBH	144-	36-	2-A-B
W1FLQ	126-	21-	3-A-B
W1AW[3]	84-	21-	2-A-B
W1BDI[3]	80-	20-	2-A-B
W1NKZ	60-	15-	2-A-B
W1SPX	60-	15-	2-A
W1RMU	56-	14-	2-B
W1HAX	52-	13-	2-B
W1OLG	44-	11-	2-B
W1A8J	44-	11-	2-B
W1QUV	44-	11-	2-B
W1DJV[3]	28-	7-	2-A
W1FWH[3]	26-	13-	1-B
W1KXM	13-	7-	1-B

E. Massachusetts

W1CTW	1170-	117-	5-A-B-C
W1SNK	900-	90-	5-B
W1MMY	820-	82-	5-A-B
W1HIL	700-	67-	5-A-B
W1OJI	650-	65-	5-B
W1MCR	560-	70-	4-B
W1AQE	544-	68-	4-B
W1TDS[1]	516-	65-	4-B
W1NFQ	320-	40-	4-B
W1GAC	320-	40-	4-B
W1OED	291-	50-	3-B
W1QOI	244-	34-	3-B
W1CTR	240-	40-	3-B
W1JLI	216-	36-	3-B
W1ODQ	216-	27-	4-B
W1SUR	208-	26-	4-B
W1AWA	195-	24-	5-A
W1LIZ	180-	30-	3-B
W1DJ	168-	21-	4-A
W1CK	148-	20-	4-A
W1RUU	144-	24-	3-B
W1LYL	132-	22-	3-B
W1SQE	126-	21-	3-B
W1QFO	124-	31-	2-B
W1FGT	120-	20-	3-B
W1LKM	114-	19-	3-B
W1KQF	72-	18-	2-B
W1PLR	52-	13-	2-B
W1JKR	40-	20-	1-B
W1ALP	36-	18-	1-B

W. Massachusetts

W1RFU	1062-	59-	9-A-B-C-D
W1GJO	1020-	102-	5-A-B
W1QWJ	322-	23-	7-A
W1DRF	280-	35-	4-B
W1RVW	132-	17-	4-A
W1BCI	124-	16-	4-A
W1NLE	72-	18-	2-B-C
W1NY	48-	12-	2-A-B
W1OBQ	34-	17-	2-B
W1RRX	14-	7-	1-B-D
W1PHU	6-	3-	1-B

New Hampshire

W1LTO	260-	26-	5-B

Rhode Island

W1KCS	545-	55-	5-B

NORTHWESTERN DIVISION

Washington

W7GAH	6-	3-	1-B

PACIFIC DIVISION

Nevada

W7JLU	4-	2-	1-A

Santa Clara Valley

W6LCZ/6	640-	65-	5-B
W6ZBS	630-	63-	5-B
W6PBV	156-	26-	3-B
W6EDC/6	136-	17-	4-B
W6IWS	18-	3-	3-A

East Bay

W6AJF	690-	69-	5-A-B-D

San Francisco

W6MHF	540-	54-	5-B
W6BUR	260-	34-	4-A-B

Sacramento Valley

W6YLO	440-	44-	5-B

San Joaquin Valley

W6BCL	410-	41-	5-B
W6DVS	280-	28-	5-B
W6GQZ	216-	27-	4-B
W6VKD	160-	20-	4-B
W6EXH	104-	13-	4-B

ROANOKE DIVISION

Virginia

W4AO	952-	68-	7-B
W4LVA	276-	46-	3-A-B
W4MID	120-	30-	2-B
W4SCJ	48-	12-	2-B
W4JUY	44-	11-	2-B

West Virginia

W8EP	36-	6-	3-B

ROCKY MOUNTAIN DIVISION

Wyoming

W7OWZ	4-	2-	1-B

SOUTHEASTERN DIVISION

E. Florida

W4AYX	4-	2-	1-B

SOUTHWESTERN DIVISION

Los Angeles

W6NLZ	198-	55-	2-B-D

WEST GULF DIVISION

Southern Texas

W5FSC	38-	19-	1-A-B
W5BHO	36-	18-	1-A-B
W5FEK	36-	18-	1-B
W5IRP	34-	17-	1-B
W5PEH	30-	15-	1-B
W5BDI	24-	12-	1-B

CANADA

Ontario

VE3AQG	752-	94-	4-A-B
VE3AIB	720-	90-	4-A-B
VE3BQN	528-	66-	4-A-B-D
VE3AXT	408-	68-	3-A-B
VE3DFW	366-	61-	3-A-B
VE3BOW	354-	59-	3-A-B
VE3IR	336-	42-	4-B
VE3BUO	280-	35-	4-B
VE3IZ	276-	46-	3-A-B
VE3AZX	240-	40-	3-A-B
VE3DER	144-	24-	3-B
VE3FT	124-	31-	2-A-B
VE3UT	120-	30-	2-B
VE3DJP	116-	29-	2-A
VE3DFA	104-	26-	2-A
VE3BHQ	88-	22-	2-A
VE3DGV	76-	19-	2-A-B
VE3QT	62-	16-	2-B
VE3JJ	48-	12-	2-A-B
VE3DBY	34-	17-	1-A

[1] Multi-operator station, not eligible for award.

[2] Steel City Amateur Radio Club station, W3RXT operator.

[3] Headquarters staff, not eligible for award.

CLUB SCORES

Club	*Aggregate Score*	*Certificate Winner*
York Road Radio Club	30,503	W3KKN
South Jersey Radio Assn.	22,616	W2PAU
Hartford County Amateur Radio Assn.	2989	W1HDF
Old Colony Amateur Radio Assn.	2698	W1MMY
The DX Club of Philadelphia	2246	W3OXQ
Frankford Radio Club	2158	W3KT
West Side Radio Club	1898	VE3AIB
Hampden County Radio Club	1814	W1RFU
Radio Assn. of Western New York	1256	W2TBD
Lake Success Radio Club	961	W2QAN
San Mateo County Amateur Radio Club	922	W6ZBS
Rochester V.H.F. Group	894	W2OWF
Mercer County Radio Assn.	188	W3LNA

Other clubs mentioned: Amateur Radio Club of Falls Church, Providence Radio Assn., North Shore Radio Club, Nassau Radio Club, Connecticut Wireless Assn., Midwest V.H.F. Club, Quannapowitt Radio Assn, El Ray Radio Club, North Shore Radio Club, V.H.F. Institute of New York.

Overtone Crystal Oscillator Circuits

High-Frequency Crystal Techniques for the V.H.F. Man

BY EDWARD P. TILTON,* W1HDQ

UNLESS it is to be part of an all-band transmitter, there is no longer much point in starting the v.h.f. exciter out on some low frequency and then multiplying in a series of doubler stages to the desired operating frequency. This was formerly necessary, to assure stable and reliable crystal operation, but new crystal and circuit techniques have made direct control at frequencies up to 50 Mc. or more entirely satisfactory in these respects. Now, the possibility of TVI troubles from crystal harmonics that may fall in the TV channels just about clinches the argument in favor of high oscillator frequencies. In crystal-controlled receiver applications the use of a high initial frequency in the oscillator is helpful if annoying birdies throughout the tuning range are to be avoided.

If methods to be outlined here are employed, crystals for frequencies up to 50 Mc. and more are not at all tricky to use. If they were processed according to techniques that have been in general use for some years they will be as stable as the better cuts for lower frequencies. Though they are a little more expensive than crystals for frequencies below 10 Mc., the total cost of equipment may be no more in the end, what with the saving in stages and power supply. If the equipment is to be for portable or mobile service the latter considerations are of major importance.

Practically all crystals currently supplied for amateur use at frequencies from 12 Mc. up are of the "overtone" variety. That is, the frequency marked on the holder is an *approximate* odd multiple of some lower frequency for which the crystal was actually ground. Thus, a 24-Mc. crystal is actually an 8-Mc. cut, ground and mounted in such a way as to encourage overtone oscillation. A 12-Mc. crystal has a 4-Mc. fundamental, and one marked for 48 Mc. is probably a 16-Mc. cut. Crystals are now available for up to 100 Mc. or so, using fifth or higher-order overtones, but most high-frequency crystals supplied for amateur use work on the third overtone.

When used in suitable circuits, standard fundamental-type crystals, including those that have been available at very low cost on the surplus market, can be made to oscillate on their third overtones readily. With somewhat more critical adjustment they will work on the fifth overtone. Some may work on still higher overtones, though adjustment becomes so critical and the power output so low that their use in this way is seldom practical. Crystals that are ground for overtone activity may, however, work very well, not only on the frequency marked on the holder, but on other odd multiples of the fundamental up to as high as the thirteenth or fifteenth. Thus, a 12-Mc. crystal (actually a 4-Mc. cut) may oscillate on 20, 28, 36, 44, 52, 60 Mc. or even higher, with proper circuitry. It should be emphasized that the overtones are seldom *exact* multiples of the fundamental oscillation frequency. Thus, crystal markings should be disregarded, if the overtone is other than the one indicated on the holder, and the actual frequency of oscillation checked carefully if it is near a band edge.

Overtone crystals may be used in most of the circuits that have been popular for years on lower frequencies, but better results are obtained with specially-designed circuits. There are many variations, but all operate on one basic principle: that of adding regeneration to make for easy starting and better performance under load. To learn their respective merits the circuits shown below were tested in the ARRL Lab for: (1) ease of adjustment and freedom from self-oscillation; (2) adaptability to use with all types of crystals; (3) order of overtone and maximum frequency limits; (4) stability.

Regenerative Triode Oscillator

One of the simplest overtone oscillators is shown in two forms in Fig. 1. Basically it is a triode oscillator, with regeneration added for better starting under load.[1] [2] [3] Regeneration is controlled by the position of the tap on L_1 in Fig. 1A, or by the coupling between L_1 and L_2 in B. The latter provides greater ease of adjustment, but the tapped coil may have the advantage of mechanical stability. If the separate feed-back winding (B) is used, some care must be taken to see that the physical relationship between L_1 and L_2 is held constant after the initial adjustment is made.

When the circuit is used with third-overtone crystals this adjustment is not in the least critical. With somewhat more care in adjusting the regeneration, ordinary low-cost crystals for up to 10 Mc. may be used on their third overtones. In either case the feed-back should be adjusted only to the point that will provide satisfactory starting and output. More care is needed to prevent self-oscillation with fundamental-type crystals, as more feed-back is required than with crystals specifically designed for overtone use. Ordinary crystals can be made to oscillate on the fifth overtone (40 Mc. in the case of an 8-Mc. crystal) but adjustment of regeneration becomes

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

[1] Sells, "V.H.F. Crystal Oscillators," *QST*, Nov., 1947, p. 44.

[2] Johnson and Bernstein, "Simple Crystal Control on 144 Mc.," *QST*, Oct., 1948, p. 22.

[3] Tilton, "So It's Hard To Get on V.H.F.!," *QST*, Nov., 1948, p. 44.

quite critical. Use of them in this way is not recommended except for receiver applications, where no great amount of power is required, and readjustment of the circuit is seldom needed after the initial setting is done. With overtone crystals, however, it is possible to use the fifth and even higher overtones with fairly good results.

With either circuit, L_1C_1 is resonated at the frequency of oscillation desired. The crystal oscillates only on the overtone selected. An 8-Mc. crystal so used oscillates on 24 Mc.; there is no oscillation at 8 or 16 Mc. In this way the circuit has a distinct advantage over oscillator-multiplier circuits, such as the Tri-tet, where the crystal oscillates on its marked frequency, with doubling or tripling taking place in the plate circuit, or in a succeeding stage.

In practice the circuit is usually employed in the first section of a dual triode such as a 6J6, with the second half acting as a doubler or tripler. A 6J6 operated in this way with an 8.4-Mc. crystal will provide ample output to drive an 832, 2E26 or 807 amplifier on 50 Mc. If the rig is for 144 Mc. an 8-Mc. crystal and 6J6 will give enough output on 48 or 72 Mc. to drive another 6J6 or 5763 as a tripler or doubler to 144 Mc. Thus, we develop enough 144-Mc. r.f. to drive a low-powered final amplifier, with only two tubes and an 8-Mc. rock. If the feed-back adjustment is made carefully it will be possible to use 8- or 24-Mc. crystals interchangeably.

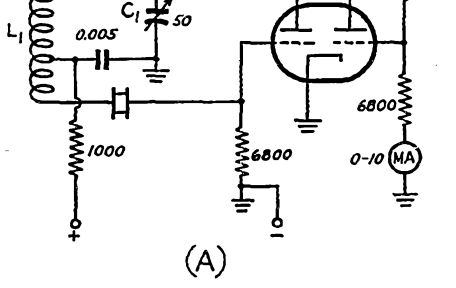
The crystal oscillator circuit may be tested by connecting up only that portion of the rig shown in Fig. 1, using the grid current developed in the second half of the 6J6 as a check of oscillator output. If possible, the signal should be monitored at 24 Mc., to check for self-oscillation. With the tapped-coil version, the tap should be as low on the coil as possible, for greatest freedom from spurious oscillation. With the separate feed-back winding the inductance should be low in comparison with L_1. The smaller the feed-back winding the closer it will have to be to L_1 to give the required regeneration. Using coils of B & W Miniductor, No. 3003, it was found that five turns was the optimum value, with fairly close coupling. Larger coils made self-oscillation easier (nearer to 24-Mc. resonance in the grid circuit) and a smaller coil would not provide sufficient feed-back for starting under load. If only overtone crystals are to be used a feed-back winding of as small as three turns will suffice.

This circuit provided good operation with 12-Mc. third overtone crystals on overtones up to the ninth, or 36 Mc.; with 24-Mc. crystals up to the seventh, or 56 Mc.; and it worked well with a 51-Mc. third overtone crystal on its marked frequency. The actual frequency of oscillation, rather than the order of the overtone, seemed to be the limiting factor, for as the oscillation frequency went much over 50 Mc. adjustment of the feed-back became critical, regardless of the order of the overtone. Good output and starting characteristics were obtainable on the third overtone with any crystal tried, whether it was an overtone type or otherwise, but above the third only the overtone crystals worked satisfactorily enough for transmitter applications. With this and other circuits shown, the plate supply should be 150 to 200 volts.

A Pentode Oscillator with Capacitive Feed-Back

The pentode oscillator circuit in Fig. 2 was developed by Bell Laboratories [4] especially for use with high-frequency overtone crystals. It is extremely stable when properly adjusted. Regeneration is controlled by the position of the cathode tap on L_1 and by the setting of C_1. The tuned circuit, L_1C_2, should be resonated at the frequency of oscillation desired. Correct adjustment procedure involves temporary insertion in the crystal socket of a capacitance equal to that of the crystal and its holder. C_1 is then adjusted until self-oscillation ceases. With the crystal in

[4] Thurston, "Direct Crystal Control at 50 Mc.," *Western Electric Oscillator*, July, 1946, p. 30.



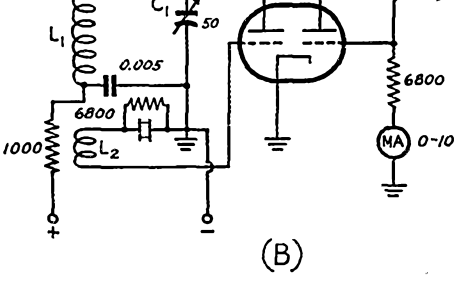


Fig. 1 — Two simple regenerative oscillator circuits for overtone service. The regeneration is controlled in (A) by the position of the tap on L_1 and by the position of L_2 with respect to L_1 in (B). This circuit is generally used with a 6J6 dual triode, with the second section operating as a frequency multiplier. Values at the right are for operation on 24 Mc.

L_1 (A) — 14 turns No. 18, ½-inch diam., 1 inch long, tapped at 4½ turns.

L_1 (B) — 18 turns, no tap.

L_2 — 5 turns No. 18, ½-inch diam., ⅜ inch long. Adjust position with respect to L_1 — see text. All coils B & W Miniductor, No. 3003.

place, oscillation should be on the crystal frequency only. If the tap on L_1 and the adjustment of C_1 are correct, the circuit will oscillate on any setting of C_3, with the output coming up as resonance is reached, but with only very slight frequency change.

Excellent starting, stability and output were obtained with this circuit using a 51-Mc. crystal, as well as various other overtone crystals of lower frequency. A 24-Mc. crystal worked nicely on 24 and 40 Mc. (the third and fifth overtones).

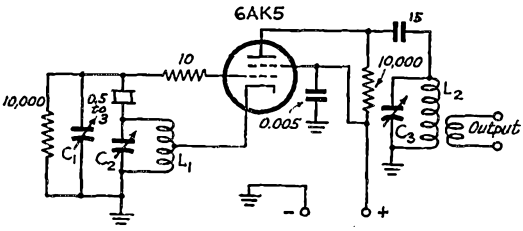


Fig. 2 — A pentode oscillator for use with high-frequency crystals. Regeneration is controlled by the position of the cathode tap on L_1, and by the capacitance of C_1. Both tuned circuits are resonated at the desired overtone frequency.

The seventh overtone (56 Mc.) became somewhat more critical of adjustment and the output dropped. Oscillation was in evidence on the ninth overtone (72 Mc.), but feed-back adjustment was too critical for practical purposes. Third-overtone operation of standard non-overtone crystals was satisfactory (i.e., 24 Mc. from 8-Mc. crystal) but fifth-overtone output was very low. The circuit was tried with frequency multiplication in the plate circuit. With a 24-Mc. crystal oscillating on its marked frequency some output was obtainable when a 72-Mc. tank circuit was connected at L_2C_3, but output was far lower than with the dual-triode circuit previously described. Stability was excellent, however. With the standard 8-Mc. crystals oscillating on 24 Mc. insufficient output was developed for satisfactory frequency multiplication.

The Lister Circuit

One limiting factor in satisfactory overtone operation, particularly at the higher frequencies, is the considerable capacitance built up across the crystal circuit. This includes the capacitance of the crystal and its holder, plus the tube and circuit capacitance, and usually amounts to 35 $\mu\mu$fd. or more, lowering the grid circuit impedance at high frequencies. Obviously, this is a deterrent to high-frequency oscillation. One way of correcting this is to balance out the effective capacitance of the crystal and holder by connecting a coil across it.

This method is used by George Lister, W8NV,[5,6] in the circuit shown in Fig. 3. With this arrangement the crystal circuit is resonated at a frequency somewhat above the desired overtone frequency. The plate circuit is tuned to the desired output frequency, and sufficient magnetic coupling is introduced between the grid and plate circuits to cause oscillation. At frequencies up to about 50 Mc. a variable capacitance (C_1) can be used to resonate the crystal circuit at the proper frequency, but for higher frequencies the inductance of the coil must be varied to attain resonance, the crystal and tube capacitance being sufficiently high to prevent resonance with a capacity-tuned coil of any size at L_1.

The circuit must be resonated *higher* than the desired overtone. If it is on the low side there may be two frequencies of oscillation, both crystal-controlled, but about 20 kc. or so apart at 50 Mc. The oscillator may jump between these two frequencies as the circuit is tuned or the loading is varied. Greatest freedom from self-oscillation will be obtained with the grid circuit as far on the high side of the desired frequency as possible. As an example, a 24-Mc. crystal oscillating on 56 Mc. (seventh overtone of 8-Mc. fundamental) gave the same output and starting characteristics with the grid on 60 Mc. or 70 Mc., if the coupling between the grid and plate circuits was adjusted carefully for each. With 70-Mc. grid resonance, however, the tuning range on C_2 over which no self-oscillation developed was considerably greater. As higher overtones are sought the resonant frequency of the grid circuit must be closer to the operating frequency; hence, the higher the overtone, the greater the likelihood of self-oscillation.

With overtone crystals it was possible to develop crystal-controlled oscillation up to as high as the fifteenth overtone (60 Mc. with a 12-Mc. crystal having a 4-Mc. fundamental). Oscillation on 72 Mc. was obtained with a 24-Mc. crystal, but with this circuit as with those of Figs. 1 and 2, adjustment became very critical and the danger of self-oscillation marked above about 50 Mc., or the fifth overtone, whichever came first. With standard non-overtone crystals fairly satisfactory operation was possible on the third overtone (8-Mc. crystal oscillating on 24 Mc.) but only a few crystals worked on the fifth. Adjustment for even the third overtone was fairly critical, and

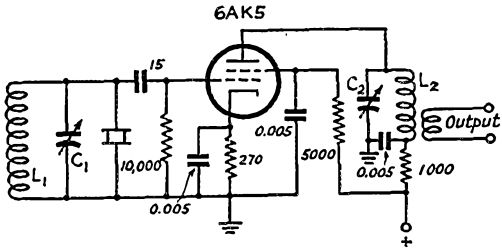


Fig. 3 — In the circuit developed by W8NV a tuned circuit is connected across the crystal to resonate it somewhat above the desired frequency of oscillation. L_1 balances out the effect of the crystal and circuit capacitance at the overtone frequency. A self-resonant coil should be used at frequencies above 50 Mc., to reduce circuit capacitance. The plate circuit, L_2C_2, is tuned to the overtone frequency.

[5] Lister, "Overtone Crystal Oscillator Circuitry," Reports of May 8 and August 2, 1950, Electronic Research and Mfg. Co., Cleveland, Ohio.

[6] Lister, "Overtone Crystal Oscillator Design," *Electronics*, Nov., 1950, p. 88.

more danger of self-oscillation was encountered than with other circuits. For high-order overtones with suitably designed crystals, however, it was superior to all other circuits tried. The originator reports having developed overtones as high as the twenty-ninth.

The Lister circuit may also be used with triodes on the lower overtones, but feed-back through the grid-plate capacitance of the tube makes control of self-oscillation more difficult. The pentode is recommended for high-overtone use.

A Crystal-Oscillator Cathode-Follower Multiplier

The circuit shown in Fig. 4 is perhaps the most versatile of all the arrangements tried. It is a two-tube (or dual triode) oscillator; it cannot be used with a single triode. The right-hand portion is also a cathode follower and the left-hand triode is a frequency multiplier. The circuit L_1C_1 is tuned to the desired frequency of oscillation, and L_2C_2 to the output frequency. The crystal is connected between the two cathodes.[7]

Up to about 10 Mc. no tuned circuits are needed except for the output frequency, at L_2C_2, and the cathode coil, L_3, is not needed. The r.f. chokes in the cathode leads can be replaced by resistors of suitable value for the tube used. When overtone crystals are to be used the coil across the crystal may be dispensed with, but it is necessary to develop overtone activity with standard crystals. The inductance should be adjusted so that the crystal is resonated just *below* the desired overtone frequency. Typical operation then might be: L_1C_1 — 24 Mc.; L_2C_2 — 48 or 72 Mc.; L_3 — 23.5 Mc. If the crystal is resonated exactly at the overtone frequency, or on the high side, two crystal modes will appear. In this it is similar to the Lister circuit, except that it is a series circuit, whereas the Lister arrangement is a parallel one. Hence, the necessity for resonance on opposite sides of the crystal frequency.

Self-oscillation is possible with this circuit, but it can be eliminated by positioning L_1 and L_2 for degenerative feed-back. The polarity of these coils should be such that bringing them closer together reduces the tendency to self-oscillation. Their position may then be adjusted until only crystal-controlled oscillation develops. The nearer L_3 is to resonance at the desired crystal overtone the easier this adjustment becomes, as the crystal and L_3 then become a high-Q circuit at the overtone frequency and the crystal tends to control oscillation over a wide range of feed-back variation.

Like the Lister circuit, this one is superior for high-order overtones. Using a 7F8 and a 24-Mc. crystal, with resonance in the cathode circuit at about 70 Mc. and L_1C_1 on 72 Mc., it was possible to double to 144 Mc. in the second triode section with enough output to drive a small final amplifier stage: a two-tube r.f. section for a 144-Mc. transmitter. Numerous inexpensive crystals in the range from 6 to 9 Mc. were tried for third overtone oscillation, and every one gave enough output to drive the second section as a doubler or tripler. More than 50 crystals were checked for fifth-overtone activity. Of these, 8 worked perfectly, making it possible to get up to 15 times the marked frequency out of a dual triode. Every crystal tried could be made to oscillate on its fifth overtone, but most of them gave too little output to be useful in transmitter applications.

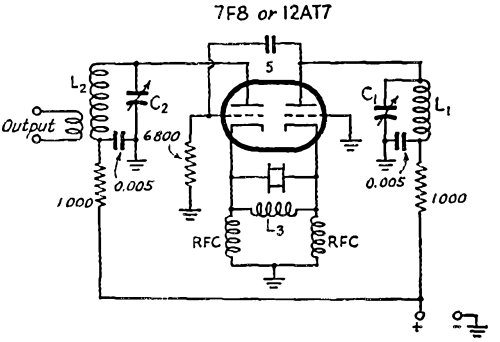


Fig. 4 — The functions of crystal oscillator, cathode follower and frequency multiplier are combined in this dual-triode circuit. The circuit L_1C tunes to the desired overtone frequency, and L_2C_2 its second or third harmonic. L_3 should resonate with tube and crystal capacitance just below the frequency of oscillation. The value of the r.f. chokes in the cathode circuit is not critical. In the test set-up values from 5 to 100 microhenrys were used successfully.

Regardless of the frequency, this circuit was highly stable. With a 7-Mc. crystal oscillating on 35 Mc., and the second triode section tripling to 105 Mc., the signal on this frequency showed a total drift from a cold start of less than 2 kilocycles. With careful adjustment of the feedback and loading it was possible to key the oscillator with only a slight chirp in the 105-Mc. signal.

Which Circuit?

The variety of circuits that may be used to encourage overtone oscillation is almost endless. Any circuit that will oscillate by itself can be converted to overtone crystal use if the method of controlling the feed-back is adjustable. Arguments over their respective merits may have as little basis as the old discussions over "which gets out better, a Hartley or a Colpitts." Any of the circuits shown and a number of others [8] may be used with good results, but preference for any one may be based on the end in view.

The regenerative triode arrangements of Fig. 1 are very simple in both circuitry and adjustment. They are ideal for third-overtone use with a 6J6 as a combined oscillator and frequency multiplier, with either inexpensive surplus crystals or those designed for overtone service. The circuit will not oscillate with the crystal removed, the crystal being an essential element of the feedback circuit. The circuits are not recommended for high-order overtones, though the fifth may be usable in receiver applications where the power output is not an important factor.

[7] Goldberg and Crosby, "Series Mode Crystal Circuits," *Tele-Tech*, May, 1948, p. 24.

[8] Treuke, "A Regenerative Oscillator for Harmonic-Type Crystals," *QST*, Dec., 1949, p. 46.

The Western Electric circuit, Fig. 2, is excellent for use with v.h.f. crystals, 48 Mc. and higher. It will not self-oscillate with the crystal removed, and when properly adjusted it exhibits no self-oscillation over the entire tuning range. It is not particularly good for overtone use with standard crystals in the form shown.

If very high frequencies are wanted in the crystal-oscillator (as in receiver applications, to prevent birdies) the Lister circuit, Fig. 3, has merit. It works on higher-order overtones than the other circuits tried, and is particularly effective with crystals that are designed for overtone service. It is somewhat critical in adjustment and prone to self-oscillation, particularly on overtones above the fifth and for oscillation frequencies above about 50 Mc., except when crystals ground for higher frequencies are used. It has no special advantage for third- or fifth-overtone work with standard crystals.

The circuit is useful for f.m. transmitter service as it may be reactance modulated in the same way as a variable-frequency oscillator. With the high order of frequency multiplication that is possible with this circuit, deviation sufficient for wideband f.m. in the v.h.f. and u.h.f. ranges is readily obtained.

The dual triode circuit of Fig. 4 is highly stable when properly adjusted, and its starting and output characteristics are good. For third-overtone applications it works well with any type of crystal, and some crystals of the inexpensive sort do almost equally well on the fifth overtone.

It requires a dual triode having separate cathodes, such as the 7F8 or 12AT7. It is somewhat more difficult to adjust than the circuits of Fig. 1, but its stability and high-overtone activity are often well worth the added effort. Because the resonant frequency of the crystal and the coil across it is an important factor in proper operation of the circuit, some readjustment may be necessary when using crystals of widely different characteristics. With crystals of the same general type differing only in frequency, it is possible to work over the entire range of the 2-meter band without readjustment of the cathode circuit.

Crystal Requirements for Civil Defense

With the possibility that crystal manufacturers may soon be operating on a priority basis because of the demands of our expanded military program, it may be difficult to obtain new crystals for amateur and civil defense communication. If one has a supply of crystals on hand it might be well to set up the circuit of Fig. 4 experimentally to determine how many of them are suitable for fifth-overtone service. For example, frequencies between 7200 and 7400, oscillating on the fifth overtone, multiply into the 2-meter band, and many other frequencies now available as surplus may be pressed into service in a pinch for 50,144 or 220 Mc. Employment of overtone techniques with crystals that are now on hand, or readily available in dealer's stocks, may be an important aid in solving the crystal problem.

M.A.R.S

The enthusiastic response to the recent invitation for civilian amateurs to affiliate with the Military Amateur Radio System has been extremely gratifying to the MARS directors. It also has resulted in a number of administrative headaches and bottlenecks.

For civilian amateurs here's what to look for and what you can expect when you sign up with MARS.

MARS directors and net control stations perform their MARS functions, as they say in the Army, "in addition to their other duties." This means that when 75 or 80 amateurs apply for membership each week, a tremendous amount of paperwork is thrown on top of an already heavy workload for some MARS directors.

A3GJY/W3GJY (*seated*) operated as part of the Western Pennsylvania Traffic Net, later served as liaison between Headquarters, WPSD, and MARS control station, A3USA, during the "big snow" of November 25th–27th. Shown with A3GJY is W3LCH.

Because they also are radio amateurs (except in a few special cases) these directors are doing all they can to speed the processing of applications, typing of necessary concurrences and indorsements, making up packets of information, writing transmittal letters, preparing the MARS Station Certificates for signature and mailing. Checking qualifications and address with the Federal Communications Commission, assignment of station call signs, determination of station capabilities, and net assignment are time-consuming chores — but necessary ones.

Right now, there has been a lot of reorganization going on in most of the Army areas in an attempt to get nets into operation on a QRM-free basis. When you look at the list of frequencies allocated to MARS, it looks like a lot. But when you begin running tests to determine what operating times are available and who can be on the air at trouble-free times the problem begins to get complicated.

A study is under way right now to determine

(*Continued on page 120*)

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

How:

If it isn't one thing, it's another.

"Where, and for how much moola, may one procure a reliable medium-power 14-Mc. wee-gee board?" writes a WØ. "Will settle for some G3s."

We cast about for literature on the subject but found little. Jeeves brought to light a few facts in this regard which may or may not be apropos. But his assertion that DX ouija boards must be addressed in naught save a Lancashire accent would seem to disqualify his observations further.

A comprehensive not-too-technical article on the design and construction of radio ouija boards appears to be in crying demand at the present stage of the solar cycle and we are awaiting the sage words of some hitherto reticent authority on the matter. Until then we can but engage in some casual comment pertinent thereto.

It strikes us that the ideal DX ouija board should encompass certain desirable features not found in those employed for more general purposes. Accurate calibration is obviously a must, as well as provision for fast bandswitching. Then, too, it is entirely possible that blooper ouija boards could radiate, thus increasing the already mountainous QRM; hence, a two- or three-stage affair may be called for.

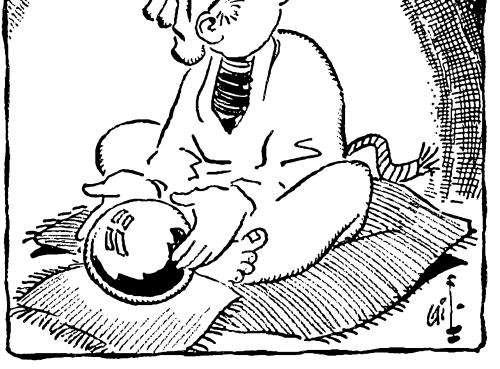
Other possibilities present themselves. For one thing, if good-sized units were made available on the market breadboard transmitter construction might become even more obsolete. DX men before all others would pioneer in assembling their gear on ouija board chassis! (If unable to work DX with this facility it should be obvious to the owner that DX is not his racket and that he should instead seek his niche in traffic, rag chewing or pure experimentation.)

Whether the gadgets will perform properly as dual 'phone-c.w. combinations is one other consideration. If the pattern set by a few amateurs were followed the layouts could become divided against themselves to defeat their own purpose with an output of pure r.a.c. Also, accidentally left switched to the 'phone position, the thing might be fatally consulted by the XYL to determine whether or not the OM was *really* attending a late conference at the office.

Surplus 807s may be tame stuff compared to these contraptions. Perhaps it would be more advantageous in the long run to stick to the old-fashioned hit-or-miss techniques.

What:

Without such necromantic nudging some of the boys have been doing pretty well lately on friend *twenty*. WØAIH is aching for a rotary beam but doesn't seem to need one badly: **FF8JC** (14,032), **FQ8AC** (14,052), **FY7YR** (14,030), **CP5EK** (14,008), **HK3AS** (14,063), **KW6AR** (14,075), **VP7NM** (14,041), **TG9CR** (14,043), **ZE3JQ** (14,018) and **ZS3K** (14,050) came back to Paul's 300-watter . . . . . W2GVZ found the KW6 on 14,042 kc. and W2QHH adds **OE5AG**, **ZS3Q** (14,009), and **CR5AC** (14,009) to this worked-and-active list . . . . . **CR5AF** (14,100) was cornered by W2EXL while W2EQS hooked the 4-watter of **VP9AI** (14,050) . . . . . **OY3IGO** looks for Ws around suppertime EST on 14,077 kc. Says he hears lots of Ws but can't raise them! He prefers to catch W5s, W6s, and W7s and W6AM managed to work him through the East Coast curtain . . . . . The chimney whip of W2HAZ accounted for SP1CM, KR6CW, IS1CNQ and YV5AE after Bill repaired the damage done to it by the Big Blow . . . . . W1JLT bounces back into the picture with a new 10-over-20 4-element eggbeater à la KH6IJ and is making up for lost time by collecting KX6AA, VP5BF, VK1PG, MI3VG, VP8AI, FK8AH, 4X4LS, CR7AD, ZE2JN and TF3MB . . . . . In terms of "when," WØFID submits the following specifications, time being EST: VP1NW (1830), VP5BL (1801), VP7NM (0800), OH2RY (1032), KG6HF (1718), YV5AE (1800), ZS3K (1806) and OX3SF (1704). Dick is turning to handmade QSLs in an effort to shake loose some long outstanding and finds DX conditions no better in Rochester at forty below zero . . . . . Needing but two cards for the Century, W2HAZ is rolling up his sleeves for another crack at trafficking on 80. Well, that band is versatile enough these days to give you both DX and BPL at the same time . . . . . **3V8AJ** (14,004) and **EK1AQ** (14,040) enraptured W2JBL while W6AM snapped up **VP8AK** (14,008) who puts out with 350 watts . . . . . LU7DJF was worked without schedule by JA2FM and Cal's log check revealed that their previous contact was just 22 minutes off being exactly one year before. They have another QSO planned for next year. Some clunk has been borrowing JA2FM's Stateside call, W5LFM, and using it on 'phone. "Haven't been on the air from San Antonio since '47 and haven't been on 'phone since 1875," asserts Cal. HS1VR, KB6AF, KC6WD on Ulithi, TF3SF and UO5KAA are his latest conquests . . . . . Figuring to retire his folded dipole in favor of a beam after 128 countries, W5FXN sampled **FO8AC** (14,040), **ZK1BC** (14,050), **VP5BL** (14,045) and **HH5VE** (14,050). Jim recommends 50 Mc. as the band most likely to produce a pasteboard from Mexico . . . . . W6WWW broke through for 4X4BX, HA5FA, YS2RC, VP8AD, KR6CP, VQ2GW, VQ4AQ, VR1C, HB1IL, TF5s SF SV, ZS3Q,

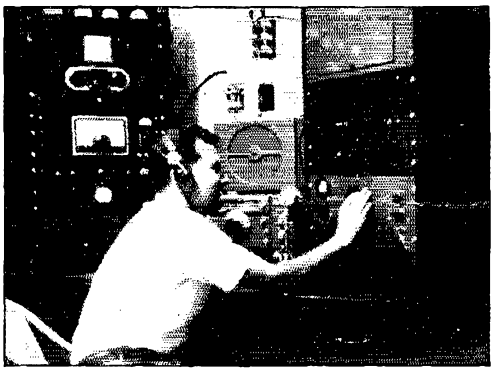


* DX Editor, *QST*. Please mail reports of DX activity to W9BRD's home QTH: 1517 Fargo Ave., Chicago 26, Ill.

EAØAB, UAØKBB (t7c), FM7WF and CT3AB . . . . . W7NPU shook his Vee at a long string of Northern Europeans in addition to VQ4HJP, **UB5KAB** (14,110 t8), **YO3RF** (14,075 t8) and **9S4AX** (14,015 t8) . . . . . W6EAY's XYL was sorry to inform him by landline to the office that his newly arrived QSL-bureau envelope contained only three cards. Then she read them off — UM8KAA, ZC1AL and ZK2AA! . . . . . Africa has been interesting W2TXB and ZD2s GAJ DYM JAB. ZEs 2JH 3JL 3JP. VQ2AB, ZS3s S Q and S will all receive cards from Al. VU2s CV JP and MD kept Asia in his log and W2TXB finds it often a toss-up as to pointing the beam north or south for best results . . . . . **F8EX/AR** (14,008), **AR8AB** (14,008-013), **GD3GBG** (14,037), **CR5AA** (14,071), **CR6AW** (14,034), **ZB2AJX** (14,010), **ZB2A** (14,100), **ZS7C** (14,051), **VP2AK** (14,018), **EA9AP** (14,010-100) and **VR1F** (14,055) came to the attention of the So. Calif. DX Club and the gang there had an ambush rigged up for **FP8BX** on 14,064 kc. . . . . **ZS8MK** has been using 14,035 kc. quite regularly.

With the A3 contingent, W5MPG scored with a brand-new junior operator whose call was AG1RL. Thus inspired, Rex pounced upon **VR5GA** (14,280), EA8AB, VP1NW and **VR1C** (14,300) . . . . . W5ONL/5's initial 'phone efforts resulted in VPs 5AK, 6WR and HC1JW, and W2TXB was stalking CR6AR and **ZE1JE** (14,170). By the way, ZE1JE would chalk up one more country for your YL DXCC . . . . . John DeMyer reports on **VQ5AU** (14,155), **ZD2PLL** (14,350) and word to the effect that VT1DF of Kuwait should shortly be breaking thru on voice . . . . . XE1AC mentions only one station but it's a honey: **I5ZC** (14,350) in Mogadiscio, I. S.

Forty continues to regale the hard workers who have no qualms about digging beneath layers of rag chewers on the low end. W2QHH found time to bag IS1BYC and **VP5AK** (7031) while W5JUF clicked with **FF8AC** (7055) . . . . . **FP8BX** (7055) is putting St. Pierre back into circulation as attested to by W2s EIK and EQS. The fellow's rig was putting out quite an unstable and rough signal but new equipment is anticipated . . . . . At W1PQI we find **HH2JC** (7080), **KV4AQ** (7015), VE8MB on Cornwallis Island and **VP5BL** (7020), with **TA3GVU** (7020), **HK5CR** (7020), **HK5DH** (7015) and **FA8DA** (7005) coming back to W3OQJ's 15-watter . . . . . **VP9DDD** (7080) came back to W4QCW



Humberto Perez of San José, Costa Rica, has logged an impressive DX total on the amateur 'phone bands from TI2HP.

and here are some "whens" from the latter's EST log: HK4DP (2150), HH2LD (0630), YV5DE (0650), FA9RW (1650), EA8CL (0315) and LU3DCC (0320) . . . . . An imposing listing is volunteered by W2WWP and includes a long-path 1600 EST chat with VK2AMB. This is always an interesting trick on 7 Mc. **YO2BU** (7002), **YU1CAG** (7012), **FM7WF** (7020), **FY7YC** (7010), **UB5KAB** (7010), **EK1AD** (7007), **KS4AC** (7020), **FA8BG** (7010), **4X4RE** (7004) and the previously mentioned TA3 were others on Clark's tally . . . . . Besides accumulating 17 ZS contacts, W5BDX encountered ZK2AA, FK8AH, VR2AA, KG4AG, FQ8AC, ZS3U and CR7CI which is good fishing on any band . . . . . The following were worked or heard by the So. Calif. DX Club contingent led by 7-Mc. specialist W6GAL: **CR7AD** (7036), **AP2A** (7015), **EK1RW** (7061), **CN8MI** (7034), **CX1SG** (7003), **ZE2JN** (7020), **HP1LO** (7058), **HZ1KE** (7027), **CT1DJ** (7023), **CT3AB** (7035), **VK1RF** (7069), **VP5BH** (7022), **VP5BM** (7010), **VS6AC** (7024), **VP8AJ** (7008), **VS7NX** (7023), **YV6AO** (7045), **OX3BD** (7006), **UA1KAI** (7015), **UA3KAA** (7024), **UAØKKB** (7046), **UC2KAB** (7052) and **PJ5FN** (7025). As for times, the Russians and Asians are breakfast-time performers out west while the Africans drop through around early evening; the latter give way to our European friends about midnight. All of which makes Old Forty anything but an "East Coast DX Band" in our books!

W2ZVS got his spinner back up in time to justify a *ten*-meter listing this month. Dixie collected VP6s FC FR JK HR LD SD, VP5AY, VP3CW, MI3s RP XX ZX, VQs 2WP 4BU, ZD1SW, ZE2JE, ZPs 2AC 3AW, PJ5HO, PZ1AL, OX3GD, TG9AS, HR2JM, FF8PG, ZL2AT, EA3FP, CN8s EP EQ, and assorted KV4s. W2ZVS even squeezed in some c.w. to the tune of EAs 4AV 4CN, FF8JC and KV4AQ . . . . . W3NNQ adds ZB1AJ and a long-path job with KJ6AP as well as miscellaneous A3 Europeans . . . . . ZL2CY and WØJRY have managed 562 QSOs on their 28-Mc. 'phone schedules and are heading toward the 1000 mark. ZL2CY puts 100 watts into a 12-element Sterba while WØJRY warms up a 24-element stacked array with his kw. **ZL2CY** (28,420) looks for other midwest U. S. A. contacts and may be heard even under fringe conditions.

Eighty continues to intrigue a multitude, sounding a good bit like a short-skipping 14 Mc. during the DX Contest. **FA8DA** (3503), **SP1JF** (3515), **ZL1HM** (3522), **FY7YC** (3516), **ZS3K** (3510) and **KZ5DE** (3505) answered W2QHH's 35-watter . . . . . W9PNE landed FA9RZ and ON4QF while W4RYS scored on TI2PZ, HB1IL and PJ5RE . . . . . 4X4RE completes a 3.5-Mc. WAC for W2EQS and Charlie's 70 watts also managed CT1SQ, VK2VN, CN8EJ, SVØWH, HB9EU, OK1DE, EI9J and PAØEP . . . . . W6IMI swung a receiver across 80 meters on his ship off the coast of Brazil and logged signals from the fists of W1TCL, W2LMS, W2MQB, W2ORS, W2PJB, W2TSL, W5RDA, W8BHW, W8EVJ, W8KJ, W8MQF, VE1JD, VE1RF, VE4NS and G5VB. He gives the prize for the most sock to VE1RF and G5VB came sliding through during daylight.

The first *one-sixty* QSO for W9PNE since 1941 was a c.w. job with EK1AO in Tangiers. Andy runs 130 watts and still employs his 3-tube blooper receiver to good advantage . . . . . W9CVQ's patience paid off with Wales contacts GW3ZV and GW3FSP. Gs 6GM and 6BQ were heard but not hooked and Mac keeps a successful schedule with KV4AA on this band . . . . . GW3ZV, EK1AO, Gs 2PL 3DIY 3PU 6BQ and 6GM were raised by W2EQS. In his heard department are Gs 2ACV 2YS 3ERN 3KP 5HV 5VB and GW3FSP . . . . . W2QHH got across with less than 25 watts and the prize was GW3ZV (1800).

Where:

W1s DJV and IKE tripped over each other to inform us that HS1PA runs the QSL bureau for Siam. His QTH: Frank Speir (W6FUV), Saha Thai, 4th Mansion, Raja Damnoen Avenue, Bangkok, Thailand. Furthermore, all VP4-bound cards may go via John A. Hoford, VP4TT, P. O. Box 554, 88 Abercromby St., Port-of-Spain, Trinidad . . . . . According to W2TXB, ZE3JL is now handling the Southern Rhodesia bureau.

W1HVF/KL7	Howard Wessenberg, CTC, USN, Adak, Aleutian Ids., Alaska
CR5AF	Box 206, Bissau, Portuguese Guinea
EA8CL	(QSL via ARRL)
FP8BX	Paul Detcheverry, % PTT, St. Pierre and Miquelon Islands
FQ8AE	Box 69, Fort Lamy, French Equatorial Africa
HH5VE	(QSL to HH3VE)
HP1LL	P. O. Box 865, Balboa, C. Z.
ex-JA2BQ	(QSL to WØEFK)
KH6AFQ	Box 1573, Hilo, T. H.
KZ5GF	Box 54, Gamboa, C. Z.
LJ2K	Navy Navigational School, Trondheim, Norway
MI3ZX	APO 843, % PM, New York, N. Y.
PJ5HO	(QSL via ARRL)
VP9AI	Sgt. E. R. Mroz, 1934 AACS Sqdn., APO 856, % PM, New York, N. Y.
VQ5AU	Box 355, Kampala, Uganda

ex-XZ2FK	Frank King, G2FK, 5 Bure Lane, Christchurch, Hants., England
YV1BK	P. O. Box 508, Maracaibo, Venezuela
ZD4BD	Box 479, Accra, Gold Coast
ZK2AA	(QSL via WØYXO or NZART)
ZS9F	J. C. Warren, P. O. Box 4, Victoria Falls, Southern Rhodesia

That we have more volunteers than addresses shows to go you that the boys are still in there with the old-fashioned college try. Now that the DX Test has finished scaring up some new customers we may have more scoop from this group next trip. All hail W1s ODW PQI RWS VG, W2s ADP CUQ EQS HAZ JBL NKV TXB ZVS, W3s DHM IXN, W4QCW, W5FXN, W6SAI, W9s CFT FID, WØFGW, and Mr. John DeMyer.

Tidbits:

Some scrumptious DX may have gone unreported this month due to the visit of XE1AC to New York City and points east. Yet Al found time to ship us the following list of active amateur stations in the Spanish possessions: EA6s (Balearic Islands) AF AI AM AP AQ AR AS and AT; EA8s (Canary Islands) AE AH AI AL AP AV AW AX AY AZ BA BB and BC; EA9s (Spanish Morocco) AA AH AI AQ and AT; EAØs (Spanish Guinea) AB and AC. There has been no Ifni activity in the postwar period and there are no Rio de Oro performers at present. Ex-EA8EDZ/EA8AO once operated on the Golden River but now hangs out in Bilbao, Spain . . . . . W2TXB reports that FA3RR was visiting such exclusive geography as FR8, FB8 and FW8 but he must have been on 2 meters. Al sent some gear to help get CR5AE back in operation and hears that ZD6s HJ and JL are becoming quite active on one band or another . . . . . If you're short your due XZ2FK veri, Frank is willing to make out another. Try the G2FK location in the "Where" listing . . . . . Possibly stirred up by our SOS to the rare-state boys on behalf of overseas DX WAS-seekers, W1QMM is returning to the air after a two-year abstinence. This Vermonter may be found near the low edges of 7 and 14 Mc. . . . . Regarding Utah, W7NPU volunteers himself as well as W7JHH as likely prospects. W7NPU works both 'phone and c.w. on 20 and has a nice new 5-wavelength-per-leg Vee pointed at Europe. "An S5 European will jump to S8 on the Vee and am now troubled with European QRM and key clicks. . . ." Gad, a few more feet-per-leg and he'll have his house lighting done gratis! Alvin uses VFO and QSLs 100% . . . . . Mrs. KS4AI relayed some mail for the OM and at the same time remarked it was a cruel world that permitted Ralph to sun himself in the tropics while the XYL stayed home to thaw out the frozen plumbing in Louisiana . . . . . Having just snagged his 101st country, W6WWW is now pruning his nails while awaiting his trophy cards. He also found time to check carefully his QSL percentage from 1947 to date and the results may be of interest to some. China, Spain, Panama, Italy and Sweden pin the meter at 100% while France, Czechoslovakia, Belgium, South Africa and the American possessions range from 80% to solid. Sharers in the booby prize are Cuba, Germany, England, Alaska, the USSR, Australia and New Zealand with from zero to 30% in comeback. These include only activity prior to 1950, giving the pasteboards plenty of time to arrive and at least three different stations were worked per country. Such averages aren't to be interpreted as universal but are merely the way things turned out for one W6 and may give you newcomers an idea of how your file may look a few years hence . . . . . Sgt. W6JVE's CO is ex-HL1AN and Walt is enjoying his California work with the AACS . . . . . The Philippine Amateur Radio Association is holding a heap of unclaimed cards for former operators of the following P. I. stations: KAs 1ABA 1AF 1AI 1AK 1AR 1CB 1JM 1WV 6AC 7GC, DUs 1HR 2AC and 7ASS. Write the Secretary, PARA, 931 R. Hidalgo, Quiapo, Manila, P. I., with your claim . . . . . 1S1AHK has worked three Utah stations but can't shake them loose from a QSL. He did succeed in straightening out the TA3FAS problem, however, and things now go well in Cagliari . . . . . Since securing his ticket last July, ZE3JQ's 50-watter has bowled over 76 countries and 25 states on c.w. "I do QSL 100% to cards received but if any of your ops have not my card after 3 months from QSO [have them] drop a card to me and will QSL again." ZE3JQ seeks WAS and DXCC before this August as he will return to England around then. This via W6SFS . . . . . W6SAI backs up W3BXE with St. Pierre & Miquelon info. FP8BX is the only active native and used to sign F2BX. His equipment was collected through courtesy of the So. Calif. DX Club and Inglewood Radio Club, same featuring 35 watts 'phone and c.w. Prior to this gear FP8BX perked with a two-tube blooper and a 6L6 Hartley job. His English isn't very extensive so let us not be too redundant during QSOs. W6SAI reiterates that FP8AC QSLs are still available to those who feel left out. Except, that is, about six characters who might

ZK2AA is one of the choicer bits of Pacific DX. Operator Bill Scarborough uses 30 watts to a 2E26, modulated by 6L6s. An NC-183 is the receiver and the various antennae include a long wire on 14 Mc., a 3-element beam for 10, and a 6-meter 4-element rotary.

as well give up the thought . . . . . On his Christmas trip aboard the *Nieuw Amsterdam*, W1PST found himself entertained and very well taken care of by such folk as HK1CN, CM9AA, CM2AC, HH2DJ, HH2LD and HH2X. Jerry had the unique pleasure of hooking up with the Brookline, Mass., home station from the HH2X shack. "It certainly is a wonderful fraternity that wherever you go you can look up people who have stations and get such fine receptions from them." And that's the way it goes . . . . . Ex-local-QRM W9OLU is in uniform and radiating to old ham friends from K4USA while stationed at Fort Myer, Va. Murray claims he never could get out to DX at home so now he'll do it the brute-force way . . . . . The layman public is now frequently being intrigued by many local-paper write-ups concerning amateur radio's intermittent puncturing of the "Iron Curtain." When consulted on such a matter it should behoove us to present information in the proper light. W5MPG had an especially well-prepared feature published in a Little Rock daily which adequately pointed out the strictly technical and nonpolitical aspects of such communications . . . . . VP8AK informs W6AM that there is no air-mail service to the So. Shetlands and a boat arrives but twice per year about November and March. Anticipate your QSLs accordingly . . . . . We still hear acid complaints from rare DX concerning the nefarious activities of the DX Hoggery. New countries are becoming like needles in haystacks for some of the high-total fellows, foreign as well as W/VE. That pile-ups ensue upon the appearance of a juicy prefix is to be expected; all the pursued station desires is a chance to operate as he prefers. There isn't much sense in wrecking his QSOs or ignoring his directional CQs anyway as it could queer the deal for his QSL even if contact were made. Let's give 'em a decent break . . . . . ZD2DYM is interested in obtaining old radio literature, mainly magazines, says W1RWS. Ship same to Capt. F. Dymond, Nigeria Signal Squadron, Lagos, Nigeria . . . . . The Turkish ham situation may get no better fast if a Hq. letter from TA3GVU has it right. Writes Col. Fred: "As matters stand now, I should be back in the U. S. near West Hartford in April unless extended for another 6 months, of which there are current rumors! Jules, 3AA, I believe expects to leave in May and Jim, 3FAS, in June or July, so that would decimate the ranks of the TAs." . . . . . After getting hitched, I1PL changed QTH and brought along his VFO and receiver. Chas has 45 countries accounted for by this modest source, using a random length of wire loaded through a pi-section coupler. XYL permitting, I1PL hopes to make it a really QRP DXCC . . . . . LA2JA took time

(*Continued on page 122*)

• Technical Topics —

Screen Modulation with Limited Carrier Control

When controlled-carrier 'phone was first introduced back in the early '30s, a principal reason why it did not "catch on" to a greater extent appears to have been its somewhat undesirable behavior at the receiving end. Although theoretically it should have reduced heterodyne interference, general comment was that a rapidly-varying heterodyne was more annoying than a steady one of the same maximum strength. Also, the varying carrier did peculiar things to the receiver's a.v.c. There were no offsetting advantages at the transmitter since the system, at that time, employed plate modulation.

The "constant modulation" system of Lippert [1] does offer something to the transmitting operator because, thanks to the relatively low duty cycle of voice modulation, it is possible to get a considerable increase in equivalent carrier output with grid-modulation systems. Unfortunately, the early disadvantages apply in receiving the signal. However, they can be overcome completely, for all practical purposes, if the constant-percentage-of-modulation feature is discarded while retaining the duty-cycle principle. This is done by designing for the same peak conditions as with constant-percentage modulation and then permitting the unmodulated carrier level to drop just to a value that will keep the over-all plate dissipation within the required limits. When the design is based on considerations outlined previously [2] the variation in carrier level from no modulation to full input is only a few decibels. This variation is hardly noticeable in practice, and the signal sounds just like any constant-carrier signal.

Carrier control on this basis will, in general, require a control circuit separate from the modulator since the control voltage must vary at a different rate than the modulating voltage. Considering screen modulation this is a distinct advantage, since it avoids the necessity for getting the d.c. screen power from the modulator and thereby reduces the audio power requirements, and likewise avoids the distortion that accompanies rectification of the modulator's output.

A circuit that operates quite satisfactorily is shown in Fig. 1. The values shown are suitable for modulating a pair of 807s, but the same system readily can be applied to larger tubes. The modulator, a 6F6, is coupled to the screens through a 1-to-1 transformer which can be of the type used for coupling a driver to the grids of a low-power Class B amplifier. The only function of the 6F6 is to supply the modulating signal. The carrier level is controlled by a 6Y6G "clamp" tube, the d.c. screen voltage being taken from the 300-volt supply common to the whole unit. The control voltage for the 6Y6G is developed by a separate amplifier, which may be any medium-μ receiving-type triode, its output being rectified by the 1N34A to produce a d.c. voltage, negative with respect to ground, that is proportional to the speech level. The control voltage is applied to the 6Y6G grid to vary its plate resistance and hence the average value of d.c. screen voltage. The amount of "upward" carrier control is a function of the setting of R_1.

Any small audio transformer of the interstage type can be used at T_2. The filter, C_3R_5, for the rectifier must have a large enough time constant to wash off any audio-frequency variations, but C_3 should not be so large as to introduce undesirable delay in the build-up of the control voltage. A value of 0.1 μfd. for C_3 and a time constant of 0.1 second for C_3R_5 have been found satisfactory.

The value of R_7 must be chosen so that the d.c. voltage at the screens, with the 6Y6G biased to

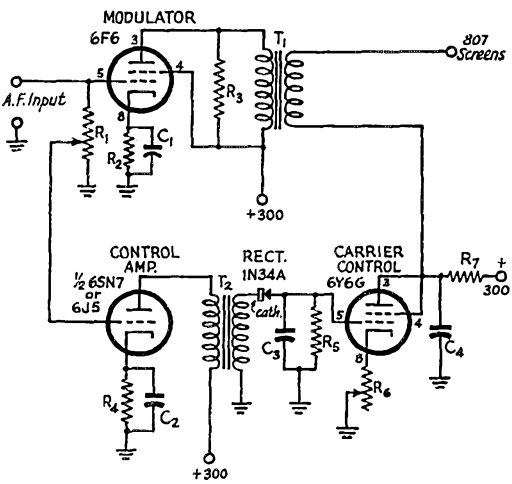


Fig. 1 — Screen modulation circuit with adjustable carrier control.

C_1, C_2 — 10-μfd. electrolytic, 25 volts.
C_3 — 0.1-μfd. paper.
C_4 — 0.5-μfd. paper.
R_1 — 0.5-megohm potentiometer.
R_2 — 470 ohms, 1 watt.
R_3 — 10,000 ohms, 5 watts.
R_4 — 1000 ohms, ½ watt.
R_5 — 1 megohm, ½ watt.
R_6 — 1000-ohm adjustable.
R_7 — 15,000-ohm 25-watt adjustable.
T_1 — 1-to-1 output transformer (such as Stancor A-4752).
T_2 — Interstage audio transformer.

[1] Lippert, "A Constant-Modulation 'Phone System," *QST*, April, 1950.
[2] Technical Topics, "Design Limits for High-Output Grid Modulation," *QST*, February, 1951.

cut-off, will result in a carrier level sufficient to take care of the maximum modulation. Its value will therefore depend on the operating conditions chosen. C_4 is an audio by-pass across R_7 and the plate supply; its value is not critical, but the time constant in this circuit should be small compared with that of C_3R_5.

The *minimum* carrier level is controlled by R_6. R_6 operates like any ordinary cathode resistor to give the tube a minimum negative bias, and thus set its plate current, when no bias is coming from the control circuit. Since the 6Y6G plate current determines the voltage at the screens of the 807s, the unmodulated carrier can be set to practically any desired level by adjusting R_6 to the proper value.

Determining Operating Conditions

On the basis of a peak power input equal to five times the plate dissipation,[2] a pair of 807s with a rated dissipation of 30 watts each can take a peak input of 300 watts. The peak plate current is then equal to 300 divided by the plate voltage, with the restriction that the peak current per tube must not exceed 200 milliamperes. A plate supply of 750 volts will just meet the requirements, but low plate voltage requires a high peak screen voltage to make the tubes draw the desired peak current. It is unfortunate, too, that the screens take considerably higher current, at a given screen voltage, when the plate voltage is low. Both these things add up to more modulating power, and a less desirable load for the modulator, and more difficulty in getting the necessary d.c. control without dropping the screen voltage from a much higher source than 300 volts. It is easier to arrive at satisfactory adjustments if a plate supply of the order of 1000 volts is used.

With a peak input of 300 watts and allowing a conservative peak efficiency factor of ⅔, the peak r.f. output is 200 watts and the carrier power under maximum conditions is 50 watts. The d.c. input (assuming ideal linearity) under the same conditions is half the peak input, or 150 watts. This is the d.c. input with sustained 100 per cent modulation. The input without modulation is a matter of choice, determined by the setting of R_6. It is certainly perfectly safe to set R_6 so that the d.c. input without modulation is equal to the rated plate dissipation of the tube; in this case of a pair of 807s this would be 60 watts. The variation in d.c. input under this set of conditions is from 60 to 150 watts; if the amplifier is perfectly linear this change in input will represent about an 8 db. change in carrier output. If it is desired to reduce the carrier variation still further, the unmodulated carrier level can be set at the point that results in an actual plate loss of 60 watts, based on the known or assumed peak plate efficiency and the linear variation of plate efficiency with instantaneous carrier level in an amplifier that modulates linearly.

The r.f. grid drive to the modulated amplifier is noncritical in one sense — that is, if a grid leak of about 7500 ohms is used for a pair of 807s the grid current can range from 3 to 8 ma. without any great effect on the operation of the tubes, *provided* the plate loading and modulating signal are adjusted to fit the particular value of grid current used. Since the screen current is less with lower values of grid current, the optimum (with the grid leak specified above) is in the range 3 to 4 milliamperes.

Depending on the value of peak plate current chosen, it is necessary to drive the screens in the neighborhood of 400 to 450 volts positive at the modulation peak. The smaller peak currents require less modulating voltage. The maximum d.c. screen voltage (maximum carrier level) is therefore 200 to 225 volts. It will suffice to set R_7 so that the voltage at the screen, with the 6Y6G out of its socket, is in the neighborhood of 250 volts. The final adjustment is made with R_1 under actual operating conditions.

Operating Adjustments

An oscilloscope should be used in adjusting the system. Use a steady tone, if possible, as the modulating signal. With a low-amplitude trial setting of the speech amplifier gain control and with R_1 at zero, adjust the plate loading on the modulated amplifier until a linear modulation characteristic is obtained. Use the trapezoid pattern since it is easier to check linearity than with the wave-envelope pattern. Increase the modulating signal until the pattern either bends down at the up-modulation end or overmodulates at the zero end. If the former occurs first, readjust the loading to straighten out the pattern, varying the grid excitation if necessary. Continue until overmodulation occurs on the down-peak before the pattern bends at the top. Then increase the setting of R_1 to eliminate the overmodulation and check the top of the pattern, readjusting the loading, if necessary, to straighten out the sides of the trapezoid. Continue this "inching up" process until a good trapezoid is obtained with the d.c. input at the design value (150 watts in the example above). When the amplifier is properly adjusted, a further increase in modulating signal will simultaneously cause bending at the top of the pattern and overmodulation at the bottom.

Once the peak adjustment has been secured, cut off the modulating signal and adjust R_6 to the desired value of no-modulation power input. It will probably be necessary to readjust R_1 after setting R_6, but this may be done (applying the full modulating signal obtained previously) without touching anything else.

With voice modulation the oscilloscope pattern behaves a bit differently from constant-carrier modulation. A finite, although small, time interval is required for the carrier to rise to its new level when modulation is applied, with the result that the pattern appears to shift instantaneously to one side. This is slightly confusing, but the thing to watch is the trapezoid itself, no matter where it may be on the screen. It should always maintain the normal appearance of a properly modulated signal.

To prevent instantaneous overmodulation

(Continued on page 122)

Results—Ten-Meter WAS Contest

It has long been observed that the shortest days of the year — or the times of the biannual equinoxes and solstices — have been conducive to short skip on the high frequencies. This certainly proved to be true in the case of the second Ten-Meter WAS Contest. Once again, no one managed to work all 48 states but considering how poor conditions have been on ten, there were some rather amazing scores turned in. As in the contest last year, no single section of the country seemed to have an advantage. Judging from the state totals, it didn't seem to make much difference where the participants lived — they still ran up impressive scores.

The OMs are not always the winners in amateur activities as attested to by WØYHD, Jenny Lukenbill, Missouri Section winner for two years in a row.

Out of the 174 logs submitted, representing 54 sections, W7PUM, Warner Thompson of Arizona, had the highest score, working 38 states, 516 contacts, 19,908 total points. W8WZ, Doc Stricker of Ohio, was highest with states worked, having 44 and missing only Wyoming, Utah, Arkansas and Delaware. The secret of Doc's success is probably that he used both 'phone and c.w. Other high scorers were W7BGH 17,424, W5IKD 16,575, W1AF 15,200, W5NQI 14,560, W6ICG 14,364, W7KIO 13,949, W6VPV 10,656, and W4POF 10,564.

Stations working large totals of states were W5NQI 40, W5OUT 40, W1AOQ 39, W5IKD 39, W1AF 38, W1BFB 38, W3KDD 38, W4POF 38, W6ICG 38, W7PUM 38, W9NII 38 and KP4KQ 38.

Comments

"Sat here drooling while I heard W1s working all the first five call areas plus W8s and W9s. We only got short skip for a few minutes during the contest. One or two stations ought to show all 48 worked from where I sit." — *WØIA.* "Can't understand these lunkheads calling 'CQ no contest' and then working some guy and signing after getting a report. A 'CQ test' would bring in nine or ten reports while he was calling 'CQ no contest.' Really enjoyed the contest and am looking forward to the next one." — *W5FI.* "Why did we have to have the contest just before Christmas? Some of us miss Saturday operation due to heavy business commitments." — *W7JTR.* (ED. NOTE: As stated in the first paragraph of these results, the reason for having contest on these dates was to take advantage of the chances for short skip.)

Scores

(Scores are grouped by Divisions and Sections. . . . The operator of the station first-listed in each Section is winner for that Section. . . . Listings show score, number of contacts, number of states worked.)

ATLANTIC DIVISION

Eastern Pennsylvania

W3QXV	952- 56-17
W3QOI	273- 21-13

Maryland

W3KDD	6270-165-38
W3NOL	2912-112-26
W3OVP	2233- 77-29
W3IZL	2016- 72-28
W3PQF	1872- 78-24
W3ONP	1856- 64-29
W3OSF	340- 34-10

Western New York

W2TVR	5993-159-37

Western Pennsylvania

W3DKL	280- 20-14
W3KNQ	168- 21- 8
W3KJM	63- 9- 7

CENTRAL DIVISION

Illinois

W9NII	7030-185-38

Indiana

W9SFR	80- 16- 5

Wisconsin

W9RBI	7770-210-37
W9RQM	4396-157-28
W9KXK	3120-130-24
W9AQD	2860-110-26
W9VHA	1955-115-17
W9HEL	752- 47-16
W9FXA	378- 42- 9
W9EWM	287- 41- 7
W9HDZ	125- 25- 6
W9DOR	105- 21- 5
W9ILR	90- 15- 6
W9GKO	75- 15- 5

DAKOTA DIVISION

North Dakota

WØDM	72- 12- 6

South Dakota

WØBLZ	1550- 62-25
WØPIG	95- 19- 5

Minnesota

WØTKX	1794- 78-23

DELTA DIVISION

Louisiana

W5PXW	4736-148-32

GREAT LAKES DIVISION

Michigan

W8FGA	7128-198-36
W8NOH	5145-147-35

Ohio

W8WZ	9460-215-44
W8AJW	3936-122-32
W8JFC	2262- 78-29
W8PNT	1584- 72-22
W8EDP	1400-100-14
W8PM	1020- 51-20
W8TZI	364- 28-13
W8KC	324- 27-12
W8ICC	272- 34- 8
W8YPT	133- 19- 7
W8EXB	51- 24- 9

HUDSON DIVISION

New York City and Long Island

W2KZE	3277-113-29
W2WC	1080- 60-18
W2GTL	936- 52-18
W2DIC	374- 34-14
W2DBI	168- 24- 7
W2NNH	162- 27- 6
W2NNB	78- 13- 6
W2AWH	30- 6- 5

Northern New Jersey

W2EQS	2046- 93-22
W2JQJ	1710- 57-30
W2GHV	986- 34-29
W2NIY	78- 13- 6

MIDWEST DIVISION

Iowa

WØHDX	1675- 67-25
WØSQN	396- 44- 9
WØATA	10- 5- 2

Kansas

WØHOM	4938-145-34
WØBNU	2958-102-29
WØDEB	100- 20- 5

Missouri

WØYHD	3588-138-26
WØAUT	1820- 91-20

Nebraska

WØINR	3234-154-21
WØAGE	418- 38-11

NEW ENGLAND DIVISION

Connecticut

W1HDQ[1]	8040-201-40
W1SYZ	5066-149-34
W1MRP	4851-147-33
W1RY	2000- 80-25
W1DEP	1344- 56-24
W1NLM	1280- 64-20
W1AW	84- 14- 6
W1IKE	4- 2- 2

Maine

W1SCY	8843-239-37
W1GKJ	2436- 87-28
W1RJE	1722- 81-21
W1NXX	36- 9- 4

Eastern Massachusetts

W1AF	15,200-400-38
W1SYV	6800-200-34
W1SUT	5550-150-37
W1RRP	690- 46-15
W1LYL	598- 46-13
W1PLJ	216- 24- 9
W1RGY	204- 17-12

New Hampshire

W1AOQ	8463-217-39
W1BFT	2376- 88-27
W1JIY	1210- 55-22
W1AO	120- 15- 8

Rhode Island

W1BFB	5282-139-38
W1LFE	4224- 66-32
W1SIK	3162-102-31
W1KHZ	1536- 64-24

Vermont

W1CTW	208- 26- 8

NORTHWESTERN DIVISION

Idaho

W7MUT	630- 42-15
W7FBD	629- 37-17

Oregon

W7GUR	6355-205-31
W7HBO	1400- 56-25

Washington

W7BGH	17,424-484-36
W7JTR	3725-149-25
W7OPO	3164-113-28
W7KCZ	3048-127-24
W7NC	3000-100-30
W7EYD	2996-107-28

PACIFIC DIVISION

Hawaii

KH6IJ	2064- 79-26
KH6ADY	570- 30-19

Nevada

W7KIO	13,949-377-37
W7JUO	528- 33-16

Santa Clara Valley

W6CUB	738- 41-18

East Bay

W6RRH	5292-147-36
W6AJN	494- 38-13

San Francisco

W6YGQ	954- 53-18

San Joaquin Valley

W6VPV	10,656-296-36

ROANOKE DIVISION

North Carolina

W4FUF	1426- 62-23
W4HER	486- 27-18

South Carolina

W4LIK	216- 18-12

Virginia

W4RDI	3680-115-32
W4KFC	2700- 90-30
W4NAD	672- 32-21
W4PNK	375- 25-15

ROCKY MOUNTAIN DIVISION

Colorado

WØIA	1200- 80-15

SOUTHEASTERN DIVISION

Alabama

W4REK	3422-118-29
W4RVV	3180-106-30
W4CYC	612- 36-17

Eastern Florida

W4POF	10,564-278-38
W4PJU	6235-145-43
W4IZ	1752- 73-24
W4RMO	697- 41-17
W4IYT	540- 27-20

Georgia

W4AYF	2592-108-24
W4PGZ	1704- 71-24
W4EV	1656- 72-23
W4ZD	846- 47-18

West Indies

KP4KQ	8360-220-38

SOUTHWESTERN DIVISION

Los Angeles

W6ICG	14,364-378-38
W6DCC	6208-194-32
W6ACL	1600- 64-25

Arizona

W7PUM	19,908-516-38
W7OLB	11,088-336-33
W6APW/7	464- 29-16

San Diego

W6APG	2254- 98-23
W6GTM	1064- 56-19

[1] Hq. staff, not eligible for award.

WEST GULF DIVISION

Northern Texas

W5LFQ	6912-216-32
W5AWT	2340- 90-26
W5OLG	832- 52-16

Oklahoma

W5HFN	2828-101-28
W5LJI	1300- 65-20

Southern Texas

W5IKD	16,575-425-39
W5NQI	14,560-364-40
W5OUT	9160-229-40
W5RXU	6290-185-34
W5FI	5069-137-37
W5NIY	480- 40-12

New Mexico

W5FVO	9024-282-32
W5LQW	7470-249-30
W5RXC	7317-271-27
W5OLN	7221-249-29
W5NXF	4560-152-30
W5DWB	2323-101-20
W5CA	210- 21-13

CANADA

Maritime

VE1MK	2368- 74-24
VE1IM	2581- 89-29
VE1CU	150- 15-10

Ontario

VE3QE	2736-114-24
VE3BTE	2373-113-21
VE3ADV	325- 25-13
VE3RM	176- 22- 8

British Columbia

VE7EH	6789-219-31
VE7BX	4212-162-26
VE7YR	3750-150-25
VE7AAH	406- 29-14

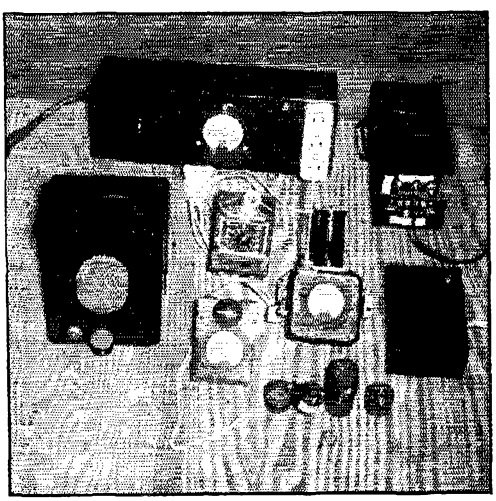
Manitoba

VE4PK	32- 8- 4

Saskatchewan

VE5KR	1380- 69-20

Strays



You aren't getting your money's worth out of surplus gear unless you use the cases as well as the parts, according to William Erickson of Spartanburg, S. C. As proof of his thesis, he sends the above picture which shows the various accessories and pieces of test gear that he has incorporated in inexpensive surplus cases. The items include (*front row*) signal tracer and probe, audio oscillator, S-meter, modulation meter (with coils), audio amplifier; (*back row*) 115-volt line filter, selenium-rectifier power supply. All units requiring power are powered from the single supply through standardization of connecting cables.

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What's in a name? — well, W8ECT is Paul E. Hamman! — *W4JWG*

—•••—

W2ITA of OWEGO, New York, boasts a QTH that is "spelled" the same backward or forward — in Continental code, that is!

United States Naval Reserve

Volunteer Instructors Needed

The ordering of Reservists into active military service has created a shortage of qualified electronics and communications instructors at many Naval Reserve activities. When one Midwest amateur radio club learned of this situation, five members immediately offered their services as volunteer instructors at the local Naval Reserve Training Center (NRTC). During this critical period, an opportunity exists for radio amateurs to provide valuable service at NRTCs and at Naval Reserve Electronics Facilities and Stations. You would enjoy working with the excellent equipment and training aids. If you are interested in devoting some of your spare time to this worthy cause, contact your local Naval Reserve unit to see if your assistance is needed.

Amateurs on Active Duty

The following Naval and Marine Corps reservists are in active military service. These are in addition to those shown on the Naval Reserve page, March *QST*. Marine Corps reservists are indicated by an asterisk.

*W1*AKE AMI CBF DNP EFQ IAE IVZ LIV LQQ MQR MXJ NK NRL OOK OSG PNE QDH QIL* QKA QNA QVO* RBN RZN* RZT SGC; *W2*QLN; *W3*CH QV; *W4*DAW LCW PAS; *W6*BVY.

Emergency Operations

Naval Reserve personnel associated with the following activities provided emergency service during the period October to mid-December, 1950, when flood conditions imperiled large areas of Central and Northern California: Naval Reserve Training Centers (NRTC) at Sacramento and Stockton; Naval Reserve Electronics Companies at Eureka, Yuba City and Kingsburg.

At NRTC, Sacramento (K6NRP), a radio-equipped truck complete with power trailer was made available to disaster authorities. In addition, an SCR-299 radio truck was dispatched to Marysville, Calif. This unit, manned by personnel from Sacramento and from Electronics Company 12–13, Yuba City, cruised the danger area around Marysville, transmitting reports to the Sutter County sheriff's office for members of the Levee Patrol.

Electronics Company 12–9 (K6NRU) at Eureka participated in a Naval Reserve emergency communications network, maintaining contact with San Francisco.

In the Stockton area, personnel from the Naval Reserve Training Center (K6NRO) and from the Stockton Group, Pacific Reserve Fleet, maintained a levee watch on a 24-hour basis. Eight transceivers and two handie-talkies were used for communication between the levee watch groups and a field headquarters, established to serve as an order center for emergency crews. Communications between the field headquarters, the training center, and the Naval Supply Annex, Stockton, were handled through transceivers.

At Kingsburg, upon the request of the Red Cross Disaster Chairman for Fresno County, Electronics Company 12–36 set up emergency communications with San Francisco. The Disaster Chairman established Red Cross Headquarters in the American Legion Hall, Kingsburg, adjacent to the quarters of the Reserve unit. An intercom system was operated between the Legion Hall and Company 12–36 for relay of messages. Naval Reserve personnel were dispatched with two radio-equipped pick-up trucks to warn residents in the area along the Kings River bottom lands concerning evacuation plans. Reports of activities in this regard were relayed to the Red Cross Chairman.

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With telephone and telegraph facilities disrupted in parts of south Texas and Louisiana as a result of ice storms, Organized Electronics Company 8–2 (K5NAN), Harlingen, Texas, performed emergency communication service on January 31st and February 1st. Supporting the Harlingen unit in its continuous operations were the Naval Reserve Master Control Station at New Orleans, and Naval Reserve Training Centers at Dallas (K5NRD), Corpus Christi (K5NRG) and San Antonio (K5NR). Other activities which handled emergency traffic with the control station were Naval Reserve Training Centers at Beaumont, Texas (K5NBW), Alexandria, La. (K5NAG), and Lake Charles, La. (K5NBQ); Volunteer Electronics Company 8–31 (K5NAX), Crowley, La.; and Volunteer Electronics Platoon 8–14, Edinburg, Texas. Communication service was rendered to the Red Cross, Western Union, Associated Press, United Press, Weather Bureau, railroads and numerous individuals.

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K5NRC, Naval Reserve Training Center, Abilene, Texas, is control station for a local 28-Mc. emergency net. Drills are conducted each Tuesday at 2000 CST, with twelve amateur stations participating.

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The emergency communication plan for Naval Reserve Training Center, McAlester, Okla. (K5NBE), provides that its communication facilities shall tie in with those of the Pittsburgh County Emergency Radio Net (PCERN). Members of PCERN are W5BGC (ARRL emergency coördinator), W5BIE, W5HEL, W5OQM, W5PRA, W5PSL, W5SEK, and K5NBE.

Here & There

KZ5NC is the amateur station of Naval Reserve Electronics Company 15–1, Balboa, C. Z. Among the amateurs in this unit is Pfc. A. Rushing, USMC, KZ5RA. . . . The

(*Continued on page 122*)

♦

Two hundred amateurs and Reservists turned out for the hamfest held at the NRTC, Camden, Ark., in January. Those in attendance included (*l. to r.*) former ARRL Delta Division Director E. Ray Arledge, W5SI; present Delta Division Director Vic Canfield, W5BSR; Cmdr. George Steed, W5BUX, mayor of Pine Bluff, Ark.; G. R. Gaddy, W5RPB.

♦

Correspondence From Members-

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

COMMENDATION

Radio Station WSFC, Somerset, Ky.

Editor, *QST:*

During the week ending February 3, 1951, this section of Kentucky was hard hit by subzero weather, heavy snowfall, ice and sleet, all of which contributed many hardships to persons and businesses. This radio station was most affected by being without its usual Associated Press teletype wire service due to wires broken by the storm. For four days we had no news service except that which was supplied by Mr. Carl W. Crain, W4YPR, of Somerset. Mr. Crain copied press dispatches which were sent to us from the Associated Press in Louisville over the Kentucky Net. The news items, especially those concerning weather conditions and damage to property in this vicinity, were of utmost value to us and our listening audience.

This letter is to commend Mr. Crain, and amateur radio in general, which again proves in time of emergency amateur radio is of inestimable value as a public service.

— *Don Orwin, News Editor*

T.I.S.

B-4 Cardinal Court, Normal, Ill.

Editor, *QST:*

I think we should give Walt Bradley, W1FWH, and the ARRL Technical Information Service a bouquet of mixed Cardwells and Ohmites, and to the fellows with rig troubles, his name.

We have a small rig and with it a few problems which proved irritating. One evening, after much experimenting and a frustrating result, I sat down and cried out my woes in a letter to the League. Walt came back with the answers!

He does a terrific job, fellows, so dust the cobwebs off that gear and give another of ARRL's valuable services a try. You'll like the results.

—*Mel Currie, W9LHQ*

FORTY-METER S.S.B.

8314 South Langley Ave., Chicago, Ill.

Editor, *QST:*

After studying the allocations tables on page 22 in February, 1951, *QST*, I reasoned there really isn't much left to the amateur in the 40-meter band. Operating experience has certainly borne out this fact!

Single-sideband operation on 75, 20 and 10 has gone forward apace but, up until now, there has been no segment of our 'phone bands opened for exclusive use of the forward-thinking hams using this type of emission. What better single-sideband subband could there be than 7200-7300 kc.? Permission for this type of 'phone emission *only* would increase occupancy to a marked degree and certainly help the hardy c.w. men operating this section of 40 to make known the fact that we U. S. hams fully utilize all our assigned frequencies.

What are the further sentiments of other amateurs? Incidentally, I am not now operating s.s.b. but would at once on 40!

— *James A. Gundry, W9KNP*

PARAGRAPH 12.160

1424 Rock Street, Little Rock, Ark.

Editor, *QST:*

I am not an amateur, just an enthusiastic SWL, but now I wish I had been one during the recent snow and ice storm emergency in the South, and had a kilowatt. I probably wouldn't have stayed on too long, for the FCC would have had me off in a little while, but I bet I would have burned some ears off before I was shut down.

I was very interested in the conditions in Mississippi and also I loved to hear the way the fellows handled the never-ending mountain of emergency traffic. It was wonderful but of course it had to be marred by someone. For five days I listened to them battling the QRM on 3870, and never before have I ever had the urge to use such language as I wanted to use, as these fellows with emergency power and temporary antennas tried to get death messages and help appeals *through the maze of QRM*. They begged and pleaded but the kw. fellows went on with their chit-chat. Of all the QRM I heard, not one word was of the least importance.

. . . I am willing to concede that sometimes the QRMing station was unaware of what he was doing, but most I heard was pure neglect and "So-what? I have the same right as you on here" attitudes. That was proven by their own admission when complaining about QRM from W5 so-and-so, as was often the case. If the interfering station could read the call, he could hear enough to know that emergency traffic was being handled on the frequency. . . .

— *Gordon Tynes*

SUPPORT

1005 South 18th, Lafayette, Ind.

Editor, *QST:*

QST is and has always been an excellent source of both technical and practical information. I have never lost touch with this excellent magazine since my last membership in ARRL back in 1938 or '39. . . .

. . . The present existing international conditions necessitate unity and complete organization. These conditions lead me to believe that my membership may in some small way contribute to our cause. . . .

— *Glen E. Rogers, W9ASX/W9VTR*

THAT COVER!

201 Pavilion Avenue, Riverside, N. J.

Editor, *QST:*

Now I have seen and heard everything! But honestly, I feel that brother Lefcourt, W6IRT, was merely joking when he wrote his complaint regarding the cover of December *QST*.

. . . If brother Lefcourt was serious surely he could have noticed a certain make of earphones, receiver, watch band, pencil, desk calendar, not to forget the "mike" and the pipe, and we might even go so far as to mention the shirt "Bud" is wearing.

Personally, I got the true message the cover told: "A Merry Christmas and a Happy New Year."

. . . So, let's lay off the Editor and *QST*. The job being done is SWELL!

— *Charles B. Roop, W2ORS*

EARLY S.S.B.

R.F.D. 5, Seneca, S. C.

Editor, *QST:*

I fail to see why all the hullabaloo surrounding suppressed-carrier transmissions. I have been using it ever since I got on the air in 1937. Only thing is the other guy has always done the suppression! Both sidebands and the carrier.

— *Eugene Charles, W4EZF*

LOW POWER

558 Burton Avenue, Highland Park, Ill.

Editor, *QST:*

I have just completed my frustrating share of the first half of this year's DX contest. And I have a suggestion which I

(*Continued on page 122*)

Operating News

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

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

Welcome, Novice License Candidates. To all candidates for Novice Class may we say "Welcome!" Let us help you all we can to get that first ticket and to see you through to the coveted General Class license. When you get that license, and you can get ready now to get it early in July, this column will welcome news of your progress. Your call and equipment should be reported to your ARRL Section Communications Manager (see his address on p. 6) so he can mention you in his Station Activities report published in *QST*. Send him word just as soon as that magic date of July 1st is here and you have got fixed up with FCC to operate and are on the air. There will be slow-speed nets you will want to get into, to talk to others and handle messages, and we plan to list all such nets in a roster either for *QST* or in a mimeograph you can get on request.

Get the application forms for your Novice Class license from any FCC office. Be ready to apply July 1, 1951! Your first problem is to master the code, following the principles in the ARRL publication *Learning the Radiotelegraph Code.* ARRL has this booklet if your local radio store doesn't. Some of you will be able to get together to talk about radio and practice for license examination by finding fellows with a like interest right in your school class, in science and scouting groups, but many of you will have to do all your learning right over the air. A receiver with a beat oscillator that will cover the ham bands is all that you will need. Even if you have a pal to talk and send code to there is nothing quite like listening to real signals over the air to learn *right.* One of the most famous amateur stations on the air is the Maxim Memorial (ARRL headquarters) Station W1AW which sends bulletins (8 P.M. and midnight EST, Mon. through Fri.) on amateur activities and daily code practice (9:30 P.M. EST). Copy as many W1AW transmissions as you can. It will help you tremendously in your initial qualification for FCC operator licenses.

Slow-Speed and Advanced-Speed W1AW Schedule Starts May 1st. A completely new and revised W1AW schedule of sending code practice material has been prepared to become effective May 1, 1951, with the new Novice and Technician License requirements in mind. We're expanding the time given this W1AW program, so we can give *four* days of every week with slow-speed range practice, with *three* other days of practice taking in the higher-bracket certification speeds. There's lots of time between each character as the characters are sent at the slowest speeds. Right here at the outset, though, let us suggest you *not* limit yourself to practice at the 5-w.p.m. speed but use the 7½-w.p.m. and higher ranges. One of the things each operator has to learn in addition to recognizing a code character is to be able quickly to pass over a character that is blurred or marred by interference or hard to interpret in order to focus his attention at all times on the *next new character coming up.* You should try to follow code at speeds faster than you can put down "solid" to aid your learning process. After initial practice you may be able to get the first letters of words in bulletins sent on our 8 P.M. and midnight EST schedule.

New W1AW Schedule

Days	*Speed Range*	*Code Practice Time Starts*
Sat., Sun., Tues., Thurs.	5, 7½, 10, 15 w.p.m.	Sat.: 8 P.M. EST; Sun., Tues., Thurs.: 9:30 P.M. EST
Mon., Wed., Fri.	15, 20, 25, 30, 35 w.p.m.	9:30 P.M. EST (8:30 P.M. CST, 7:30 P.M. MST 6:30 P.M. PST)

A 15-second string of dots will be sent in advance of each code speed at the rate of the speed coming up in order to assist those who are attempting *sending* practice in step with the tape transmission on those dates when texts have been announced in *QST* in advance, and to assist rhythm and wrist limbering with-the-key exercises at other times. Monthly qualifying runs from W1AW will now all fall on M-W-F and will include a 10-w.p.m. period.

Novice Class and Opportunities. The Novice Class license gives today's new man in amateur radio the greatest break ever in getting started *on the air,* opportunity to transmit and talk with old-timer amateurs after minimal assurance to the licensing authority that he knows how to handle equipment. By regular operating in amateur radio the Novice Class man should proceed to learn through doing and enjoy real communication with distant points. This should move him rapidly from 5- to 13-w.p.m. code levels. *Amateur Radio* needs these new amateurs. *Clubs* are looking for new members. *Civil Defense* (RACES) operational plans will need more amateurs than presently available. We feel sure that most all present day amateurs already have the welcome sign out to work with these new fellows. By the end of their year of apprenticeship and fun in operating they should easily graduate into advanced Hamdom by taking the 13-w.p.m. and General Class (B) examination.

Civil Defense Communications. We cannot yet report the definitive rules for the FCC licensing or authorizations for use of the civil defense earmarked frequencies, since the rules are still in the conference stage at the date we have to turn in this column. In view of the intention to count on amateurs and their gear largely to effectuate this new service, it is expected that it may be named the Radio Amateur Civil Emergency Services (RACES).

In mid-February, following conferences with Director of Communications Burton of FCDA and discussion with representatives of FCC, an 8-page ARRL bulletin to SECs and ECs was issued as a tentative planning guide. When the special RACES regulations are issued, it should be expected that municipalities and other government subdivisions sponsoring licensees will all quite likely have to submit operational plans covering their area of operations, the system of checking loyalty and integrity of each person permitted in the system, and the method of alerting, supervising, monitoring and controlling station units under integrated local or area plans. But we know the earmarked frequencies and should now concern ourselves with equipment and local plans embracing the needs for communications as may be indicated by responsible local civil defense authorities. In equipment particulars we should start programs of building and operational tests that are capable of providing one strong complete communications facility for civil defense using our equipment operative in 10-, 6-, 2-, and 1¼-meter regions.

The mutual-aid concept must be kept in mind in all civil defense planning. One organized group should be deployed about main and alternate control centers to serve all needs of emergency medical, public works (city engineering), warden, welfare, rescue team, radiological, bomb removal, evacuation requirements, etc. Just as fire-fighting and medical help are required from a whole surrounding area, the communications must cover the field geographically as well as connect to points in the evacuation zone.

An operational diagram showing what might be set up at a typical RACES Main Control Center utilizing 10-, 6-, and 2-meter control units with separate equipment provisions for liaison to other towns and liaison to other services was made a part of our bulletin which is in the hands of all SECs and ECs. The small-city problem for RACES communications may be handled in a single frequency segment of those earmarked. In a small community one may conceivably place the two ends of a circuit on channels at the extremities of the civil defense frequency sectors. This will minimize interference trouble for the less-selective receiving equipment. In the large-city and county organizations a more complicated pattern making use of all the available frequencies in the 2-6-10 ranges, planning deployment of mobiles, etc., will have to be visualized. At the outset it must be made plain that use of any unstabilized equipment must be kept in the 1¼-meter and highest-frequency 2-meter band sectors alone and never used in haphazard or unorganized fashion. Just a few of these less stable transmitters and radiating receivers can wreck an entire communications plan. Try to work out a plan that gives some frequency separation between your fixed stations and mobiles so there will be no unduly husky signals on adjacent channels. Keep in sight the principle that groups equipped with mobile should be able to go from a town instantly into the adjacent large city or near-by towns, if necessary, to assist or supplement facilities there in an organized plan. This requires a common frequency pattern!

Keep an ear on W1AW and stay in touch with your ARRL Emergency Coördinator for latest news on the enactment of regulations for the provisions to be established for Civil Defense Communications Radio Service which will continue into any wartime need and share frequencies with the amateur service in necessary coördinated drill activities. While standing by for such information note all the following ARRL recommendations, as applicable:

ARRL Recommendations

1) That SEC-EC contact with public safety and Civil Defense Council work be maintained at state and community level.

2) That ECs sign up all active licensed amateurs in the Amateur Radio Emergency Corps; register station data; renew old cards by annual endorsement; issue the new Official Mobile Unit and Emergency Radio Unit identifying cards to AREC personnel wherever justified.

3) That community planning contemplate deployment of amateur units for any contingency *in accord with the plans of the responsible local authorities.*

4) That *local area plans* for civil defense communications (RACES rules being formulated) be based on:

28.55– 28.75	29.45– 29.65 Mc.
50.35– 50.75	53.35– 53.75 Mc.
145.17–145.71	146.79–147.33 Mc.

and 220–225 Mc.

5) That availabilities be reëxamined for Operator-Pools and Equipment Pools.

6) That in equipment building, needs should embrace 50-Mc. band mobiles and emergency-powered portables, 1¼-meter gear, and more 2- and 10-meter rigs. Local groups should evaluate deficiencies in coverage of specified segments and undertake building and procurement programs to meet them.

7) That in tests, *all* unstabilized equipments be kept in 146.79–147.33 and 220–225 Mc.

8) That recruiting and indoctrination programs be stepped up.

(a) ECs will invite all present amateurs to register availability for civil defense *operator*, whether equipped with v.h.f. equipment for these bands or not. (Extra men are needed for mobiles, for relief shifts, for equipment local authorities in vulnerable areas may be able to provide at a later date.)

(b) Clubs can help by starting *new-operator classes* for amateur radio and civil defense communications. (Novice and Technician Licenses are to be available from FCC by July 1, 1951.)

(c) Procedural planning should include tests and drills so the stand-by facility is tested and proved, not just on paper. The ARRL Net Directory (to permit radio observation of good on-the-air handling of nets) and the booklet *Operating an Amateur Station* (p. 13) will guide new NCS.

9) That all planning look toward participation in a Radio Amateur Civil Emergency Service as soon as the rules are out . . . and Directors of Civil Defense and Civil Defense Councils are informed on the rules and procedures.

— *F. E. H.*

As the civil defense-amateur program develops, indications point more and more to the key part which will be played by amateurs in civil defense communications. This key rôle is being developed at local, state and national levels, to the extent that civil defense communications are seldom mentioned without mention also of amateur radio. The two terms are being linked together like bread and butter. From our standpoint, this is a most pleasing development, one which we have long sought and one which we deserve in view of our past emergency communications contributions to the national welfare. More than that, we amateurs are being recognized as a service in our own right rather than a group of hobbyists who might, in a national emergency, be a useful auxiliary to some other service already existing or contemplated. Present thinking at national level indicates a desire to include the word "amateur" in the name of the civil defense emergency communications service, for which frequencies have been earmarked in our present bands, and for which operating plans and regulations are being worked on by the Federal Civil Defense Administration and FCC.

The increasing tendency to recognize us for what we are and wish to be — a communications service operating in the public interest — makes us swell with pride. A little pride is good for any organization, and we have a right to be proud of what we have accomplished. But there is a great deal more to it than that. Pride of accomplishment, while a good thing, should not be allowed to become a deterrent to further accomplishment; so let's not start beating our chests too much until we stop and consider what this new recognition means.

Actually, we amateurs are being put on a spot. Recognition means *responsibility* — something we have never had before officially. In World War II we had the War Emergency Radio Service, which was practically run by us amateurs, but it was not an amateur service and amateur radio, as such, was not responsible. Since then, our organizational unity has increased tremendously, and the public has been made aware of our existence and usefulness in no uncertain terms. We have now come of age, to the point where we are recognized as a service, and it now looks as though our service, the *Amateur Service*, will be put to work in civil defense, and this time, unlike WERS, the service will in all likelihood bear our name (latest thinking calls it the Radio Amateur Civil Emergency Service). If it does, we rise or fall in the public esteem with the success or failure of RACES (or whatever it is eventually named). It's up to us. We will get the credit if we put it over, but don't forget also that we take the rap if we fail!

This is the clarion call, fellows! We're off to the RACES! Every day we are receiving letters from amateurs who are interested in participating in the civil defense effort and who want to know how they can help. The AREC is growing larger, more Emergency Coördinators are being appointed. In spite of this, we'll never have enough amateurs to put over the job we have to do. We're going to have a long, hard row to hoe.

Can we do it? You bet we can! We'll have to — or else!

—•••—

The story of the Greenville, Ill., tornado in early December was pretty well told in Feb. *QST*, but a late report coming to us from W9UQT indicates that some additional stations should have received credit for the parts they played in this emergency. W9s EOP and UHD accompanied W9UQT to the scene, and the CAP mobile, W9GOZ, was operated by W9s NET and HLX on the Illinois Emergency Net frequency. IEN suspended its regular Sunday morning roll call and its members assisted by listening and keeping the frequency clear. Other stations who were especially active and deserve mention were W9s AEX, CFV, IMX, KCX, LJP, NOO, SUV, YJH, and YS.

NATIONAL CALLING AND EMERGENCY FREQUENCIES

C.W.	*'PHONE*
7100 kc. (day)	3875 kc.
3550 kc. (night)	14,225 kc.
14,050 kc.	29,640 kc.
28,100 kc.	

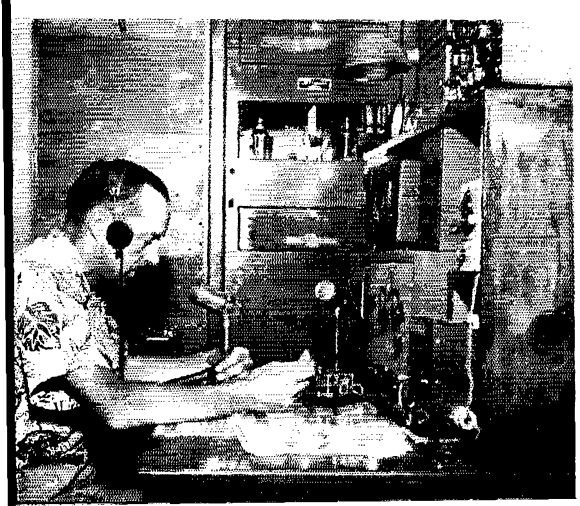
During periods of communications emergency these channels will be monitored by stations of the National Emergency Net for personal-inquiry traffic. At other times, these frequencies can be used as general calling frequencies to expedite general traffic movement between amateur stations. Emergency traffic has precedence. After contact has been made the frequency should be *vacated immediately* to accommodate other callers.

The following are the National Calling and Emergency Frequencies for Canada: *c.w.* — 3535, 7050, 14,060 kc.; *'phone* — 3815, 14,160 kc.

In late January a severe ice storm struck Mississippi and Ohio River Valleys and surrounding areas, tearing down electrical and communications wires so widely that amateur radio was called upon and came to the rescue in several instances. The situation was made worse because of the fact that such conditions are not expected in southern climates and thus spans are longer, poles, guying and bracing lighter than in climates where such conditions are expected.

Mississippi, Tennessee, Louisiana, Kentucky, Alabama and Texas amateurs sprang to the assistance of isolated communities. W5PQD, EC in Opelousas, Louisiana, regained his power early and was able to do some outstanding work in the emergency. He mentions particular assistance from W5s BSR, CCD, EB, HBY, HEK, IVS, LVG, MK, NXD and the South Texas Emergency Net. Traffic was handled for the Red Cross, oil and gas pipeline companies, news agencies, Western Union, railroads and various other commercial concerns.

The Alabama Emergency Net on 3955 operated all night both February 1st and 2nd, handling emergency traffic. A total of 72 messages was handled these two nights, mostly



♦

Meet Ray Warner, W7JU, SEC for Nevada, shown busy at his operating position during a recent emergency drill. Ray is active on both 'phone and c.w., and holds a 35-w.p.m. code proficiency certificate. His job of coördinating AREC activities in sparsely-populated Nevada is not an easy one. Naturally, being in Nevada, he holds a WAS certificate.

from Western Union, Associated Press, public utilities and railroads.

Natchez was hard hit early in the storm, the entire town plunged into darkness. W5KZM obtained emergency power and got on the air that night and reported into the Magnolia Emergency Net. Railroads, the telephone companies, Western Union, light and power companies and newspapers availed themselves of this emergency service and W5KZM was swamped with traffic. The station was operated on practically a 24-hour schedule for a full week for a total of over 200 hours, and during this period handled approximately 1000 messages. Assisting in the operation of W5KZM were W5s IHP, KHB, LPL, OQH and QKX.

A comprehensive report from Kentucky SCM W4KKG indicates that a tremendous job was done by amateur radio all over this icebound and flood-stricken state during the emergency. The two section nets, KYN on c.w. and KYB on 'phone, coördinated their efforts to effect maximum possible communications coverage of the state. In Glasgow, which has completely isolated, W4WZH did an outstanding job handling press, Western Union and many other important messages. W4CMP, EC at Bowling Green, was on hand practically around the clock, and took much traffic for W4WZH when the latter had to get some rest. W4KBY also did a fine job as alternate NCS. SEC W4MGT in Lexington participated in both KYB and KYN, taking traffic out of one and putting it into another where an outlet was available. He also arranged for delivery to uncovered towns through the State Police system. W4YPR took over traffic for the Associated Press, broadcast station TWX facilities and any other messages for the Somerset area. W4JPV held down the fort at Pikeville and vicinity. W4NBY at Harlan did a fine job of clearing traffic in both KYB and KYN. W4MQ at Jeffersontown was NCS for KYB and was largely responsible for the fine coördination between the two nets. W4KKG handled some press items to Somerset for the AP. In Louisville W4s BAZ, MDB, MFI and NZY were active on both KYN and KYB. W4CDA was NCS for KYN with the help of W4MWX. In Ashland and Richland W4MRT and W4YCC handled respective traffic for their areas. Other amateurs who participated actively were W4s BEW, BXU, JLJ, MVL, NEP, OGB, OGP, PRT and RQS.

SCM W4KKG says, "It is like pulling teeth to get an amateur to brag about himself when he does something worthwhile . . . except the DX he works!" He sums up the operation in these simple words: "The amateur was needed, was called upon and responded."

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Quick action by amateurs brought ambulances to the scene of a serious highway accident minutes after it occurred in Dodge City, Kansas, on January 14th. WØTYR and WØCFW were conducting coverage tests on 75 and 10 meters, the former operating from his home station and the latter from his car. WØCFW came upon an accident a minute after it had happened. He quickly relayed the information to WØTYR, who telephoned for ambulances, county officers and highway patrolmen, while WØGWI took over the controls of WØTYR. WØNOE contacted WØHUX of Wichita to give information concerning a man who was fatally injured in the accident. Other amateurs on the air at the time gave full coöperation in clearing the channel so that there would be no interference with the operation.

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A neat job of emergency communications was performed by W7IOQ and amateurs in Snohomish County, Washington, over the week end of February 10th–12th when heavy rains caused rivers to overflow their banks and catch many residents unaware. The civil defense chairman of Snohomish County contacted W7IOQ on Saturday morning, Feb. 10th, and took three handie-talkies to use in boats. W7MHM was set up as NCS on a bridge. Operating on 3885 kc., daytime operation was successful, but nighttime operation on that frequency was all but impossible. Meanwhile, W7CMX of the Washington State Patrol called from Olympia and asked W7IOQ to alert the Everett gang, and by the time action orders came through they were ready. W7s BEE, CSK, CZY, IJY, IOQ, JFB and KYV arrived in Stanwood, one of the hardest-hit communities, early Saturday evening and set up a net control station and six handie-talkies. They worked with local authorities, the sheriff, the state patrol and an Army "duck" operated by the Coast Guard. The streets were patrolled (usually with hip boots) to see that all personnel had been evacuated and to prevent any prowling and looting. Leo, W7IOQ, says it was no picnic wading around in water from three to sixteen inches deep in the cold and dark.

The operation lasted about 24 hours, after which the danger seemed over, and operation was discontinued Sunday afternoon. W7IOQ indicates that much was learned, and "Now I know what the boys in Korea have to face."

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The train wreck in Woodbridge, N. J., on February 6th, turned a meeting of the Union County Amateur Radio Association, where the boys were discussing civil defense, into a full scale emergency activity. After hearing of the catastrophe, the group stood by at the request of the Elizabethtown Chapter of the American Red Cross, and later it was decided to send a mobile unit to Woodbridge to see if any assistance was required. W2LOP/mobile was sent, and en route contact was made with W3OZJ/mobile who was also on his way to the scene of the wreck. The Woodbridge Red Cross welcomed their assistance and dispatched W3OZJ to the scene of the wreck, with a police escort, while W2LOP held down the chapter headquarters. W2CCY and W2HVK took along their handie-talkies and thus were enabled to provide communication directly from the wreck to W3OZJ/mobile, who relayed to W2LOP at headquarters. K2BC and W2GYG assisted in handling traffic to towns other than Woodbridge. Several civil defense and Red Cross officials rode in the mobiles and helped talk them through police barricades. Operation was conducted on both 10 and 2 meters.

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JANUARY CD QSO PARTIES

Listed below are the highest claimed scores for the January C.W. and 'Phone CD QSO Parties. The figures following each call indicate the claimed score, number of contacts and number of ARRL sections worked. Complete results will appear in the April CD Bulletin.

C. W.

W4KFC	142,675–432–65	W3CUL	69,025–205–55
W1EOB	124,440–401–61	W8SCW	63,720–229–54
W6BIP	122,602–227–59	W1OS	62,720–256–49
W4BZE	104,780–333–62	W9GDI	60,320–208–58
W2PWP	100,520–354–56	W1AQE	60,240–251–48
W3FQB	87,640–306–56	W2COU	59,800–255–46
WØIA	83,780–277–59	W4NH	58,650–230–51
W2GFG	83,160–290–56	W4FF	58,500–219–52
W1JYH	82,080–300–54	VE3QE	58,250–228–50
WØBQJ	81,715–272–59	W4RWE	58,025–204–55
W7KGJ	81,588–171–52	W1CRW	56,750–227–50
W9NH	81,510–280–57	W4LAP	56,595–231–49
W8TZO	80,300–285–55	W7KGF	56,457–123–51
W4IA	80,100–260–60	W7EMT	54,768–124–48
W7KWC	77,400–172–50	W9KXK	54,060–201–53
W5ONL/5	76,950–265–57	W8NOH	54,000–195–54
W2CWK	75,880–267–56	WØATA	53,530–202–53
W6CMN	75,419–161–51	W2LPJ	53,360–180–58
W2ZVW	74,790–270–54	W2MHE	52,935–199–53
WØPHR	74,250–275–54	W5DEJ	51,940–205–49
WØAY	73,080–245–58	W5AQE	51,700–182–55
W3OAQ	72,600–257–55	W4FV	50,352–196–48

Others with scores over 35,000: VE7XA 49,410, W8DAE 48,020, W6YYN 47,872, W9YTV 47,320, W9UKT 46,110, W7UJ 46,076, W4PNK 45,825, W4OGG 45,550, W9CBE 45,250, W7LCM 44,574, W7MLL 44,142, W2VNJ 44,000, W9QLW 43,195, W9IQM 42,140, W1AW 40,035, W9JTX 39,200, W1TS 39,000, W3NRE 38,480, W3AXA 37,995, W2OBU 36,960, W8AQ 36,410, W1AYC 35,325.

'PHONE

W4DCQ	33,370–142–47	W2MHE	7540–52–29
W4NYN	30,315–129–47	W9ACU	6968–45–26
W4FV	27,412–114–44	WØBQJ	6860–44–28
W8NOH	27,025–110–47	W9RZS	5945–41–29
W8AJW	20,910– 96–41	W3OAQ	5940–47–22
W4KFC	15,770– 76–38	W5ONL/5	5640–42–24
W2ZVW	15,120– 77–36	W1AQE	5635–49–23
W7KGF	14,508– 52–31	W1NXX	5460–45–21
W1CRW	10,230– 62–33	W8ZJM	5290–40–23
W1VW	9750– 61–30	W8QGZ	5250–35–30
W9RQM	9100– 59–28	W2PZE	5175–42–23
W2PGT	7980– 52–28	W2ILI	5160–43–24
W8AQ	7980– 50–28		

TRAFFIC TOPICS

There are a good many new calls in traffic handling these days, due largely to the increased impetus and consequent interest given traffic handling by the National Traffic System and the flow of morale traffic to and from GIs at camps in the U. S. and overseas. At the risk of being repetitious, we want to point out certain principles of operation and conduct in traffic nets and in traffic handling which will make for better accuracy and speed, and therefore a better record for amateur radio traffic handling:

1) Use the procedure signals AA, AR and BT in their proper places in each message. Failure to use these separation signals properly can cause and has caused errors in reception and retransmission.

2) If you do not use break-in (every good traffic man should), make sure you know how to give and ask for fills. Use AB (all before), AA (all after) and BN (between).

3) Indicate whether or not you use break-in when you start transmitting a message. If you don't use it, the receiving station will not waste time trying to break you. If you do, he can save time by breaking you instead of asking for fills afterward. NBK has been suggested for nonusers, and we suggest BKN for users.

4) Some nets are open to all comers; some aren't. Unless you are a member of a net or have traffic for that net, it is best courtesy to stay out. If you do report in, be sure you do so properly and in accordance with their procedure. If you get the brush-off, polite or otherwise, don't be offended. Some nets are set up for high-speed efficiency and cannot waste time in explanations. A little listening around will soon acquaint you with the nets and their procedures. Do some listening and observing before you barge into any strange net, regardless of the reason. If you want to find out whether a net is open or closed, give the NCS a buzz *after the net is over.*

5) Normally, your section traffic net can handle traffic for anywhere. It is not necessary and slows down the pace to try to put it directly into a high-speed net such as an NTS regional or area net, TLAP, Rebel, etc. Unless you really know your traffic handling, use the facilities of your section net.

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Once in a while a need is felt for an outlet to the Caribbean, Canal Zone and South America (Chile, Ecuador and Peru). We are informed by W4SDK at K4AIR, the MARS station at Langley AFB, Va., that a schedule is maintained between K4AIR and KZ5CG for handling just such traffic as the above. They operate at 1430 EST (1930 GCT) on 14,025 kc. on Monday, Wednesday and Friday, and would like to have anyone join them with traffic for Caribbean and South American points. Such traffic can also reach them via the Virginia Net (3680 kc.) or the Virginia 'Phone Net (3840 kc.). NTS routing via EAN and 4RN. Also via Eastern Shuttle Net and W3CUL.

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We make contact with the public at two points in handling traffic for third parties — at the point of origin and at the point of delivery. In both places, the conditions under which the message is handled should be made clear. At the originating point, the person filing the message should be made to understand that he is utilizing an unguaranteed service conducted by amateur radio operators voluntarily for their own amusement or for the sense of satisfaction they derive out of rendering this service. At the delivery point, the method by which the message was handled should also be explained, and the delivery card, if one is used, should present the best possible impression of the amateur service. ARRL delivery cards and message blanks are designed for this purpose. If they are not used, at least make delivery on a form of your own which does not give the impression of a hastily-scrawled note on a piece of scrap paper which is hard to decipher and almost impossible to understand. If you accept a message, you are accepting the responsibility of seeing that it is relayed or delivered within a decent interval. If it falls to your lot to make delivery, do so in neat, understandable and explanatory form so that the person receiving it does not get the impression of "kids playing at communication" which is often attributed to our service-hobby.

BRASS POUNDERS LEAGUE

Winners of BPL Certificates for January traffic:

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
W3CUL	214	1544	1475	147	3380
W6JZ	20	1015	839	260	2134
JA2MB					1956
W7IOQ	46	108	780	707	1641
KG6FAA	329	614	486	123	1552
W7CZY	2	50	705	733	1490
W2RUF *	77	695	503	108	1383
WØZJO	11	601	559	37	1208
W5L8N	5	520	517	3	1045
W6GYH	32	400	262	138	832
W3NHI	46	386	283	62	777
W8IB	25	366	323	46	760
JA3AC	334	202	132	70	738
JA2KW	484	0	42	206	732
W9ILH	19	335	310	28	692
W6BAM	15	311	319	39	684
W9JTX *	13	314	259	50	636
JA2HQ	128	245	105	140	618
W2COU *	126	242	151	78	597
W9DGA *	128	225	136	63	552
WØSCA	8	259	269	4	540
W5GZU	9	260	253	2	524
W8AUJ	15	261	235	13	524
W8RJC	12	260	242	10	524
W2RUF	29	281	195	17	522
W7NH *	6	257	244	13	520
W9QLW *	18	254	237	3	512
WØAY	21	235	223	33	512
W6KYV	32	220	39	213	504
W3CUL *	362	3072	2931	358	6723
JA2MB *					5159

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

W4NZG....273	W7FIX.....143	W1SUK.....103
K4WAR....195	W8DZX....119	W9NZZ 102
	W7KCU....111	

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

* December Traffic

National Traffic System. Progress has been encouraging during January, with conditions getting slightly better and a lot of NTS nets which have been hanging on by their teeth rallying strongly. We want to introduce three new regional and area net managers. Hal Reid, WØZJO, who has been filling in for W7WJ on and off for some time, is now in the driver's seat of the Pacific Area Net. W7WJ was forced to resign because of ill health, and we are sorry

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If you handled any traffic in 1950, you probably handled some with or via W3CUL. Mae Burke racked up a grand total of 28,187 message points last year, made BPL every month, and still had time to do all her housework (almost). Her December total alone was 6723, which is, we believe, an all-time record for a single-operator station. W3CUL is a member of the Third Regional Net of NTS, the Hit & Bounce Net, and reports into a good many other nets to peddle the great volumes of traffic she always has on the hook. That shiny gear is not on her operating table for looks!

to lose him. Ray Cornell, W6JZ, has taken the reins of the Sixth Regional Net (RN6) from champ W6CE, who can no longer devote his customary eight hours per day to traffic work; and Nellie Hart, W7NH (no relation), has taken over RN7 from Larry, W7CZY, who has similarly found himself unable to continue. All three of these new managers are new as managers only — they are old to the traffic-handling game. Even so, they have some mighty big pairs of shoes to fill, and we hope you Mountain and West Coast traffickers will help them along as much as you can. The complete turnover of managers in the Pacific Area may (but should not) cause some complications. More participants are needed out there to handle the terrific loads which were being carried individually by W6CE and W7CZY.

January reports were received from EAN, CAN, PAN, 1RN, 2RN, 3RN, 4RN, 8RN, TRN, Indiana and West. Mass. in time to make this column.

Net	Total Tfc	High	Low	Average	No. Sessions
Eastern Area.....	892	58	18	39	23
Central Area.....	537	41	7	23	23
Pacific Area.....	702	56	17	26	27
1st Regional.....	347	32	0	8	46
2nd Regional.....	185	19	0	8	22
3rd Regional.....	196	25	0	4	44
4th Regional.....	346	15	0	7	46
8th Regional.....	67	9	0	2	32
13th Regional.....	45	8	0	1	—
West. Mass.....	118	16	0	3	46
Indiana (QIN)....	257	21	3	10	27

I have to hand in my copy the 15th of the month, fellows, so if I don't have your report it doesn't get recorded, thassall. Again, let us point out that it is not always the net manager's fault if the report doesn't get in. NCS should report to him the stations who QNId and the traffic handled for each session.

Eastern Area Net (EAN, 3705 kc., 2030 EST, Mon.-Fri., W2CLL): Everything going smoothly. Geo, W2CLL, states that some of the NCS do not report to him in time to get his report in to headquarters. January operation most successful, with all but 3rd and 13th Regions 100%. They each missed only one session. Certificates have been issued to W1s EOB, RWS, EMG, NJM, CRW; W2s RUF, ZVW; W3s GEG, GZH; W4s ANK, LAP; W8s DSX, YCP; VE3BUR.

Central Area Net (CAN, 3670 kc., 2030 CST, Mon.-Fri., W9CBE): All three regions were perfect in attendance during January. Certificates have been issued to W4APC, W4NNJ, W5DRW, W5GZU, W9SUF and WØHMM.

Pacific Area Net (PAN, 3670 kc., 2030 PST, Mon.-Sat., WØZJO): Both regions and CAN were perfect in attendance in January, and EAN missed only one session (Hal says he may have been there but bad conditions prevented his being heard by the NCS). CAN sent two or more representatives to every session. W7NH and WØZJO have all the NCS assignments on PAN at present.

First Regional Net (1RN, 3610 kc., 1945 & 2130 EST, Mon.-Fri., W1BVR): With some NCS reports missing, Western Mass. made 34 sessions, Conn. and Maine 33, E. Mass. 28, R. I. 25, Vt. 24 and N. H. 22. NCS and liaison assignments are divided among the gang on a scheduled basis. Certificates were issued to W1s EMG, HYF, QKM, QR, TY and UE during January.

Second Regional Net (2RN, 3690 kc., 1945 EST, Mon.-Fri., W2PRE): Despite poor conditions, 2RN missed only one session in January (New Year's Day). NLI reported in 100%, with NYS and NJ each missing only twice. Only three section nets now report into 2RN, since in two cases section nets have combined. W2PRE indicates good progress during the month but says that some New Jersey traffickers by-pass 2RN and report directly into EAN, thus creating bottlenecks at the area level.

Third Regional Net (3RN, 3590 kc., 1945 & 2130 EST, Mon.-Fri., W3GEG): The Md.-Del.-D.C. section net has become the most regular participant on 3RN, with 41 out of 44 appearances in January. W. Pa. showed up 38 times, E. Pa. 35 times. W3GEG wishes to commend especially W3s BIP, CUL, FWP, GZH, JZY, LOJ, LZM, ONB and NCD for their fine January performance.

Fourth Regional Net (4RN, 3615 kc., 1945 & 2130 EST, Mon.-Fri., W4ANK): All sections are again represented on 4RN, and things are looking up. S.C. made the best record in January with 40 out of 46 sessions, followed by N.C., Va., E. Fla., and Ga., in that order. Hunter says a lot of traffic is received for Ala. and Tenn. (which is in the Fifth Region) and Ky. (which is in the Ninth), and has to be rerouted. QRM is an increasingly difficult problem and 4RN may seek a better spot. Certificates have been issued to W4s CHD, JPY, KGI, LAP, LCV, LMT, MWH, NZG, OGI, QDX, and K4NRK.

Fifth Regional Net (RN5, 3645 kc., 1945 & 2130 CST, Mon.-Fri., W4NNJ): W4NNJ is moving again and has asked Asst. Mgr. W4APC to take over until he can get back on the air. RN5 certificates have been issued to W4s APC, AXP, BAQ, KIX, and W5s DRW, KRX and LUX.

Eighth Regional Net (8RN, 3530 kc., 1945 & 2130 EST, Mon.-Fri., W8YCP): In January, Ohio reported 29, Michigan 26 and West Virginia 14 times out of 32 sessions. Certificates have been issued to W8s AUJ, DSX, ELW, EXZ, IB, OXO, SG, SCW, UPB and YKC. Considerable trouble is experienced with South American 'phone QRM, and a shift in frequency is being considered.

Thirteenth Regional Net (TRN, 3675 kc., 1945 & 2130 EST, Mon.-Fri., VE3BUR): Beaver, QON and PQN nets are 100% in attendance, and Maritime is represented occasionally by VE1s OM and TO. Certificates have been issued to VE2CD, VE3ATR and VE3GI.

CODE-PROFICIENCY PROGRAM

Twice each month special transmissions are made to enable you to qualify for the ARRL Code Proficiency Certificate. The next qualifying run from W1AW/WØTQD will be made on April 19th at 2130 EST. Identical texts will be sent simultaneously by automatic transmitters. Frequencies of transmission from W1AW will be 1887, 3555, 7215, 14,100, 28,060, 52,000 and 146,000 kc. WØTQD will transmit on 3534 kc. The next qualifying run *from W6OWP only* will be transmitted on April 1st at 2100 PST on 3590 and 7248 kc.

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

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

Date	Subject of Practice Text from February *QST*
April 3rd:	*"Over the Hills and Far Away,"* p. 13
April 5th:	*Electronic Instrumentation*, p. 16
April 9th:	*Furlough in Monaco*, p. 19
April 11th:	*The "Clemens Match,"* p. 26
April 17th:	*In Search of the Ideal Electronic Key*, p. 33
April 20th:	*New Life for the Q5-er*, p. 37
April 23rd:	*Technical Topics*, p. 40
April 25th:	*V.H.F.: Why-How-When?*, p. 46

A.R.R.L. ACTIVITIES CALENDAR

April 1st: CP Qualifying Run — W6OWP
April 14th-15th: CD QSO Party (c.w.)
April 19th: CP Qualifying Run — W1AW, WØTQD
April 21st-22nd: CD QSO Party ('phone)
May 5th: CP Qualifying Run — W6OWP
May 16th: CP Qualifying Run — W1AW, WØTQD
June 8th: CP Qualifying Run — W6OWP
June 9th-10th: V.H.F. Contest
June 19th: CP Qualifying Run — W1AW, WØTQD
June 23rd-24th: ARRL Field Day
July 8th: CP Qualifying Run — W6OWP
July 19th: CP Qualifying Run — W1AW, WØTQD
July 21st: CD QSO Party (c.w.)
July 29th: CD QSO Party ('phone)
Aug. 10th: CP Qualifying Run — W6OWP
Aug. 20th: CP Qualifying Run — W1AW, WØTQD

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.

Alabama	Lewis C. Garrett, W4LEN	Dec. 15, 1950
Kentucky	Ira W. Lyle, jr., W4KKG	Jan. 2, 1951
Oregon	J. E. Roden, W7MQ	Mar. 1, 1951
Mississippi	Norman B. Feehan, W5JHS	Mar. 8, 1951
Western Pennsylvania	Ernest J. Hlinsky, W3KWL	Mar. 17, 1951
Southern Texas	Dr. Charles Fermaglich, W5FJF	Apr. 29, 1951

In the Maryland-Delaware-District of Columbia Section of the Atlantic Division, Mr. James W. John, W3OMN, and Mr. Eppa W. Darne, W3BWT, were nominated. Mr. John received 220 votes and Mr. Darne received 169 votes. Mr. John's term of office began Mar. 21, 1951.

ELECTION NOTICE

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

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

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

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

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

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

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

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

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

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

— F. E. Handy, Communications Manager

Section	*Closing Date*	*SCM*	*Present Term Ends*
Maine	Apr. 16, 1951	Manley W. Haskell	Apr. 15, 1951
Western Florida	May 15, 1951	S. M. Douglas, jr.	July 29, 1951
N.Y.C. & Long Island	May 15, 1951	George V. Cooke	July 31, 1951
Eastern Florida	May 15, 1951	John W. Hollister, jr.	July 31, 1951
East Bay	June 1, 1951	Horace R. Greer	Aug. 16, 1951
British Columbia *	June 15, 1951	Ernest Savage	Aug. 22, 1951
Southern New Jersey	June 15, 1951	Dr. Luther M. Mkitarian	Aug. 26, 1951

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

DXCC NOTES

Changes are made from time to time in the ARRL Postwar Countries List, and we are pleased to announce two recent additions.

A new addendum is the country of Saarland, the prefix of which is now 9S4. Confirmations of contacts with Saarland on or after November 8, 1947, will be accepted for DXCC credit.

In November, 1950, we announced in *QST* that Amsterdam Island, FB8, would be grouped with Kerguelen Islands, FB8, on the Countries List. Since the time of that announcement, some additional facts have come to our attention, with the result that we have decided to group Amsterdam Island & St. Paul Island, both FB8, as a country *separate* from the Kerguelen Islands.

In view of evidence recently received to the effect that 3A1A was not operated from Monaco, we are deleting Monaco DXCC credit from our records of all who have submitted 3A1A cards. Credit is also being deducted from the records of those submitting PX1A cards. Although this station sent out many QSLs, we have conclusive proof that operation took place illegally from Mexico.

DX CENTURY CLUB AWARDS

HONOR ROLL

W1FH.....236	W2BXA.....227	WØYXO....225
W8HGW....233	G2PL.....226	W3GHD....223
W6VFR....229	W6ENV.....225	W3CPV....223
W3BES....229	W6EBG.....225	

RADIOTELEPHONE

W1FH.....196	VQ4ERR.....188	W9RBI.....177
XE1AC.....192	PY2CK.....187	W2BXA....175
LU6AJ.....189	W8HGW.....184	W1JCX.....172
	W6DI.....181	

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

NEW MEMBERS

W7AHX.....126	W8JRG.....104	W7JYZ.....101
DL1QT.....110	W9KA.....104	W9HQF.....101
SM5KX.....109	HB9IM.....104	I1FO.....101
PAØOK.....108	W6VDG.....103	WØBGJ.....101
W9TLT.....108	W2LV.....103	G4LP.....101
PY4RJ.....107	SM5TQ.....102	F8SM.....100
VK5BO.....106	OK2MA.....102	W8MKY....100
	FA9RW.....102	

RADIOTELEPHONE

PY4RJ.....107	WØMKF.....101	ZS3G.....100
DL3DO.....102	W3SFK.....101	G2HIF.....100

ENDORSEMENTS

W4BPD.....220	W5LGS.....150	W9HUZ.....121
W1ME.....214	W4CYY.....150	W6KYV....121
PY1AJ.....210	KZ5IP.....142	W9BRD....121
W6MJB.....200	ZL4GA.....142	W4AAW....121
F8BS.....200	ZS6A.....141	G3DOG....121
W6GFE.....190	W5LXY.....140	WØQVZ....120
W8DX.....190	W6EAY.....140	W4LQN....120
W2EMW....183	W6LVN.....140	W6ETJ.....120
W3KDP....180	W1ATE.....132	W1HRI....120
W3JKO.....180	W3FYS.....132	W4EPA....120
HB9X.....173	G3COJ.....131	W6PBI.....120
W3JTK.....172	G8KU.....130	VE3ADV....115
ZL1BY.....170	WØMKF.....126	W5NW.....114
W3LBG.....166	PY4IE.....124	VE2BV.....113
VE3IJ.....164	OK1SK.....124	W6GPB.....111
W3NOH.....164	OH2NB.....122	W6NGA....110
PAØGN.....160	I1IT.....121	W3MZE....110

RADIOTELEPHONE

W6AM.....151	LU8CW.....130	W4AAW....120
ZS6Q.....150	EA2CA.....122	G8QX.....116
I1RM.....134	LU4MG.....121	W3KT.....110
W1ATE.....132	W2ZVS.....120	

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

ATLANTIC DIVISION

EASTERN PENNSYLVANIA — SCM, Jerry Mathis, W3BES — New officers of the Northeast Radio Club are KHR, pres.; HYJ, vice-pres.; DHH, secy.; KIW, treas. The Abington Twp. Radio Club now is 100 per cent Class A. The Lancaster Emergency Net operates on 3640 kc. and is coöperating with local defense agencies. The following is quoted from a letter from SM, of Scranton, "During Sept. of 1950 the WGBI Broadcasting Co. found a new QTH and transferred all rights to the original location to the Electric City Radio Club. This includes a 5-room building, two small outbuildings, one with a rotary beam installed, a 60-foot tower, oil heater, and many other things too numerous to mention. Also there are seven acres of land for an antenna farm and the nearest TV receiver is ½ mile away. The club call is KX. The elevation is 1200 feet. There is presently a 1-kw. 75-meter 'phone rig working and a low power all-band rig. LZD is making a 750-watt v.h.f. rig for the station." SM further states that the Club is actively engaged in Civil Defense work and has had several successful test runs. The 144-Mc. net is tied in with the E. Pa. net via MRQ and PMG. DGM is new president of the Frankford Radio Club; all other officers remain the same. The Philadelphia Area Council of Radio Clubs continues to function mostly on matters of C.D. The Frankford Radio Club members were guests of the Potomac Valley Radio Club at a banquet in Washington. C.D. activities were discussed and an interesting talk on radio in Switzerland was given by HB9AW. The proposition of calling a moratorium on all activities that had no bearing on defense work for the duration of the emergency was kicked around but no conclusions were reached. The stations of 4KFC and 3JTC were visited and admired. The Potomac group will visit the FRC next year. Traffic: (Jan.) W3CUL 3380, NHI 777, BIP 99, PDJ 84, AXA 50, PMG 38, OML 19, GJA 17, OAQ 9, ADE 5, CAU 5, WTS 4. (Dec.) W3CUL 6723, WTS 35.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA — SCM, Eppa W. Darne, W3BWT — Members of the Baltimore ARCS and the Maryland Mobile RC visited the National Bureau of Standards Frequency Station, WWV, Beltsville, Md., Jan. 14th. A talk on "Correlation Between Various Civil Defense Agencies and On Sabotage," by Mr. Dan Burkhardt, American Legion, high-lighted the Jan. 15th meeting. New officers of the Chesapeake ARC are AFM, pres.; LZM, vice-pres.; MTE, secy.; PJL, treas.; FLG, sgt. at arms. Also at the meeting E. C. Nunn, research engineer, Bendix Radio Division, gave an excellent talk on "Regulated Power Supplies." The Potomac-Rappahannock Valley Net has started a trial period to guard its 3935-kc. frequency. Its purpose is to guarantee, insofar as possible, a net member to get a weather or river report into Washington with minimum delay. Stations outside of Washington on the 146,800-kc. frequency are equipped to alert PYW by automatic start, amateur radio teletype arrangements. Members of the Washington RC enjoyed a talk on "Newest Developments in Single Sideband Suppressed Carrier Transmission," by 4OLL at its Jan. 13th meeting. At the second January meeting FYS spoke on "DeLuxe Ham Receiver Design Considerations for the Low Frequency Bands." The Potomac Valley RC and the Frankford RC held their Annual Dinner in Washington on Jan. 28th at the Harrington Hotel. Among the speakers were HB9AW, 2IOP, 2ESQ, and 2UOL. The Rock Creek ARA featured Walt Goode, speaking on "Model Control," at its Jan. 26th meeting. Students at Howard University have formed a radio club called the Howard Amateur Radio Society. The Greater Washington Radio Amateur Liaison Committee has been formed to plan for c.d. work. QYA is turning a war surplus ambulance into a mobile ham shack. PDZ has a new Collins 32V-2 rig. 2ZEQ/3 now is located in the Great Mills, Md., Area. PTZ is working on a "break-in" system for his equipment. GUS has his 144-Mc. beam on high mast, and uses two guy wires of mast for 3.5-Mc. transmitting antenna. ONB, GUS, and HJV are newly-appointed ORS, HJV is ex-5MBV. CDQ has a new antenna and V.F.O. LUN and QOM are conducting some tests on a small workable 144-Mc. antenna. IZL is newly-appointed EC for the Washington, D. C., Area. MCD is constructing new V.F.O. unit. OUQ is on 7 Mc. with 100 watts. OHI has completed a grid-dip oscillator and is operating on 7 Mc. with 35 watts. GZH has been appointed amateur radio chief in c.d. by the Delaware State Director. Plans are being made for 144- and 28-Mc. emergency nets with three State Net Control Centers operating on low frequencies covering the entire State of Delaware. PLP is on 14 Mc., c.w., and 'phone; he also is on 3.5-Mc. c.w. FQB and OFU were active in the January CD Party. PTZ and PDZ visited K4AF and K4USA. QZC is on 3.5- and 7-Mc. c.w. QBG, with a stalled car, summoned her OM, JCL, for assistance via Evelyn, PJL. NAP is on 28 Mc. EQK routed traffic to a G.I. stationed in Italy, enabling him to return in time for his mother's funeral. KAV, in Cumberland, Md., is on 3.85-Mc. 'phone, fixed and mobile. WIT has a beam on 60-foot tower, running 100 watts on 144 Mc. BHQ is rebuilding his exciter. JCS is building a TV receiver. GBB has completed a new 'scope. II is on 14-Mc. c.w. with 400 watts. REV is a new Baltimore station on 28-Mc. 'phone. CHS has one watt on 28 Mc. QWE is building a new 150-watt final for 28-Mc. 'phone. RFZ is a new Baltimore station on 3.5-Mc. c.w. NNX is building a new "Quad." PSP has a new "one-element" beam for 28 Mc. NQC and OOT have Class A tickets. PRL has a new HRO-50. Traffic: W3GZH 253, LZM 193, PTZ 174, ECP 127, CVE 124, AKB 109, HJV 109, JZY 91, UF 60, ONB 53, MCG 46, NNX 12, QZC 11, AKR 10, GUS 10, MCD 8, BWT 7, IZL 7, JHW 4, PZ 4.

SOUTHERN NEW JERSEY — SCM, Dr. Luther M. Mkitarian, W2ASG — PTM is in charge of emergency communications with the civil defense of the Camden Area. Please extend to him all the assistance he requires. Your SCM has forwarded a printed copy of Bill No. 106 introduced to the State Assembly by the Hon. N. C. Smith of Ocean County regarding the amateur call letters on our automobile license plates. To all known amateur radio club secretaries, I would be glad to receive all the constructive criticisms which you may have. The next Annual Old Timers' Nite, sponsored by the DVRA, will take place in Trenton on April 21st. For details contact ZI. Incidentally, he is operating the New Jersey State Police station, DOJ; the rig is a BC-610. K2BG made 91 contacts during the last CD Party. BAY has moved to a new QTH away from TVI and QRM. ZVW is high traffic man again this month. Greetings to a new ham in Merchantville. Yes sir, he finally made it and his call is FXT. Traffic: W2ZVW 140, EBW 83, ZI 82, ORS 57, CSA 29, ASG 21, K2BG 12, W2ZYX 10.

WESTERN NEW YORK — SCM, Harding A. Clark, W2PGT — SEC: SJV. RM: RUF. Announcement of available frequencies for c.d. use by the FCC has brought forth a spurt of activity among various groups throughout the section. Many of them now are holding regularly-scheduled drills. If you are interested in getting into this work you are requested to contact your local EC. If you don't know who he is, get in touch with either PGT or SJV. The Oswego County Amateur Radio Assn. has been organized with ZHU, pres.; MSG, vice-pres.; WER, treas.; and CCW, secy. ZHU also has been appointed EC for Oswego County. This gang has nets on 3720 and 3965 kc. meeting weekly with mayors from various localities participating and sitting in on the drills. The Rochester Mobile Club has gone DX-minded with CR working DL4DB, and DFS working KV4AQ, CO7RM, and G2QL. BDY is trying a noise limiter on his mobile receiver. K2BS now is operating 3.85-Mc. mobile as well as 28-Mc. mobile. EMW now has 182 confirmations out of 192 countries worked and handles traffic with Germany and Japan between DX contacts. COU, a newcomer to the traffic ranks and one of NYS mainstays, has left for a five-months stay in Oklahoma and will be looking for the gang on the air. RUF gave a talk on amateur radio to the Kiwanis Club. RSL has moved to Syracuse, thus necessitating his resignation as EC for Monroe County. This post has been filled by the appointment of QY. TQ is new EC for Clinton County. RZP has been reappointed EC for Delaware County. DJF has applied for and has been appointed ORS. There are several League official appointments that need endorsing to continue in good standing. You are urged to check your status at once. QHL is Asst. EC for Oneonta. FAN is Asst. EC for Lockport. SZK spoke on single sideband transmitters and PRI on rockets and associated equipment at recent KBT meetings. QKX spoke on power distribution at recent RAWNY meetings. TBD, QNA, UDD, and SJV journeyed to Oakville, Ontario, for a v.h.f. meeting at which the main topic was c.d. FMH has been working some of the gang from Florida. RVH is busy installing v.h.f. gear in his plane. RUF continues to make

BPL with nice totals. Traffic: (Jan.) W2RUF 522, COU 352, DJF 115, RUT 80, SJV 43, PGT 40, BLO 28, YRF 21, EMW 20, HYQ 20, RZP 20. (Dec.) W2RUF 1383, COU 597, NAI 148, RUT 134, WOE 82, DJF 77, PGT 63, FCG 60, HYQ 34.

WESTERN PENNSYLVANIA — SCM, Ernest J. Hlinsky, W3KWL — SEC: OMA. PAM: AER. RMs: GEG and NUG. TQX and PIY send in fine newspaper clippings of their club activities. The biggest item is a QSO Party idea suggested by the club, with prizes offered for the best score made in the 25 hours allotted time. QMY worked his first DL contact. QZE can be heard on 3.5-Mc. c.w. OIH now is Class A. Down Horse Shoe Bend way our ORS man, LJQ, editor of *Hamateur News of Altoona*, sends in his club paper and we note that the club had some tough luck with antennas during the snowstorms. Congrats to WPA, who is Western Pennsylvania's only woman publisher of a club paper. KQD renewed his ORS appointment. POZ is doing a nice job on the Navy nets. Down Pittsburgh way the Steel City Radio Club's official publication, *Kilo Watt Harmonics*, is a good source of fine information. New members of KWH are QOQ and QYG. RXT is to be congratulated on obtaining an ARRL v.h.f. certificate for KWH for work in the September V.H.F. Contest. Also congrats to NKM on his fine work in piling up new states on 144 Mc. NRQ is rebuilding. The Amateur Transmitters' Assn. sends its monthly report via its club paper, *ATA News*. We find that OB gave an excellent talk on "A Plan for Civilian Defense Communication." The Western Penna. Emergency Net, under the direction of AQK, meets Wednesdays at 9:30 P.M. and Saturdays at 11:30 P.M. on 29,425 kc. Congrats to AAX on a swell club paper, and thanks for those kind words on your SCM. The Mercer County Radio Assn. had several honors bestowed upon one of its outstanding members. GEG not only is RM for the Western Penna. Traffic Net, but is a member of EAN and is manager of 3RN. If you listen on 144.160 Mc. at 10 P.M. each night you will hear LNA, as NCS, calling a newly-organized Ten O'clock 2-Meter Net. Up Dubois way, MOT reports all in operating condition with 750 watts on 3505 kc. nightly. LSS is working on the Auto License Bill which is to come up in the Pennsylvania House and Senate. Traffic: (Jan.) W3GEG 332, NCD 140, NRE 86, LSS 61, NUG 57, KWL 49, LEV 16, UHN 5, MIZ 4. (Dec.) W3UHN 13.

CENTRAL DIVISION

ILLINOIS — SCM, Lloyd E. Hopkins, W9EVJ — HKA is the proud owner of a new car and reports the Iroquois County Radio Club now is affiliated with ARRL. JLL is a member of MARS and has a 500-watt rig for all bands. His 16-year-old son is EJU. LMC, after four months on the air, has snagged 39 states, VE1, VE2, XE1, and XE2. GDI enjoyed the recent CD Party. YIX is getting ready to give 144 Mc. a try. JGL is organizing the MARS mobile net. NN is hot after DXCC. KHJ is a new ham on 14-Mc. c.w. SYZ finally has located a new QTH and hopes to be able to join the ILN gang soon. UBP hopes he has TVI licked. The Central Illinois Radio Club has formed a net on 1815 kc. in civil defense set-up. SKR is operating 14-Mc. c.w. with indoor antenna in poor location. Officers of the Hamfesters Radio Club for 1951 are HOV, pres.; ZIW, vice-pres.; INF, secy.; AVH, treas.; GJO, sgt. at arms; NIF, financial secy. LNI is at his wit's end trying to lick TVI in a fringe area and is thinking of giving up ham radio. Can anybody give him practical suggestions? ACU schedules a friend in the Army once a week. FKI reports the Twin City Radio Club is getting set for civil defense work, and its new president is IAW. Newly-elected officers of the Tri-Town Amateur Radio Club are JMG, pres.; TMD, vice-pres.; JAN, secy.; DTX, treas. VZP, HPS, DUB, and OBY got together in 36-below-zero weather to plan the SWANI Net (Southern Wisconsin and Illinois) which will meet Monday nights at 10 P.M. CST on 29,500 kc. QN is operating mobile on 3.5-Mc. c.w. and 3.85-Mc. 'phone. KQL signed up with MARS, and also got high voltage pole transformer so he can run a full gallon. Sangamon County hams organized an emergency net on 1831 kc. which operates Sundays at 1100 and Wednesdays at 1900 CST. PHE recently had a sinus operation. He has added NC-57, RME-DB22A, TBS-50A, and VHF-152A. FGZ purchased a new Collins 32V-2 to return to the air shortly. The Starved Rock Radio Club paper, *Static*, provides news of planning for another hamfest this year and also shows a great deal of activity around that area in 160-meter work. IAY, LAX, and ILH are new ORS. Traffic: (Jan.) W9ILH 692, YIX 187, KQL 102, PEK 93, QN 85, SXL 54, KJ 53, BUK 52, LAX 34, PK 26, LIN 25, FKI 18, CMU 15, FRP 12, HOV 8, NN 4, UBP 4, ACU 3, GDI 3, HKA 1, LMC 1. (Dec.) W9FFR 10, HKA 3.

INDIANA — SCM, W. E. Monigan, W9RE — SEC: PHV. PAM: BKJ. RM S: DGA. RM N: RCB. New EC appointees are HDB, WKN, and UB. New ORS appointees are JUJ and LZI. Net Control Stations for QIN (3656 kc.) are: Monday, DGA; Tuesday, RCB; Wednesday, MKM; Thursday, JUJ; Friday, JUJ; Saturday, TT. New officers of the Purdue Amateur Radio Club are QBH, pres.; NVY, vice-pres.; YDP, secy.-treas.; 8CKW/9, program chairman. LHI, ex-9CXC, is back on the air after a lapse of about twenty-seven years. LXI has completed rebuilding and is back with a pair of 814s and 350 watts. He expects to be back in the Air Force soon. NH has been on 160-meter c.w., and was heard by GD3UB. PNE works EK1AO, also on 160 meters. DGA has new 28-Mc. mobile outfit and says it's lots of fun. DHJ is rebuilding set into a steel cabinet. SQN says radio repair keeps him busy. DLI is on 144 Mc. NZZ handles Stateside for VE8ML. HQF received DXCC certificate. South Bend and Evansville have tested their AREC organizations. RZS gave a talk on amateur radio to the Delphi Rotary Club. Quite an interest was shown and a better understanding of our hobby was given to the assembled businessmen. JBQ is on at Seymour with 30 watts and is developing a civil defense organization there. See you at the Central Division Convention, French Lick Hotel, Oct. 20 and 21, 1951. Traffic: W9JTX 409, JUJ 353, TT 234, NZZ 211, RCB 188, QLW 177, DGA 97, NXU 76, BKJ 43, DOK 33, DHJ 29, JBQ 20, K9WAA 17, W9YB 16, PMT 14, LZI 12, RE 9, KUT 5, NH 1.

WISCONSIN — SCM, Reno W. Goetsch, W9RQM — SEC: UFX. PAM: ESJ. RMs: CBE, CWZ, and LFK. ANM's TVI problems have been cleared. IQM received WAS certificate. With change in regulations on n.f.m., UIT will use 3805 kc. for his OBS schedule. A new '51 Ford takes care of CWZ's transportation while his 14-watt 'phone rig puts him on the BEN. HDZ is rebuilding power supply as a result of a blown transformer. Two new ORS, BVG and KZZ, are active traffic-handlers in WIN, 9RN, CAN, and PAN. IVE, YCV, and WEN have been recalled for military duty. CSU is building a bandswitching final. ERW has turned to 28 Mc. for his first 'phone operation. HMX soon will be mobile on 3.85, 14, and 28 Mc. The Door County Club awards ARRL memberships to its members who obtain a 1st-class amateur license. The Racine Megacycle Club held its annual banquet Jan. 27th. SZL is the C.D. Asst. Director for Communications in Racine and Red Cross Communications Chairman. Oshkosh reports a new ham, LTE on 28 Mc. HDX and IDL are bothered with BCI on 28 Mc. The Oshkosh Club is active in local c.d. communications plans, reports ELY. VHA, Wausau EC, has completed a disaster plan which also incorporates facilities of the local Naval Electronics unit. According to GPI, the MRAC Mobile Station Unit was on display at the Milwaukee Auto Show. IHW now is OQ. ESJ renewed OBS and OPS appointments. UFX, our SEC, announces that the civil defense frequency for Wisconsin Emergency Corps units will be 29,620 kc. The WVRA Annual Banquet and Hamfest will be held at Wausau April 21st. ILR is a member of USCGA and BEN Nets. AFT has new SX-71 receiver. TQ worked 20 stations during the V.H.F. SS. DDG and JBF both have new crystal-controlled converters on 144 Mc. FPE's new job takes him to Chicago. Traffic: W9CBE 350, ESJ 350, KZZ 218, BVG 184, ANM 101, IXA 92, IQM 89, FXA 57, IQW 39, UIT 38, CIH 26, CWZ 25, HDZ 11, NRP 9 RKT 9, RQM 9, BZU 8, IHW 8, OVO 7, IVE 6.

DAKOTA DIVISION

NORTH DAKOTA — SCM, Rev. Lawrence C. Strandenaes, WØJWY — In Fargo, RRW, has been appointed chief of the communications section in the National Defense organization and has submitted a comprehensive plan for the communications set-up for the simulated emergency March 5th. All hams located in county seats are urged to take part in civilian planning for defense with the local authorities, since it now seems that this State is to be organized on a county basis. Wherever possible, an EC will be appointed in each county seat. A note from 5DOY, of Dallas, says that Paul Carufel, KL7IN (WØPQW), visited Dallas in January. Don also mentions that HJC, for twenty years a ham in Fargo, died from a heart ailment last October. Class I OOs: RRW, VSK. Traffic: WØLHB 29, ZCM 29, NPE 27, NVK 26, KOY 15, CDO 13, CAQ 12, EXO 11, KRC 11, BIH 7, FNZ 6, FPW 6, JWY 4, RRW 4, PUP 3, ACN 2, BWY 2, UGM 2, AAM 1, CHA 1, JER 1.

SOUTH DAKOTA — SCM, J. S. Foasberg, WØNGM — Asst. SCM, J. W. Sikorski, ØRRN. HDO has worked 18 countries on 28 Mc. since Jan. 1st. New calls at Mitchell are CLS and CMD. New appointments: ZWL and CAR as ORS, HYV as OPS. RRN, ZRA, PHR, ZWH, and RWE, of Sioux Falls, have signed with MARS. The Gold Nugget Radio Club has been formed at Lead, and officers are AWU, VNK, AGL, and AEN. AWU is installing mobile rig, and VNK has mobile in his new Nash. AEL has 5-band mobile installed. South Dakota has new 160-meter emergency net with 24 members. GLK is NCS and KQO is alternate. The Mitchell ARC has new monthly publication the *WØZSJ Ground Wave*. Members of SFARC have completed a modulator for the club station. FSD is trying to promote 144-Mc. activity in Sioux Falls with little success. YKY, OSQ, and AWU have new 28-Mc. beams. Traffic: (Jan.) WØPHR 71, HYV 17, HDO 6, IWE 6, CAR 5, QHX 5, RRN 5, GLA 4, JLS 3, QBK 3. (Dec.) WØOLB 52.

MINNESOTA — SCM, John B. Morgan, WØRA — Acting SCM, Charles Bove, ØMXC. Asst. SCM, Jean Walter, ØKYE. SEC: BOL. IPX designed a dandy clamper tube modulator for his kw. rig which proved very successful SII built an all-band bandswitching rig covering 160 trough 6 meters, using a 465A in the final. VNB now is onh 144 Mc. QIN has a new twelve-element beam on 144 Mc. Bob also has finished his broad-band crystal-controlled

converter which is also for 144 Mc. HXY has a regular schedule on 144 Me. with 9FPE, of Willard, Wis., a distance of 140 miles. The Minneapolis Radio Club, Inc., passed a resolution to give all-out aid to the civil defense effort. The two 3.85-Mc. 'phone nets held an election for Net Controls and Alternates. EPJ is Net Control and FIT, UCV, and MRX are Alternates on the noon net, and HEO is Net Control with CWB, LPT, and SW as Alternates on the evening net. The Minnesota State C.W. Net now has a traffic route from Minnesota to Camp Rucker, Ala. The CAP has been enlisting a lot of hams from Minnesota into its defense set-up. There seems to be an old statute on the State law books that prohibits a civilian from using a short-wave receiver in his car that might pick up police calls, so the Hennepin County Mobile Radio Corps has acquired permits from the State Bureau of Criminal Apprehension to cover the use of this equipment. RXL is building a modulator using 304TLs. The Red Cross has supplied the Duluth emergency unit with an 800-watt generator. HRY has a new rig to cover 3.5 through 28 Mc. built around an 813. BGL is the new assistant to BOL, your SEC. AIH now has a new power supply which will give him 300 watts. BPI is new Official Bulletin Station on 3.5 Mc. Three more states and BPI will have WAS. DTS, of Wadena, took his rig with him to Norfolk, Va., and expects to be on 3.5 and 14 Mc. Join your local civil defense organization and above all join your Amateur Radio Emergency Corps now. Obtain application blanks from BOL, 1130 Delaware, St. Paul, Minn. Traffic: WØKFF 134, LVG 130, ITQ 102, RJF 96, EPJ 63, MXC 56, CWB 41, AIH 31, BPI 30, BGY 28, AAS 25, MRX 18, RXL 13, RA 9, BOL 8, UCV 6.

DELTA DIVISION

ARKANSAS — SCM, Dr. John L. Stockton, W5DRW — MET has 114 countries confirmed. ONL has new electronic key. The Camden Radio Club did a bang-up job as host at the hamfest in January. The Little Rock Club will hold the next meeting of the Arkansas Catfish Club April 22nd. DYF has a new 32V-2 with Collins low-pass filter. ECs ICS and EGY have met with civil defense administrators in their respective towns and are making plans with them. LUX says the Ozark Net can use more members for better coverage of the State. OCX is new EC in Russellville. MRD has been meeting the Armed Forces Net daily on 14 Mc. BAB has new antenna tuner and has improved the TVI situation. Following are Arkansas ECs: AQF, Okay; FPD and LQN, Hot Springs; RWJ, Jonesboro; NLL, Corning; DFX, Lonoke; BJH, Delight; NSW, North Little Rock; BAB, Siloam Springs; NBG, Conway; ASO, Mt. Home; LUX, Harrison; ICS, Ft. Smith; MRD, Danville; PYU, Camden; EGY, Texarkana; DRR (SI), Pine Bluff; IIV, West Memphis; FMF, Springtown; and OCX, Russellville. If there is no EC near you and you desire AREC membership, please contact SEC W5EA or myself. Traffic: W5EA 80, DRW 69, MRD 69, IIV 50, ANR 46, LUX 43, OXR 30, FMF 22, ONL 21, PYU 6, EGY 4, RWJ 3.

LOUISIANA — SCM, Robert E. Barr, W5GHF — KC renewed ORS appointment. PXW received appointment as OBS, and PVR was appointed EC. HEJ is building a separate rig for use on the MARS frequencies. CEW and LVG rated a very nice write-up in connection with their assistance to A.P. during the ice emergency. Louisiana hams now are sporting their call letters on 1951 auto tags. KCH again is active after a long illness. 4FCG/5 handles traffic from Camp Polk. FCG is back on 3.85 Mc. at Lafayette. BWZ is a newcomer to the nets from Ville Platte, returning to the air after a long absence. HEJ is planning to organize a slow-speed c.w. net for the State. NG wants recruits for state nets on 3.5 and 7 Mc. FYZ has very good mobile rig on 3.85 Mc. Practically every amateur in this section was active during the ice emergency January 29th through February 8th. The combined Pelican-Magnolia Nets maintained 24-hour operation on 3870 kc. for the entire period, with connecting links to the So. Texas Net, the Tennessee Net, the Delta Net, and the Arkansas Emergency Net. Traffic schedules also were maintained by the 3.5- and 7-Mc. c.w. gang, and by the 'phone nets on 28 and 144 Mc. Articles of praise appeared in all the leading daily newspapers of the State. The Louisiana gang thanks amateurs throughout the nation who helped police the emergency frequencies, and who acted as relay points when long skip prevented actual point-to-point communication. Traffic: W5NG 264, GHF 212.

MISSISSIPPI — SCM, Norman B. Feehan, W5JHS — QMQ is a busy man. He holds OES, OO, ORS, EC, and RCC certificates. EWD, FCH, and AAH are active on CAP frequencies. SKB, SJD, and SMD are new hams on 28 Mc. SKA is working 7 Mc. SKA and SKB are brothers. Congratulations to the Gulf Coast Amateur Club on becoming affiliated with ARRL. K5FBB, Keesler AFB, has a new console for operator RUT and RGC did an FB job on this. EGE, IGW, and WZ are heard nightly handling traffic on the Rebel Net. SCE has a new Globe King. RMC/M holds the record for mobile contacts on 28 Mc. There was not much to report this month as all Miseissippi hams were busy handling emergency icestorm traffic. Traffic: (Jan.) W5WZ 237, JHS 215, K5FBB 142, W5QMQ 68. (Dec.) W5WZ 305, MGR 23.

TENNESSEE — SCM, D. G. Stewart, W4AFI — As this report is written the middle and western sections of Tennessee are emerging from one of the most severe icestorms in years. Again amateur radio in its traditional form was the only means of communication for many isolated towns and in dispatching service for numerous railroads. Participating and assisting stations and operators were too numerous for coverage in this column. Thanks for your unselfish devotion to the service and the splendid manner in which it was covered. A mobile test was conducted for coverage of Oak Ridge with the following mobiles: AFI, FDF, KAF, KMH, MJR, NDE, and JDY. 50 Mc. is gaining popularity for local coverage in the c.d. set-up. Along these lines, MJR has developed a new one-tube 50-Mc. converter for mobile use. PFP, a new 28-Mc. mobile, also is sporting a new ham shack. FLW has been appointed communications chairman for the Dresden Red Cross Disaster Committee and is active in MARS. HQM also is in MARS on 4.02 Mc. OOA received 20-w.p.m. C.P. certificate. NNJ was the outlet for the Florida Fair traffic. OGG schedules 3CUL and ran up a terrific CD Party score with a 25-watter. ODF is a new ham in Chattanooga. AFI, FDF, and HHQ met with the Knoxville c.d. head and assisted in setting up a communications organization. Traffic: W4NNJ 319, APC 150, BAQ 133, OGG 89, JWO 58, IIB 52, AEE 50, QT 48, AFI 40, HHQ 37, FX 26, FDF 24, CXY 21, AKJ 18, HQM 14, NNH 10, NDC 9, OOA 8, PFP 4, PMR 1.

GREAT LAKES DIVISION

KENTUCKY — SCM, I. W. Lyle, jr., W4KKG — VP is quite busy performing Official Observer duties and experimenting with linear amplifiers. CDA's antenna suffered from the icestorm. MDB now is instructing code class for Civil Air Patrol. He also is NCS for KYN on Friday nights. If anyone has traffic for Greenville, BXU can be relied on to handle it. FKM is rebuilding for TVI reduction. BAZ bemoans the fact there are only twenty-four hours in the day! SFU, SHD, and SFS are new calls. SHD is the son of VP. OXX got married. CMP is newly-appointed EC for Bowling Green. He has a fine emergency set-up. MQ is new PAM for Kentucky. MGT, in the job as SEC for one month, is doing a fine job. Send him your application for Emergency Corps membership. PLN is going good on KYB, as are PKR and RQS. MKJ, veteran 144-Mc. operator, works his twelfth state on this band. YPR takes traffic for all points. SHF, new call in Lexington, has a 32V-2 on all bands. OGB, down Henderson way, is a reliable traffic man. NSZ has nice emergency power ready. CDA and MWX publish an FB Net Manual. The nets still are very busy with emergency traffic from the ice and snow storms. Especially noteworthy was the coöperation between the c.w. and 'phone nets. The State was well covered by these nets and everybody worked hard. To all stations participating in this emergency work the highest words of praise would be truly filling. Traffic: W4MGT 86, YPR 68, BAZ 62, OGB 38, MDB 31, CDA 26, KKG 21, BXU 12, MKJ 11, FKM 8, VP 4.

MICHIGAN — SCM, Norman C. MacPhail, W8DLZ — Asst. SCM c.w., J. R. Beljan, 8SCW. Asst. SCM 'phone, R. B. Cooper, 8AQA. SEC: GJH. PAMs: YNG and TTY. RMs: UKV and YKC. New appointments include EXO as EC for Kent County, TOM as EC for Berrien County, ZZU as EC for Allegan County, and AQA as Asst. SCM 'phone. GJH reports applications for membership in the AREC are coming in rapidly. The importance of this organization cannot be stressed too highly at this time. Flint and Grand Rapids continue to vie for top honors in AREC activities. The National Rifle Association intercity match between Detroit, Pittsburgh, Akron, and Grand Rapids was conducted Feb. 2nd with all scores relayed via c.w. on 3743 kc. Grand Rapids won the match. W8AW/8, at Detroit, was manned by IHR, AW, ILP, CYX, KSL, ZDK, IWG, VRB, FSI, MTH, and PKA. The Grand Rapids gang, operating from W8DC, included IV, EXO, DLZ, UBF, BJD, PTO, FNH, ZCH, and COF. SWF says he intends to start a petition asking FCC to eliminate Channel 2! QGZ has had a run of tough luck. He broke a rib or two, then dropped a power supply on his toes. RJC now is an MARS net member. The DARA now meets in the USNR Armory and FX says all radio clubs in the 9th Naval District can make similar arrangements. Please send station activity reports as quickly as possible after the first of the month. The deadline for *QST* is the 7th. We need news items. Let's have the dope on club activities, elections of officers, etc. Requests for information on MARS nets now are flying thick and fast on the MEN and BR Nets. There is plenty of discussion on new FCC regulations and TVI, too. 28-Mc. boys are hitting the openings in the band like a ton of bricks. The band is very erratic. FNZ, EXO, AKI, and ZCH are working on plans for a state-wide 144-Mc. net. ZEE has a new 50-watter going on 3.85-Mc. 'phone. Traffic: (Jan.) W8RJC 524, SCW 177, NOH 161, SWG 133, UKV 126, DAP 115, IV 84, YGS 71, QBO/ATB 70, TZD 61, UGD 48, W2RTZ/8 38, W8YNG 35, DLZ 28, DSE 25, COW 23, UES 19, TQP 18, DWB 15, TUX 15, AQA 12, FX 12, ZDF 12, JUQ 11, LR 10, QGZ 7, ZEE 6, TIC 3. (Dec.) W8DSE 122, TZD 53.

OHIO — SCM, Leslie Misch, W8HGW — Asst. SCMs, C. D. Hall, 8PUN, and J. E. Siringer, 8AJW. SEC: UPB.

RMs: DAE and PMJ. PAMs: PUN and AJW. Your SCM and AJW attended the OCARC meeting in Columbus on January 13th. It was an enjoyable meeting with ENH, PNY, OAC, EQN, and OCARC officers, along with other delegates, present. Among the honored guests were SPF, Great Lakes Director, and UPB, our very capable SEC. Among the various subjects discussed were emergency work, TVI, Docket 9295, the oft-discussed 15-meter band, and Ohio license plates bearing amateur call signs. Regarding the last-named subject, interested parties should contact their local State Representatives. Suffice to say, the OCARC is an alert and progressive organization. Many of the Cleveland amateurs had the privilege of hearing Commissioner Sterling of the FCC on Jan. 18th. Mr. Sterling's talk dealt with the various types of radio interference and he specified that TV receivers were creating interference in the channels reserved for numerous services, including the amateur service. Dick Baldwin, Asst. Secy. of ARRL, was in Cleveland on Feb. 27th and spoke before a large group of amateurs. Our congratulations to IB and DZX upon making BPL. The SEARC meets on the 2nd and 4th Tuesdays at Komenski Hall, 3613 E. 131st St., Cleveland. ZAU has left the country for overseas duty. WDQ has moved to Baltimore. AQ was active in the January CD Parties on 'phone and c.w. LBH now has separate transmitters for individual bands. WAV's MARS call is A8WA. FYW collected 244 messages for U.S. troops in Korea and, with the help of Columbus operators, got them all away at Christmas time. The Portage County Amateur Radio Club has 15 members, 7 of whom have mobiles. Its net operates twice weekly. PAU has a new 32V-2. JFC has been busy rebuilding. WLW, Cincy a.m. broadcast station, 700 kc., has programs devoted to the amateur each Saturday at midnight. BSD now is active on 28-Mc. mobile. EIB keeps schedules with his brother, ØBTM. Middletown's Dial Radio Club's officers are MGA, pres.; EQJ, vice-pres.; FAD, secy.; and DDZ, treas. ZRV was the Club's selection for EC. BFQ and 4JDN hold nightly schedules on 144 Mc. More 144-Mc. activity is needed in southwest Ohio, and representatives are wanted in Hamilton, Oxford, Portsmouth, Chillicothe, Washington C.H., Lebanon, and Wilmington. From the *Q5*, of the Springfield Amateur Radio Club, we learn that EOV, OKB, and FOA finished one-two-three in their local SS Contest. The *RF Carrier*, of the Dayton Amateur Radio Assn., tells us its emergency program is shaping up nicely, that FPE is a new member, and that Bill Boyd was awarded a plaque in recognition of his teaching code and theory during the past five years to prospective amateurs. DOG, of Cleveland, is looking for pupils for his code class. BF has returned to the active DX fold. There still are appointments open in this section. Contact your SCM if interested. Traffic: W8IB 760, DAE 273, YCP 170, DZX 155, EIU 136, UPB 90, WE 75, ARO 49, EQN 46, EQ 25, GZ 22, CBI 21, QIE 21, SFI 20, WAV 20, AJW 15, AL 14, WAB 13, DXO 8, LBH 7, AQ 4, DZO 4, ZAU 4, EZE 3, BUM 2, RN 1.

HUDSON DIVISION

EASTERN NEW YORK — SCM, George W. Sleeper, W2CLL — SEC: NJF. SPECIAL ATTENTION. Plans have been completed to form two state-wide nets for the N. Y. State Civil Defense Commission. One of the nets will be 'phone (3.85 Mc.), and the other will be c.w. (3.5 Mc.). The nets will connect ten district headquarters of the DPW. The DPW has been authorized by the State Civil Defense Commission to organize these nets and to bring amateur radio into the overall plan. HCM, of the DPW, has been assigned as the amateur liaison, and all contact with ARRL field organization will be via your SCM, 2CLL. The frequencies finally chosen will fall within the emergency bands recently allocated by the FCC. Participating amateurs will have to be cleared by the FCC. These nets will handle vital communications between the districts and the Albany center only. Intradistrict communications will be handled via AREC county nets, probably on 50 or 144 Mc. The nucleus of these interdistrict nets will be the N. Y. State Emergency 'Phone Net (now on 3920 kc.), and NYS/NYSS C.W. Net on 3720 kc. 8GSJ/2 soon will be blasting the ether from Saugerties. New officers of AARA are AAO, pres.; ILI, vice-pres.; ITQ, secy.; DIF, treas. 1HDQ was a visitor to AARA recently. JAM is 3.85- to 28-Mc. mobile. ISG now is radioteletype. FWZ's house really is built around the ham shack. KH spoke to WARA recently. AAD finally arrived on 144 Mc. Appointments made: NOY, EC for Altamont; JJO, EC for Watervliet; CYW, EC for Westmere; CTM, EC for Glenville; HF, EC for Carmel; WRI, EC for Katonah; LWG, EC for New Rochelle; OZH, EC for Mt. Kisco; PMO, EC for Irvington; GTC as ORS. SUL and LDS have been endorsed for another year as EC for Albany and Dutchess Counties. Hoseman John Lavigne, YJR, of Pumper 11, recently was hospitalized after being overcome twice while fighting a fire in a Troy apartment building. Traffic: W2LRW 128, KBT 113, TYC 107, BRS 38, CLL 38, GTC 28, CEV 17, ANB 9.

NEW YORK CITY AND LONG ISLAND — SCM, George V. Cooke, W2OBU — Asst. SCM, Harry Dannals, 2TUK. SEC: BGO. RMs: PRE, TUK. Suffolk County, with KDB as EC, reports the 2-meter net growing steadily. AJF is new EC for southwestern Suffolk, WDP now is Asst. EC, replacing PIA, who takes over as Asst. EC for medical contacts. During the big blow in November OBW, MZB, AJF, GIC, ABS, SAH, and ZUN did outstanding jobs. ZTS is NCS for the 2-meter net, with weekly drills on 146.8 Mc. and intercounty QSOs with Nassau County on 146.25 Mc. Full c.d. coöperation is enjoyed and progress is reported with the police, Red Cross, sheriff's office and other government agencies. HCA and MFJ are Acting ECs for Brookhaven and Babylon Townships, respectively. The Suffolk AREC 75-meter 'phone net on 3995 kc., under Asst. EC AJF, includes AJF, PIA, NXZ, SAH, and WDP operating mobile, and BEF, DFT, EWX, and UVM fixed with regular weekly drills being held Sundays at 1100 for mobile and 1200 for fixed stations. The 2-meter net operates at 2100 Mondays on 146.8 Mc. The Nassau net would like all amateurs who do not belong to the AREC to join up. Contact FI for details. In Queens County, with SYW as EC, activity and membership surge forward with c.d. operations. Brooklyn, with BIV as EC, is showing tremendous strides in reactivating its AREC groups on 28 and 144 Mc. New Asst. ECs are DLP, YHX, HYF, DIR, ALJ, UGZ, and BXK. 28- and 144-Mc. cross-band operation is the regular plan with two-band weekly drills. Simulated drills show 21 fixed and 9 mobiles operating, some with emergency power. EWJ operates at Honan Hospital with emergency power. Staten Island, with VKF as EC, requests that all Richmond hams contact him on AREC affiliation to join with the 16 AREC members conducting weekly drills. DUP has taken over as Bronx EC. The Fire Department Auxiliary Radio Net is established and working on 28 Mc. with fixed stations being set up in each borough at a Fire Alarm Central Station. Each office has several mobiles operating in the net for the borough, and interborough drills are being conducted between the five offices. The following are c.d. frequencies set up in the city areas: Richmond, 29.492 and 145.35 Mc.; Brooklyn, 29.5 and 145.28 Mc.; Manhattan, 29.58 and 145.53 Mc.; Queens, 29.6 and 145.62 Mc.; Bronx, 29.62 and 145.44 Mc. for fixed stations. Mobile stations will operate on the following: Richmond, 29.56 and 146.97 Mc.; Brooklyn, 29.54 and 146.88 Mc.; Manhattan, 29.46 and 147.24 Mc.; Queens, 29.52 and 147.15 Mc.; Bronx, 29.48 and 147.06 Mc. The Staten Island Radio Assn. enjoyed its annual beefsteak dinner and office installation. K2AR was guest speaker and PZP, JLR, and VKF were feted as new officers of the club. RTZ is back in Detroit. Here's a coincidence: Jimmy Durante just got his ticket in the Bronx. He's only 14 and received the call EWI. TUK, new RM for the NLI traffic net on 3710 kc. Mon. through Fri., reports 30 different stations reporting in during his first month as RM. GGS got back on the air just in time to save his license. DKH is conducting code classes for Boy Scouts and urgently needs help. The Jamaica U.H.F. Club is planning a series of lectures on radio topics. Contact QPQ for topics and dates. KTF has been appointed head of communications for Baldwin c.d. Most of the members of the Mid-Island Club are active in c.d. work. JZX says the "Dragnet" operates on 3960 kc. from 1145 to 1230 daily. Traffic: (Jan.) W2BO 433, VNJ 260, EC 178, OBU 101, MQB 49, YDG 35, TUK 28, RQJ 23, PFL 20, UGZ 19, BVL 15, DIC 15, IVX 15, PF 13, IAG 12, IN 10, LPJ 8, PZE 7. (Dec.) W2OUT 25.

NORTHERN NEW JERSEY — SCM, Thomas J. Ryan, jr., W2NKD — By the time you read this much of the work will have been done in getting legislation through the State Senate calling for '52 license plates in New Jersey with your call letters on the plates. As soon as you finish this column, please drop a line to your State Senator, urging him to vote for the passage of this Bill. Urge your club and its members to do the same. Here's the latest AREC news: KOJ, of Scotch Plains, is the new EC of Union County, assisted by LOP. Three appointments were made in connection with our c.d. work: UWK became Asst. SEC for the Metropolitan District, K2CM, for the Northern District, and YLS for the Central District. AOW is the new EC for Area No. 1 in the c.d. organization. UOU is the new EC of Bergen County. Other new ECs are BYH, Glen Rock; MSR, Ramsey; AGO, Bloomfield; GFG, Verona; FGA, Orange; JYW, Belleville; ZQC, West Caldwell; KLA, Asst. EC of Essex County; K2BX, Eatontown; LNK, Locust; WRG, Belmar; FMG, Wanamassa; YTH, Morris County; K2BO, Morris Plains. ORS endorsements went to CWK and CGG; OPS endorsement to EGM. A neat system of frequency allocation within a county has been devised by LV. K2NRW, the Naval Reserve station in Ramsey, is active with FHX, ZPA, YMF, YCM, and YCS. NPH moved to Ramsey. In the same town, MSR was appointed co-chairman of communications on the Defense Council. The Ocean County ARA held its annual dinner Jan. 27th. DXD moved to Bergen County. FQN's car, with mobile gear, was in a crack-up. RPE returned to Middlesex 144-Mc. net. HJU is working 28 Mc. BEP is busy mass-producing antennas for 144-Mc. friends. JOE is a new signal on 144 Mc. IJV completed walkie-talkie for the same band. The Tri-County RC of Plainfield is building twenty 144-Mc. rigs for AREC-c.d. use. CWK says the "JN" Net on 3630 kc. at 1900 EST sounds like old times. CUI built up his 3.5-Mc. signal with new antenna. CGG was reëndorsed as RM-emeritus of N.N.J. ORX has done a tremendous job on AREC work in Livingston and other municipalities.

(*Continued on page 88*)

CD

DUE to the emphasis being placed on civilian defense because of the current world tension, and the fact that hams are being called upon to play an important role in setting up emergency communications, it behooves us as hams to review the frequency allotments and the relative advantages of each band of frequencies to be used. Of course, many of us have already made commitments along these lines and this review may serve only to affirm our previously taken position. When reviewing these allocations we should keep in mind the kind of communications to be carried on (such as inter-city, intra-city, interstate and intrastate), the availability and practicability of mobile equipment, possibility of crowded bands and the relative ease of getting a local network started on a particular frequency. This discussion will be confined to v.h.f. bands, although there are allocations in the 1800–2000 kc., the 3500–3510 kc. and the 3990–4000 kc. bands.

The 28.55–28.75 Mc. and 29.45–29.65 Mc. bands are good for local transmissions at night, but if the emergency should take place when the band is open, it is probable that QRM from other zones would make communications difficult. And, of course, we might put our signals into enemy territory or interfere with our own military communications afield.

The 50.35–50.75 Mc. and 53.35–53.75 Mc. bands seem to have excellent application for civilian defense net work. There are two 400 kc. bands which make for plenty of room; also these bands are relatively free from DX conditions and will be for some time to come. The coverage of this band is extremely good for most local contacts, and, where good fixed station equipment is available, communication can be consistently carried on over considerable distances if necessary. In addition, there are not too many technical difficulties in the way of getting suitable two tube transmitters. Walkie-talkies could also be constructed without too much technical know-how. Incidentally, vertical polarization seems to be in order where mobile installations are to be considered. All in all, the band seems to us to be the best bet for CD work.

The 145.17–145.71 Mc. and 146.79–147.33 Mc. bands are also good for this purpose, although transmitting and receiving equipment tend to get more complicated with more tubes and more battery drain in prospect.

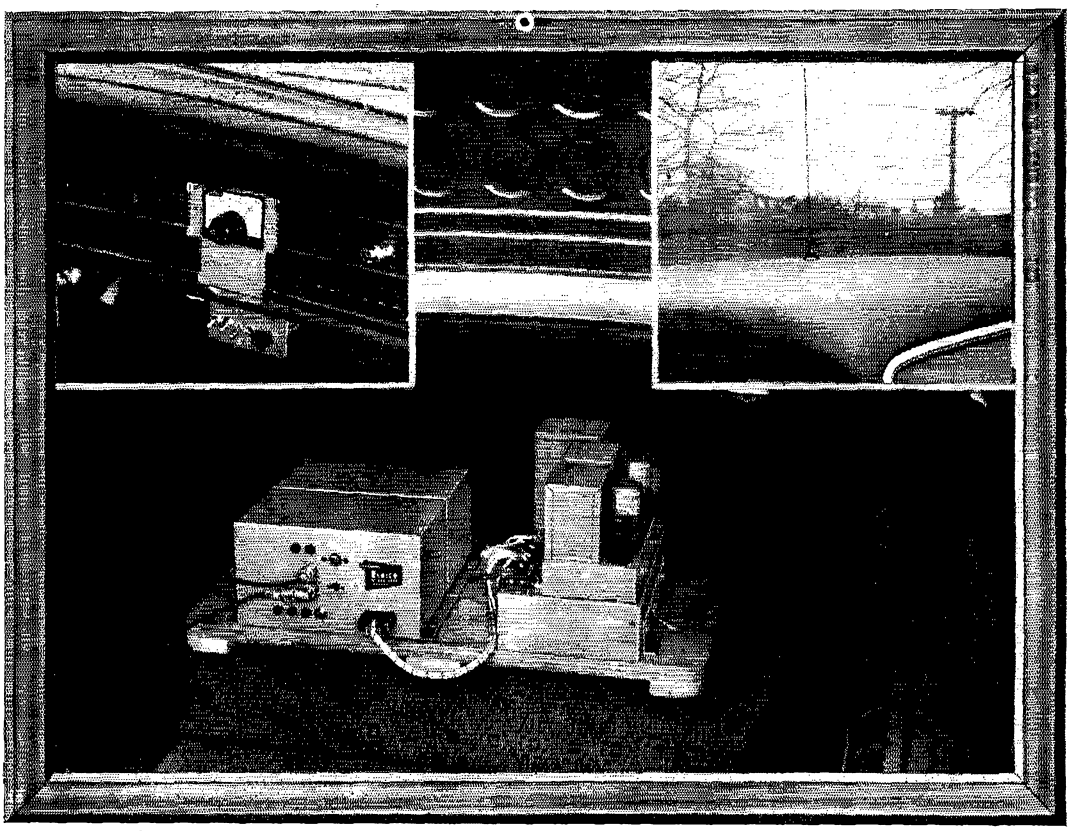
The 220–225 Mc. band seems to be a little too high in frequency for the simplest equipment at the present time for regular operation. However, Handy-Talkies and the less complicated equipment such as modulated oscillators should find application in this band for local contacts.

The HFS, by the way, is the only receiver that will cover all the v.h.f. bands from 11 meters up and can be used for portable or fixed station use.

Regardless of the band or bands to be used, this is no time for prima donnas who want to work their band "or they won't play." Let's all pitch in and show that we amateurs are willing and able to set up satisfactory emergency communications on whatever band is chosen by our local group. And, incidentally, we might find out that some of the bands we ignored aren't so bad after all.

BILL BARTELL, W1PIJ

The COMPLETE Communication



A typical CD mobile installation. Shown in photo is a neat, compact installation of an Eldico 2 mtr rcvr, xmtr, and complete power supply, all mounted on a one foot by two foot platform. Upper left insert shows the Eldico remote tuning oscillator mounted right into car panel with control switching below. Right insert shows simple, efficient 2 mtr vertical whip on car roof.

Eldico is the first and only manufacturer to have a complete line of mobile and fixed station equipment specifically designed to meet all Civil Defense requirements. There are Eldico transmitters available covering the proposed bands on 80, 10, 6 and 2, the major CD frequencies. There is a complete line of high-efficiency, interchangeable mobile transmitters and receivers including all essential accessories for fixed or portable installations. For further details on the units listed and the other Eldico products, see your local distributor or write for catalog 51. Remember . . . whether your requirements are a single station or a community-wide system, Eldico can supply "engineer-balanced" equipment, reasonably priced, sturdily constructed, with or without installation and maintenance. Engineering specifications adjusted to your community needs available at no cost.

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RECEIVERS. Individual superhet receiver for 2, 6 or 10 meters with broad or sharp selectivity to order.

TRANSMITTERS. Crystal controlled transmitters for all the CD frequencies. For 160, 80 or 10 meter operation: the TR-1 300W, AM phone or C.W.; TR-75 for 75 Watts C.W.; MD-40 or 40P for 75 Watt AM phone. For 10, 6 or 2-meter operation: AM phone, multiple channel transmitters; choice of 10, 50 or 100 watts output.

ANTENNAS. Eldico's "Vxer" for non-directional coverage on 6 and 2, Eldico's ground plane for 10 meters. Rotary beams if desired.

ACCESSORIES. Microphones, control units, frequency standards, test equipment, gasoline generators and hardware. Everything that is needed for the *complete* fixed station operation for CD.

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RECEIVERS. Complete superhet for 2, 6 or 10 meters with provision for trunk installation and remote tuning.

TRANSMITTERS. Complete crystal control AM phone for 2, 6 or 10 meters with provision for trunk installation and remote control.

POWER SUPPLIES. Single and dual vibrator or dynamotor supplies with built in filtering for interference-free operation. AC supply for test or fixed station operation of mobile equipment.

ANTENNA. Mobile or fixed for 2, 6 or 10 meters; bumper, windshield or roof mount, coaxial feed.

ACCESSORIES. Microphones, control units, cable, relays, plugs and test equipment. Everything that is needed for the *complete* mobile installation for CD.

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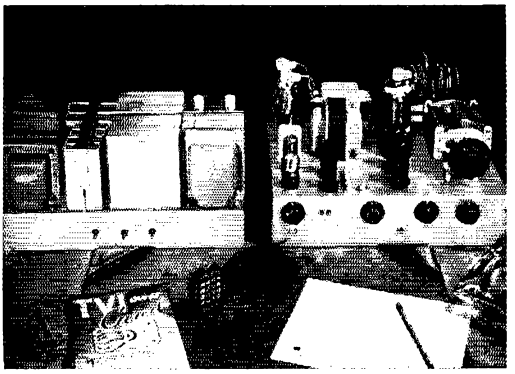
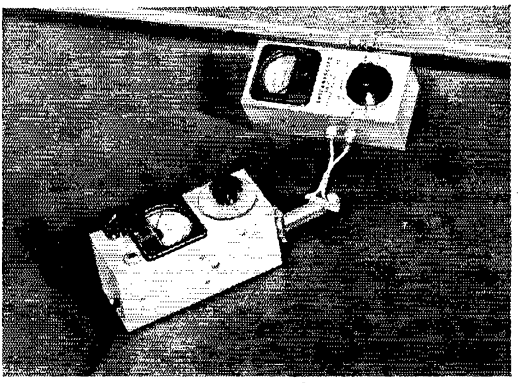
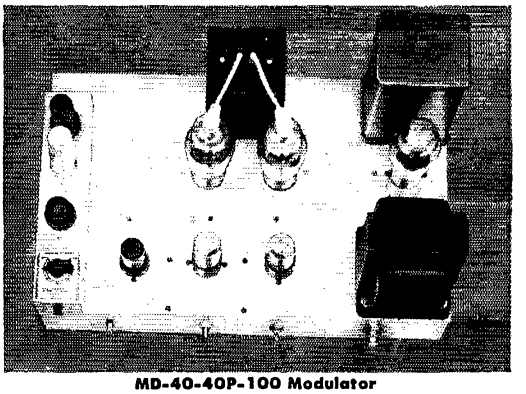


TR-1 Transmitter

TR-75-TV Transmitter



Grid-Dip Oscillator and Antennascope



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says LeRoy Knass, W6RIA

To many hundreds of people today the call letters W6RIA are the world's most welcome signals. For, these letters identify the two stations of LeRoy Knass, who is devoting most of his time relaying messages between U. S. Servicemen in Tokio, Guam, and Hawaii, and their families here at home.

Mr. Knass, an arthritis victim since 1935, is grateful for the opportunities offered by Ham radio work. And naturally, he is particular about the equipment and parts he uses. About tubes he says: "Give me Sylvania Tubes for powerful performance and long life. Also, Sylvania's up-to-the-minute Tube Substitution Book offers a lot of helpful pointers about redesigning circuits to eliminate hard-to-find tubes."

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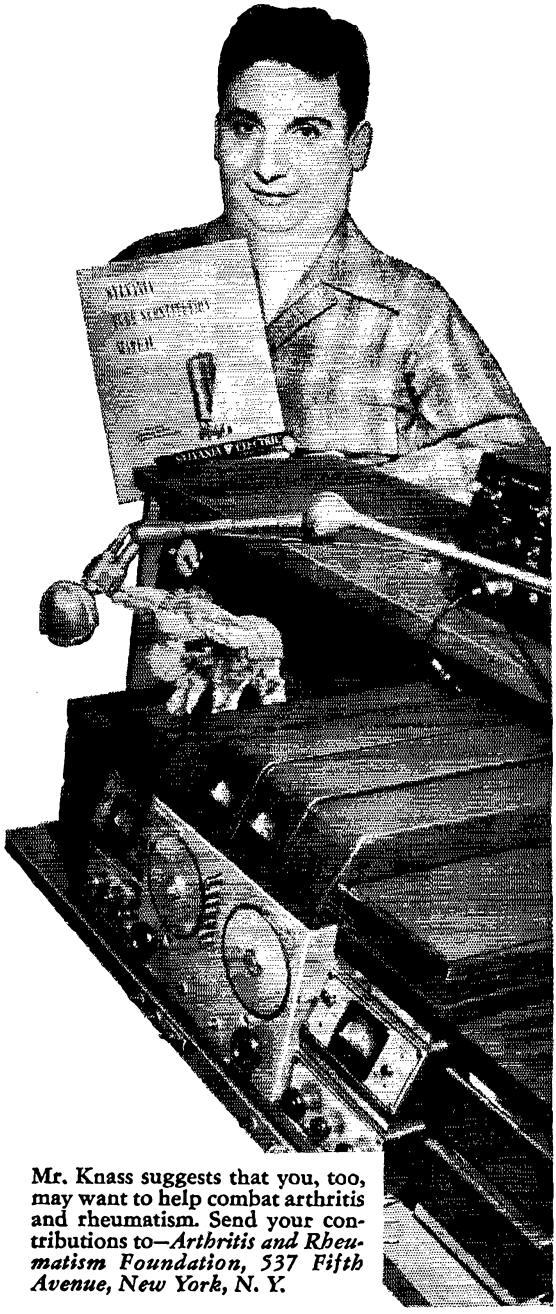

Mr. Knass suggests that you, too, may want to help combat arthritis and rheumatism. Send your contributions to—*Arthritis and Rheumatism Foundation, 537 Fifth Avenue, New York, N. Y.*

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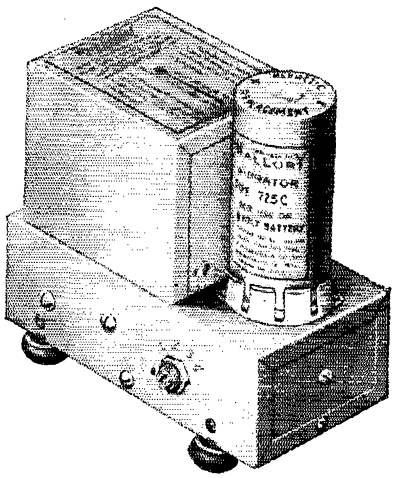

Twenty years ago, far-sighted radio men—amateurs and police communicators in particular—first recognized the advantages of Vibrator type power supplies to provide high voltage for operating mobile receivers and transmitters. Twenty years ago, Mallory Vibrator engineering design ingenuity made practical the first commercial "all electric" Vibrator power supply for automobile radio set operation.

Today, twenty years later, the Mallory Vibrapack Vibrator type mobile power supply is still the most popular and satisfactory means for getting high voltage for radio set operation from the 6 volt battery system of an automobile.

There are several good reasons why the Vibrapack type power supply is still the preferred system of power for mobile equipment. With warm weather coming to stimulate thoughts of a new mobile rig for the family bus, you'll probably want to know what these reasons are.

First, and foremost perhaps, as far as the amateur is concerned, the *initial cost* of a Vibrator type power supply is considerably less than rotary-mechanical types.

Second, the Vibrator power supply is usually *quieter in operation* with *less inherent mechanical vibration*. This means the Vibrator supply may be mounted directly on the same chassis with sensitive radio circuits with little fear of mechanical interaction.

Next, the Vibrator supply is usually *less expensive* and at the same time, *more convenient to maintain*. Vibrator power supplies are built entirely of conventional electronic parts with which every amateur is familiar. Servicing is accomplished easily and quickly using standard radio tools and replacement parts normally found in the ham shack or at the nearest Mallory Radio Parts Distributor.

Last, but by no means least, a Vibrator type supply is easier on the automobile electrical system, because its *operating efficiency is higher*.

These are important factors you'll want to consider carefully when planning your new mobile rig. Also, you'll want to know that 7 different models of Mallory 6 volt Vibrapack Vibrator power supplies are available with outputs from 125 to 400 volts and 15 to 60 watts. You'll want to know that Mallory Vibrator supplies are compactly built, light in weight, and extremely dependable as proven by thousands of hours of satisfactory operation in police patrol cars.

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EVEN MY WIFE DOESN'T COMPLAIN . . .

SYDNEY J. FASS
84 VICENTE ROAD
BERKELEY 8, CALIFORNIA

March 3, 1951

Eitel-McCullough, Inc.
San Bruno, California

Gentlemen:

Last year I felt that if I wanted to stay on the air during television hours I would have to have a new transmitter built in such a way that interference to nearby TV sets would be eliminated.

I studied the available literature on TVI and talked it over with some of the gang. The general consensus of opinion was that if I built a final with the usual precautions, used Eimac tetrodes, and shielded everything well, my chances of success would be good.

You will be interested, I'm sure, in knowing that by careful construction, the grace of God, and a pair each of Eimac 4-250A tubes and Eimac vacuum condensers, the final was built and, without any alteration since enclosing it in its cabinet, has worked without a complaint from any of my neighbors. Even my wife, who is an ardent TV fan, has never been able to discern the least flicker on any of the local TV programs, although our receiver is located only a couple of rooms away from the transmitter.

My compliments to you for building such outstanding tubes.

Sincerely,

Syd Fass

Syd Fass

Syd Fass W6NZ — an old-timer (he got his ticket in 1909) from Berkeley, California — licked his TVI problem the way thousands of other amateurs are doing . . . with common sense engineering, modern circuit techniques, and of course Eimac tetrodes.

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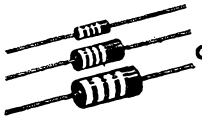

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Resistance and wattage are clearly marked on every one of these tiny, rugged insulated composition resistors. Three sizes: ½, 1 and 2-watt in all RMA resistances. Tolerance ±5% and ±10%.

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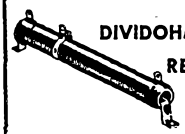

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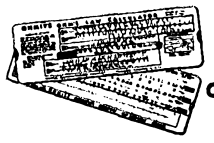

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(*Continued from page 80*)

Congrats to the Garden State ARA upon its affiliation with the League. TZF conducted three field tests of EC equipment in Union City. The New Jersey Slow Speed Net meets nightly on 3630 kc. Starting time — 1930 EST. LMB chalked up 109 points with traffic on 'phone! EWZ is working on 160 meters. LOP is forming a 144-Mc. meter net in Roselle Park. BYH built 144-Mc. gear for the Red Cross hq. in Ridgewood. JYW was given space in the concrete-protected section of the Belleville City Stadium — an ideal AREC-c.d. location! OUS worked Greenland on a MARS frequency. CTI was one of first to receive civilian MARS appointment and call. YTI, XYL of YTH, handles the mike as Morris County reports into the Northern New Jersey Emergency 'Phone Net every Sunday at 1000 on 3900 kc. Traffic: (Jan.) W2CUI 124, LMB 109, WCL 87, CCS 72, CGG 59, UWK 38, BUX 26, OUS 17, ANG 14, CFB 14, EWZ 8, NIY 7, OXL 5, CTI 3. (Dec.) W2CCS 157.

MIDWEST DIVISION

IOWA — SCM, William G. Davis, WØPP — SCA again is top traffic man for Iowa. New members of TLCN are IUY, ZYX, BSG, and 4NNN/Ø. TVC reports he's building a new rig. The Sioux City Amateur Radio Club's new officers are AZR, pres.; YNW, vice-pres.; ENS, secy.; UFL, treas.; and HFT, sgt. at arms. The Club is taking advantage of all ARRL training aids. MHC is recovering from a serious eye operation. QAO now is located at Black River Falls, Wis. ZLC is new president of the Clinton Ham Club. The new Iowa Great Lakes Amateur Radio Club is unique in that most of the members are budding hams; three recently passed their exams. The Council Bluffs Club is having a slump in attendance, but as SCM I'm sure it's only temporary, fellows. SEE has landed on 14 Mc.; it seems 28 Mc. is n.g. UTF is operator at MARS station at Lackland Air Force Base. ATA is new ORS. The Waterloo gang is going all out in the civil defense program and has won approval of its plans from all the interested officials of Blackhawk County. A committee is raising a fund of $2000 to set up a central station in quarters furnished by the City of Waterloo. The gang also has a 2½-kw. emergency power plant furnished by the City and all equipment has been signed over to the Club. The set-up will be on 3.85, 28, and 144 Mc. with separate equipment on each band. Five mobile units are ready for quick installation when and as needed. Traffic: WØSCA 540, QVA 89, AUL 50, ZYX 12, NYX 7.

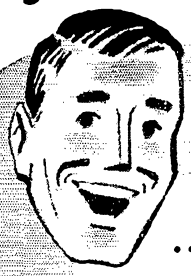
KANSAS — SCM, Earl N. Johnston, WØICV — HVL, secretary of the Eldorado Amateur Radio Club, reports the following new officers: ONI, pres.; HVL, secy.; and TDW, local EC who also is ARRL EC for Marion, Chase, and Butler Counties. STM is on the air again working DX. ONI and HVL are working with an oscilloscope. New officers of the Kaw Valley Radio Club of Topeka are: AFN, pres.; ICV, vice-pres. and treas.; AGC, secy. The annual banquet and election of officers was held at White Lakes Club with more than fifty attending. The Wichita Amateur Radio Club elected the following officers Jan. 9th: HVE, pres.; DMF, vice-pres.; GAV, treas.; DEB, publicity chairman; and DJS, secy. TYR and CFW, of Dodge City, did a nice bit of emergency work while testing a mobile Jan. 15th. CFW, while driving TYR's mobile and testing with Chet, ran across a bad accident and summoned ambulances, county officers, and the highway patrol. CET, of Topeka, alerted the mobiles the evening of Jan. 31st for a hotel fire. Four out of eight were on deck twenty minutes after notification. MVG, of Salina, JFE, of Abilene, and ICV conducted evening and morning tests on 144 Mc. with fair results. NBC, of Burrton, has joined the 144-Mc. gang. The Kansas Nebraska Radio Club held an auction Jan. 21st with good results. ALD has new SX-71 to help in MARS Net work. The Kansas OMs and XYLs will miss Opal Hawkins. XYL of 5EAK, who passed away after a short illness. Traffic: WØNIY 92, FDJ 69, WGM 67, TDW 15, GHR 14, AHA 11, KXL 6, ALD 1.

MISSOURI — Acting SCM, H. Glenn Lipscomb, WØHUI — WAP has been assigned to Midland (MARS) Net on 4020 kc. NNH made application for MARS. OUD is making interesting contacts on 7 Mc. with 35 watts to 807. FWB is leaving Columbia for his home QTH, Joplin, Mo. A new traffic man at ZLN is Tom, BKV. TPK is building all-band exciter using an 829B final with bandpass filters to prevent TVI. DHN is working on Hi-Fi phono amplifier system. AZL is having transmitter troubles. HUQ is working on civil defense. John has been making the various towns working out details on networks. KIK was surprised that he could work both coasts with 7½ watts power. GBJ is rebuilding the rig and will be off the air for some time. ARH is experimenting with various types of clamp tube modulation. Reports are interesting but not too successful. All reports indicate that higher frequencies have been bad. PTG is experimenting with 50-Mc. rig. The Springfield Area Net operates the 1st and 3rd Sundays on 3995 kc. at 0800. HQM is back in the U. S. Naval Air Service, Ocean View, Va. Traffic: WØWAP 122, NNH 61, OUD 55, DEA 27, PTG 25, ZLN 24, TPK 16, KIK 10, GBJ 9, SOM 4.

NEBRASKA — SCM, Scott E. Davison, WØOED — BIA is operator at FAB. UVI has an FB rig on 3.5 kc.

(*Continued on page 90*)

"by far the best I have ever used!"



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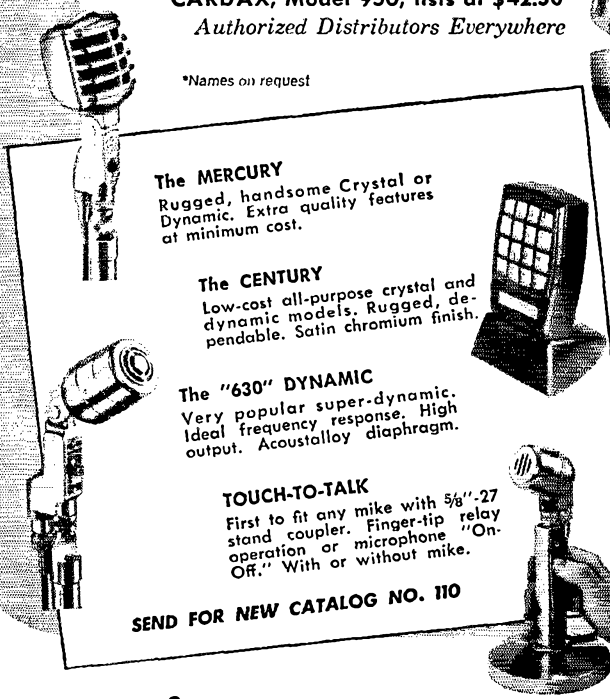

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Very popular super-dynamic. Ideal frequency response. High output. Acoustalloy diaphragm.

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First to fit any mike with 5/8"-27 stand coupler. Finger-tip relay operation or microphone "On-Off." With or without mike.

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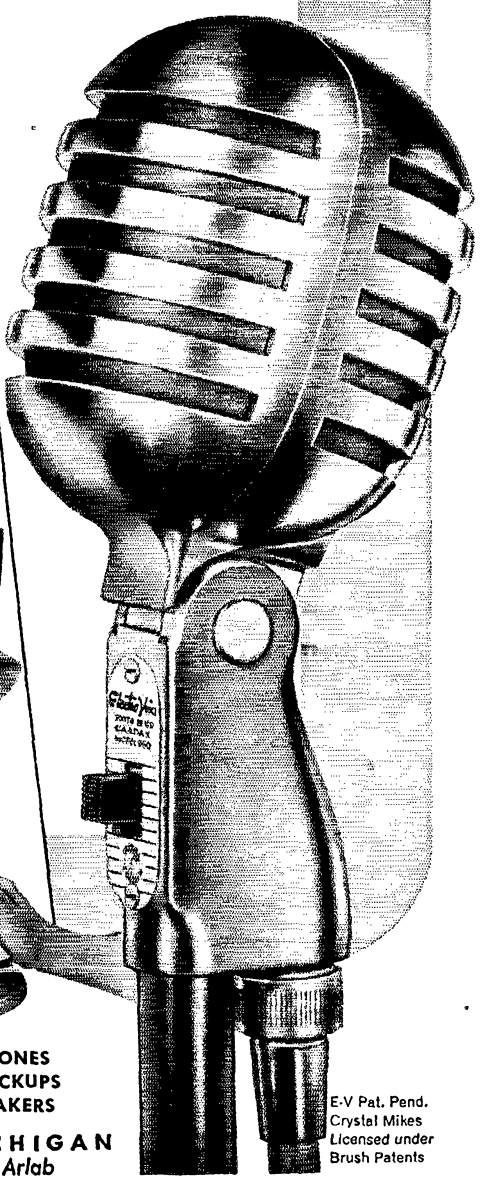

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Nebraska has more than 100 members in the Emergency Corps now. NKG is touring south with 28-Mc. mobile. JJK has his new mobile on the air. PZJ put the new rig on the air recently. YOF is operating both 'phone and c.w. on 3.5. and 3.85 Mc. The AK-Sar-Ben Club is putting out an FB bulletin. AOW has T-20s running 100 watts on 28 Mc. MZG has new Viking I perking. LSI has 100 watts on 7 and 14 Mc. CHV is back on the air on 7 Mc. with a 50-watter. IJB has new BC-348 on 14 and 28 Mc. GMZ is back in the traffic channels again. USU has a new A ticket and a new antenna coupler. VQR has 3.85-Mc. mobile operating. FMW reports 1.9-Mc. emergency 'phone net in full swing. AY banged out his sixth BPL this month. KDW gets out with his BC-rig on 3.5 Mc. IAJ reports the North Platte gang is busy on all bands. AIN, in the Army, sends 73 to the gang. RYG is new ORS in Lincoln. AY has been appointed RM to fill the vacancy left by our loss of FAM. RCH has a new 600-watter on all bands. HWM and NZ have potent signals on 3.85 Mc. CBH is NC on bi-weekly 3.85-Mc. 'phone net. FCK is on 3.85 Mc. JGT has mobile rig on 3.85 and 28 Mc. HK3AS spent several weeks visiting his dad, AZC, en route to his new station in Massachusetts. JED has new Collins 75A-2 receiver. Traffic: W0AY 512, IXL 300, RYG 179, GMZ 44, KDW 39, OED 36, IAJ 29, FMW 24, DMY 20, USU 18, SAI 12, BLM 9, JED 8, JDJ 7, IDR 5, VQR 4, BJP 3, YLC 1.

NEW ENGLAND DIVISION

CONNECTICUT — SCM, Walter L. Glover, W1VB — AJO, EC for Greenwich, has been named chief of communications for the Greenwich Civil Defense Council. BUN, OYU, ODC, NNA, KKU, and FVO are working with him. The Amateur Radio Club of Storrs, at the University of Connecticut, recently was reorganized under the call LXV, with QZB as president. Members include QZB, SOR, QQT, 2WZL, RFY, RBT, QJL, and KJF. The transmitter runs 350 watts, 'phone and c.w. on all bands. DJV worked G3AAM on 3.5 Mc. with 35 watts and poor antenna. OJR finds it necessary to turn over the EC job to WX in Fairfield, and reports the Fairfield emergency net is in operation on 145.35 Mc. at 10:30 A.M. Sundays. ODW has joined the TIB gang at Ridgefield Barracks, as has HYF. IKE is on the air again from his new house, reports no TVI, and so is all set. Business affairs keep AOS off the air pretty much. TVI allows BVB to work the daytime nets only. YU is in the process of moving into a new shack. APA still is after DX, when his traveling salesman job gives him a chance. LKF, our SEC, has been appointed a member of the Communications Advisory Committee for the State Civil Defense Office, and has been very active in promoting civil defense programs throughout the State. He has announced that the following civil defense frequencies have been tentatively selected for Connecticut: 29.6 Mc. mobile operations, 29.63 Mc. local control centers to area control center, 1810 kc. police barracks to barracks, and 3505 kc. interstate. For local operation, 145.44 and 50.46 Mc. are suggested. However, the present frequency of 29.68 Mc. for our statewide mobile set-up will be used until the civil defense plans are permanently decided upon. It is hoped that all the hams in the section will get back of this c.d. program. Contact LKF direct for the latest information. QMB and SED have been called into the services. Traffic: W1AYC 248, NJM 155, LV 119, BDI 105, VB 83, AW 81, HYF 61, KYQ 54, IKE 46, KV 33, CTI 25, GVK 16, RFJ 11, ODW 10, ORP 7, APA 6, OJR 3.

MAINE — SCM, Manley W. Haskell, W1VV — Net frequencies and times of operation remain the same. The Oxford Amateur Radio Assn. sponsored an address on AREC by IGW, SEC for Maine, on Jan. 28th. The meeting place was 3960 kc., at 10:30 A.M. Sun. A full-dress rehearsal of any possible communications emergency was held in Maine Feb. 3rd at 2000 hours. State Director of Communications Hersey attended a banquet at Bangor and from that point traffic was originated. KOB, mobile, was located at the hall and accepted traffic, passing it to OLQ, who put it on the network. Forty-six stations checked in and took part in the drill. All traffic was delivered and most of the answers obtained and returned. Five states and Canada were represented. SUK made BPL this month. The OM/XYL team of HYH/SRQ will be ORS soon. SRQ has made over 1000 contacts in less than one year. She also was N. C. of PTN and did a swell job. AI renewed his OPS appointment. PTL, our PAM; IGW, our SEC; and LOZ were present at the State House to speak for radio amateurs and the need for special number-plates on automobiles. MGR is back home in Detroit and making that 807 talk out loud. AFT says he uses something besides water to cool those tubes in the "Mighty-Dekka Watt." GVS, GE, and FV are reviving the Clam-Chowder Net on 3600 kc. at 2000 Thurs. The PAWA started new code and theory classes Feb. 21st. Traffic: W1LKP 262, QUA 208, SUK 119, SWX 81, VV 69, HYH 60, SFZ 47, PTL 46, QQY 38, RQR 36, SRQ 28, EFR 26, ITU 21, GE 15, QBK 15, JAS 13, QDO 12, AFT 7, AMR 4, EOP 3, NXX 1.

EASTERN MASSACHUSETTS — SCM, Frank L. Baker, jr., W1ALP — New ECs: JNV, Milton; SNK, Wayland; AAQ, Concord. Certificates endorsed: IXI, KTG, and HIL, as ECs; TY, WI, AGX, JDP, and PU as ORS;

(Continued on page 92)

HARVEY is HQ for CD emergency communications gear

New—ELDICO—2 Meter XMITTER-RECEIVER

VHF superhet for amateur, civilian defense and CAP . . . mobile or fixed station operation. 144-150 mc. 10 tubes. Sensitive, stable, selective. Vernier tuning.

TRANSMITTER — Crystal controlled, 144-150 mc. 7 standard tubes. Coax connectors. Uses any power supply providing 300 v. at 200 ma. Screwdriver adjusted tuning controls.

Metal cabinets, in baked hammertone enamel, 5½ x 9½ x 5½ in., with universal mounting flanges.

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Receiver, wired and tested, net 94.95
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TR-1 TRANSMITTER KIT

A conservative 300-Watt phone and c.w. rig 6V6-6V6-6L6-813, Class B 811 modulators. All bands, 80, 40, 20, 15, 11, and 10. Exciter broad band, single control PA tuning. Three power supplies delivering 1500 v.d.c. at 350 ma, 500 v.d.c. at 200 ma, and bias supply. Punched aluminum chassis, tubes, transformers, capacitors, resistors, antenna changeover relay, meter, wire, hardware and coils included. Electro-Voice 915 high level crystal microphone part of the package. Plug in the crystal and line cord and you're on the air. Shpg. Wt. 180 Lbs.....Only **$199.95**

TR-75 TRANSMITTER KIT

Loafing along at 75 watts this is the c.w. man's buy of the year. Simple enough for the beginner to assemble. Punched chassis. Uses the time proven 6L6 oscillator-807 amplifier combination. Pi-network output. Husky power supply delivers 600 volts to the 807. Complete . . . including a punched chassis and a smartly shielded cabinet to minimize television interference. Unbelievably low priced at $44.95
Shpg. Wt. 80 Lbs.

NOTE: In view of the rapidly changing price situation in both complete units and components we wish to emphasize that all prices are subject to change without notice, and are Net, F.O.B., N.Y.C.

New GONSET TRI-BAND CONVERTER — Most versatile for amateur mobile use on 10, 20 or 75 meters $47.60

GONSET Noise Clipper..... 9.25

MD-40 LOW POWER MODULATOR

40 watts of audio, the MD-40 is a kit of the same superior parts that go into its bigger counterpart, the MD-100. In place of the 807's, two 6L6s are used. 200 ma. additional power available in MD-40-P. Complete, including the same standard communications Electro-Voice 915 high-level crystal microphone, only $34.95
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Shpg. Wts.: MD-40—15 Lbs.
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MD-100 MEDIUM POWER MODULATOR

100 watts of audio ending in two 807's. Includes E-V 915 mike. Shpg. Wt. 35 lbs.
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NC-125 .....**$149.50**
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are invited to consult us on any of their emergency radio communications equipment problems. Six members of our staff are fully qualified and licensed operators. Their services are available to you. No obligation, of course.

HIL as OPS and OES. New nets started up: Boston Suburban Net on 28 Mc. Mon. and Wed. at 8 P.M., and Quincy Emergency Net on 28 Mc. Mon. and Wed. at 7 P.M., also one on 144 Mc. Sun. at 10:30 A.M. and Mon. at 7 P.M. A Round Robin on 144 Mc. Sun. at 8 P.M. is being started by LDD, QJS, now in South Carolina, keeps schedule on 7 Mc. with his dad, AKN. Stations on 144 Mc.: LLZ, JKR, NJN, IAT, KBN, LAO, ASN, HSV, and NFQ. DW is working for WAS on 28 Mc. LEM, AYN, and IZB are Asst. ECs. RSE is on the Sea Gull and TCPN Nets. The T-9 Radio Club met at MVQ's QTH. MME is on 144 Mc. and will assist SAI in teaching school for civil defense in Hull. The Quannapowitt Radio Assn. held an auction with HIL as auctioneer. The Eastern Mass. Club had Walter Butterworth and CTW at its meeting. The South Shore Radio Club had Mort Reardon and PLX as speakers. Quincy hams met with GYZ for civil defense work. BGW is on 14-Mc. mobile. BGH is working DX on 14-Mc. c.w. RRP has an emergency rig for 3.5 Mc. RGY is working on 28-Mc. n.f.m. JSM, Waltham EC, is chairman of communications committee for net. HYG is rebuilding. The Deep Sea Dragnet has three Class A XYLs: HIH, NUO, and SCS. ATX has BC-696 on 3.5 Mc. SS is starting a new NEEN on 1.8 Mc. PKW has new antenna for 3.85 Mc. with 600 watts to push-pull 813s. AVY has W.E. transmitter on 28 Mc. in his car. ZS6XQ, who is in the Boston City Hospital, thanks all the hams for their QSL cards and all kindnesses. KTG is busy with c.d. work in Cambridge. AOG is on 3.5 Mc. The Boston Trade High School Radio Society, BTS, elected SFJ, pres.; TGF, vice-pres.; BIO, secy.-treas.; AKN, trustee. MXG/MM writes from Houston, Tex., that he is on 28 Mc. IXI has rig in the car on 28 and 3.5 Mc. LVN, Falmouth EC, says they have a net down there with the Islands on 3700 kc. each Tues. at 6:30 P.M. Club officers are LYV, pres.; AHX, secy. NFE is giving the code instruction and LVN the theory. AVY reports a net on 28 Mc. with AHX, AVY, OQT, SGL, SVE, LYV, and ONK. AVY, the EC, and CTZ, Asst. EC, sat in with c.d. officers. SSS has a TBS-50. APN has an HT-9. New officers of the Quannapowitt Radio Assn. are CTS, pres.; QXS, vice-pres.; PSF, secy.; KXU, treas.; MDH, OEX, HIL, JBI, and MW, board of directors. The Club holds theory and code classes Thurs. at 7:45 P.M. at the Greenwood Hose House. The Weymouth Emergency Net is on 144 Mc. at 11 A.M. Sun. SAF, SJJ, JXM, and CTR are on 28 Mc. TEM is on 14-Mc. c.w. MRQ is very busy with CAP. The Framingham Club's bowling team includes PAD, RHA, QQW, RKD, RXH, and CTR. KBS is on 144 Mc. from Weymouth. The Newton Amateur Radio Assn. elected RM, pres.; NSZ, vice-pres.; PWV, secy.; JOW, treas.; BL, EK, and EYI, directors. EYI is new chief operator of the Newton Emergency Net. The Brockton Amateur Radio Club held an election of officers. PLQ, Watertown EC, held a c.d. meeting with QQB, ADL, IXD, MR, OMD, OSK, PBM, and RZP present. NBS visited PY1GH while in Brazil. RSE is building all-band rig with 813s in final. BHD has the rig on 220 Mc. The Everett Emergency Net meets on 29 Mc. Fri. at 7 P.M. Traffic: (Jan.) W1EMG 404, TY 122, LM 121, ZR 72, SS 70, DMS 58, JCK 45, PU 42, ATX 32, MRQ 27, IH 17, QJB 15, DWO 12, ILN 11, QGJ 8, NBS 6, PKW 5, AVY 3, CTR 2, RSE 2, WU 2. (Dec.) W1QGJ 70, BB 32, IH 21, ATX 6, ILN 2.

WESTERN MASSACHUSETTS — SCM, Victor W. Paounoff, W1EOB — SEC: JYH. RM: BVR. Net frequency, 3725 kc., Mon. through Fri. at 7 P.M. and 10 P.M.; slow-speed net Mon. and Fri. at 6:30 P.M. C.d. preparation is rolling ahead in high gear. You know the frequencies. The AREC organization is nearing completion. Let's get in there and prepare ourselves. RDR has been appointed chairman of the sub-committee on amateur radio for Massachusetts c.d. communications planning. New ECs are RLV, Ludlow; RRW, West Springfield; MNG, Agawam; LHW, South Hadley; CJK, Holyoke; RDR, C.D. Region #2; EHH, C.D. Region #9. New OPS is RDR; new ORS is THU, formerly 2BKI/1, in Leicester. IJT has returned to the fold in West. Massachusetts. JYH did a creditable two-hour job of selling ham radio to forty-eight c.d. directors and twenty Chamber of Commerce officials at a dinner meeting in Northampton. He had just finished his dessert when he was advised for the first time that he was to be principal and sole speaker of the evening! MUN is busy with OO activities. GZ has new 28-Mc. beam. THU worked KZ5DE with 25 watts on 3.5 Mc. JLT has new 10-over-20, both four elements. Result — five new countries to bring the total to 157. BVR is busy completing work as chairman of ARRL constitution revision committee. PV is turning to 'phone after many years of c.w. only. SVW really is putting out on 144 Mc. RIA and RTV are applying TVI remedies. KC has new 32V-2. RFU purchased 28-Mc. mobile from NY. It's a jr. operator for RVW. RHU was front-page news with home-built Geiger counter. AMI has been recalled to active Navy duty. Check the date on your appointment certificate and send it in for endorsement if needed. Traffic: W1EOB 181, JYH 128, BVR 68, THU 62, JLT 56, AZW 53, GZ 47, MOK 3, BDV 2.

NEW HAMPSHIRE — SCM, Norman A. Chapman, W1JNC — SEC: KYG. RM: CRW. See February *QST* for N.H. net schedules. The Thirteenth Annual Banquet-Party of the Nashua Mike and Key Club was held Jan. 27th at

(Continued on page 94)

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"WORLD'S LARGEST DISTRIBUTORS OF SHORT WAVE RECEIVERS"

Howard Johnson's in Nashua. About fifty OMs, YLs, and XYLs enjoyed the social gathering. Mr. Ward spoke to some 50 hams on the civil defense set-up in Nashua. The Emergency Coördinators for the following counties are: Rockingham, CRW; Hillsboro, GDE; Merrimack, AOQ; Grafton, MCS; Belknap, SAL; Cheshire, KPL; Sullivan, AXL. Asst. Emergency Coördinators are: Hillsboro, NKI, DUB; Grafton, GTY. QWH now is Class A. TGJ is the new station in Conway. AREC plans for Hillsboro County under DUB are well organized and ready to go on 144 Mc. QJX is pushing up the "S" meter with her "Mighty Eight Watter" on 3.85-Mc. 'phone. Would like to receive your monthly reports not later than the fourth of the month. And don't forget, gang, Field Day is just around the corner. Let's get ready now for plenty of competition and lots of fun. It is hoped Nashua will put on the next Convention Hamfest. Traffic: W1PFU 80, QJX 28, GMH 21, JNC 13, POK 11, MCS 6, JGI 5.

RHODE ISLAND — SCM, Roy B. Fuller, W1CJH — SEC: MIJ. RM: BTV. PAM: BFB. The Rhode Island Net meets Mondays through Fridays at 1900 on 3540 kc. The first c.d. drill was held with test messages emanating from communication headquarters at the Armory of Mounted Commands on North Main St. Hams on duty at Headquarters were BGM, JP, KKE, NZR, SBC, PAZ, LFB, BIL, CAT, CN, MIJ, and Al Bolton. 28-Mc. mobiles at evacuation points were NBU, OOR, SGA, PTF, RUS, MNC, LZY, and MIJ. Participating in the drill by towns were Westerly: KRQ, PAM, AGJ. Kingston: PXI. Portsmouth: BBN. Peacedale: ALJ. Cranston: BTV. Newport: OUR, BVI, JBB, JFF, OIK, SUP. East Greenwich: KNE, BFB, NCX, LZD. Pawtucket: BGA, CPV, OJE, SJQ. EC CPV reports favorable comment in the local newspaper of the amateur activity. Intercity contacts were maintained on 3.5-Mc. c.w. while mobile work was handled on 28 and 144 Mc. NZR has been appointed c.d. director of amateur communications in Rhode Island by the c.d. chief. The PRA held its annual election and the following were voted to office: NZR, pres.; QLD, vice-pres.; CN, secy.; KKE, treas.

NORTHWESTERN DIVISION

IDAHO — SCM, Alan K. Ross, W7IWU — Pocatello: KEA is attending Idaho State College and studying television. Rupert: The Magic Valley Radio Club now is affiliated with ARRL. New EC for Burley and Cassia County is HAH. EC for Minidoka County is FT, as nominated by the Club. I had fully intended to journey to a club meeting in February but had to cancel it because of illness in my family. Twin Falls: EC OQT writes of signing up NGA, MMO, LNC, 6TQV/7, and OMU in the AREC with mobiles on 29.625 Mc. Aberdeen: FBD is trying to contact TA3GVU for his 100th country. In the meantime, he is content to work Africa on the low end of 3.5 Mc. Shoshone: OQO writes that he enjoys operating on 7 Mc. with ARC-5 transmitter and NC-57 receiver. Boise: IWU moves a portable rig in and out of his car for mobile. Watch 7155 kc. for Idaho contacts. I am on as much as possible every Friday evening. Traffic: W7NH 214, EMT 26, FIS 17, DMZ 15, IWU 8.

MONTANA — SCM, Edward G. Brown, W7KGJ — The Butte and Bozeman gangs tried to establish contact on 144 Mc. Dec. 27th. The Bozeman gang started transmitting at 9:30 P.M. MST for five minutes, with the Butte stations listening. Then the Butte boys transmitted until 10:00 P.M., when the test ended if no contacts were made. Among those active were LER, CJN, KKB, MNI, NML, EMF, and OIQ. No contact was established. 28.900 Mc. is the net frequency between Bozeman and Butte at 9:00 P.M. nightly. NML is building with 813s. JZW is on with Collins 32-V. JFR and KKB were on during the SS Contest. CJN is remodeling his home. EQP is active on 144 Mc. The Electric City Radio Club elected EOI, pres.; Herb Schrader, vice-pres.; BUJ, secy.-treas.; NXW, NZJ, JGG, IOC, and MYX, board of directors. 7AHN is on with a pair of 304s modulating with 304s. BOZ is operating 3.5 and 3.85 Mc. with his BC-474. BUJ is on 3.5 Mc. with 815 final. CRD and IOC are operators at KMON. CT has kw. completed p.p. 810s. SAW and FMV are conducting code class on 28.600 Mc. for the Billings Club. Skip conditions still are holding traffic activity at a minimum on the state nets. Traffic: W7KGJ 128, CT 51, KGF 29, CVQ 12, JIZ 4, FEE 1.

OREGON — SCM, J. E. Roden, W7MQ — NFU is new OPS. BDN is new EC for Pendleton Area. OJG is Southern Pacific Wire Chief located at Eugene. BSY is holding nightly code lessons on 3585 kc. at 1800 PST, consisting of 5, 7, and 10 w.p.m. at intervals of five minutes each. FSP now is located permanently at Dillon, Mont. OHX now is located in Morro Bay, Calif. ORX maintains regular schedules with JA, KG, and KH. ADX helped keep Pierce, Idaho, in contact with the outside world during its recent disruption of all power and communications facilities. PCE is a newly-licensed amateur in the Pendleton Area. LJJ is building up a real 144-Mc. portable unit. JN, now a Silent Key, will be greatly missed in this section. GUR is a new OPS in Portland. PAB, the Medford (Rogue River Valley) Club, reports that 144-Mc. activity is growing by

(Continued on page 98)

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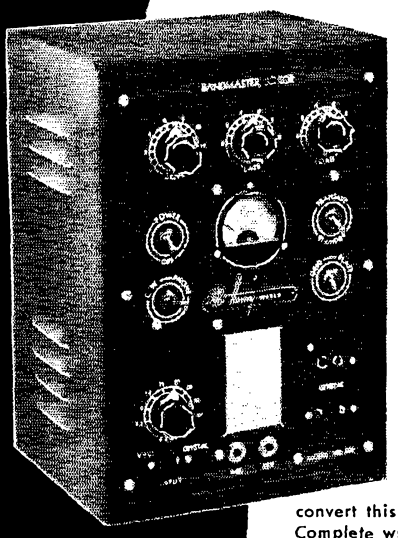

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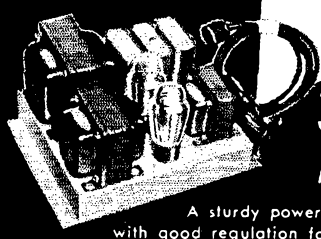

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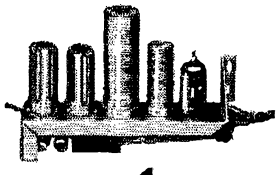

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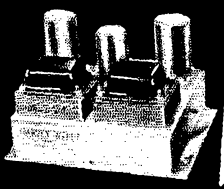

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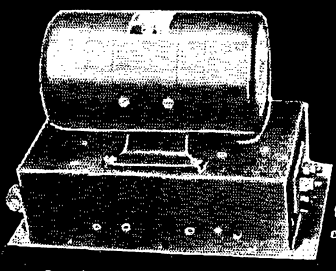

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leaps and bounds in this area, and also reports that NOL is new chairman of the membership committee to launch a campaign for new members. GPO is recovering from a long illness. AMF, Coos Bay secretary, reports that the theme for this year's OARA Convention at Coos Bay will be civil defense. The Southern Oregon Radio Club at Grants Pass elected the following new officers: OPH, pres.; NFZ, vice-pres.; FTA, treas.; ITZ, secy. Traffic: W7KTG 147, HLF 122, ESJ 97, NOJ 78, AJN 67, IIV 60, MQ 59, BSY 57, GNJ 57, GUR 53, ADX 51, OVO 51, HDN 32, OHX 29, OJA 26, NGG 13, ORX 12, JKU 9, BDN 6, AOL 4, KTF 4.

WASHINGTON — SCM, Laurence Sebring, W7CZY — SEC: KAA. RM: JJK. Local civil defense officials have asked the Kirkland ham group to form its own unit. KAA is teaching electronics four nights a week at Olympic Junior College. ETO is chairman of the Wenatchee civil defense set-up. MLN is back in the Navy with a rating of chief. MQM just got married. Congratulations, OM. ZU worked ZL1AAK on 3.5 Mc. in the middle of the CD Contest. QGN worked ZL4HJ on 3.85-Mc. 'phone with 500 watts during the SS Contest. AIB just got back on the air after an absence of several years. FWD is making a new emergency station using SCR-274N transmitter and receiver. The Skagit County Emergency Net (SEN) is pretty well organized. HMQ is storing MCU's transmitter while he is in the Coast Guard. MTX is trying to fire up his 813 on 28 Mc. EHJ has his 309TLs on 3.85 Mc. The Valley Amateur Radio Club, Inc., of Puyallup, is building some 50-Mc. gear for emergency use. BG received an HRO-50 from Santa Claus. KTL has his 28-Mc. beam up and working. A newcomer to Vancouver, Wash., is NQB, from Forest Grove, Ore. There is considerable activity in Spokane on 144 Mc. The following stations have unofficially called themselves the "Washington-Idaho 2-Meter Net": JY, GBU, FGQ, JXC, GAH, ISF, and OTD. Traffic: (Jan.) W7IOQ 1641, CZY 1490, FIX 254, FRU 146, KCU 133, JZR 110, ZU 108, FWD 36, ACF 27, MBY 19, DRA 17, AIB 15, LVB 13, GAT 10, APS 6, CWN 4, ETO 4, EAU 3, JC 2, KTL 2, NWP 1. (Dec.) W7QGN 101, GAT 2.

PACIFIC DIVISION

NEVADA — SCM, Carroll W. Short, jr., W7BVZ — SEC: JU. ECs: HJ, JLM, JVW, KOA, KTH, MBQ, NIV, TJY, VO, and ZT. RM: PST. OPS: JUO. JLM is EC for Sparks, and NIV for Hawthorne. JU gave a talk on ham radio to the Boulder City Rotary Club. OXX is communications chairman of c.d. in Las Vegas. ZT assisted the Frisco Motorcycle Club on 3.85 Mc. during the recent "Turkey Run." KLK has a new rig, 4-65A, on 3.5 and 3.85 Mc. PAZ and PBA are new hams in Las Vegas. 3BKS/7 has new beam. MKQ has new mobile rig on 28 Mc. OHJ switched mobile rig to new car. KEV did a rewiring job on the big rig and was on 28 Mc. with low power. MWF has new VHF-152A. NWU works VKs and ZLs on 7 and 28 Mc. NRU is operating K7NAL at Ely. TFF looks for 28-Mc. contacts to and from work. KOA is on the FARM Net and also CAP frequencies. KOI has new 400-watt rig. OLF has a kw. on 28 Mc. QYK has 10 watts on 3.85 Mc.! New hams in Yerington are PAR and PAQ. NIV is working 10, 20, 40 and 160 meters. Traffic: W7JU 7.

SANTA CLARA VALLEY — SCM, Roy I. Couzin, W6LZL — ECs throughout the section are getting the local club activity into high gear with emergency gear and participation with local defense groups as the key effort. A word of praise goes to FTG, up Palo Alto way, for the effort and planning which has put a sound system to work. The SEC is UTV. ECs are FTG, CLF, CER, IXJ, QIE, NOE, and TFZ. They are hard-working fellows and can use all the coöperation the hams in their respective areas can offer. Simulated emergency drills are becoming more predominant in city defense plans and the hams are a big part of the success of the drills. San Jose has now had two drills and is preparing for a third. Sunnyvale was found sadly lacking in emergency communications during the *big windstorm*. New officers of the Palo Alto Club are QXP, pres.; MUY, vice-pres.; UCE, secy.-treas. Directors elected were DVB and HCD representing the North, YWD and LCN Central, and QCB and FOA the South. BPT still is quite active despite TVI and now is a member of MARS with the call A6BPT. HC received a Regional Net certificate from JZ for participation in RN6. UTV has his hands full organising and keeping track of emergency groups. The North Peninsula Electronics Club now meets the 1st and 3rd Saturdays at Boy Scout Cabin, Orange Ave. Park, South San Francisco. HAN finished the 144-Mc. rig for the SCCARA control station. Traffic: W6HC 248, BPT 243, UTV 210, FTG 12.

EAST BAY — SCM, Horace R. Greer, W6TI — Asst. SCM, Charles P. Henry, 6EJA. SEC: OBJ. ECs: ZZT, EHS, NNS, IT, IDY, LMZ, OJW, WJN. LGW is new OBS for Alamo. JZ turned in another small traffic report, this time only 2134. Ray has received appointment as manager of the Sixth Regional Net, and also has joined MARS with the call A6JZ. RRH still is active in the Mission Trail Net. YDI manages to handle some traffic. OJW is collecting equipment for 420-Mc. experimental TV. ITH is planning two new large rhombics. WWT has moved from the section. SARO's new officers are QWX, pres.; CBF, vice-pres.; NZG,

(*Continued on page 98*)

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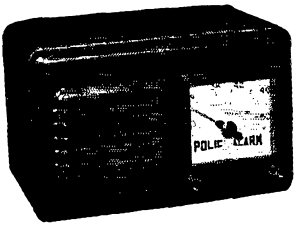
treas.; BFZ, secy.; and CBX, comm. mgr. New officers of the No. Calif. DX Club are ATO, pres.; JK, vice-pres.; MHB, secy.-treas.; LDD and BUY, directors. On Dec. 15th, with MLZ as president, the Central California Radio Council held its first meeting of the new year in Vallejo. The following were present: VDR, QDE, AKB, CIS, NQS, BF, FNT, WXU, ATO, WGM, PAK, AOI, HC, CTH, UTV, ZBS, MLZ, ZZT, and ZJD. For counting purposes traffic is divided into four categories. Originated: Every message sent by radio for the first time from your station. Received: Every message received by radio at your station. This includes all messages received, whether received for relay or received for delivery. Relayed: Every message sent by radio from your station that is not originated at your station. Delivered: Every message delivered to the addressee other than yourself, your station, or someone on the immediate premises. This does not include messages addressed to yourself or to your station, which could only be counted as one received. Your traffic total then will consist of the messages originated, received, relayed, and delivered. In some cases messages can be counted twice. The same message received by radio and then relayed by radio is counted both in the received and relayed totals, while a message received by radio and then delivered is counted both in the received and delivered totals. The following calls were found on the Mission Trail Net ten-year-old check-in list: JSB, LHH, SHM, KNZ, ATP, INU, PZU, NQJ, OMC, QFF, QZA, RFG, TDW, OJX, IGO, PGZ, FCA, ZM, KZF, AOA, AVZ, IZM, NOG, BWK, OML, RCF, QLM, QDE, OUE, JTE, HHE, PST, BF, and HPE. Several have now passed on. Get your reports to me by the 5th of each month. Traffic: W6JZ 2134, YDI 16, RRH 11, TI 1.

SAN FRANCISCO — SCM, R. F. Czeikowitz, W6ATO — Phone: JU 7-5561. SEC: NL. Phone: PL 5-6457. *Marin Area:* EC is KNZ. KNZ has been appointed by Col. Englehardt, head of the Marin County Disaster Service, as the amateur radio coördinator for the County. A representative group of all the amateurs in the County has been set up by the Colonel, and is formulating detailed plans for amateur participation in the master disaster plan. This committee consists of SG, HVX, LUM, EUI, OZC, ZUB, YME, and OEI, with KNZ and Mansfield Lewis as ex-officio members. In the Marin Radio Amateurs Club, TIJ now operates a fine-sounding n.f.m. rig on 28 Mc. OEI has shack trouble — a tree having fallen through it in the recent storm. FYJ is improving his 3.5-Mc. mobile. HVX is in a new QTH. SG and NLQ are operating 3.5-, 7-, and 14-Mc. c.w., with a little 'phone thrown in on the part of SG. LUM is his own TVI. MRZ is wiring up a mobile converter. The Marin Radio Amateurs Club meets the second Friday in the Engineering Lecture Room, Marin College, Kentfield. The new Tamalpias Radio Club is an active and growing organization. Meetings are held on the third Friday at the radio shack and rumpus room of ZUB, 232 Mirimar Ave., San Rafael. All are invited. The secretary is OZC. Captain John Downey, U. S. Signal Corps, Presidio, presented a film on single sideband 'phone transmission at the last meeting. *Sonoma Area:* EC is IEN. All amateurs interested in emergency and mobile work should contact IEN and enroll for this important work. WQE has been changed by the FCC to BAZ, says Paul Boberg, who now is at P. O. Box 10, Santa Rosa. The SCRAC meets the first Wednesday in the Tap Room of the Grace Bros. Brewery, Second St. west of the Freeway, Santa Rosa. *San Francisco Area:* EC is BYS. BIP worked 230 stations in the last CD Contest. Contrary to our previous statement, GGC has NOT yet received his new 75A2, but is hopefully waiting. SWP has TVI. JCG and KKH continue to handle traffic. The January meeting of the Central California Radio Council was well attended. The HAMS 144-Mc. transreceiver production line continues to turn out mobile units for members of the Emergency Corps. Failure to report on the emergency net at least once a month automatically requires the return of the unit to the Emergency Corps pool. The San Francisco Radio Club meets the fourth Friday at 1641 Taraval St., and the High Frequency Amateur Mobile Society meets the second Friday at the local Red Cross Building, 1625 Van Ness Ave. *Eureka Area:* EC is SLX. Congratulations to WVS, SLX, EQQ, BJO, BWV, CWR, FYY, and NL, all of whom recently were awarded Public Service certificates. The HARC meets the 2nd and 4th Fridays in the YMCA Rooms, rear of municipal auditorium, entrance on "E" St., Eureka. *Guam — Japan:* KG6FAA completed 118 'phone patches for January, included in his traffic total of 1552. He now has erected a Gordon 20-meter rotary beam. T/Sgt. Parrish, JA3AC, reports a traffic total of 738. QSLs to JA3AC will reach him at APO 1054. Martin and Gene, operating JA2MB, handled 5159 messages in December and 1956 messages in January. Their QTH is MARBKS, Navy 3923, % Postmaster, San Francisco. Traffic: (Jan.) JA2MB 1956, KG6FAA 1552, JA3AC 738, JA2KW 732, JA2HQ 618, W6JCG 59, ATO 6, BIP 1. (Dec.) JA2MB 5159.

SACRAMENTO VALLEY — SCM, Ronald G. Martin, W6ZF — Asst. SCMs: Northern Area, 6YNM; Central Area, 6CKV; Southern Area, 6SUP. SEC: KME. ECs: Met, Sacramento, AUO; Walnut Grove, AYZ; Dunsmuir, JDN; Mount Shasta City, EWG; Paradise (Chico Area), HBM; Roseville, GHP. RM: PIV. OBS: AF, BTY. PAM: ZYV. OES: PIV, GHE. OOs: ZYV, YNM, BTY, GDO, YV. OPS:

(*Continued on page 100*)

"BEST BUYS" IN MOBILE AND CIVIL DEFENSE GEAR



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IMMEDIATE DELIVERY! Precision built receivers covering police, fire, railroad, bus, forestry, ship, border patrol, medical bands. Only home radio built to bring in all these calls — ideal for all emergency and defense purposes. Two models, each AC/DC, 5 tubes, ratio detector, 5" Alnico-5 PM speaker, plastic cabinet, superhet, 100 kc selectivity, 10 mv sensitivity.

MODEL PR-31 Polic-Alarm — 30-50 megacycle band, receives clear signals up to 50 miles!
Order No. PR-31 .....Only **$44.95**

MODEL PR-8 Polic-Alarm — 152-162 megacycle band, complete with 14" indoor whip antenna. Also brings in taxicab calls in addition to above.
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Model	Description	Net
132	Universal Body Mount	$8.75
132X	Same with Heavy Duty Spring	9.85
132S	132 with Stainless Steel Spring	10.75
140	Bumper Mount	6.55
140X	Same with Heavy Duty Spring	7.65
142	Bumper Mount — No Spring	3.25
92	18" Adjustable Extension Bar	3.25

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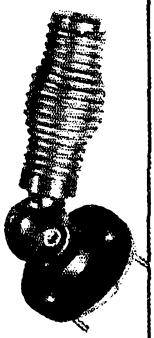
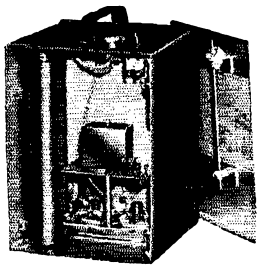
100-96S	96" Whip 3/8" Stud for All Mounts	5.25
106-96S	96" Whip, Plain end to fit 92 ext.	4.50
All Band Antenna with 20, 40, or 75 meter coil		8.75
Extra Coil for 20, 40 or 75 meters. Each		3.30

(Use All Band Antenna on 10 by shorting coil)



BODY MOUNT MOD 132



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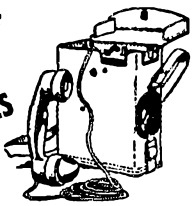

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She cost Uncle Sugar $$$ — our price is the lowest EVER. Hand-powered unit providing automatic SOS or alarm signal then 20 sec. 1000 cycle tone; also may be keyed manually. Perfect for life rafts, boats, vehicles, etc. NO EXPERIENCE needed to operate. Chock full of valuable parts including 12SC7, 12A6 tubes; in shock and wet-proof bag.
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BC-1206 Lazy Man's Q-5'er Rvcr, $7.95

Perfect replacement for BC-453 at HALF its price. Made by Setchell Carlson. Its 5 tubes alone are worth our price for the entire set! 200-400 kc. 135 kc i.f.'s; low .75 amp drain; 24V operation convertible to 110V AC. Weighs only 4 lbs. 4 x 4 x 6¾". Can be panel mounted. Condition: like new.
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JDN. Nets: Sac. Emergency (city) AUO NCS. Sac. Valley Traffic Net, JEQ NCS. Sac. Valley Emergency Net, BTY NCS. Mother Lode Net, UNT NCS. Tall Pine Net, 29,224 Mc., 8 P.M. Wed., YNM NCS. *Southern Area:* KRX acts as relay point for Chico, Artois, and Marysville on SVS. JEQ is new SVS Net NCS. MYT is new MARS president. PIV is converting 522 for crash truck work. GDO received WAC certificate. OXG cleared his BCI and is on 160. AK is mobiling on 75. JTF now has antennas for all bands. FHW is a newcomer from San Diego. VBI is working on DXCC. KL7AGO/6 is in So. Sacramento and active on 75. ZF worked ØDWD to renew friendship after 26 years! *Central Area:* New GERC officers are CKV, pres.; Casey White, vice-pres.; Frank Azevedo, jr., secy.-treas. Chico area is going all out on civil defense. JBK now lives at Corning and is on 40. GUV is in civil defense communications set-up. AF copies W1AW direct and retransmits bulletins. CKV works 2 and 160. GERC has new wrinkle for maintaining club interest: wire recordings of mobile QSOs and play backs at club meetings. *Northern Area:* JDN holds MTN spot for Dunsmuir. YNM and his Tall Pine Net turn out regularly on Wednesdays. Effective immediately, please forward reports each month to Willie Van de Kamp, W6CKV, RFD 1, Box 492A, Chico, Calif. CKV will be Acting SCM during my absence on military duty. It is my wish that the section give him the coöperation and kind support that I have had. Let's adopt a slogan to help CKV: "Keep the Sacramento Valley section the best in the West!" Thanks for being such a swell bunch. I'm going to miss you. Traffic: (Jan.) W6PIV 130, KRX 112, JEQ 98, JDN 82, ZYV 77, MYT 73, ZF 47, HNL 26, HTS 23, GDO 17. (Dec.) W6KRX 15.

ROANOKE DIVISION

NORTH CAROLINA — SCM, Herman P. Jolits, W4DCQ — SEC: ZG. PAM: DLX. RM: AKC. NZG is a new ORS in New Bern, having moved here from the Delta Division. NC, REZ, and DLX did a fine job in the c.w. section of the CD Party. DLX, NYN, CVQ, and DCQ kept the 'phone end going. NYE is getting a new rig on the air. DKG was appointed OBS during a club-forming meeting in Asheboro, attended by CVQ and DCQ. NTS is a new member of the Tar Heel Net. AJT is EC for Greensboro and CLH is EC for Durham Area. The Greensboro Club elected the following officers: HEH, pres.; IOH, vice-pres.; MR, secy.; AGD, treas.; BAJ, director; OEC, communications mgr. The Piedmont Club sends the results of its election by SDW: EAA, pres.; FTK, vice-pres.; NTW, secy.; SDW, treas. During 1950 the Club completed its club house, instituted code and theory classes, and put transmitters on the air on 7, 14, and 28 Mc. Two new hams, SDW and RNU, were sponsored by the Piedmont Club. An *Atlantic Net Bulletin*, received from LWU, lists RRH as Net Control, PDY and HSM as Alternates, BCO as secy.-treas., and LWU as OBS. This net meets at 7:00 P.M. EST Mon., Wed., and Fri. on 1895 kc. and at present has 32 members. ZG has held several civil defense meetings to date and has appointed a few ECs. OQQ has returned from his Florida trip and says that 3.85-Mc. mobile fishing is very fine, with 82 contacts in 15 days on mobile. Traffic: W4NZG 440, REZ 20, LWU 13, DCQ 7, CVQ 5, DLX 4, NC 3, NYE 2.

SOUTH CAROLINA — SCM Wade H. Holland, W4AZT — At its January meeting the Greenville Amateur Radio Club appointed KZ and FNS to the local Civil Defense Communications Board to represent the amateurs. Greenville's Mayor Cass and C.D. Head Aughtry addressed the Club and gave plans for using ham facilities. "Voice of America" Announcer Hank Miller and Engineer Louis Ross made a fifteen-minute tape recording at the Club meeting for the use of VOA stations. The Club also has set up a TVI committee to investigate and clear up complaints of ham interference. The directors' meeting in Charlotte was attended by DX, ILQ, MVX, NLP, OZL, CPZ, NZC, CXO, AZT, FNC, GTW, and HSM. Civil defense and League affairs were discussed. ANK participated in emergency work with Tennessee-Mississippi hams in the late January emergency. TVI low-pass filters have been installed by MVX, KEC, ILQ, HWZ, and AZT with much improved relations with near-by neighbors. CPZ has a new p.p. 813 final for 14 Mc. Traffic: W4ANK 416, AZT 19, CPZ 6.

VIRGINIA — SCM, H. Edgar Lindauer, W4FF — The finest display of friendly rivalry and superb sportsmanship was observed during the Second Annual get-together, in Washington, of the PVRC and the Frankfort Radio Club from the Philadelphia Area. HBGAW, an honor guest, highlighted the occasion with tales of Swiss hams. NKV is back at the U. of Va. Ex-ØAHX, from Iowa, joins us on 7 and 14 Mc. as W4MOC in Bluefield. QRX for a hamfest given by the Shenandoah Valley Amateur Radio Club, Inc., at Winchester, sometime in 1951. ENH is mobile on 28 Mc. OOL and OHM can be found on 160 meters these days. KTG, new EC for Fairfax County, has been actively coördinating his organization with plans for Area Emergency Corps operation, which include Washington, D. C., and surrounding area. Too much cannot be said about the need for emergency organization. Selection of ECs should be carefully explored with emphasis on planning and public relations ability as a paramount requisite coupled with communication skill. ONV and JAQ received appointments as

(*Continued on page 108*)

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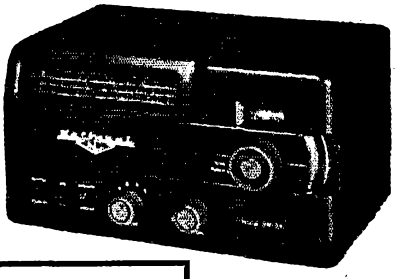

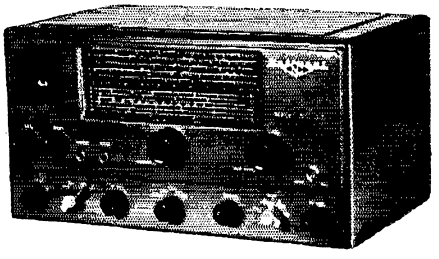

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EC for Culpepper and Newport News, respectively. ODC will handle the EC job for York and Gloucester Counties and holds weekly emergency drills with AJA. VFN net certificates were issued to PQO, PXA, and MUD. PWX now is OO. Word from LK informs us of an s.s.b. outfit in the making. Long skip dragged CVO, Norfolk, into the Arkansas Emergency Net, as NCS, twice during the month. SDA is Naval Air Station's answer to ham radio at Norfolk. PWF is building 'phone patches to assure QSO with friends in WØ-Land. K4AIR pushes traffic in the ham nets 75 per cent of operating time with contacts established with ESN, MARS, Pan-American, VN, VFN, the Pacific Area, and German outlets. FF experienced the wrath of the recent storm with the loss of one 70-foot mast. Traffic: W4MWH 148, K4AIR 138, W4PWX 138, QDX 116, FV 114, LAP 110, FF 79, JAQ 46, KFC 33, NKV 28, RYS 24, CVO 20, MUP 17, LK 14, GR 13, BCI 11, PAS 11, KSW 6, WG 5.

WEST VIRGINIA — SCM, Donald B. Morris, W8JM — Weston amateurs have formed the Stonewall Jackson Amateur Radio Club with PZT, pres.; AUJ, vice-pres.; Harvey, secy.; BWD, treas.; UHK, trustee. Meetings are held the 1st and 3rd Saturdays of the month. GIN, a new amateur in Weston, is operating 7-Mc. c.w. with 60 watts. AUJ continues to lead West Virginia traffic handlers and is getting his share of Korean traffic. VCA and BWD are testing on 144 Mc. The following West Virginia stations have earned WVN 3770-kc. Section Net certificates: BWI, BWK, DFC, DTL, OIC, YPR, and AUJ. YPR received a nice write-up in the paper on his GI traffic work. WVF and AEN now are on 3.85-Mc. 'phone. DFC is promoting the formation of a radio club in the Princeton Area. The MARA entered the Morgantown Hobby Show and had a fine booth with FMU, KWL, and TDJ doing most of the work. JKN is raving about the results he gets from s.s.b. on 3.85 Mc. with low power. YMN has been busy with his OBS work on the West Virginia 'phone net. UNS keeps weekly schedule with OED in Ohio. RJG renewed OPS appointment and is active on 3.85 Mc. Traffic: W8AUJ 524, BWI 57, QHG 26, DFC 18, BWK 8, GCZ 7, BNL 2, YPR 2, GBF 1.

7TH WEST VIRGINIA QSO PARTY

The Mountaineer Amateur Radio Association will sponsor the 7th West Va. QSO Party on the week ends of April 7th and 14th. The Party starts at 6 P.M. on April 6th and 13th and ends at midnight on April 8th and 15th.

Rules: Open to all West Va. amateurs and to any other amateurs who have held calls at sometime in the past in West Va.

No power limitations. Any and all bands may be used and the same station may be worked for credit on different bands. C.w.-to-'phone QSOs are allowed, but cross-band QSOs are not permitted. In working West Va. stations, score two points for each completed QSO when following is sent and received: date, time, call, city, and county. For contact with stations outside of West Va., obtain the above information plus the call the operator held in West Va. Multiply the total QSO points by the number of different counties and states worked. All logs must contain complete information and incorrect logs will not be counted. The following frequencies are suggested for finding West Va. stations: 3770-3780, 3890-3900, and 7100-7110 kc.

To be eligible for prizes, logs must be postmarked not later than April 20th and be sent to L. E. Bates, secy. of MARS, Box 909, Fairmont, West Va. The high scorer will receive a two-year ARRL membership; second prize will be an ARRL *Handbook*.

ROCKY MOUNTAIN DIVISION

COLORADO — SCM, M. W. Mitchell, WØIQZ — SEC: KHQ. RMs: ZJO and LZY. ZJO makes BPL again this month. ZJO would like to have someone volunteer for NCS on PAN. Don't be bashful, fellows! GQY has finished his 10-over-20 stacked beam and is ready to hoist it in the air. He also has finished his mobile rig and can work 3.85, 14, and 28 Mc. KHQ was slated for the hospital but has put it off for a while. He has tried out the new rig on c.w. but needs to build an antenna tuner to get the full efficiency he desires. IA is building electronic test sets on contract and his hamming is limited. He says he can't buck the kws. with 25 watts on 3.85 Mc. LZY reports that the Colorado Springs Radio Club is coming along fine with more interest shown each month. He also reports that CSSN is suffering because of the long skip prevalent for some time on this band. DYS has licked his key-click problem by vacuum-tube keying and is contemplating changing from coax feed to twin lead feed. IC reports no traffic this month but advises that CXW is now in Munich, Germany, and his new call is DL4KZ. He is looking for 14-Mc. contacts with Colorado. DD is State

(*Continued on page 104*)

EXCLUSIVE! Harrison Has It!

NEW! GONSET TWO-METER Superheterodyne Converter...

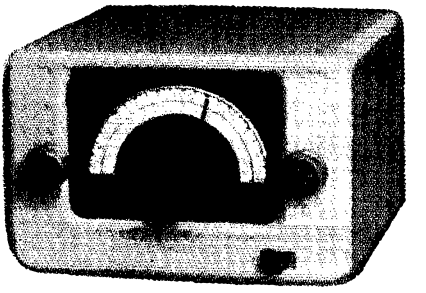
. . . for dual conversion reception!

GONSET's sensational 2-meter superheterodyne converter is now coming off the production lines! Designed for use with any auto radio, home BC set or communications receiver for "hot", dual conversion 2-meter reception!

Extraordinary sensitivity and selectivity! During exhaustive mobile field engineering tests, FAUST GONSETT, W6VR, gave this converter a real rugged workout and reports — "Heard about everything on the air and was able to separate S9 signals 10-20 KC's apart — positively amazing performance!"

NEW SUPER-IMPOSITION TUNING!

With this new exclusive Gonset feature, you actually tune both the top half and the bottom half of the entire 144-148 MC band simultaneously! Effectively doubles the already extremely wide bandspread! Positively no images from police, taxicabs, radiotelephones, etc., etc. — source of most 2-meter commercial interference!



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Emergency Communications

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BANDMASTER SENIOR — 40 to 50 watt, band-switching rig for 80, 40, 20, 15, 10, 6, and 2 meters — Phone or CW. Ideal for fixed or mobile station. Carbon mike input for crisp communications. Complete $111.50

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MODEL 145 — Compact, 12-watt, 2-meter xmtr for mobile or home station. Efficient clamp tube modulation. Only 4"W x 4½"H x 6". Requires 300 to 500V at 120 MA. $39.95

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NEW MODEL B NOISE CLIPPER — Provides excellent suppression of ignition, power leak, and similar interference. Used in almost every mobile installation! Complete. $9.25

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GONSET "6-Meter", "10-11", "75-Meter", or "Continuous Coverage 3 to 30" Choice $44.75

FAMOUS TRI-BAND CONVERTER Only $47.60

144 MC XTALS

Peterson 8 MC xtals for 144MC Band $2.75

HARRISON

NEW YORK 7, N.Y.

225 GREENWICH STREET

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BArclay 7-7777

Coördinator of all communications for the CDA. Why haven't you joined up with the AREC? We need you! Traffic: WØZJO 1208, GQY 71, KHQ 26, IA 13, LZY 9.

UTAH — SCM, Leonard F. Zimmerman, W7SP — St. George is again on the air. BED completed another rig with 4-65As p.p. in the final and he says that he is going to help UTM with Utah c.w. traffic. KVS is on down there with a new rig. The UARC held its annual dinner Jan. 30th at Rose Gardens. BRV and his band furnished the music. A vote of thanks goes to NXM and the entertainment committee for an excellent program. The UARC 28-Mc. mobile net, plus an extra operator or two for each unit, with DZX as Net Control, have been deputized by the S.L.C. Police Department and are taking the Department's regular civil defense course. Ogden has authorized a similar move. JOE, our SEC, reports that the civil defense picture is shaping up nicely with the hams as an auxiliary communication unit and recognized by the civil defense authorities at state, county, and municipal levels. Traffic: W7UTM 335, SP 8, BED 2.

WYOMING — Acting SCM, A. D. Gaddis, W7HNI — GOH reports the Casper Radio Club, under the direction of LKQ, is ready for a demonstration to show city officials the potential of its 28-Mc. mobile units. ACD had a car wreck. Better equip with radar, Carter! FWU, at Pinedale, is on 160 meters. OSP is a new ham at Daniel. ILL is on Intermountain Net. AEC is spreading some wild antenna stories. GS reports eight countries on 3.5-Mc. c.w. AMU, HX, GSQ, HNI, and possibly other Wyoming hams are working to coördinate CAP and ham communications. HLA reports the Cheyenne Club is planning a contest to boost interest. JRG reports working three stations on 50 Mc. during January. Traffic: W7HLA 6, NVX 4, HNI 3, GS 1, GSQ 1.

SOUTHEASTERN DIVISION

ALABAMA — SCM, Lewis C. Garrett, W4LEN — KIX has received appointment as RM for AENB. The Mobile gang is doing its best to help the Alabama section ARRL activities to gain full strength, with LCK as SEC, HFP as NCS of AENP, a well-organized local 28-Mc. emergency net including 12 mobile units, and an excellent club newspaper, *The Azalea Net Breeze*, with SLJ as editor. FGT, PYU, and FGT have 75 mobiles in Selma. JYK is back on the air at Maxwell Field. REK is a new call on 28 Mc. from Enterprise. OLF is on 14-Mc. c.w. from Oneonta. COU is leaving the State; he has been active in both 'phone and c.w. nets. SEI, Huntsville, and CNQ, Birmingham, are new AENP members. AENP gave new NCS and new alternates, OKJ and FGT, a good shakedown with all night sessions Feb. 1st and 2nd because of damage caused by ice to normal commercial communications. Seventy-two messages were handled these two nights. Hats off to KIX, BFM, and 5QMQ (associate AENP) who meet two and three nets each night. Your new SCM needs monthly reports from all stations, especially all ARRL appointees. Traffic: W4KIX 42, LEN 9, BFM 6.

EASTERN FLORIDA — SCM, John W. Hollister, W4FWZ — During the Florida State Fair at Tampa hundreds of messages were sent by the following operators on duty at DUG: ALP, BIF, BNR, DES, DIN, DQW, FYI, GEE, GMJ, HAD, IWX, JFH, KQS, MDV, OVE, OZ, and RGI. Among those who helped to channel it out on 7282 and 3664 kc. were OCG, OZC, NNJ, BAZ, ANK, PFH, 5IGW, EGE, DRJ, and KRX. It soon will be time to get the Gator Net started again. Does 7290 kc. still suit you fellows, or would you rather change to another spot? Making plans yet for Field Day? Why not invite the civil defense officials out as well as the Red Cross. LMT and JZV are new EC appointees. If there isn't an EC in your community will you take the job? The big ARRL DX catch-as-catch-can brought out the old regulars as well as some new ones this year. The Dade Radio Club set up a multiple-operator plan at NVU, according to SAT. A hidden transmitter hunt and picnic is scheduled by the JARS. New Orlando Club officers are NKD, CQY, and RSL. The traffic nets need more members, and that reminds me, the 'phone traffic net on 3945 kc. is surely doing a bang-up job bringing in traffic from our overseas troops. Among the net members we have WS, the NCS for the 'phone emergency net, in two other nets, OGI, RM for 3675-kc. net, in two others, LMT in four, OCG in six, DES in three, not to mention others who belong to the MARS, USNR, and USGCA Nets. CKB, ex-8CKB, writes, "Haven't been here a year yet and have worked 117 countries." Considering that BRB also lives in West Palm Beach, it is evident that it is a DX paradise. The MacLeans can and do have a family net, the Broken Toe, with 2BZL, 2BZU, and W4s OZC, PMN, and PIK, plus some jr. operators. Traffic: W4OCG 274, LMT 201, OGI 66, KJ 57, DES 44, CKB 30, WS 26, FWZ 14, PZT 10, IYT 7.

WESTERN FLORIDA — Acting SCM, Edward J. Collins, W4MS — PAA has new 32V-2. OKB is building grid-dipper. PRV keeps the air hot with 26 watts. PQW and CNK are on 144 Mc. HJA is mobile again. MFY keeps 3.5-Mc. schedules Sunday mornings. ODO is building all-band switching transmitter. PLA is working Mississippi stations nightly on ground wave. PTK has construction program going. GPH now is Class A. RCH is building high-power final. SAW is putting in a pair of 250THs. NN is

(Continued on page 106)

The 1951
RADIO AMATEUR'S HANDBOOK

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Continues the lively, refreshing style of presentation as well as the breadth of content which has made it world famous, and which makes each new edition so eagerly sought. This acceptance (to the tune of more than 2,000,000 copies since the first edition) is based on the *Handbook's* practical utility, its treatment of radio communication problems in terms of how-to-do-it, and its long-established policy of presenting the soundest and best aspects of current practice rather than merely the new and novel.

NEW CONTENT

The changes that have taken place in the technical practices of amateur radio during the past year are, as always, reflected in the present edition. A considerable amount of new equipment in all categories — transmitting, receiving, v.h.f., measurements — appears throughout the book. Continuing the trend of the past few years, all transmitting equipment has been designed with the reduction of harmonics in the television broadcasting bands as a primary feature, and in view of the large number of television transmitting stations now in operation, the problems of amateur interference with this service are given special attention. As compared with previous editions, the plan of the book has been modified somewhat: Radiotelephony, formerly covered in its entirety in one chapter, is now broken down into several chapters dealing with audio equipment, various basic types of modulation, and single-sideband; similarly, transmission lines and antennas are now treated in separate chapters. It is the thought that by this means information on a specialized phase of a general subject will be made more readily accessible.

FOR THOSE WHO WANT TO KNOW HOW AND WHY!

$2.50 *U.S.A. proper* • **$2.75** *U. S. Possessions and Canada* • *Elsewhere* **$3.00**
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AMERICAN RADIO RELAY LEAGUE, INC.

WEST HARTFORD, CONNECTICUT, U.S.A.

heard on 3.5 Mc. in E. Fla. nets. MS is pushing 144-Mc. and 430-Mc. TV projects. CQF is enjoying 28-Mc. 'phone. MEN operates all bands. FHQ is planning modulator for his v.h.f. gear. QK is reworking the receiver. SDT puts out an FB mobile signal. BFD gets on after the bands close. NJB is heard on 28 Mc. after selling beam. RZV has become a DX man. NOX is heard on 14-Mc. c.w. regularly. BKQ is talking about a cubical Quad again. JPD is building a new rig. QCB comes into Pensy on 28-Mc. ground wave. DAO stays on 7 Mc. MUX has new transmitter. PWL and SRB are new locals. RJH works ground wave into Pensy.

GEORGIA — SCM, James P. Born, jr., W4ZD — LYG has been appointed chairman of radio communications for civil defense for Richmond County. LXE, our PAM, has been appointed chairman of radio communications for civil defense for Bibb County. RTD is taking a leave of absence to return to school. EGX is active on 3.5 Mc. HDC is working over an old police rig to use on 28 Mc. in his car. OHH has completed his 150-watt bandswitching transmitter and now is on 3.85-Mc. 'phone. KSZ has a new rig with a pair of 24Gs in the final with a BC-459 VFO on 7 Mc.; he also is on 3.5 Mc. with a BC-696. OSE now is a member of the MARS Net. K4WAR is back on 14-Mc. c.w. after an absence from that band for more than a year and is looking for traffic on all bands. KWC has completed a new antenna for 7 and 14 Mc. and has added FP8BX to his country total. HDC, HZG, and ZD are on the radio committee for civil defense for the Atlanta Metropolitan Area. SII, a new ham in Atlanta, got his license about two weeks before entering the Army. His ham shack was located only twenty feet from ZD's shack. JDR has a new kw. using a pair of 4-125s. Our sympathies go to FBH, whose father passed away recently. PBF and his XYL had a nice write-up in the Atlanta papers. MTS is working ZLs on 28 Mc. running 24 watts. NQO, who was sick for about a month, is active again on 28-Mc. 'phone. The Voice of America's roving reporter, Hank Miller, recently visited Atlanta and interviewed BOC, HDC, MTS, OPS, and ZD. Traffic: K4WAR 443, W4PBF 69, OSE 33, LYG 28, ZD 28, KSZ 8, MTS 8, KWC 6.

WEST INDIES — SCM, William Werner, KP4DJ — SEC: ES. JM is Acting NCS of the 3925-kc. Net while ID is undergoing repairs. JE, KD, and HU are working VKs and ZLs on 3.5 Mc. KD needs Asia for 3.5-Mc. WAC. MRAC's call is KP4NW. Colegio San Jose RC's call is KP4NY. AK and KE have Class A licenses. HU put up a 275-foot Zepp. W4KGK, now KP4NX, has bisquare on 50 Mc. and Wallman amplifier to low-noise converter into HRO7 on 144 Mc. HN has Millen VHF transmitter and superregenerative receiver using coaxial antennas and transmits daily 2300 to 2315 GMT on 144.5 Mc. ES installed ten-element 144-Mc. beam and has new VHF-152A and Millen VHF transmitter. IT, CC, and DU are attempting contact on 144 Mc. using 522s. MD has new 3.5-Mc. antenna. DU has HFS receiver and 50-Mc. beam. ID installed new 866 transformer and driver transformer. KB is up to 105 countries with 9 watts. KD worked AR8AB for 189, postwar. LV built grid-dipper. Traffic: KP4DJ 18, KD 5, AK 3.

CANAL ZONE — SCM, Everett R. Kimmel, KZ5AW — The Canal Zone now is organized into three areas; RM is new EC for Pacific Area, WA for the new Central Area, and NM is continuing as EC for Atlantic Area. New Asst. ECs in the Atlantic Area are AR, for Ft. Gulick; BL, for Gatun; and DE, for Margarita. The three areas drill with fixed and mobile units every Monday at 2100 on 28.6 and 28.9 Mc., rotating NCS. Tests by BL, PC, RM, and WA show 3.85-Mc. mobile 'phone is FB for hilly Canal Zone Areas. Route Manager CG, via K4AIR and the Pan-American Net, Mon.-Wed.-Fri., at 1630, on 14,025 kc., can put traffic anywhere in U.S.A. 1951 officers of the Atlantic-side Crossroads Radio Club are NM, pres.; DE, vice-pres.; LM (Mrs. NM), secy.; and AR, act. mgr. Preview of MARS headquarters, the "V" beams and rotaries, the gear assembled, and the building, mark it for another ham paradise. Traffic: KZ5PC 68, NM 62, FL 32, CG 15, RM 11.

SOUTHWESTERN DIVISION

LOS ANGELES — Acting SCM, Vincent J. Haggerty, W6IOX — The Long Beach Club has plans for an active year and aims to be shooting for top honors on Field Day. GTE, in his capacity as OO, will monitor the DX Contest. KSX, Crescent Bay EC, says AREC applications are increasing. KYV reports a nice traffic total; he has applied for ORS appointment. The U. S. Navy transferred RET from San Diego to Oxnard and he has one beam up already. YVJ was active in the CD Party. WMQ completed setting up rigs in his new QTH. FYW reports the San Luis Obispo Club was host to the Santa Maria and Paso Robles Clubs at a very fine turnout at which ARRL Director Johnny Griggs, KW, delivered an interesting and informative talk. GYH led the section in traffic and reports he is a member of MARS. BHG sends code practice on 147,500 kc. on Mon., Tues., Thurs., and Fri. from 1900 to 2000 PST. Reports indicate Cupid has a dart pointed at AFR. YSK has his two-band mobile antenna working well on 3.85 Mc. NAZ is QRL with a new TV show. MU is QRL at the movie studios. DTY reports the following stations active in the Oxnard Area: IKR, FML, WZS, YUV, HMX, RET,

(Continued on page 108)

POWER TRANSFORMERS

Fully Shielded Upright Mounting Type

Type No.	H. V. Secondary		Rectifier		Fil. Wdgs.		Dimensions			Price
	Volts	DC.M A.	Volts	Amp.	Volts	Amp.	H.	W.	D.	
P-3147	240-240	50			6.3	2.5	3 1/8	2 5/8	2 1/2	$3.23
P-3148	260-260	90			6.3	3.5	3 1/8	2 5/8	3 1/8	3.82
P-3149	240-240	40	5	2	6.3 c.t.	2	3 1/8	2 5/8	2 5/8	3.53
P-3150	325-325	40	5	2	6.3 c.t.	2	3 1/8	2 5/8	2 15/16	3.68
P-3154	275-275	50	5	2	6.3	2.6	3 1/8	2 5/8	3 1/8	4.85
P-3160	350-350	50	5	2	6.3 c.t.	2.6	3 1/2	2 15/16	3 1/16	4.26
P-3151	325-325	70	5	3	6.3 c.t.	3.5	3 7/8	3 1/16	3 1/16	4.26
P-3152	350-350	90	5	3	6.3 c.t.	3.5	4 1/4	3 1/2	3 1/16	4.70
P-3153	350-350	110	5	3	6.3 c.t.	4.5	4 5/8	3 13/16	3 1/16	5.44
P-3155	400-400	200	5	3	6.3 c.t.	5	4 5/8	3 13/16	4 1/4	8.23
P-3156	435-435 (80-volt Bias Tap)	250	5 / 2.5	3 / 10	6.3 c.t. / 6.3 or 5	3 / 3	4 5/8	3 13/16	4 7/8	10.29
★P-3165	350-350	200	5 / 5	2 / 3	6.3 / 6.3	.6 / 7	4 5/8	3 3/4	5	10.58
★P-3166	400-400	300	5 / 5	3 / 6	12.5 c.t.	10	5 1/2	4 3/8	5 3/4	17.64
★P-3170	1750	2	2.5	2	6.3 or 2.5	.9 / 2	3 1/8	2 5/8	2 7/8	6.17
★P-3171	2500	5	2.5	2	6.3 or 2.5	3 / 3	3 7/8	3 1/16	3 1/8	8.23

PLATE TRANSFORMERS

For Small Transmitters. DC Voltage Ratings are Approx. Values Obtained at Output of a 2 Section Choke Input Filter Using Mercury Vapor Rectifier Tubes. Pri. is for 115 V. 60 cy.

Type No.	Sec. Rms. Volts	Sec. DC Volts	DC Sec. M.A.	Dimensions			Price
				H.	W.	D.	
P-3157	660-660 † / 550-550	500 / 400	250	4 5/8	3 13/16	4 3/8	$8.08
P-3158	1080-1080 / 500-500	1000 ‡ / 400	125 / 150	4 5/8	3 13/16	5	10.00
P-3159	900-900 / 800-800	750 / 600	225	4 5/8	3 13/16	5 1/8	9.70
P-3167	1450-1450 / 1175-1175	1200 / 1000	300	5 3/4	6 1/8	4	24.12
P-3168	2100-2100 / 1800-1800	1750 / 1500	300	5 3/4	6 1/8	4 1/2	30.58
P-4062	2900-2900 / 2385-2385	2500 / 2000	300	8 1/2	6 1/2	5 5/8	47.04

‡For dual operation with simultaneous use of both sec. ratings. †Has 40-volt bias tap. ★Indicates TV Replacement.

MODULATION TRANSFORMERS

For Specific Applications

Type No.	Output Tubes	Ohms Impedance		Max. M.A.		Watts	Dimensions			Price
		Pri.	Sec.	Pri.	Sec.		H.	W.	D	
A-3108	PP6AQ5, 6V6, 6F6. Single 6A6, 6N7, 53	10000 c.t.	4000-5000 7500-10000 12000	70	60	10	2 1/4	2 7/8	2 1/8	$2.12
A-3109	PP2A3, 6A3, 6B4, 6L6, 45, 46, 59	6000 c.t. 3800 c.t. 3000 c.t.	5000-8000 10000	80	100	25	3 1/8	2 5/8	2 3/4	5.00
A-3110	PP6L6, 807, RK41, HY56, HY61, HK24	6600-3800 c.t.	4000-5000 7500-10000 12000	175	150	60	4 1/4	3 1/2	3 3/4	8.53
A-3113	PP-800, 809, TZ-40, T-55, HK-54, RK-31, HY-40, 811, 807, 812	15000-6900 c.t.	3000-4000 5000-6000	250	300	175	4 5/8	3 13/16	5 5/8	12.94

UNIVERSAL MODULATION TRANSFORMERS

Tapped Series-Parallel Coils Provide a Wide Range of Modulation Ratios

Type No.	Pri. Impedance	Pri. M.A. Per Side	Sec. Impedance	Max. Sec. M.A.‡	Watts	Dimensions			Price
						H.	W.		
A-3104	2000-20000	50	2000-20000	50/100	15	3 1/16	2 5/8	2 3/4	$6.32
A-3105	2000-20000	150	2000-20000	150/300	60	3 7/8	3 1/8	4 1/8	9.41
A-3106	2000-20000	220	2000-20000	220/440	125	4 5/8	3 13/16	4 5/8	13.23

8BXT/6, IEI, and ZKL. Also a YL operator, HVJ, has just fired up in that Area with 5 watts on 7 Mc. COZ reports that JMY has a new BC-348, HYO is selling out, GUM now is mobile on 28 Mc., TV has taken over at COZ, GAE, and DGB, HCC has a kw. going, IDM is on 3.8- and 7-Mc. c.w., ZGY is in the Army, KAA is a new ham in Ontario, MJU has new surplus G-09 transmitter, QE is very happy with his HQ-129X, SW soon is going mobile on 28 Mc. Traffic: W6GYH 832, KYV 504, DBY 109, LDR 87, CMN 86, TDO 70, BHG 58, MU 39, CKO 33, FYW 26, AFR 11, NAZ 10, YSK 9, DTY 8, WMQ 8, COZ 7, JQB 7, FMG 6, FZO 2.

ARIZONA — SCM, Jim Kennedy, W7MID — A surprise emergency test was held in Phoenix at 0400 January 28th, with 12 mobiles and several fixed stations participating, all on emergency power. Results were satisfactory from every standpoint, pointing up the desirability of mobile operation for emergency work. Interest in this phase of hamming is increasing rapidly in Arizona, and we find that more and more of the gang back East are on the lookout for mobile contacts. The simplest rig will get good results on 28-Mc. mobile with judicious choice of frequency. The W7GV Memorial Station will be in operation soon. LVR now has beams for 14, 28, 50, and 144 Mc. KYM, in Prescott, has a new mobile station. BH is active on the traffic nets in Mesa. K7NRZ, the Naval Reserve station in Phoenix, has begun a daytime traffic net which meets daily on 7200 kc. in the mornings, and which covers the Southwest. He monitors 7200 kc. all day for calls. KWB lost his brand-new 250-watt rig when NAP's car containing the rig caught fire in an accident. OCB is a new call in Scottsdale. JYZ made the DX Century Club and got his name in the local paper. Traffic: W7OIF 59, LVR 16, MID 8.

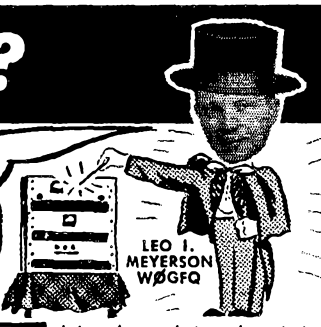
SAN DIEGO — SCM, Mrs. Ellen White, W6YYM — Asst. SCMs: Shelley E. Trotter, 6BAM; Richard E. Huddleston, 6DLN; Thomas H. Wells, 6EWU. SEC: NBJ. RM: ELQ. ECs: DEY, VJQ. New officers of the Orange County Amateur Radio Club are LDJ, pres.; RBA, vice-pres.; FCT, secy. BAM hit 684 for January traffic total, making BPL for the third time in four consecutive months. FMZ is on 160-meter 'phone for the first time in twenty years. AD is handling heavy 'phone patch traffic from the South Pacific and also is working on civil defense communications. IZG is copying traffic more enjoyably these days on a new SX-28 receiver. One of the more active young hams in the section is GTC, 14 years old, who has just received his 20-w.p.m. sticker. DK has moved to Corona Del Mar. YBI, in Costa Mesa, is giving 28-Mc. mobile a try. BAG is sporting a brand-new Ford. BVI is rebuilding the station and plans to join the Mission Trail Net. The Orange County Net frequency is 29.360 Mc. Checking into the net are mobiles VKN, CTP, LDJ, and DEY. DBZ received the word from Uncle Sam and now is QRT. AD reports his TVI problem completely cured. YYM and YYN attended the January meeting of the Imperial Valley Amateur Radio Assn. and had an FB time meeting LVN, HMJ, GUP, DED, QUS, UQI, FLD, and DLN. DLN, by the way, has accepted the post of Asst. SCM for the Valley. The IVARA station call is GG. The YLRL is planning the year's activities and still is undecided about Field Day. The Aztec Radio Club of State College finally has been given permanent quarters in the Administration Bldg. 4YE, at El Toro, now is using his new call of K6CN and is active on 3.85 Mc. late at night. Jim Quinn, ex-KR6EP, now is in town with mobile W6HKJ and presently is QRXing for Navy Club call at Imperial Beach. Erv Greene, ex-7IXT, on 3.85-Mc. mobile, is awaiting reassignment of his old call 6TJT. Traffic: W6BAM 684, ELQ 360, LDJ 65, IZG 31, FCT 10, FMZ 8, YYN 8, CHV 4, BVI 1.

WEST GULF DIVISION

NORTHERN TEXAS — SCM, William A. Green, W5BKH — Asst. SCM, Joe G. Buch, 5CDU. SEC: AAO. RM: GZU. PAM: ECE. EC appointments were made to DRV, JOG, LEZ, OGK, and MBP. NWTEN is leading in the Trophy Contest. North Texas hams in general were standing by to assist in the South Texas ice storm with LTP, MQH, FLA, MAW, IWQ, LEZ, QQU, BFA, and EBW keeping constant monitor watch. RHC was elected president of the East Texas Radio Club. New officers of Big Spring ARC are ROH, pres.; PXD, vice-pres.; AWT, secy. It now seems possible that Texas amateurs may be able to introduce suitable legislation to enable amateurs operating mobile emergency-powered stations to have license plates with their call letters. A telecast featuring ARK on WBAP and amateur radio demonstrations for radio station and newspapers by LEZ and EBW were nicely presented. Dallas ARC, assisted by RCA engineers, held a TVI clinic. MSB had amateur TV on the air Jan. 19th, frequency 435.2 Mc., 12 watts average power, flying spot 525 lines. FCC advises this is a first for amateurs in the Southwest. Hams assisting were RGL, PAZ, MPU, SHI, and QHI. SGR is new Class A YL operator reporting into traffic and emergency nets. NUJ returned to Big Spring. IY and DAS are operating marine mobile from Lake Dallas. OJQ is handling traffic to Japan direct. Traffic: W5LSN 1045, GZU 524, BKH 194, ARK 179, LEZ 111, GER 57, IWQ 40, GYW 36, MTL 24, AWT 22, ASA 16, JOG 16, PPS 15, RHC 13, QQU 6.

(*Continued on page 110*)

TVI TROUBLES?



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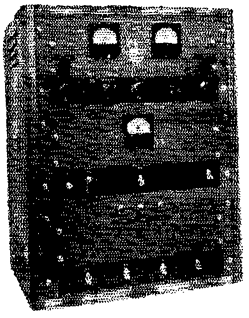

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Our newest model with increased power—400 watts Phone, 425 watts CW. Incorporates some of the latest TVI protective features. Efficient performance on all bands—10 to 160 on phone and CW. Provisions for ECO. Complete with tubes, meters, and one set of coils.

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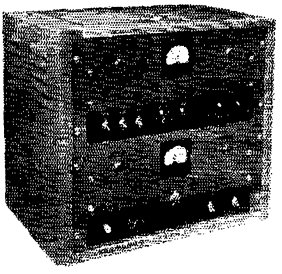
TRANSMITTER



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Send for the 1951 complete WRL catalog containing everything new in radio and television. Deal with the "World's Most Personalized Radio Supply House."

GUARANTEED CRYSTALS IN HOLDERS Type FT-243

160 METER

1.8 to 1.825 — 1.875 to 1.9
1.9 to 1.925 — 1.925 to 2.0

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80-40 METER

3.5 to 4.0 — 7.0 to 7.4

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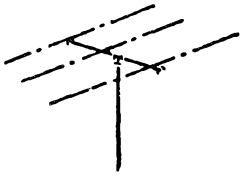

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OKLAHOMA — SCM, Frank E. Fisher, W5AHT/AST — SEC: AGM. RM: FOG. PAM: ATJ. Operations during January were plagued by severe long-skip effect which disrupted many schedules. Both OLZ and OPEN have gained new members and AREC is building up and there is considerable activity in the mobile field. OWG lost his beam-supporting pole by fire and now has a 55-foot pole replacement but it has been too cold to put up the beam. Tulsa ARC has the following officers: PHH, pres.; NDE, vice-pres.; PEV, treas.; OOM, secy. The Club now has a Board of eight directors. BCO has a panel truck equipped for emergency work with 7-Mc. rig. PHH is about to settle down in new home. OPI left Tulsa for Boeing at Wichita. GCE is working to build up CAP communications. GZS, OOM, ETR, NDE, JJR, HFY, BBS, RVX, and OEH are all mobile in Tulsa now, with a drill each Sunday on 29.6 Mc. Kay County AREC, under the direction of HXC, is getting up full steam. The State AREC now comprises 17 counties, 122 full members and 19 supporting. This is a fine growth, but there are close to a thousand amateurs in the State and each should be a member of AREC. Are you? Write your SEC or SCM if you haven't registered in AREC — or if you do not now have an EC in your county. These are serious times; let us be prepared. Traffic: W5AHT 167, MRK 135, FOM 133, MQI 123, K5WAH 85, W5OYP 58, OQD 54, LCN 45, MFX 44, MEZ 43, OWG 38, FOG 29, EHC 22, PHR 20, IOW 12, ADB 1.

SOUTHERN TEXAS — SCM, Dr. Charles Fermaglich, W5FJF — STEN has been doing a nice job handling traffic to and from Japan. The San Antonio Radio Club is making plans to aid in civil defense. PTR handled hundreds of messages from Japan. PY also handled a lot of these messages. NKM is on 14-Mc. c.w. He and LGG, at San Marcos College, are working with 2300 Mc. ZJR is working on crystal-controlled converters. PCO is on 3.85-Mc. mobile. MXY is working on a new 7-Mc. c.w. rig. JJF's OBS schedule is Mon., Wed., Thurs., 7 P.M., Sat. and Sun., 10 A.M. on 28,700 kc. GUN is working 28 Mc. CYS is working on 28-Mc. beam. GI is EC for El Paso. FAG is running tests on 144 Mc. with 200 watts Tues. and Thurs., beaming north 6:30 to 6:40 P.M., beaming south 6:45 to 6:55. PIJ is active on 14, 28, and 420 Mc. PTR, SARC secy., is active on all bands. She is in STEN, Armed Forces Net, and Marine Corps Net. BDI has fifteen elements on 144 Mc., 70 ft. high. RAL gave a talk on message handling to the SARC. NWS, SARC pres., appointed an emergency communications committee as follows: FNA, FMZ, MUL, UB, and EYB. SFR and AXI visited SARC recently. FMZ is new chairman of the S.A. section of I.R.E. LXO is getting out fine with 35 watts on 7 Mc. PGX has a new kw. 813 rig. The SARC XYLS and YLs have a fine auxiliary club. PY is working on a 1st-class commercial 'phone ticket. EYV is Texas State Guard chief communications officer. RIE, OBS, transmits nightly at 6 P.M., on 7150 kc. and 6:30 P.M. on 28,600 kc. FPH is president of Winkler County Club and is on 3.85 Mc. LGG is now on 3.85-Mc. 'phone with 32V. STEN will hold its Sixth Annual Convention in Kerrville May 26th and 27th. AHJ is a Zone Control for STEN. NPW, CIX, FAH, OUQ, LCR, IVV, ORG, and PIL are new members of Zone 1 STEN. MAQ has new VFO. AHJ is using high power with 813s. MWN, EYV, OUA, MVY, and RLZ are on 160 meters every noon. Zone 1 STEN had a fish fry. PNP, OWS, CU, ENH, FNY, IYE, LBF, NXD, and EV are active on 3.85 Mc. JBZ claims he is running 80 watts to a pair of 810s. GXP has a new tower and 10 and 20 beams. HRO handled lots of traffic in the recent icestorm. The Rio Grande Radio Club (Brownsville) visited KSW the night before he left for a hospital in New Orleans. NZH has 3.85-Mc. mobile rig and is president of RGVRC. NES, OWS, MXM, GUD, and REM are on 3.85 Mc. EV, OWS, NPR, NYG, MXM, BZL, PSB, and KBP are going mobile. PCO and XYL OVH, and LUN visited hams in Marfa. RFG is on 3.85, 14, and 28 Mc. with 32V-1 and 75A-1. IPT still is working DX. AMK, IPT, and RHU are on 7 Mc. LM is on 28 Mc. PNP and QGD are on 3.85-Mc. 'phone. AQE is on NTX, OLZ, and STEN and reports 144-Mc. activity is on the increase around Kermit. MN works 3CUL at 5 A.M. on 7160 kc. The HARC is getting ready to aid in civil defense. Ben Reich has a new 144-Mc. mobile f.m. rig. KFY and ON are on 144 Mc. JJF reports that the El Paso gang has a transmitter hunt every two weeks on 11 meters. Traffic: W5MN 54, JJF 32, RIH 21, AQE 11, RFG 3.

NEW MEXICO — SCM, Lawrence R. Walsh, W5SMA — Acting SCM and PAM, R. J. Matthias, 5BIW. SEC: PLK. RM: NKG. PAM v.h.f.: FAG. Our SEC, PLK, is working out detailed plans which can be put into effect should any local emergencies or disasters occur. Through *CQ-NM*, edited by NXE and RMH, we learned that the Sandia Base Club heard Ted Sprink, 2CH/5, speak on "Quartz Crystals" at its January meeting. The Los Alamos Club viewed the ARRL film on TVI at its January meeting. The Mesilla Valley Radio Club at its Dec. 14th meeting heard a talk by Ray Malloy on "FM-FM Telemetering." At the Dec. 28th meeting Hal Dressel, 2UVF, the EC for his section in Batavia, N. Y., told of the plans and progress of his club along the line of coöperation with the civil defense group there. The Club enjoyed a visit from the SEC at its Jan. 25th meeting. Your Acting SCM and his XYL, DRA, had a very nice visit the week end of Jan. 27th and 28th with

(Continued on page 118)

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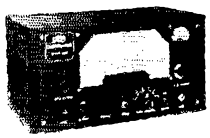

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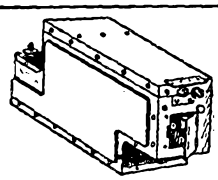

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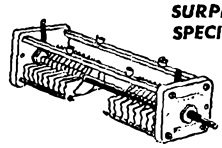

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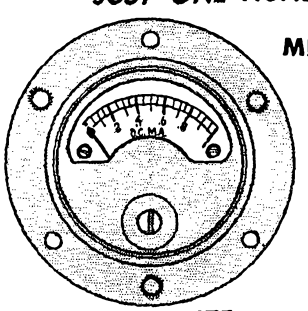

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band leader, Tex Beneke, 2CKD, and his XYL, 2EHR. A get-together at White Sands National Monument is being planned for sometime in May. Watch the New Mexico 75-Meter Emergency 'Phone Net frequency, 3885 kc. 7:30 A.M. Sun., or 6 P.M. Tues. and Thurs., for further details. Traffic: W5QKJ 155, AZU 55, ZU 55, NKG 46, PIZ 8, LFT 5, OPN 2.

CANADA

MARITIME DIVISION

MARITIME — SCM, A. M. Crowell, VE1DQ — EC: FQ. The M.T.N., on 3715 kc., meets at 1900 AST. Tie-ins with the T.R.N. on 3675 kc. at 2045 and 2230 AST are proving good for moving traffic. OM spends about 70 per cent of his time handling traffic. ES has been rebuilding. FQ has been named "Northern Messenger" because of regular schedules "Brit" has been keeping with the VE8 boys. QZ, of Dartmouth, reports a recent opening on 56 Mc., working a total of 26 stations, including W1s, 2s, 3s, and 8s. WD is a new convert to n.f.m. HD has his usual high-quality n.f.m. going on 3.8 Mc. The Valley boys and members of the Maritime 'Phone Net handled emergency traffic during the recent sleet storm. The AFARS is planning a hamfest at Greenwood. ZX and EO are on 28 Mc. LF and AXR have been active on 14-Mc. 'phone. HH is planning a new beam for the new rig. RR, who has been putting a pair of 4-125s to work on 14-Mc. 'phone, has gone n.f.m. LZ has been active on 3.8- and 14-Mc. 'phone. IE and QW are working DX on 3.8-Mc. 'phone. ET, PT, and NN have been active on 14- and 3.8-Mc. 'phone. Traffic: (Jan.) VE1MK 101, FQ 69, AL 24, AAK 19, OM 18, YO 14, YC 8, YV 8, AAL 6, CN 6, ABA 5, ABJ 5, PS 5, VC 5, KI 4, JS 3, ZO 3, KG 2, XA 2, YR 2. (Dec.) VE1MK 60, AAK 36, YO 7, YV 7, AL 4, JS 4, KI 4, PS 4, VC 4, ZO 4, AAL 3, YC 3.

ONTARIO DIVISION

ONTARIO — SCM, G. Eric Farquhar, VE3IA — The Ontario 'Phone Club held its annual meeting with a large turnout. Newly-elected officers of the Queen City Club are NZ, pres.; AJV, vice-pres.; AAT, secy.; NO, treas. DCS now is OK after an appendix removal. Congrats to BNQ and WE, who made Class A. BHS bagged a rare one, JA2MB. The Southern Ontario V.H.F. gang held an enjoyable get-together. IL, EC for the Toronto Area, gave a talk on civil defense. XZ outlined what might be required of every emergency-minded ham. BL delivered a very timely lecture and illustration on the transmission of TV signals via microwave at the Hamilton TV Club meeting. Congrats are extended to EAB on a swell job as editor of the *Mohawk Journal*, monthly bulletin of MARS. EAP has ARRL Code Proficiency sticker for 30 w.p.m. The Scarboro Radio Club's fifth annual banquet is over but still the talk of the town! Summer vacation planners are reminded to circle July 1 and 2, the dates of the North Bay hamfest picnic. The Hamilton Amateur Radio Club's New Year's Party was another big success. Congrats to HA and BXB and their XYLs on their new harmonics. The Quinte Club and the Nortown Club of Toronto are already making plans for Field Day. New executives of London ARC are AT, pres.; AN and DU, 1st and 2nd vice-pres.; EAC, secy.; BVP, treas.; BYT, publicity. GB and BYT have jr. operators. HI looks in on TV. XN TVI-proofed the rig. AGV is on 3.5 and 7 Mc. BUG is a regular reporter in the Beaver Net. WN is Toronto outlet for QON. The Brantford gang is doing fine in AREC organization work. Word has been received of the passing away of DIN and NG. Traffic: (Jan.) VE3BUR 143, IA 142, WY 139, ATR 129, AYW 61, APS 55, IL 55, BUG 48, AZH 37, BTZ 36, FQ 36, BUS 31, BMG 29, NI 28, DU 26, KM 22, DH 18, VD 9. (Dec.) VE3AWE 142, DU 14.

QUEBEC DIVISION

QUEBEC — SCM, Gordon A. Lynn, VE2GL — ECs: AG, Montreal east of St. Lawrence Blvd.; BR, Westmount and Verdun; TA, Snowdon-Hampstead-Cartierville Area; BB, Lachine and Lakeshore Area; RC, mobiles, Montreal General Area; AKO, Sherbrooke Area; RA, Chicoutimi and Lake St. John Area; JN, St. Johns, Iberville, and Area; QN, Quebec City and east. Send your AREC application to the EC nearest you. BB is working 3.5 Mc. mostly now with traffic because of poor conditions on 7 Mc. RA schedules AFARS and has emergency net under organization. CA plans on replacing 810 with 833A. His XYL still schedules VE8SF, to whom she sent a 410-word message without a repeat! LO reports maintaining net schedules but finds things a bit quiet. EC also reports things slow. TR, EF, and ALR handled considerable emergency traffic when the Duplessis Bridge collapsed. AT, AIM, AON, AFU, and VE continue active on 144 Mc. in St. Maurice Valley Area. AKJ reports operating time considerably reduced because of the arrival of a second jr. operator, a YL this time. DD and AKJ have been trying out clothes-lines as antennas with good results. MARC election results: BK, pres.; CK, vice-pres.; XZ, treas.; HI, secy. CB is on 14 Mc. from Verdun with controlled grid modulation. AOJ, at Port Harrison up on Hudson Bay, is on 14 Mc. with HT-18. SX, at Fort Chimo,

(Continued on page 114)

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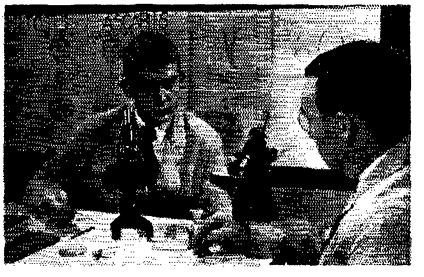

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schedules CA. Congrats to Tony, XYL of GQ, elected Alderman for the Town of Mount Royal. CO is back on 3.85- and 14-Mc. 'phone after 11 years! Traffic: VE2CA 48, LO 18, EC 15, GL 14, AKJ 9.

VANALTA DIVISION

ALBERTA — SCM, Sydney T. Jones, VE6MJ — EO has plans for mobile operation with fire truck equipped with f.m. and a.m. NW, BU, OD, NY, AO, and RL attended the NARC Clubfest recently held in Edmonton. OC has been appointed Emergency Coördinator for the Peace River Area. The Alberta 'Phone Net has changed its meeting time to 1830 in view of poor band conditions. OW is a new call in Edmonton. Albert puts out a nice signal. Edmonton amateurs held their first emergency workout during January with eleven participants. LG has moved to a new house and is without telephone as yet. LX is interested in civil defense communications and wishes to hear from some of the gang interested in forming a hot traffic net on 7 or 3.5 Mc. ES checks in on the 'phone net when the OM is busy. FB is really enjoying 'phone contacts. TK addressed the banquet meeting of the Lethbridge Emergency Corps. AT has the ham bug again and has been heard on 3.5-Mc. c.w. LW finally made his 100-kc. rock work. DZ has his Class A ticket and expects to be on 'phone real soon. BH is checking in on the Alberta 'Phone Net regularly, as is FB. Traffic: VE6EO 7, MJ 4.

BRITISH COLUMBIA — SCM, Ernest Savage, VE7FB — Shaughnessy Hospital is host to AAA, ADR, OM, JM, and ANF, formerly a ZL. They have no rig but listen on the bands. AKD, MQ, and NY have new cars with mobile. AKC has been working 3.8- and 28-Mc. mobile with very fine reports from all over the country. CB has been heard listening on 50 Mc. The East Kootenay gang is down there. CR has been heard on 3.8 Mc. TD has been planning how to put mobile in a Baby Morris sports car. The receiver and transmitter are larger and heavier than the motor that pulls the car. Your ECs still are looking for members, and the two active EC nets are on 3755 kc. every evening except Sunday at 1800 hours PST. XA has eleven holes for sockets in his new VFO but no time to finish the job. Received a very nice letter from the VSW Club. PO has been elected the Club's EC, with SF as AEC. RV is folding that big frame of his to fit into the little car he has just bought. AOB has the new rig on all bands and it sounds fine. US has his new rig debugged. A number of years ago in the crystal detector era Mr. W. J. Bowerman came to this coast as radio operator for the Department of Marine and Fisheries, now called the Department of Transport. He then became radio inspector and the last few years has been chief radio inspector for British Columbia. He now leaves his office for a well-earned rest and all of us amateurs wish him all the best and extend many thanks for all the hard work he has done for us.

PRAIRIE DIVISION

MANITOBA — SCM, A. W. Morley, VE4AM — Because of the serious illness of our SCM's XYL, Jean, 4JM, LC is substituting for Art this month. We all wish Jean a very speedy recovery. The WARC held its annual general meeting in January and the following were elected to office: AX, pres.; EI, vice-pres.; LC, treas.; Bob McEwan, secy. ND celebrated his 80th birthday Jan. 30th with a gathering of about 35 ham friends at his home. QI has gone Class B 'phone but still keeps his n.f.m. TX is heard again after an absence of two years. ZZ now signs 3AZL at Ft. William. NI has added noise limiter to his Q5-er and reports FB results. DL is back on after cleaning up after last spring's flood, but is disgusted with 14-Mc. 'phone so operates c.w. XA, ex-MC, is back in town and hopes to be active again soon. HL and HP have new HQ-129 receivers. JG is heard with FB signal on 14-Mc. 'phone with 100 watts to a pair of 807s. DJ now has HT-6 transmitter. PL is getting new RME receiver. EL is new at Langruth with 60 watts to a pair of 807s and 1155 receiver. SR is rebuilding mobile rig with the new ruggedized 6L6s. The Dauphin Radio Club will hold its annual hamfest Labor Day week end this year.

SASKATCHEWAN — SCM, Harold R. Horn, VE5HR — JW is new EC for Regina. Get behind him and give him your support. CO has a new harmonic (a girl) and in his spare time is on 56 Mc. BH has a new Panadapter, so watch your modulation, boys. TK, at Moose Jaw, and MX, at Margo, are new hams. Welcome, fellows. MC, FY, DR, and UC are busy getting their mobile rigs in shape for EC and summer activities. JD is back on with 10 watts. LD is doing fine as portable from a lumber camp. HR is QNI RN7 now. Not much news this month, fellows, so please send in your activities for this column. Traffic: VE5MA 33, YF 24, HR 23, SE 12, BH 10, LE 4, TE 4, DS 2, GI 2.

"It Seems to Us . . . "

(Continued from page 9)

relation is apparent as between what the applicant is expected to know and for what reason he should possess such knowledge.

It is clear that so long as no additional privileges are made available for the Extra Class licensee the license would merely represent a certification of the individual's merit or degree of attainment. While the League recognizes the value of awards for merit, and does issue such awards itself, it does not believe that it is a necessary function of the Commission to provide, through its Rules, for the issuance of such certificates to a particular class.

The statutory authority of the Commission to promulgate the rules herein involved flows from §4(i) and §303(r) of the Communications Act. Both of these sections impose a jurisdictional prerequisite of need. The Rules here challenged cannot be predicated upon any showing of necessity when the situation for which standards must be set or a course of conduct outlined doesn't exist.

The League also considers the procedure adopted by the Commission in raising the licensing requirements for maximum operating privileges to be improvident. The League is not aware of what might be conferred in the way of additional operating privileges and the Commission does not state what new privileges might be conferred upon the Extra Class licensee. Nevertheless, it has, in contemplation of some undelineated privileges, superimposed upon the present license structure a new class of amateur license and has prescribed the qualifications for it. Thus, the Commission has committed itself to deal in a particular way with an unknown situation that might arise in the future. The League believes this unwise.

The action of the Commission further seems improvident when it is realized that for the *sole* purpose of increasing the licensing requirements for maximum operating privileges it felt compelled to create a new class of license.

The League believes that the logical way to accomplish its purpose is to raise the licensing requirements for the classes of licenses as presently constituted. Such a procedure would be flexible and would be administratively convenient. This suggestion of course presupposes that the presently licensed Class A amateur should continue to enjoy his unlimited operating privilege as the League has urged and does so urge.

In the dissenting opinion of Commissioners Hennock and Sterling in Docket 9295 it is pointed out that the creation of the Extra Class license, without making provision for a "grandfather clause", is unfair to the body of amateurs who have been the backbone of the amateur service and have made amateur radio what it is today. It is hardly a tribute to those amateurs, who for so long a time have rendered "gallant and meritorious services" in peace and in war, eventually to diminish their stature and to lessen the extent of their operating privileges by requiring them to be re-examined in order to continue to maintain their relative status.

It is common knowledge that in our society those in the professional classes, who are subject to a licensing process, are not required to be re-examined whenever some new development occurs in the professional field. This should be as true in amateur radio as in the legal profession or the medical profession. At least, never before in the history of amateur radio has it been found necessary to re-examine existing licensees.

The foregoing, and other relevant considerations, can be presented on reargument on a time allocation of not to exceed fifteen or twenty minutes. It is believed that the convenience of the Commission and the public interest will be served by an oral elaboration of the considerations herein outlined.

AMERICAN RADIO RELAY LEAGUE

By: PAUL M. SEGAL
QUAYLE B. SMITH
Its Attorneys

February 20, 1951

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Radiological Monitoring

(Continued from page 13)

certainly be fatal if absorbed by the body in one day, but would have little effect if spread over 25 years. The probable effects are shown in Table I for "acute" doses, by which is meant the total radiation received in a short period of time; i.e., one day.

TABLE I

Probable Early Effects of Acute Radiation Doses Over Whole Body
(By acute is meant total radiation received in a short period of time; i.e., one day)

Acute Dose	*Probable Effect*
0– 25r	No obvious injury.
25– 50r	Possible blood changes, but no serious injury.
50–100 r	Blood cell changes, some injury, no disability.
100–200 r	Injury, possible disability.
200–400 r	Injury and disability certain, death possible.
400 r	Fatal to 50 per cent.
600 r or more	Fatal.

The current Atomic Energy Commission policy allows laboratory workers to be subjected to doses of 0.3 r/week.

To compare radiation dosages to cases that may be more familiar we note the following:

Medical X-Ray Exposures

a) Photofluoroscope investigation of chest — 0.7 r to 1.2 r.
b) For extremities — 0.25 to 1 r.
c) Skull — 1.3 r.
d) Abdomen — ½ r.
e) G.I. series — 0.64 r/plate — 4 r for 6 plates.
f) Lumbar (spinal lateral) — 5.7 r.
g) Pregnancy (lateral) — 9.0 r.
h) Fluoroscopy — 0.28 r/sec.
i) Shoe store X-ray — as high as 90 r/min.
j) Wrist watch (average) — 0.001 r/hr. from back and 0.040 r/hr. from front.

In the next section of this article, the circuitry for measuring radiation will be discussed and construction features will be shown; also, the general survey procedures of radiological monitoring will be described.

Bandswitching Converter

(Continued from page 26)

The power supply utilizes an *RC* filter, and since the current drain is light, the constants shown give more than adequate filtering.

Stability

The total drift on the three lower bands is less than 4 kc., all within 10 minutes of a cold start. At 144 Mc. there is a total drift of about 70 kc. in the same period, with complete stability after an additional 20 minutes. All checks were made within 20 seconds after the application of heater power. During stand-by periods the plate power is left on the oscillator, so there is no stand-by drift. Reset accuracy, with operation of the bandswitch, is within five kilocycles on all bands,

Auditory Test Equipment

(*Continued from page 30*)

and electronics magazine for the blind, *The Braille Technical Press*. Several of the items of Braille test equipment described and pictured here have been presented in the complete word-picture form that is the essential element in all Braille texts.

Bob Gunderson has stated that the lack of suitable test equipment and literature in Braille has been a great obstacle to the mastery of amateur radio by blind people interested in the subject. His equipment, and other developments now on the way, have gone a long way toward solving the first problem. *The Braille Technical Press* is helping with the second, but it needs your support, both technical and financial, if it is to continue.

It is encouraging to note the ever-increasing interest being shown in this project by members of the amateur fraternity. With our help it should not be long before most blind amateurs will be able to enjoy their hobby on an equal basis with their sighted brothers. If you would like to assist in this work, send contributions to The Braille Technical Press, Inc., 980 Waring Ave., New York 67, N. Y. — *E.P.T.*]

M. A. R. S

(*Continued from page 60*)

just what military frequencies are going to be available for what jobs. New military requirements are a part of the mobilization picture. Some changes may be expected. Obviously two networks "butting heads" on the same frequency or on adjacent frequencies are likely to cause each other interference.

Most new MARS members are apparently thinking in terms of civil defense and emergency radio service to their local communities when they apply for MARS membership. A few of their questions, such as "How shall I revamp the rig to tie in with civil defense?" or "I'm all ready to supplement my present amateur station with the necessary equipment to operate the National Emergency Frequencies; please advise what I should do," are virtually unanswerable at the present time.

The following advice, being given to all new MARS members, is believed to apply equally well to other radio amateurs: Don't stampede. Do all you can on a local basis to coördinate community planning with the American Red Cross, Civil Defense set-up, Civil Air Patrol and local amateur radio clubs.

Keep your rig as it is. Don't rush out and buy equipment you may not be able to use. As soon as networks are determined and plans coördinated on a national or regional basis, you will be fully informed.

Think in terms of emergency power supply for your present equipment.

Study and practice procedure. Participate in nets. Constant drill and traffic handling are the best possible training methods for an emergency system.

How's DX?

(*Continued from page 63*)

out to rebuild after 5 years of heavy opping and hopes to hit the comeback trail early this year. Odd trusts that all contacts have received their LA2JA QSLs, having always maintained a 100% policy in this regard . . . . . Inspecting the So. Calif. DX Club *News*, we see that no casualties resulted from the joint Fresno clambake held in conjunction with the No. Calif. DX Club and that a huge time was had by all. The Sixes hear from W4LVV that an FG8 should be firing up a 10-watter immediately if no sooner . . . . . The longest-permanent-resident ham on Kangaroo Island, VK5XK, has been awaiting improved conditions to resume his chatting with Ws. Arch commenced operations in 1930 with a 210 Hartley and slop-jar rectifier. Lack of a.c. limits him presently to a 6L6 at 18 watts and Windom antennae are preferred. He bats away on the landline for the Post Office Service during the day and then can be heard on any one of several bands at night. Kangaroo Island has no industries; sheep and barley are its produce.

Technical Topics

(*Continued from page 65*)

downward, some attention should be paid to the "poling" of the speech waves, since they will usually have higher peak amplitude on one side than the other. If the system, when set up as described above, has a tendency to shoot over on the down-peaks with voice modulation, reverse the connections of one winding of T_2 so the larger peaks will actuate the carrier-control circuit.

— *G. G.*

U. S. N. R.

(*Continued from page 68*)

Detroit Amateur Radio Association (W8ZZ) is now meeting at the Naval and Marine Corps Reserve Training Center (K8NR), 7600 East Jefferson Avenue, Detroit, Mich. . . . Lieut. Cmdr. R. C. Scott, USN, W1SOL (ex-JA2AA, W2TFE, W4CVZ), is on duty at First Naval District Headquarters, Boston. W1SOL runs ½ kw. on 14-Mc. 'phone and c.w. . . . A hamfest was held in late January at Naval Reserve Training Center (K5NBL), Camden, Ark. Approximately 200 amateurs were present from Arkansas and surrounding states. Chief Radioman Bill Highes, W4PYU, was master of ceremonies. Other Naval Reservists present: W5BUX, DRW, DWJ, EGX, GII, ICS (ARRL emergency coördinator), LQO, NEL, NSW, PYU.

Correspondence

(*Continued from page 69*)

think is constructive and will increase the pleasure of a lot of amateurs.

. . . In the contest my fifty watts got lost in the shuffle. I worked several KH6s who were just firing up because I got there before the mob, and actually snagged one ZL. . . . However, I logged over 65 good DX stations heard with good strength . . . that I couldn't raise. Time and again I heard fellows whose reports ended in "000" or "950" bull their way in, many not using common courtesy or careful procedure in waiting for the DX station to sign, get the contact and waltz away to better things.

Honest, I'm not sour-graping. I had a wonderful time and snagging the ZL repaid me for the whole works . . . the contest puts too much of a premium on beams and power and not enough on operating ability. A lot of fellows with low power . . . no money or inclination to go over 100 watts tops, get pretty well left out.

How about changing the rules, or running a second contest, so that part of the time at least there is a maximum power limitation. Just credit for low power, as in the SS, isn't enough. It does no good if the kilowatts snag most everything.

— *William B. Katz, W9PPH*

HAM-ADS

(1) Advertising shall pertain to radio and shall be of nature of interest to radio amateurs or experimenters in their pursuit of the art.

(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters be used which would tend to make one advertisement stand out from the others.

(3) The Ham-Ad rate is 30¢ per word, except as noted in paragraph (6) below.

(4) Remittance in full must accompany copy. No cash or contact 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 take the 7¢ rate. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising by him takes the 30¢ rate. Provisions of paragraphs (1), (2) and (5), apply to all advertising in this column regardless of which rate may apply.

(7) Because error is more easily avoided, it is requested signature and address be printed plainly.

(8) No advertiser may use more than 100 words in any one issue nor more than one ad in one issue.

Having made no investigation of the advertisers in the classified columns, the publishers of QST *are unable to vouch for their integrity or for the grade or character of the products or services advertised.*

QUARTZ — Direct importers from Brazil of best quality pure quartz suitable for making piezo-electric crystals. Diamond Drill Carbon Co., 719 World Bldg., New York City.

QSLs, 100, $1.75 up. Stamp for samples. Griffeth, W3FSW, 1042 Pine Heights Ave., Baltimore 29, Md.

SUBSCRIPTIONS. Radio publications a specialty. Earl Mead, Huntley, Montana, W7LCM.

QSLS. Very attractive. Best in printing and prices. Kromekote or any other stocks. Stamp for samples. W4LXJ, Roop, Radford, Va.

WANTED: Marconi coherer magnetic detector. Multiple tuner; deForest responder and other gear prior to 1920. Franklin Wingard, Rock Island, Ill.

QSLS! TAprint, Sumrall, Mississippi.

QSL'S, SWL'S. Meade, WØKXL, 1507 Central Avenue, Kansas City, Kansas.

QSLS, modern. Sample booklet 12¢. Stamps okay. Westerners see samples at leading Ham stores. W6GFY, van Groos, 1436 N. Serrano, Hollywood 27, California.

CONVENTION! ARRL National Convention in Seattle, July 27, 28, 29th, 1951. Plan your vacation in the Great Northwest during Seattle Centennial year. The time of your life! General Chairman: W7RT, 1921 Atlantic St., Seattle 44, Wash.

PHONE patch schematics, practical discussion. $1.00. Nichols, W1MRK.

BEAMS and antenna elements. Send a card for full information. Riverside Tool Co., Box 87, Riverside, Illinois.

QSLS: Uncle Fred QSLs. Three colors and up. Rainbow map. QSLs. Special DX QSLs. Bargain QSLs. Samples rushed. 10¢. Uncle Fred, Box 86, Lynn, Penna.

QSLS-SWLS. High quality. Reasonable price. Samples. Bob Teachout, W1FSV, 40 Elm Street, Rutland, Vt.

MOTOROLA used communication equipment bought and sold. W5BCO, Ralph Hicks, 204 E. Fairview, Tulsa, Okla.

WANTED: Teletype 1/60TH HP synchronous motor. W6ITH, Moraga, Calif.

CRYSTALS: Our eighteenth year manufacturing precision crystal units for Marine, Aircraft, etc. Television markers. Regrinding service. Request catalogue. R. E. Nebel Laboratory, 1104 Lincoln Place, Brooklyn 13, N. Y.

QSLS, SWLS. They're better. Samples. C. Fritz, 1213 Briargate, Joliet, Ill.

CRYSTALS: Bassett precision Type 100A (FT-243) within 80, 40, 20 meter bands or MARS channels at $1.50 each. Specify exact frequency and include postage. Rex Bassett, Inc., Bassett Building, Fort Lauderdale, Florida.

WANTED: Marconi tuners 101–106–107–112; magnetic detector, deForest responder, Clapp Eastham apparatus, E.I. Co. apparatus, Elementary Manual of radio telegraphy and telephony by Fleming; Wireless Telegraphy & Telephony by A. P. Morgan; Wireless Telegraphy by A. F. Collins. Marconi code records. Wireless Specialty IP76 tuner; IP 76–1914 double-deck tuner. Have QSTs, Wireless Age, Electrical Experimenters, Radio News to trade or to pay cash. L. Rizoli, W1AAT, 100 Bay View Ave., Salem, Mass.

SELL: BC-348, Meissner Signal Shifter, PE103. W2SSV, 355 Baker Ave., Syracuse 5, N. Y.

GLOBE KING 400-A. Full 400-watt phone. Newest model. 80, 20, 10 meter coils. $390.00 F.o.b. Omaha. Also RME-45 with speaker and HF-10-20 for best offer. Tom Fifer, WØAQJ, 7214 North 35th St., Omaha, Nebraska.

QSLS? SWLS? Modernistic? Rainbow? Cartoons? Photographic? QSL specialists. Samples, 3¢. Sakkers, W8DED Holland, Michigan. QSLs unbeatable.

COUNCILOR wanted for Maine Boys' Camp for summer. License required to operate Ham voice station. 20 years minimum age. Healy, 18 Floral, Hastings, N. Y.

QSLS. Samples. Larry's QSL's. Opportunity, Wash.

BARGAIN: 50-watt A.M. 'phone transmitter for 5–10 and 20. Excellent throughout, finest parts, many extras. Also home-made single signal preselection Superhet. Best offer for both over $125.00 or will sell separately. W2JWS, H. C. Kranich, 390 Riverside Drive, N. Y. C. 25. Phone Monument 2–9822.

SELL: Receiver S-20R, in good condition: $35.00. Express prepaid. James F. Quigley, 645 Polk Blvd., Des Moines, Iowa.

FOR Sale: 1–177 Dynamic Mutual conductance tube tester, $35.00. Hickok OS 10 signal generator, 85 Kcs to 50 Mc. $25.00. W7MOU, Jordan, 909 Elva Street, Idaho Falls, Idaho.

WANTED: Ten-meter mobile fone transmitter. Orville Braaten, WØNVI, 1131 Park Ave., Morris, Minn.

SELL: New modulation xfrmers UTC-CVM5, $48; RCA 1 Kw, surplus, $25.00. Sealed 715Bs, $8.90 each. Almost new 4–250s, $25.00. Thordarson power xfrmrs, 3000, 2450, and 2000/1000 DC at 500 mils, $35 and $20. BC-604 FM xmittr with tubes, 80 xtals and gen. $35. All guaranteed. Ralph Barnett, WØFMK, 100 No. Florissant Rd., Florissant, Mo.

TRADE or sell: Want 8mm movie equipment, radio correspondence course, Linguaphone French course and other things. Have much radio gear to trade or sell. Send your list — I'll send mine. W2QUJ, 405 Weaver Street, Larchmont, N. Y.

SX-71 rcvr with R46 spkr, 2 mos. old, $175.00; 800 watt 75 meter AM xmittr, 'scope, VFO, class A modulation, in 6 ft. metal cabinet: $325.00. Write for full details. Daniels, W9DSV, Box 261, Webster, Wis.

COLLINS 70E8 wanted, new or used, and in good condition. State price. VE3KT ex-VE3AZI.

FOR Sale: BC-342 receiver. 115 volts Ac. Good condition. $50.00 F.o.b. Earl L. Eggers, 70 Maxwell Road, Eugene, Oregon.

SELL: 300 watt Thordarson Multimatch; two 100TH's; RK 20; Two RK51, Stancor 10P as is; 334 Z G.R. condenser, 250 $\mu\mu$ per section: all for 60 bucks or separate. W2EB, East Bloomfield, N. Y.

SELL: P.P. 8005 final, $35.00. Power supply, $25.00. 811 Mod. $20.00. DeLuxe cabinet, $28.00. Will trade. W7JLJ.

LYSCO 600, TVI-proofed transmitter, $80.00; Super Pro BC779, $80.00; Hallicrafters SX-42, $165.00; Vanbrunt, 4277 South 35th St., Arlington, Va.

FOR Sale: DB22A, preselector HQ-129X rcvr, built-in xtal freq. standard; 3 months old: $250.00 or best offer. Will ship in original cartons. W9RTB, 1551 Ohio Ave., Whiting, Ind., P. G. Kompler.

KELSEY 5 x 8 press, in new condition. Type, supplies. Suitable for printing QSL's. Cost $105.00. Make an offer. W4HFP.

BC-459 7–9 Mc. VFO xmitters, several good used unconverted with plug $8.75 each, plugs for 274N transmitters and receivers, 2 for $1.00; two good used untampered 522 $27.50 ea., two good TBY Transceivers with 110Vac packs, $27.50 each; several new BC-348 shock-mount bases, $1.50 ea. 3D23 (TB35) HF beam tetrodes, two for $7.50. All F.o.b. Seattle. Al Williams, W7HVA, 12015 75th Ave., South, Seattle 88, Washington.

FOR Sale: RCA police transmitter, 31 Mc. with power supply and hand-set, $35.00; S-53 Hallicrafters receiver, $69.00; RME-45, in excellent condition, $95.00; Sonar FM, 10-meter exciter, $19.95; Sonar MB611, 10-meter mobile transmitter, $37.50. Art A. Johnson, W9HGQ, Art A. Johnson Sales, 1117 Charles St., Rockford, Ill.

WANTED: Collins 32V1 or 32V2, within driving distance of Hartford, Conn. W1RQN.

SELL: *QST*s from 1938 on. George Kravitz, 7919 20th Ave., Brooklyn 14, N. Y.

GUARANTEED satisfaction when you trade with Carl, W1BFT at Evans Radio, Concord, N. H.

HQ-129X and speaker, $120.00; DB22A, $59; Triplett 2400 V.O.M., RCA 167 B signal generator. Want: BC342, AC Instructograph. B. Marshall, 455 Washington Ave., Dumont, N. J.

QSL Printing shop for sale. Includes 2 presses, type, complete. W1HJI. Cushing, Box 32, Manchester, N. H. Dial 3–6735.

WANTED: transmission drive unit complete with motor for Amphenol Signal Squirter Beam Assembly. Right price desired and condition of equipment. Howard R. Sisson, 708 Francis St., St. Joseph 8, Mo.

SWAP Lettine 240 transmitter in A-1 condition for Meissner shifter, BC459, or similar equip. Send your deal to W4QDC, Park View, Box 49, Harrisonburg, Va.

WHERE can I buy a "Smith Chart" either new or used. State price, size and condition. Harold J. Carr, W3JFI, 125 Walnut Ave., Croydon, Penna.

NEW Crystals for all commercial services at economical prices, also regrinding or replacement crystals for Motorola, Link, G-E and other commercial types. Over fifteen years of satisfaction and fast service! Eidson Electronic Co., Phone 3901, Temple, Texas.

TRYING for an amateur license? Sure check tests Class B & C, $1.75, Class A, $2.00. Amateur Radio Supply, 1013 Seventh Ave., Worthington, Minn.

CRYSTALS: Precision, low-drift, mounted units for all services. Also crystal diodes: 1N-21, $.75, 1N-23, $1.00, 1N-23A, $3.00; 1N-23B, $4.00. Breon Laboratories, Williamsport, Penna, 1520 Evergreen Road.

TAKE pride in the quality of your 'phone rig. Increase intelligibility and cut through QRM. Install a new AF-2 narrow band audio filter today. Satisfaction guaranteed or refund. $11.75 postpaid. Northeast Radio Products Co., P.O. Box 72, Quincy (Wollaston), Mass.

WANTED: Complete or nearly complete files of Southern Edition of *QST* only, from January, 1935 to December 1942, both inclusive. Most copies were identified by publisher at bottom of last or next-to-last page before back cover. Must have both covers and be in good condition. Sumner B. Young, WØCO, Route 3, Wayzata, Minn.

TRADE new Crown Graphic strobe light and tripod for medium power transmitter or parts. A. G. Woolfries, c/o WØHFT.

WANT: 6–425 volt dynamotor as sold this winter by Burstein-Applebee. State condition and C.o.d. price. WØUUS.

BUILD a Bantam 1-watt transmitter, bargain foundation unit with two crystals, coil and data, 98¢. Top dollar for your tubes: 1N21B/-23B, 304TH/TL, 450TH/TL, 250TH/TL, 4E27/257B, 3E29/829B. All FG/KU, receiving, television types. Send list, best price. "TAB," 109 Liberty St., NYC.

WANTED: Code machine with tape. Reasonable. Frank Janowiak, 1210-18th St., Bay City, Mich.

WANTED: 5R4GY tube. Trade DPDT 110 VAC relay or buy. John Kovach, 2368 Andrus, Hamtramck, Mich.

SWAP: Kodak 35 with carrying case. Only exposed 10 films. Cost $85.00. For 160 fone rig or component parts. W3QOS, Box 20, Big Run, Penna.

200 w. 20 to 80 meter. FB any ant. Fully metered. 4 x 4 ft. $100. W6JQP.

WANTED: Pair of 25 $\mu\mu$fd variable condensers, ¼" spacing to neutralize 211 final. Cardwells preferred. W4EXO, T228 Apt. 1, Ft. Monroe, Va.

FOR Sale: KW power supply, Thordarson components, with voltmeter and meters for final. $120 or best offer. F.o.b. Austin. Write: Oscar F. Nash, W5POL, 2600 Guadalupe, Austin, Texas.

SWAP: Cessna 120, starter, radio, etc. for ham equipment. Need modulator for pair of 813's or complete station. B. L. Hinnant, W4RJ, Whiteville, N. C.

DO you have April, May, June and July 1916 *QST*'s? Write E. Collins, 83 Deerfield Dr., Manchester, Conn.

WANTED: RCA-AVR-20A, 2300–6700 Kc. receiver in new condition. Also: AVA120 antenna reel for Aircraft. Paul N. Gibson, W7OMY, P. O. Box 312, Siletz, Oregon.

FOR Sale: Complete 1 Kw xmitter now on the air. Bandswitching CW and NBFM 10 and 20 meter. Metal cabinet enclosure. De-TVI'd. 10 xtal spot frequencies and separate VFO with speech clipped NBFM. 5 power supplies. All for $400, or sell in units. 95 countries. Reason: going mobile. WØUW, Heidt, 251 Bernard St., St. Paul, Minn.

WANTED: "Auto Power" by S. W. Duncan. Drop card. Name price. W3OX, Anthony Mag, P.O. Box 152, Bakerstown, Penna.

COLLINS 32V2 2 months old and 75A1 in excellent condition, W8GWA.

WANTED: March and May 1916 *QST*. 200 copies for sale, 1920 to 1951 at 25¢ each. WØMCX, 1022 N. Rockhill Road, Rock Hill 19, Mo.

1275/1540/1800 VDC, 300MA power supply. New parts, mounted, professionally wired on relay panel and chassis, with lights, fuses, meter, relay and switches. Parts cost $85. Sell best cash offer. Trade for Harvey-Wells Bandmaster. W4JUX, Somers, 102 Norton Road, Oak Ridge, Tenn.

HRO-7. All coils. Like new. Will consider best offer. W. H. Bass, W4ONV, Falmouth, Va. Emergency Coordinator.

WANTED: SCR-522 conversion data, including schematics. Wanted rush. WØVBV, Ellis, Charles City, Iowa.

BARGAINS: New and reconditioned Collins, National, Hallicrafters, Hammarlund, RME, Millen, Gon-Set, others. Reconditioned S-38 $29.00; S-40, $69.00; SX-42, $199.00; NC-57, $69.00; NC-183, $199.00; HQ-129X, $139.00; RME-84, $69.00; RME-45, $89.00; DB22A, HF-10-20, VHF 152A, SX-43, SX-28A, NC-173, NC-240D *HRO*, Collins 32V, Collins 75A, Meissner *EX VFO* complete, $59.00, BC610, others. Terms. Shipped on approval. List free. Write: Henry Radio, Butler, Mo.

TUBES . . . Hard to get? Send want list for quotations. Standard brands only. Quantity discounts available. Telradco, Box 108, Elizabeth, N. J.

*QST*s: 1917 to 1948, many other books, old tubes, Riders, etc. List. Mrs. Conrad Beardsley, 103 Wythburn Road, South Portland, Me.

BARGAINS in new and used transmitters, receivers, parts: Collins 32V1, $395.00; Globe-King, $299.00; HT-9, $199.00; *HRO*-7, $225.00; Temco 75GA, $225.00; Collins 75A1, $295.00; new 150 watt phone, $199.00; HRO-5T, $175.00; NC-173, $139.00; Hallicrafters S-47, $139.00; SX-43 $129.80; RME-45, $99.00; NC-46, RME-69, $69.50; VHF 152A, $69.00; SX-24 $69.00; NC-100 $59.00; Globe Trotter, $57.50; HT-17, $32.50; New Bud VFO21, $39.50; New Meissner signal calibrators, $24.95; S-38, $29.95; MB-611, $29.00; 90800 Exciter $29.50; Gon-Set 10-11 converters, $25.00; XE-10, $19.95 and many others. Large stock trade-ins. Free trial. Terms financed by Leo, WØGFQ. Write for catalog and best deal to World Radio Laboratories, Inc., Council Bluffs, Iowa.

COLLINS 310B-3 exciter, in excellent condition, best offer. *QST*'s, Nov. 1919 the "Liberty Number"; Sept. 1919; Sept. 1920; Mar. 1921. Best offer. Jim Larsen, W7DZL, 2134 NW Flanders, Portland 9, Ore.

MEISSNER EX signal shifter, $50.00. Telvar T-60-2, $90.00. Fred S. Eggert, W8FIL, 11833 Wisconsin, Detroit 4, Mich.

FOR Sale: Mackay 167BY console 750 watts c.w., NFM, VFO, 2-24 Mcs., Variac, Hallicrafters SX-43 built-in; R-44 spkr, ICA audio osc., McElroy CP-500 bug, brush xtal fones, natl. 17" oscilloscope. All for $400.00. Davis, W9LTY, 1506 Summit Dr., West Lafayette, Ind.

BANTAM transmitter manual. New circuits for inexpensive one to ten watt xmitters AC, DC, phone or CW. Also antenna dope. Written by original designer of Bantam 1-watter (Jan. '48 *QST*). Send $1.00 for manual. Kit prices quoted. W4BIW, Lindsey, 751 San Antonio Dr., N.E., Atlanta, Ga.

WANTED: RA-34 rectifier, TCS equipment, BC-654, PE-103, PE-104, Arrow Appliance Co., 525 Union, Lynn, Mass.

SELL: BC-654 sets, new or used, easily converted 3500–4000 Kc. Navy TCS transmitter, receiver, 1.5–12 Mc. portable, 35 watt, 12 VDC input, crystal, VFO, 'phone, cw. TBY sets. Want: RA-34 rectifier. T. C. Howard, 46 Mt. Vernon St., Boston 8, Mass. Richmond 2-0916 (W1AFN).

FOR Sale or swap: Kilowatt final using pair 250TH; 500 watt final using pair 100TH; 600 v. 300 m. power supply; driver for 500 watt final (single 807); 5-100TH's; 1-250TH. Want: 72" enclosed rack, three 4-125A's or 4-250A's. Make me an offer for any or all of the above. Send inquiries to W4PNF, 760 Poole Dr., Fayetteville, N. C.

WANTED: Collins 70-8 permeability tuned oscillator, 310C-1, or 310C-2. The unit must still have accurate calibration and need not be in cabinet. Fincke, W2BCK.

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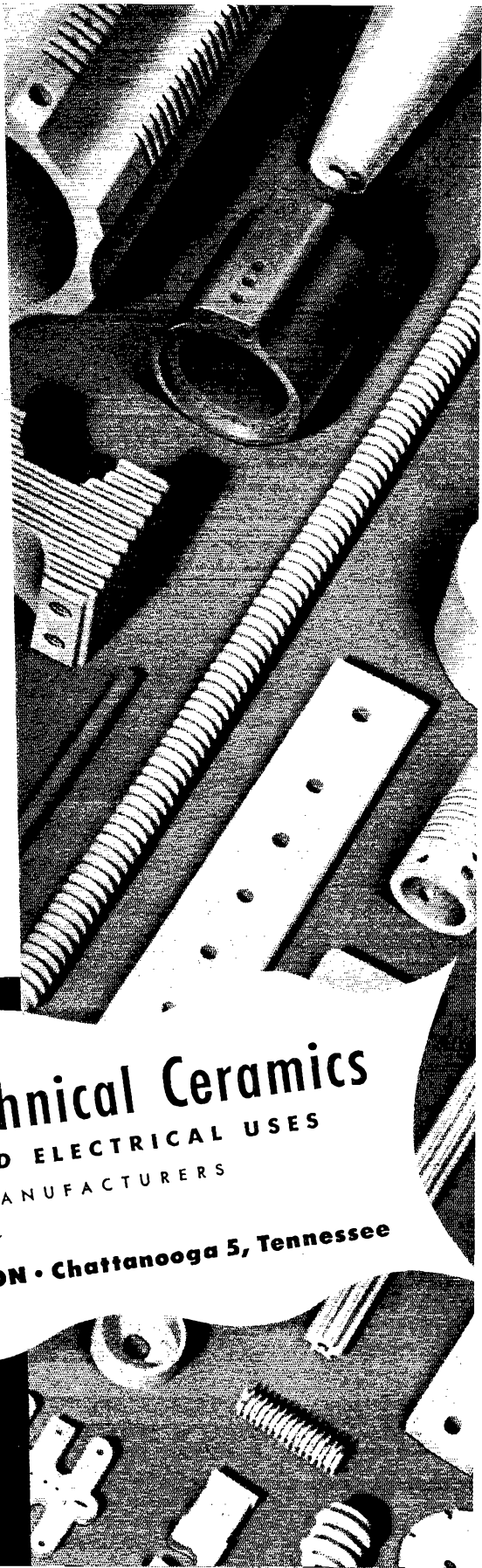

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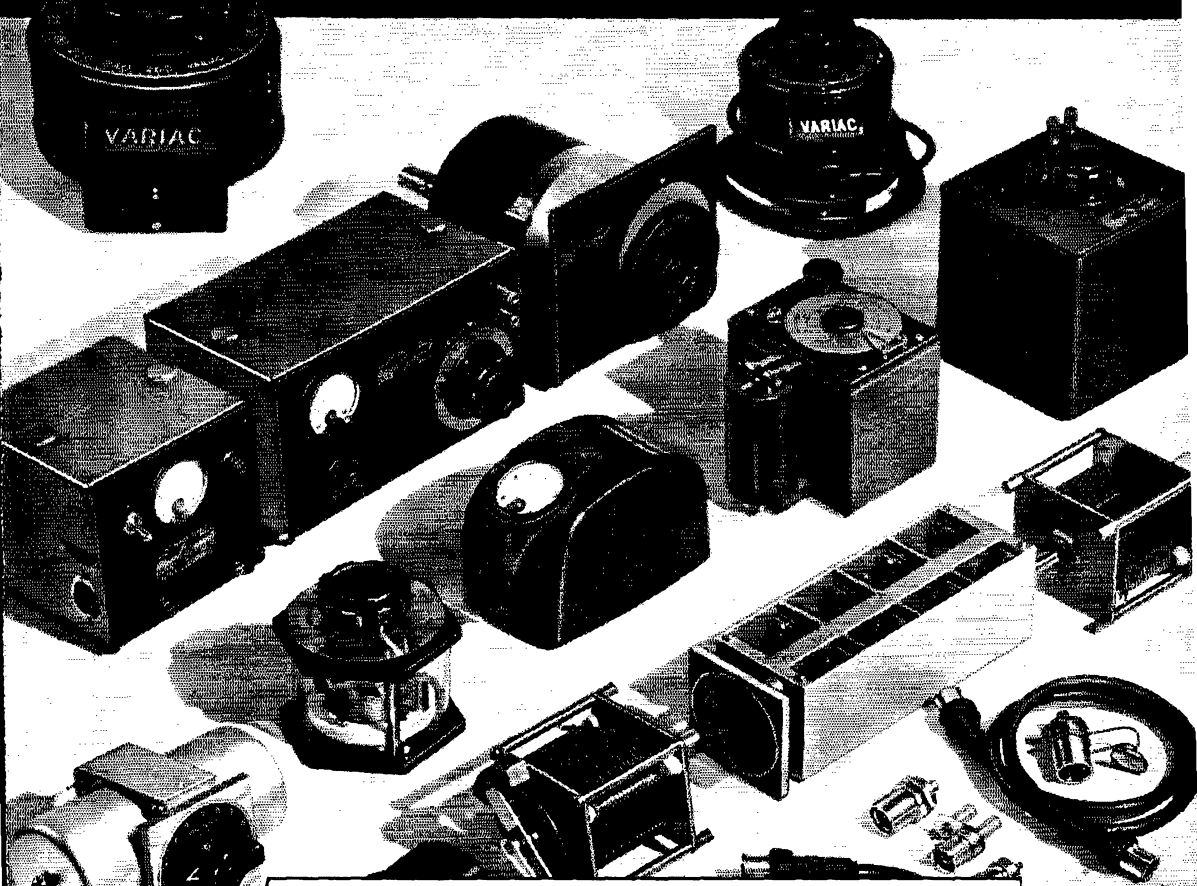

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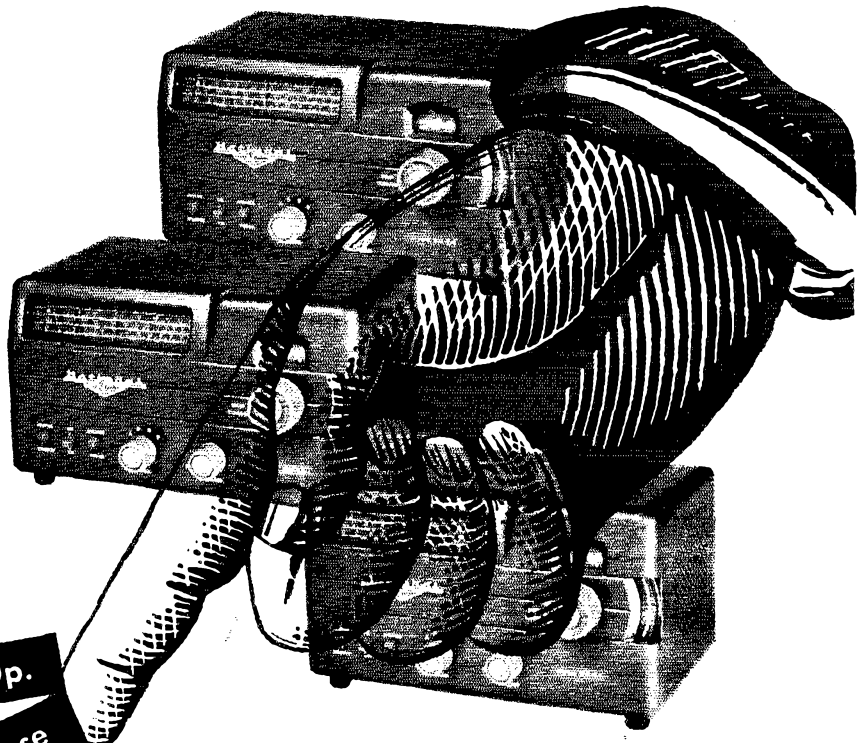

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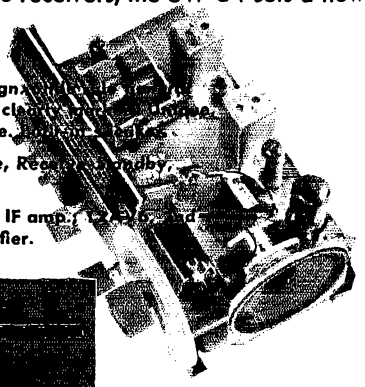

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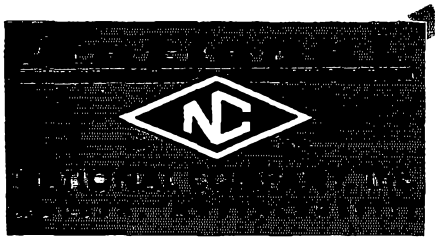

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