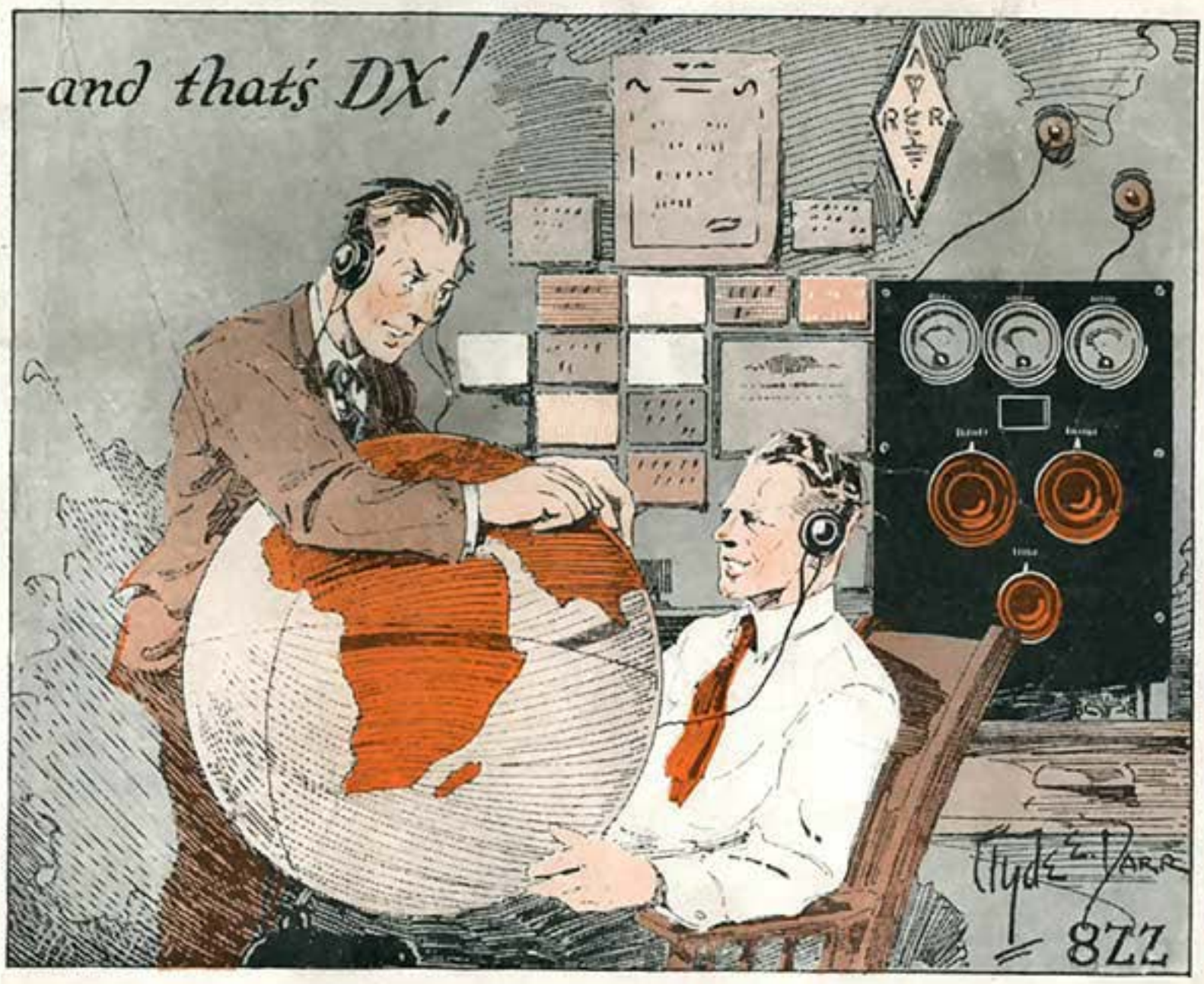
QST

DEVOTED ENTIRELY TO

AMATEUR RADIO

— PUBLISHED SINCE 1915 BY THE AMERICAN RADIO RELAY LEAGUE INC —



FEBRUARY 1928

25¢

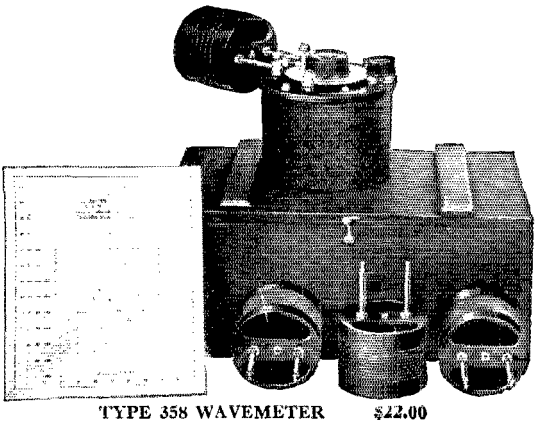
DANGER! Take Heed!

HIS LICENSE REVOKED

See Pages IV and V of January Q S T for harrowing details.

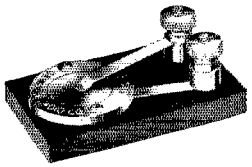
To The Rescue!

Being "off wave" is just a case of not knowing where the dead line starts. Insure your (radio) life by keeping within the earthly happy hunting ground limits. How? Just obtain the wavemeter shown at the right. Each instrument is hand calibrated, and by means of four interchangeable coils covers just the ranges you are interested in—14 to 225 meters.



TYPE 358 WAVEMETER $42.00

Oh Boy! Pure Tone



Type 356 Crystal Holder $1
Type 276A Quartz Crystal $15

If you really want to be safe and at the same time have that crystal pure note, why not try a crystal? Ground with a fundamental in the 160 meter band, but designed also to operate in the 40 and 80 meter bands.

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Vitrohm Radio Resistors

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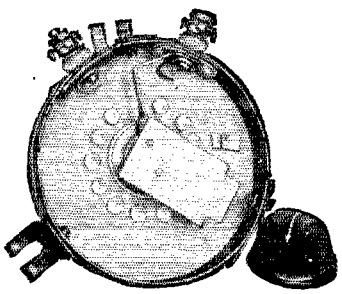
507-4†	50,000	200	60	1000	6.50
507-5†	20,000	200	100	1000	4.25
507-51*	10,000	200	135	1000	4.00
507-66**	15,000	200	120	1000	6.00

*Center-tapped
†DeForest P or R. C. A. 852 Tube
DeForest H. Tube
**Steps at 5M—10M—15M
for R. C. A. 852 or DeForest P Tube

RESISTOR 507-66



VITROHM
HEAVY DUTY RHEOSTAT

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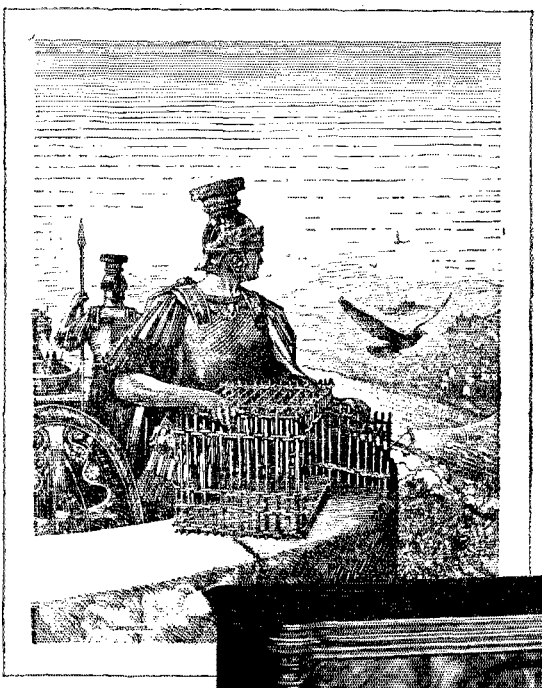
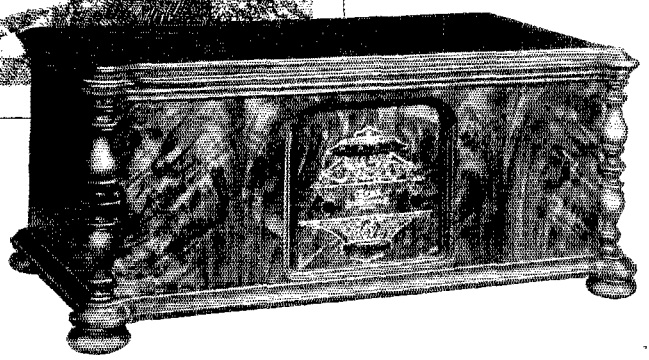


To prevent communication with the outside world, Antony closely surrounded the city of Modena with his army and stretched nets across the river. Brutus, in charge of the defense, easily thwarted these measures by the simple expedient of fastening *letters to the feet of* carrier pigeons.



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Makers of quality radio since 1909

QST

The Official Organ of the A·R·R·L

VOLUME XV — FEBRUARY, 1928 — NUMBER 2

QST is published monthly by The American Radio Relay League, Inc., at Hartford, Conn., U. S. A. Official Organ of the A.R.R.L. and the International Amateur Radio Union

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The American Radio Relay League

The American Radio Relay League, Inc., is a non-commercial association of radio amateurs, bonded for the promotion of interest in amateur radio communication and experimentation, for the relaying of messages by radio, for the advancement of the radio art and of the public welfare, for the representation of the radio amateur in legislative matters, and for the maintenance of fraternalism and a high standard of conduct.

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

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

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

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EDITORIALS

AS the weeks roll by it is possible to look back upon the International Radiotelegraph Conference with a bit of perspective. We didn't get as great privileges as we wanted or as great as we think we were entitled to, but we got all that we were able to, with loyal and powerful assistance from our Government. Some of our members do not understand how the attitude of foreign governments could have any effect upon what our Government does for us. They forget that radio is an international affair and that it has been agreed that radio is to be governed by international treaties. Every nation of course has always been free to grant the right to use wavelengths and low power that do not get outside of the country of origin—and this was the condition under which we amateurs operated our 200 meter spark stations in the old days. But the nations have always agreed that when wavelengths could interfere internationally, they should be the subject of an international agreement. Twenty years ago they made such a treaty, and agreed that they would have meetings every five years thereafter to bring things up to date. In 1912 the nations met in London and adopted what has been known as the London Convention of 1912. Then came the War and it was impossible to have the next meeting in 1917, and post-war difficulties caused a further postponement, so that it was fifteen years before the next conference was held—the one this winter in Washington.

In the meantime amateur radio grew up in the world, and the various nations recognized it and gave it varying privileges in accordance with their inclinations. All of these privileges were considered experimental and tentative, as they had never been internationally agreed to by the other nations, which of course was essential because amateur short waves are international in effect. When the nations met in Washington this winter the United States wanted to keep all of the present privileges for its amateurs and tried to get the same privileges for amateurs everywhere—as there had to be an international agreement on it. Unfortunately most of the other countries were unwilling to give amateur radio more than limited privileges, and some of them didn't want to make any provisions for amateur at all. Our Government stood up most stoutly for us, in a fashion that was very pleasing, and did its very best in arguing for us. Finally a compromise was reached—the figures reported in our January issue—which give us much more than most nations wanted us to have but less than we wanted and less than our Government wanted us to have. Our Government did not feel, however, that it could refuse to play ball with all of these other countries, because there was much more at stake than just the matter of amateurs, and it was highly necessary for radio as a whole to have the benefit of an international agreement. No nation got what it wanted at Washington—every one of them had to take into consideration the desires of all of the others and make compromises. Our Government wishes that we had got more but it was impossible to get international agreement therefor, and obviously there is no use talking about anything that cannot be internationally agreed to because any deviation from the international plan would disrupt all of the services of all of the other countries.

Although we amateurs in this country perhaps have not fully understood that our wavelength privileges of the past have been only temporary in character, the licenses of amateurs in many other countries have specifically stated that they were subject to amendment by the next International Conference. Never before was there an international agreement on amateurs. That is why this Conference was so important an event in the lives of us amateurs; that is why our League officials studied it so diligently the past year, and why we talked so much about it throughout 1927 in *QST*. Anything might have happened. It is chiefly when we consider what a great danger this International Convention offered to amateur radio that we may be pleased with the results of it. As it is, we have achieved an international status and are written into the treaty. Although the privileges we now get definitely are considerably less in some respects than we previously had tentatively, we shall be able to get along all right. The League accepts the results—its Board so votes.

The League will make no effort to secure from the United States Senate a reservation on behalf of amateur radio when the treaty comes up for Senate ratification. We do not believe it would be possible to get a reservation. We do not believe that it is necessary. And we are sure that the effort, successful or unsuccessful, would bring us into the

greatest disrepute with our own Government officials. And the effort if successful would cause us to be the most detested group in radio anywhere under the sun, because of the thoroughness with which our activities would then demolish most of the plans for international coöperation arrived at so laboriously at Washington. Individual amateurs of course are privileged to protest to their Senators if they are convinced they must, but that cannot be the League position and the League urges against the effort as being futile, unnecessary, and unwise.

WHEN we speak in *QST* of the united opposition against the amateur at the Washington Conference it must be understood that we are speaking of the opposition offered by those nations which directly participated in the discussions concerning the amateur, particularly the "teacupping" sessions where wavelengths were discussed. Many nations did not get to participate in these preliminary discussions; some that did not were friendly to us, and in fact we had no opportunity at all to learn the attitudes of some of the nations. We have listed as friendly and helpful the delegations of the United States, Australia, Italy, New Zealand, and the efforts of Commander Edwards of Canada. In the group who actively carried on the opposition to the amateur we have Great Britain, Germany, Netherlands, Japan, Belgium, and Major Steel of Canada. France must be listed as mixed but more opposed than friendly. There are several nations that were inactive but whose delegates we believe would probably have been friendly to the amateur if they had had an opportunity to express themselves in these early discussions: South Africa, Argentina, British India, Irish Free State, Hungary and Switzerland. The listing of Switzerland under this head may come as a surprise when our readers remember that it was this country which originally gave voice in the Book of Proposals to the most stringent anti-amateur suggestions. It seems now that these Swiss proposals were dictated chiefly by a fear for the safety of the State's monopoly on communications and because of a lack of proper appreciation of amateur work, for the Swiss delegate, Mr. Ernest Nussbaum, turned out to be a very fair-minded man, quite interested in learning more about amateur radio. He asked for and received from us much information and data on the organization of amateur radio in this country and internationally, displayed great interest in the progress of amateur radio and the regulations under which it operated in different countries, and promised that when he returned home he would devote efforts to the advancement of Swiss amateur radio. He will have ample opportunity to extend encouragement to it, for he is chief of the government bureau of telegraphy and communications.

Finally, we have some definite friends of the amateur to list, who, unfortunately, were without opportunity to participate in the amateur wavelength discussion because of the accidental informal composition of those meetings, but who undoubtedly would have lent a vote to support the amateur if they had had the chance. Amongst these are Dr. Otto Kucera, chief delegate of Czechoslovakia; Mr. Constantin Barbulescu, the delegate of Roumania; and Major Jose Sastre, one of the leading delegates from Spain, whose very kind support of the amateur position had been assured before his departure for this country by Sr. Miguel Moya, EAR1, the president of the Spanish Section of the I.A.R.U. Senor Moya is to be thanked and congratulated for his enterprise and success in this respect. The friendly interest of Spain in the amateur is of additional interest when it is remembered that the next International Radiotelegraph Conference is to be held in Madrid in 1932.

A TERRIFIC little tempest has been kicked up about the recent change in amateur phone regulations, particularly the rescinding of the privilege to operate phone on the lower 100 kilocycles of the so-called 80-meter band. Some disappointed phone amateurs have gone so far as to claim that the A.R.R.L. recommendations to the Federal Radio Commission were the unauthorized personal views of an individual or two at Headquarters, launched as part of a carefully concocted plan of persecution of the phone, aiming to do away with it. Fortunately some sanity of viewpoint has now returned and it should be possible to examine the question dispassionately.

The new amateur phone regulations are based upon recommendations of the League and, with the single exception that the Federal Radio Commission reserved 190 to 200 meters as a buffer band against interference with broadcast reception, they follow the League's recommendations exactly. Those recommendations were the unanimous views of the Executive Committee of the League, based upon the expressions of our A.R.R.L. Board of Directors at its last annual meeting, and were regarded as technically sound and desirable by the technical staff at Headquarters. We believe that a moment's serious consideration will indicate that they are by long odds in the best interests of amateur radio.

At one of Secretary Hoover's national radio conferences some years ago a committee on amateur matters succeeded in opening the lower 100 kilocycles of the 80-meter band to amateur phone. That regulation was never looked upon with favor by a majority of our Board, who regarded it as a mistake because of the very serious interference to telegraph operation which amateur phone on 85 meters immediately introduced into that band. Now it is most important that that not happen in the 80-meter band, which is by long odds our most important telegraphing band. The organized national communications service of the League, our message traffic, our emergency and distress communications, take place almost altogether in that band. It is the very heart of the League organization, the nucleus of those activities which have held this League together and which have made it the valuable national asset which brings to us the endorsement and support of our Government, without which we would very soon suffer. On the other hand, the main operating territory of amateur phones has always been in the region above 150 meters, although in the past they have been confined there to a band of but about 100 kilocycles width. The 150- to 200-meter band is used very little for telegraphy to-day. Those frequencies are ideal for telephony, chiefly because selective fading is so much less there than in the 80-meter band and also because of the greater ease with which stability of the oscillator may be attained. Nor is there any particular difference in the performance of the two wave-bands—both are essentially "national" in character, one is about as good as the other, and neither shows any particular "skip effect". What could be more logical, then, than that our Board should feel that all short-range or domestic amateur telephony should go together in one large band in a region where the accidental trend of amateur development has caused the virtual abandonment of amateur telegraphy? The important telegraphy of the 80-meter band would be freed of the really serious interference from amateur phone; amateur phone could be given the much greater (more than twice as great) expanse of territory which it needs and has been requesting, in wavelengths of substantially identical performance, and in a region where, although not guaranteed as exclusive for phone, the possibility of interference from amateur telegraphy—which is a bad handicap in phone operation—would be infinitely less.

So our Board thought. And our A.R.R.L. Board, as we have repeatedly said in *QST*, is the "big boss" in A.R.R.L. affairs. It is our governing body, it creates our policies, and at its annual meetings it tells our officers what to do during the coming year. Even if our Executive Committee and Headquarters Staff had been of a contrary mind when the matter of our recommendations arose, they could have no option, for the Board had spoken. But it was unanimously believed that such a change in amateur regulations was greatly to be desired and in the best interests of amateur radio—as much in the interests of the phone man as of the code man. *QST* sees no reason for altering that view now; it seems to us perfectly apparent that it is in the best interests of each group to have the arrangement as it now stands. Probably it is only natural that any amateur at first blush should feel hurt at the loss of any privilege and at the necessity for making any changes in his apparatus. It is of course intensely regretted that the amateurs operating phone on 85 meters are put under the temporary inconvenience of shifting wave. Any such readjustment is always distressing, because communication is interrupted until antenna and coils can be changed and a set retuned. We sincerely believe, though, that mature consideration will convince everyone that the new regulations are all to the good.

If there be phone amateurs who after this mature consideration are unable to think of the new regulations as wise and who persist in the view that they have been treated unjustly, Headquarters would suggest that they write to their individual Division Directors about it, as the Directors will have their annual meeting in February and it is the Board which governs.

In passing, let it be stated that the opening of certain higher frequencies to amateur phone was in no sense as a substitute for the 85-meter privilege, but as additional wavelengths for long distance and international operation. American amateur telephony has never had an international wavelength before. The opening of a portion of our 20-meter band to amateur telephony now gives our phone experimenters the same opportunity for long-distance work that the amateurs of so many other nations enjoy and will lead, we hope and believe, to some very interesting developments in this field.

K. B. W.

A Low-Power Master-Oscillator Transmitter

By Beverly Dudley*

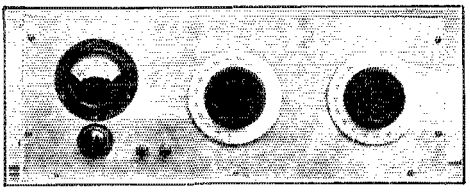
THE necessity for maintaining the amateur's transmitter on a constant and definitely known frequency is becoming increasingly more stringent as frequencies of 1,500 Kc. and more are being investigated and used by commercial and experimental interests. If a transmitter is built to operate at a constant frequency within one or more of the frequency channels assigned to amateur use, the operator will cause much less interference than if his transmitter emitted a wave, the frequency of which was subject to variation upon the least provocation. Not only will the interference be less, but because of the constancy of the emitted wave, signals will be readable at points where they could not be copied if an unsteady wave were emitted.

ADVANTAGES OF M. O., P. A. CIRCUITS

Transmitters of the master-oscillator, power-amplifier type sometimes known as separately excited transmitters, can be made to hold their emitted frequency to within narrow limits during the time of transmission *provided the circuit is properly designed.* This is the most important characteristic of master oscillator transmitters although separately excited transmitters have other advantages, which may be summed up as follows:

1. The signal emitted from a master oscillator transmitter is constant in frequency or very nearly so.

2. Since the amplifier operates at the fundamental or at some desired harmonic frequency of the oscillator, the effects of undesirable harmonics being radiated is greatly reduced, that is to say the selectivity of the amplifier cuts down the undesired frequencies.



FRONT VIEW OF THE SET

At the left are the filament rheostat and antenna ammeter, next the key binding posts. The central dial tunes the amplifier and the right hand one tunes the oscillator.

3. As the amplifier tube may be made to oscillate at all times when being keyed, the danger of overheating because of the failure of the oscillating circuit, is avoided.

4. Modulation of radiophone or i.c.w. transmission (if desired) may be carried out at relatively low powers, thus reducing the cost and complexity of the modulating apparatus.

5. Changes in the radiating system may vary the power output, but if the design is correct will not greatly affect the frequency of the signal.

6. The following adjustments are almost entirely independent of each other:

A. Frequency of the oscillator circuit.
B. Frequency of the amplifier circuit.
C. Frequency of the antenna circuit.
D. Antenna coupling.
E. Adjustment of the oscillator circuit for the delivery of maximum power to the amplifier.

THE OSCILLATOR

It is generally conceded that a crystal controlled transmitter fills the requirements of amateur transmitters best of all. A crystal controlled transmitter, if properly designed, is the most constant type of oscillator available for amateur transmission. However, such a transmitter has the disadvantage of not being able to change the frequency of the emitted signal, so that if interference is encountered, it is impossible to change to a different frequency freer from interference. Of course several crystals having slightly different frequencies of oscillation might be employed, but even this is not as flexible as an oscillator which is not controlled by a crystal. Furthermore, the cost of even one quartz plate is frequently a big factor in low power amateur transmitters let alone the price of several different plates.

It is of course true that the principal reason for employing quartz crystals is to maintain the oscillator at a very constant frequency. With the proper design the frequency of master oscillator circuits not crystal controlled may very closely approach the constancy of frequency of the crystal controlled transmitter. There is nothing particularly difficult in constructing a good master oscillator transmitter that will maintain its frequency constant to within very narrow limits.

THE OSCILLATOR CIRCUIT

The first thing to consider in building a master oscillator transmitter is the oscillator circuit. The design of the oscillator circuit is important since even a separately excited transmitter may emit signals which are not constant in frequency if the circuit

*Radio Editor, Chicago Evening Post, also owner Station 9BR.

design is not properly carried out. Constancy of frequency and stability on all commonly used amateur frequency bands, as well as ease of adjustment and operation are probably the major requirements for the oscillator circuit.

While any oscillator circuit that operates satisfactorily in the amateur frequency

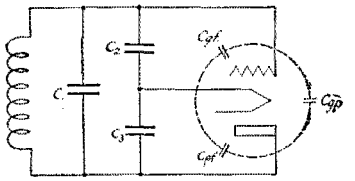


FIG. 1. THE ADVANTAGES OF A COLPITTS CIRCUIT EXPLAINED

Each tube capacity is shunted by a condenser which must be large for best results. In the set here described C2 and C3 each have a fixed capacity of 400 μμfd and C1 has a maximum capacity of 250 μμfd. Thus the capacity across the coil may be as large as 650 μμfd. It is never made less than 420 μμfd. This should be compared with ordinary amateur practice.

bands might be used to excite the amplifier tube, the Colpitts oscillator was chosen in building the low power master oscillator transmitter at 9BR, since it seemed to possess the desirable features in the best proportion. The Colpitts oscillator may be used in operating in any of the amateur frequency bands, and once adjusted is thoroughly stable, the circuit is very easily adjusted and tuned, changes from one frequency band to another may be made with interchangeable coils that do not require taps, and finally, the Colpitts circuit has rather large capacities in shunt with the tube inter-electrode capacities which greatly helps in maintaining constancy of frequency.

One of the most disagreeable annoyances in copying high frequency continuous wave signals is the change in frequency—resulting in a "drifting" beat note—of the signal, that occurs as the tube is gradually heated during operation. Ordinarily this frequency change, or creeping is only noticed when a tube is first heated and put into operation, but if the tube is overloaded, or the circuit poorly designed, rapid creeping or "chirping" may be noticed every time the key is closed. The decrease in frequency as the tube warms up is due to the slight thermal expansion of the tube elements which causes a change in the inter-electrode capacities of the oscillator tube.

Two methods of reducing this creeping may be employed at present, although if the power tubes of the shielded plate type make their appearance, much of our present trouble may be eliminated. The simplest and safest method is to heat the tube by lighting its filament a few minutes before it is to be used, and by *using the tube at its rated power output* and not at several hundred per cent. overload. While this system will not always work out to entire satisfaction, it will go a long way in helping to keep the frequency from changing as the circuit is keyed. Another method of reducing creeping is to employ a low ratio of L to C in the circuit, and to use a circuit such that the inter-electrode capacities of the tube are only a small portion of the total capacity of the circuit. If, then, changes do occur in the tube's capacity due to thermal expansion of the elements, the per cent. of change of the total circuit capacity will be small, so that the frequency of oscillation will remain very nearly constant, and not shift the beat note out of the audio range.

The Colpitts circuit is particularly suited to the latter method of preventing changes in the emitted frequency as may be seen in considering Fig. 1 which shows the essentials of the Colpitts oscillator circuit. The inter-electrode capacities of the tube are represented by C_{gf}, C_{pf}, and C_{gp}. The condensers C_2 and C_3 are used to secure the proper feedback. C_1 is an adjustable or variable condenser used to accurately control the frequency of the emitted wave. It will be noted that C_1 is in parallel with C_{gp}, that C_2 is in parallel with C_{gf} and that C_3 is in parallel with C_{pf}.

Now the frequency of oscillation is dependent upon the values of L, $(C_1 + C_{gp})$, $C_2 + C_{gf})$, and $C_3 + C_{pf})$. It will therefore be seen that if a low L/C ratio is used in the circuit, and the capacities of C_1, C_2, and C_3 are several times as large as their cor-

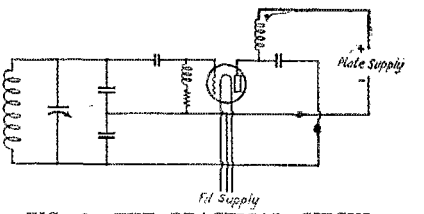


FIG. 2. THE PRACTICAL CIRCUIT

responding internal tube capacities, changes in the tube capacity will have a negligible effect on the frequency of oscillation. This is an important consideration, since, in the majority of high frequency transmitters, a slight change in the circuit capacity will change the frequency of the emitted signal by such an amount that the heterodyne at the receiving station may change several thousand cycles and may even go beyond the frequency of audibility.

An operative circuit making use of the advantage just mentioned is shown in Fig. 2. The frequency of oscillation is de-

termined by the values of L, C_1, C_2, and C_3 as before, and if the values of these capacities are *at least ten times the tube capacities*, the circuit will be found to be steady, and tuning throughout the entire frequency range of the transmitter is accomplished by varying C_1. To change the frequency of the emitted wave by large steps, L may be replaced by an inductance of larger or smaller value.

While the type of Colpitts oscillator of Fig. 2 might be coupled to the antenna for purposes of transmission, and would maintain its frequency more constant than some other circuits, the use of a power amplifier to couple the oscillator to the antenna will greatly improve the transmitter. The load of the antenna is thus removed from the oscillator to the amplifier, and changes in the antenna circuit, while varying the power output, will not affect the frequency of the signal, which is determined by the oscillator circuit.

MASTER OSCILLATOR TRANSMITTER

Fig. 3 shows the schematic wiring diagram of a master oscillator, power amplifier arrangement using a Colpitts circuit. The oscillator is the same as that shown in Fig. 2, except that it is capacitively coupled to the power amplifier. The amplifier is a standard shunt feed affair, inductively coupled to the antenna, and probably needs little or no detailed description.

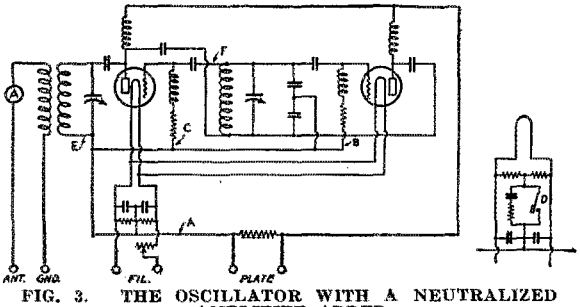


FIG. 3. THE OSCILLATOR WITH A NEUTRALIZED AMPLIFIER ADDED

The resistor across the plate supply discharges the filter and prevents accidents. The small diagram shows a method of center-tap keying with minimum key thump.

The circuit of Fig. 3 was used in experimental work in building up the final model of the transmitter, which was intended to be—excepting antenna and power supply—self contained so that it might be used at practically any sort of installation, requiring very little time to put the circuit into operation.

Various keying positions were tried, as shown by the letters. Key clicks were found to be objectionable when the key was in position A, B, or C. A slightly different form of center tap keying, shown at D was also tried, and while the results obtained were better than those obtained at A, B, or C, it still gave trouble. In order to keep the oscillator operating at nearly uniform temperature, to keep the capacity changes due to expansion to a minimum, it was desired to keep the oscillator running continuously, keying in the amplifier circuit somewhere. A key was tried at F, but the capacity of the key and its associated wiring was so great that the distributed capacity passed nearly all the r.f. energy and keying could not be accomplished in this manner. Finally the key was inserted at E, breaking the r.f. circuit of the plate circuit of the amplifier. Keying in this position permitted quick and steady keying without producing objectionable key clicks. In fact the clicks were so faint that they could barely be heard on a three circuit regenerative circuit using three audio stages, the receiver and the transmitter being only three feet apart. While the plate voltage, is, at all times, applied to the plate of the tube, and some plate current is thus always being drawn, no difficulty was experienced in overheating the amplifier tube. Other arrangements might have to be made, however, if tubes larger than the UX-210 tubes are used.

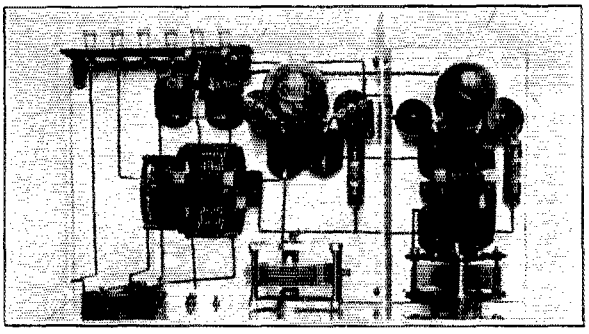


FIG. 4. THE SET TILTED FORWARD

The small compartment at the right contains the oscillator with its fixt and variable tuning condensers, inductance, grid leak and two chokes and two fixed condensers, one pair each for plate and grid. The large compartment contains the amplifier and all parts can be seen so plainly that no explanation is needed.

When the circuit of Fig. 3 was built and operated satisfactorily, the transmitter was rebuilt into its final form. The circuit used in the final model is shown in Fig. 4, while the photographs show the general construction. The transmitter was built with the idea that it should be as simple to operate as possible, and all unnecessary items, such as filament voltmeters, and plate current meters, etc. were eliminated. It was intended that the transmitter be so designed that it would operate with any kind of antenna system so that simplification was further carried out by leaving out loading coils or series condensers in the antenna circuit, these items being supplied, as found necessary, in the particular installation in which the transmitter is located.

While the circuit and photographs explain details quite well, a few words of description may not be amiss. As may be seen from the photographs the rheostat is placed below the antenna current meter, the binding posts are for the key, and the condenser, from left to right are the amplifier tuning condenser and the oscillator tuning condenser. It will be noticed that the transmitter is housed in an aluminum case, which besides offering a strong and light container was found to offer sufficient shielding to make neutralization of the amplifier not only unnecessary but undesirable. Fig. 4 shows the transmitter, tilted forward the case being removed. The arrangement of parts shown makes it possible to do a very nice job of wiring, in this case the oscillator was wired with thirteen inches of wire, the amplifier requiring approximately five or six feet more.

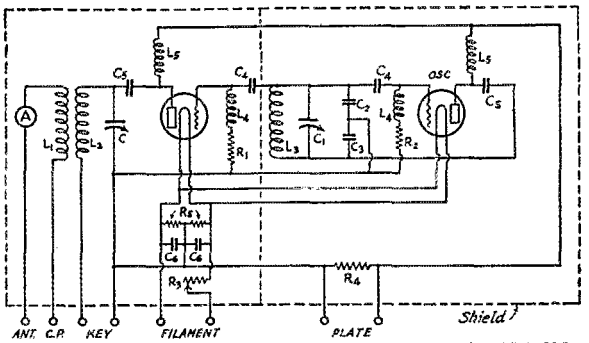


FIG. 5. THE FINAL CIRCUIT WITH SHIELDING BUT NO NEUTRALIZING AND WITH THE KEY IN THE TUNED PLATE CIRCUIT OF THE AMPLIFIER

A—Antenna ammeter
L1—Antenna inductance—Aero
L2—Amplifier plate coil—Aero
L3—Oscillator coil—Aero
L4—Grid R.F. chokes—Aero
L5—Plate R.F. chokes—Aero
C1—Oscillator tuning condenser—G. R. type 247, max 250 μμfd.
C2—Grid oscillation condenser—Sangamo, 400 μμfd.
C3—Plate oscillation condenser—Sangamo, 400 μμfd.
C4—Coupling condenser—Sangamo, 100 μμfd.
C5—Plate blocking condenser—Sangamo, 2000 μμfd.
C6—R.F. filament bypass condenser—Sangamo, 250 μμfd.
C7—Amplifier plate circuit tuning condenser—B. T. max. 500 μμfd.
R1—Grid leak—Tobe—7,500 ohms
R2—Grid leak—Tobe—10,000 ohms
R3—Filament rheostat—Howard 1½ ohm, 2½ ampere
R4—Discharge resistor—Elmenco—250,000 ohms
R5—Center tap resistor—Carter—100 ohms each side

Aero interchangeable coils are used, and the circuit is so arranged that only one frequency band is covered (with each type of Aero coil) in the oscillator circuit. The values of C_1, C_2 and C_3 of Fig. 5 are so chosen that the amateur bands are covered between about 10 and 90 on the oscillator dial. This makes accurate tuning easy to accomplish.

The oscillator circuit contains a similar Aero coil and a 500-μμfd. condenser so that the amplifier circuit may be tuned to the same frequency as that of the oscillator, or to one of its harmonics.

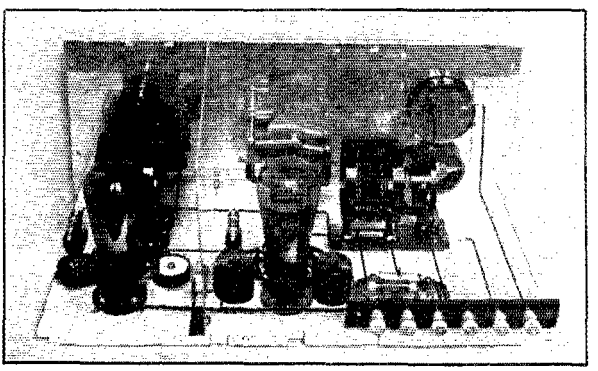


FIG. 6. A REAR VIEW OF THE SET

From left to right the binding posts are—positive and negative plate supply (shunted by the 250,000 ohm discharge resistor right above the strip), two filament posts (shunted by the center-tapped resistor and pair of condensers), ground (or C. P.) and antenna.

Fig. 6 shows the rear view of the transmitter, which helps to see the location of

parts better. The rack of binding posts makes all connections—except to those of the key—for the transmitter. Fig. 6, the posts are, from left to right, positive and negative plate posts, two filament posts, ground and antenna. The circuit is intended for a.c. on the filaments, but d.c. may be used. The grid leaks used are the 5-watt Tobe fixed resistor. A resistance of 10,000 ohms for the oscillator and 7,500 ohms for the amplifier proved the best experimental values. All fixed condensers are the mica moulded Sangamo condensers which were found to stand up very nicely with plate voltages up to 750. Sangamo condensers designed for transmitting circuits are now available, however. During the period of experimental work, it was found, through a number of "first hand" experiences, that the rather large filter at 9BR took quite a long time to discharge. Consequently a discharging resistor, R_4 of 250,000 ohms was used in the experimental model and worked so well that it was used in the final model. The discharge resistor may be seen above the plate binding posts in Fig. 4 and Fig. 6.

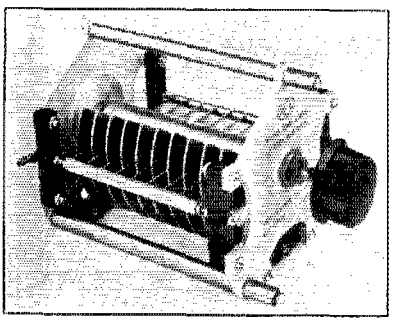
As has already been mentioned, and as can be seen from the schematic wiring diagram, no neutralizing system was required in building the aluminum housed transmitter. A neutralizing system was originally used, as shown in Fig. 3, but was later discarded because it was found to decrease the output, and furthermore, the circuit as shown in Fig. 5, was found to be perfectly stable even when both the amplifier and the oscillator were operating on the same frequency.

Variable Transmitting Condensers

THE accompanying illustration shows a transmitting condenser that has been recently placed upon the market.

The frame consists of two heavy aluminum castings which are the end pieces and carry the bearings. These are held together by means of three heavy brass rods making the frame both strong and rigid.

The plates are made of brass and are approximately 1/16" thick. Both the rotor and stator assemblies employ accurately turned spacers to separate the plates. The shaft carrying the rotor plates is of very generous proportions and is made of steel. Cone shaped bearings are provided and the shaft diameter at the bearing is ⅜ inch. Because of the cone bearings, it is possible to take up any slack that may appear due to wear. This should not occur very readily though, because the bearings have been subjected to a rotation test to insure that they have been properly fitted before the condenser left the factory. At the end of the unit which is screwed to the panel, the shaft has been turned down to ¼ inch to take care of any standard knob or dial. The other end of the shaft extends through the



bearing to allow coupling to another condenser for tandem operation or for any other similar arrangement. This end of the shaft has been turned down to ⅜ inch.

The stator plate assembly is insulated from the rigid endplates which carry the rotor, by blocks of hard rubber. These blocks are highly polished which helps materially to reduce loss due to creepage between the stator plates and the rotor assembly. The actual contact between the stator plates and the insulating blocks is so small as to be almost negligible. The temperature coefficient is low enough to be of no importance.

They are made in three voltage ratings. The 3,000 volt size has spacing of ¼ inch between adjacent plates of the same potential. The spacing for the 5,000-volt size is ½ inch and for the 10,000-volt units, it is 1 inch. The maximum capacities range between 25 μμfds. and 650 μμfds. depending upon the voltage rating and number of plates.

Three metal stand-off bushings are supplied for back-of-panel mountings. Insulating bushings may be obtained for mounting to metal panels. In all but the largest sizes, these bushings will carry the weight of the unit. In the largest, though, it will be advisable to employ additional support at the end farthest from the panel.

These units were designed to be used in oscillating circuits carrying from 100 to 2,000 watts and also will be found to be suitable for laboratory work and in other places where condensers of low power factor, small dielectric losses and high potential breakdown are essential.

It is a product of the Radio Engineering Labs of Long Island City, N. Y.

—*H. P. W.*

MacMillan and Party in Labrador

By Clark C. Rodimon*

THE *Bowdoin* has been known to amateurs as WNP since Don Mix went north on board as the first radio operator in 1923. In June of 1927 the Rawson-MacMillan Field Museum Expedition sailed from Wiscasset, Maine, for a trip on the Labrador to last some eighteen months. Cliff Himoe, at the time 1IK ex-9AOG, was chosen as radio operator on the present trip.

At this time the *Bowdoin* is frozen in Anatalok Bay, Labrador. The party of twelve is spending the winter in this bay which is also known as Bowdoin Harbor. The various bits of news that are to be related are some of those that have been gleaned by the writer on his daily 20-meter WNP schedule.

This year, WNP first came into realization when a d.c. signal was heard signing WNP on thirty-six meters.

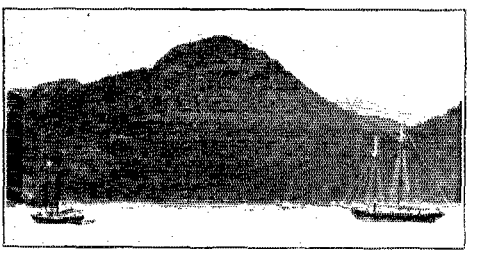
Shortly after leaving the U.S., WNP went down to the 20-meter band and found QSO there much better than on the 40-meter band. Immediately, contact was had daily with Europe and the United States. Since that time, every continent save the Far East has been worked.

The *Bowdoin* was trailed to Nain, Laborador, by a supply ship, the *Radio* otherwise known as WOBD. Nain is a settlement a few miles from the winter quarters of the Expedition. On board the *Radio* was the "makings" of a building that was to house the members of the Expedition during the bleak winter months when the *Bowdoin* would cease swinging at her anchors and be held fast in the bay by ice.

In September, the *Bowdoin* made a dash to Frobisher Bay, Baffinland. Commander MacMillan was not with the party, as he had gone south to St. Johns, Newfoundland, on a business trip. The captain of the *Radio* piloted the *Bowdoin* while his charge lay at anchor at Nain. The scientific staff of the Expedition carried on research work in Frobisher Bay during the three weeks stay of the ship there. WNP at this location put through some real hefty signals, in fact the audibility of these signals reached a peak that has not been equalled before or since. Rarely was there a signal in the 20-meter amateur band that would come in with as much volume as WNP during her stay in Baffinland. Evidently this extra thousand miles distance added more than enchantment!

When the *Bowdoin* dropped anchor once again at Nain, the *Radio* and crew made ready for departure and left within a few days. MacMillan came back from his trip to St. Johns a little later amid a great welcome. That evening WNP signed off with the hasty explanation that Mac had just returned.

From the time that the *Radio* turned south, WNP was the only signal from Labrador. After the first few days of forty-meter work WNP had dropped to the twenty-meter band and remained there with occasional hops to the higher band as the forty-meter signals were not breaking through consistently. However, communication had been conducted regularly, between WOBD and WNP on thirty-six meters at noon.



THE BOWDOIN AND RADIO ANCHORED IN ANATALOK BAY

Ashore in the center of this photograph is where the scientific station and house is located. The Bowdoin is the smaller ship on the left.

The Dempsey-Tunney bout in Chicago was of as much interest to members of the Expedition as to folks back in the States. After the result of the fight there was one person in Labrador, at least, who took the sporting chance of picking the winner of this melée and consequently two people in the United States are satisfied this Labradorian did!

Moving into new houses in Labrador is no different in some respects from moving right here at home. A rush message came through one evening with a request for telephone delivery to the addressee living in Massachusetts. This person having been a member of the Expedition until the *Radio* came home was supposedly responsible for the misplacing of the dishes for equipping the kitchen and dining room of the new home. The next morning a reply message went north on regular schedule to the effect that a man on the *Bowdoin* and still with the Expedition had stored the dishes. He was reminded of their hiding place. That

*1SZ-1BIZ, A.R.R.L. Headquarters.

evening eleven men smoked at the chagrin of the twelfth!

On Thanksgiving Day, the MacMillan party moved into the "house". This is also the scientific station, depending on who is telling about this structure. A week previous to this opening, a house-warming was held to celebrate the event. One thinks of things in Labrador that might well be forgotten in the U. S.

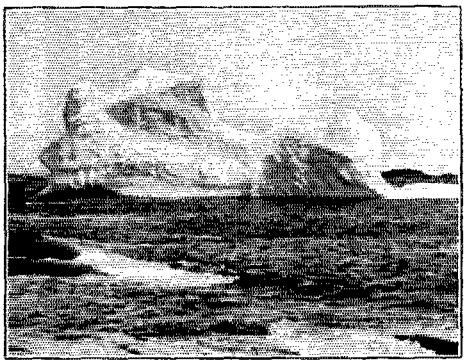
About the middle of November there were anxious messages going to and from the Expedition. The last boat taking supplies and mail (no other boat expected before July) was two weeks late, and it was feared

THE VOICE BEHIND WNP

Cliff had just gone through a tonsorial treatment before going 18 months without another! This photograph was taken by a friend on board the Radio.

that the boat could not break through. Commander MacMillan remained in Nain for two weeks awaiting the arrival of the boat. Then he returned to Anatalok Bay with the depressing news that no mail had come. Supplies were missing, too. A message went up to the Expedition telling them that the *Kyle*, the long-awaited mail boat, had left her supplies at Nain and was already back in St. Johns. Himoe and the writer both agreed that it was a real practical joke on MacMillan. He had been waiting two weeks in Nain for supplies that were there all the time! Our bit of humor was discarded the next day when a telegram from St. Johns said that the trip of the *Kyle* that had been referred to was one that had been previously made. In consequence of this mishap a careful check was made on the fuel that drives the generator that puts the mighty WNP on the air. It was ascertained that there was enough to last until late summer providing the minimum amount of operation was done with no superfluous sending.

This meant a change in the tactics of WNP. Rag-chewing was at an end; operation assumed a strictly business basis from this time on. I secretly believe that Himoe slipped up the weights on his "bug" quite a bit; in this way to save operation, time



A BIT OF SCENERY GLIDING PAST BATTLE HARBOR, LABRADOR, IN MID-SUMMER

and the priceless fuel. His steady fist is readable and a delight to copy at any reasonable speed, so nothing was said and I proceeded to write a little faster!

The supplies were not missed nearly as much as the mail. Outgoing mail that was to have gone on the *Kyle* stayed in Nain and did not go out. This will have to wait until a dog sledge goes north in January. And some of the letters in the mail sack were written in September! Decidedly, amateur radio is speedier than mails. If there hadn't been amateur radio, the Commander might have spent his winter in Nain, each day thinking there would be some news of the *Kyle*. Receiving letters in Labrador is the greatest event known, premier only to receiving radio messages.

Traffic is handled on schedules with WNP by numerous stations on both the twenty- and forty-meter bands. The twenty- meter band has proved to be the more reliable, and WNP can be heard on this band when he is sending, for thirteen hours each day!

After local conditions have kept WNP off the air for a few days the call comes forth on twenty meters as the old guard on twenty recognizes WNP's signal the instant it is run across. Then comes the explanation for the absence of WNP for those days.

Recently, Himoe and another member of the party had an experience that any of us would remember for quite some time. As the *Bowdoin* is anchored a quarter of a mile out in the bay from the camp site, the operator had to row out to the boat before ice formed. The gales and driving snow storms had kept the bay open much later than usual, so that the rowing

changed to a process of breaking thin ice all the way out to the *Bowdoin*. This certain day the fellows were half way out to the boat when the little craft capsized, throwing both boys into the icy bay. The ice would by no means hold their weight. With considerable difficulty they managed to struggle to a tiny island that luckily was near at hand. There they remained nearly all day before their plight was discovered by MacMillan. Needless to say, WNP was not heard that day.

By this time the *Bowdoin* is frozen solidly in the ice, and Himoe insists that he is operating a land station. These frosty mornings Cliff goes out to the *Bowdoin* in regular Roman fashion, chariot and all; he makes use of a dog team. Not many fellows go out to their radio shacks via dog team!

Calisthenics are not forgotten, we are reminded, when Himoe tells of climbing up the anchor chain to board WNP. The morning he related that novelty he did not forget to boast of the fact that it was colder in his sanctum than in mine. He said the thermometer indicated fifteen below zero but he would give it more than that! The reason for coming up the anchor chain may have been for the purpose of getting some extra exercise before sitting down to a cold pair of headphones and a fifteen-below-zero schedule. From now on it is the mitten sending, but we must be informed of this fact as the character of the sending has not been impaired in the least. We also marvel at Himoe's still being able to write down messages in series of ten, being handicapped by a bulky pair of mittens.

One morning when below-zero weather prevailed in Labrador, the writer was asked to stand by for an hour while a fire was brewed as there was a snag of traffic at each end. At the end of the hour WNP told us that he had built the fire and that he was feeling great as the mercury had come up over the zero mark and was slowly creeping upward, as were his spirits. After traffic had been handled we were asked to stand by for another half hour while a report was compiled for *QST*. At the end of this intermission, Himoe said that he had not finished with the report as he had been playing with his old friend the fire. (We hope he did not burn his fingers.) Evidently that slow creep of the mercury had halted, wavered and then slipped down into the depths again.

WNP makes use of a 204-A with about 300 watts input from a generator. The note is nearly always pure d.c. save when a chopper of about 200-cycle frequency is used for traffic when WNP is breaking through with a real loud signal.

A New Chief Signal Officer

WHEN we speak of the United States Army valuing and appreciating the radio amateur we are talking primarily of the Army Signal Corps. This is the branch of the Army which handles its communications and in which radio and radio operators find their chief place. It is the branch with which we have had that definite bond of affiliation which has resulted in the Army-Amateur Net. This is the branch which calls upon us when the "Army" needs coöperation from amateurs and is generally the branch which speaks for us when the "Army" has something to say about amateurs. For these reasons if for no other we are interested in the Chief Signal Officer of the Army.

During January Major Charles McK. Saltzman the Chief Signal Officer reached the age of retirement. The relations between amateur and Army have reached their present high point during the incumbency of General Saltzman. Our present affiliations with the Signal Corps were contracted during his office. That this relation was most fruitful for us was gorgeously proved at the recent International Radiotelegraph Conference where General Saltzman served as chairman of the technical committee of the American delegation and was largely responsible for the very splendid support which the American delegation gave the cause of amateur radio, as reported in our January issue. We have reason enough to be very grateful to him and our heartiest good wishes go with him as he leaves the Service.

The new Chief Signal Officer is Major General George S. Gibbs, who has been the Signal Officer of the Second Corps Area with headquarters in New York City. As Corps Area Signal Officer Colonel Gibbs (as he then was) of course had occasion to know much about radio amateurs and by his frequent attendance at Director Dunn's meetings of the Hudson Division he has been thoroughly "exposed" to us and believes in us. It is good to have as the new Chief Signal Officer one who knows and understands us as well as General Gibbs does.

—*K. B. W.*

CRACKLE FINISH

Dog-Day Doldrums

By Ross A. Hull*

Our household pup spent a wretched day yesterday. Not that that is anything really unusual, for though Sput is a very human little wretch, he has a miserably morbid disposition and sulks quickly into a state of sluggish boredom if someone, human or canine, does not provide diversion for him. Sput's mental condition yesterday, however, seems to have been slightly varied, for Spit who lives two doors north, and Spat from three houses south, provided ample diversion by trespassing across the lawn. Sput, though never sufficiently ambitious to go afield seeking amusement accepted this localized challenge and a glamorous and gory scrap ensued. Sput, our dog, claimed the victory but in the process of recon-

ditioning himself sank into profound melancholia. Very clearly, he had decided for the moment that there was nothing more to live for now that he had conquered Spit and Spat—who seem to have comprised the only two worlds in Sput's narrow mind. Of course a rat will walk out of its hole soon and provide another one but Sput didn't think so.

ALL of which, possibly, is beside the point and at least foolish. In any case I am in possession of neither dog nor household and the story is lacking in foundation. The point is, however, that some dogs and most humans drift into a temporary state of quiescence, boredom and stagnation just as soon as they lack an objective, or from the moment when they inwardly believe that they have mastered the problems confronting them. Particularly is this so in the case of the radio amateur. The per capita enthusiasm of the radio amateurs, and the corresponding advance, I believe, has always been greatest at periods when the difficulties and problems appeared most profound. When a month of juggling with spark coils and electrolytic detectors failed to give contact with AZ three blocks away; when 50 miles could be covered only if one had the enthusiasm to build and rebuild, tune and retune for weeks at a time; when the hearing and working of a station a thousand miles away set the zenith of accomplishment and the objective of all Hams; when the Atlantic could be spanned if one's station was tuned to the last fraction of a "hot wire ampere"; when the Pacific could be conquered if only the plate wouldn't melt at 600 mills or if the tube could be persuaded, after a few weeks jiggling, to oscillate on 100 meters "them was the days" when amateur enthusiasm rose to enormous peaks.

"But now," bemoans misguided OM Ham, "there is nothing more to do. If the amateur had been blotted out of existence at the Conference there might have been some thrill in operating a bootleg station and getting away with it, but now there is no justification even for that. We have shown commercial radio how long range radio is to be done, we have proven our value to the Army, Navy and the Press, and the whole world's radio interests admit that we are a useful band of enthusiasts helping to develop the science. The young fellows can get their kick out of building a station and working the world in the first week but—ho hum—that's all there is, there isn't any more." Which all boils down to the fact that we amateurs are humans—that our tendency is continually toward quiescence and boredom and that as humans we must resist this drift toward monotony by constant search and grasping for new worlds to conquer.

If we could only realize it we are fortunately situated in this regard for the amateur game is still as rich in new worlds to conquer as any other field of human endeavor we know about. OM Ham is very human in thinking that the game is threadbare—he thought the same between the peaks ten years ago—but he is now, as then, "all wet". And to prove it let's talk about this 20-meter phone.

* Experimenters Section and Technical Information Service A.R.R.L.

If ever circumstances conspired to provide amateurs with an objective crammed with interest and as wide as the world in scope it was, surely, when the upper end of the 20-meter band was opened for telephony. To my way of thinking this privilege, new in this country, will do more to restore the enthusiasm of mature hams than any other one factor and will most certainly result in loud whoops of joy on the part of the many foreign amateurs who have had as their chief interest that rare but unequalled sport—DX phone. As one of this tribe I recall the time, three years ago, in Australia, when nothing would have gladdened my heart so much as the opening of the 40- or 20-meter bands to the U. S. amateurs for phone. At that time, as now, slices of readable phone could be sent to or

received from the English amateurs to the accompaniment of the grandest "kick" that amateur radio can provide. But then, as now, the English signals rarely if ever equalled the strength of those from the U. S. and while we would hear Englishmen at R5 and get phone from them we would, within the same twenty four hours, hear scores of U. S. signals at R6 and R7 any one of which would have provided the most excellent phone if only such working had been lawful. "Just why don't the U. S. hams wake up to DX phone and press their Government for permission to use it?" I used to think. "Surely they can't think that an amateur to be an amateur must work exclusively with a key—surely they don't think that short wave phone is any less a part of short wave development than key punching!"

To my surprise, on arriving in this country, I found just this state of mind to exist. The amateur with an interest in phone was found to be in extreme minority, and almost all of these fellows had their minds sidetracked along broadcasting lines. The nearer their outfits resembled broadcasting stations in spirit and appearance the better they were pleased. The message handling and "CQ DX" amateurs seemed unanimous on their opinion that phone was foreign to amateur radio, while the phone men seemed to feel that by interesting themselves in phone they had deserted the ranks of the true amateur. Both of these viewpoints being, to me, puzzling if not ridiculous.

Phone, to my way of thinking, is just as much a part of short wave development as any other of its phases and should for even this reason be just as integral a part of true amateur radio as telegraph. I must admit, of course, that I wonder at times how amateurs can spend the evening yelling, "How is my modulation now?" at another fellow fifty or a hundred miles away, but I do insist that international and general DX phone operated for just those contacts and friendly "rag-chews" that the 40- and 20-meter code work has provided is a field of true amateur work of magnificent interest and limitless scope.

Of course, the difficulties at the beginning will appear great, for even 40- and 20-meter DX code work is very much a will-o'-the-wisp. There is not the slightest doubt, though, that satisfactory two-way phone working under good conditions, will be possible between any two points on the earth just as soon as amateurs become conversant with the new standards involved and build transmitters and receivers suited for the work. Such contacts over distances of more than a few thousand miles may be few and far between but, from experience, I can say that each of them will provide "that grand and glorious feeling of accomplishment" in large salubrious gobs.

North Carolina-Roanoke Division Convention

March 2nd-3rd, 1928, Charlotte, N. C.

GANG, here it is again, the 2nd annual Roanoke Division Convention (North Carolina Section). Keep in mind the above dates. The Charlotte Amateur Radio Assn. is again sponsoring the affair and those who attended last year know what a good job they did. The committee in charge is planning more this year and cordially extends an invitation to all amateurs in neighboring states. Director Gravely will be with us and he promises to do all in his power to bring Secretary K. B. Warner, from A.R.R.L. Headquarters, for our guest of honor.

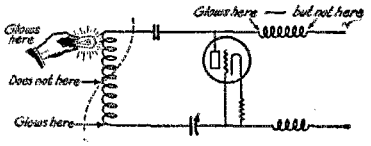
All meetings will take place at the Chamber of Commerce, and T. R. Banks, Sec'y of the Club, 2233 Avondale Ave., Charlotte, N. C. will be glad to hear from those who contemplate being present.

Cheap "Neon" Lamps and How to Use Them

By F. S. Huddy*

IN the course of visiting a large number of stations in this country and Europe, the author was surprised at the general lack of knowledge of that useful little article, the neon lamp. It has a multitude of uses in the amateur station, and I believe that many more would be used if they were more generally known and were cheaper. You are going to say right away, "This is all old stuff,"—and so it is, in a way. But I *know* that an amazingly large part of the gang never used a neon tube or anything like it, particularly sensitive ones such as I refer to. I have found some men testing chokes with lead pencils —they make a lovely yellow flame!—and when there isn't enough juice to make a quarter inch arc, the choke is labelled "O.K." It happens in my set that anything that isn't just so burns up immediately and thus indicates its unworthiness, but the chap with the 5 watt peewee doesn't have that luck, and he doesn't always have enough power to light a spark tester, of which more later. Ergo, I think that a few pointers on how and where to get some cheap, sensitive indicators are not amiss.

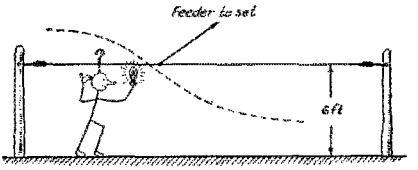
The first lamps that were used were the "Spark-C pencils" that are used in testing automobile spark plugs. They consist of a glass tube containing neon gas under low pressure, and one metallic electrode. They are not at all sensitive and require a high voltage to get them going. This means that they go out whenever the voltage drops



FINDING VOLTAGE NODES ON INDUCTANCES AND CHOKES
FIG. 1

to a few hundred, and indicate to the unwary that a certain choke is functioning perfectly when really it is leaking juice all over the lot and may have its lower end at a potential of several hundred volts above that at which the tube says it is. Hence, the need of a more sensitive indicator was felt as soon as the defects of the old tubes became apparent.

While the author was in Europe, he found some neon lamps there in very common use. They are made like the 75-watt gas-filled Mazdas in shape and size. They only draw 2 or 3 watts and will not move an ordinary watt-hour meter, and that explains, perhaps, their absence in this country. The remarkable thing was that they light up on *110* volts instead of requiring a thousand or so. Two of them were brought home, and upon trial soon proved that they were worth their weight in gold in detecting small radio frequency voltages in unsuspected places. They were tried in a wavemeter, and it was found that the coupling could be reduced far below the



TO FIND VOLTAGE DISTRIBUTIONS ON DIFFERENT ANTENNA PUT UP LOW TEST ANTENNAE
FIG 2

loosest possible coupling for the old style Spark-C tubes. In short, there was no doubt that they were worthwhile. But they are not sold here, and it is hard to get them, hence the author cast about for something better.

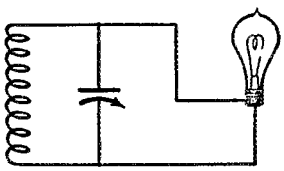
The first thing that was found was the small neon lamps put out by the Edison Lamp Works in New Jersey. These are made in two sizes, 1/20 watt and 1 watt. They sell for 75c and $1.00 respectively. They are neat and convenient. The small size has a candelabra base and the larger has a standard Edison base. They have, however, two disadvantages. First they cost too much. Second, they have a very high resistance in the base of each lamp which does not improve their work-in in radio frequency circuits. The resistance can be taken out by skilled surgeons, but it's a nuisance, so the search went on.

Not long ago, the author went into that amateur's paradise known as the 5- and 10-cent store. On the counter were some small carbon 110-volt bulbs. They were rated at 2 c.p. and were marked "Japan" on the base. "Hexx," thot ye scribe, "the Japanese don't know how to get all the air out of a bulb, and what is more I don't believe anyone can do it for ten cents and then give you the bulb and the other works into the bargain." So two of the lamps were bought and rushed home. The small 20-meter set was started up and the bulbs brought near the inductance. When fully 18 inches away, they both lit up with a

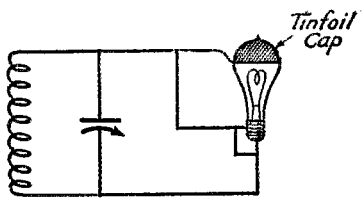
*1II-1ZS-7SW, A.I.E.E., Ex. Section, A.R.R.L., 204 Bowen St., Providence, R. I.

bright blue glow. "Eureka," I said, as did old Archimedes, but instead of running down the street sans attire as he did, I switched over on the big 20-meter set and tried again. Just how much power that big set uses had better remain a secret, but both bulbs lit up four feet from the grid end of the inductance. Did someone say "You are using W. E. tubes?" Yes, wise one, I am, two of them in parallel! And there is a 5 k.w. line going into the set, too, but that is beside the point.

A test was then made to see how much better or worse the new found lamps were than the regular neon bulbs. To the delight and amazement of the writer, they proved to be almost as sensitive as the best of the foreign tubes. But one cloud remained on the horizon. Suppose these bulbs were the exception rather than the



FIRST SCHEME AS USE IN W.M.



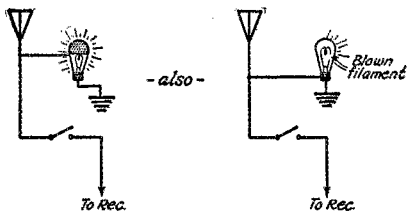
SECOND IDEA

FIG. 3

rule. There was only one way to decide, and it was done by the simple process of buying a dozen more bulbs. They all worked as well, and some worked better. So now you have it,—all the sensitive indicators you want for 10c each. I have found these same useful bulbs in four 10c stores, both Kresge and Woolworth, so I think the gang can get 'em.

Some amateurs know how to use these gas tubes and some don't. The first use that comes to mind is that of finding the voltage node on your transmitting inductance. If you don't use a filament tap, it may be anywhere along the inductance. To find out, hold the test bulb by its metal base and slide the glass part along the inductance as in Fig. 1. It will glow brightly at the ends of the coil, but will go out at some point along its length. This point is the voltage node quite exactly since the lamp remains lit even after the voltage has dropped below its ignition point. It might be said in passing that if the node occurs in the center of the inductance, your circuit is properly balanced.—(Assuming a "single coil" circuit.—*Tech. Ed.*)

The same manner of application may be used to find the voltage distribution on your



DETECTING ABSORPTION OF POWER OR WORKING OF SET

FIG. 4

antenna. How do you get up to do it? Dunt esk! That's why we drew Fig. 2 with a low antenna.

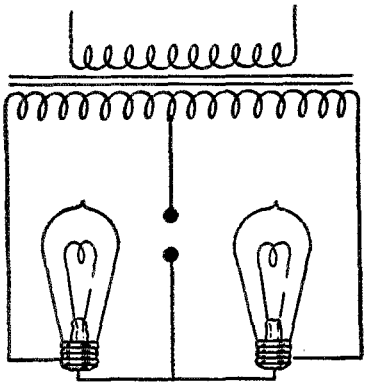
A third use is that as an indicator in a wavemeter. There are two methods of doing this. The first is quite satisfactory and also spectacular in its execution. Blow the filament (what ham needs to be told how!) and then connect as shown in the first diagram of Fig. 3. If you want to get an indicator with a minimum of capacity, do not bother to blow the filament, but connect the thing as shown in the 2nd diagram. The electrode on top is a piece of tinfoil. This is not so sensitive as the other connection, but has the advantage of having very low capacity.

In *all* the uses of the lamps it will be noted that the glow tends to lag. In other words, the glow persists after the exciting voltage has dropped below that necessary to initiate the glow. This is somewhat of a drawback, but can be obviated by paying attention to the point at which the glow starts. Also, resonance is located half way between the two points up and down on the scale at which the glow *ceases*.

Another use can be made of these by those who use syncs, high power, and separate antennae. In my station the tubes in the receiver are wrecked promptly if left turned on even though the receiver is ten feet from the transmitter and not connected during transmission to antenna or ground. It is also true that the sync refuses to start "sunny side up" about 99.8% of the time. The transmitter cannot be seen from the receiving tables easily and it used to be hard to tell when the sync was perking right. Now all is well. One of the ever useful bulbs was connected between the re-

ceiving antenna and the ground. When the transmitter perks, the bulb lights up nicely, connections being per diagram Fig. 4. It is interesting to watch the bulb during a thundershower. It lights up at each flash of lightning.

One other use was found that may interest the gang who cannot afford kenotrons for these 201A sets. While monkeying around the 2200 volt plate transformer, it was noted that one of the bulbs glowed



AS RECTIFIERS
FIG. 5

dimly when the base was touched to one side of the 2200 and the glass held in the hand. (Dangerous experiment!!!) This suggested that the tubes could be used for rectifiers. It was tried, and worked nicely. The first step is to blow the filament. Blow it good and hard by connecting the bulb across about 1500 volts. This will (in nine cases out of ten) leave one small piece of filament and one large piece, each connected to one lead in wire. Here we have the elements of a gaseous rectifier, whose rectification is in proportion (theoretically) to the areas of the electrodes. It works. Connect the bulbs as shown in Fig. 5. The two small electrodes should be connected together and the two large ones connected to the ends of the power transformer. Continuous (though pulsating) current may then be drawn from the center tap on the secondary and the common connection of the lamps. It may be filtered as usual. At least 700 volts will be needed to start things going (that's 1400 volts in all). The voltage drop is very great, but the tubes make a very nice little rectifier for such uses as the grid biases on C. C. sets.

Doubtless other uses may be found for these lamps. They cannot be correctly called "neon" lamps for they have but very little neon in them. The blue glow is very much like that in a Raytheon rectifier, but I leave it to you to find out what the gas is. Meanwhile thank your stars that even the Japanese can't for 10c pull all there is in a bulb out of it.

We Grow

AMATEUR RADIO showed a growth of 13.6 per cent. in the past Government fiscal year, according to the recent annual reports of the Chief of Radio Division and of the Secretary of Commerce. Good news, and reassurance we hope to those who had been fearing that amateur radio was slipping. The following quotation is from Mr. Terrell's annual report:

"During the past fiscal year the number of amateur transmitting stations increased from 14,902 to 16,926. Much credit is due to the amateurs for their contribution to the development of short-wave transmission. Nearly all of the amateur stations are now operating on wave lengths of 80 meters and below.

"It seems appropriate to mention briefly here some of the more important public services rendered by amateur stations during the past year. Immediately following the Florida hurricane many amateur stations in Georgia, Florida, Alabama, Mississippi and Louisiana provided the only means of communication with the stricken sections. They handled important and urgent messages between the State and municipal authorities, messages for the Red Cross consisting of requests for food, medical supplies, and doctors. Much of the same service was performed during the Mississippi flood. For the past three years the American Radio Relay League, through the American Railway Association, has placed its stations and facilities at the disposal of railroads for use as a means of emergency communication should their regular wire system be interrupted. Actual use of this emergency service has been made several times during the past year."

Strays

If you are interested in a plug-in choke for the receiver, the following suggestion by A. A. Kopf of Ancon, C. Z. may be of help.

"File the ends off an old Amperite glass tube after the metal caps have been removed and insert a piece of quarter inch glass rod that has been wound full of fine wire inside of it. The ends of the wire come out to make contact with the metal end pieces that came on the Amperite and the assembling job may be made with wax and rosin or with woodsmetal. The choke can then be plugged into the mounting and is easily changed if it becomes necessary."

The Shielding Efficiency of Metals

By Ralph B. Mason*

DURING the past few years much attention has been given to the theory and practice of shielding radio equipment. Experimentation has been quickly followed by commercial application and an examination of almost any factory built receiver of today will reveal some form of shielding. Some rather astonishing results have been obtained with completely shielded commercial sets and many a "handy man" has attempted to shield his favorite set with varying degrees of success. For example, an article by an enthusiastic fan tells how he used an old coffee can for a shield and obtained wonderful results! After measuring the resistance at radio frequencies of a coil shielded by a coffee can, one can appreciate the disadvantage of placing radio frequency c ils in an iron container.

A previous article in this magazine[1] has discussed the various changes in the characteristics of a coil when it is shielded by metal. While the general principles of shielding are simple, the practical application is not always so easy and the promiscuous application of metal to a set is not to be encouraged. Morecroft and Turner[2] have carried out a series of experiments upon the efficiency at audio and radio frequencies of shields of different metals and of varying thickness. However, most of their measurements were made at audio frequencies since they found that the efficiency of the better conducting metals was substantially 100 per cent at radio frequencies. Moreover, they did not give any data for aluminum, which is finding extensive use as a shielding material.

Some have contended that at radio frequencies, aluminum would have a high resistance due to the thin film of non-conducting oxide upon its surface. Our measurements show that aluminum does not behave in any extraordinary manner at radio frequencies and that its value as a shield can be predicted from its conductivity.

The work of Morecroft and Turner at 1000 cycles was repeated using shields of aluminum, copper and brass. Three duolateral wound coils were used, two of 200 turns each, and one of 300 turns. The 300-turn coil was used as a standard inductance on a General Radio inductance bridge. A current of one kilocycle frequency was furnished by a General Radio audio oscillator. The two coils of 200 turns each were mounted face to face 1.7 cm. apart and connected in series with the bridge. By means of a commutator the direction of the flow of current in one of the coils

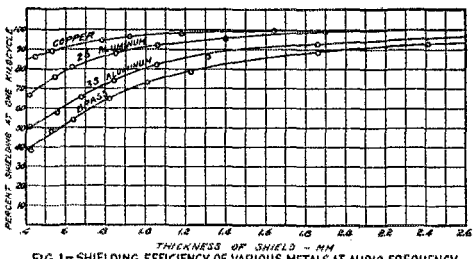


FIG. 1 – SHIELDING EFFICIENCY OF VARIOUS METALS AT AUDIO FREQUENCY

could be reversed. The effective inductance was measured first when the current was flowing in the same direction through both of the coils and then again when the direction was reversed in one of the coils. Then various sheets of metal (18" x 18") were placed between the coils and the measurements repeated.

The percentage shielding is given by the expression,—

$$S = \frac{M-M'}{M} \times 100$$

where S = per cent. shielding.
M = coefficient of mutual inductance without shield.
M' = coefficient of mutual inductance with shield.

The coefficient of mutual inductance, M, is given by the expression,—

$$M = \frac{L_1-L_n}{4},$$

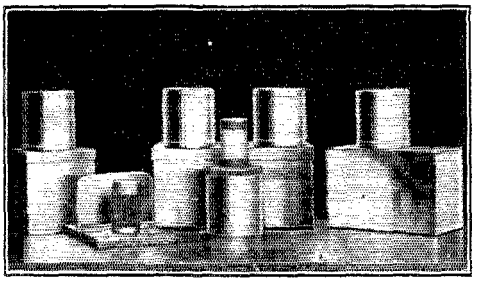
where L_1 is the inductance when the E.M.F's are in the same direction and L_n is the inductance when the E.M.F's. are in opposite directions. The results of this experiment are shown graphically in Fig. 1. The aluminum is a better conductor than the brass and not quite as good a conductor as the copper (on the usual volume basis), and one would expect its shielding efficiency curve to fall just under the curve for copper. On the other hand if the shielding efficiencies of the 2 S aluminum and copper sheet had been plotted as a function of the weight instead of the thickness, the relative positions of the two curves would have been reversed. It must be remembered that

*Research Bureau, Aluminum Company of America, New Kensington, Pa.

1. D. R. Clemons, *QST*, March, 1926, pages 9-20.
2. Proc. Inst. Radio Eng., Vol. 13, p. 477-505, 1925.

these curves are for a frequency of 1 kilocycle (audio frequency).

Morecroft and Turner have shown that the shielding efficiency increases with higher



VARIOUS TYPES OF METALLIC SHIELDS USED IN EXPERIMENTAL WORK

frequencies until at radio frequency the efficiencies of copper and brass shields of reasonable thickness are practically 100 per cent.

Several experiments were carried out at a frequency of 500 kilocycles after making the necessary modifications in the original method but the thinnest sheets of copper, aluminum and brass all showed 100 per cent. shielding. This is in accord with the results of Morecroft and Turner. The method employed by Clemons in *QST* March, 1926, page 16, seemed to offer greater possibilities and was therefore used for the experiments upon shielding at radio frequencies. In the accompanying diagram (Fig. 2) O is the oscillator coil and A the small pick-up coil which are totally shielded from the rest of the apparatus by a large grounded aluminum box. A sensitive galvanometer and thermocouple were used to determine when circuit No. 1 was tuned to resonance by the condenser. The shield S was rigidly clamped in a wooden frame. The coil C of circuit No. 2 was tuned to resonance by a precision condenser, this point being determined by means of a very sensitive Western Electric vacuum thermocouple and a sensitive Leeds and Northrop galvanometer. The shields consisted of copper, brass, 2 S and 3 S aluminum[3], and were 18" by 18" square. They varied in thickness from .042 cm. to .260 cm. (B. S. gauge, 26 to 10, approx.)

It was soon discovered that an ungrounded shield allowed an appreciable current to be picked up by coil C. However, if the shield were grounded, the coil did not pick up enough current to give a deflection on the sensitive galvanometer and therefore the relative merits of the different shields could not be determined. Neither was it possible to differentiate between the various shields when they were not grounded as there was no appreciable variation in the amount of current flowing in the shielded circuit. For instance with 154 milliamperes flowing in circuit No. 1, each ungrounded shield of 26 gauge copper, 2 S or 3 S aluminum allowed 7.35 milliamperes to flow in circuit No. 2. However, it was noticed that circuit No. 1 seemed to have a little greater resistance when 3 S aluminum or brass shields were substituted for the copper or 2 S aluminum shields, and this observation led to the resistance measurements to be described later.

As was mentioned before, no current could be picked up when the shield was grounded. In combination with a sensitive galvanometer, a crystal detector may be used to measure currents of a few microamperes. Several experiments upon grounded shielding were carried out with this very sensitive indicating device taking the place of the regular thermocouple. The hookup was taken from the Bureau of Standards circular No. 74, page 165, and is shown in Fig. 3. A carborundum crystal detector acted in a very satisfactory manner being both sensitive and stable in its action. In an instrument of this type the galvanometer deflections are proportional to the square of the current. No attempt was made to standardize the instrument, as only relative measurements were desired.

At 600 meters no current could be detected passing through the heavier grounded shields with this extremely sensitive indicating device. With 123 milliamperes flowing in circuit No. 1 the following deflections (Table 1) were obtained for various thicknesses of shield.

Efficiency of Shielding Vs Thickness of Shield
Wavelength = 600 meters

Thickness cm.	Approx. gauge	Shields 18" x 18"	Galvanometer Deflection cm
.042	26	3S	61.7
.056	23	3S	10.4
.068	22	3S	0.2
.085	20	3S	0.0
.042	26	2S	3.9
.055	23	2S	None
.048	24	Copper	None

TABLE 1

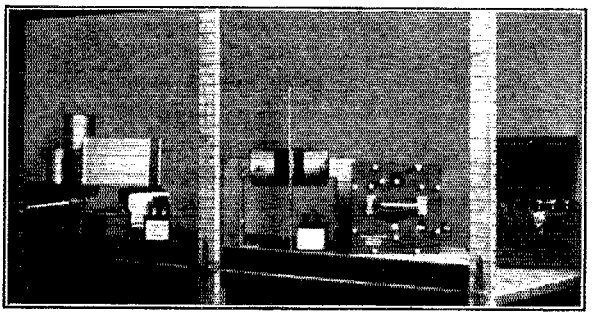
The thinnest sheet of copper did not allow any current to flow at 600 meters and the corresponding 2 S aluminum shield allowed very little current to pass, while the shield of 3 S aluminum, being a poorer conductor, allowed an appreciable current to flow. Table 1 shows that a sheet of 2 S aluminum .055 cm. in thickness did not allow any current to pass at the frequency used but a

3. 2 S is the trade designation for commercially pure aluminum sheet; 3 S is an aluminum-manganese alloy sheet having substantially lower conductivity than 2 S.

sheet of this thickness is not very rigid and for satisfactory working qualities it is suggested that at least 20 gauge (.081 cm.) sheet be used.

Hollow cylinders 4" in diameter and 4⅜" high were constructed from commercial 22 gauge brass, copper, 2S and 3S aluminum sheet. A tightly fitting cover was spun for each end, so that the metal of the cover extended ⅜" over the outer edge of the cylinder. The seam was brazed in the case of the copper and brass cans, but welded in the case of the aluminum. A coffee can (tinned iron) was found which had very nearly the same dimensions as the other cans and was used for comparison with them.

A small coil was wound on a 2" cardboard tube and mounted on a circular wooden disk of the same diameter as the metal cylinder. The coil with its mounting was placed in the metal can and connections made to a crystal detector indicating device through small holes in the side of the can.



GENERAL HOOK-UP FOR TESTING THE EFFICIENCY OF LARGE FLAT SHIELDS OF DIFFERENT METALS
One of the shields may be seen between the two horizontal coils. The wire upon the hinged frame-work acts as an electrostatic shield between the apparatus and the operator.

An attempt was made to pick up current from circuit No. 1, (Fig. 2) with this shielded coil a short distance from coil B. Large deflections of the galvanometer were obtained if the cans were ungrounded or the covers were not fitting tightly. (In one experiment a cubical copper can was used as a shield and a large deflection was noted when the cover did not make good electrical contact. After fitting the cover tightly, no deflection was noted until a small wedge was placed under the flange of the cover next to the radiating coil.) However, if the shields were grounded and the covers carefully fitted, not enough current was picked up to give a deflection on the galvanometer scale. Aluminum, copper, brass and iron seemed to be equally effective as shields, but more will be said in regard to the effect upon the resistance of the coil, especially in the case of the iron.

Two binocular coils were mounted equidistant from a small 4" x 6" flat sheet shield. The current from circuit No. 1 was passed through the coil on one side of the grounded shield. The other coil could not be completely tuned before the galvanometer deflection was too large to read, thus showing that a small wing shield does not offer complete protection, even though it is grounded and binocular coils are used. A shield of this type can very often be used to stabilize an oscillatory circuit, since the presence of the shield tends to increase the resistance of the circuit and stop the oscillation. The shield also changes the apparent inductance of the coil and can be used to tune one coil so that it will match the characteristics of another.

RESISTANCE OF COILS

A metal shield may very effectively protect a coil from external electrical fields, yet it may so change the inductance, capacity and resistance of the coil that it will no longer serve the purpose for which it is used. On the other hand, shielding is sometimes purposely introduced in the circuit to change the constants of the coils in some desired manner.

The resistances of the various coils were measured at three wave lengths with the different forms of shielding in place. The resistance variation method described in Bureau of Standards Circular 74, page 180, was used to determine the coil resistances. Circuit No. 2, Fig. 2, was removed and the precision condenser used to tune circuit No. 1. Three straight wire resistance links were inserted, one after the other, between the grounded side of the thermocouple and the low potential side of the condenser. In this way, three values for the resistance were obtained and the average taken. The large shields of sheet metal (18" x 18") were clamped against a rigid back board, as it was found that concordant results would not be obtained unless the coil could be accurately placed at a given distance from the shield. The relative positions of the coil and shield were so adjusted that the axis of the coil was perpendicular to the center of the plane of the shield, while one end of the coil was close to the shield.

The field of a coil has a greater flux density at the end than along the side and a piece of metal perpendicular to the field of force around the end of the coil causes a more marked change in the coil characteristics than when parallel to the field of

force. Since the purpose of these particular tests has been to show any differences between copper, aluminum and brass in their effect upon the characteristics of a coil, the windings of the coils in the cylindrical cans were 1" distant from the sides and ends, and consequently the end of the

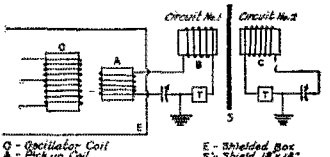


FIG. 2 DIAGRAM OF CIRCUITS FOR MEASURING SHIELDING EFFICIENCY

coils are closer to metal than they may be in ordinary practice. A recent article by Zahl in Radio News, Vol. 9, page 52, 1927, states that the shielding should preferably not come closer than one inch to the sides of a coil, and not closer than 2 or 3 inches to the end of the coil, where the field is more intense. The cylindrical cans are the same ones which were used in the experiments described above.

The following table (No. 2) shows the resistance of the various coils with different kinds of shielding, measured at three wave lengths, namely, 600, 300 and 200 meters.

Resistance of Coils in the Presence of Metallic Shielding

Shielding Cylindrical Cans	600 meters Resistance in ohms of circuit No. 1 with coil B1	300 meters Resistance in ohms of circuit No. 1 with coil B	200 meters Resistance in ohms of circuit No. 1 with coil B
Copper	5.38	4.15	10.86
2S Aluminum	5.50	4.26	10.47
3S Aluminum	5.57	4.34	11.22
Brass	5.66	4.64	11.88
Iron	10.07	7.50	17.04

Shielding Wing Type Shields 26 Gauge	600 meters Resistance in ohms of circuit No. 1 with coil B3	300 meters Resistance in ohms of circuit No. 1 with coil B4
Copper	6.77	4.98
2S Aluminum	6.93	5.04
3S Aluminum	7.13	5.08

TABLE 2

Coil B, 50 tuns No. 20 D.C.C. wire on 2" form

Coil B_1, 80 turns No. 22 D.S.C. wire on 2 form

Coil B_3, 40 turns No. 22 D.S.C. wire on 4" form

Coil B_4, 80 turns No. 22 D.S.C. wire on 2" form

The effective inductance of a coil is decreased when a shield is present, and in all cases a larger capacity was required to balance the circuit than when the unshielded coil was used. In most cases the 3 S aluminum and brass increased the resistance slightly more than copper, while 2 S aluminum was about on a par with the copper. The iron can increased the resistance of the coil to a marked extent, and for this reason iron should not be used.

The apparent resistance of a coil increases very rapidly with increased frequency, especially as the natural resonance period of the coil is approached. The resistance of a coil should be determined when the E.M.F. is introduced into the circuit by coupling with the coil itself. On account of the shielding, an external pick-up coil was used in the above experiments. Under these conditions the distributed capacity of the coil is in parallel with the coil, but in series with the rest of the circuit. The resistance values here given are valid only

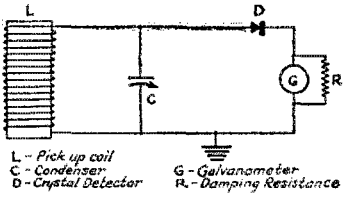


FIG. 3 CRYSTAL DETECTOR CIRCUIT USED IN MEASURING SMALL CURRENTS

when the coil is placed in the same position with respect to the other instruments and applied E.M.F.

COMPARISON OF COILS WOUND WITH ALUMINUM AND COPPER WIRE

Thirty-two turns of bare copper wire (20 gauge) were wound on a 4" threaded bakelite tube and the apparent resistance measured when the E.M.F. was induced directly into the coil. After measuring the resistance of this coil at 200, 250, and 300 meters, an aluminum wire was wound on the same identical form and the measurements repeated.

If the high frequency resistance of the straight copper wire is calculated and then subtracted from the high frequency resistance obtained for the coil, a value is obtained which may be considered to be due to winding the wire into the form of a coil. The value thus obtained was added to the calculated high frequency resistance of the aluminum wire, and this sum of the two resistances equalled the experimentally determined resistance of the coil. The aluminum acted in a normal manner and its behavior could have been predicted from

its conductivity measured at low frequencies. The L/R ratio (where L=inductance and R=resistance) at 300 meters was 26.9 for the aluminum and 29.7 for the copper coil.

SUMMARY

1. Frequency, conductivity and thickness of sheet are important factors in determining the efficiency of metallic shielding.

2. At broadcast frequencies relatively thin sheets (up to 24 B. and S. gauge) of aluminum and copper show high shielding value. Commercially No. 20 B. and S. gauge and heavier sheet is used because it has the necessary working qualities and shielding efficiency.

3. Complete box or can type shields are recommended for coils. Partition or wing type shields are usually impractical on account of the large size necessary.

4. Box shields should have joints that make good electrical contact such as is obtained from a tight slip joint. There should be no more holes or openings than necessary to make connections.

Resistors

AN INTERESTING type of resistance unit employing somewhat unusual mechanical construction has been placed upon the market under the trade name of, "Truvolt". A standard Nichrome resistance wire is wound around an asbestos covered enameled copper wire of about No. 20 guage. This method of coiling up the resistance wire allows surprisingly large resistances to be obtained in a small space. It also results in a flexible "wire" that may be used to connect together two terminals between which a resistor is to be inserted. This not only simplifies wiring but does away with the necessity for a separate mounting for the unit.

The resistors may be obtained in various ranges both as to resistance and the amount of energy they will dissipate. They may also be obtained as both fixed and variable units.

For the man who is using a filament lighting transformer not properly center-tapped, there are available units consisting of two matched resistors which have been riveted together. The standard two-hundred ohm size will safely pass 85 milliamperes. When connected across the filament of a 210 there will pass thru it approximately 40 mils due to the filament voltage. This leaves a margin of about 45 mils for both the plate and grid currents. As these currents should divide between both halves of the resistor, it makes the allowable combined plate and grid current somewhere in the neighborhood of 90 mils which should be plenty for the job.

For a couple of 210s or a 203-A, it will be necessary to use a standard variable unit which in the 200 ohm size is capable of passing over 350 mils. These resistors may also be used to drop the plate voltage in crystal and similar sets and may be had in resistances up to 100,000 ohms, capable of dissipating 75 watts. They may be used in all sorts of voltage dividing circuits as well as for grid leaks, etc.

The manufacturer is Electrad, Inc. of New York City.

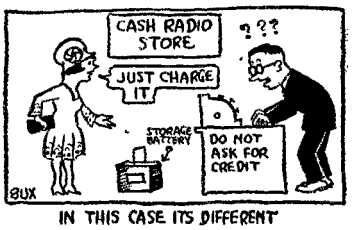
—*H. P. W.*

Changes in Radio Division

MR. Bernard H. Linden, who has been acting Supervisor of Radio for the Sixth District since the appointment of the late Lt. Col. Dillon as Federal Radio Commissioner, has now been confirmed by the Department of Commerce as Supervisor. This is good news to his many friends. Mr. E. A. Beane resigned in late November as the Supervisor at Chicago, to enter private business, and has been succeeded by Mr. Harold D. Hayes, formerly of the Sixth and Seventh Districts and for the past two years in the Chief's office at Washington. Both Mr. Linden and Mr. Hayes are old-timers at their business, and both have a sympathetic understanding of amateur radio. We welcome and congratulate them both.

The recent appropriation of funds by Congress now makes some very desirable expansions possible in the Radio Division. Branch offices under Radio Inspectors are being planned for Buffalo, Dallas, Denver, Los Angeles and Minneapolis, and for either St. Louis, Omaha or Kansas City. Additional radio test cars are being built and equipped, and new apparatus of the finest type, capable of accurately measuring frequency and field strength on all waves down to some point below 20 meters, will soon be available in every District. The service has needed this increase in personnel, equipment and funds for a long time; happily it is now at hand.

—*K. B. W.*



IN THIS CASE ITS DIFFERENT

Extracts from the Washington Convention

THE new International Radiotelegraph Convention and Regulations signed at Washington on November 25, 1927, constitute a document which in its printed form fills 118 pages. It does not seem that it will be placed on public sale, in this country at least, until it is ratified by our Senate, or possibly until a "definitive edition" is released by the Berne Bureau. It seems appropriate, therefore, for *QST* to reproduce those portions of the document which are of immediate interest to the amateur fraternity.

The convention has a preamble which recites that the plenipotentiaries of the governments enumerated have met and adopted this text. Definitions follow, and then the numbered articles, from which the following are selected, from a translation supplied by the United States government.

Article 1

1. The contracting Governments undertake to apply the provisions of the present Convention to all radio communication stations established or operated by the contracting Governments, and open to the international service of public correspondence. They undertake likewise to apply these provisions to the special services covered by the Regulations annexed to the present Convention.

2. They agree, moreover, to take or to propose to their respective legislatures the necessary measures to impose the observance of the provisions of the present Convention and the Regulations annexed thereto upon individuals and private enterprises authorized to establish and operate radio communication stations in the international service, whether or not open to public correspondence.

Article 3

The stations covered by Article 1 must, so far as practicable, be established and operated under the best conditions known to the practice of the service and must be maintained abreast of scientific and technical progress.

All stations, whatever their purpose, must, so far as practicable, be established and operated so as not to interfere with the radio communications or services of other contracting Governments and of individuals or of private enterprises authorized by these contracting Governments to carry on public radio communication service.

Article 22

The present Convention shall go into effect on January 1, 1929; and shall remain in force for an indeterminate period and until one year from the day on which a denunciation thereof shall have been made.

The denunciation shall affect only the Government in whose name it has been made. The Convention shall remain in force for the other contracting Governments.

Following Article 23 the signatures of the plenipotentiaries are affixed, and then come the General Regulations from which the following are quoted:

Article 1

In the present Regulations, supplementing the definitions given in Article Zero of the Convention:

.....The term "private experimental station" means:

1. A private station intended for experiments with a view to the development of radio technique or radio art;

2. A station used by an "amateur," i.e., by a duly authorized person interested in radio technique solely with a personal aim and without pecuniary interest...

Article 2

1. No radio transmitting station shall be established or operated by an individual or by a private enterprise without special license issued by the Government of the country to which the station in question is subject.

2. The holder of a license must undertake to preserve the secrecy of correspondence, both telegraph and telephone. Moreover, the effect of the license must be that the interception of radio correspondence other than that which the station is authorized to receive is forbidden, and that, in the case where such correspondence is involuntarily received, it must not be reproduced in writing, communicated to others, or used for any purpose.....

Article 3

1. The choice of radio apparatus and devices to be used by a station shall be unrestricted, provided the waves emitted comply with the provisions of these Regulations.

2. (1) The Administrations must take the necessary measures to assure themselves that the frequency meters (wave meters) employed in the adjustment of the transmitting apparatus are as accurately calibrated as possible by comparison with their national standard instruments.....

Article 4

2. Waves emitted by a station must be maintained upon the authorized frequency, as exactly as the state of the art permits, and their radiation must also be as free as practicable from all emissions not essential to the type of communication carried on.

3. The interested Administrations shall fix the tolerance allowed between the main frequency of emissions and the recorded frequency; they shall endeavor to take advantage of technical improvements progressively to reduce this tolerance.

4bis. The width of a frequency band occupied by the emission of a station must be reasonably consistent with good current engineering practice for the type of communication involved.

4. In cases where frequency bands are assigned to a specified service, stations in that service must use frequencies sufficiently remote from the limits of these bands, so as not to produce serious interference with the work of stations belonging to services to which are allocated immediately neighboring frequency bands.

Article 5

The Administrations of the contracting countries may assign any frequency and any type of wave to any radio station within their jurisdiction upon the sole condition that no interference with any service of another country will result therefrom.

2. These Administrations, however, agree to assign to stations, which by their nature are believed capable of causing serious international interference, frequencies and types of waves in conformity with the rules for allocation and use of waves as set forth below.

3. The Administrations agree also to consider the table of allocation of frequency bands (see paragraph 7) as a guide giving, for the different services, the limits which must be observed by all new stations and to which they shall adapt all existing stations with the least practicable delay, without diminishing the quality of the service which these existing stations carry on and taking into account the present state of their installations.

7. The table opposite shows the allocation of frequencies (approximate wave lengths) among the various services:

There follows here a lengthy table in which all the wave lengths from 30,000 meters to zero are allocated to various services. We reproduce the table only for the wavelengths below 200 meters:

Frequencies in kilocycles per second	Approximate wave length in meters	Services
1500–1715	200–175	Mobile services.
1715–2000	175–150	Mobile services. Fixed services. Amateurs.
2000–2250	150–133	Mobile and fixed services.
2250–2750	133–109	Mobile services.
2750–2850	109–105	Fixed services.
2850–3500	105–85	Mobile and fixed services.
3500–4000	85–75	Mobile services. Fixed services. Amateurs.
4000–5500	75–54	Mobile and fixed services.
5500–5700	54–52,7	Mobile services.
5700–6000	52,7–50	Fixed services.
6000–6150	50–48,8	Broadcasting.
6150–6675	48,8–45	Mobile services.
6675–7000	45–42,8	Fixed services.
7000–7300	42,8–41	Amateurs.
7300–8200	41–36,6	Fixed services.
8200–8550	36,6–35,1	Mobile services.
8550–8900	35,1–33,7	Mobile and fixed services.
8900–9500	33,7–31,6	Fixed services.
9500–9600	31,6–31,2	Broadcasting.
9600–11000	31,2–27,3	Fixed services.
11000–11400	27,3–26,3	Mobile services.
11400–11700	26,3–25,6	Fixed services.
11700–11900	25,6–25,2	Broadcasting.
11900–12300	25,2–24,4	Fixed services.
12300–12825	24,4–23,4	Mobile services.
12825–13350	23,4–22,4	Mobile and fixed services.
13350–14000	22,4–21,4	Fixed services.
14000–14400	21,4–20,8	Amateurs.
14400–15100	20,8–19,85	Fixed services.
15100–15350	19,85–19,55	Broadcasting.
15350–16400	19,55–18,3	Fixed services.
16400–17100	18,3–17,5	Mobile services.
17100–17750	17,5–16,9	Mobile and fixed services.
17750–17800	16,9–16,85	Broadcasting.
17800–21450	16,85–14	Fixed services.
21450–21550	14–13,9	Broadcasting.
21550–22300	13,9–13,45	Mobile services.
22300–23000	13,45–13,1	Mobile and fixed services.
23000–28000	13,1–10,7	Not reserved.
28000–30000	10,7–10	Amateurs and experimental.
30000–56000	10–5,35	Not reserved.
56000–60000	5,35–5	Amateurs and experimental.
Above 60000	Below 5	Not reserved.

Note—It is recognized that short waves (frequencies from 6,000 to 23,000 kc/s approximately—wave lengths from 50 to 13m approximately) are very efficient for long distance communications. It is recommended that as a general rule this band of waves be reserved for this purpose, in services between fixed points.

18. Each Administration may assign to amateur stations frequencies chosen from the bands allotted to amateurs in the allocation table (paragraph 7 above).

The maximum power which these stations may use shall be fixed by the Administration concerned, taking into account the technical qualifications of the operators and the conditions under which the stations must work.

All the general rules fixed in the Convention and in these Regulations apply to amateur stations. In particular, the frequency of the waves emitted must be as constant and as free from harmonics as the state of the art permits.

In the course of their transmission, these stations must transmit their call signals at frequent intervals.

Article 5 ter

5. (1) The exchange of communications between private experimental stations of different countries shall be forbidden if the Administration of one of the interested countries has given notice of its opposition to this exchange.

(2) When this exchange is permitted the communications must, unless the interested countries have entered into other agreements among themselves, be carried on in plain language and be limited to messages bearing upon the experiments and to remarks of a private nature for which, by reason of their unimportance, recourse to the public telegraph service might not be warranted. [The French text reads "....*ne saurait entrer en consideration.*"—Editor.]

(3) In a private experimental station authorized to carry on transmission any person operating the apparatus, either on his own account or for another, must have proved his ability to transmit text in International Morse Code signals and to read by ear texts thus transmitted. He can be replaced only by authorized persons possessing the same qualifications.

(4) Administrations shall take such measures as they deem necessary to verify the qualifications, from a technical point of view, of all persons handling the apparatus.

Article 14

1. Fixed, land, and mobile stations covered by paragraph 1 of article 1 of the Convention as well as private experimental stations must have a call signal from the international series assigned to each country in the allocation table below. In this table, the first letter or the first letters of the call signals shall identify the nationality of the stations.

There follows a table of allocation of call signals, which space at present does not permit us to reproduce. In ample time before the inauguration of the new system in 1929 we shall present the table. The Regulations also sugest the use of the intermediate "de". Thus with calls that indicate nationality, and the standard intermediate "de", amateur intermediates may be abandoned in 1929:

2. The call signals shall consist of:

(a) three letters in the case of fixed and land stations;

(b) four letters in the case of ship stations;

(c) five letters in the case of aircraft stations;

(d) the letter or letters indicating the nationality and a single figure followed by a group of not more than three letters, for private experimental stations.

There are several appendices annexed to the regulations. One of these is a new and much more lengthy Q Code of three-letter abbreviations, bearing small resemblance to the present code. Another appendix lists a considerable number of miscellaneous abbreviations, many of which should be useful to us amateurs. *QST* will present them in good season—they are not effective until 1929.

—*K. B. W.*

As we go to press we are advised by the Superintendent of Documents, Government Printing Office, Washington, that the English translation of the new International Radiotelegraph Convention, with attached regulations, is now carried for public sale by that office, price 25c per copy (stamps not accepted). League members are urged to procure a copy and become familiar with its contents.

Measuring the Inductance of an Iron-Cored Choke Coil at Different Currents

By J. Katzman*

After having said for years that iron-core inductances are uncertain we here offer the explanation and a method of measuring the uncertain "L".—Tech. Ed.

IN the July, 1927 issue of the *QST*, I described a bridge to measure capacity, power-factor, resistance and inductance. The method there described to measure inductances will give accurate results for air-cored coils. For iron-cored coils, however, the magnitude of the current flowing through the coil very materially affects its inductance, and hence that particular method will give the inductance of an iron-cored coil for small currents only. When such choke coils are used in a filter combination as shown in Fig. 1, the current passing through the coils, is, for most commercial coils, sufficiently large to have quite an effect on their inductances. The same bridge and capacity standards may also be used to measure the inductances of iron-cored coils, with various direct currents flowing through them, as will herewith be shown.

When in 1923 experimentation on the first B-eliminators was started in the Dubilier Laboratories, the engineers observed the reduction in inductance with current. They also observed the well-known phenomenon that when the direct

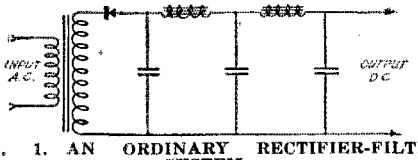


FIG. 1. AN ORDINARY RECTIFIER-FILTER SYSTEM

The inductance of the chokes changes with load as shown in Fig. 2.

current is large, an air-gap may actually increase the inductance of the coil. Fig. 2, shows the variation of inductance of an iron-cored choke coil with d.c. The coil was made up of 9000 turns with a length of magnetic path of about ten inches and an effective cross-sectional area of about ¼ square inch. For curve 1, the air-gap was 9 mils (.009") while for curve 2, the air-gap of the same coil was increased to 20 mils (.020").

It may be of interest here to depart from the main purpose of this article, which is to show how to obtain the inductance, and to examine the reason why such a variation

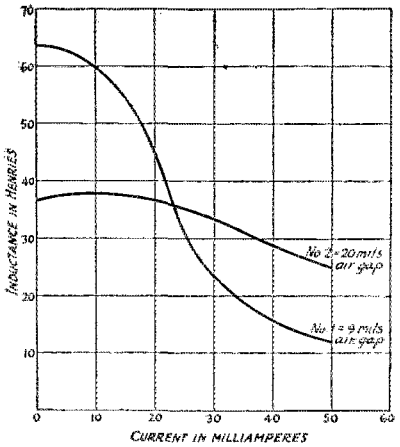


FIG. 2. HOW THE INDUCTANCE OF AN AIR-CORE CHOKE CHANGES WITH THE LOAD

Both curves are for the same coil and core as described in the text. How should these chokes be rated?

of inductance with current takes place.

The inductance of a coil depends upon the change of flux with change in current. The exact formula for inductance is:—

$$L = N \frac{d\varphi}{di} 10^{-8}$$

Where L = inductance in henries
N = the number of turns
$d\varphi$ = the change of flux
di = the change in current that produced thechange in flux.

For a constant number of turns and a constant current range, the inductance varies directly as the total flux, and for a constant area the inductance varies directly as the flux density.

In Fig. 3, two curves are given, No. 1, is a curve showing the approximate flux density plotted against ampere-turns for the 9000-turn coil with a 9 mil gap, while No. 2, is the curve of flux density of the same coil with a 20 mil gap for correspond-

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ing magnetizing forces. For the purpose of demonstration, assume that superimposed upon the direct current is an alternating current ripple in each of these coils of 2 2/9 milliamperes, giving 20 ampere-turns for the 9000 turns. It is, therefore, seen from Fig. 3 that for 10 milliamperes of d.c. (ampere-turns = 90) the additional 2 2/9 milliamperes will produce about 5500 additional lines of force per square inch

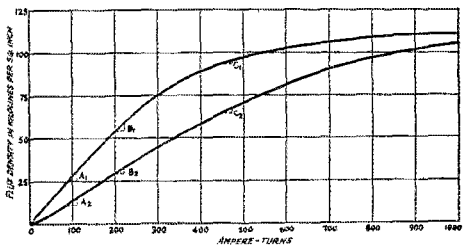

FIG. 3. CURVES SHOWING WHY A COMPARATIVELY SMALL DIRECT CURRENT MAY SATURATE THE CORE AND THEREBY REDUCE THE INDUCTANCE OF A CHOKE COIL IN THE MANNER OF CURVE NO. 1, FIGURE 1

for the coil with the 9 mil gap as shown at A_1, and about 3500 additional lines of force per square inch in the coil with the 20 mil gap as shown at A_2. The ratio of inductance at 10 milliamperes for the coil with each of the gaps is therefore:

$$\frac{L1}{L2} = \frac{5500}{3500} = 1.57$$

where L1 the inductance of the coil with the 9 mil gap and L2 the inductance of the coil with the 20 mil gap.

From Fig. 2 at 10 milliamperes

$$\frac{L1}{L2} = \frac{60}{38} = 1.58$$

thus showing the close relationship between the inductance and flux.

Again at 22½ milliamperes, Fig. 2. shows the two inductances to be equal and at B_1 and B_2 in Fig. 3, the flux changes are equal (about 3200 lines per square inch.)

For 50 milliamperes of direct current

$$\frac{L1}{L2} = \frac{10.8}{24.8} = .43$$ from Fig. 2, and

$$\frac{L1}{L2} = \frac{1000}{2200} = .44$$ from Fig. 3 at C_1 and C_2.

The reduction in inductance for the coil with the large air-gap at very small direct currents as shown in Fig. 2, is due to the bend in the magnetization curve at the origin which becomes more pronounced for this coil as seen in Fig. 3.

From the close agreement between the actual inductance ratios and the corresponding flux ratios, the relationship between flux and inductance becomes obvious. It can also be seen that the phenomenon of inductance variation with current, which at first looks peculiar, can really be deduced from the well known magnetization or B-H curves for air and iron.

The method of measuring the inductance that will now be described was employed in obtaining the curves of Fig. 2. Fig. 4 shows the bridge with the tuned 1000-cycle amplifier which was fully explained in the *QST* of July, and which was used in the above tests.

R_1 and R_2 are the fixed resistance arms of the bridge. "C_3" is a variable calibrated condenser while "C" is a fixed condenser, which for iron-cored choke coils in B-eliminator work may be between .00025 to .0005 μfds. "C_3" and the variable resistance R_3 are then adjusted until the 1000-cycle note heard in the ear phones becomes a minimum when "C" alone is in the other arm.

Two identical choke coils, of which the inductance is to be measured, L1, L2, are then connected in series with a milliammeter, a variable resistance and a battery. The resistance is adjusted until the current flowing in the coils is equal to that

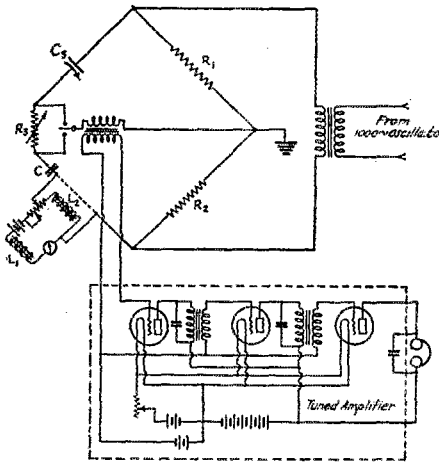

FIG. 4. A SPECIAL FORM OF WIEN'S SERIES RESISTANCE BRIDGE USED TO MAKE THE MEASUREMENTS DESCRIBED HERE

required, and the whole combination is connected in series with the condenser "C" as shown in Fig. 4. Condenser "C_3" is then increased and R_3 again adjusted until the 1000 cycle note heard in the ear phones becomes a minimum again.

If C_2 equals the capacity in microfarads of the variable when the inductances are connected,
C_1 equals the capacity of the variable when C alone is on the bridge, and
L_x equals the inductance of the combination,

then

$$L_x = \frac{C2 - C1}{39.5\ C_2\ C_1} \text{ henries}$$

or practically $= \frac{C_2 - C_1}{20\ C_2\ C_1}$ henries

for each coil.

It is of interest to note that by means of this method a short circuited turn or turns is easily disclosed by the abnormally large increase in the resistance R_3 that such a short circuited turn makes necessary in order to balance the bridge, and by a very large decrease in inductance from that obtained for similar good coils.

It was thus shown that the apparently odd behavior of iron-cored choke coils is a natural predictable occurence and that two more uses for the "Wien's" series resistance bridge are its application to the measuring of inductances at desired currents and the detection of short-circuited turns.

West Gulf Division Convention

February 10-11, 1928, Norman, Okla.

HOORAY! Three times hooray. Say, fellows, a real-to-goodness A.R.R.L. Divisional Convention is to be held at Norman, Okla., under the auspices of the Alpha Sigma Delta radio fraternity. Through the courtesies of the University of Oklahoma, the committee has secured the use of the Engineering Auditorium and the Engineering Buildings in which to hold the events of the convention.

The program shows sightseeing trips to points of interest in Norman and Oklahoma City; good radio talks, traffic meetings, all the brasspounding for the boiled owls; games, stunts, prizes, etc. Strong efforts are being made to have Fred Schnell, former traffic manager and Don Mix present during the convention. E. Pat Schultz, secretary of the fraternity, 1020 Monnett Ave., Norman, Okla., will be glad to hear from you.

Strays

8ASE suggests that the "Calls Heard" department be changed to "Calls Heard Above and Below the Bands". He has a good sized list to start it off with and believes this system should be of considerable help to the various Supervisors.

A cheap way of indicating in a relative manner the plate current in the transmitter is to bolt a thin piece of transformer core material to the core of the choke coil. As the current through the choke varies, the intensity of the vibration of the reed will change and so vary the intensity of the sound produced by it. While it may not be accurate, it's lots cheaper than a milliammeter.

—9EHR

While most everyone is familiar with the Weston model 489 portable double range voltmeter, it is probably not so well known that similar meters may be obtained for use on alternating currents. The a.c. meters are of the same external shape but differ in color, being moulded of red bakelite to distinguish them from the black d.c. meters. They may be had in ranges of 150/15, 300/150 and 600/300 volts. The same model meter (528) may be had in 1-, 3-, 5-, 10-, 20-, and 30-ampere sizes.

When using mercury arc rectifier tubes, it is necessary that the positive of the keep-alive circuit be connected to the largest or bottom electrode if a long life is to be obtained.

We are told by 8CYM that although the screen door spring is useful to take up shrinkage in a rope halyard, it rusts quickly and snaps. He recommends robbing the springs from the baby's swing. They are so constructed that they are compressed when a pull is exerted on them and even if they do break, the whole works won't come down.

The 1927-28 edition of the *Official List of Radio Stations in the Dominion of Canada* which contains particulars of every licensed transmitting station in Canada including ship, coast, broadcast and *amateur* stations may be obtained from the Office of the Director of Radio, Department of Marine and Fisheries, Ottawa, Canada. The complete list and binder is 50 cents and the list alone sells for 25 cents. Supplements to complete the list will be forwarded free of charge as they are issued.

Announcement of the marriage of Miss Helen C. Hinchcliff to Harold A. Snow of the Radio Frequency Laboratories at Boonton, N. J. has just been received. Congratulations and best wishes from us all.

8CEO has been using a pair of UX-281 rectifier tubes to supply the plate of a 203-A. Even though there are 1200 volts on their plates they don't seem to have any difficulty in handling all the current needed by the 203-A.

Prizes for International Test Winners

FROM present indications, the total value of the apparatus prizes to be awarded at the conclusion of our February International Tests will lie between $4,500 and $4,000. As the prize list is receiving some additions at this writing, it is impossible to estimate the exact value. Our good friends of the radio industry are responsible for the generous prize awards which it gives us pleasure to list herewith. The American Radio Relay League acknowledges with a great many thanks the fine response and the expressions of interest and cooperation which were received from the individual contributors to our competition. The donors express the hope that our Tests will be successful and enjoyable to the participants as well as that they may be fruitful in advancing the communication art. The writer hopes that the Tests will be helpful to the radio industry as well as that every contributor may get back in good will and sales many times the value of his prize. Again, many thanks to you all!

It is going to be *some* job to donate $4,500 worth of prizes in a way that is satisfactory to everybody while handling the numerous other details in connection with our Tests. It will be impossible to make up the groups of prizes until the conclusion of the contest when results have been tabulated and the number of awards depending on the number of countries and amateurs participating is known. There will doubtless be between fifty and sixty prize groups —a *grand* prize to the station in the United States and also the station in Canada with the highest total score—25 prizes of different values for the 25 highest scoring stations in the U. S. or Canada considered together—suitable prizes for stations which are the only stations to score with a particular foreign locality—a prize for the highest scoring station in each locality outside the U. S. and Canada (localities partitioned from the list of I.A.R.U. intermediates).

For full information on the contest, see the following references: Page 31, 32 and 33, December 1927 *QST*, page 51 and 82 January 1928 *QST*. Remember the dates of the fourteen day contest—not so far away now (Feb. 6, 1928 0000 GCT to Feb. 20, 1928 000 GCT). Attention is also called to an error appearing on page 82 January 1928 *QST*, the paragraphs (3) and (4). Giving a reply test message to a U. S. or Canadian station raises the score *two* points (not three). It is probable that stations in foreign localities can add *three* points (not four) to the score for each U. S. or Canadian QSO after the first, providing stations entered in the test are worked instead of others not equipped with test messages. Logs are required from *everybody* who takes part, whether that part be great or small. They should contain the information specified in the rules. U. S. and Canadian entrants are provided with suitable log forms on which a full record may be kept as required. It is necessary for foreign amateurs to make up their own log sheets to contain this information. Remember, not a single station in any locality whatsoever may receive prize awards or honorable mention in *QST* unless we have the log and also copies of test messages handled during the contest.

Every amateur in the world with a short wave station is invited to participate and stands equal opportunity to win some of the valuable prizes. From what we hear, some of the fellows with UX210 transmitters are planning to run rings around the high-powered 40-meter stations by using 20 meters, where power is a minor consideration. U. S. and Canadian stations must have their entry cards on file at Contest Headquarters on or before February 1 in order to take part—there has been plenty of advance notice in *QST* as well as in broadcasts and bulletins to give everyone opportunity to enter. For stations in localities outside the U. S. and Canada to take part, it is only necessary to get on the air during the tests, working as many "nu" and "nc" stations as possible, and handling test messages.

As for the prizes, each prize or prize group is of considerable value. Groups of condensers, resistors, tubes and coils of various descriptions together with plate and filament supply units, receiver kits, etc. will be made up so that each group will be as useful as possible to the recipient. There will be single prizes of great value, too—complete broadcast receivers, complete short wave transmitters and receivers with the latest accessories — B-eliminators — A.C. tubes—chokes. A list of the donations giving the name of the donor, description of apparatus, and value follows. This is as complete a list as may be prepared at the date of writing.

—*F. E. H.*

PRIZE AWARDS

Operadio Mfg. Co., Chicago, Ill. $375.00
50 Operadio Bloc Tone Chambers, model 54. Made of Stonite, they contain a 54 inch air column. Dimensions only 12" x 14" x 6¾" Exponential air column is cast in a monolithic structure prohibiting vibration. Designed for speaker units of a 2" to 3" free diameter.

F. R. Pray & Co., Boston, Mass $300.00
300 Somerville dials, silver-plated and lacquered brass

with calibration space and vernier grip knob 3 in. diameter; Dials fit ¼" shaft; 600 bakelite knobs (to match dial). These knobs fit 3/16" shaft but have heavy brass bushings which may be drilled to ¼".

Silver-Marshall, Inc., Chicago, Ill. $277.00
10 type 242 modulation transformers: 10 type 240 audio transformers; 4 type 635 shortwave receiver kits, 18-150 meters, 4 coils and instruction booklet supplied; 3 sets of power equipment consisting of type 328 full wave power transformer and type 331 Uni-choke filter system, trans. wndg: 2-550v, 2-7½v, 1-1½v.

Federal Radio Corp., Buffalo, N. Y. $275.00
Choice of EIO Ortho-sonic 6 tube broadcast receiver, for battery operation, or EIO-60 set operated from light socket. Balanced circuit, single control, extremely selective, illuminated scale, cabinet of genuine mahogany with walnut inlay, escutcheon plate of dull gold with knobs to match. Length 27½", depth 13¼", height 11¾". In EIO-60 current supply equipment eliminates all batteries.

Federal Brandes, Inc., Newark, N. J. $195.00
Model 8A Kolster Radio 8 tube broadcast receiver. This table model in satin finished mahogany cabinet contains four stages of tuned r.f., detector, and three special audio stages. It has single illuminated control, Selectivity and sensitivity adjustable. Power tube may be used in last stage. Height 12½", width 27 1/8", depth 14¼".

Aero Products Co., Chicago, Ill. $164.75
Two 250W Aero 250 watt transmitter coils; Three 204OK Aero transmitter kits (16.5-52 meters); Six LWT125 Aero short wave receiving kits; six C60 Aero Noskip r.f. receiver chokes; Six C248 Aero transmitter r.f. chokes; one Aero short wave foundation unit (drilled and engraved 7 x 18 panel, baseboard, and circuit blue-prints).

Radio Engineering Laboratories, L. I. City, N. Y. $139.50
One No. 139 type TR75 tuned plate-tuned grid transmitter, completely wired and tested, less UX852; one set type S inductances (two transmitting coils with glass coupling rods); one No. 133 short wave plug-in receiving coil kit (15-107 meters with 100 mmfd. condenser), one No. 129 UX852 holder.

Eastern Radio Institute, Boston, Mass. $120.00
One complete scholarship in the Radio Theory and Operating Course at the Institute. A fine opportunity to obtain a commercial ticket. Must be used by winner himself who may enter Institute anytime during 1928 he sees fit.

Atwater-Kent, Philadelphia, Pa. $112.00
Model 37 self-contained a.c. set. Uses six a.c. tubes and one rectifying tube and runs from 110v 60 cycles a.c. Shielded cabinet and power supply, single dial control, volume control, choice of two color combinations in satin finish Hight 7 1/8", width 17¼". Also Model E speaker in any one of five color combinations.

The Magnavox Co., Oakland, Calif. $105.00
One type R4 dynamic speaker or power cone unit, 12-ohm field requires ½ ampere at 6 volts; one type R5 dynamic speaker unit, 2500 ohm field takes 40 to 80 mils from 110 v.d.c. The 40-henry field can replace one choke of filter system in A.C. sets. Fine Magnavox units for radio or electrical phonograph work.

Ward Leonard Electric Co., Mt. Vernon, N. Y. $100.30
5 vitrohm resistor kits (8 two-inch resistors, totaling 21,750 ohms), 6 grid leaks (5000 ohms, 200 watts dissipation, 200 mils max.); 7 11-step vitrohm rheostats for transformer primary input control (20 ohms 60 watts dissipation, 2 amps. max.); 1 center-tapped resistor (200 ohms, 100 watts dissipation, 220 mils max.).

A. H. Grebe & Co., New York City $100.00
Grebe CR-18 short wave receiver complete with 5 coils. See full description in June 1926 *QST*, page 24. Range 10-200 meters, plug-in coils, SLF condensers, and other desirable features.

Electric Specialty Co., Stamford, Conn. $90.00
Item 8 motor-generator set with motor end wound to requirements of winner. Output 500 volts, 150 watts. Two-bearing, wick-oil type with field rheostat included.

Burgess Battery Co., Madison, Wisc. $75.00
12 No. 21308 45 volt Burgess Super B batteries, 16 lbs. each, 4¼" x 8¼" x 7⅝"; four No. 2308 45 volt Burgess B Batteries, 9½ lbs., 3¼" x 8 1/16" x 7".

Bremer-Tully Mfg. Co., Chicago, Ill. $68.50
Two improved short wave receiving kits; two sets of Bremer-Tully audio couplers; two sets of S. F. 13 and S. F. 17 condensers.

National Co., Inc., Malden, Mass. $66.00
Four type T M 450 transmitting variable condensers —.00045 mfd., 3/16 in. spacing, equipped with type A vernier dials.

Heintz & Kaufman, San Francisco, Calif. $65.00
900 cycle, 200 watt plate supply unit. An m.g. set with quarter h.p. motor for a.c. or d.c. Includes 900 cycle transformer. Output 1500 volts—750 each side of center tap. Engraved plate with name of winner and suitable inscription is included on m.g.

Cable Supply Co., Inc., New York City $60.00
Three sets of SPEED Super Emission Radio Tubes in types that may be selected by the winners.

C. E. Mfg. Co., Providence, R. I. $55.00
Six M-26 a.c. amplifier, 2 N-27 a.c. detector, 2 R-81 half-wave rectifier and 2 R-80 full wave rectifier.

The Crosley Radio Corp., Cincinnati, O. $55.00
One battery-operated Crosley Bandbox broadcast receiver, model 601. Six tube, single illuminated control, shielded, Brown crystalline finished metal cabinet, 17¼" x 7⅝" x 5½".

The Q.R.S. Music Co., Chicago, Ill. $54.75
Q.R.S. tubes: six 201-A type; one 200A-type; one 112-type; one 171-type; rectifier; one 85 mil. 200 v. full wave rectifier; one 100 mil. 350 v rectifier; one 100 mil. 550 v. rectifier; one 400 mil. for eliminators.

Hoyt Electrical Instrument Works $54.00
(Burton-Rogers Co.) Boston, Mass.
Six Hoyt type No. 508, flush mounting milliammeters, case diameter 2¼", flange diameter, 3"; range 0-200 mils. Black finish with white hand-calibrated scales.

Raytheon Mfg. Co., Cambridge, Mass. $50.00
Four Raytheon-H full wave rectifier tubes with 150 milliampere capacity, maximum anode voltage, 600; four Raytheon-280 full wave rectifier tubes, 125 milliampere capacity, maximum anode voltage 350 R.M.S.

The Allen D. Cardwell Mfg. Corp., $50.00
Brooklyin, N. Y.
Material to be selected by winner from standard Cardwell products as one prize not to exceed value stated.

American Mechanical Laboratories, Inc., $50.00
Brooklyn, N. Y.
Power Clarostats, dissipation 40 watts; three 0-10 ohm range, three 25-500 ohm range, four 200-100,000 ohm range, four volume control Clarostats 0-500,000 ohm for receiving set applications; four standard universal range 0-5 million ohms, dissipation 20 watts for power units and receiver applications.

Sprague Specialties Co., Quincy, Mass. $50.00
Credit letter extending choice of any Sprague products, such as midget condensers and tone controls.

E. F. Johnson & Co., Waseca, Minn. $49.50
One 150 mmfd. type B ball-bearing transmitting condenser, with etched scale, pointer, handle and locking device, nickle finish, hard rubber insulation, large clearance between rotor and stator.

Hammarlund Mfg. Co., New York City $48.00
Six 20 inch long 3"dia. coils. Nr. 16 wire, 10 turns per inch.

Wireless Specialty Apparatus Co., Boston, Mass. $47.50
Twenty-five Faradon UC-490A, 1 mfd., 100 d.c. or 500 a.c. volts max. filter condensers.

L. S. Brach Mfg. Corp., Newark, N. J. $45.50
Ten lightning arrestors; Five B. S. Electric Soldering Irons, 24 phone plugs; 12 cord connectors.

Carter Radio Co., Chicago, Ill. $44.20
Six No. 110 power switches for 110 volt circuit, quick break; six No. 2 IMP Battery switches; six .002 mfd. condensers; six No. 10 Tip Jacks; six Y 5 M resistors (500 ohms, 40 watts); six Y10M resistors (10,000 ohms, 40 watts); six HW 75 HI-WATT 75 ohm rheostat, 20 watts dissipation.

All-American Radio Corp., Chicago, Ill. $42.00
All-Amax Senior 3 tube reflex kit.

Scientific Radio Service, Mt. Rainier, Md. $40.00
One 80 meter and one 150-170 meter quartz crystal.

The Formica Insulation Co., Cincinnati, O. $40.00
Ten panels of black Formica 7" x 21" x 3/16"; thirty pieces of tubing 2 inches O.D. by 2½ inches long, or size specified by winner.

National Radio Tube Company, San Francisco, Calif. $40.00
Pair of Rectobulbs (3000 volt rectifier, 10 volts filament); Set of plug-in Inductrons, UX base (Vacuum sealed receiving coils for 10-20-40-80 bands).

Electrad, Inc., New York City $37.50
Fifty 100 ohm center tap resistances, type V100

Halldorson Co., Chicago, Ill. $36.00
Set of super-het transformers (2 audio, 1 output, 3 intermediate).

E. F. Johnson Co., Waseca, Minn. $36.00
Type B, 100 mmf. ball-bearing transmitting condenser with scale, pointer and handle.

Kokomo Electric Co., Kokomo, Ind. $35.00
Type 2 B-eliminator for sets having not more than 8 tubes (110-v-60c).

Thordarson Electric Mfg. Co., Chicago, Ill. $34.00
T-2098 transformer and T-2099 Choke Unit for full wave power supply for 2 UX-210's.

The Electric Storage Battery Co., Philadelphia, Pa. $31.90
One Model 3A 6-volt A power unit. (Trickle charger providing storage battery A power).

Tobe Deutschmann Co., Cambridge, Mass. $28.00
Two type 2020, 2 mfd., 2000 volt filter condensers.

National Carbon Co., New York City $25.00
Case of 5 No. 486 Eveready Layerbilt 45 volt "b" batteries.

C. K. Dodge, Mamaroneck, N. Y. $25.00
Ten copies of "Intensive Speed Practice", (method of increasing code speed and proficiency).

Hardwick, Field, Inc., Newark, N. J. $25.00
Two 5000 ohm center-tapped mounted transmitting grid leaks, 25 watts continuous rating; two sets of five resistors, each unit rated at 20 watts, ranges between 1000 and 10,000 ohms.

Gold Seal Electrical Co., New York City $24.00
Complete set a.c. tubes; one type GSY 227 detector, and six type GSX 226 amplifiers.

Weston Electrical Instrument Corp., Newark, N. J. $23.00
One model 425 Thermo Ammeter, Milliammeter, or Galvanometer; one model 476 a.c. voltmeter or ammeter. Ranges and types to be selected by winner.

General Radio Co., Cambridge, Mass. $22.00
Type 358 wavemeter with four coils (Range 14-224 meters).

Leach Relay Co., San Francisco, Calif. $21.00
One PR5 and one PR9 relay,—straight relays designed especially for tube transmitters.

American Transformer Co., Newark, N. J. $20.00
Pair Amer-Tran DeLuxe Audio transformers.

Marathon Battery Co., Wausau, Wis. $20.00
Four No. 3081 Marathon Super-Power "B" 45 volt Batteries.

Ensall Radio Laboratories, Warren, Ohio $18.50
Set of Item 68 coils (Six inductances for 15-210 meter super-het).

Metro Electric Co., Chicago, Ill. $18.00
Metrocone table model speaker.

Herbert H. Frost, Inc., Elkhart, Ind. $16.85
One each; Remler SLW .0005 mfd. var. condenser; Remler illuminated drum dial; ten ohm Frost metal frame rheostat; 25 ohm Frost bakelite rheostat with fil. switch; 200,000 ohm Frost variable resistor; 500,000 ohm Frost variable potentiometer with switch; single open circuit Frost Gem-Jac; pair Frost cord tip jacks.

Pacent Electric Co., Inc., New York City $15.00
Two Pacent No. 27 shielded input tranformers.

Palmer and Palmer, Buffalo, N. Y. $15.00
Varioloop (Variometer type loop antenna) with base.

R. Wood, Corona, N. Y. $15.00
900 cycle dynamotor, input 16 v.d.c. output 120 watts, 120 volts, wt. 15 lb.

Radio World Time Clock, Brooklyn, N. Y. $13.75
Three clocks (time in all zones at a glance) One leather with note pad, one plain leather, and one for panel mounting.

J. H. Bunnell & Co., New York City $13.50
Bunnell heavy duty "Gold-Bug". (Automatic transmitting key).

Elkon Works, Inc., Weehawken, N. J. $13.50
One Elkon 3 ampere "A" battery charger.

Seattle Radio Laboratories, Seattle, Wash. $12.50
Type 106 wavemeter (15-110 meters) with 2 coils.

Utility Radio Co., East Orange, N. J. $12.50
200 watt plate-filament transformer. (Two 7.5 volt, one 1100 volt winding, each center-tapped).

Jewell Electrical Instrument Co., Chicago, Ill. $12.00
Pattern 64 flush type h.f. ammeter, ranges up to 15 amperes as chosen by winner).

X-L Radio Laboratories, Chicago, Ill. $12.00
Three Model N Vario-densers, 3 Model G Vario-densers, and 3 of seven sets Binding Posts.

Jefferson Electric Mfg. Co., Chicago, Ill. $12.00
Two Concertone audio transformers. Excellent tone range.

Belden Mfg. Co., Chicago, Ill. $12.00
1 Beldenamel Aerial Kit, and 5 fused battery cables.

Corning Glass Works, Corning, N. Y. $11.40
Four 7¼ inch PYREX transmitting insulators; twelve 3½ inch PYREX receiving insulators.

Mueller Electric Co., Cleveland, Ohio $11.00
Assortment of 100 Universal helix and battery clips.

Radiall Co., New York City $11.00
10 Amperites with mountings. (Automatic filament control).

James Radio Curtis & Robert Curtis for the Curtis Sales Co., Ft. Worth Tex. $10.50
Curtis-Griffith 250-watt power-filament transformer, 350-550 v. each side of c.t.

(*Continued on Page 44*)

The Final Capacity in a Two-Section Low Frequency Filter

By D. E. Replogle* and James Millen†

This is the 2nd of a series of articles on the practical design of filters and filter parts. These articles are written by members of the Raytheon organization and are based on the extensive experience of that organization in the handling of the problems that arise in the manufacture of filters for a wide variety of needs. The third article will follow shortly.—Technical Editor.

ALTHOUGH it is a rather well known fact that the value of each of the capacities, C_1 C_2 and C_3 in (Fig. 1) a B-power supply unit has some effect upon the effectiveness of the filter, as far as ripple suppression is concerned there is no written information generally available as to just how effective these different condensers are. In fact, about the only material published on the subject so far, other than the first article of this series, was some brief remarks of Prof. Dellenbaugh's quoted on page 29 of the February, 1926, *QST*. His remarks on the subject may be summarized with equal brevity by stating that: "The prime function of the initial filter condenser C_1, is voltage regulation; of the middle condenser C_2, ripple suppression, and of the final condenser C_3, audio quality control.[1] The value of any one of the three condensers has some effect upon the percentage ripple in the finally output, but changes in C_2 produce a much more marked change in ripple value than changes of either C_1 or C_3."

Thru the facilities available at the Raytheon Laboratories in Cambridge, Mass., the writers have been able to investigate in a quantitive way, just what effect changes in capacity of C_1 C_2 and C_3 have upon the general excellence of a B-power filter circuit.

In the September 1927 issue of *QST* the function of C_1 was considered. At this time, C_3 will be considered. In the near future a paper on C_2 will be presented followed by a final paper treating simultaneous changes in capacitance of C_1 C_2 and C_3.

The purpose of these papers is to present data to guide B eliminator designers with a limited amount of total filter circuit capacity at their disposal in the distribution of this capacity between C_1 C_2 and C_3 so as to produce the best results.

The first step taken in the investigation of the effect of the capacitance of C_3 on the a.c. ripple or "hum" in the power unit, was to construct a conventional Raytheon type power unit in which any value of C_3 between 0 and 30 μfd., could be readily secured.

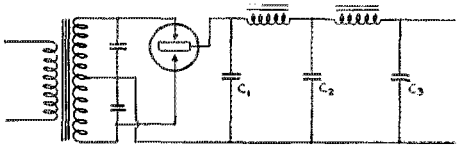

FIG. 1. RAYTHEON PLATE-SUPPLY SYSTEM USED IN THE INVESTIGATION

Across the output of the power unit was then placed a resistance load which drew 90 m.a. A cathode ray oscillograph, with "bucking" battery to balance out the d.c. voltage component was then connected across the resistance load as shown in Fig. 2. By varying the value of C_3 with a constant load of 90 m.a. the different oscillograms in Fig. 3 were obtained.

The curve in Fig. 4 showing percent ripple in the output was then obtained from the oscillograms in Fig. 3. This curve was then checked by the use of a vacuum tube voltmeter in place of the oscillograph.

But let us see how this curve checks up with the conventional filter circuit specifications? Generally the arrangement is 2, 2, 8 μfd. or, with many of the more recent eliminators 2, 3, 6 μfd.

We find from Fig. 4 that as C_3 is increased in value up to 6 μfd. there is a constant and very marked reduction in ripple value. Still further improvement results between 6 and 8 microfarads, but not as marked as before. In fact, there is even something to be gained by increasing C_3 up to 10 microfarads. After 10 microfarads is reached, however, very little further reduction in ripple results. It would seem therefore, that a good value for C_3, as far as ripple is

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1. The "audio quality control" can be explained by considering that the audio-frequency variations in the plate currents of the tubes must be supplied by the final condenser C_3. If C_3 is not adequate the full a.f. variations cannot occur, the peaks are clipped and harmonic distortion results.

In a transmitter plate supply we usually have but two condensers, the second one to a degree combining the functions of C_2 and C_3.—Tech Ed.

concerned, would be 8 μfd. with an allowable variation of plus or minus 2 μfd., which is exactly the practice adapted by the different manufacturers of the Raytheon approved power units.

But let us get back to the prime function of the final filter capacity of the B-eliminator—the control of audio quality.

Suppose, for instance, that there is a sudden demand for a fairly large amount of

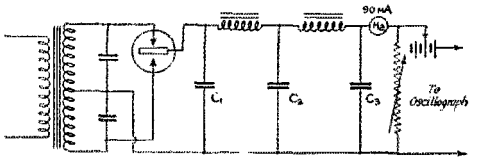


FIG. 2. SETUP USED IN OBTAINING OSCILLOGRAMS OF FILTER PERFORMANCE

The variable resistance is used as a load. The bucking battery prevents direct current from going to the oscillograph but passes the A.C. component freely.

additional energy from the B-eliminator, as would occur with the placing of a low frequency signal voltage of even average magnitude on the grid of the power tube. Due to the large time constant of the filter circuit, the variations in current required for the receiving set cannot be obtained through the filter chokes. In other words, the rectifier and filter, less the final condenser, must together be considered as a constant current device. The variations in energy required, must be taken care of, then, by the final or storage condenser. In such a case, when an increase of current is required, the condenser voltage will begin to fall off. Just how much the drop in voltage will amount to will depend entirely upon the increase in current demanded and the length of time thorugh which the demand exists. Thus, the worst conduction will be with a low frequency audio signal on the grid of the power tube. Here the time is long and the current change large.

Dellenbaugh, in his thesis on filter circuits states that the approximate variation under very bad conditions may be obtained by considering that a signal is received upon the grid so as to instantly reduce the plate resistance by some given amount; and that the signal then maintains this apparent resistance at a fixed value for a definite period of time. This period of time will never be more than one-half cycle; and, therefore, at fifty cycles it will be equal to 0.01 second. This half-cycle time will be called t. Since the change in tube resistance will reduce the voltage drop, the difference between the previous voltage, which we will consider the average delivered, and the resistance drop in the tube will be the condenser voltage available for reducing current.

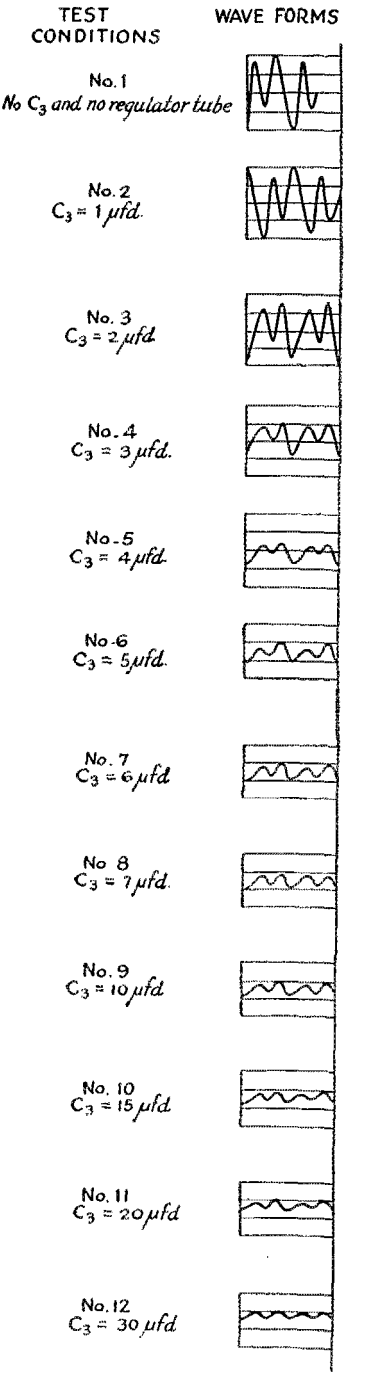


FIG. 3 – OSCILLOGRAMS OBTAINED FROM THE CIRCUIT OF *FIG. 2*

NOTE: *Load current in all cases 90 Ma*

t = .01 seconds for ½ cycle at f = 50
$E_{dc} - \Delta E$ = Condenser voltage difference upon arrival of signals.

$$V = (E_{dc} - \Delta E)\left(1 - \varepsilon^{-\frac{t}{RC}}\right) + E_{dc}\,\varepsilon^{-\frac{t}{RC}}$$

t = .01
$E_{dc} - \Delta E$ = 50
if E_{dc} = 150
and R = 5000
and C = 4 $\mu fd.$
then $V = 50\left(1 - \varepsilon^{-\frac{.01}{.02}}\right) + 150\,\varepsilon^{-\frac{.01}{.02}}$
= 110 volts at end of period
but if C = 20 $\mu fd.$
then V = 140 volts at end of period, only 10 volts below the normal 150.

Thus in the one instance, the variation in voltage amounted to 27% and the other but 7%. While the drop in one case is rather extreme, it is given to show just what a marked effect the value of C_3 really has on maintaining a constant voltage supply to the receiving set. Experimentally it has been found that with present high grade broadcast receivers using the UX-171 type of power tube that a minimum allowable value for C_3 commensurate with good reproduction is approximately 6 microfarads, and that slight improvement can be noticed as this value is increased up to about 10 µfd.

While, as previously mentioned, the above discussion applies but to transformer coupled amplifiers, a large value for C_3 is also important in the case of resistance impedance and other formers of amplification requiring constant current rather than constant voltage. Should the value of the terminal condenser in such instances be unduly small, oscillation will occur as a result of the common coupling due to the filter choke coils.

An attempt was made to determine the "equivalent capacity" of the 3-element gaseous Raytheon regulator tube.[2] (This type of voltage regulator tube eliminates the necessity for C_3.)

Two B power units of identical construction, except for C_3, or its equivalent, were connected as shown in Fig. 5.

Since the two power units are similar, their output should be similar with respect to ripple when C_3 has such a value as to produce the equivalent filtering action of the regulator tube. As the outputs are bucking each other, any ripple common to both power units will be balanced out (180° out of phase). If, then, the capacity of C_3 is varied until the minimum hum is heard in the phone, the equivalent capacity of the regulator tube will be equal to the value of C_3. As a result of tests with a number of different rectifiers and regulators in this circuit, an equivalent capacity of between 20 and 60 microfarads was obtained for a regulator tube of the Raytheon type. This apparently wide variation does not indicate a large variation in the action of the different regulator tubes, but, as will readily be seen from the curve in Fig 4, that any capacity between 20 and 60 microfarads has essentially the same effect upon the ripple value.

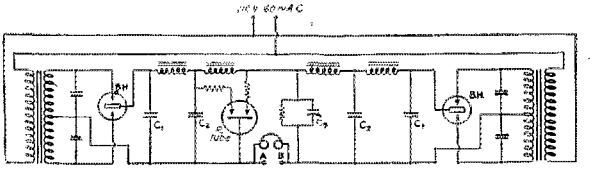
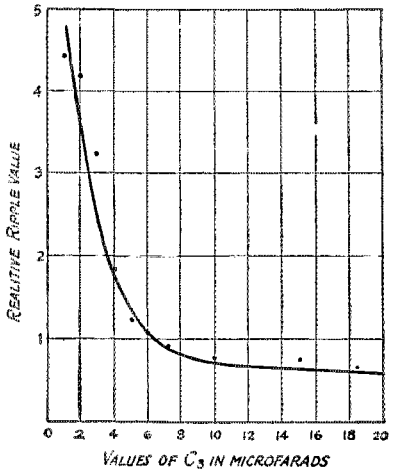
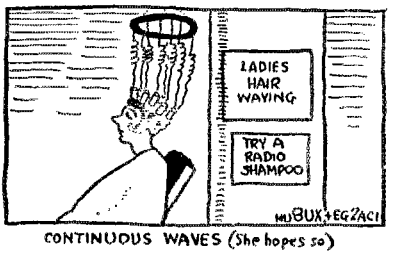


FIG 5



VARIATION IN RIPPLE VALUE WITH VARIATION OF CAPACITY C_3. *(See Circuit Diagram Fig. 2)*
FIG. 4

2. This tube works in a manner somewhat resembling the operation of the UX-874 regulator tube previously described in *QST*. The presence of a third electrode and a different system of connecting across the full system voltage thru limiting resistances shows that the parallel cannot be carried far. —Tech. Ed.



CONTINUOUS WAVES (She hopes so)

Experimenters' Section Report

THE Section has this time furnished us with three problem-reports, of which we hope to have at least two in this issue, though only one may appear in the section report. The reports in question are as follows:

Problem T-30	A 5 Meter Experimental Station, Norvell Douglas.
Special No. 2	A Portable Transceiver, Herman Radloff.
Special No. 1	A Low-Power Master Oscillator Power-Amplifier, Beverly Dudley.

One of these articles will be found below, the choice of the particular one being largely a matter of magazine make-up. The others will be found elsewhere in this or the following issue.

Lansingh & Stuedle,
Short Wave Radio Engineers,
Box 731, Hollywood, Cal.,
Dec. 28, 1927.

Experimenters' Section,
A.R.R.L., 1711 Park St.,
Hartford, Conn.

Gentlemen:

This is an open reply to Mr. Nightingale's letter on page 48 of January *QST* which I have just received. First, I want to thank Mr. Nightingale on behalf of the OWLS Committee; practically all letters received by 9XL, 1XM or the "X" Section regarding Standard Frequency signals pass through my hands sooner or later and I can testify that such letters are more welcome than a dozen "ur std. freq. sigs hrd hr" cards.

This question of accuracy will become increasingly important when our band widths are cut down, so I feel justified in taking space with the question where otherwise I would not do so. Mr. Nightingale observes "I much prefer the tone modulation now used on these S.F. transmissions to the pure CW used before, although I do think that the pure CW allowed a greater percent of accuracy on attaining true zero beat in the receiver". This is undoubtedly true, and I can congratulate Mr. Nightingale on considering the question of accuracy at all which is more than most amateurs do. But note the following:

In utilizing standard frequency signals, it makes no difference at all whether or not you have the receiver at zero beat with the incoming signal! The explanation is quite simple for those who happen to be interested in the *why*. Consider 9XL is transmitting on 40 meters; this is 7500 K.c. or 7,500,000 cycles per second as any table will show if you don't know how to figure it. Now, the accuracy which we try to reach (and exceed if possible) in OWLS-SF signals is 0.1 of 1%. One-tenth of one per cent is then 7500 *cycles*. You can now see that even if you have a beat note in your receiver of 1000 cycles (which is a fairly high note) with the incoming signal you still are adjusted to the incoming signals 7½ times more accurately than the fundamental accuracy of that incoming signal. So why worry about that zero beat? And even if the OWLS-SF should maintain a greater accuracy than they do, I'll bet I can count on my fingers the number of hams who have wavemeters capable of measuring and holding an accuracy of 0.1 of 1% on the high frequencies or short waves.

Now that our bands are soon to be so narrow and fractions of meters are becoming so important, isn't it time we dropped the wavelength designation entirely? Those who are not used to frequency, kilocycle or megocycle designations would very soon become so by exclusive use of those terms.

KILLIAN V. R. LANSINGH,
Member OWLS Committee in charge of SF.

MORE S.F. STATIONS WANTED

The OWLS Committee is interested in hearing from any persons who have crystals which are of a frequency very close to the boundaries of the 3500, 7000 and 14,000 Kc. bands that will become effective in January, 1929.

The purpose is to conduct later in the year special OWLS-SF transmissions on these particular frequencies more often than the regular OWLS-SF schedules are so that when the new allocations go into effect no one will have an excuse for not knowing where the boundaries of the new bands are. The idea, of course, is to use the crystal in a crystal-controlled transmitter. If you cannot give frequent schedules (though, unlike 9XL, each schedule would be short) your service would not be of much value; but if you have the crystal and not the time, you might combine up with someone else.

The Committee would also welcome communications from any one who has the necessary time, apparatus, and ambition to transmit schedules similar to 9XL's but on either the east or west coast. Though the Committee has no official standing outside the territory of the A.R.R.L., we would be glad to give our recommendation to the I.A.R.U. that any station outside North America be appointed an I.A.R.U. OWLS-SF, if that station is willing and able to undertake a similar service, and can give the same evidence of such accuracy and ability as we require from A.R.R.L. OWLS-SF.

Those interested in either of the above should write K.V.R. Lansingh, Box 731, Hollywood, California.

—*K. V. L. R.*

The 5-Meter Experimental Station 9EHT

By Norvell Douglas*

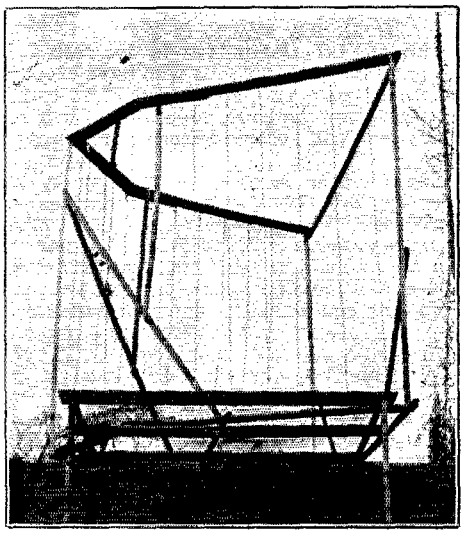
FOR several years 9EHT has been a 5-meter experimental station. Gradually this activity has pushed other radio work into the background until at present the station is purely a 5-meter one.

Earlier in the proceedings the antenna was of the usual "high harmonic" variety and while signals from this were heard very weakly on a few occasions in Connecti-

*Member Experimenter's Section, 9EHT, 1622 New Hampshire Street, Lawrence, Kansas.

cut and New York that antenna has now been replaced by a vertical "half-wave" (Hertz!!) with a reflector.

Reflector antennas are obviously impractical for amateur use on bands higher



THE REFLECTOR ANTENNA

Signals from this antenna were heard at the San Diego station of Don C. Goode by R. S. Kruse with a superheterodyne built by the author and R. S. Kruse and carried to the west coast by the latter. The reflector is mounted on a platform on top of the garage. It may be turned to any desired position in a few minutes. The feeders, which are spaced 5 inches apart on glass insulators, may be seen at the left. The antenna at the focus of the parabola is a ⅝ inch copper tube 78 inches long. The antenna current is between 1.5 and 2 amperes.

than five meters, but a five-meter reflector assumed a size that is not difficult to build or handle. Also, some of the difficulties encountered on this wavelength may be obviated by the use of a properly directed beam.

Last summer I built a reflector, hoping that something more could be learned about the peculiarities of five-meter signals. The photograph and Fig. 1 illustrates the reflector. It consists of a vertical current-feed antenna worked at the fundamental, placed at the focus of a parabolic reflector of 21 parallel wires spaced one foot apart. The length of the antenna and reflector wires is one-half wavelength minus a few inches to allow for loading due to the ground and objects in the field.

The parabola has a focal length of one foot. This gives a much sharper beam for a given aperture than a focal length of one-quarter wavelength. As the focal length is made less than one quarter wavelength, the reflector wire back of the antenna is put out of phase and the back leakage is probably increased, but the advantage of a highly concentrated beam obtained with a reflector that is not too large to handle overshadows these disadvantages, I believe. Fig. 1 illustrates the argument.

The antenna feeders are spaced 5 inches apart on glass insulators. The length is not critical and they are preferably left untuned. The separation of the feeders on the antenna is adjusted of best antenna current. When working properly there should be a voltage node at the center of the antenna coupling coil and *no pronounced standing waves on the feeders.*

Fig. 3 is a diagram of the field strength indicator used to explore the field around the reflector. Due to the location of the reflector 18 feet above ground, no curves could be obtained to show the complete field. Fig. 4, however, shows the field at the aperture of the parabola and gives an idea of the sharpness of the beam.

By raising the indicator vertically in front of the reflector, curve 5 was obtained. This indicates the usual low angle radiation from a fundamental vertical antenna.

During a limited number of tests, signals from this reflector have been heard in California, Hartford and possibly New York. This does not mean messages were transmitted; the signals were merely heard.

Numerous local tests conducted here in the last three years indicate that five-meter signals behave similarly to those of lower frequency except that the ground absorption is much greater. Signals are better in clear spaces, on hills or bridges as would

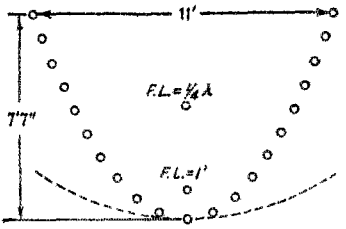


FIG. 1 ARRANGEMENT OF THE WIRES OF REFLECTOR. THE DOTTED LINE IS A PARABOLA WITH A FOCAL LENGTH OF ONE QUARTER WAVE LENGTH

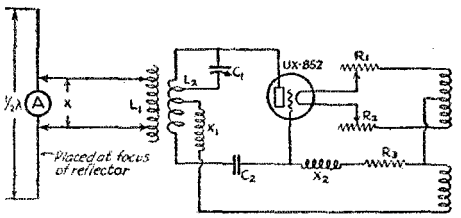
be expected, but in many instances fair signals have been received at the bottom of steep hills out of line of transmission.

THE TRANSMITTER

The Ultra-Audion circuit has always been used in the five-meter transmitters here because of its extreme simplicity. And simplicity is an essential at this wave length. As the grid-plate capacity of the tube is in series with the oscillatory circuit, a tube with low internal capacity should be

used. For this purpose the UX-852 can not be bettered for a low power transmitter. This tube in the Ultra-Audion circuit allows a relatively large primary inductance to be used, as can be seen from the photograph. The large inductance means that more energy will be put into the antenna coupling coil—and antenna where it is wanted.

The secret of success with the UX-852 is in the use of the proper grid leak. Nothing less than 20,000 or 25,000 should be used



X Separation of feeders on antenna. About 18"
L_1 3 turns ¼" copper tubing, 4" Diameter
L_2 2½ turns ¼" " " " "
C_1 See photograph
C_2 Not less than .0002. As "low loss" as possible
R_1=R_2 Keeps center-tap balanced. Wire wound-serves as r.f. chokes
X_1, X_2 See photograph. X_1 connected to L_2 at voltage node.
R_3 25,000 ohms for UX 852

FIG. 2 ULTRA-AUDION 5 METER TRANSMITTER

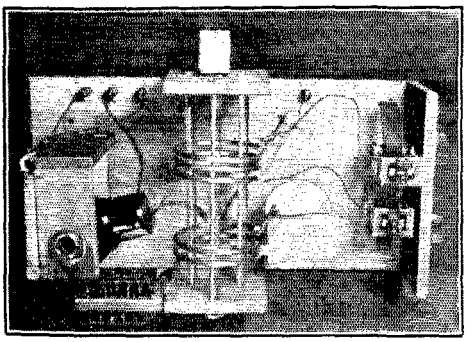
if the efficiency is to be kept high. One that will handle 10 watts is large enough. The tube shown in the photograph has been worked for hours at a plate input of 640 watts with no signs of excessive heating.

Five-meter signals are unsteady enough without any additional help along this line from the transmitter. If the filament supply is from a.c., some arrangement should be made to hold the voltage constant. Better yet, use d.c. We usually don't have much choice about the plate supply but one should use the best available. All leads should be as short as possible and rigid enough to not vibrate easily. The feeders and antenna should be pulled taut so as to cause no swinging.

THE 5-, 20- AND 40-METER SUPERHETERODYNE

A regenerative detector and one or more stages of audio amplification can not be used to any advantage at 5 meters because such a receiver is neither sensitive or selective enough, and not being selective allows the 5 meter noise level to become terrific. Obviously the difficulties may be overcome to some extent by adding more tuned stages. Since straight r.f. amplification with three element tubes is out of the question at five meters, the superheterodyne is the only solution (not considering super-regeneration).

The picture and Fig. 7 show the receiver we are going to talk about. The circuit is an autodyne detector with resistance

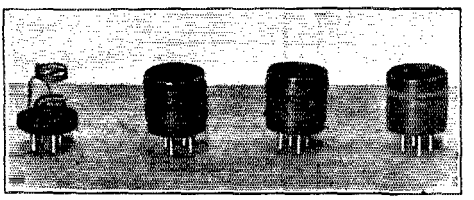


THE FIVE-METER TRANSMITTER

The ultra-audion circuit is used. The plate blocking condenser is made of 12, 1¼ x 2½" copper plates spaced ¼" apart on thoroughly dried hickory strips. The tuning condenser consists of one fixed and one moveable copper plate connected across two turns of the primary inductance. A set screw enables the plate to be locked after the wave is properly adjusted. The series condensers in the antenna feeders are shown in the picture, but are not used in practice.

control of regeneration, followed by two stages of 40 Kc. I.F., detector and two audio. Instead of heterodyning a signal at 1,000 cycles as is ordinarily done with detector and two audio alone, it is heterodyned at 40,000 cycles.

A five-meter receiver is essentially no different from a 20- or 40-meter receiver, but much more care must be used in building the former if decent results are to be



THE PLUG-IN COILS

The coils from left to right cover the following bands:

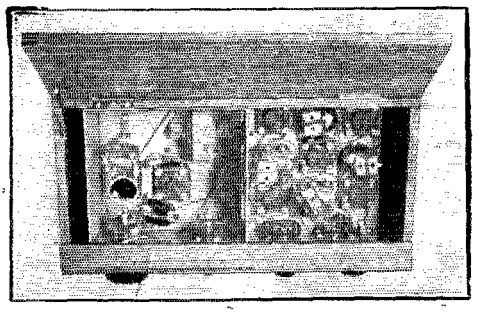
A	**4.9- 5.3**	**meters**
B	**23 -30**	**meters**
C	**17 -23**	**meters**
D	**30 -43**	**meters**

expected. Here are a few qualities that high wave receivers *may* have, but which all five-meter receivers *must* have if they are to be successful.

1. A metal panel or shield with the first detector completely shielded.
2. The first detector mounted on a sponge rubber with No. 30 leads to the

socket. The other tubes should be mounted on spring sockets. Don't overlook these features if you want to enjoy yourself while tuning a five meter receiver.

3. Noiseless resistance control of regeneration. Any other kind changes the



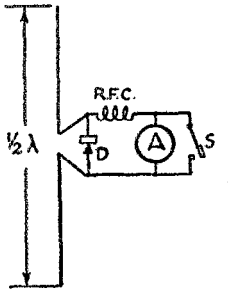
THE 5-, 20- AND 40-METER SUPERHETERODYNE
The autodyne detector is in the metal can at the left. This can has a tight fitting lid. The plug-in coils go into the socket to the left. The variable condenser to the right tunes the antenna circuit. For five meters, a long horizontal wire seems to make the best antenna. The variable resistance used to control regeneration is directly under the antenna condenser. The big honeycomb coil was used as the tuned input merely because no other kind was available at the time the set was built.

frequency and ruins ones chances of hearing signals.

4. A *good* vernier dial.

5. All leads as short as possible.

The plug-in coils allow the same receiver to be used on 5, 20 and 40 meters. Possibly the midget tuning condenser would cover the 80-meter band also. The coils are space wound on bases of defunct 201-A's. The



D *Carborundum detector*
A *0-1 Jewell milliammeter*
S *Shunt to protect meter*

FIG. 3 FIELD STRENGTH INDICATOR

diameter of the base was too large for the five meter coil so the shell was cut off and self supporting coils of No. 14 aerial wire were made. The coil was quickly adjusted for the desired band as follows: Both grid and plate coils were each given 4 turns of about one half inch diameter. One end of each was soldered to the base. The other end of each spiral made connection to the base via a small wire. With the coil in place in the receiver and the wavemeter handy, this small wire was slid around the spiral until the wavemeter indicates the desired band. At each measurement the dead end was cut off to avoid loading. The other coils were made in a similar cut-and-try manner. In the picture the grid coil is at the bottom.

At five meters, the superheterodyne handles as nicely as any 40 meter receiver. Two stages of audio can be used on the headphones as the noise level is surprisingly low. Signals from my transmitter can be heard with loud speaker volume at a distance of eight miles, while with a regenerative detector and audio they are just audible. At 20 and 40 meters the results were beyond expectations. Many distant stations seem to come through like locals. The noise level is also low enough to make high amplification possible.

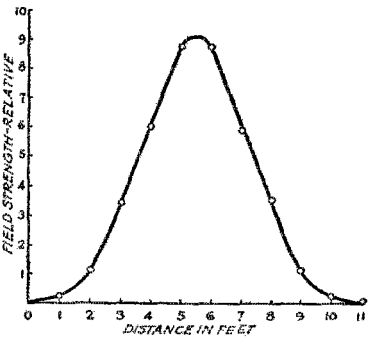


FIG. 4 - FIELD STRENGTH AT APERTURE OF PARABOLA

So much for the station as it stands. Of course it would not be true Experimental station if there were not plans for the future. These plans include work with horizontal antenna in a similar reflector to the one now used, also some 24 hour tests which have been long planned but until recently not possible.

After this one naturally asks, what is the profit of all this? The answer to that is not difficult, for enough stations excuse their existence by merely providing pleasure through conversations with other radio men. The 5 meter "game" has other advantages in addition—but that is a separate story and will be told as it came to our minds after many conversations by radio, mail and in person.

The Worthwhile 5-Meter Wave

By Norvell Douglas and Robert S. Kruse

TO CLAIM that something is worthwhile means that one must expect to be called on for a proof of the claim.

We being with the claim—

Nothing in A.R.R.L. is more encouraging or has been much more worth while than the steady pursuit of the elusive 5-meter wave by a group of our members—a group of which the present writers are proud to be members.

Very probably there will be raising of eyebrows at this, for there is a very general impression that "5 meters isn't good for anything". We have already said that we do not believe this, and will add that in our estimation 5 meter work has plentifully justified itself—and will continue to do so.

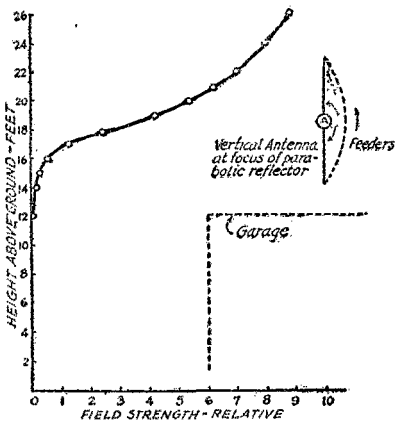


FIG. 5 - FIELD STRENGTH IN VERTICAL PLANE, 15 FEET FOCUS OF REFLECTOR

What is it that we expect of a waveband? What makes a new wave worthwhile?

One of the promptest answers will be—"Its communication value."

True—but a long way from complete. What, for instance, caused the opening of the whole territory below 200 meters? It was most certainly *not* a desire to operate stations down there, for everyone in the operating game (amateur and commercial alike) was dead sure that all waves below 200 were worthless and the person that tried to use them was a fool.

What actually caused the early cutting and trying at Washington and Minneapolis and Lawrence and South Manchester was a *desire to know.*

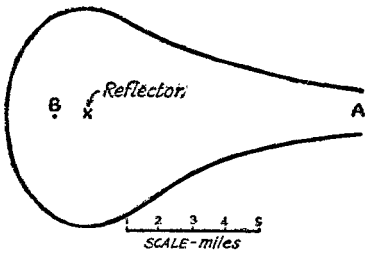


FIG. 6-APPROXIMATE LIMITS OF AUDIBILITY OF SIGNALS ABOUT 5 METER REFLECTOR. SIGNALS MAY BE HEARD AS FAR AS 15 MILES IN LINE WITH THE BEAM AT GOOD LOCATIONS BUT WIDTH OF BEAM COULD NOT BE DETERMINED BEYOND 8 MILES SIGNALS HAVE SAME STRENGTH AT "A" AND "B".

The men of this outfit who so persistently kept after the "useless" waves below 200 meters were not doing it to gain any particular benefit but purely to find out what would happen.

Enough things happened so that we scrapped all amateur radio, all theory about transmission and most of the commercial stations—and started telegraphic radio over again.

To expect such a revolution again is too much, but even now 5 meter work has paid for itself, though it receives no credit.

WHAT HAS BEEN GAINED

How many have ever given a thought as to the causes of our better information on methods of antenna feeding, our improved r.f. chokes, our non-crystal methods of stiffening oscillators, our better ways of keying without chirps, and the presence of

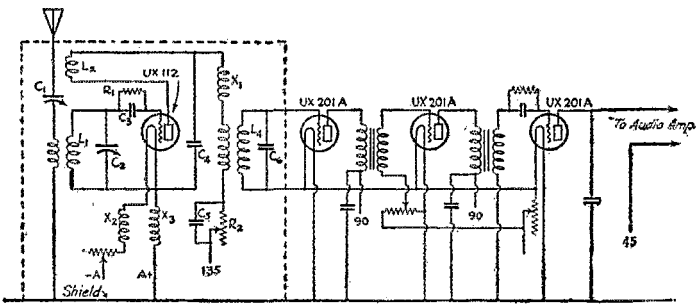


FIG. 7

a godsend known as the UX-852 tube?

It happens that they are all by-products of the 5-meter work. As far as *QST* is concerned, the question of chokes, stiffness of oscillators, chirpless keying, antenna feeding were all of interest but not of actual vital importance at waves above the 20-meter band—until 5 was tackled. There we *had* to have better information and when it was gathered together or found out by testing the 20-meter band benefited—and to a lesser degree so did 40 and 80.

As for the 852, our own 5-meter work was followed with interest by commercial firms (remember that "our" does not mean us two alone) and in checking on the results they found the need for a tube that would behave at waves below 20 meters. After everyone had taken a shot at several sorts of tubes the 852 emerged as a general amateur utility, helpful to the 5-meter man to be sure—but very fine at 20 and also at any wave for the lover of high plate voltage!

A less tangible thing has been gained, we have learned that the final test of any notion about transmitters and receivers is to try it at 5—there the defects are magnified and we learn faster. Of course one may object that if the same things are not bad at 40 they are not worth worrying about—but many small defects add up to make a poor station and one had therefore better learn where one may.

Just one point more—the increase in fraternal feeling between the experimenters in the U. S. A. and in other countries as well has seemed to receive unusual encouragement through the 5-meter game, nothing before seems so well to have taken hold of the experimental imagination. That too is worth while.

WHAT HAS ACTUALLY BEEN DONE

In talking these things over at Lawrence and by mail we have been surprised to find how little we have said in *QST* as to the testing and trying that has been done in Kansas, in Connecticut, in New York, by Ducati in Italy, by several men in France. It occurs to us that a story somewhat summing these things up may be worth while. It will be written, and if it still seems worthwhile will be told here.

Meanwhile it is too bad that only a few "X" stations can *legally* attack the forthcoming 10-meter band at this time.

PRIZE AWARDS

(Continued from Page 35)

Parmater Products, Lansing, Mich. $10.00
Transmitting coil for either 20-40 or 80 meters, or same value in other products.

Yaxley Mfg. Co., Chicago, Ill. $10.00
Two Nr. 444 Automatic power controls (Relay switch).

Leslie F. Muter Co., Chicago, Ill. $10.00
Two "Clarifiers" (audio output choke and condenser), or other Muter products of equivalent value.

Arthur H. Lynch, Inc., New York City $9.00
Resistance amplifier kit, or American tapped resistor, or heavy duty resistor.

Klosner Radio Corp., New York City. $8.75
Five sets of 5 type Universal sockets.

The Sterling Mfg. Co., Cleveland, Ohio $8.50
Sterling Model R-415 0-300 d.c. voltmeter.

Dejur Products Co, New York City $8.00
No. 110 Planofier (Resistance coupled amplifier).

Wireless Radio Corp., Brooklyn, N. Y. $7.00
Universal Panlkit (Metal panel, brown crinkle finish, 2 illuminated dials, rheostat, knobs and hardware).

Chas. F. Jacobs, Brooklyn, N. Y. $6.00
Twelve cage antenna spreaders, either 5 or 7 in. diameter.

F. W. Sickles Co., Springfield, Mass. $6.00
Three No. 30 shielded r.f. transformer coils (200-550 m.)

American Sales Co., New York City $5.70
2 Mesco Keys, 2 R.C.A. power rheostats, and 2 TB1 Kenotrons.

H. H. Eby Mfg. Co., Philadelphia, Pa. $4.50
Ten binding posts, any markings desired; six sockets either four or five prong type.

Strays

F. A. Hill, of Bremer-Tully, suggests that when connecting the lead from the audio transformer to the plate circuit of the detector tube in a short-wave set that it go to the "throttle" condenser side of the tickler. If it is connected directly to the plate, it is quite possible that the set will not oscillate at the shorter waves because the capacity of the transformer, etc. will be in shunt to the tickler coil and may by-pass too much energy around it.

For those who need resistors for dropping the voltage to the power stages to a value suitable for a crystal tube use, the G. E. sell some 11,500 ohm, fifty watt, units that cost about 60 cents. They are wire wound resistors and are known as Size C, Industrial Control Units, CR9000, Form P and PM. Your local electric shop should be able to get them for you.—9DAX.

Two or three of the 2-candle-power, 110-volt lamps used in G. E. time switches can be gotten from most every power company at 60 cents each. They have a high resistance and will make a good grid leak for the low-powered transmitter.—9DAX.

High School students should go and see their Printing Instructor when they want to have some QSL cards printed. In many cases they will be able to do the job themselves.—6BWS-6BYG.

6AM

By Don C. Wallace* and Robert S. Kruse**

THIS IS A STORY about a type of plate supply that does not blow filter condensers, because it does not use them. The idea is not new but has had very little attention in amateur transmitting stations which is rather remarkable. We, therefore, have the feeling that the plate supply system used at station 6AM will be of interest, which feeling is supported by the interest shown by the men at the San Diego convention where the scheme was talked over in open meeting.

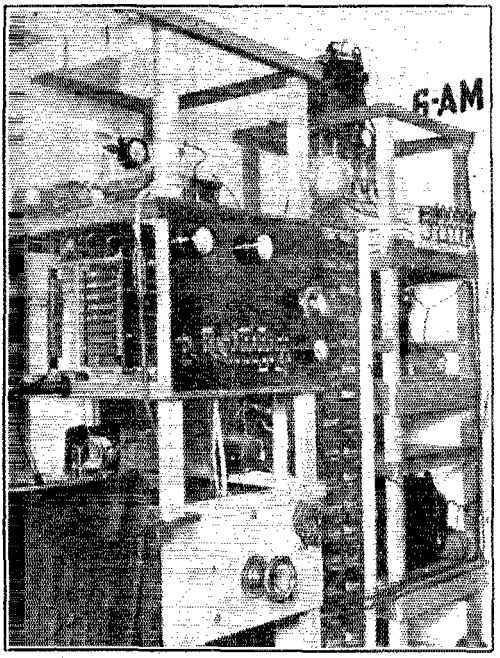
Naturally, the story falls into two parts, an explanation of the "why" of a system that seems rather complex at first and the description of the apparatus and its performance at 6AM. The second part of the story is naturally best told from personal experience at 6AM, therefore, you may be able to see joints in the story where we have put together the part written at Long Beach and the part written at Hartford.

Before going to an explanation of the meaning of the term "3 phase" we can gain clearness by thinking over the things we expect from a perfect plate supply. They are about as follows:—

1. Reliable operation without replacements or attention.
2. Good regulation, i. e. steady voltage.
3. A good heterodyne note-distinctive if possible.
4. Reasonable cost.
5. Ability to carry various loads.
6. Reasonable compactness.
7. Silent operation.

All of us will agree that none of our ordinary plate supplies pass all of these requirements, especially not the ones of reliable operation and good regulation. Let us see how and why they fail.

Usually we use 60-cycle supply current. We feed it to a transformer, step the voltage up, go thru a "full-wave" rectifier, then to a filter and finally to a set. If the voltage is below 1000 we have little to worry about, it is only necessary to make any of the ordinary systems amply big. If the voltage goes above 1000, the rectifier and filter both become troublesome. Certain of the rectifiers (electrolytic and gaseous) refuse to work well. The condenser of the filter system becomes quite expensive, causing us either to economize on the capacity and put up with bad regulation or blow condensers. (Of course we usually claim that the condenser was no good and write hot letters to the advertising manager—but secretly we know that it wasn't



THE OSCILLATOR FRAME (LEFT) AND POWER PANEL (RIGHT)

The Lewis water-cooled tube is unfortunately not visible though its discharge tube and the glass telltale in the waterline may be seen. The top deck holds the secondary inductance, filament transformer and primary coil. The tube hangs somewhat lower and on the next level is the large special V.C. The tuning cards are at the top of the frame. Each frame is 6½ feet high but only 24" square so that ample room is obtained with small floor space.

right to put 1500 volts a.c. plus key surges on a "1500 volts d.c." condenser.)

On top of all this there is the difficulty that *any* filter has an output voltage that changes with the load. When the key is up the filter will charge to the very peak voltage (1.4 times the ordinary transformer voltage) and when the load comes on (See Fig. 1c) this voltage will drop to some uncertain point that depends on the current drawn, the filter resistance, drop thru the rectifier, size of the filter condensers and a few other things. To keep the note inside the township we must use crystal control

*6AM, 279 Molino Ave., Long Beach, Cal.
**Tech. Ed. QST.

with its attendant complication and inflexibility, or at least use a large C/L in the tuned circuit with probably some sort of a load resistance to "waste the peak" and keep the voltage within reason. Now, would

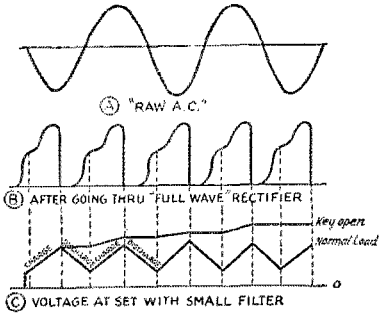


FIG. 1. CURVES TO SHOW HOW A "FULL WAVE SINGLE PHASE" MERCURY ARC RECTIFIER WITH FILTER OPERATES

Note that the output of the rectifier is anything but the smooth and beautiful curve ordinarily shown. The voltage curves of C are rough approximations only.

it not be nice if we could only cause the rectifier to give us some additional bumps of current which we could drop into those gaps in Fig. 1B, plugging them without any aid from a filter? In one moment we would be rid of the blown condenser, the unsteady voltage, the need for any "anti yooping" devices, the danger of a violent shock from a charge left in the filter after the set is turned off, and—this is important—we could key in the 110-volt line where keying is easy and where there is no key thump. On top of all this the rectifier will have less work to do for it will not be asked to stand the filter voltage on top of the transformer voltage.

NOT AS BAD AS IT SOUNDS

There remains only a pair of difficulties. Will this require any very special knowledge or skill, or will it cost too much? The answer to the first question is "no". One can probably build such a system from a reading of the present description. As to the cost, that depends on local conditions; the present story relates to the largest sort of supply that any amateur will need and a little arithmatic will show that it costs less than one would pay for the usual sort of supply with all the usual sort of trouble thrown in. Later on several suggestions will be made as to smaller sets and changes in the present one.

CONCERNING 3-PHASE SUPPLY

This is not a class in electrical power transmission, therefore, we will talk just as little about the meaning and uses of 3-phase supply as we may. Suppose that the 220-volt 3-phase power has been run into the house and we have before us the ends of the wires as shown in Fig. 2. A voltmeter will show that we have 220 volts between any two of these wires.

The voltmeter will *not* show us another and very interesting thing—that the voltage "peaks" do not happen at the same moment on the three wires. What actually does happen is as shown in Fig. 3A. We do not care now why this is so, but it is. If we rectify each phase in the usual "full wave" manner we will have a set of outputs that will look like that of Fig 3B. If these outputs are all fed to the same load the voltage to that load will look like Fig. 3C. It is rather easy to see that we hardly need to bother with a filter here—the ripple that is left is no more than one likes to have for the sake of removing the monotony of pure d. c.

THE DISTINCTIVE TONE

If d.c. is desired for any reason it is easy enough to get, a small condenser alone will smooth out the ripple without landing one in any of the usual difficulties. Being small the filter will load and unload promptly so that one may still key in the line, likewise

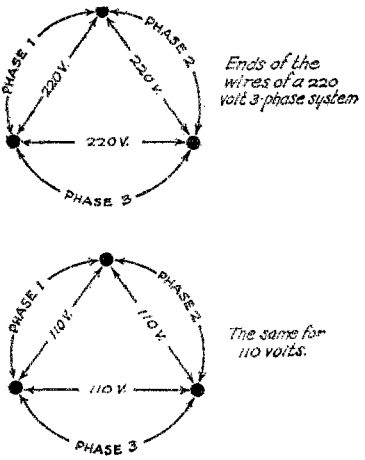


FIG. 2. WHAT IS MEANT BY A 3-PHASE SUPPLY

If the load and line are balanced the voltage between any two wires is the same, though the voltage peaks of the cycle do not occur at the same instants.

one can afford a condenser that will not blow up on the working voltage, especially as the working voltage is mostly d. c.

However, it is hardly desirable to use the smoothing condenser for some ripple

is rather pleasing to the ear of the receiving operator. Besides this one may by merely pulling switches on the various rectifier tubes adjust the ripple to secure (with 60-cycle supply) smooth tones of 360, 180, 120 or 60 cycles. The 360 will be a smooth note that is mostly d.c. The 180-cycle note will have about 70% of d. c. under it, while the 120- and the 60- cycle note will be the ordinary full-wave and half-wave "unfiltered r.a.c.". By closing 4 or 5 of the switches it is also possible to obtain 240 or 300 ripples per second but they will not be evenly spaced and the note is rather odd.

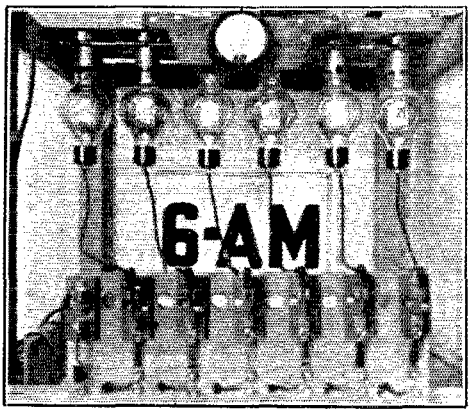
For 50-cycle supply such as is used at 6AM the corresponding pitches are 300, 150, 100 and 50 with the odd "notes" at 200 and 250.

THE START

Many of you do not realize that in most cities, at least, it is comparatively easy to get 3-phase current wired into a home. In southern California all that is necessary is to make a deposit of $10 which is refunded after one year. The minimum meter-charge is $3 per month. Inquiries made of generating and distributing companies in other parts of the country have produced varying results but in general the attitude seems to be that if the 3-phase power is nearby they are willing to run it in at a moderate cost. Naturally, a 1 kilowatt load will hardly cause them to feel enthusiastic about setting a line of poles and putting in a line at a cost of several hundred dollars. Where that is the case one had better refer to some of the suggestions farther along in this story and then make out a list of costs on the various possible schemes, being sure to make one for the ordinary single-phase system which is usually more expensive than the owner realizes.

THE 6AM INSTALLATION

The installation at 6AM supplies each of the 6 rectifier bulbs from a separate transformer. Of course, 3 transformers with center-tapped secondaries could have been used, as could a single 3-phase transformer with 3 center-tapped secondaries, one for each phase. The power rack therefore, looks rather more impressive than might be the case at other stations. When one considers that old power line transformers are just about the cheapest form of equipment that an amateur can buy, the economy of getting old line transformers and mounting them on a rack as shown is very evident. The bottom shelf of the power rack (see photos) has on it three one kilowatt power-line transformers with 220-volt and 6600-volt windings. These are transformers whose core losses had increased until the Edison company at Alhambra junked them. High core losses are of course not serious for the intermittent service of a radio transmitter, in fact the average amateur equipment is probably not very good in this regard. The insulation of such transformers is fine and they may be purchased for $7.50 each by anyone. The cases and oil were removed. There are of course 6 transformers in all, the other three being on the third shelf up. It frequently happens that the three phases do not deliver exactly the same voltage, or else that there is a difference in the transformers, so that the voltage from each is not the same. On the transformer shelves will be seen some coils that contain odd pieces of iron. These are chokes placed in series with the primaries of two of the transformers which deliver too high a voltage. (See Fig. 4.) Nails, bolts and other pieces of iron were placed in these coils until the output (current through rectifier tube) was the same for these as for the others. A hammerhead was used in one!



THE RECTIFIER BANK, SIX OF THE "6EX RECTOBULBS"
The filament voltmeter is above the bulbs, the cutoff switches below.

THE RECTIFIER

Just as the ordinary "full wave" rectifier calls for one rectifier tube for each phase (considering the two halves of the center-tapped secondary as two opposed phases) so this set calls for one tube for each phase.

Our ordinary rectifiers use one tube for "half wave" or two tubes for "full wave" rectification. That is for a single phase supply. Naturally, when we have a 3-phase supply there will be needed 6 tubes for full wave rectification. We could use half wave rectification of course, which would only require 3 tubes, (and in the 6AM arrangement only 3 transformers) and would still give a very smooth output with a large proportion of d. c. in it—considerably larger than our ordinary systems.

The tubes used in the 6AM installation are the Rectobulbs manufactured by G. W. Lewis. The filaments draw 6 amperes each at 10 volts, which means that the filament transformer must supply 36 amperes at 10

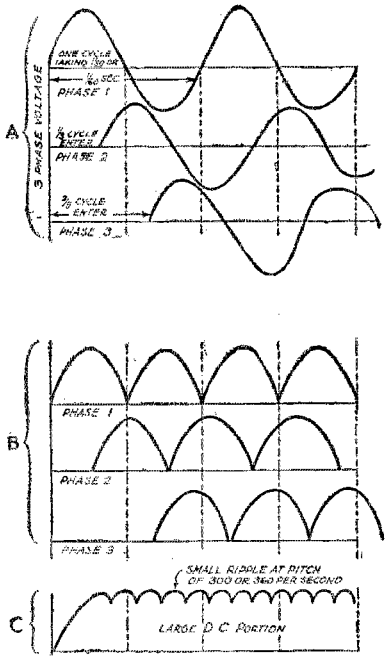


FIG. 3. THE MANNER IN WHICH A 3-PHASE FULL-WAVE RECTIFIED PLATE SUPPLY OPERATES

This may also be called a 6-phase half-wave supply.
A—The three phases before rectification.
B—The three phases after rectification.
C—The three rectified phases combined for feeding to the tube.

volts or 360 watts, besides which it must of course be insulated for the full plate voltage of 6600. Rather than wind a special highly insulated transformer a 3-kilowatt line transformer was used. It has two low-voltage windings of No. 10 wire and these are worked in parallel. 220 volts are applied to the high-voltage winding and 22 volts taken from the secondary, a suitable rheostat R_2 being used to reduce this to the desired 10 volts. That rheostat is shown at the bottom of the transmitting rack. It controls the filament of both the Rectobulbs and the oscillator tube to compensate for line voltage variations. Separate adjustments for each are provided by the iron-cored chokes L_3 and L_4. By referring to the way in which the Rectobulbs are hooked up it will be noted that one filament supply lead goes to the right end of one bus and the other supply lead goes to the left end of the other bus. In this way identical voltage to all tubes is assured.

When using a plate voltage of 6600 it is dangerous to key in the so-called center-tap as someone may forget at the wrong moment and touch the set when the voltage is on though the key is open. Keying is therefore handled by a Leach relay which breaks two of the three lineleads and therefore opens all phases. The extra contacts of the Leach relay are used to break the receiving aerial so that break-in can be used at any time.

The smoothness of the keying is assisted by the 600-ohm resistance R3 in the plate lead. This resistance consists of three 200-ohm potentiometers in series. Before proceeding to the necessary tests of the transformers it may be well to finish describing the station.

The gridleak resistance R_4 is a 5000-ohm Lynch type P resistor.

R_5 is a makeshift center-tap for the Rectobulb filaments. It is an 8-inch piece of the coiled wire from a burned out electric hot plate. The three limiting resistances R_1, R_2 and R_3 prevent sudden surges such as sometimes result from throwing an un-excited transformer on the line. They, therefore, help to smooth the keying but do not particularly affect the circuit otherwise as their resistance is only 2 ohms each.

Any chance of a serious arc thru a damaged rectifier or oscillator tube is avoided by the ¼-ampere fuses F_1 in series with each tube. In case the rectifier system should ever be out of order an airbreak switch has been provided in series with each tube and finally if it is desired to operate without any rectifier one may close an extra switch (7) and operate with "raw a. c.". This switch is also fused to protect the oscillator tube.

Radio frequency voltages are kept from the rectifier by means of the chokes and by-pass condensers shown in the diagram. This aided in clearing up the note. Chokes RF1 are made of 200 turns of No. 30 d.c.c. wire on a 1" tube, the turns being spaced with thread. The by-pass condenser consists of two UC 1015 RCA condensers in series, giving a capacity of .00025 μfds.

Radio frequency is kept from the line as far as possible by additional chokes. In the oscillator filament transformer primary are chokes RFC_2 which have 200 turns of No. 16 d.c.c. on a 1¼" tube. In the main line are chokes RFC_1 which are wound of 200 turns of No. 12 d.c.c. on a 1¼" core.

Each of these chokes has been of further aid in cleaning up the note and by preventing r.f. from getting back into the line, prevent the station from bothering neighboring BCLs. The transmitter is clickless as it is

keyed in the primary. Anyone 50-100 yards away is not bothered as far as we know.

THE OSCILLATOR AND ANTENNA

The oscillator is a water-cooled tube, also made by Lewis of 6EX.

The waves regularly used at the station are 79, 39 and 21. The station can also be operated at 5 meters though the shift to that wave is not so prompt. At the top of the oscillator frame may be seen 4 cards that look like postals. These are charts, each bearing the information needed for setting to one of the waves named.

The antenna is a 1-wire horizontal approximately 62 feet long, split at the middle so that is becomes two 31 foot lengths. Where they meet at the middle they connect to a 2-wire r.f. line 60 feet long and spaced 4". The two National transmitting condensers C3 are tuned so that there is a node at the center of the coil L_2—the test being to see where no spark can be drawn by a pencil. To find out if the antenna and feeder are of the proper length one only needs to short across the two feeder wires at X, Figure 4. If the condensers still tune to the same place, retaining resonance, everything is right. If the shorting of the r.f. line at X does not give these results, change the length of the antenna. (Shunt the r.f. meter while making this test.)

Apparatus not appearing in the photos includes the receiver and the transmitting keys. The receiver is a copper shielded affair with a stage of r.f. made of and along the lines of the National-Browning-Drake sets but modified for short wave c.w. Without this receiver, European reception in the 40-meter band was rather scarce but the r.f. stage has materially improved matters so that signals from Europe have been received as high as 10 nights in a row. There has lately been added another shielded set with a stage of UX-222 r.f. that seems to be giving splendid results.

The keys are numerous. There are several hand keys, an Omnigraph for sending test signals, and an Electro bug, any one of which may be used to operate the Leach relay. The Electro Bug, which makes any number of dots evenly and automatically was won in the code sending contest at the A.R.R.L. convention in San Diego.

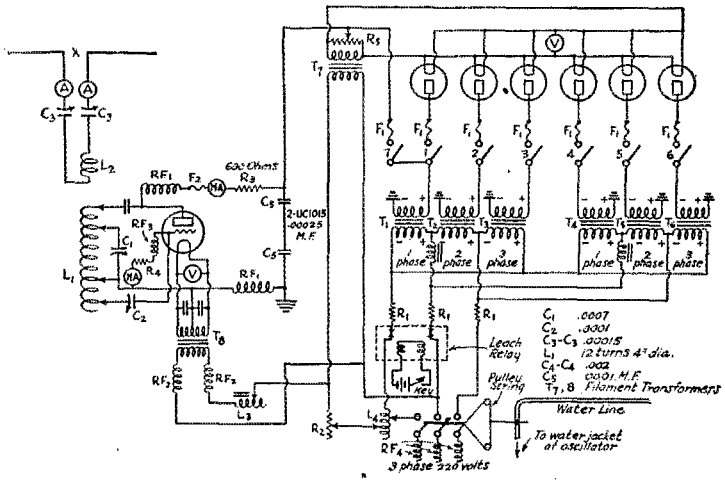


FIG. 4. COMPLETE DIAGRAM OF TRANSMITTER AT 6AM

It is to be understood that the separate ground shown on the oscillator and on the plate supply secondaries are actually one ground bus. The water-supply for cooling the oscillator is mechanically interlocked with the 3-phase power-supply switch so that the power and water go on and off together. The constants not given here are explained in the text.

T1, T2, T3, T4, T5, T6—plate supply transformers 220-6600 volt.

T7, T8—Filament transformers.

L1 and L2 Tuned circuit inductances suited to wave in use. C1 Special high voltage condenser with spacing of 1 inch and maximum capacity of .0007 μfd.

The other variable condensers are all of National make with capacities as follows, C2 .0001 μfd., C3-C3 .00015 μfd each.

The plate stopping condenser is of mica as is the rectifier by-pass condenser C5-C5.

F1 and F2 are 3" lengths of ½-ampere fuse wire.

TRANSFORMER TESTS

Returning now to the plate supply we will take up some points that may easily be very puzzling.

The marking of the transformers as to polarity is usually not clear and it is best

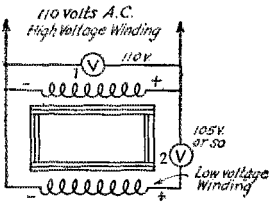


FIG. 5. TRANSFORMER POLARITY TEST CIRCUIT When making tests be sure to tag each transformer as a mistake is serious.

to make tests to avoid considerable danger. The testing scheme is shown in Fig 5. Nothing is necessary but one meter able to measure in the neighborhood of 110 volts a.c. The diagram shows two meters but that simply means that the same meter is connected on in two ways. First connect the 110-volt line to the transformer as shown in Fig. 5. Measure the line voltage and then connect one side of the secondary winding to one side of the primary, thereby putting the two windings in series—either aiding or bucking. Now measure the voltage in position 1, which is simply a check on what you did before. Then measure at position 2. If the voltage is lower than it was in position 1 the two windings are bucking and the polarities are as shown. Otherwise reverse the connection of the secondary winding until these results are obtained.

Caution—Before doing anything be absolutely certain you know which is the high voltage winding and be sure to connect the 110-volt line to the winding. If you get the wrong winding there will be some thousands of volts across the other winding and someone will be killed.

If you are sure to connect the 110-volt line to the high-voltage (small wire) winding you will have a stepdown transformer and the voltmeter will simply read about 5 volts more or less in position 2 than it did in position 1—and neither 115 not 105 volts is dangerous.

FURTHER TESTS

Having tested *and tagged* all the transformers as to polarity it is well to make some rough tests as to the goodness of the windings. For instance one may connect the low voltage winding of a transformer to the line through a large rheostat (carbon pile—salt-water—flatiron) and *with a long stick of dry wood* push the high voltage wires toward each other. It should be possible to draw a good hot arc.

Another test is to put the line into the high-voltage winding (just as in testing polarities) and measure the voltage of the low-voltage winding with a filament voltmeter. By switching around to the various taps one may find a combination such that all the transformers will (with the same line voltage) give the same secondary voltage. Use these taps later on in the set.

ADJUSTING

After the transformers are tested, put into place and connected and the tubes all found to light properly, the switches are thrown in one at a time. If the output remains the same on any one of the switches then the resultant note will be even and smooth. Before trying this it may be necessary to tune up with all switches in and

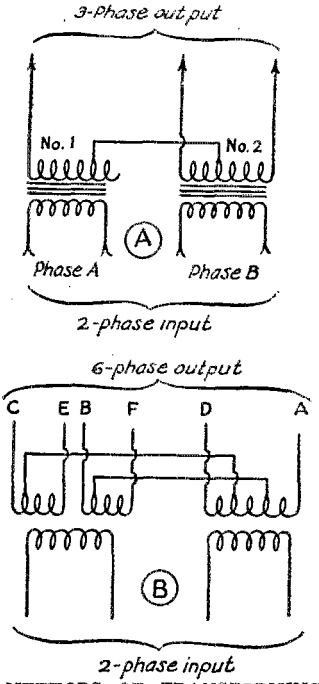


FIG. 6. METHODS OF TRANSFORMING FROM 2-PHASE TO 3-PHASE AND 6-PHASE POWER A. Scott connection from 2-phase to 3-phase. B. Two-transformer method from 2-phase to 6-phase.

the tone anything that it may be. Any irregularities may be corrected for with the devices that have been suggested, provided no transformer connections are wrong.

When properly adjusted the system gives a note that is entirely free of the annoying "creeping" that results when two tubes are worked back to back, and the system has none of the delays connected with an m.g., which generally spoils break-in altogether. The various notes can be secured by working the switches as mentioned before.

If our bands are reduced in size—as seems certain—a distinctive note, especially if steady, will be an even greater asset than at present and it will be especially convenient to be able to change it. Incidentally, even if two stations use this same system they need not sound alike at *any* time. For instance in Minneapolis the highest note will be 360, in Buffalo 150 and in Southern California 300. Inasmuch as the filter may be connected to any of the various combinations—and that filter may be of various sizes—the combinations are very numerous, while always retaining the advantages.

In the installation as it has been described various amateurs helped with suggestions and with their hands. Especially should be mentioned Messrs T. E. Nikirk and G. W. Lewis of 6KA and 6EX respectively. The various more or less theoretical points and information as to the attitude of power companies are largely from engineering literature and from the advice of Mr. Harry Thompson of the Hartford Electric Light Co.

OBTAINING 3-PHASE SUPPLY

For those who desire to use a 3-phase supply but do not think it is convenient to have such power wired in there are several

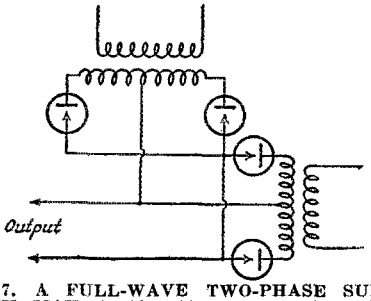
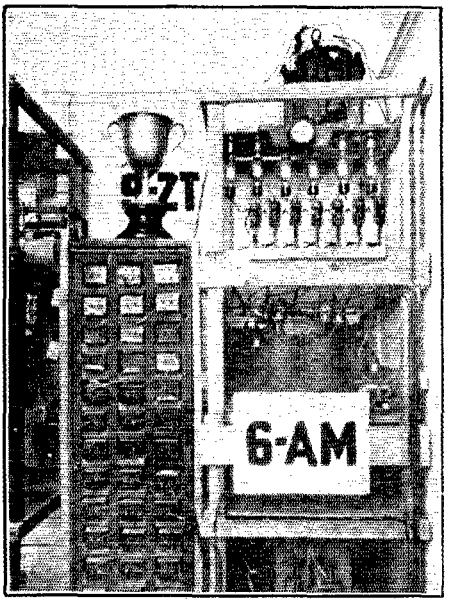


FIG. 7. A FULL-WAVE TWO-PHASE SUPPLY WHICH MAY ALSO BE CALLED A 4-PHASE HALF-WAVE SUPPLY
To be used where 2-phase instead of 3-phase power is available.

alternatives, all of them depending on converting some other form of power into 3-phase power.

Of these methods the simplest by far is to start with two-phase power, converting it to three-phase by means of transformers alone. Probably the simplest way of doing this is the so-called "Scott connection" which employs two transformers with tapped secondaries. Referring to Figure 6A the transformers No. 2 is center-tapped and the lead from that tap goes to a tap on the secondary of transformer No. 1. The num-



THE FILTER BANK AND POWER PANEL
The rather impressive condenser bank is not often used. It is made of many low-voltage old-style condensers and has a total capacity (with present connections) of 1/3 μfd, which is ample to turn the note of this station into "pure d.c. ", showing the great ease of filtration. In the power panel we have from top to bottom, 3-k.w. transformer used for Kenotron filament supply, bank of rectifier tubes, one group of high voltage transformers, some chokes, second group of high-voltage transformers. The cup and the 9ZT card are Minneapolis souvenirs.

ber of turns *used* on the secondary of No. 1 is 87/100 of the number of turns in the *whole* of the secondary of transformer No. 2. The dead end of the secondary of transformer No. 1 is of course useless. It will be noticed that the arrangement just described had but three output terminals and would therefore operate with 3 rectifier tubes and with somewhat more ripple than the 6-tube arrangement at 6AM. As a matter of fact the supply at 6AM is correctly referred to as a 6-phase half-wave supply, rather than a 3-phase full-wave. In order to obtain a 6-phase supply from a 2-phase source one would need to use another Scott-connected pair of transformers to supply the other three terminals, or else one might make the 2-to-3-phase transformermation at low

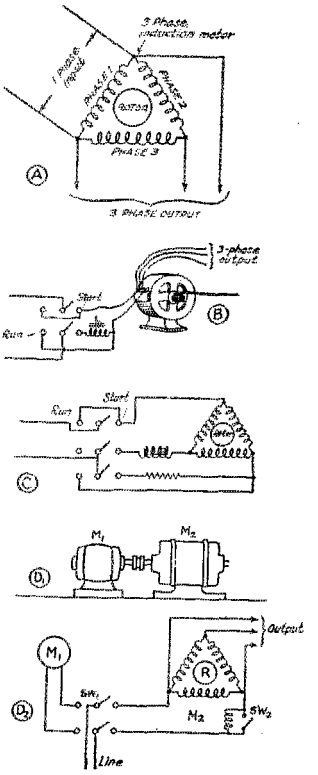


FIG. 8. METHODS OF OBTAINING 3 PHASES FROM 1 PHASE WITH THE AID OF A 3-PHASE MOTOR

The same methods will work with a 2-phase motor in transforming from 1 to 2 phases. The motor has been shown as having a delta stator winding and a "squirrel cage" rotor but other types may be used.

A. General scheme. Single phase supply is fed to two of the stator terminals and when the motor is running 3 phase power may be taken from all 3 terminals. Phases 2 and 3 will have lower voltage and if the load is heavy this must be corrected for with resistance, chokes or transformer taps.

B. Simplest method of starting the motor with a cord wound around the shaft. The starting current is limited by L to a value not over twice the normal running current. L may be replaced by a resistance.

C. A split-phase method of starting. The method is not sound but has been used in the case of a 2 h. p. 3-phase motor with delta stator, both L and R being of such proportions to hold the starting current to about 2¼ times normal. The switch was in the starting position about 20 seconds.

D. A better method of starting. M1 is a motor whose speed is near that of the induction motor, but it should be of a sort not taking a large starting current. The connection may be by belt but there will be some difficulty with this and a coupling is to be preferred. One of the many possible connections is shown at D2. L may be a resistor or it, with SW2 may be omitted. The procedure is—close Sw1 to left, after a moment close it to the right, then close Sw2. The timing must be tried out.

voltage and then go to the step-up transformers in one of the various fashions suggested previously.

As an alternative to this one may convert to 3-phase and step up at the same time with only two transformers, which must have the connections shown in Fig. 6B. This becomes complex and of doubtful advisability.

Before starting in on any of these arrangements it is best to gain a preliminary idea of the desired arrangement (current distribution etc.) by looking through some convenient reference book such as, for instance, the Standard Handbook. In the 4th edition the reference is Section 6, paragraphs 136 to 139, pages 406-408.

THE USE OF 2-PHASE SUPPLY UNCONVERTED

As a matter of fact the whole business of conversion from 2-phase may be questioned. Unless one is greatly concerned with the desirability of a high-pitched tone without the use of any filter at all or any mechanical device to produce the tone it may be just as well to use the two-phase supply "as is", simply driving a "fullwave"rectifier system from each phase with the connections as shown in Fig. 7. This is of course a "two-phase full-wave" or a "4-phase half-wave" system. It is gifted with as high a percentage of d.c. as is "3-phase half-wave" (3 switches in) arrangement at 6AM and has a somewhat higher pitch. In both regards it aproaches the full 6-tube arrangement.

2 OR 3 PHASES FROM 1 PHASE

All of this may seem more interesting than useful since the usual house supply is *neither* 2 or 3 phase but ordinary single phase, either 2- or 3 wire, which is to say either 110 (or thereabouts) or else 110+110 =220.

It is possible to convert such supply into more phases by a combination or transformers, resistors, chokes and condensers but the arrangement is expensive and not flexible, that is to say it will not carry a load differing much from the design load. As soon as the load is changed the voltages and phases all get out of gee. This sort of thing is of no good in an amateur station.

A more practical arrangement would be to have either—A.—A single-phase motor driving a 2- or 3-phase generator. B.—A rotary phase converter made from an induction motor.

The first arrangement needs no comment. It seems to have almost all of the possible advantages and none of the defects of the high-voltage d.c. generators, in addition to which almost any sort of power can be taken from it for all sorts of purposes. However, the motor takes a large starting current unless we have starting equipment and we must pay for two comparatively large machines.

Sometimes it is simpler to use the rotary phase-converter.

ROTARY PHASE CONVERTER

Any 2- or 3-phase induction motor can be used as a rotary phase-converter. Such use is not new and has been previously suggested in *QST* (April, 1924) by C. P. Sweeney for use in connection with a 3-phase mercury arc to provide a filter-less plate supply.

The scheme is briefly to feed single-phase current into two of the leads of the stator winding and to draw 2-phase or 3-phase output (depending on the construction of the motor) from all of the leads. The motor must be running when in use and since it will not start on one phase alone there must be some way of starting it. The diagrams suggest various ways of doing this without drawing enormous currents. The motor may be started in so simple a manner as by merely giving the shaft a twirl by hand or by a short rope wound around the shaft. There should be some sort of limiting resistance or choke in series to hold the current down until some speed has been gained, when the limiter may be shorted out.

If the motor is larger than ¼ h.p. this hand spinning becomes quite a chore and one longs for some way of starting electrically. The obvious way is to run the motor up to speed by means of another

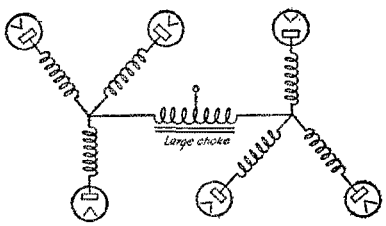


FIG. 9. A FURTHER REFINEMENT OF THE 6-PHASE SUPPLY SCHEME USED AT WGY AND OTHER COMMERCIAL STATIONS

This scheme is adaptable to 6 separate transformers such as are used at 6AM. The choke has an iron core and its two halves are closely coupled; its purpose is to buck out the even harmonics. Such a system when well balanced may be used for speech transmission without any filter at all, though it is desirable to use one for high-quality work. The filaments are as usual center tapped, connected together and run to the "+" of the set; the center-tap of the choke is the "—" terminal.

motor which is meant to run at the same speed (or within a reasonable distance thereof) and which does not demand an outrageous starting current. This may be a repulsion motor, repulsion-induction or universal. The only requirement is that it may be coupled or belted to the phase-converter, be able to run the converter up to such a speed that it will "take hold" and promptly go on up to full speed, after which the starting motor must be able to stand running continuously at the speed of the converter—though the starting motor is of

RELATIVE ANTENNA CURRENTS IN FEED WIRES - 6AM

RECTOBULBS	SUPPLY FREQ.	PHASES	WAVE	NOTE PITCH	ANTENNA AMPS.
Any one switch	*50*	*Single*	*Half*	*50*	*3.0*
No 1 and No. 4	*50*	*Single*	*Full*	*100*	*4.0*
No. 1, 2, and No. 3	*50*	*Three*	*Half*	*150*	*4.6*
No's 1, 2, 3, 4, 5, and 6	*50*	*Three*	*Full*	*300*	*5.5*
The above may all be filtered into D.C. or near D.C					
Raw A.C. No. 7	*50*	*Single*	*Half*	*50*	*3.1*
A.C. may not be filtered and remains A.C.					

FIG. 10. CHART SHOWING PERFORMANCE OF THE RECTIFIER

course disconnected from the line.

The diagrams of Fig. 8 also show how it is possible to get a start without either motor or handwork, but the usefullness of these methods depends largely on the size and the design of the induction motor used as a converter.

BALANCING

A little thought will show that when we use the rotary phase converter scheme we draw 1 phase straight from the line while the other one or two are obtained by a species of transformer action. Naturally when a load is put on, the voltage of the "legitimate" phase will hold up better than that of the induced ones. This tends to make the system an unbalanced one so that the original phase will always have the higher voltage. This can be compensated for by exactly the methods used at 6AM, the setting being made for normal load. If the load is changed, re-adjustment will be necessary. Partly and fully automatic systems can be arranged to do this but are not worth while at small loads.

Naturally the balance is best if the machine is large as compared to the load. In any case the machine must be big as compared to the load, because of heating effects. The part of the winding connected directly to the line will draw more current than if it were only attending to its own 1/3 of the work in the usual manner, and a good general rule is to operate the machine at something like 1/3 its rating. Putting it differently a 1 h.p. motor (746 watts) ought to be able to supply something like 250 watts of 2- or 3-phase current without undue heating or unbalance. This is very general indeed and the design of the motor will change

(Continued on Page 55)

A Single-Control Device

By Warren E. Danley*

THAT there is a popular demand for single control is generally recognized. Furthermore, from the standpoint of manufacturing costs, single control has an advantage over multiple control, notwithstanding the necessity of somewhat greater refinement in manufacturing processes. In practical operation with the variety of aerials installed by set owners, full efficiency has only been obtained when there has been some provision for an auxiliary adjustment of the tuning of the stage immediately connected with the aerial.

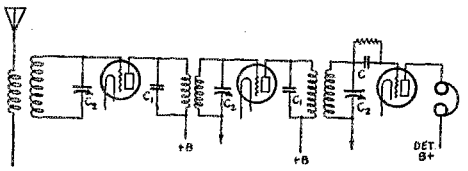


FIG. 1. SCHEMATIC DIAGRAM SHOWING THE IDEA APPLIED TO A SET WITH A TWO-STAGE R.F. AMPLIFIER

The condensers C_1 C_2 are the ones referred to in the text. Grid-returns, etc., have been omitted to simplify the diagram. In the actual set the tuning condensers C_2 C_2 C_2 would be connected mechanically.

In effect, this has constituted dual control.

I have developed a radio frequency amplification circuit which makes possible single control. In respect to both selectivity and amplification, the circuit seems slightly superior to the common transformer-coupled tuned radio frequency circuit.

An adjustable condenser C_1 (not variable in the customary sense) is shunted across the primary of each of the radio frequency transformers which follow the aerial stage, as shown in Fig. 1. When the set is connected to an aerial, these condensers are adjusted so that the natural frequency of these primary circuits is the same as the natural frequency of the aerial circuit. This is a simple adjustment, correctly made when maximum response is secured for any station, preferably a distant one of relatively low wavelength. With the correct adjustment, there are nearly identical coupled circuit effects in all the radio frequency stages, given coils and tuning condensers which are mechanical equivalents. Accordingly there is no need for an auxiliary control of the tuning of the aerial stage, for identical variations of the capacities in shunt with the secondaries of the several transformers will produce identical tuning effects in all stages.

*Consulting Statistician, 155

In an aerial circuit there is, of course, some inductance in addition to that of the primary winding of the first transformer. From the theory of coupling, it follows that, given transformers which are mechanical equivalents, that the coupling in the first stage is somewhat looser than that in the following stages. Therefore, theoretically, there should be some way of equalizing the several couplings. Practically, however, the couplings are commonly so loose that there is no necessity for coupling adjustment. In other words, given relatively loose coupling, the tuning of the individual circuits is much more important in determining the frequences to which the coupled circuits will resonate than is the exact degree of coupling.

The gain in selectivity suggested above is appreciable at the higher frequency settings of the tuning controls. This may possibly be explained as follows. In the common r.f. amplifier the coupling is not very great and the natural frequency of the primary is of such a high order that the coupled circuit effects are somewhat weak and the reactance curve of the secondary tends to become similar to the curve A of Fig. 2. This curve is simply the reactance curve of a series-tuned circuit and is taken from Fig. 26 of circular 74 of the

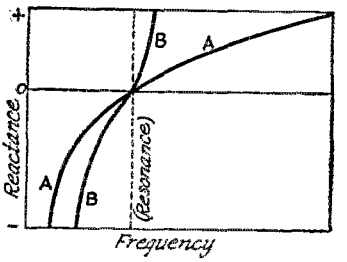


FIG. 2. REACTANCE CURVES

A. Series circuit such as R.F. secondary.
B. Combined series circuit and parallel circuit such as the tuned primary used here.

Bureau of Standards. When the primary is made resonant to a frequency materially nearer the secondary frequency there is a stronger coupled circuit effect similar to that shown in Fig. 2 B, which shows a reactance curve much sharper than that of Fig. 2 A. (Fig. 2 B is taken from Fig. 30 of the Bu. Stand. circular 74.)

A test of the circuit does not require a single control setup. In fact, a test run on a radio frequency amplifier built of matched individual condensers and matched coils will yield the best possible demonstra-

tion that the several stages can be made to tune exactly alike throughout the range of the receiver. In general, capacities substantially equal to the capacity of the aerial used are required for tuning the primaries. To compensate for stray and different tube capacities, it may be necessary to make some provision for shunting small fixed capacities across the secondary tuning condensers.

I have tried the circuit with aerials of widely different capacities and in no case were results disappointing. Of course, it was always necessary to avoid the use of any stabilizing method capable of an appreciable tuning effect.

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6 AM

(Continued from Page 53)

the performance as a phase converter widely.

The beauty of such an arrangement is of course that the motor, once started, is connected directly to the line without a moving contact anywhere in the system and therefore will not make the electrical uproar that comes from an ordinary m.g. Having no mechanical friction except at the bearings it will also make very little mechanical noise and can therefore be allowed to run most of the time, especially if it can be placed a short distance from the set.

Official Wavelength Stations

THE Official wavelength System furnishes a service coöperative with, but differing from, that of the Standard Frequency Stations 9XL and 1XM, which are also operated in accordance with plans made with the O.W.L.S. Committee. Contact with the O.W.L.S. is through Mr. D. C. Wallace, 6AM, who is also chairman of the committee. Mr. Wallace is continuing the practice of checking up all O.W.L.S. to make sure that they are really indicating their wavelength (or frequency) at the end of each transmission—and are doing so with proper accuracy; which is to say 2%. They do this in the course of regular operation and do not send calibration schedules as do the S.F. stations.

The list is as follows:

1AAC, 1AVW, 1AWW, 1BHW, 1BZQ, 1CCW, 1CK, 1KP, 1ZL, 1ZO, 2CLA, 2DS, 2MU, 2SZ, 2XI, 3APV, 3BE, 3XW, 4LK, 5AGN, 5AKN, 5EW, 5MN, 5OX, 5PH, 5SP, 5XBH, 5ZAV, 6AKW, 6AM, 6BB, 6BCP, 6BGM, 6BMW, 6BQB, 6CAE, 6CMQ, 6CVO, 6LJ, 6QL, 6SX, 6TI, 6TS, 6XAG, 6XAO, 6ZE, 6ZZH, 6ZV, 7AGI, 7BE, 7BU, 7GQ, 7NX, 7QK, 7XF, 7ZX, 8AA, 8APZ, 8BAU, 8BZT, 8EQ, 8GU, 8GZ, 8XC, 8ZG, 9AXQ, 9BCH, 9BGK, 9BMR, 9CPM, 9CXU, 9DXN, 9EFO, 9EGU, 9ELB, 9FF, 9IG, nc1AE, nc2BE, nc3CO, nc3NI, nc3FC, nc4BT, nc9AL, eg2OD, eg2SE, Ireland 5NJ, oa2CM and oz2AC. Crystal Controlled O.W.L.S.; NKF, 1AXA, 2BO, 2BRB, 2EF, 2WC, 4BY, 4XE, 6AOI, 6DLL, 8CMM, 8DAJ, 9AUG, 9BVH, 9UZ-NRRL, 9ZA, eg2NM, eg5LF and oa5BG. Standard Frequency Stations: 1XM and 9XL.

The South Dakota Convention

ALTHOUGH the thermometer at Sioux Falls on the morning of December 28th registered 14 degrees below zero, when the convention was called to order by Director Jansky it did not freeze the enthusiasm of the assembled delegates who had come from Minnesota, Nebraska, North and South Dakota and Iowa.

After the proper introductions of traffic officials, Nick Jensen, the old time amateur and friend of Hams, took charge and Oh, Boy! what a good time we all had until we drank the last cup of Modulated Java.

The committee had secured a room on the fifth floor large enough to take care of a dozen cots and installed a complete ham station to enable the "Boiled Owls" to work to their heart's content—which they did as well as register some pretty good "dx" as there were some good prizes to be worked for.

There were no very highly technical talks but good, sensible information was given by 9DB, Beck, the SCM, on transmitter tuning with the equipment right before your eyes; and by Dwight Pasek, 9DGR, on "Mercury Arc Rectification". And with plenty of discussion, a whole lot of interesting "dope" was given, which caused this old reporter to think that with such talent at work there should be no worry about overcoming such difficulties as we may have when we have to adjust ourselves to the new regulations when they are put into force.

Johnny Berg, the Route Manager, was the winner of the largest number of contests and if he is as efficient with planning schedules for the fellows his section should lead.

A couple of the most interesting events of the convention were the trips to the State Penitentiary under the leadership of Nick Jensen, who by the way is deputy chief marshall, and to the Morrell packing plant.

Director Jansky in his usual good way

(Continued on Page 88)

I.A.R.U. NEWS

DURING October and November most of our leading operators were fully occupied with tests on the five-meter band. Everybody was prepared for the international tests that were run and we are sorry to report that nothing was heard from the other side nor from the locals excepting the usual lot of harmonics.

"New contacts have been made between Belgium and Hawaii by both eb4XS and eb4AU. Several other good distances were bridged by 4WW, 4ZZ 4CO and V8. The following stations were heard at Bellevue, Tasmania: 4AA, 4AC, 4AR, 4AU, 4AX, 4BC, 4CB, 4CK, 4CO, 4FT, 4BK, 4RS, 4OC, 4VU, 4XX, 4WW, 4ZZ, N33 and V33.

"General conditions during the last fortnight were very bad on the 20-, 32- and 40-meter bands. Practically no contacts could be made. Reports from the short-wave station at Brussels, eb82, confirmed this. This station operates on 16.25, 25 and 38.5 meters putting something in the neighborhood of ten kilowatts into a Zeppelin antenna."

-Paul de Neck, President, Reseau Belge.

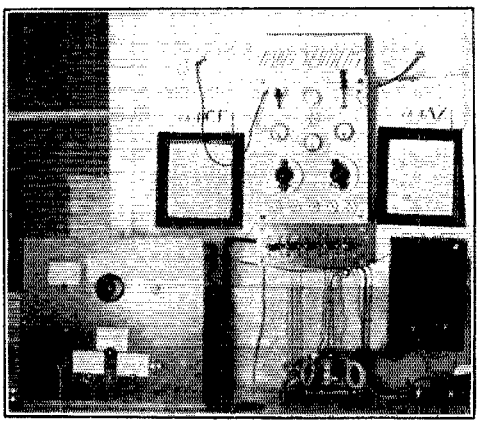
We are showing herewith a view of the station of R. P. Verreux located at 16 rue de Rome in Verviers. This is eb4AZ and also the broadcast station, "Radio Verviers". eb4AZ works on 45 meters with a pair of Metal or Fotos 20-watt tubes in a Mesny push-pull oscillating circuit. The plate voltage which is obtained from storage batteries is 600. The antenna is a 50-foot single wire and is operated against ground, no counterpoise being used. The receiver is the popular kind employing basket-wound inductances and regeneration is controlled by means of a variable condenser.

The broadcast transmitter works on 215 meters. Grid modulation is used.

FRANCE

"Since October the amateurs in France have been on the air consistently. Every morning, ef8FD has been in contact with oz4AE at 0700 G.C.T. and has also made contact with af1B at Saigon, French Indo-China three times each week.

"In making some low power tests, 8FD succeded in working oz4AE when using an input to the plate of but 0.64 watts. This



eb4AZ-RADIO VERVIERS

The broadcast transmitter is on the left and the s-w transmitter is mounted on the wall at the right. The receiver is on the table between the two transmitters.

is equivalent to approximately 29,800 km. (18,360 miles) per watt. Communication was established before two witnesses who are members of the Reseau des Emetteurs Francais.

"Signals on the 20-meter band from stations in the U.S.A. are coming in perfectly during the afternoons but lose their strength along about 2000 G.C.T. On the contrary, the 40-meter band is good in the morning and at 0930 G.C.T. the fifth and ninth and on rare occasions the sixth district stations are heard quite well. A contact was made between ef8FD and nu6AM when the power input to the transmitter at 8FD was only ten watts.

"Station 8JF on Nov. 9th, made a first contact with fb8HL located in Tananarivo, Madagascar. Following this, both 8CL and

(Continued on Page 72)

Calls Heard

oa-3WM, W. J. M. McAuley, "Mia Mia," Union St., Brunswick, Vic., Australia.

ac-8em af-8fok af-8hva ai-2kt ai-2kw aj-1gs aj-1sh aj-1sk aj-4zz eb-4ac eb-4ww eb-4zz ec-earl ef-8cp ef-8eo ef-8ix ef-8jf ef-8ju ef-8nn ef-8fd eg-2od eg-5ku eh-9oc ei-1uu ei-1no ei-1er ek-4yo ek-4dba en-0ja xep-1ma nr-cto nj-2pz oc-8xz od-pki oo-dgk op-1hr fo-a4f fo-a5x.

oa-4PM, Russell F. Roberts, West End, Brisbane, Queensland, Australia.
(Heard during October)

2sz 3kh 4acm 5hep 5mea 5zav 6dmt 6bkh 6dpa 6clj 6dma 6dlr 6cex 6dog 6cwj 6bws 6amn 6aj 6akw 6dkx 6hj 6dfw 6lfq 6ap 6dey 6app 6ajm 6alk 6clj 6uxq 6dlk 6dfw 6ckj 6czr 6clj 6eww 6hlk 6ddt 6dlr 6dm 6dkv 6dey 6dju 7cs 8ceo 9jh 9cei aj-4zz aj-2by aj-2fx aj-1sk aj-1am ac-2ff ac-8rj ac-8to am-1ab ai-2kt od-1pd op-1cj op-1rc oo-bam oc-8xz.

oa-5CM, Reg. M. Anthony, 3 High St., Unley Park, South Australia.
(Heard during October, 1927)

1bms 1bux 1cjc 1cmp 1cmx 2atq 2crb 2cuq 2gp 2tp 3aih 3ckl 3lw 3pr 3oq 4fu 4ob 4rp 4rn 4sb 4si 5aav 5acl 5ajr 5amk 5avf 5aqe 5ba 5kc 5la 5nw 5ql 5rg 5sh 5wz 6ann 6app 6avj 6bdl 6bfr 6bjv 6bkh 6brw 6bsb 6buc 6cnk 6dbc 6dey 6dlr 6dor 6dqq 6dmd 6eb 6fh 6ud 7add 7adf 7lz 8ajn 8axa 8bau 8ccs 8cew 8csu 8djv 9ara 9bil 9bw 9ck 9cn 9cwq 9cyp 9dew 9dku 9dpw 9dr 9eev 9ef 9efw 9ekf 9ely 9kc 9xi ac-1ax ac-8hb ac-2ff ac-8rj ac-8to ai-2kt ai-2kw ai-2kx aj-1aw aj-1gs aj-2bk aj-4zz am-1ab ef-8eo ef-8if ef-8zb eg-2sz ei-1no eu-iora fo-a3e fo-a3u fo-a4f fo-a4v fo-a4x fo-a8n fo-a8p fo-a9a fo-a9m fo-a3z fo-1srb fo-7sra op-1ad op-1at op-1bd op-1cw op-1ma op-4aa op-7il.

oa-7CH, C. Harrisson, Rokeby Rd., Bellerive, Tasmania.
(20 meters)

1aep 1asu 1akz 1caw 1sz 2ahm 2bg 2dr 2ox 2tp 3bev 3rb 4ft 4jr 5aec 5aqu 5uk 6bb 6bih 6bux 6clt 6dch 6dgq 6dfe 8ahc 8avd 8cil 8csr 9ara 9bjj 9bvh 9cv 9dnu 9ef 9kv eb-4au eb-4ww ed-7cz eg-2nh eg-2it ef-8yor nr-cto or3 cr1o oh-6akpt oh-6bdl.

(80 meters)

eb-4ac eb-4bc eb-4bk eb-4co eb-4ft eb-4oc eb-4xx eb-4vu eb-n33 eb-v33 ee-ar54 ef-8er ef-8ee ef-8er ef-8fd ef-8ft ef-8fy ef-8kg ef-8kk ef-8ku ef-8ln ef-8nn ef-8xo ef-8yy ef-8abc ef-8aro ef-8est ef-8oco ef-8tis ef-8raf ef-8rlt ef-8vvd ef-8xix eg-2bi eg-2bz eg-2gf eg-2oq eg-2qb eg-2jb eg-5kh eg-5ku eg-5ls eg-5mq eg-5uy eg-6rw ei-1au ei-1cr ei-1dl ei-1dm ei-1dy ei-1uu ek-4abv ek-4dbs ek-4uu ek-4ya ek-4yab ek-4yo el-1ala el-1alw en-0cy en-0fp en-0ja en-0ze ep-1aa ep-1aj ep-1bl ep-8gb er-saa fe-egez fi-1cw fk-4ms fo-a4e fo-8ar ac-vps ac-1ax ac-2ck ac-2ff ac-8rj ac-2bk ai-2kt ai-2kw ai-2kx aj-1sm aj-1sk aj-4zz am-1ab am-3ab aq-1lm nc-1ac nc-1ax nc-3nj nc-1co nm-8a nm-1k nn-m3y nn-1nic nq-8kp nq-2ac nr-2fg ns-1fmh sa-hgl sa-eb8 sc-3ag od-4as x-5ma xen-oep xep-1ma nidk oic 2bn gkt wxr nwq vpx nixb kdo.

oz-2BJ, 269 Taranaki St., Wellington, N. Z.
(Heard during October)

2are 2afr 2ag 2amh 2ev 3bqz 3cdg 4km 4qb 4rm 4uo 5aci 5aq 5ayl 5co 5kc 5ok 5rg 6aak 6ahn 6am 6aqm 6avj 6baj 6bb 6bh 6bhz 6bjh 6bjq 6bkh 6bpm 6cgr 6cmz 6cqm 6cqp 6cto 6cua 6cwj 6cww 6czz 6dfe 6dfu 6dhq 6dkv 6dxx 6dlj 6dnh 6dog 6dor 6ec 6ew 6gw 6hj 6ix 6la 6rn 6ty 6ud 6wh 7aa 7aef 7add 7bb 7ck 7ou 7tz 7xf 8avk 8avp 8cfv 8ckc 8cy 9auu 9bmm 9bpl 9brc 9bzi 9cfd 9cpq 9crd 9dku 9dr 9eev 9ef 9efw 9ely 9ff 9nr 9oj 9xi eb-4ww eb-4zz ef-8cp ef-8nn ef-8xo nr-cto oc-8xz oh-6ahl oh-6ajl oh-6avl oh-6alm oh-6boe oh-6buc oh-6ch oh-6dey oh-6dju oh-6dlr oh-6dqq oh-6wu oo-6am sb-1ah sb-1ib sc-3ac su-2uk aqe arex ardi bam fy fyb kzet 1pl.

Robert Kreisinger, Maracaibo, Venezuela.

1ads 1bkp 1ckp 1de 1ga 1pa 1xv 2abe 2ag 2bvh 2cxl 2di 2gk 2hv 2ol 2ov 2qu 2tp 2uo 2vs 2xam 3ag 3ahp 3ais 3auv 3ckl 4aao 4ac 4br 4cf 4cu 4ge 4jd 4kf 4tv 5adg 5amk 5axs 5ns 5rg 5uk 5we 5zav 6am 6cnj 6dgx 6xi 8alu 8ane 8aro 8as 8axg 8axz 8bau 8bhz 8bni 8bqr 8brc 8brf 8cau 8cc 8ced 8cfr 8coj 8dgl 8dlv 8dqb 8fb 9ara 9axu 9axx 9bhz 9ck 9cpr 9czh 9dcb 9dck 9drw 9dzb 9eaj 9ely 9ra eg-6nf agb anf fy nrrg pkh poa sgl xc51.

Cpl. Henry P. Karr, Hq. Btry. 2nd F. A. Bn., Gatun, C. Z.
(20 meters)

1acm 1ajm 1awe 1era 1bhm 1sz 1zz 2ank 2anm 2arn 2aol 2avz 2bac 2beh 2et 2fp 2gq 2jn 2tp 2va 2xam 3aic 3ani 3bsd 3cw 3jm 3ku 3ra 3tn 4abc 4dv 4qb 5akp 5av 5nb 5nj 5lf 6aaz 6bzc 7aae 8ams 8atv 8avb 8bhz 8bl 8bqf 8dbm 8dnn 8dpo 8re 8ut 9aji 9amb 9apl 9arh 9as 9asc 9bgq 9bnd 9efd 9cis 9civ 9cki 9ckq 9cmo 9cmv 9cqm 9dd 9dij 9drd 9eaj 9eap 9ecz 9efh 9egq 9eht 9emn 9epf 9pf 9rf 9ux ef-8no ef-8uz nc-1ar nc-3cj nc-3cm nc-4ey nm-1l wgt.

(40 meters)

1age 1amj 1ara 1awe 1bda 1blf 1bux 1cd 1ckw 1dm 1ic 1to 1vw 2aih 2ass 2aqo 2avw 2axx 2baa 2baz 2bb 2bew 2ce 2cej 2fj 2jp 2ju 2mu 2rp 2rs 2pv 2xd 3adi 3afx 3afu 3aih 3aks 3bsd 3ex 3kt 3qe 3rq 3tn 4ada 4an 4cu 4cv 4ep 4fe 4ff 4ha 4lk 4uo 4vf 5afx 5ai 5ain 5ank 5ant 5aqf 5gd 5hp 5ja 5kc 5kd 5la 5ln 5lo 5nd 5no 5uc 5yb 6aak 6aat 6am 6bgp 6cty 6di 6dr 6eb 6id 6ud 7abk 7afu 7aw 7ek 7if 8ajt 8ccq 8cym 8dbd 8dg 8gq 8jq 8rj 8vd 8vx 9awj 9bgq 9bho 9blf 9bpx 9bqc 9bul 9ccm 9crd 9erj 9cup 9deu 9dfj 9dkg 9dlq 9drw 9dxg 9dxp 9dzj 9ek 9ekw 9emj 9eow 9es 9oq 9ww 9xi xen-0sq nc-2be nc-3bo nq-2jt nq-2pt nq-7cx sb-1ar sb-1ao anf irl.

fo-GEDQ, Simonstown, South Africa.
(Heard since Oct. 15)

1amd 1lu 1bux 1bgq 1aof 1xi 1aq 1cmx 1ckp 1ah 1cio 1wl 1cnz 1ic 2ayj 2cxl 2cdl 2bad 2cu 2tp 2sm 2abe 2ag 2rs 2ie 2nm 2pf 2cuz 2avw 2bbx 3bnu 4yd 4cu 4rn 4lk 4kw 4aar 5ahp 5yb 5nf 6dly 6hm 6aak 6ju 6bjx 6dos 6dpu 8cc 8ed 8ckc 8dnf 8bwr 8axz 8bhz 9akt 9aok 9cmv 9dpw 9dcg 9cjw 9cpd 9bgk 9aeb 9dkc 9rf 9ek 9dax 9xl 9ejo.

2AWU, (Heard enroute London to New York—over 2000 miles).

1acu 1avj 1axx 1bux 1bvl 1ic 1xf 2acd 2afv 2alu 2cuq 2cxl 2cty 2cx 2dh 2md 2jc 2tp 3agf 3aib 3bnu 3ckj 3ag 3dh 3di 3kj 3kt 3pt 3lu 3qe 3qw 3sj 3uk 4ao 4by 4cu 4ob 4uo 4zx 8adm 8agy 8bin 8brc 8bhz 8bjx 8cau 8xe nc-9cx.

3AG, Willard Hunton, Falls Church, Va.
(Heard during Sept., Oct. and Nov.)

6aak 6abg 6ano 6agr 6apd 6axp 6bam 6bgb 6bpm 6buh 6bva 6bvs 6bxu 6cae 6cco 6cez 6cdf 6cet 6czo 6dfv 6dhj 6dpo 6dre 6dmq 6es 6sm 7aat 7abb 7aiq 7fe 7ok nc-4bp nc-4cm nc-4cu nc-4gi nc-4hh nc-5ef ea-bu ea-cl ea-cm ea-fo ea-gp ea-jz eb-4ai eb-4ar eb-4au eb-4bv eb-4cb eb-4co eb-4di eb-4tm eb-4ww

(Continued on Page 82)

Correspondence

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

Some Amatuer Reactions on the International Radiotelegraph Conference

Just a word to these birds who are yowling about the decisions of the convention. We ought to be well satisfied with the concessions granted us in the face of what looked like the doom of amateur radio! These fellows don't realize what was happening up there at Washington—three or four representatives bucking the adverse attitudes of forty-five or fifty other representatives all intent on putting us in cold storage. I consider that we were exceptionally lucky to have as much territory given us as we did. One little tip: 80 meters isn't a bad wave at all for international work and just as good DX was done there as is being done on 40, with the added advantage that it is not as freaky at night as 40 has been lately. If you don't believe it, just dig up *QST* of about two years back and take a squint at the calls heard and the international section. Now, fellers, let's be sports, because what's done can't be helped and maybe these same adverse conditions will inject a little new life into the game—and Lord knows we need it. We are getting into the kind of rut that you read about in the magazine advertisements!

—J. M. Eubanks, nu4SI.

Congratulations, Fellows, on your eternal plugging to make us a better outfit. The fruits of your work are coming in, as shown by our placement into the International Conference papers.

—Victor H. Schleuder, 9BKX.

We would like a letter from Headquarters stating just why this "give up the ship" attitude before the treaty has been ratified by our government. If this government truly believes that the American amateur is really an asset, then why this attitude of generosity at the expense of her own assets? . . . Must we stand for the dictates of England and some of the other war-mad countries who would force this treaty upon the world? . . . Let's fight. We want action and not supine acceptance of this state of affairs. . .

—N. C. Hugus, 8CVS.

While probably the best thing to do is to make the best of the present amateur situation, I am convinced that the American radio amateur has been most unfairly and unjustly dealt with. . . We are told that our American delegation was back of us. Then why did they yield to the rest? Since when has it become necessary for the United States of America to accept the dictates of a crowd of foreigners who are fifty years behind the times in most respects because of their petty jealousies and perpetual warfare? If they balked at our Delegation's proposed amateur bands it was no more than happened at the naval conference last summer—and did Uncle Sam compromise his interests at that time? My recollection is that John Bull was advised that his proposals were unacceptable and we came home to run our own business in our own way. The idea of such foreign dictation . . . is simply too much to swallow.

—Ross Moorhead, nu8ARO.

Just a few words of appreciation in these dark days for amateur radio. I, for one, sense a little of the strenuous effort you must have put forth, and I'm sure we are, to a man, with you to the last ditch. Here's hoping the "narrow" is wide enough to exist on, but it looks dark.

—D. I. Gue, nc4FF.

. . . What I think of England would not be good news over there.

—F. J. Hinds, 9APY.

Please renew my membership for 1928. I also want to thank your organization for their work done at the Washington Conference. We amateurs appreciate this very much.

—Wells Chapin, 9DUD.

Congratulations on your noble efforts and success on behalf of A.R.R.L. Vy FB, OM. Everyone down here is very disgusted that Canada let you down so badly.

—A. G. Brewer, nc2BR.

It is with some misgivings and no little anger that I read of the proceedings of the international conference. It seems the amateur is looked on as a necessary evil. I believe the countries that are so opposed to the existence of the amateur are just a little jealous of the progress that has been made along that line. If those countries would allow their younger citizens to

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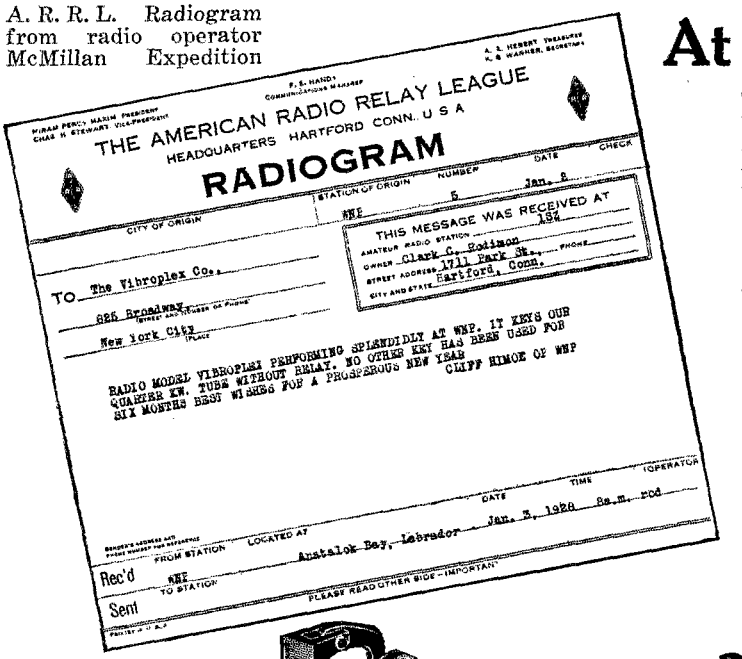
A. R. R. L. Radiogram from radio operator McMillan Expedition



THE AMERICAN RADIO RELAY LEAGUE
HEADQUARTERS HARTFORD CONN. U S A

RADIOGRAM

CITY OF ORIGIN | STATION OF ORIGIN: WNP | NUMBER: 5 | DATE: Jan. 8 | CHECK

THIS MESSAGE WAS RECEIVED AT 19?
AMATEUR RADIO STATION
OWNER Clark C. Robison
STREET ADDRESS 1711 Park St. PHONE
CITY AND STATE Hartford, Conn.

TO The Vibroplex Co.
825 Broadway
New York City

RADIO MODEL VIBROPLEX PERFORMING SPLENDIDLY AT WNP. IT KEYS OUR QUARTER KW. TUBE WITHOUT RELAY. NO OTHER KEY HAS BEEN USED FOR SIX MONTHS BEST WISHES FOR A PROSPEROUS NEW YEAR
CLIFF HIMOE OF WNP

DATE | TIME | OPERATOR

Rec'd WNP FROM STATION | LOCATED AT Anatalok Bay, Labrador | Jan. 8, 1928 8a.m. rcd
Sent TO STATION

PLEASE READ OTHER SIDE—IMPORTANT

"Radio Model Vibroplex performing splendidly at WNP." That is what it was built to do.

Himoe knew this—that's why he selected the Vibroplex as part of his equipment on the Bowdoin for the McMillan Expedition.

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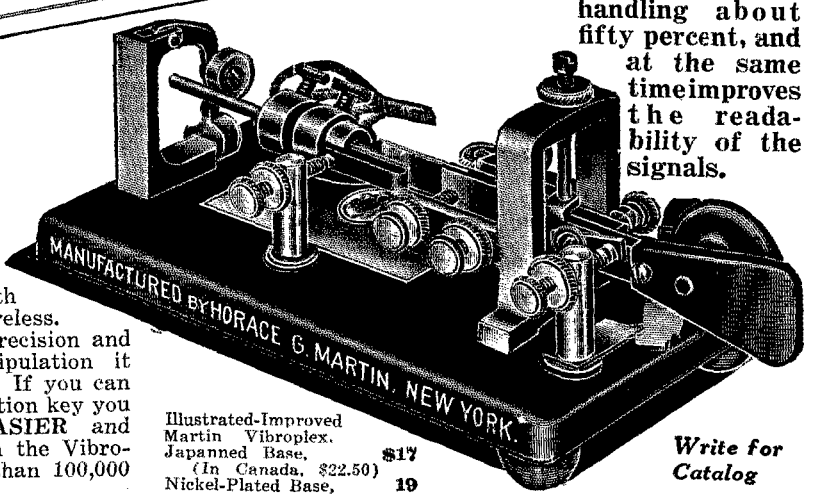

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experiment along radio lines, they would not be so far behind the good old U. S. A.
—A. G. Adams, Miller, Mo.

I want to congratulate the American Radio Relay League, its officers and employees, upon its splendid and, doubtless, heroic work in retaining the amateur wave bands for the amateurs of the world at the International Radiotelegraph Convention. I consider the action taken as a signal victory for amateur radio, and one of the outstanding accomplishments of the League. It again proves the necessity for the League, and I am personally grateful for the League and the men who administer its affair. They have done a noble work, and I am confident they were a handful against large odds. It is plain they presented our case in such a way as to convince the delegates that amateur radio is worthwhile and a potent factor in the protection of government.

—Bradford Hearn, 5ANC.

I sure do know this: that if it wasn't for the A.R.R.L., we amateurs would be a thing of the past by this time.
—P. T. Montgomery, Sandy Lake, Pa.

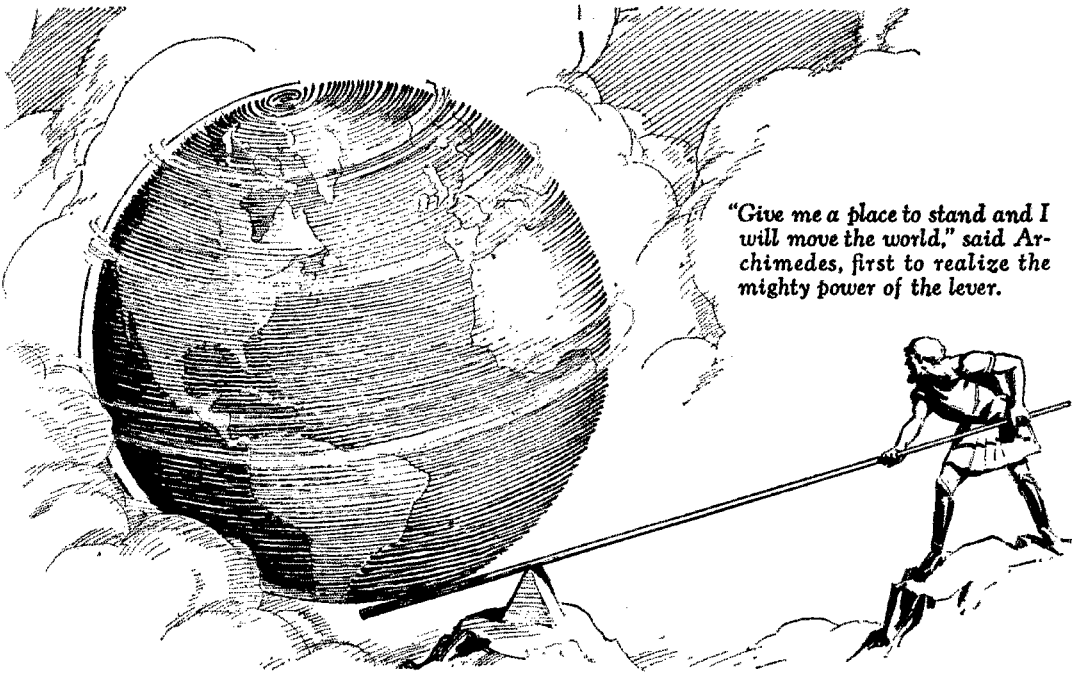
. . . I can appreciate the position you had, the selfish motives of the other delegates, the ignorance, their lack of an amateur problem and therefore their intolerance, their sinister attitude towards the United States. I have traveled this world enough to realize that the rest of the world doesn't love us, to know that they will not concede anything, not because it would help them necessarily by this non-admittance, but simply because of their inherent greed. But what better can we expect from a world whose intrigue has been ages old, whose motto is "Prevent others whether or not it would gain them, but simply because it is not gaining us"?
—W. E. Schweitzer, 9AAW.

. . . Things turned out not so worse.
—Ehret, 5APG

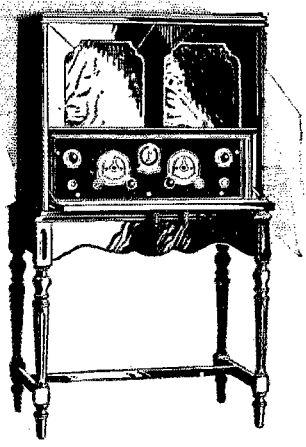
Your editorial, *QST*. Twenty thousand American amateurs behind you. We will not accept a cut in any band without a fight. United States is big enough to run our own affairs. Positively will not be governed by local BCLs, much less by foreign QRM.
—M. O. Davis, 9CDE.

Congrats on the fine work done by you fellows at the Washington Radio Conference. Personally I expected we would lose all our waves between 12 and 75 meters.
—Chas. J. Heiser, 8DME.

. . . I really think that it will be a dirty trick if the 40-meter band is taken, because it was the A.R.R.L. and amateurs that made short waves what they are today.
—D. B. Lamb, S.C.M. Arizona.



"Give me a place to stand and I will move the world," said Archimedes, first to realize the mighty power of the lever.



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. . . I don't see where we were so badly "laced". They narrowed our bands a trifle but that will force some of the amateurs into other bands besides 40—maybe that is a good thing at that. As you say in last *QST*, it takes difficulties to make us boys work.

—C. B. Diehl, 9BYG.

Am very glad to see that the amateurs still are holding their bands. Great work on the part of the A.R.R.L. officials.

—J. A. Gjelhaug, nu9ZC.

. . . The new allocations mean that the League will have to come to the rescue with some sort of plan. It will be bad enough to have the bands cut to one third their former size but how about the foreigners? . . . Looks to me like a polite and diplomatic way of gradually shelving the amateur by making him interfere with himself until he gets disgusted and quits.

—Frederick Westervelt, 8VE.

. . . Why do the (bad word deleted) want to decrease our bands? (Exclamation deleted) there's plenty of room on each side of our bands. Why in (censored) do they want to QRT us? Oh (expurgated) but it makes me sore. If we have to give up the waves, make the (more deletions) promise never to bother us again.

—E. L. Maneval, 8EU.

You are to be congratulated for holding as much as you did. Personally, I think we are sitting pretty. If you will fish around in the 40-meter band I think you will agree with me that approximately 70 to 75% of the amateurs are operating between 37.5 and about 39.8 meters. The rest of the band is used very sparingly, which is contrary to the condition which existed when we first got that band. Right now most of them are crowded at the lower end simply because when they answer a call the practice is to start at the lower end and tune up.

—F. H. Schnell, 9UZ.

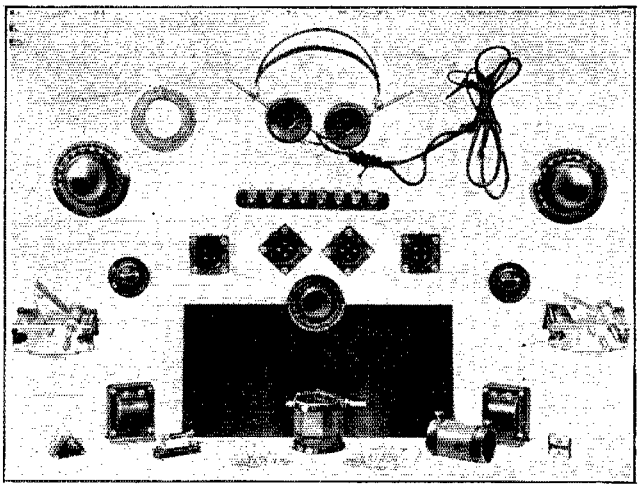
No utilitarian or government end can be served by curtailment of present amateur bands. Am convinced this move is British-inspired and most vindictive. As a member I am with you to maintain our position, heart and soul. As a citizen with powerful influence I will back you with bayonets and guarantee you the political death of all who oppose us. They owe me some allegiance—now they shall pay.

—Goodyear Pitts, Portland, Ore.

The Indianapolis A.R.R.L. members want to express their appreciation for good work done by A.R.R.L. officers at Washington Conference. Please transmit this to the proper parties.

D. J. Angus, 9CYQ.

LEARN RADIO and find



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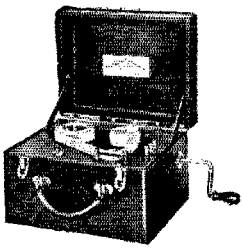

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Congratulations on the victory of the International Radio Conference. I realize the difficulties which you have faced at Washington, and I want you to know that I appreciate your efforts in my behalf, as one of the gang. I think we suffered some serious losses in the 40-meter band, and for a while it may be difficult to adjust ourselves to the new conditions, but the gain you made for us in the 10-meter band is splendid, and better yet is the retention of the whole 80-meter band.

—Louis R. Huber, ex-SCM Iowa.

I wish to extend to you on behalf of the Quebec Division our appreciation of your wonderful success at the International Radio Conference. Although we were unable to assist you in your work, we were with you during that very trying period, when we are sure everything appeared to you to be lost. We are more than pleased with the results which you have obtained, and we must again thank you, for without the old A.R.R.L. amateur radio would have been completely washed out.

—A. Reid, S.C.M.

A little study of the waves we have left shows that it is time to get busy and prove that the American ham cannot be stumped by these handicaps, and the gang will have to scratch their heads and make 5 and 10 meters do their stuff. I suppose when we get these bands the way 40 and 20 are now, we will get bounced down to 0 minus, eh? However, let to-morrow take care of itself, and get to work, for the new problem may prove a tougher one than we have tackled yet.

—Jos. A. Mullen, 1ASI.

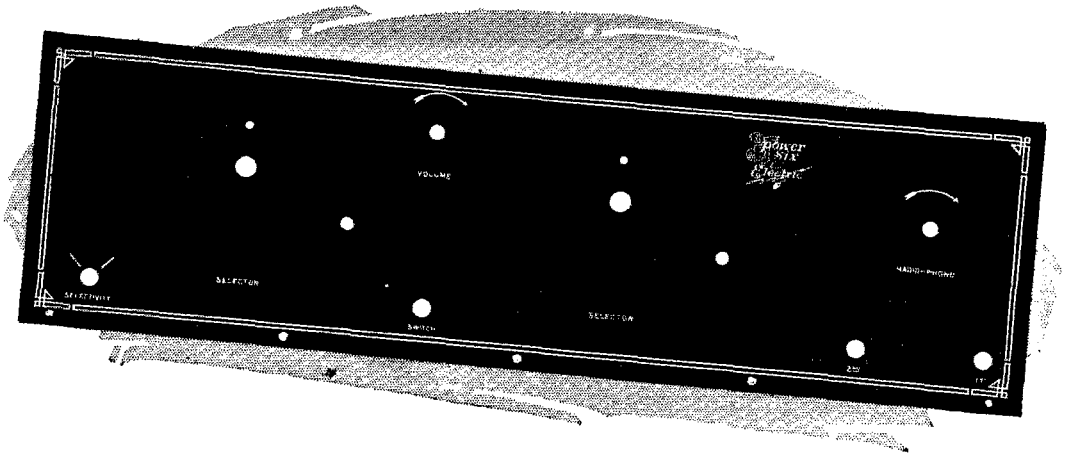
The Hackensack Radio Association of Hackensack, N. J., wishes to express the deepest admiration and thanks for your work and efforts on behalf of amateur and international amateur radio operations at the past International Conference at Washington. We are more than gratified for the amateur allocations, however meager, obtained by you and your colleagues, and hope most sincerely that the amateurs, world-wide, still continue with the A.R.R.L. and I.A.R.U. as a body, to further growth and development in spite of some curtailment.

—Hackensack Radio Association,
per Lloyd C. Wells, 2GE, Traffic Mgr.

We are so thankful that we have an A.R.R.L. and that the A.R.R.L. is fighting, tooth and nail, to keep the privileges of the amateur. Altho we have lost a little of each band, we all know that without the A.R.R.L. we would have a lot less than we have now.

—D. F. Cottam, 9BYA.

It is my opinion that the A.R.R.L. has done everything possible in connection with



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the alloting of the amateur bands. Many people cry before they think, and they do not realize we are mighty lucky to have all the territory we now use.

—Bruce Hoag, 8AXA.

In view of all of the circumstances and the strong opposition from European nations I feel that the League is particularly fortunate in retaining as much space as has been agreed upon, and I congratulate our people at headquarters upon the work which they have done in this connection. Very likely, had it not been for the concerted action on the part of the League representatives, the amateurs would have had little or no consideration.

—William W. Porter, New York.

Some More Abbreviations

2533 Herschel Street,
Jacksonville, Fla.

Editor, *QST:*

Seeing as it is all the rage lately to think up more abbreviations to add to CQs, I want to offer one or two more that the gang should find to be very useful.

YNB—Yes! We have no bananas.
YLB—My YL is a blond.
YLB—My YL is a brunette.
WCT—We chew tobacco.
NCC—Not a cough in a carload.
GLD—Good to the last drop.

Maybe after I've disconnected the universal joint from the r.f. choke, I can think of some more.

Honestly, though, it seems that in every *QST* lately somebody has some more CQ additions to offer. I suggest we call a halt. No doubt, some of them are good but how many use 'em and who remembers what they are when they hear 'em?

And say, K. B. W. or whoever is the guilty party, we sure do appreciate the hard work you put in for us at the big conference. If it hadn't been for you, *QST* would make a million off of ham ads offering junked radio apparatus for sale.

—*John H. Webb, 4NE.*

European DX

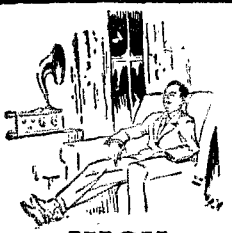
Aboard S. S. *American Shipper*

Editor, *QST:*

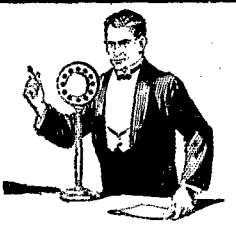
Just a point or so concerning DX on the forty-meter band as I have heard it in Europe.

In the first place, a majority of American amateurs are believers in the idea that most European DX can be worked by sticking right close to 37.5 meters. After being in Europe and keeping watch on the forty-meter band, I will say that twice the number of signals were logged on waves in the middle and upper parts of the band than were logged in the near vicinity of 37.5 meters. The lower end of the band is completely covered with high powered European commercial stations and even NAA comes in with kick enough to QRM any amateur signal on a nearby wave.

Cardwell



STANDARD *for* Broadcasting STATIONS



HIGH POWERED

(As Well as Amateurs)

Here is a partial list of American Broadcasting Stations using CARDWELL CONDENSERS. They vary from a few watts to 50 K. W. in power.

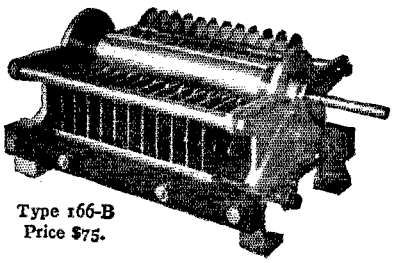
WAAM — Newark
WARS — Brighton Beach
WCOA — Pensacola
WEAF — New York
WGCP — New York
WLW — Cincinnati
WMCA — New York
WKRC — Cincinnati
WMAK — Lockport
WNBH — New Bedford
WRMU — New York
WPSC — Pennsylvania
WJAF — Ferndale
WQCB — Philadelphia
WJAG — Norfork, Neb.
KGM — Picher, Okla.
KGDR — San Antonio

WBBC — Brooklyn
WCFL — Chicago
WCBI — Scranton
WFIC — Akron
WEBW — Beloit
WEMC — Berrien Springs
WKBO — Jersey City
WLTH — Brooklyn
WNJ — Newark
WNYC — New York
WTFF — Washington
WSKC — Bay City
KOIL — Council Bluffs
WEAN — Providence
KFKB — Milford, Kansas
WICC — Bridgeport
WHK — Cleveland

WBAK — Harrisburg
WBNY — New York
WFDF — Flint
WGMU — New York
WHN — New York
WKBQ — New York
WLBW — Oil City
WMSG — New York
WNAD — Norman, Okla.
WPCH — New York
WSMK — Dayton
WSWS — Chicago
KOWW — Walla Walla
WCWS — Danbury, Conn.
KGCN — Concordia, Kan.
WSDA — Brooklyn
KFUM — Colorado Springs

STATIONS OF THE RADIO CORPORATION OF AMERICA
STATIONS OF THE WESTINGHOUSE ELECTRIC & MANUFACTURING CORPORATION
STATIONS OF THE AMERICAN TELEPHONE & TELEGRAPH COMPANY
STATIONS OF THE GENERAL ELECTRIC COMPANY
—and many others—

SINCE the inception of broadcasting, Cardwell has made a specialty of Condensers built particularly for the needs of powerful transmitters. Originally designed for commercial radio communication, they are the only condensers in regular production which are suitable for use with more than 500 Watts output, and have become standard for antenna, tank circuit, neutralizing, and every other use where a low loss fixed or variable capacity is necessary.



Type 166-B
Price $75.

FOR use in Amateur Transmitters and low powered commercial installations, the regular line of Cardwell Condensers is unsurpassed.

Write for full particulars and prices, giving all possible information as to voltage, circuit and current.

The Allen D. Cardwell Mfg. Corp.

81 Prospect St. Brooklyn, New York

Condensers

"THE STANDARD OF COMPARISON"

My advice is to keep above 38 meters if you want to get through. I hope this suggestion is of benefit to someone.

—*John H. Gullans.*

Grinding Quartz

P. O. Box 172,
University Station,
Tucson, Arizona

Editor, *QST:*

Some time ago I noticed an article on crystal grinding in *QST*. I do not have my back files at hand but as nearly as I remember, the article suggested that a couple of milled iron or steel plates be used as grinding surfaces.

Having done a little work along this line in the past few months, I have found what I believe to be a better method of doing this besides being much cheaper, a point which usually brings joy to some ham's heart.

I have found it quite satisfactory to merely use a couple of pieces of high grade plate glass. These may be obtained for nothing or, at the worst, for a few cents and therefore save all the time and expense of having to mill the steel or iron plates. The glass probably has a smoother surface than the steel would have anyway. There is another distinct advantage in the use of glass and that is its hardness. While it is not as hard as the quartz, it will be found that the wear on glass is decidedly less for a given amount of grinding than the steel. This, I believe, is of importance since the surfaces must be absolutely plane and parallel. While it is possible to have a variation in thickness of as much as a thousandth of an inch in a two hundred meter crystal and still get fairly satisfactory results, an error this large in an eighty meter crystal will ruin it. If added weight is desired, a chunk of iron may be cemented to the glass plate. The iron, if used, should cover the entire glass uniformly to avoid any tendency of the glass to bend.

I hope this hint may prove of help to someone.

—*M. W. Bannister, 6CDY-6CPK-KGAR.*

Rubber Stamp

2216 Madison Street,
Chicago, Ill.

Editor, *QST:*

A majority of recent articles published in *QST* dealing with traffic regulation and best methods of dispatch contain in their text a growing resentment against messages of the rubber-stamp variety.

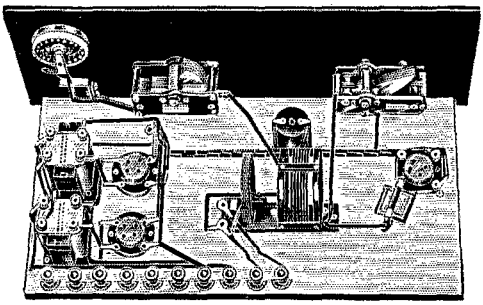
It is difficult to imagine what the result of their extermination would be, since it is almost impossible to serve the public either in professional or amateur circles, with reservations which may appear to facilitate traffic yet are more apt to hinder an organization's progress towards complete national recognition of its abilities.

The delivery of a message of no tangible importance, except as a greeting or trans-

The AERO Short Wave Receiver

SUPER-Sensitive SUPER-Selective SUPER-Flexible

The Finest Short Wave Receiver



Build It Yourself— Right Away!

Superlative performance in every respect assured by carefully selected parts around which set is built

If you want a **real** short wave receiver—a set possessing unusually long range, fine selectivity, great power and splendid tone qualities—build the AERO SHORT WAVE RECEIVER.

This excellent receiver is neat and compact, and is flexible to an unparalleled degree. It has a normal range of 15 to 130 meters, and completely covers U. S. bands 20, 40 and 80 meters. Range can be reduced or increased if desired (see note below). Any amateur desiring the very best in short wave reception should certainly build this set.

These Parts Make Possible Its Excellent Performance

AERO PRODUCTS, Inc.
Supersensitive AERO Coils, in the form of the AERO Low Wave Tuner Kit, play a big part. This kit consists of 3 interchangeable coils. Special patented construction reduces high frequency losses to a minimum. Price of kit, $12.50. You can lower range of set to 13 meters with AERO INT. 0, or increase range to 725 meters with AERO INT. 4 and INT. 5. These coils priced at $4.00 each. The AERO Choke and AERO Foundation Unit are also used.

AMSCO PRODUCTS, Inc.
AMSCO Condensers are another important factor in the AERO SHORT WAVE. One .00014 condenser and one .00025 condenser are used. These list at $2.75 and $3.00 respectively. AMSCO parts are noted for their accuracy, dependability and fine construction.

THORDARSON ELECTRIC MFG. CO.
THORDARSON radio transformers are particularly desirable in the AERO RECEIVER. For code work the R-151 6 to 1 ratio transformers give maximum amplification at 500 cycles. For short wave reception of broadcasting type R-152 or R-200 will give excellent volume and tone quality. As used in this set, these transformers leave nothing left to be desired.

YAXLEY MFG. CO.
You'll like the outstanding quality and neat finish of the YAXLEY battery switch, resistances and rheostat. These items contribute much to this receiver's beautiful finished appearance and electrical efficiency.

BENJAMIN ELECTRIC CO.
BENJAMIN sockets insure utmost electrical efficiency. That's why they're specified in this receiver.

X-L MANUFACTURING CO.
X-L binding posts are used, of course. Neatly finished—and 100% efficient.

CARTER RADIO CO.
The products of this well-known manufacturer also contribute to the merits of this circuit.

Any or all of these specified parts are available at your radio dealers. Get them today. For literature or further information regarding the AERO SHORT WAVE RECEIVER address

AERO PRODUCTS, Inc.

Dept. 16 1772 Wilson Ave. Chicago, Ill.

fer of personalities, probably does not provoke within an operator a feeling of heroic work akin to locating lost trains or directing rescue work on a gigantic scale, the effect of which is felt by thousands, yet any organization devoted to the relaying of radio traffic is bound to have its standards lowered if the personnel refuse to transmit or deliver a radiogram due to its seeming unimportance.

These messages finding their destination more often in the station waste-basket, should be cherished by the amateurs as the life-blood of their organization: the means of constantly exploring for easier and more definite lanes of traffic: the opportunity to increase operating ability which will stand in good stead when needed most, and last but not least, convince the public the amateurs are a body of genuine non-professional operators that accomplish their work, whether to their likes or dislikes, in a professional fashion that shows reliability and systematic perfection.

—Theo. R. Lowenthal, XG at 9AUE.

GBA and QSL

Bremerton, Wash'n.

Editor, *QST:*

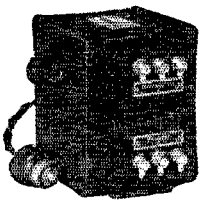
Although I have not been a ham for years and years, in fact only for the period of four months, I would like to bring a thought to this wonderful organization. That is, please give sufficient address on messages. Insufficient addresses cause more undelivered traffic than anything else. It takes so little time for the originating station to obtain a complete address that there seems to be no excuse for not getting it. How many of you fellows have received a message addressed, for instance, John Howard, Philadelphia, Pa.? Makes you feel real good, don't it, trying to locate him? Although this town is not as large as one-fourth of Pennsylvania's proud city, it is no small matter to locate anyone without a sufficient address. During my four months as a ham, I've handled just ten so addressed messages. After every means was exhausted in trying to locate the addressee they were finally mailed but all returned unclaimed except three. On servicing this to the originating station, no reply has been received to date to my request to GBA. What say fellows if we remedy this immediately?

Then those QSL cards. I'm no millionair but I will QSL to every ham I work whether he is five or five thousand miles distant. But don't it make you sore when after weeks and weeks you get not a card in return after the other fellow says, "Psc QSL OM I'll do the same." If you don't intend to QSL, OM, do you think it fair to ask for one? My QSL returns to date are twenty-five percent. Lets rectify this too. What say?

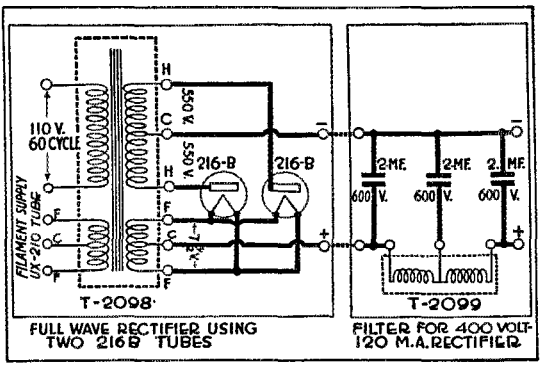
—R. J. Marion, 7AHV.

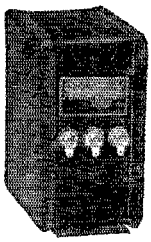
POWER FOR YOUR 210 TRANSMITTER

This Thordarson 130 M.A. power supply unit will operate your 210 Transmitter at full capacity. The excellent filtering improves audibility by "sweetening" your note. This unit when in operation in the 9-J C Transmitter was reported from coast to coast at R-5 with a pure D. C. note.



T-2098





T-2099

Power Supply Transformer T-2098

Designed for use in amateur transmission and heavy duty power amplifiers using two UX-281 or two Ux-216-B rectifiers. Primary 110-115 volts 50-60 cycles. Secondary No. 1—550 volts each side of center. Secondary No. 2—7½ volts, 2½ amperes center tapped. Secondary No. 3 same as secondary No. 2. Price **$20.00.**

Double Choke Unit T-2099

Consists of two individual chokes of 30 henries, 130 M.A., each. Designed as filter chokes for power supply transformer T-2098. Chokes mounted in crackle finished compound filled case. Dimensions 3¼" x 4⅞" x 5⅝" high. Price **$14.00.**

NEW

THORDARSON

Plate and Filament Transformers

A Complete new line of Thordarson long distance transmission equipment has just been released including filament supply, plate supply and microphone transformers and filter reactors for use with all existing transmitting tubes.

WRITE FOR YOUR CATALOG TODAY

THORDARSON ELECTRIC MANUFACTURING CO.

Transformer specialists since 1895

WORLD'S OLDEST AND LARGEST EXCLUSIVE TRANSFORMER MAKERS

Chicago, U.S.A.

3574

I. A. R. U. News

(Continued from Page 56)

8FD made contacts with this station, the 33.5-meter signals of which are heard QSA at night."

—*J. Reyt, ef8FD.*

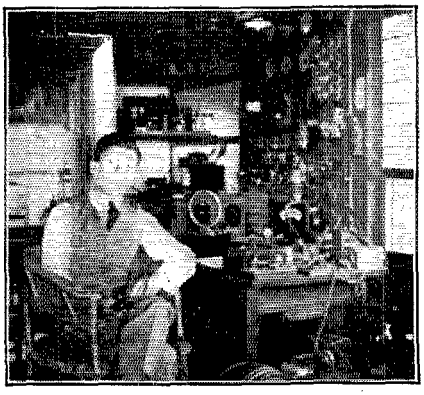
Page 64 of the November *QST* carried a report from Mr. C. Conte concerning receiving conditions on the 40-meter band. He reports that during the month of November, conditions changed somewhat for the better and he was able to log more than two-hundred U.S.A. signals. However, it is not yet possible to count on a satisfactory daily service between the U.S.A. and France and most everyone is complaining that signals continue to be weak and unreliable.

During this month, he has found that the best time for receiving "nu" signals is between 0500 and 0600 G.C.T. During all but about five or six days, receiving conditions were extremely good between these hours.

It has also been noticed that in many instances, even though nu signals are being heard, the French signals do not seem to get over and two-way contacts cannot be obtained. The ninth U. S. district is the most consistent of all in getting over.

JAPAN

We have received word of the licensing of another amateur station under the call letters of JXIX. The owner of this station is K. Kasahara who will be better recognized as being old 3AA. The watts output are limited to 7 and we also understand



A LOOK AT JXAX

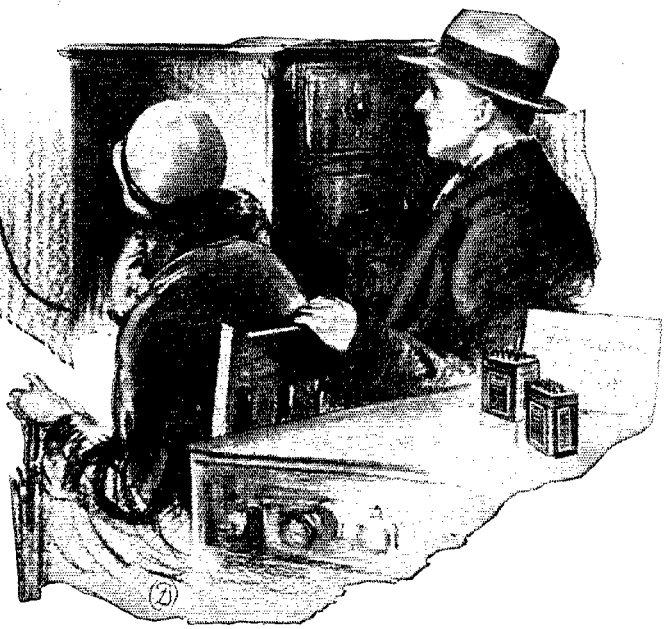
that the working hours of all these stations are limited and specified in their licenses. The hours do not seem to be uniform for all stations as JXAX works from 0900 to 2100 G.C.T. on week days, all day Sunday and on all holidays, while JXIX works from 0100 to 0300, 0500 to 0600, 0700 to 0900, 1300 to 1500, and 2100- to 2300 G. C. T. It is probable that the other licensed stations have still different hours assigned to them for operation.

Most of the better sets are Faradon equipped

In high grade Radio Receiving and Broadcasting equipment you will find Faradon Capacitors the accepted favorite.

Amateurs as well as manufacturers know that Faradon is the unit which may be specified and used with complete confidence that it will give unvarying and long lived service.

Regular production will take care of most requirements. Write our Engineering Department regarding any unusual condenser problem.



WIRELESS SPECIALTY APPARATUS COMPANY

Jamaica Plain
Boston, Mass., U. S. A.

Established 1907

Faradon

Electrostatic Condensers for All Purposes

1456

JXCX and JXDX are allowed only two watts output and except for JXAX who is allowed 10 watts all the others are licensed for powers not exceeding 4 watts.

The accompanying photo shows the operator of station JXAX as well as part of the station. The operator and owner is Mr. K. Kusama who is one of the leading amateurs of Japan and is an active member of the J.A.R.L.

The transmitter is a crystal controlled one employing a 152-meter crystal driving a Cymotron 201-A type tube with 96 volts on the plate. The first amplifier stage acts as a frequency doubler and also uses the same type tube and the same plate voltage as the crystal circuit. The second amplifier is also a frequency doubler with its output on 38 meters. A 202 is used with 190 volts applied to the plate. The third amplifier (and last stage) consists of a Cymotron 203-A with 1,000 volts on the plate. This is a straight amplifier and is not used as a frequency doubler. The antenna is a single wire 8.5 meters long and 13 meters high and the counterpoise is 8 meters long and 5 meters high.

The crystal was made in Japan and the Cymotron tubes are manufactured by the Tokio Electric Company (it will be remembered that JKZB, the experimental station, is located in this factory) and are similar to those radiotrons, the type numbers of which they bear.

The station is allowed to use phone transmission. Both the carbon grain type and some special microphones employing moving iron armatures are employed. The two stage amplifier that follows the microphone has such constants as to tend to compensate for any distortion in the microphones themselves. The second stage is a push-pull affair using power tubes, the output of which is fed to the grid circuit of the last amplifier in the transmitter.

Jacks are inserted in the grid and plate circuits of all the amplifier stages in the transmitter so that a milliammeter may be readily plugged in and the current flowing in those circuits measured. In order to facilitate such readings, the jacks are all mounted on one panel.

The power for the transmitter is obtained from the 110-volt, 60-cycle supply line. A home-made filament transformer is used in conjunction with a home-made auto transformer by means of which the voltage applied to the filaments is controlled. The plate is supplied from a 1 Kw. step-up transformer. A rectifier of the electrolytic type consisting of sixteen cells in test tubes is used and it is possible to rectify voltages up to 1200 with it. The filter uses some home-made electrolytic condensers and a 100-henry choke. As part of the filter, there is a storage battery of 1,000 volts which is floated across the line. This might seem to be expensive but only costs 6 yen or roughly three dollars, American money. A Westinghouse motor-generator giving 500 volts is also available for plate supply as are three 96-volt, 1.5-amperehour storage

batteries and 200 volts of dry cells which are used for grid bias.

SOUTH AFRICA

"Of late, DX has been consistently good, conditions having greatly improved here.

"The 'fo' amateurs have been in communication with all continents, with such stations as odPK1, ai2KT, nu6HM, ai2KX and ef8IX figuring most prominently.

"foA3V is to be commended for his good work in having been in communications with stations on all continents within a period of twelve days. Hill of foA3Z is to be congratulated on the winning the S.A.R.R.L. HOS Trophy for the second time. The recent competition for this Trophy, which is confined to South Africa, resulted in the following scores:

foA3Z, B. Hill	138 points.
foA8G, D. Richardson	134 points.
foA5L, J. Malan	118 points.

A close finish and a good one which kept everyone deeply interested.

"A new recruit to the ranks is our old friend, W. Hilarius who is chief engineer to the African Broadcasting Company. His call is A9X and needless to say, we expect quite a lot from him. Another one to join the fold is OM Perry. As A9Z has been alloted to him, we are wondering what the next call letter to be issued will be.

"A special sub-committee of the S.A.R.R.L. will hold a meeting soon with a view to changing the constitution so as to make it conform with the I.A.R.U.

"The 36-hour test sent out by 5SW in England came through with remarkable clarity and volume. However, as might be expected, when it came time for the official opening, everything had changed and the results were very poor. On Saturdays at about 2100 G.C.T., 2XAD has been reported as R7 to R8 and in my own particular case it could have been made an R9 plus.

"A3V and nu1CMX have clicked for the first time since the 'fade out' which occurs each year and separates us from our many nu friends."

—*F. P. Marks, foA5F.*

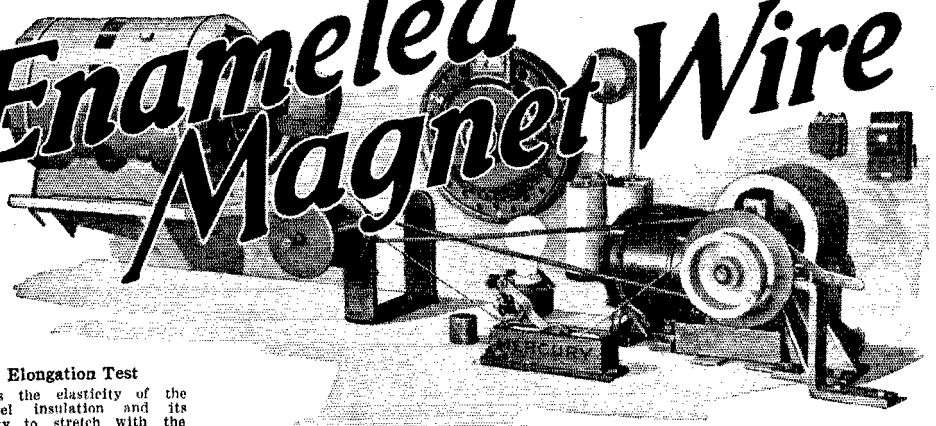
U. S. S. R.

"During the summer further developments have taken place in amateur radio in the U.S.S.R. although perhaps not as great as has occurred in some other countries.

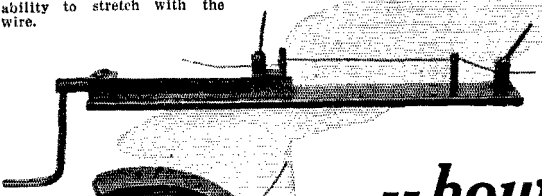
"We have now an official organization of short-wave enthusiasts which is known as he Short-Wave Section (called S.K.W.) of the Wireless Friends Society of the U.S.S.R. which is referred to as the O.D.R. QSL cards for eu, as and ag stations may be addressed to that organization for handling. Address as follows: Moscow, U.S.S.R., Polytechnic Museum 124, Wireless Friends Society of the U.S.S.R., S.K.W.

"Information concerning our activities appears in our publication called, RA-QSO-RK. The first issue of it made its appearance in April of 1927 so that it is now a

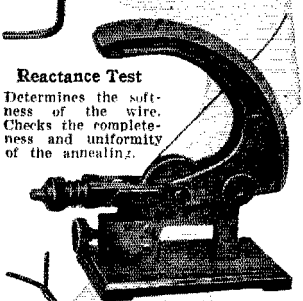
Enameled Magnet Wire



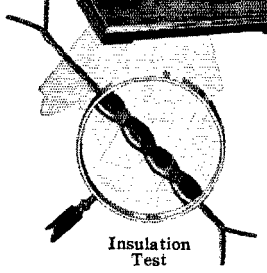
Elongation Test
shows the elasticity of the enamel insulation and its ability to stretch with the wire.



Mercury Bath Test
A positive method of detecting and guarding against imperfections in the enamel insulation.



Reactance Test
Determines the softness of the wire. Checks the completeness and uniformity of the annealing.



Insulation Test
Measures the dielectric strength of the enamel insulation by determining the voltage required to break it down.

--how would YOU test it?

Regardless of how varied or severe your tests might be, Dudlo enameled wire has already been subjected to a series of scientific tests at the factory, covering every physical or electrical characteristic required for any purpose.

Besides the four tests illustrated here, a number of others regularly employed including the "Ageing" test to determine the ability of the enamel to stand up under heat over continued use—also the "insolubility" test proving the qualities of the insulation to resist the effects of oil, water, varnish, etc.

Thus Dudlo protects the quality of *your products* by constantly maintaining the highest possible standard of its own.

DUDLO

DUDLO MANUFACTURING COMPANY, FORT WAYNE, INDIANA

DIVISION OF THE GENERAL CABLE CORP.

56 Earl Street Newark, N. J.	160 North La Salle Street Chicago, Ill.	4153 Bingham Ave. St. Louis, Mo.	274 Brannan Street San Francisco, California

half year old. It is published as an enclosure of the official organ of the O.D.R., Radio Wsiem. (apparently some distortion occurred in the translation of this name) which gives it a wide circulation of somewhat more than 22,000 copies. The enclosure is now of eight pages but it is hoped and expected that it will be of sixteen pages in the near future.

"The Commissariat of Posts and Telegraph recently advertised that all amateurs that are members of the S.K.W. would not be charged for their licenses. Licenses will be issued to every one applying for them who has a recommendation from the S.K.W. (Previously it was required that one get a recommendation from some recognized radio laboratory before a license would be issued. Assist. Tech. Ed.) Applicants to the S.K.W. will not be given such recommendations unless they already have a short-wave receiver and know a little Morse. We are, of course, very glad that licenses may be now obtained but believe that strict regulations must be maintained for the good of all concerned.

"We now have about sixty licensed transmitting stations and approximately three hundred and fifty registered short-wave receiving stations. In spite of the ease with which licenses may be obtained, some of our stations are still operating under their old call letters, their owners having apparently made no effort to obtain the necessary papers.

"The Commissariat of Post and Telegraph has not accepted the suggested new arrangement of call letters which would call for the dividing up of the country into districts such as is now in force in the U. S. A. We shall therefore continue to use the present system with the letters RA either followed or preceded by two numbers.

"The general public is now showing a keen interest in short-wave work and several of the 'popular' radio magazines are devoting special pages to it under the direction of prominent scientists and specialists in this branch of radio. It can only result in additions to our ranks.

"We now have some short-wave commercial stations in operation and there are several amateurs in the army who are operating transmitters. It is very pleasant to be able to look at a map and see that in practically every big town there is at least one amateur station in existence. The cities of Nijni-Novgorod, Moscow, Leningrad and Tomsk have the largest number of stations.

"A test to show whether or not reliable and consistent communication could be established between European and Asiatic parts of the Union was conducted recently. Though contacts between these extremities of our country were established, they were not very durable.

"Our best contacts are made with South American stations and for several hours during each day of the week, we are able

In September we published this advertisement:

$4 Worth of Book for $1

SOMEBODY got to figuring not long ago and made some interesting discoveries about THE RADIO AMATEUR'S HANDBOOK. They show what we mean when we say the Handbook is the biggest dollar's worth of radio literature ever offered.

This Handbook is not printed in the fashion of an ordinary book. Books are printed in relatively large type, lines clear across the page, space between lines. We found it more convenient to print the Handbook after the fashion of QST—the same size page, the same size type, and the same two columns to the page. The result is that the Handbook has that same often-unrealized quality of QST—it has an astonishing number of words between its covers. It runs three times as many words to the page as an ordinary book. If printed after the ordinary fashion of books, the Handbook would have over 500 pages!

Let's get a complete comparison. Everybody knows Ballantine's "Radio Telephony for Amateurs", universally admitted to be an extremely valuable book for every amateur. The A.R.R.L. Handbook, "The Radio Amateur's Handbook", has nearly twice as many words as Ballantine! Is Ballantine worth its $2? You know it is. Is Ballantine profusely illustrated? The Handbook has thirty more illustrations in it than Ballantine.

If the Handbook had been produced like an ordinary book it couldn't have been sold for less than $4. Now you know what we mean when we say the Handbook will represent the best dollar you ever spent.

"THE RADIO AMATEUR'S HANDBOOK"

A Manual of Amateur Short-Wave Radiotelegraphic Communication

By F. E. Handy, A.R.R.L. Communications Manager

Price $1 Postpaid Anywhere

Published by

American Radio Relay League, : Hartford, Conn.

—and now the new, revised, 3rd edition, 32 pages larger and up-to-the-minute, is available!

to obtain excellent communication. The best time for such work is 0000 G.C.T. Very strange to say, we can hear but very few signals from stations in the U.S.A. and our contacts with that country are scarce."

—*W. Grzybowski, eu13RA.*

W A C

On the night of Nov. 19-20, sb1AO made some interesting contacts. Beginning at 6.40 p.m. he worked xep1MA, the Cruiser Adamastor at Shanghai and at 4.30 a.m. he worked op3AC. In between these times he worked foA9A, six of the nine U. S. A. districts, some locals and ef8XO, thus being in two-way communication with stations in five different continents in less than ten hours. Not so bad!

Even at this late date, there seem to be folks who are not quite clear on what the requirements for membership in the WAC Club are. For their benefit, we are repeating them herewith.

To be eligible for membership, you must have been in two-way communication with stations on all six continents, namely: Africa, Australia, Asia, Europe, North America and South America. In order to give those stations located on islands some status in the matter, we will consider a station on any island that is closer to one continent than to any other continent and that is farther from your station than the nearest point on the mainland of the continent, to be the equivalent to a station on the mainland of that continent. It is understood that this applies only to islands along the coast of a continent and does not apply to such unattached groups as the Azores and the Hawaiian Islands.

Reports on the reception of your signals will not count as having worked a continent. All reports must be on two-way communication.

Send the six QSL cards confirming your contacts to the WAC Club, 1711 Park Street, Hartford, Conn., but be sure that each indicates in an unmistakable manner that two-way communication has taken place. We cannot take anything for granted in this matter.

We are sorry to report that although nu1MV has been a member since May 18, 1927, he has never been given credit for it in the lists of member stations that have appeared in *QST*. This omission is regretted.

Membership now numbers 117 and the following list gives the calls of all members. In the case of nu stations, the intermediate has been omitted.

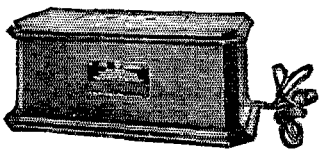
6OI, 6HM, 1AAO, nc4GT, np4SA, 9ZT, eb4UZ, 9DNG, op3AA, 2APV, op1AU, 5ACL, 5JF, eg2IT, gi5NJ, op1CW, fo1SR, 1CMP, 1CMX, eb4RS, 7IT, 1CH, sc9TC, 5TW, 6CTO, op1BD, 9BSK, 4SI, amvs1AB, eg5XY, sc2LD, ef8CS, 2CRB, oa2SH, 7VH, 2MK, 2AHM, 2CYX, su2AK, su1BU, 4BL, 9BHT, 6ZAT, eg5SZ, 5QL, 8ALY, eg5MA, foA5X, 1VC, 6VZ, 6CCT, 7EK, eg6TD, sc2AS, nj2PZ, 6VC, 9ARA, eg2QB, ek4UAH, 5AQ, 1ALR, op1HR, 6BAV, 1MV, ai2BG,

MORE SPECIAL OFFERS

UNI-RECTRON POWER AMPLIFIERS

MODEL AP-935

AS the Uni-Rectron stands it is a super power-amplifier which can be used in connection with any radio set and loud speaker. Binding posts are provided for input to the Uni-Rectron and for output to a loud speaker.



If it is desired to use the unit as a source of high voltage supply (375 volts) for a UX-210 socket in the Uni-Rectron, so that the oscillator tube may be placed close to the transmitting inductance in order to keep the oscillating leads as short as possible.

The Uni-Rectron is, therefore, a double duty device —it is a high grade power amplifier, which by removing the input and output transformers, can be also used as a source of power for an oscillating, or transmitting tube, furnishing power for all circuits, grid, plate and filament. Uses a UX-216 B or 281 rectifying tube and a UX-210 power amplifying tube.

The cheapest form of Power Supply for Amateur Transmitting purposes ever offered. Every one new and packed in original factory cartons.

LIST PRICE $88.50
(Without Tubes)

SPECIAL at $19.75 EA.

KENOTRON RECTIFYING TUBES

(TYPE T. B. 1) **MFD. BY GENERAL ELEC. CO.**

These rectifying tubes operate on a filament voltage from 8 to 10 Volts and draw 1½ amps. They will safely stand an A.C. input voltage up to 750 Volts and pass plenty of current and voltage for the plate of the Transmitting Tubes.

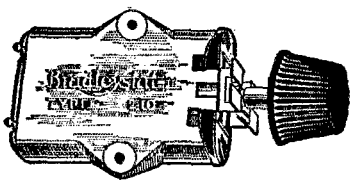
They are also very efficient rectifiers for use in "B" Battery Eliminators.

STANDARD BASE
NEW IN ORIGINAL CARTONS

PRICE ONLY $1.25 EA.

TYPE E-210 BRADLEYSTATS

MFD. BY ALLEN-BRADLEY CO.



Bradleystat E 210 is a compact graphite disc rheostat well suited for filament and plate control applications.

By using it in the primary circuit of the Transformer the center tap is not displaced and the Transmitter efficiency is greatly improved.

One knob provides noiseless, stepless control.

Can also be used to control output of Eliminators or Power Packs. NEW.

LIST $4.00

SPECIAL at $1.60 EA.

AMERICAN SALES CO., 21 Warren St., New York City

Laboratory Product

CRESCENT LAVITE RESISTANCES

for Distortionless Amplification

12,000, 48,000, 50,000, 100,000 Ohms, List $1.50 each. Special Sizes to Order, $2.50 each. Dealers write for discounts. When Better Resistances are made they will be Crescents.

Cresradio Corp., 160-32 Jamaica Ave., Jamaica, N. Y

TOBE

Write for Price List

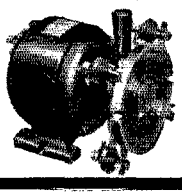
Radio Interference Filters

Take out noises in your radio caused by motors and household appliances. Requires NO attention. Over 1000 now in use.

Size No. 1 for small motors **$10** Up to 1-4 h. p.

Size No. 2 for larger equipment **$15** Up to 5 h. p. at 220 volts.

TOBE DEUTSCHMANN CO.
CAMBRIDGE, MASS.



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GET this improved "Sync" Rectifier. Superiority proven by its prevailing use in international transmitting. Lower in price in *spite of higher quality.*

The Advance Sync Rectifier meets all requirements for heaviest duty. Improves all transmission—giving clearer tone and better volume. Can be easily and quickly filtered. Speedy starting. Requires no attention—always ready. With ¼ H.P. Westinghouse motor, $55.00 complete.

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eg5BY, 6CKV, foA3Z, eg2NH, eg5KU, ac8HB, 1PY, 6NX, 6CDW, oz4AO, oz3AR, 7DF, 1AZD, foA3X, eg5UW, ei1GW, 6KB, oa2RC, eb4BC, sb2AS, saGA2, 7RL, 9CCS, foA4L, 6BUX, su1FB, eg5HS, 2APD, ei1RM, 6AZS, 1ON, eg6YD, eg5YK, 2GX 6BJL, 5AUZ, 2MD, 6DFE, 6AOI, su1CD, 9AEK, 6CAE, 6AM, oz4AM, 5WZ, gi6MU, sc2AB, foA6A, oh6BDL, sb2AX, 2CUQ and 6BZF.

Is your call in the list, OM?

Calls Heard

(Continued from Page 57)

eb-4zz eb-k6 ee-eari ee-ear6 ef-8acz ef-8ba ef-8bf ef-8btr ef-8cp ef-8dmf ef-8eo ef-8fd ef-8ft ef-8gdb ef-8gi ef-8gm ef-8jf ef-8jo ef-8lmh ef-8lug ef-8raf ef-8rlt ef-8rp ef-8toy ef-8udi ef-8vvd ef-8xix ef-18gr eg-2bi eg-2dn eg-2gf eg-2kz eg-2nh eg-2sc eg-2xy eg-2yu eg-5ad eg-5by eg-5bd eg-5is eg-5ml eg-5sz eg-5yk eg-5yx eg-6nf eg-6oc eg-6rb eg-6rw eg-6vp eg-6wl eg-6yq eg-gi-2it eg-gi-8kg gw-1ib ei-1ay ei-ibd ei-1cn ei-1ea ei-1fo ei-1xw ei-1za ej-7qq ej-7xo ek-4aap ek-4aar ek-4abv ek-4dba ek-4oa ek-4uah ek-4xy ek-4yo en-opm ep-1aa ep-1be ep-1bk ep-1bl ep-3am ep-3gb ew-h4 ex-1as fi-1ab fm-8psrv fo-a3v fq-pm nb-be3 nd-hik ne-8ae ne-8af ne-8wg ng-uf nj-2pz nm-1l np-4oi np-4rx nq-2cf nq-2jt nq-2ro nq-2ac nq-5ev nq-5ry nq-7ex nr-2fg nr-cto nx-1xl oa-2no oa-2rb oa-2sh oa-2tm oa-2wc oa-2yi oa-2yj oa-3pj oa-3yp oa-5bg oa-5by oa-5dx oa-5hg oa-5xg oa-7hl oa-4aw oa-4bd oa-4go oh-6amu oh-6bdl oh-fil oz-1mn oz-2aq oz-3au oz-4am sa-afl sa-fa3 sb-1af sb-1ah sb-1ao sb-1ar sb-1aw sb-1br sb-1ck sb-1cl sb-1ia sb-1ib sb-1ic sb-2aw sb-2ay sb-2ba sb-7aa sb-sqax se-1fg ss-2bn su-1br su-1oa su-1pc su-2ak xei-1fp xen-oqq xen-osq xnc-crlo xnc-vde xnc-voq xoa-5ma.

400, A. K. Edgerton, 18-40th St. So., St. Petersburg, Fla.

(Heard between Nov. 23 and Dec. 23, 1927)

7aae 7afo 7agj 7ali 7gj 7rs 7adg oa-2dy oa-8jk oa-5by ef-8ba ef-8cp ef-8ct ef-8ul ek-4xy ep-1aa ep-3tm ep-3uz es-1co fo-a4l nc-1dj nc-2am nc-2cw nc-8el nc-4du nc-4gi ne-8ea nm-1rl nm-9a nn-1nic nq-2kp oa-5dx oa-5hg oa-5rj oa-5wh oa-7ch oa-7hl oo-bam oz-1an oz-1ap oz-fe oz-2ab oz-2ay oz-2dy oz-2go oz-3aj oz-3au oz-4am sb-1aj sb-1ak sb-1ao sb-1aw sb-1ca sb-1cn sb-1ib sb-2ah sb-2ah sb-2aj sb-2ax su-2ak sv-1xc.

Ef-RO91, C. Conte, 24, Allee Du Rocher, Clichy-sous-Bois, (S-et-O) France

1aap 1abd 1ach 1acu 1afl 1ahx 1ajx 1aqp 1atv 1avy 1axa 1axx 1bae 1bdo 1bdq 1bke 1bln 1bnh 1bns 1bdq 1bsd 1bux 1chg 1cjc 1cmf 1cnz 1cpf 1cre 1fi 1fs 1gi 1ja 1jc 1kf 1mo 1mv 1nv 1si 1ue 1rf 1vs 1vz 1xi 1xv 2adv 2aed 2afr 2afv 2agb 2agn 2ag 2ali 2alu 2amf 2amh 2ang 2aoj 2aqu 2atq 2ayj 2bdl 2be 2bms 2bv 2cbe 2ci 2cmw 2ctm 2cwm 2cuq 2cxl 2dh 2ie 2iz 2jp 2kr 2kx 2la 2nm 2pv 2qs 2sz 2tp 2tr 2uo 2rs 3adp 3afw 3aib 3aim 3aiv 3ag 3ahp 3aks 3ali 3amx 3bjy 3blp 3bms 3bmz 3bnu 3bqz 3cab 3cc 3ceb 3ckl 3gi 3jm 3mv 3nr 3ow 3pf 3pr 3qt 3qw 3ss 3sz 3ua 3wj 4acn 4ei 4fu 4gy 4jd 4jw 4ll 4lp 4oc 4oo 4qz 4rn 4vr 4we 4wo 5abi 5acl 5afb 5aqe 5as 5atv 5fu 5kc 5uk 5yb 5acu 8adg 8adm 8agv 8air 8ajt 8alu 8amu 8amx 8ank 8apt 8aro 8avl 8avp 8awu 8bau 8baz 8bfp 8bjh 8box 8bxh 8byn 8cch 8ceo 8cdt 8cjb 8cjw 8cli 8cpc 8cvd 8cxd 8ddk 8dcd 8dct 8dod 8dsa 8es 8eq 8ew 8im 8ipt 8jj 8qb 8ru 8uy 8vd 8xd 8xe 8wp 9aid 9aqa 9aqi 9avp 9bdg 9bed 9bz 9cbd 9cjh 9cjm 9cjw 9cnc 9cpn 9cpr 9crj 9cv 9cx 9ddn 9dpj 9dr 9eecx 9ef 9efo 9efz 9eld 9emj 9eps 9fo 9lf 9nr 9uu 9ux 9uz wnp nc-1br nc-3zb nq-2la.

M. Thomassin, 16 Bould St., Jacques, Paris, France
(Heard during November)

1abd 1acm 1afl 1age 1ahx 1akm 1aq 1aqt 1asi 1avj 1awm 1axa 1bdq 1bhs 1bkp 1bl 1bnh 1bq 1bvl 1chg 1ceo 1cjc 1ck 1emp 1emx 1cnz 1di 1ej 1ga 1ic 1mo 1no 1ql 1qp 1rf 1si 1vc 1vz 1xv 1yd 2aad 2abe 2abp 2aes 2afr 2afv 2agb 2age 2ags 2agw 2ahg 2aib 2ali 2alu 2alv 2ama 2amh 2ang 2aqu 2art 2ase 2asg 2atq 2atr 2aun 2avr 2avw 2ayj 2bad 2bbx 2bch 2bdc 2bi 2crb 2ctm 2fc 2ih 2iz 2jc 2lh 2ol 2sm 2tg 2tp 2tr 2vd 2vo 3acf 3adi 3aib 3alq 3amx 3cbt 3dh 3lq 3pf 3qe 3qm 3qw 3sh 3sj 4ar 4ei 4gy 4hh 4mi 4nu 4oc 4qb 4rn 5abi 5acl 5afb 5kg 5qi 5yb 8acu 8adm 8aip 8aks 8apt 8aue 8axa 8baz 8bek 8bm 8box 9cta 9ctn 9cgo 9cxc 9cxd 9dcm 9dsa 9dqz 8es 8ex 8ipt 8ro 8vd 8xc 8wa 9ayr 9bq 9crd 9crj 9cn 9ddn 9eds 9efo 9fs 9uz.

Frank S. Adams, 1f0 Ivor Road, Spark Hill, Birmingham, England

(Heard at Baghaad, Iraq, between Aug. and Nov.)
1abd 1bvl 2ag 2aiu 2aun 2dh 2rs 2uo 4acy 4qz 1abz 1ar 1aw 1ced 1md 2nh 2cag 3kr 4uai 6die 7dh 7xu 9dad ea-cm ea-kl ea-ku ea-wy ed-7eth ed-7lk ed-7jo ef-8ju ef-8nn ef-8uga ef-8ct eg-2gv eg-2od eg-6wn ei-1fo ei-1za ek-4aap ek-4abr er-5ab fq-1pm nc-1ar.

eg2BQH, G. G. E. Bennett, 26 Blenheim Park Rd., Croydon, Surrey, Eng.

(20-meters)

1aba 1abx 1acm 1aiq 1ajm 1amc 1aqt 1awe 1bbm 1bhs 1bjk 1bkv 1bqs 1bux 1bw 1byv 1caw 1ccz 1cmf 1cmx 1dl 1eo 1fl 1ip 1kl 1pm 1rd 1rf 1ry 1sw 1sz 1uz 1wz 1xr 2agn 2aiu 2aol 2ate 2atr 2aul 2bac 2bcb 2bg 2bui 2dr 2gp 2nm 2ox 2tp 2va 2xad 3ade 3bgg 3mv 3nz 3qe 4km 4qy 6xi 7ek 8adg 8ago 8ahc 8axa 8bct 2bfg 8cjw 8cpq 8cug 8djv 8kr 9adn 9bzi 9cei 9dfz kel kzet waj wbu wik wiz wgt wll wnp wnu wqq nc-1ap ne-1ar ne-1br ne-1dm nc-2al nc-3dn nc-3fe nc-vde ne-8af nc-2sm sl-hjg sb-1aw oa-2no od-and od-anf od-anh od-pkh fe-2vo fm-8mb fp-crhb af-1b af-hzal.

(40-meters)

1aao 1aep 1afw 1ag 1agc 1ahc 1akm 1amu -anz 1aqi 1aqp 1aqt 1asf 1atz 1auk 1avj 1axx 1ayl 1azw 1bak 1bhs 1bl 1bqb 1br 1caa 1cbh 1cd 1cjc 1cnz 1fl 1ic 1ig 1ka 1kh 1kl 1mo 1nq 1og 1ql 1rd 1si 1td 1uz 1vs 1xi 1xv 1yb 1zw 2abp 2abt 2ach 2adl 2aes 2ag 2agb 2agp 2agu 2ah 2ahb 2ahi 2aib 2ajb 2akv 2alu 2amf 2ang 2anp 2apd 2api 2aq 2aqg 2aqu 2arb 2ase 2ate 2atx 2aua 2auh 2aul 2aun 2aut 2avl 2awq 2ayj 2azk 2bao 2bbc 2bbj 2bco 2bcv 2bcw 2bdk 2bi 2bm 2boi 2bry 2bs 2byg 2ca 2cc 2cep 2crb 2crn 2cty 2cuq 2cyx 2dp 2ev 2fa 2fw 2fx 2hh 2hq 2ie 2ih 2iz 2kg 2kl 2oe 2pv 2qh 2sb 2sz 2ub 2uo 2vm 2wz 2xaf 2xg 3abg 3acf 3aeb 3aed 3afw 3aim 3aks 3ali 3amx 3apn 3auv 3auw 3bbw 3bei 3bms 3bqz 3bsd 3cbt 3chg 3ex 3ez 3gb 3gr 3lq 3mb 3mv 3pr 3qe 3as 3sz 4aba 4act 4acv 4acz 4adb 4aom 4ei 4fu 4gl 4iz 4jd 4jw 4ll 4mi 4ob 4oc 4on 4pa 4rm 4rn 4rq 4si 4uo 4za 5ahp 5atf 5ayl 5eb 5kc 5ki 5mx 5oa 5or 5qj 5rg 5uk 5vx 6adm 6eww 6czc 7sf 8afu 8agi 8aip 8ajx 8akv 8anx 8apy 8asg 8auc 8bad 8bau 8bhz 8bjb 8bjx 8bki 8bum 8bwe 8bwz 8byn 8cae 8cau 8chl 8cjw 8cpe 8cqa 8crq 8cul 8cvd 8cxi 8dgl 8dhx 8dif 8dkk 8dnf 8eq 8es 8ex 8ey 8li 8rh 8rt 8sh 8sx 8sy 8ua 8uy 8vd 8vx 8zi 8zzc 9abu 9akt 9amg 9anc 9anz 9aol 9aqt 9auu 9axo 9bat 9baz 9beq 9bgq 9bjw 9bmm 9bnp 8bzi 9eb 9cfy 9cks 9cmz 9cpq 9crd 9crj 9dae 9dbj 9dku 9dli 9dma 9dpj 9dr 9dso 9dte 9ebo 9ebp 9ecb 9eld 9fs 9lz 9oo 9dx 9pb 9uq 9wr 9xi kel naa nss wiz nc-1bi nc-1br ne-3bt nc-9bz ne-8ae np-naj nq-2ac nq-2cf nr-2fg sa-da9 sa-db2 sa-en8 sa-lp1 sb-1ah sb-1aj sb-1ak sb-1ao sb-1aq sb-1ar sb-1aw sb-1ax sb-1br sb-1cg sb-1sm sb-1ic sb-1jb sb-2ad sb-2aj sb-2ak sb-2ar sb-2ay sb-6qa sb-pth sb-ptq sb-pty sb-snni sb-sqbw sc-2ab sc-3ag ss-2bn su-1bc su-1oa su-2al sv-1xc oa-2ch oa-2gw oa-2jw oa-2no oa-2rc oa-2sh oa-2wb oa-3bq oa-3vp oa-8wm oa-4bd oa-4go oa-5ax oa-5mb oa-5wh oa-7cw oa-7gh oa-7hl oa-7pf od-and oz-1ao oz-2ab oz-2al oz-2at oz-2bg oz-2bp oz-2ga oz-2gc oz-2xa oz-3ai oz-3ap oz-3ar oz-3au oz-4aa oz-4ac oz-4ae oz-4am ar-8fbh fm-8ay fm-8ma fm-8mb fm-8rit fm-8vx.

J. Bernfield, 14 Richmond Rd., Wimbledon, London, England

1adm 1ahi 1ajm 1aot 1aoh 1alr 1azw 1asi 1aep 1aff 1akz 1ajh 1ach 1apv 1aai 1anv 1aba 1awe 1ag 1ebd 1awm 1ahx 1amu 1agw 1arx 1aq 1axx 1akm 1afl 1att 1ang 1aaw 1axn 1bcw 1bjk 1bux 1bbm 1bql 1bcn 1bgc 1beb 1bgt 1bkt 1bl 1bqs 1bw 1bed 1bbo 1bvb 1cio 1cmf 1cue 1ctu 1cpb 1cjh 1ccz 1cxy 1cmp 1ck 1cnz 1cra 1cdi 1dm 1dl 1di 1fl 1ff 1fs 1gc 1gh 1ia 1ie 1ii 1ka 1ke 1kl 1lv 1lj 1mo 1no 1ow 1qi 1rd 1rw 1sz 1uw 1ue 1uz 1vw 1vc 1xi 1xv 1zl 2afv 2apa 2ags 2ahm 2alu 2aoj 2aef 2asc 2aib 2ada 2aue 2awq 2ahi 2avw 2ayj 2amj 2agn 2atr 2atq 2ass 2abc 2agp 2awi 2arb 2alu 2ag 2abf 2aev 2amh 2ard 2ase 2adb 2agb 2awf 2aqg 2anp 2awk 2axy 2bbe 2bdk 2bmr 2bda 2bnr 2bek 2bad 2bum 2buy 2bae 2bui 2bdc 2bcc 2bco 2bdh 2bbm 2cuz 2cns 2cwm 2cyx 2crb 2cuq 2cjb 2cx 2sa 2cid 2dh 2gp 2hv 2hq 2ih 2jn 2md 2ow 2or 2px 2pq 2pv 2rs 2sj 2tp 2tw 2uo 3ag 3aks 3ajx 3aim 3aqe 3anr 3adl 3acm 3aib 3aef 3bwt 3btq 4acn 4bu 4be 4cj 4fv 4hx 4iz 4it 4ic 4jw 4oh 4qz 4qb 4rq 4rn 4sq 4tu 4wh 4we 4xc 6mu 8aly 8afg 8alu 8axn 8azg 8aj 8axa 8atv 8arg 8akg 8azt 8adm 8asf 8agi 8ayv 8ajt 8axz 8bni 8bas 8bwa 8ben 8hwz 8emb 8cvs 8emg 8ccs 8cae 8eln 8cdf 8ces 8ejv 8ejo 8dsy 8dtp 8djp 8dod 8dcm 8dne 8doa 8djv 8dgp 8dae 8eh 8es 8li 8uy 8vx 8xe 8ze 9akn 9afa 9ara 9acl 9bpl 9bjw 9cei 9crd 9dbi 9eg 9ein 9edb.

Miss B. Dunn, Stock, Essex, England
(Heard during November)

1acm 1amn 1aur 1azd 1bke 1on 1oph 1di 1ke 1zz 2aad 2afr 2agl 2agn 2alu 2amh 2ase 2bdc 2bum 2czr 2md 2rs 2xs 2auv 3chg 3gf 3pf 3qe 3qw 3sj 4we 8ecr 8dne 8li 9beq sb-tca od-anc od-anf ed-7ahl ed-7bb ed-7bx ed-7fr ed-7hp ed-7jo ed-7mt ed-7ng ed-7zg ed-7zm ed-oxg ed-oxz eg-axa eh-9xc ej-7qq el-1a el-1alg el-1als em-smrt em-smss em-smua em-smuf em-sab em-sdk em-sfy ep-1aa ep-1ae ep-1ag ep-1be ep-1bk ep-3am es-2hb eu-wt eu-15ra ac-xom ai-vwx fe-suc fe-suc2 fm-8rit fo-a9a fv-oodb agj dnse eex28 gbh gbi ocej pad pcmm pcpp rlj sjg vzdk.

ei-1CR, Ing. Vincenzo Quasimodo, Piarza Tommaseo 16, Gorizia, Italy

1mv 1ben 1aff 1nv 1py 1byv 1ry 1awe 1vw 1awy 1bzi 1xv 1zz 1cpb 1da 1bhm 1adm 1bux 1mw 1akz 1ajm 1bw 1biv 1bcn 1aao 1axx 1ccz 1aiz 1ia 1bgs 1zl 1bke 1emf 1dl 1ayz 1air 1aqt 1ii 1asu 1fd 1cjh 1nf 1beb 1kl 1bjk 1ki 1sz 1aq 1als 2jn 2agn 2avb 2je 2sg 2bbc 2asr 2gp 2aef 2tr 2ch 2cjd 2avb 2bvd 2aim 2amd 2ane 2ahg 2bac 2avz 2ahm 2nm 2azk 2aib 2abf 2atq 2bad 3aed 3aqe 3tn 3nr 3jv 3nb 3add 3xan 3ql 3jq 3jx 3czc 3mw 3bgo 3qe 3mv 3kj 3caq 3amx 4px 4rn 4io 4ip 4rm 4lk 4tu 5avs 5la 5agq 5bf 5mx 5afb 5yb 6dcq 6ahn 6agr 8htr 8aly 8adg 8box 8cil 8ve 8dhx 8dlp 8lev 8dod 8aja 8bto 8odb 8dia 8bsr 8atv 8efr 8bod 8ddn 8dld 8ccs 8aj 8acz 8ben 8dgx 8che 8ciq 8brr 9bay 9db 9ark 9evy 9jk 9cmv 9ed 9adn 9cn 9aic 9ewa 9bzi 9awi 9blw 9ef 9dkc 9afa 9dws ne-3jm ne-2al ne-1br ne-2be ne-1ap ne-3ag ne-1bt ne-1dm ne-1ar ne-1co ne-2fo nf-bat ni-tfhb nj-2pz nm-1bw mm-gx np-4sa nq-2cf nq-5ry ns-3jg ns-2gx nx-1xl nr-2fg nr-cto ne-8rg ne-8ae nz-5er sb-2as sb-1ax sb-1ad sb-1ac sb-2ar sb-1ib sb-2ax sb-1ah sb-1ay sb-2ad sb-1ic sb-1br sb-7ab sb-1cg sb-2ag sb-1aw sb-2ay sb-1ao sb-1ca su-2ak su-1cd su-1bc su-1oa su-3ah su-1pu sa-cb8 sa-de3 sa-c6f sc-2ah sc-2ar sv-1xc oa-7cw oa-3wm oa-3am oa-3bd oa-7gh oa-2tm oa-2jw oa-2yj oa-7hl oa-3vj oa-2sh oa-2cm oa-2no oa-5bg oa-3bq oa-7bq oa-2ro oa-3jk oa-3ga oa-8oe oz-2bg oz-2br oz-2ga oz-3ap oz-1ax oz-2gx oz-4ae oz-3aj oz-3ar oz-2al oz-1ao oz-2ac oz-2bp oz-4aa oz-1fb oz-2ae oz-4am fq-pm fo-a9a ai-2kx.

ei-1ER, Ing. Mario Santangeli, S. Rufemia 19, Milano, Italy
(Heard during October and November)

1abd 1als 1aow 1aq 1asf 1awx 1bdq 1bed 1bnh 1bns 1bqd 1bxl 1clv 1cnz 1kw 1jq 1qo 2ach 2afr 2agb 2ahi 2ahr 2ali 2alu 2awm 2bdh 2bfj 2bgb 2bgt 2bi 2bjy 2bud 2bvd 2bzf 2cd 2ewm 2fp 2kl 2lv 2ow 2ps 2rd 3adl 3aed 3ah 3anh 3apn 3aqs 3bfw 3bjw 3bnu 3buv 3cm 3cn 3gb 3pv 3qp 3wm 3xw 4ac 4acn 4acv 4anc 4cy 4km 4kw 4lu 4nq 4oo 4qe 4uo 4xe 5kd 5ql 5rg 8abx 8abz 8adq 8aff 8agi 8agw 8ajt 8aqn 8bbg 8bec 8bdt 8bek 8bww 8cfv 8ckc 8cjb 8cnt 8dke 8dsr 8ht 8jj 8vd 9beq 9cfd 9cjw 9cn 9crd 9dck 9dkc 9eb 9ell 9eqa 9fs 9jw 9rxh na-iyb ne-8ae ne-1bh ne-9bz oa-2hm oa-2no oa-2ro oa-2tm oa-2yj oa-5kv oa-8on oa-8ry oz-1ap oz-2ab oz-2at oz-2ay oz-axa2 oz-3au su-2aa fm-8mt fm-8st fm-8rit aqe arcx 2xd erha gzc fm fy nwq oist qrb ogd sqbw tru.

N. S. Hurley, Radio Operator (5AC) U. S. Coast Guard Cutter Tallapoosa, Headquarters, Mobile, Ala.

(Heard during November)

(20 meters)

1aep 1ajm 1awe 1bwm 1fl 1ho 1ne 1rw 1sz 2aib 2alw 2aol 2ard 2bui 2gp 2nm 2md 2tp 2vp 2vs 3adm 3aib 3bsd 3fw 3jm 8ku 3ra 3tn 3wm 5aav 5acl 5avs 5ql 5tp 6bjh 6dfs 6cmy 7fl 8adn 8agy 8akx 8arb 8avb 8axa 8axd 8ayo 8bag 8baz 8bkc 8cer 8ccw 8c8l 8den 8djv 8dpo 8dip 8hw 8re 8ut 8wb 9afa 9agy 9ara 9asc 9auu 9bha 9bmd 9bnd 9bpx 9bsa 9bza 9civ 9cjw 9cko 9cmv 9cu 9crd 9cuh 9cvy 9dax 9dbj 9dbm 9dij 9dll 9dmb 9drd 9dwe 9dws 9ecz 9enu 9ef 9enu 9emn 9ln 9nm 9sx nc-2al nc-2be nc-3bt nc-3gg nc-3gn nc-4fv sb-1aa sb-2ag nm-9a wnp uc uf hjg eto ocdl.

(40 meters)

1cio 1ctl 1vt 2bco 2bdj 2ctn 2ih 2sh 2xd 3amx 6akw 6avj 6bjh 6brd 6bzn 6czm 6dje 6ju 6xi eg-5ls eg-6yq ef-8cp ef-8dmf ef-8fd ef-8fg ef-8xo fd-8k ea-1co ei-1er nc-3gn nc-4bc nc-4bl nc-4ey nc-4fv sb-1aw sb-1ah sb-cb8 nr-2fg fm-8st ardi arcx vlb nm-1r ns-3jg kzet xc1 oa-2dy oa-2jy oa-2uk oa-2xi oa-3gr oa-3ot oa-4nw oa-5mb oa-5hg oz-2ab oz-2ay oz-2bp oz-2kw oz-3af oz-3au oz-4am.

S. S. Liberty Bell, KUJX, calls heard during November, 1927.

From Port de Bouc, France, to Gibraltar (40 meters)

1ic 1td 1vc 1xv 1zz 1abm 1acm 1avj 1awm 1azd 1bed 1boq 1cbh 1com 1ctp 2bs 2fx 2gp 2hr 2hv 2iz 2mb 2md 2or 2pv 2qu 2sg 2sz 2tr 2uo 2vm 2adl 2aed 2agb 2agp 2ags 2ajb 2alu 2amj 2anp 2aoj 2aqo 2aqu 2aul 2brb 2bzf 2cwm 3ag 3am 3cf 3dh 3lm 3qe 3qp 3sz 3ua 3zw 3aib 4cu 4ei 4fx 4kw 4lu 4oh 4rn 4abz 4acn 4acz 5jf 5jy 5ql 5rg 5nw 5yb 5auz 8ex 8jj 8on 8pl 8vd 8xe 8abx 8adg 8adm 8agi 8agk 8ajv 8akv 8aly 8ank 8awu 8ben 8bpd 8bsu 8bwr 8cem 8cer 8ccs 8cpc 8cqi 8ctd 8ddk 8dsa 9dr 9gj 9mn 9ra 9uq 9abu 9acu 9anz 9ars 9beq 9beu 9bpb 9cmj 9cph 9crj 9crd 9cvy 9dbj 9des 9dkc 9efz 9eky 9eps ea-fo ea-kl ef-8im ei-1bd fm-8vx fm-8rit nc-1br, nc-2be ne-8ae nn-1nic.

From Gibraltar to Madeira Islands (40 meters)

1fl 1po 1wv 1zs 1asf 1avj 1bed 1bbm 1bvl 1chg 1clv 2ag 2bc 2bi 2dh 2fj 2ie 2md 2tr 2uo 2vp 2afr 2ajb 2ali 2alu 2aun 2awf 2bad 2bfw 2bsk 2cei 2cjd 2etm 2eua 2euf 2euq 2exl 3kp 3ld 3pr 3rn 3wc 3wj 3adl 3afl 3afw 3amx 3awf 3bnu 3bqz 3caq 3cdg 4fv 4oc 4rn 4rp 4tn 5kl 5acl 5ako 6am 6ec 8ez 8gk 8on 8ru 8vd 8vn 8agi 8ajt 8alu 8amt 8bsu 8buj 8ccm 8cer 8ceo 8cgf 8cjx 8ckc 8cnio 8ctd 8ded 8dqb 8dsi 9cn 9cf 9fo 9mn 9nr 9ra 9wr 9xi 9ajr 9bed 9biz 9bmm 9bxi 9cjw 9dbw 9des 9dkc 9efz ef-8cp ef-8btr ef-8gdb ek-4dba nc-1ac nc-1ar nc-3dp.

The South Dakota Convention

(Continued from Page 55)

gave a very fine talk on working the different wave bands and seems to delight in keeping in close touch with the members of his division.

Treasurer Hebert, of the A.R.R.L. Headquarters, talked on the International Radiotelegraphic Convention, explaining some of the complexities, and made us realize the benefit of thorough organization.

With the awarding of the prizes for all the contests and hamfesting afterwards the convention closed in the wee hours of Friday morning with a rousing cheer to the Y.M.C.A. Radio Club for so successfully conducting the convention.

—*A. A. H.*

The A.R.R.L. Diamond Is the Emblem of a Real Amateur!

The League Emblem comes in four different forms. Its use by Members is endorsed and encouraged by the League. Every Member should be proud to display the insignia of his organization in every possible way.

THE PERSONAL EMBLEM. A handsome creation in extra-heavy rolled gold and black enamel, ¾" high, supplied in lapel button or pin-back style. There are still a few fellows who are hiding their light under a bushel. Wear your emblem, OM, and take your proper place in the radio fraternity. Either style emblem, $1.00, postpaid.

THE AUTOMOBILE EMBLEM. Introduced only this spring, already more than 800 cars are proudly displaying the mark of the "Radio Rolls-Royce." 5 x 2½", heavily enameled in gold and black on sheet metal, holes top and bottom, 50c each, postpaid.

THE EMBLEM CUT. A mounted printing electrotype, the same size as the lapel button, for use by Members in any type of printed matter, letterheads, cards, etc. $1.00 each, postpaid.

THE "JUMBO" EMBLEM. You've taken care of yourself, your car and your printing. How about the shack wall or that 100-footer? Think of the attention this big gold-and-black enamel metal emblem will get! 19 x 8¼", same style as Automobile Emblem. $1.25 each, postpaid.

Mail your order and remittance NOW to

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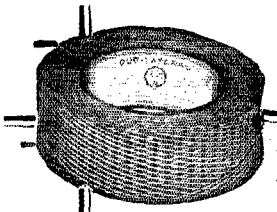

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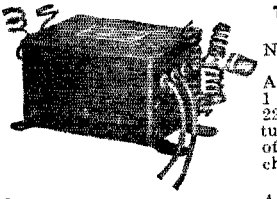

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To Our Readers Who Are Not A. R. R. L. Members

Wouldn't you like to become a member of the American Radio Relay League? We need you in this big organization of radio amateurs, the only amateur association that does things. From your reading of *QST* you have gained a knowledge of the nature of the League and what it does, and you have read its purposes as set forth on page 6 of every issue. We would like to have you become a full-fledged member and add your strength to ours in the things we are undertaking for Amateur Radio, and incidentally you will have the membership edition of *QST* delivered at your door each month. A convenient application form is printed below—clip it out and mail it today.

.....1928

American Radio Relay League,
Hartford, Conn., U. S. A.

Being genuinely interested in Amateur Radio, I hereby apply for membership in the American Radio Relay League, and enclose $2.50 ($3 in foreign countries) in payment of one year's dues. This entitles me to receive *QST* for the same period. Please begin my subscription with the ..... issue. Mail my Certificate of Membership and send *QST* to the following name and address.

....

....

Station call, if any .....

Grade Operator's license, if any .....

Radio Clubs of which a member .....

Do you know a friend who is also interested in Amateur Radio, whose name you might give us so we may send him a sample copy of *QST*?.....

..... Thanks!

HAM-ADS

NOTICE

Effective with the July issue of **QST** the policy of the "Ham Ad" Department was altered to conform more nearly to what it was originally intended that this department should be. It will be conducted strictly as a service to the members of the American Radio Relay League, and advertisements will be accepted under the following conditions.

(1) "Ham Ad" advertising will be accepted only from members of the American Radio Relay League.

(2) The signature of the advertisement must be the name of the individual member or his officially assigned call.

(3) Only one advertisement from an individual can be accepted for any issue of **QST**, and the advertisement must not exceed 100 words.

(4) Advertising shall be of a nature of interest to radio amateurs or experimenters in their pursuance of the art.

(5) No display of any character will be accepted, nor can any typographical arrangement, such as all or part capital letters, be used which would tend to make one advertisement stand out from the others.

(6) The "Ham Ad" rate is 7c per word. Remittance for full amount must accompany copy.

(7) Closing date: the 25th of second month preceding publication date.

ONE-HALF and one KW Navy Transmitters; ¼ KW portable field type; 64 feet sectional poles; small one cylinder ¼ KW 500 cycle power outfits; also four cylinder models with AC and DC outputs; ½ to 5 KW motor generators; ½ KW 500 cycle transformers easily tapped $12.50. Westinghouse 27.5-350 volt and General Electric 12-350 volt .143 ampere dynamotors $18. 6-400 volt model $15.00 SE 1012 receivers unused minus condensers $20.00. Wavemeters direct reading calibration no curves. $35. Photographs. All ex-Navy material. Henry Kienzle, 501 East 84th Street, New York.

THE life blood of your set—plate power. Powerful permanent, infinitely superior to dry cells, lead-acid, Bs, B eliminators. Trouble-free, rugged, abuse proof, that's an Edison Steel-Alkaline Storage, B-battery. Upset electrically welded pure nickel connectors insure absolute quiet. Lithium-Potassium solution (that's no lye). Complete, knock-down kits, parts, chargers. Glass tubes, shock-proof jars, peppy elements, pure nickel, anything you need. No. 12 solid copper enameled permanently perfect aerial wire $1.00, 100 ft. Silicon steel laminations for that transformer 15c lb. Details, full price list. Frank Murphy, Radio 8ML, 4837 Rockwood Rd., Cleveland, Ohio.

PURE aluminum and lead rectifier elements holes drilled brass screws and nuts, pair 1"x4" 13c, 1"x6" 15c, 1½"x6" 17c, 1½"x8" 19c. Sheet aluminum 1/16" $1.00, lead $1.00 square foot prepaid, $1.00 or more. Silicon transformer steel cut to order .014" 10 lb. 25c, 5 lb. 30c, less than 5 lbs. 35c lb. .022" 5c less per lb. Not cut 2-7" wide 15c lb., minimum 10 lb. postage extra. Edgewise wound copper ribbon 7 sizes, see January QST. Air pocket and stand off insulators 25c each. 4 for $1.00. Glazed porcelain 5 and 6½" long prepaid on 4. Electrolytic condenser parts, $1.50 prepaid. Geo. Schulz, Calumet, Michigan.

OMNIGRAPHS, vibroplexes, "S" tubes, teleplexes natrometers, perfectographs, transmitters, receivers, chokes, meters, transformers, 50 watters, motor generators, portable superheterodynes. Bought, sold, exchanged. L. J. Ryan, 9CNS, Hannibal, Missouri.

THE new Kennedy 15 watt tube oscillates at 5 meters. Ideal for crystal stage. Postpaid $6.50. Satisfaction guaranteed or refund. W. K. McCulla, Waukegan, Ill.

LOUDSPEAKER units rewound and magnets recharged $3.00. 24 hr service. Henry Wagner, East Chicago, Indiana.

I am not selling out. But I have a lot of stuff I don't need and want to sell. Write for list. nu5ON, Box 205, Montgomery, Ala.

FIVE tube gang sockets, all Bakelite, UV or UX type, 70c. Edison element storage B batteries, 100 volt, 3000 M. A. $12.50. 135 volt, $16.00. Type "A" elements drilled or welded, 5c per pair. 3-G, 6c type 5-G, 9c. Prices include separators. Potash-lithium for 5 lbs Edison electrolyte, 85c, 10 lbs, $1.50. Sheet separators, 5½"x 8½", 5c. No. 20 pure nickel wire, 1c per ft. No. 18, 1½c. J. Zied, 834 N. Randolph, Philadelphia, Penn.

JEFFRIES plate transformers, 1000 watts, 550-825-1100-1500-2200 each side, $19.00. 1000 watts 2500-3000 each side $22.50. Folder on request. 125 watt filament transformer 9-12 volts, $6.25. Carl Schwenden, 7427 Alameda Blvd., Los Angeles, Calif.

THORDARSON and Acme power transformers 30% discount. RCA Cunningham tubes 25%, Sonotrons 35%, The new Visitrons and Neotrons for television 30%. A complete line of ham and BCL apparatus. Write for complete list. 1 Megeff, Apt. No. 5, 35 West 110th Street, New York City.

HAWLEY Edison element battery and parts standard for over five years. Look at our patent pending connector——no thin wires to drop off—contains 20 times more metal than regularly used. Heavy shock proof cells, fibre holders, etc. Everything for a rapid-fire "B" supply. Complete assembled 100 volt "B" $10.00. Knock-down kits at still lower prices. Chargers that will charge in series up to 160 volts $2.75 to $4.00. Trickle B Charger for 90 to 150 volt "B" $3.75 Special transmitter "B" batteries up to 6,000 milli-amp capacity, any voltage. Write for interesting literature, testimonials, etc. B. Hawley Smith, 360 Washington Ave., Danbury, Conn.

8AGV going to college. Selling out. Sacrifice everything to get quick sale. Everything for a medium power set. Write to Robert Laurenson, 129½ Maple Street, Battle Creek, Michigan.

WANTED to buy or sell: 203 or 203A DeForest H or R tubes. What have you. Will trade Grebe CR13 short wave receiver. R. E. Davis, 9AHG, Concordia, Kansas.

GENERATOR wanted—one of the 200 watt, 900 cycle, 110 volt Westinghouse units designed for wartime airplanes. Please give details regarding condition and best price. Miles Pennybacker, 368 Cambridge St., Boston 34, (Allston District) Mass.

SELL—coupled inductance 40-80 meters, $2.00. Hand microphone $3.00. Best offer takes universal receiver with detector and two stage. 8JW, 6923 McPherson Blvd., Pittsburgh, Penn.

SELL 6/400 dynamotor $12.50. Write for list. nu5ADA-5CQ.

UV204 never used $50, UV203 $15. Transmitter 50 watt cabinet mounted $50, Receiver excellent condition, Gross coils $10. Acme 30 Hy 300 mil choke new $15, Transformers—Acme 500 watt 1000-1500V each side $14.50, Acme 300 watt 0-12V filament $14. D. A. Wilbur, Oak Ridge School, Royal Oak, Michigan.

SELLING out: Complete station equipment at 9EOA, Fifteen watt transmitter, wavemeter, three tube receiver, power supply, tube rectifier, three transformers, meters and many other items. Everything is brand new and unconditionally guaranteed and used but two months. A real bargain cost $165.00 and will sell to turn quickly for $115.00. Write for list of apparatus, can give reference if desired. 9EOA L. S. Pettygrove, Oxford. Nebraska.

SELL Gross tuned plate tuned grid 7½ watt transmitter complete with power supply, tube, and tube rectifier, also Kennedy 110 and two step $75.00 . Robert S. Bloomer, Newark Wayne County, New York.

TRADE magnetic modulator and Federal microphone for 202s, 3UZ.

FOR sale; New 852 R.C.A. tube, $25. Also one new Acme TR5, 2000, 1500-1000 volt 500 watt transformer $20.00. Wanted new 203A or will trade either for same. C. W. Glover, Georgetown, S. C.

WANTED: Seaman for private yacht position capable operating radiotelegraph. 4FM.

FOR sale or trade: 15W fone and C.W. xmtr, $20.00. 100W-500 volt Emerson M. G. 110 a. c. and field rheostat, $45.00. 1 Radiola 111 cs tubes $5.50. 1—2 tube set cabinet-tubes $6.00. Want power filament xfmr, 500 and 800 volts each side center tap. 9AQT, F. W. Steffen, Hartley, Iowa.

CURTIS-Griffith 250-watt power-filament transformers 350-550 each side $10.50. Thordarson power-filament transformers for 7.5-watters $6.90. Thordarson power transformers 350-550 each side $11.00; 1000-1500 each side $16.00. Aluminum square foot 85c; Lead square foot 85c. Potter 2-mfd 1000-volt condensers $2.75. A new edition of the "Ham-List" 4c. James Radio Curtis, 5-A-Q-C, 1109 Eighth Avenue, Fort Worth, Texas.

HEADQUARTERS for Hams:—Mueller 150-watt input tubes $15.00. UV202 5-watters $3.15. Complete 5-watt transmitters—tube, transformer, rectifier, key, etcs. for 20-40 meters, each $35.00. 20-40 meter receiver and

one step $17.50. Aerovox 1000-volt tested 1-mfd condensers $1.75. Potter 2000-volt tested 1-mfd condensers $2.50; 2500-volt 1-mfd $3.25. New "Ham-list" 4c. Robert Curtis, 1109 Eighth Avenue, Fort Worth, Texas.

ODDS 'nends. Acme 1500 volt plate transformer, $18; Signal antenna switch, $1; Acme 3 henry double choke $1.50; UL1655 rf choke, $1; Western Electric 284W microphone and stand $5; RCA 9-1 audio transformers $2; Pyrex 10" insulator, $1; General Radio transmitting variable, $3.25; RCA chopper wheel $1; 200 watt UX210 plate and filament transformer, $12.50. 2 AHO Wm. M. Derrick, 30 Leslie Street, East Orange, N. J.

SHORT wave transmitter with 201As also omnigraph. All for $25. Sherwood, 5BH.

OMNIGRAPH, five dial, perfect condition, $12. W. B. Campfield, 302 High St., Charlottesville, Virginia.

QSL hams: Neat clean-cut and reasonable cards. The best. Samples on request. 1NQ, 206 Metropolitan Ave., Roslindale, Mass.

NOW a more Precise instrument—flush panel mounting meters—0-100 M.A. plate milliammeters $1.00, 0-300 M.A. plate milliameters, $1.25. 0-500 D. C. voltmeters with external resistance $5.75. 0-10v. A.C. filament voltmeters, $2.50. Circle cutters adjustable from ⅜ to 3 inches each 65 cents. Ed. Keers, 9CJR, 2300 E. Washington St., Joliet, Illinois.

UP1658 filament transformer 11 volt $6.50. UP 1653 thirty henry 160 mil. $6.50. Faradon 1 mfd 1750 volt condenser $2.50. John Bittens, 2938 Minnie, Cleveland, Ohio.

BRAND new $6.00 Pyrex insulated .0005 general instrument slf condensers, easily double spaced $1.35. James Marinell, 725 Oak St., Youngstown, Ohio.

QSL cards $1.00 per 100. Government cards $1.90. Stationery. Samples. F. L. Young, 9CKA, Corwith, Iowa.

QSL cards two colors, government post cards $1.90 per hundred, white cards $1.00. Real ham stationery at $1.40 per hundred sheets and envelopes, pad form. Postage 10c. Free samples. 8DTY, 257 Parker Ave., Buffalo, N. Y.

WHILE they last, 210s, $7.25. Sonatron 210s, $5.60. Guaranteed UX210As and UX199s, 90c. Brandes fones $2.60. 5 or 11 plate vernier condensers, $1.00. 4 fh heavy glass insulators 6 for 75c. UX sockets 25c. 0-10v A.C. meters, $1.50. Everything new. Postage extra. Stamped envelope brings discount lists. Howard McIntyre, Bx. 1118, Memphis, Tennessee.

TRANSFORMERS 325-325 and 7½, $6.25. 275-275 and 5, $4.00. Filament transformers for A. C. tubes, 1½ and 2½ volts, $4.00. Chokes, 1½ henry 2 amperes, $4.75. 30 henries 100 M.A. $3.00. Adjustable core chokes 30 to 100 henry 150 M.A. Great for filters, $5.75. Send for special lists of ham material and set builders parts. M. Leitch, 34 S. Park Drive, West Orange, N. J.

VT14 Navy 5 watters, all new, plate voltage up to 550 filament 7½ volts. Only $1.25 each. 50 Henry Bristol chokes rated to pass 300 mils at 150 volts. In original boxes. Special $2.95. A new and better UX210 type tube $5.50. A 750 volt 110 mil rectifier tube $5.00. R.C.A. 852s, 75 watters only $31.00. 0-500 D.C. hi resistance voltmeters, $4.75. Cardwell .00035 condensers $1.50. Pyrex sockets 50c. Large Neon tube $1.50. Plug-in coils cover 15 to 200 meters $4.75 per set. Articles all guaranteed. Sent C.O.D. Please include postage. Send for our new and better bargain list. E. P. Hufnagel, 879 S. 18th St., Newark, N. J.

NAVY standard compass receivers type SE1440A 150-1250 meters, equipped with detector 3 stages audio, ideal for commercial work and broadcasting stations, $250. Western Electric tubes all sizes. Long wave navy receivers CN240 $80. Navy precision wave meter $87. Navy direct reading wave meters equipped with galvanometer manufactured by General Radio range 300-1000 meters. Can be calibrated for short wave use special $13.50. Navy 300 watt General Electric battleship tube transmitters ideal for yachts and steamships. Navy spark transmitters from ¼ to 5 kw. Write for prices. Other 500 cycle equipment. Ham supplies. Write for list and save money. Arthur Faske, 350 Stone Ave., Brooklyn, N. Y.

YOU want UX222, $6.25, mercury arc $11.90. Westman RF kit $14.50. We have any ham or BCL apparatus. Write us your needs. We will save you money. 9ARA, Butler, Mo.

LICENSED amateurs only—Aero Short Wave Kit—$8.13. $60.18 Aero 7 Kit—$36.39. $146.34 Tyrman Ten Kit—$87.81. $25.00 Browning-Drake Kit—$16.25. $10.00 Ensco 36" Cone Kit—$6.18. $31.00 Modern B. Eliminator, with Raytheon—$19.23. Discounts on Cardwell (transmitter items—15%), AmerTran, Jewell (transmitting meters—25%), Benjamin, Samson—35%. On Sangamo, Daven, Karas, Deutschmann, Aero, Hammarlund, Kodel, Silver-Marshall, Abox, Yaxley, Bodine, Ceco, Raytheon Baldwin—40%. Postpaid. Our weekly data sheets give more "dope" than all radio magazines combined. Twenty weeks—$1.00, 52 weeks—$2.50. Over two pounds, catalog, data, circuits, prepaid—25c. Fred Luther Kline, Kent, Ohio. (Established 1920.)

QSL cards—unstamped $1.00 per hundred. Government cards at $1.65. Prompt service. 9BEU, 9032 Windom Ave., St. Johns Station, Missouri.

WE 7A amplifier with 3 nearly new 216As, no horn $28.00. 12500V. Dubilier .004 condenser $11.00. Edw. DuBois, 7703 Sherwood Ave., Detroit, Michigan.

BARGAINS Rheostats any resistance 40c. Glass sockets 35c each. Bradleyleak or Bradleyohm, $1.00 ea. Many other bargains, all new. 9DWC, Republican City, Nebr.

RECTIGON bulbs in original carton with Westinghouse guarantee tag. Full wave, for easy filtering in A Battery eliminators. 1 amp. each side. 2 amps. output. Mongul base. Anodes may be connected in parallel for 2 amp. Single Wave rectification for battery charging, etc. Money Order No C. O. D. Prcie $2.50 each F. O. B. 2 Horse Power Single Phase 110-220 Volt Century Motor with sliding Base. Like New $75.00. R. M. Blair 8EB 3934 Ivanhoe Avenue, Norwood, Ohio.

ATTRACTIVELY painted design of your station call on 9"x12" card. 75c prepaid plus 5c postage. 8AXE, 149 Center Rd., Bedford, Ohio.

ONLY a limited supply of RCA 5 watters are left. Model UV 202 with filament rated at 7½ volts and plate at 350. Fine for dx. Each one is guaranteed brand new. Order now, prepaid at $2.25 each. Send for bargain price list. B. C. Mitchell 3520 Sheridan Rd. Chicago, Ill.

QSB? $8.00 list Dudlo wound chokes. 50 henry, 150 milliampere, only $2.95; Flechtheim filter condensers. 1000v. 2mf. $2.60; 1000v. 4mf. $4.60; 2000v. 2mf. $4.25; 2000v. 4mf. $6.85; Corwico No. 12 enameled antenna wire, $.90 100'; Myers tubes. Grid and plate leads at opposite ends, $.95; All sizes unmounted honeycomb coils, Low prices, write for list. Please add postage. Articles sent PP, or COD. Send for our early spring bargain list. D. L. Moon, 3344 Boulevard, Jersey City, N. J.

QST says that all hams should have an accurate wavemeter, but: a thermogalvanometer is expensive, so why not try one of our inexpensive neon tube indicators, Type "A" is only $.85; Type "B" ultra sensitive, $1.50; Cardwell double spaced 1500v. .00025 condenser, $3.75; Cardwell .0005 $2.00; Electrad 75 watt grid leak, 10,000 ohm $1.75; Complete line of transmitting and receiving apparatus at lowest prices. Many exceptional bargains. Send for list. Articles sent COD if desired. Please include postage. G. I. Lang, 2WW, 2AWH, 1128 Springfield Ave., Irvington, N. J.

FELLOW amateurs—If you haven't our list of transmitting and experimental apparatus you're wasting money. For example—UV202 5 watters $2.15, GI Lo-Loss .0005 Mfd condensers list $6 $1.50, 12" antenna insulators 80c and many other bargains. Also used Scientific books at bargain prices. Postage extra. Selling out used parts. Kenneth Hanifan, Waterville, Ohio.

TWO W.E. fifty watters $24.00 each. Set three W.E. superheterodyne transformers $20.00. New CX310, $6.50. Few peanut tubes, $2.25. 2BYJ, Levy, 2050—69th St., Brooklyn, N. Y.

FOR sale: Shortwave receiver with two step. Aero coils, Karas condensers, etc. Write for price. 8DDK, Delaware, Ohio.

BURNT out plate supply transformers and filter chokes rewound equal to new at one half cost of a new one of same make. Transformer and filter choke cores to your order, magnet wire for winding transformers and chokes, 014 Silicon steel 17c pound. Plate supply transformers and filter chokes to order. Nat G. Scott, New Albany, Mississippi.

GENERATORS, new 275 volt d.c. 120 watt gives up to 500 volts, $8. General Electric new double current generators, 600 and 8 volts, $18. 6 volt input dynamotor output 400 volts $15. Slightly used 500 cycle generators 200 watt $10. ¼ kilowat $15. 900 cycle generators $10. Dynamotors 120 volt output 900 cycles $15, input 16 volts, 120 volts d.c. drive 1 kw and ½ kw new motor-generator 500 cycle microphones $1.25. VT1s $1. Enclose stamp for list. Postage or express extra, R. Wood, 46-20 102nd St., Corona, N. Y.

CATALOGUE, fully illustrated sent free for your QRA. Standard proven merchandise only. Prompt courteous attention, and all orders shipped same day received. Harris 5RM 104 East 10th St., Forth Worth, Texas.

QSL cards: 100 plain cards, 95c; 150, $1.20; 150 Govt. cards, $2.50. Radiogram blanks, one and two color stationery. H. M. Selden, Cranesville, Penn.

1000 VOLT 200 Watt Esco motor 110 Volt single phase $75.00. 400 Volt 100 Watt Esco coupled to 220 Volt 3 phase Alternating motor $25.00. New General Electric 500 Volt 100 Watt generators $12.00. 750 Volt 300 Watt double commutator with 110 Volt single phase motor $65.00. 2000 Volt to 5000 Volt Broadcast motor generators. Filament motor generators 50 to 200 amperes capacity. Also many others. ¼ H.P. 110 Volt 3500 speed alternating current motors $8.50 prices f.o.b. Chicago. James Smat, 1734 Grand Ave., Chicago, Ill.

TRADE copy of G.R. Precision condenser for portable typewriter, 9CIN, 2013 Porter, Joplin, Missouri.

WAVEMETERS—Neat sturdy wavemeters in hardwood cabinet, with genuine Bakelite panel and Marco vernier dial. Four coil plug-in. Accurately calibrated. 15 to 200 meters, $7.25 each. Milliameters: 0-100, $1.90; 0-300, $2.75 . Brandes phones, $2.65. ¼" heavy copper tubing inductance, 4" diameter, 12c per turn, 3", 9c. Pure aluminum, lead, pair, complete 1"x4", 7c; 1"x6", 10c. Extra heavy 12c; 16c. Your wavemeter accurately calibrated from General Radio standard, $4.50. Quality merchandise and prompt service. Terms: Cash with order or 25% deposit. Send for free catalogue. William Harrison, 35 Ft. Washington Ave., N. Y. C.

TRULY—apparatus to be proud of, everything new: Precisely calibrated wavemeters, plug-in 17-160 meters. $5.00. Accurate milliameters, 0-50, 0-100, 0-300, 0-400, $2.00. 0-10, $3.00. Voltmeters, 0-8, 0-50, 0-150, $2.00. 0-8-100, $3.00. RCA UX201Sa, $1.19, UX210s, $6.90. Type X201As, 78c, X210s, $5.00. Power filament transformers, 100 watt for UX210s, $6.25. 225 watt for UV20sAs, $9.00. Power chokes, 30 Henry, 300 milliampere, $4.00. Imported seven watt tubes, $4.00. Ten watts, $4.90, fifty watters, $9.00. Rectifier elements, aluminum lead, pair 1"x4", 7c; 1"x6", 10c. QSL cards, two colors, $1.00 per 100. Free radio catalog and QSL samples. William Green, 207 Cathedral Parkway, N. Y. C.

ADDRESSES wanted: Letters addressed to the following have been returned. Correct addresses will be appreciated by the Technical Editor of QST. V. H. Fraenkel, Major Raven-Hart, J. H. Tyzzer, Abner R. Willson, E. A. Tubbs, Byron R. Wedemanns, Charles Earl Paulson, A. W. Parkes, Jr., L. H. Morrisson, H. O. Boehme, Everett M. Walker.

DODGE Radio Shortkut. See display section page 87. C. K. Dodge, Mamaroneck, N. Y.

POSTPAID. Dubilier 1¾ mfd. 1000 volt working voltage filter condensers, $1.95. Stromberg-Carlson 3½ mfd. 600 volt working voltage filter condensers, $2.35. General Electric 5000 ohm Heavy Duty gridleaks, $1.25. R.E.L. Equipment:—Transmitting Inductances, Type L, double unit, with glass coupling rods and clips, $8.90. Radio Frequency Chokes, $1.00. Fifty watt sockets, $1.89. Write for other prices. G. F. Hall, 535 West Horter St., Philadelphia, Pa.

200 watt filament transformer 8-11V, $7.50, 200 watt 25 cycle 8-11V, $11.00, 700 watt 1000-1500 each side $14.25, 700 watt 2000-2500 each side, $18.00, 250 watt 550-700 each side, $10.25. 250 watt 25 cycle 600-800 each side, $14.00, 700 watt 25 cycle 1000-1500 each side $18.00, 700 watt 25 cycle 2000-2500 each side, $21.00, 1 kw. 2000-2500 each side, $30.00, or any voltage you want. 30 Henry 150 mil. choke $10.00. 9CES, F. Greben, 1927 S. Peoria St., Chicago, Ill.

Q R A SECTION

50c straight with copy in following address form only:

6DAO-6CWM—Werner Eilers, R. William Bell, Jr., 6510 Brynhurst Ave., Los Angeles, Calif.

6MU—San Francisco Radio Club, 454 Bright St., San Francisco, Calif.

8BAC—Jerry Trousil, 3769 E. 131st St., Cleveland, Ohio.

8CWK—F. Kelwin Kearney, 16580 Outer Drive, Detroit, Michigan.

9CPH—H. L. Durflinger, 502 Caroline St., Peoria, Illinois.

9EVE—Milwaukee Journal Co., WTMJ, R. F. D. 6, Box 130A, Waukesha, Wis.

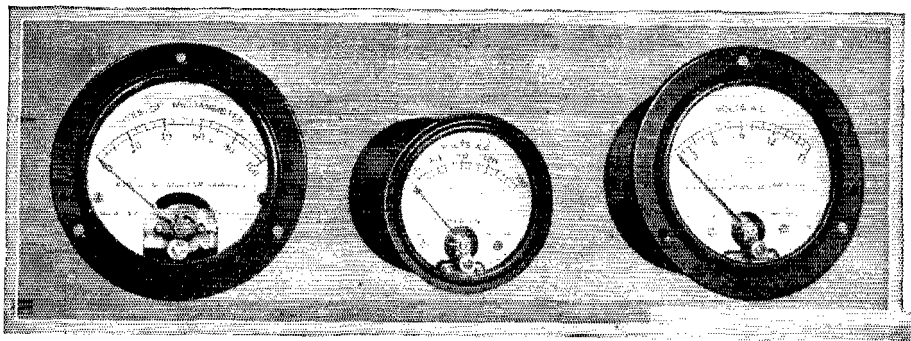
9PC—J. A. Martino, 2644 N. Menard Ave., Chicago, Ill.

oz1FE—Alf F. Wood, P.W.D. Substation Waihou, New Zealand.

1MK Headquarters	1BUD A. L. Budlong "bud"
1AL H. P. Westman "ws"	1ES A. A. Herbert "ah"
1BAO R. S. Kruse "lq"	1GO L. A. Jones "lj"
1BDI F. E. Handy "fh"	1KP F. C. Beekley "beek"
1BHW K. B. Warner "kb"	1OA R. S. Kruse "lq"
1BIZ C. C. Rodimon "rod"	1SZ C. C. Rodimon "rod"

FOR YOUR CONVENIENCE
QST'S INDEX OF ADVERTISERS IN THIS ISSUE

Quality versus Imitation

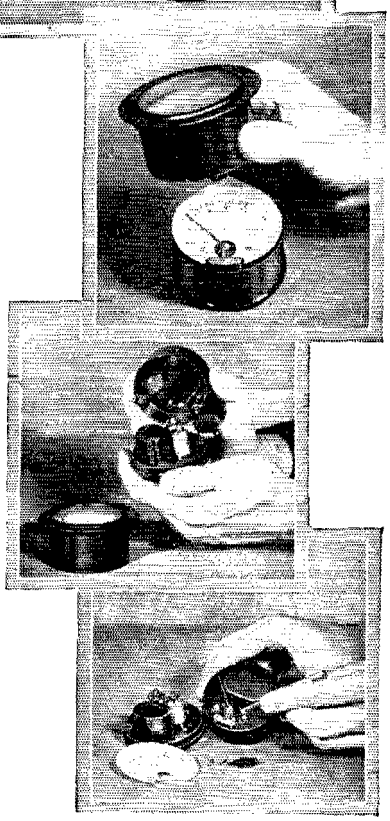


The favorite practice of imitators is to duplicate the *appearance* of original instruments. But to duplicate their construction and performance is quite another matter. The nicety of design and workmanship of Weston Instruments is well known to radio amateurs, and it is these refinements—the hall-mark of Weston quality—which have always defied serious imitation.

When contemplating the purchase of small A. C. meters such as Line Voltage Indicators and Filament Voltmeters, it will be well worth your while to compare the following characteristics of Weston designs with other small meters which the market affords.

Special Characteristics of Weston 3¼" Model 476 and 2" Model 517.

1—High insulation value affording full protection from break-down in case of leakage from plate voltage supply. 2—Ability to withstand the shock imposed on the movement and pointer at times of sudden no-load voltage—due to the unusual current carrying capacity of the instrument. 3—Designed for continuous service without noticeable heating. 4—Unusual sensitivity; for example, the 150 volt range takes only about 9½ milliamperes at full scale deflection. 5—Self-contained resistance for ranges as high as 300 volts. 6—Construction of damper box, and method of assembling movable iron piece and damping device within the field coil, insures continuous accuracy of the instrument, and produces perfect dead-beat pointer action. 7—Uniform scale divisions permit use of the instrument down to 1/10 of full scale value.



Weston Electrical Instrument Corporation

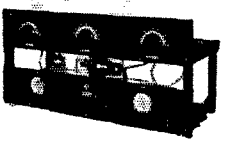
158 Frelinghuysen Ave., Newark, N. J.

Voltmeters, Ammeters and Milliammeters—both 3¼" and 2" sizes—$8.00 to $12.00. Thermo-couple instruments—both 3¼" and 2" sizes—$12.50 to $15.00

WESTON
RADIO
INSTRUMENTS

BEGINNER'S TRANSMITTER

TRANSMITTING INDUCTANCES—



TUNED PLATE TUNED GRID

50 WATT SOCKET

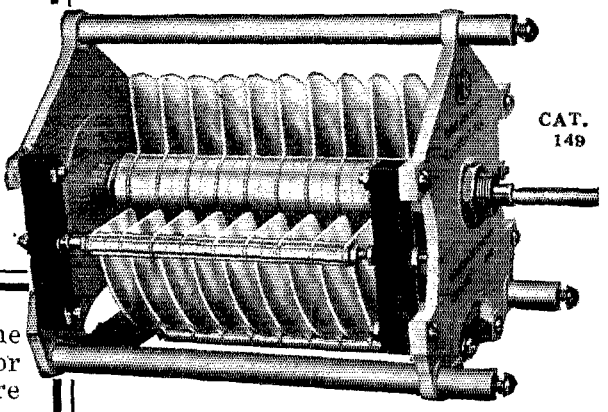
WAVEMETERS

Now!

A CONDENSER

FOR THE

SUPER-SET



CAT. 149

THIS is not a condenser for the knock-about set nor is it built for "bang-up" purposes. So if you're looking for a job that will be your trusty paper weight six months hence,—pass on, you'll not be interested in this message.

But,—if you have a set that's going to be heard from Rio to Hong Kong, take a good, long look at this. It's a Super Condenser for a Super Set, and if you don't think so,—you're ravin'.

All REL Transmitting Kits are now equipped with the new condenser and —no increase in prices. Write for bulletin No. 39. It tells the whole story.

Here it is!—

Heavy brass plates...Cast aluminum end plates...Solid, husky steel rotor shaft...Conical adjustable bearings...Highly insulated between stator and rotor plates...accurate spacing...Overall strength carried to an access

SPECIFICATIONS

TYPE NO	Breakdown Voltage	No of Plates	Max Cap Mmfd	Plate spacing inches	PRICE
K	3,000	19	200	.250	$17.50
L	3,000	33	350	.250	21.00
M	3,000	59	650	.250	29.00
N	5,000	11	60	.500	17.25
O	5,000	19	100	.500	20.00
P	5,000	33	180	.500	28.00
R	10,000	7	25	1.000	17.00
S	10,000	11	45	1.000	19.00
T	10,000	19	80	1.000	27.00

REL owns and operates experimental Station NU2XV on 15.1, 30.2, and 60.4 meters

Radio Engineering Laboratories

100 Wilbur Avenue, Long Island City, N. Y.

REL CHOKE COIL

DE FOREST "H" TUBE HOLDER

50 WATT COUPLED HARTLEY

UX-852 TUBE HOLDER

SPECIAL SHORT WAVE COIL KIT

AERO COIL

SUPER-SENSITIVE

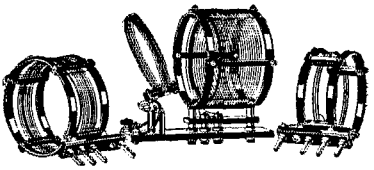
INDUCTANCE UNITS

The Perfect Inductances for All Low Wave Work

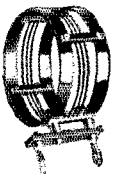
FOR RECEIVING

AERO LOW WAVE TUNER KIT — Price $12.50

Completely interchangeable. Adopted by experts and amateurs everywhere. Range 15 to 130 meters. Includes 3 coils and base mounting, covering U.S. bands, 20, 40 and 80 meters. You can increase or decrease the range of this short wave tuner by securing the AERO Interchangeable Coils described below. All coils fit the same base and use the same condensers. Use Code No. INT-125 in ordering.



PRICE $12.50



INTERCHANGEABLE Coil No. 0

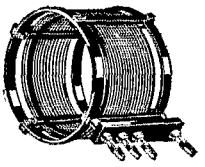
Range 13 to 29.4 meters. This is the most efficient inductance for this low band. Code number INT-0.

Price $4.00

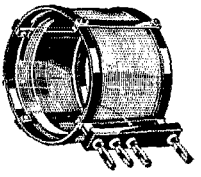
INTERCHANGEABLE Coil No. 4

Range 125 to 250 meters. Fits same base supplied with low tuner kit. Code number INT-No. 4.

Price $4.00



THE NEW AERO INTERCHANGEABLE COIL No. 5



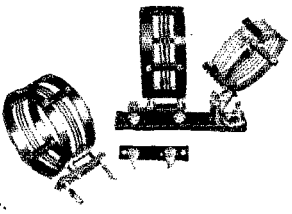
Normal range 235 to 550 meters. However, by using .0001 Sangamo fixed condenser across the rotor and stator of the .00014 variable condenser, the maximum wave band of this coil is increased to 725 meters. This gives you coverage of the following bands: Airplane to Airplane, Land to Airplane, Ship to Shore (Great Lakes) Ship to Shore (Atlantic and Pacific Oceans). Code number INT-No. 5. Price $4.00

NOTE *This new Aero Short Wave Kit is wound with No. 16 wire on secondary, making it even stronger, and cutting down the resistance appreciably,*

FOR TRANSMITTING

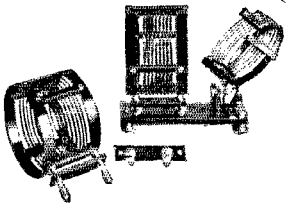
KEY 2040 KIT — Price $12.00

Kit contains 2 AERO Coils, 17 to 50 meters each, 1 AERO Antenna Coil Mounting Base, 1 AERO Grid Coil Mounting Base, 2 AERO Essential Choke Coils.



KEY 4080 KIT — Price $12.00

Kit contains 2 AERO Coils, 36 to 90 meters each, 1 AERO Antenna Coil Mounting Base, 1 AERO Grid Coil Mounting Base, 2 AERO Essential Choke Coils.



KEY 9018 KIT — Price $12.00

Completely interchangeable with either of above kits. Range 90 to 180 meters. Contains 2 coils and mounting base.

COMPLETE AERO TRANSMITTER KITS

Complete Aero Transmitting Coils for the 20-40 and 40-80 bands, $20.00. Complete for 20-40, 40-80, and 90-180 bands, $28.00.

AERO PARTS

Transmitter coils (17 to 50 meters, Key 2040C, 36 to 90 meters, Key 4080C and 90 to 180 meters, Key 9018C) $4.00 ea. Antenna Base, Key PRI-300, $3.00 ea. Grid Coil Base, Key GRID-100, $1.00 ea. Choke Coils, $1.50 ea.

RADIO MANUFACTURERS ASSOCIATION RMA MEMBER

PLAN FOR D. X. RECORDS *NOW!*

Order these coils direct from us if your dealer hasn't them and start now for wonderful records. Specify code or key numbers when ordering. Or write at once for complete descriptive literature.

AERO PRODUCTS, Inc.

Dept. 16 — 1772 WILSON AVE., CHICAGO, ILL.

Inside Information!

Inner seal cementing cells into a solid block

Moisture-proof insulating cell partitions.

Moisture-proof inner container

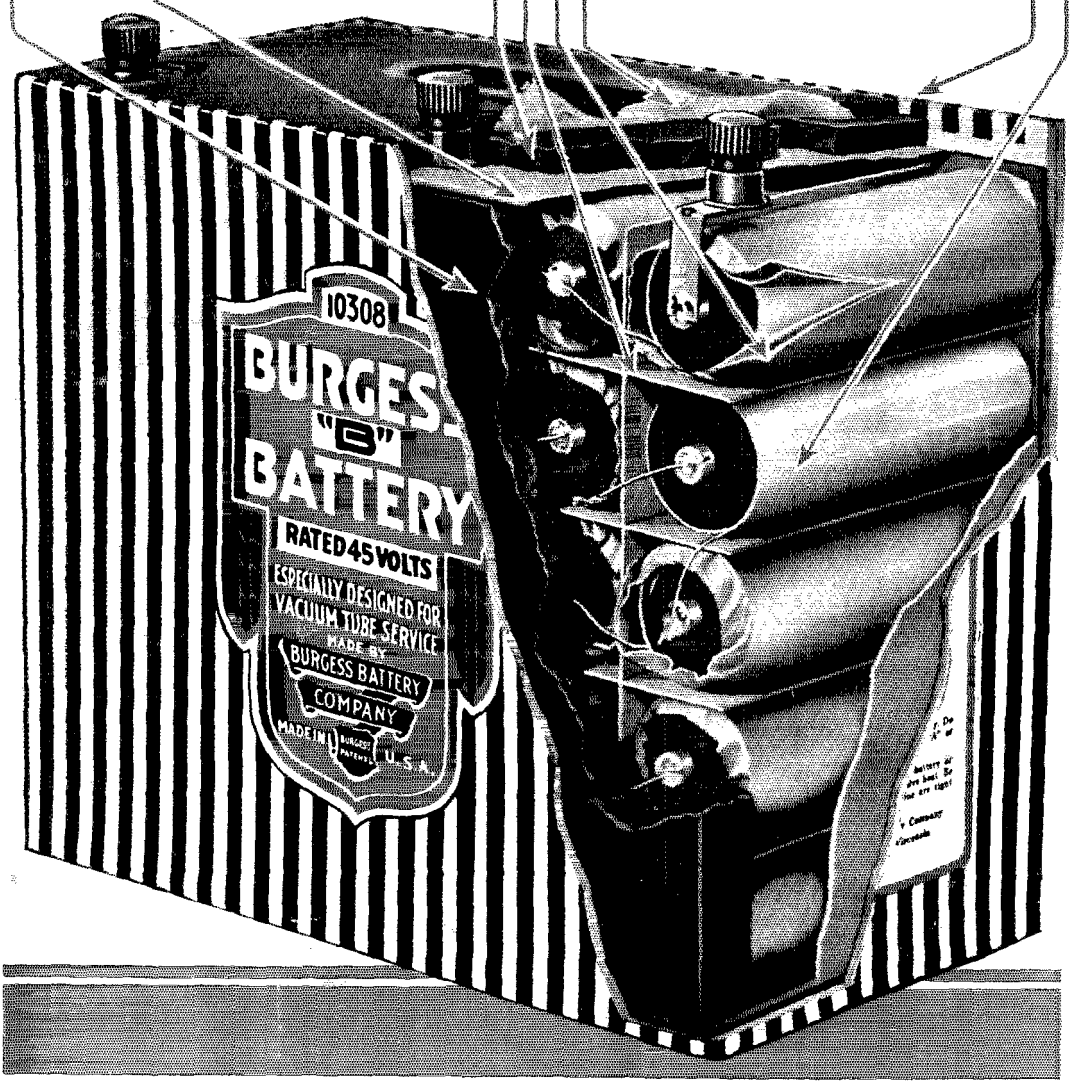
Double top seal

One piece, drawn, seamless zinc can

Moisture-proof cell wrapper

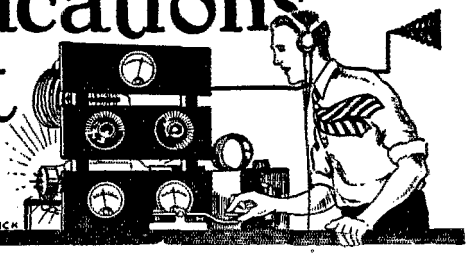
Black and white striped water-proof container

Re-inforcing strip in top seal



The Communications Department

F. E. Handy, Communications Manager
1711 Park St., Hartford, Conn.



On Promoting A Hamfest

By Lyle F. White, 9EAI

THE idea of a Hamfest in my home town has been with me since the first event of the kind I attended. On a trip to Chicago in July, I visited 9QD at Cicero, who was secretary of the Chicago Radio Traffic Association, who was making cards to send to members announcing the regular bi-weekly meeting. He asked for something to write to get the fellows to the meeting. I at once suggested a Hamfest and said I would promote it and attend the meeting to discuss plans. So that settled it. With just a month to make plans, I had to hurry.

Money was necessary and so I tried to secure some from the local Chamber of Commerce. They informed me that they never *paid* money out themselves but merely recommended the worthy cause to their members whom you had to talk out of the filthy lucre. So I borrowed fifty dollars and decided to get this back by a fifty-cent registration fee, rather than argue with a hundred business men to get the same amount. I wrote out a letter to be mailed to every amateur in the state and for nine dollars and a fraction, I had a thousand copies mimeographed by a public steno. With twenty-four more dollars, I purchased a thousand stamped envelopes. Then I took my two weeks vacation a month before I had planned and personally addressed and sent out the nine hundred odd letters. That, I might add was the hardest part of the whole job. One week I spent in Chicago and nearby towns talking up the affair. The close proximity of Kankakee to Chicago accounts for the whole success of the affair. Letters and cards started drifting in from all over the state from fellows planning to attend.

Next I started writing articles for the two local daily papers to let the townspeople know something about amateur radio as a whole and Hamfests in particular. In all, I had better than a dozen articles printed in each paper when the reporters started interviewing me. I guess I had stretched some points a little far for the people started to think this was going to be some kind of an international affair. Hi! Anyway, I had the satisfaction of seeing my brain fever (the Hamfest) being discussed on the front pages. Then articles started appearing in neighboring papers and even attracted small notices in the Chicago papers. Pretty good publicity I called it and very much better than I had ever expected.

There was no time to write to any manufacturers for prizes so after a few articles had appeared in the local papers I again went to the Chamber of Commerce and asked for their endorsement in order to secure money to purchase prizes. I tried only the two leading Hotels and a half dozen of our best restaurants and readily collected five or ten dollars apiece from them. By virtue of a few articles in the papers telling the YLs about the Hams, and including a dance at a nearby beach resort, the proprietor of the dance hall offered me a contribution of twenty-five dollars. Then with the help of 9DQY who is a radio dealer and the Chicago Radio Apparatus Company we bought at wholesale a bunch of first class transmitting and shortwave receiving apparatus to be distributed as prizes. Ask any of the fellows who received them about the kind of prizes we distributed, even the booby prizes being valuable. This is, in my opinion, the superior method of securing prizes for an amateur affair.

For speakers, we had Governor Len Small, a native of our city. Mr. Glaser, connected with the New York and Chicago Radio Shows, SCM Schweitzer, and RM Hindsslated. Governor Small invited the gang over to his place to shake hands with him and he posed for pictures with the fellows and YLs present. This is quite an unusual attraction for a Hamfest. The Park Commissioners gave the exclusive use of our best city park, and the police department the freedom of the city, despite the fact that some of our retired farmer residents disliked the noise made by the auto horns tooting code. One fellow leaned out of a window of a hotel at a wee small hour of the morning and called CQ on a tin whistle and got an answer from another hotel a block away. Hi! We had a ball game between the CRTA and the Chi-Nines, rival Chicago organizations. A banquet brought the affair to a close.

I shall be glad to give anyone suggestions* from my experience to help avoid many of the disappointments that go along with planning such an affair. If a person wants to do something worthwhile, I suggest a Hamfest.

*Sample programs, badges, and suggestions for estimating attendance, etc., may be obtained on application to A.R.R.L. Headquarters.

—F. E. H.

FLASH—10-METER RESULTS

Radio reports indicate that experiments between ef8CT and nu2JN have resulted in the first two-way 10-meter work between France and the U.S.A. This work took place January 1 at 9 a.m. EST, the contact lasting until 11.45 a.m. One way to start the New Year right! The 10-meter receiver used has as a tuning unit a 2-inch diameter coil (one plate and two grid turns) shunted by a 5-plate variable condenser, wavelength range 8-14 meters. Less plates give smoother tuning over a smaller range. There is already an intense interest in the 10-meter territory which in 1929 may become available for amateur work following the action taken at the International Radiotelegraph Conference. The Executive Committee of the A.R.R.L. has just asked the Federal Radio Commission to make the 10-meter territory available to U.S. amateurs for general amateur work at an early date. If granted, this request will make it possible to start work on 10-meters soon so that we may be in a better position for the changes that must come in 1929. Whatever you do, don't attempt any 10-meter two-way communication unless you have an X license or approval from the Federal Radio Commission. To do so will weaken the League's request and make the possibility of general privileges more remote.

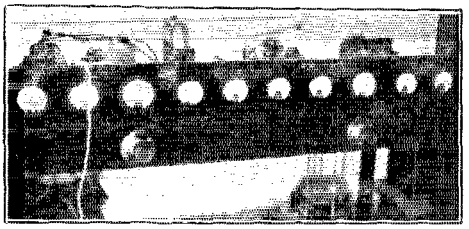
cf8CT, eg2NH, eg5YX, eb4AU, foA3Z, and nu1XAM have been pioneering in the vicinity of ten meters. This group of stations is conducting cooperative tests each Sunday in listening for those in the group having permission from their government to attempt 10-meter communication, in exchanging information on results, etc. Observers are badly needed and are requested to listen each Sunday between 1400 and 2000 GCT and report results through A.R.R.L. Hq.

Canadian General Manager Russell announces for the information of all A.R.R.L. members in Canada that permission has been received from C. P. Edwards, Director of Radio (Dep't. of Marine and Fisheries, Ottawa) for all Canadian-licensed amateurs to open up at once on the waveband 9.99-10.71 meters. For the present Canadian amateurs may continue to use the 52.5 meter wavelength for inter-Dominion QSOs although some decision respecting the use of this band may be announced later.

GMD

Commander George M. Dyott will soon be returning to Brazil to search for the lost English explorer, Col. P. H. Fawcett. Preliminary tests with the portable transmitter that will be used by the 1928 expedition have given surprising results.

We have just learned through Commander Dyott that amateur radio played a more prominent part in the 1927 expedition to the River of Doubt than



THE CRYSTAL CONTROLLED TRANSMITTER AT sb1IB.

This station relayed messages from the River of Doubt expedition in Brazil (GMD) to the Naval Research Laboratory (NKF) in 1927.

was commonly known. A great deal of the traffic was transmitted by operator Bussey of GMD to sb1IB, the station of Mr. A. S. Friere at Estado do Rio (near Rio de Janeiro) Brazil. The messages were then relayed regularly on schedule to NKF from sb1IB. Amateur radio relaying of traffic helped here as it has helped expeditions before—and will again.

The Dyott expedition will be heading south again not long after this appears in print. GMD will again use a 36-meter transmitter, many of the messages coming to the U. S. A. between midnight and 5 a. m. E. S. T. Please be on the lookout for GMD and for Brazilian amateurs who have traffic to be relayed. Lend full cooperation to this and all the expeditions depending on us for contact. Amateurs everywhere are requested to keep us informed of their work with expeditions. The modesty of the operators rendering the most worth while services has often kept us from printing complete expedition reports promptly. At least drop us a postal when you do expedition work so we can note the information and pass the card along to the expedition operator when he returns to his base.

BURGESS AIRPLANE TEST RESULTS

In the recent Burgess Short Wave Airplane Tests, successful QSO was had by the plane with 14 different amateur stations. The airplane transmitter, 9XH, used two receiving vacuum tubes in an MO-PA arrangement, with an 85 foot trailing antenna. 79 meters was the wavelength used. The receiver complete with batteries weighed less than nine pounds, the complete outfit weighing only sixty-five pounds. Taking off from Madison, Wisc., airport at 3:25 PM, communication was almost immediately established with 9DTK of Milwaukee. From that time until the plane landed at 5 PM, one station after another was worked. The plane flew at altitudes of 3000 to 5000 feet, and very little fading was reported. 8CEO and 8ARC, both of Oakmont, Pa., were each awarded 450 volts of Burgess B Batteries for their good work, and 8CEO was also given a flashlight for submitting a complete report of the transmissions from the plane. 8BCM, of Deposit, N. Y., received 180 volts of B Batteries for having copied the plane signals over the greatest distance, it being about 725 miles. The operator of the plane reported hearing 2AIZ and 2BBL while flying.

Here is a list of stations reporting copying the signals of 9XH (stars designate QSO): 8BCM, *9EHO, 9CE, *8CEO, *8ARC, 9CHC, *9DTK, *9QT, *AW5, 9AMG, 8ARK, 9DLD, *9DBW, *9BQQ, 9CVJ, *9DCE, *9BBT, 9AIR, 9CVI, 9ACL, *9BKV, *8EJ, *9JA, *8CVQ, *9EMD, *8AMU, W. E. Warner, Davenport, Ia., Aero Products, Chicago, J. H. Brader, Mt. Horeb, Wisc.

Lieut. Roberts, the operator at AW5 established QSO with code, and then switched to phone, talking to the plane operator for about 10 minutes. Splendid reception of Roberts' voice was held in the plane.

Arrangements are under way for additional airplane tests on 20 and 40 meters, and it is expected that some excellent results will be obtained.

TRAFFIC BRIEFS

During the S-4 episode, 1FL did some listening on 600 meters, and got a lot of dirt. The UP called 1FL up one night and asked 'em to help out. The story was that the commercial companies were not delivering the stuff fast enuff, and it was thought that 1FL could intercept their traffic on 915 and give it to the UP via fone. Accordingly, FL got a long one coming from NON to WBF and foned it to the UP. The next day the UP called up and said that they had beaten the story from New York by about 50 minutes, making it possible to have the story in the next day's papers.

And speaking of figures—1ASU worked 448 stations during 1927, 185 of which were foreigners, and 61 were west coasters. Total mileage was 905, 646, and average watts input was 125.

It seems that 5AQD had been trying for a long time to get in touch with 6CPC (an old friend of his), and so 8BYN, prompted the good old ham spirit, stayed up half a night in an effort to connect the two, and —succeeded. It was hard work, but doggone it, gang, it's a great feeling to have been of service to some of your fellows. As 8BYN himself sez, "I sure got a big kick out of pulling this, and sat for over an hour just listening to them chew the rag."

Who sez there's no dx on 80? 9DGW worked BX in Nicaragua at 7:30 PM, Dec. 13. He tells us BX was on 76 meters, and expects to be on every evening at nine, Nicaragua time. BX's sigs were r6-rac.

At a convention of the National Council of Women, an organization of twelve million women, which met at the Waldorf-Astoria, New York, the announcement made by the president of the co-operation given in securing a goodly attendance by 8CYK, by sending radiograms to the head of every state and National group was received with great acclaim. 8CYK is at present giving similar service to the New York State Federation of Business and Professional Women in connection with the spring convention to be held in Buffalo. Good stuff!

5ACL and gi6YW report working nx1XL during the past month. 5ACL took a message for the Univ. of Mich. gi6YW was using a receiving tube with 220 volts dc direct from the mains, and feeding its juice into a very poor antenna, but had a very satisfactory QSO.

5AHU worked RJC, which he says is a ship then off the coast of Fla., and just starting across. We don't know across what, but suppose it's the Atlantic. RJC had a steady ICW note near the middle of the 40 meter band.

9DNG QSO'd ARDI, at the South Pole on Dec. 26. ARDI sigs were r6-7 on 35 meters, and 9DNG took two messages from him.

The largest gathering of hams the Los Angeles Section has ever seen was held at the Hotel Maryland, Pasadena, December 30. Over 100 hams from all parts of Southern California responded to the unique invitations sent to A.R.R.L. members in the Los Angeles and San Diego Sections by the Short Wave Club of Pasadena, under whose auspices the banquet was staged. After a real feed, during which a good orchestra entertained, 6BXA, Miss Flora Turner, officiated as toastmistress. A short musical program, and two well presented recitations by ex oa5AP. Speakers were General McMeen, SCM Don Wallace, SCM G. A. Sears, Former SCM Smith of 6BUR, and Director Babcock. The committee in charge of arrangements consisted of 6BJX and 6CMQ.

Members of the I Tappa Kee fraternity have been having numerous three and four way QSOs. Good operators and break-in make these possible, and they are tremendously more interesting than the standard two-way QSO. A good many of them can QSY the different bands, so if daylight or anything interferes, they just go to a better band. Much more traffic can be moved in this way.

6CUH is keeping in touch with his father who is in Argentina, through a weekly 20-meter sked with saDA8. FB!

6BJX sends us a message from S. H. Escudero, operator on the SS Salvager, xop1DR, whose mail address is Box 626, Manila, P. I., which says in part: "xop1DR will gladly QSR traffic for steamers visiting P. I. waters and for all points in far east. Work regular skeds with nu, oh, ac, and op. Maintain constant QSO with oa, fo, fh, ef, etc." Give him your traffic, fellows.

2BG, at Patterson, N. J., has been doing some excellent work in keeping a schedule with 1AB in Liberia. Many messages have been handled satisfactorily, including an exchange of greetings between the State Departments of the two countries. An article in the *New York American* reads in part, "An amateur radio station was used by the Government for the first time in history to transmit a message of good will to a foreign nation today, when Secretary of State Kellogg felicitated the Acting President and Foreign Minister of Liberia."

8AGQ, the Oakmont H. S. Radio Club of Oakmont, Penna., is organizing a radio net-work between high schools having stations. All those interested are asked to communicate with 8AGQ. This is a fine idea!

The Pasadena-Altadena gang have a new kind of contest. The idea is to see who can work the greatest number of new stations. When a station works a fellow whose call is higher than the last one listed in the book, that station gets the same number of points as there are possible calls between the last one listed and the station worked. For instance, 6DKA is the highest 6 listed in the call-book they use. A station working 6DKC would get two points. It is rumored that a beautiful cement bicycle with crocheted handlebars will be awarded to the winner each month.

4FM tells of some real communication work. It seems that 4CP, of Miami, went to Paris with the prize-winning Miami Drum and Bugle Corps, and arrangements were made to establish communication with Miami. 4FM put up a UX852 on 40 meters, and handled twenty messages on sked with ef8GI, fourteen of which went through "first lick," with no QTA. Needless to say, the recipients of the msgs in Miami were tickled, and nice write-ups appeared in the daily papers. On the last schedule 4CP was at the French station personally, and his wife was at 4FM. It was almost as good as talking over the trans-oceanic telephone.

7BM and 7NO took up a collection from a few brother hams of their locality, and with the money obtained materials for making a huge A.R.R.L. diamond on which were lettered the calls of these hams. This sign was placed along the state highway at a point where all tourists coming into Gray's Harbor, Wash., could see it. 7BM tells us that the sign created a good deal of interest, and let the people know that Grays Harbor is a live A.R.R.L. section.

8AKC-DAH bewails the habit most 40-meter hams have fallen into, of covering only about half the band on their receivers after a CQ. A number of fellows do seem to listen over a space of about ten tuner degrees each side of their own wave, and let it go at that. Let's get over this habit. Just because our own set is on 37.5 meters, is no reason why we shouldn't QSO a station on 42.8, is it? It is good operating to listen over the whole band not only after each CQ, but after signing off with a station.

One afternoon 8CEO received a telegram from St. Louis, stating that some relatives had met with a serious auto accident, but the extent of the injuries was omitted. So 8CEO came on the air with a msg to them in an attempt to get the details. He hooked 9CEH in Chicago, who spent a busy hour with him trying to snag someone in St. Louis. They, or rather CEH, finally succeeded in connecting with a station there. 8CEO says, "Imagine our feelings when this station, after acknowledging the msg, said that he did not have time to deliver it as he had to go to bed. It was then 11 PM in St. Louis. I did not think that there was a man in all our organization who would pull a stunt like that. What a contrast between this and the fine work some of our members have done. I might add that 9CEH later forwarded the message by telegram, and gave a fine example of the true A.R.R.L. spirit."

ANOTHER TRAFFIC TROPHY!

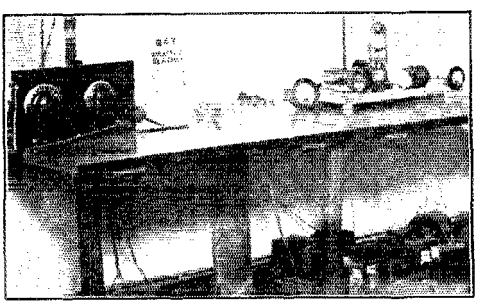
A very handsome silver cup will be presented at the 1928 Pacific Division Convention to the A. R. R. L. member having the largest traffic total from Jan. 1, 1928 to the Convention date. The "1928 Pacific Division A.R.R.L. Traffic Trophy" will be engraved with the name of the winner by its donor, Mr. W. N. Jenkins, Jeweler of Oakland, California.

The prize will be awarded to the operator who leads all other operators in the total number of bona-fide messages handled for the several months of the contest which opened January 1 and runs until the opening day of the convention. The Trophy will be awarded to an individual operator and not to a station. Where stations are operated jointly by several operators, credit will be given each operator for his individual work. An affidavit must be furnished that the messages were handled only by such an individual. All message files must be saved so that the evidence may be produced when required for checking purposes. The standing of various contestants will be mentioned in the Brass Pounders' League from month to month beginning in March *QST*. Message reports are to be sent through the regular C.D. channels—to the S.C.M. on the 26th of each month. It is important to keep copies of every message handled for checking. Remember that this is a contest of operating skill and not of station equipment.

Messages of the "rubber stamp" variety will not be counted—nor will those held on the hook more than 48-hours without QSR or delivery. "Rubber stamps" are messages which have exactly the same text and go to more than one addressee. A minimum number will be sent on "UR CRD RECD WL QSL" messages, so don't try to inflate totals that way. All messages must be handled in accordance with standard A.R.R.L. practise with respect to prefix, number, and date. Abbreviations in the texts of messages are not permissible—use plain English and spell out each word fully. All this may not be necessary to remind you of the correct ways of handling messages—you know what is expected as well as we do. See that messages are of high class and then none of 'em can be thrown out on that score.

Who is going to handle most traffic between now and next fall when the A.R.R.L. Pacific Division Convention will be held? Better get busy with the schedules. If each station works out a way to get some good and worthwhile messages to originate in *his* community for friends in *your* community—and if stations in each network swap lists of schedules so that good service can be given between a large number of cities and towns there will be plenty of traffic for everyone. Let's see some real competition. Fred Best of 1BIG became famous for winning Mr. Goodfellow's splendid traffic trophy and he will probably make a bid for this one. Your 210's ought to be just as good as his. Are you going to let him run away with it?

—*F. E. H.*



4RM, GOVERNOR'S NET CONTROL STATION, ATLANTA, GEORGIA

This amateur station was on the air 37 consecutive hours handling important traffic in the Florida disaster. Again 4RM handled a quantity of press to NTT nightly for two weeks. Mr. James G. Cobble, the owner of 4RM, has had successful transmitters on the air for the Georgia National Guard at their camps for the last three years. In addition to the work that has brought 4RM over 4,000 cards in the last nine years, he is president of the Atlanta Radio Club.

For the Traffic Handler

As a result of many requests for an up-to-date and complete list of A.R.R.L. Route Managers to appear in *QST*, the following list is printed:

Md. Del. D. of C.:	E. W. Darne, 3BWT
Eastern Pa.:	E. L. Maneval, 8EU
	J. B. Morgan, 3QP
Western Pa.:	H. M. Anderson, 8GI
So. N. J.:	Ed Raser, 3ZI
West N. Y.:	H. E. Frost, 8AYB
Illinois:	F. J. Hinds, 9APY
Indiana:	F. R. Finehout, 9CLO
	H. B. Miller, 9DUZ
	J. W. Shaw, 9EGE
Kentucky	L. H. Howard, 9ABR
Michigan:	J. P. Sincock, 9CSI
	Rus Sakkers, 8DED
Ohio:	J. A. Carnes, M.D., 8ALU
Wisconsin:	J. P. Kemmeter, 9DLD
No. Dak.:	M. C. Adams, 9DKQ
So. Dak.:	John Berg, Jr., 9DWN
So. Minn.:	J. C. Pehoushek, 9EFK
	Kenneth Wolfe, 9CAJ
Arkansas:	E. R. Arledge, 5SI
Mississippi:	W. H. Moffat, 5AGS
Tenn.:	Polk Perdue, 4FI
East N. Y.:	H. Rosenthal, 2QU
N. Y. C. & L. I.:	J. Toman, Jr., 2ANX.
	E. Roberts, 2AFV
	J. R. McKenna, 2AVB
	David Talley, 2PF
	M. E. Solotar, 2CYX
	J. B. Kilpatrick, 2EV
No. N. J.:	J. J. Hallahan, 2CP
Iowa:	B. E. McElwain, 9CZC
Kansas:	V. Dennis, 9BGX
	O. B. Gambill, 9JU
Missouri:	Jack Stone, 9DAE
Nebraska:	E. R. Anderson, 9EW
	A. H. Cummings, 9EBL
Conn.:	C. B. Weed, 1BHM
Vermont:	C. Paulette, 1IT
	F. Drew, 1BJP
	G. Wallstrom, 1BBJ
	Chas. Kibling, 1BIQ
	F. Adams, 1FN
	Ralph Colvin, 1AC
East. Mass.:	G. G. Hannah, 1KY
Maine:	H. G. Riley, 1AUR
	G. P. Clement, 1FP
	V. H. Ashton, 1COM
New Hampshire:	L. E. Jacob, 1IP
R. I.:	G. M. Mathewson, 1BQD
Idaho:	M. L. MacLafferty, 7GW
Montana:	Jack Provis, 7DD
	L. H. Bolen, 7PU
Oregon:	L. H. Simson, 7AEC
San Diego:	D. C. Good, 6AJM
	W. Jones, 6BYZ
East Bay:	J. Geritz, 6CTX
	W. R. Fisher, 6ANE
	J. H. MacLafferty, Jr., 6B
	W. G. Smith, 6CCT
Los Angeles:	C. T. Swift, Jr., 6CMQ
	J. C. Lewis, 6ZBJ
	R. M. Stapp, 6AWQ
	E. W. Munger, 6ALZ
	J. M. Hayes, 6BAV
	E. O. Knock, 6BJX
Arizona	Puss Shortman, 6BWS
	D. C. Mast, 6SW
Santa Clara Vy.:	C. J. Camp, 6BMW
San Francisco:	John Morrison, 6BIA
Philippines:	Al de Lange, op1DL
Virginia:	R. E. Smith, 3CEB
W. Virginia:	E. L. Murrill, 8AMD
Colorado:	W. Wright, 9BQO
Alabama:	C. T. Harrison, 4DL
Florida:	E. J. Collins, 4MS
	W. Moore, 4VS
Oklahoma:	J. C. Cardin, 5ANL
	L. M. Edwards, 5FJ
So. Tex.:	Derwood Cline, 5IW
New Mex.:	W. F. Todd, 5APB

Now the ORS who is on his job will get in touch with his RM and help out his Section by keeping schedules. The Route Manager is there to help you and your section, and it is up to you to give him your co-operation. Without it he is helpless.

Here's a proposition, fellows. We msg handlers are fortunate enough to have a column or so available in every *QST*. Up 'till this month we have called the column "With the Route Managers," for want of a better name. Under that head, as some of you know, several different schemes have been tried, all in an attempt to get over some kind of information that would aid traffic routing and help you clear the book. Apparently these attempts have been more or less unsuccessful, and so we are in danger of losing this space.

Now the question is this. Do you want to keep this column, where ideas and hints on more efficient operation can be distributed, as it were, and where information on schedules and message routings can be given? It is up to you!

Time and again we have asked for suggestions as to just what you wanted here, but we never get 'em. We have plenty of letters saying that, for instance, the idea of printing daily schedules each month is not good, but none of them suggest anything better. There certainly must be some way in which this column can be made interesting and valuable to every one of you, but it's your job to tell us how.

When you have finished reading this, just sit down and think it over. Decide what you prefer here, whether it's suggestions from the gang on snappy operating or what have you, whether it's schedule lists, or whether it's bedtime stories. If you like it the way it's been running, drop a card in the box saying so. Thanks.

—*L. A. J.*

TRAFFIC BRIEFS

According to sc1AH, the Chileans are wondering what's happened to our nu stations. He says they can only pick up one or two of us in an all night sitting, now where they used to hear us all over the map. Well, what is the matter? This'll never do, with the International Tests just a short time off.

1FL has been doing some great tfc work with WNP. The Christmas story from MacMillan was handled through FL, with operator DH on the receiving end. It started at 2PM, and was in the AP office in Boston at 3 PM. The check was 800! It would have been finished sooner, but MacMillan said he couldn't write the thing as fast as Cliff and Dick could get it off.

WNP

Message nr. 996, Dec. 8, to A.R.R.L., Hartford, Conn. via 1SZ. "Frozen in at last! After gales and driving winds for the past thirty days which kept the *Bowdoin* tugging and pitching at her anchor chains in Anatalok Bay and made WNP's signals famous for their QSSS the ice king has won out. WNP is a land station now held fast in a smooth table of white.

Kept schedules very erratically during the latter part of November on account of difficulty boarding the ship as she was swinging through fields of slush and ice. 1SZ, 1FL and 9AFA, by their consistent watch on schedules, have kept radio communication possible even during the worst weather. These stations have kept schedule after schedule when I was unable to get on board and consequently WNP was unheard, but when WNP called them they were on the job with a QRV. Message total for November 295. Sent 155, received 140. Of this total 1FL handled 85, 1SZ 79, 9AFA 76, and the other stations 55.

Twenty Meters

1aff 1ajm 1ajo 1akz 1ana 1awe 1bat 1bq 1bux 1bw 1bz 1cd 1cfo 1ckp 1ia 1mw 1ne 1nf 1qi 1sz 1fl 1uo 2aiu 2akl 2anm 2arn 2bxp 2dp 2gp 2ig 2nw 2vi 2vw 2xd 3akw 3ali 3apn 3bsd 3ce 3di 3oq 3tn 5ql 6bjd 6cto 6cuc 6gw 7bm 7fe 8adg 8ahc 8ajp 8arb 8atv 8avb 8axz 8aze 8azo 8bde 8bhz 8bju 8ccr 8efi 8che 8cj 8cke 8cmo 8cvq 8dbm 8ddn 8dhp 8dhx 8dkx 8iq 8mq 8wb 9afa 9anz 9bkd 9bov 9hza 9civ 9cjw 9cpf 9cvb 9dbj 9dmb 9dmj 9drd 9efh 9efz 9eir 9ejs 9ell 9nm 9so 9ux ef-8xo eg-2ao.

Thirty to Forty Meters

1aba 1bkp 1fs 1ic 1lx 1mv 1sz 1vc 1xam 2afv 2bad 2bs 2bum 2crb 3bms 3cee 3ckj 3dh 3hg 4ob 4tk 5ia 6bgb 6cin 6hm 6uf 8adm 8aef 8ajv 8akx 8akz 8bf 8bqr 8ccm 8ckl 8dcm 8es 9afa 9jw 9bwj 9cej 9crd 9efz nc-5go ne-8rg ef-8ez eg-5ku eg-6lv gi-5nj gi-6mu ek-4dba ei-Lais.

Best regards,

Cliff. Himoe. WNP."

(Recd fm. WNP Jan. 9, by radio via 1SZ to A.R.R.L.) "December was a heavy traffic month with numerous Christmas messages piled on top of ordinary business messages brought the message total for the month up to 529. Of this amount 1FL of Hudson, Mass. handled about half, his share of WNP traffic being 282. 1SZ took care of 84 messages. 9AFA forwarded 82 and other stations relayed the remaining 81. These messages are exclusive of Christmas Day when a number of messages were handled but our log was lost.

Operator DH of 1FL deserves great honors for his efforts in moving our traffic. DH is without questi n the best operator I have ever worked with his ability to read a 150-cycle note through local noises. Speed around thirty a minute it is a real pleasure to QSO 1FL.

The following stations worked WNP on six or more days during December; 1FL 22, 1SZ 19, 9AFA 18, 2VI 8, 9DLD 7, 8CMB 6. 1SZ and 9AFA were hindered in their daily schedules by work and short December days. Twenty meter schedules are only good these days between 9 a.m. and 3 p.m. E.S.T.

Among noteworthy messages handled this month was MacMillan's Christmas greetings to President Coolidge and a long Associated Press message describing our Christmas activity in Labrador. So far no limit has been placed on the number or length of messages filed by members of the Expedition and thanks to 1FL we have not yet been snowed under. Short days and Christmas coming together kept us on the hop all month, and kept the air blue with WNP's signals. Now that the holidays are over and the sun is beginning to show more of himself daily we hope to settle down to more leisurely operating.

QSOs for December are as follows:

20 meters

1aqt, 1asf, 1ask, 1avl, 1awe, 1axq, 1azd, 1bat, 1bft, 1ckp, 1cpb, 1ff, 1ga, 1gd, 1kl, 1qb, 1sz, 1wv, 1xv, 1zl, 2agn, 2alu, 2atr, 2ayj, 2bgc, 2fn, 2vi, 2xd, 3ahr, 3aks, 3ank, 3ez, 3jn, 4nl, 4rn, 8agy, 8ahc, 8aho, 8ail, 8arb, 8ayu, 8axz, 8bfg, 8cbi, 8ccq, 8cjm, 8cmb, 8ctd, 8cvj, 8czr, 8dhp, 8dhx, 8dks, 8dld, 8dme, 8dsi, 8oq, 8tn, 8wo, 8xe, 9afa, 9bpm, 9bqc, 9cki, 9dii, 9dsu, 9efh, 9hm, 9kv, eg5lf, eg5ml, eg5yx, eg6vp, gw17c, fmOist, ef8ct, eb4au, eb4cb, eb4rs.

40 meters

1abz, 2crb, 9efk, 9efo.

Best wishes for a Happy New Year to all.

Cliff Himoe WNP"

ARMY AMATEUR NOTES

FIRST CORPS AREA—A new Directory has been issued, describing the AA Radio System in this area. There is also a Bulletin on Army Procedure, which has been prepared for the correspondence course given to the AAs in this area. Approximately sixty percent of the AAs in this area are enrolled in the course. The weekly drill is conducted each Monday night from the C.A.N.C.S. BA-7, operating on 71 meters. (4224 kc.) BA-7 is a 100 watt DCCW transmitter and from 1WF on 79 meters.

SECOND CORPS AREA—8HJ, N. C. S. of West N. Y. Net, has been busy reorganizing his stations. 2CP, N.C.S. of the N. J. Auxiliary Net has also replaced the deadwood with active stations. 2JG, 2LK, 2BHX are some of the new applicants. 2AAT and 2AOP continue their good work. 2AFV and 2PF continue to hold the Brooklyn Net together, and 2EV and 2ALS are keeping the Manhattan and 77th Division Nets respectively, on the map. More activity is desired in the Bronx and Eastern N. Y. Nets. 2SC, the C.A.N.C.S. continues to handle lots of amateur traffic through its schedules.

THIRD CORPS AREA—8GI, 8BPD, and 8DNU have held successful schedules during the month. 8DOQ and 8CYP have been issued AA certificates. More A.R.R.L. stations are needed for the work. Communicate with Signal Officer 3rd Corps Area, Baltimore, Md.

SEVENTH CORPS AREA—Organization of a Governor's Net in Missouri is now in progress. The AA schedules between the C.A.N.C.S., 9APV, and 2CXL have not proved satisfactory as yet.

EIGHTH CORPS AREA—The N.C.S. at Fort Sam Houston has been in regular operation, and has received good reports with a radius of 1500 miles.

20-METERS

1AWE (Providence, R. I.), "ef8CT sure does pound in FB here. I QSO daily at 1130 Greenwich. ef8CT desires one or two consistent 20-meter schedules at 1200 Greenwich."

eb4AU (Peruwelz, Belgium), "Nu's on 20-meters are heard from 11 a.m. until 22.30 Greenwich. Was QSO oz2XA R7 January second from 7.30 until 9.30 Greenwich with single sending." This report received by radio via 1AWE at noon Greenwich (7am EST).

5ACL (Dallas, Texas), "Tho few foreigners are heard sc8AG and nqUF are R7. Conditions are again improving. 8AHC's signals have been observed for 15 months (no other signal except W1K is heard consistently enough) and are very strong during daylight fading at about 8 or 8.30 pm. 8AHC uses a vertical Hertz while my antenna is a 60-foot horizontal wire. 8AHC fades out first and more quickly than 5ACL. 'Fone' has been used on 20.8 meters modulating with a three inch 5-turn loop coupled to the 'ground' end of the plate coil in the T.P.T.G. circuit. Modulation is reported FB with no hum. 5th, 6th, 8th and 9th districts have been worked with flattering reports. Plate supply is 1000 v. crac with 6 mfd. of filter condensers—no chokes."

9DHP (Minneapolis, Minn.), "Haven't heard a 20-meter 'fone' yet that you would say *was* 'fone'. Modulation is in most cases good but *few stations have good enough d.c. or are steady enough to hold for any length of time.* Thus far I shall say that 20-meter 'fones' are a flop. I hear eg5HS and eb4WW. Would like to see more 'oa' and 'oz' stations on '20'—there are plenty of 'nu' looking for 'em around midnight our time. Have a good schedule with 1AWE at 7.15 a.m. daily and would like one with a west coast station also. On Jan. 1 with wx 20 below zero, moon clear and brilliant, I worked 9DBJ (Fort Wayne Ind.) and heard 8JB and 8BOX R6. 9HM (St. Paul Minn.) worked three 8's and a 9 at this time, 11.15 p.m. Stations came in as the high noon. Any other stations observing that night?"

eg5ML (Coventry, Eng.), "DX on '20' continues good. Best QSO with U. S. A. (mid-December) 1200-1900 Greenwich. Have QSO nu (1, 2, 3, 4, 7, 8, 9), ne (1, 2, 3), fm, OIK, WNP and foA3Z. Skeds with 1SZ and 9AUU are still in progress. nu7FE was worked at 1730 GMT on Dec. 9 which shows that '20' is still the berries."

oa7DX (Hobart, Tasmania), "20-meter reception in 1927: 1BGT, 1AWE, 1ADM, 1BHS, 1KA, 2BG, 2ARM, 2IE, 2XG, 2TP, 2CBD, 2EV, 3BMS, 4TN, 4SI, 5WZ, 5QS, 5UK, 5ARF 5BJF, 5HE, 6BZM, 6CDW, 6BXR, 6KG, 6VZ, 6BFE, 6ZI, 6EC, 6EA, 6BJF, 8ALY, 8AHD, 8ALG, 8DLD, 9BAY, 9BGT, 9EAS, 9EF, 9AEX, 9AJI, 9KV, NIDK, oh6AXW, oh6ACG, eb4AU, eg2NH, nc3FC." This information rec'd by radio via 6AKW.

1EZ (Pownal, Vt.), "Have been working a lot on 20-meters and find it certainly is the band to QSY to if one wants DX with low power such as I have here—at present using 180 volts d.c. on a CX301-A."

1AVL (Concord, N. H.), "Me for '20'. First station hooked was WNP. Have worked him several times and taken messages. Next worked was foA3Z. Have worked a number of eg, es and ef stations. One would think them locals the way they pound in at 3 p.m. EST. eg5BY sounds as tho in the next block! Worked RJC a ship 1500 miles East of N. Y. C. but he wouldn't give full QRA."

9EFH—9RG (Newton, Iowa), "The first thing in the morning HJG comes thru followed by WGT with WIK very weak. Then WIK comes up to usual volume followed by 1AWE—then 1SZ. PCRR and WNP come thru at all odd times. Most European stations do not break through until about 9 a.m. CST. For traffic and REAL schedules there is no wave that beats '20' tho it is sometimes undependable at night. Never had a nicer or more dependable schedule than the one with 1SZ."

8CMB (Cleveland, Ohio), "Handled a 350 word message from WNP to the Field Museum. Had a time convincing the Western Union op that he should take the message collect. Some calls heard on '20'; eg5ML, eg5BY, eg5YK, eg5HS, eg5KY, gi2IT, xedOIK, gw18B, eb4UU, eb4CB, eb4AX, eb4ZZ, eb4WW nm9A."

9EFK (Minneapolis, Minn.), "After 9EFO worked WNP on Dec. 27, I took a couple of WNP messages for Omaha. Also want to report that conditions were queer on night of Jan. 1-Jan. 2. Heard 20-meter signals quite well all night long."

nc3CS (London, Ontario), "20-meters is very good in day but goes dead just after dark. Have heard several 'fo' stations and worked eg5BY, eg6TD, WNP and na7MN taking a message for the East Coast from my first Alaskan station."

BRASS POUNDERS' LEAGUE

Call	Orig.	Del.	Rel.	Total
1BFT	252	38	213	503
1ATJ	64	74	362	500
8EU	43	62	372	477
1AEF	44	50	356	450
1IP	31	79	330	440
9AIN	69	21	350	440
9DTK	92	38	292	422
1FL	72	145	162	379
3AKB	57	54	266	377
9BWN	24	17	304	345
9CZC	5	12	324	341
1LM	16	11	308	335
9EJQ	37	41	253	331
9ABM	22	10	294	326
9DLD	33	43	240	316
9BKV	59	15	242	316
3CFG	25	15	273	313
8CYK	140	15	158	313
1CRA	83	48	178	309
8DBM	11	39	253	303
6BJX	91	180	22	293
8DED	89	45	159	293
9EAM	20	42	215	277
9AWX	120	60	92	272
2CP	37	30	198	265
9DAE	9	19	234	262
9DXZ	18	62	175	255
9DZW	68	51	76	249
9EHN	95	7	138	240
1APL	16	58	164	238
8AHC	14	17	204	235
9CAA	23	44	163	230
1AKS	139	19	68	226
3SM	17	34	166	217
1ACH	56	43	117	216
6DPK	25	21	187	212
8GI	8	24	176	208
9AMO	10	11	184	205
9DGW	4	9	191	204
7AEC	28	50	124	202
8DIH	64	130	18	202
9SO	130	28	44	202
9ABM	54	83	24	161
1ANI	23	51	82	156
1MK	46	62	45	153
2MD	19	50	69	138
6ALZ	16	55	66	137
6DKX	30	52	48	130
8BAU	14	57	30	101

1BFT and 1ATJ were almost tied for first honors this month. 8EU pulled up from sixth to third place. 9ABM, 1ANI, 1MK, 2MD, 6ALZ, 6DKX and 8BAU "rate" because of good work in making *deliveries* of radiograms.

A total of 200 messages—or just 50 *deliveries* will elect you to B.P.L. membership, OM. Regular *schedules* and a little initiative in connection with the origination and handling of worthwhile traffic in organized fashion will make *you* eligible for the honor roll. Why not?

The following have been appointed Official A.R.R.L. Broadcasting Stations. These stations broadcast official A.R.R.L. Headquarters messages, giving the very latest information on hand on regular schedules each week. Listen for them and get the latest dope, OM.

1AOX	4LK	7FL	9CPQ
1BEP	4OB	8AHK	9CVR
1BFZ	4OH	8ANX-8QU	9CZC
1BIG	5ACL	8AVK	9DAE
1BIL	5ADA	8AYU	9DHP
1BVB	5AZD	8BMJ-8CJC	9DNG
1GA	6ALZ	8CEO	9DQN
2APD	6AMM	8CNC	9DUD
2BRX-2FF	6AVJ	8DME	9DUZ
2CTH	6BJX	8GJ	9DZR
2PF	6BXD	8ZH	9ECJ
2ZA	6BYG-6BWS	9AGL	9EGU
3AAX	6BYZ	9AL	9JU
3ALE	6CDU	9AUG	9KZ
3SJ	6CTX	9BKJ	9MN
3ZI	6DKX	9BWN	9RR
4CK	7AAT	9CCQ	9ZD
4JR	7DD	9CJS	oh6DB

NOTICE

January 7, 1928

Valid nominating petitions for Section Managers in the Manitoba section of the Prairie Division, in the Delaware-Maryland-District of Columbia Section of the Atlantic Division, and in the Hawaiian Section of the Pacific Division were filed on or before January 7, 1928. In each case a single petition was received naming a candidate for the office. As provided by our Constitution and By-Laws, when there is but one candidate named by one or more valid petitions, that candidate shall be declared elected. Messrs. D. B. Sinclair (ne4FV), H. H. Layton (3ALS), and F. L. Fullaway (oh6CFQ) are herewith declared elected for the next two-year term of office in their respective Sections. Please give your officials cooperation in all they are attempting for *your* Section of A.R.R.L.

This month we are sorry to be obliged to record the resignations of Section Managers H. M. Walleze (8BQ) (Eastern Pennsylvania), P. W. Dann (6ZX) (East Bay), W. B. Forrest Jr. (5AJT) (Northern Texas), Don C. McRae (6RM) (Utah-Wyoming), and Harry W. Densham (3EH) (Southern New Jersey) for various reasons, in most cases due to business pressure outside A.R.R.L. affairs. All good wishes to our retiring Section Managers. Most of them we will hear on the air as usual. The organization will feel a distinct loss in the resignation of these S.C.M.'s.

Members of the A.R.R.L. in the Eastern New York Section of the Hudson Division, in the Alaskan Section of the Northwestern Division, and in the Philippine Section of the Pacific Division have failed to take any action. As no valid nominating petitions were received the closing dates for receipt of nominations are set ahead to the dates given herewith.

Due to the resignations and to vacancies in our line-up as mentioned above, *nominating petitions for Section Communications Managers are hereby solicited from the following Sections.*

Section	
Eastern New York	Noon, March 7, 1928
Alaska	Noon, January 31, 1928
Philippine	Noon, April 7, 1928
Eastern Pennsylvania	Noon, March 7, 1928
Southern New Jersey	Noon, March 7, 1928
East Bay	Noon, January 28, 1928
Northern Texas	Noon, March 7, 1928
Utah-Wyoming	Noon, March 7, 1928
North Dakota	Noon, March 7, 1928

Petitions must be filed at A.R.R.L. Headquarters on or before the time announced to be valid. The proper form for nomination is as follows:

(Place and date)

Communications Manager, A.R.R.L.,
1711 Park St., Hartford, Conn.

We, the undersigned members of the A.R.R.L. residing in the ..... Section of the ..... Division hereby nominate ..... as candidate for Section Communications Manager for this Section for two years from the close of the election.

(Five or more signatures of A.R.R.L. members are required)

The candidate and five signers or a nominating petition for Section Communications Manager *must* be members of the A.R.R.L. in good standing and the signatures on the petition must be authentic or the petition will be thrown out as invalid. Members are urged to take initiative immediately, filing petitions for the officials of each Section now operating under temporary officials, so that the work of the organization can go forward everywhere without delay.

—F. E. HANDY, Communications Manager.

TRAFFIC BRIEFS

On the back of one of the traffic report cards received this month, we find the following pencilled list: "1 lettuce, 1 cabbage, 1 celery, 1 egg plant, 3 artichokes, etc." We've heard of 3 *Henry* chokes, but this our first encounter with 3 *Arti* chokes. Suppose Art is Henry's brother. No?

9BPX thinks we ought to make it a rule that when a message becomes five days old it should immediately be mailed, whether it is any where near it's destination or not. 'S a good idea.

3CFG worked 630 stations and handled 506 messages during October. Who can beat it?

DIVISIONAL REPORTS

ATLANTIC DIVISION

WESTERN PENNSYLVANIA—SCM G. L. Crossley, 8XE—The reporting this month was terrible. Only 14 stations out of a total of 27 ORS reported. This is practically 50% of the stations did not report. By the method of elimination, the SCM intends to get the reporting up to a high mark. Of the 13 which did not report, there are 3 to be cancelled for not reporting for three months, three to be warned after the second month and seven failed to report this month but reported last month. 8GI, as Route Manager and an active ORS is holding up his end of the game. 8DFR complains that the long nites are playing bad with his 20 meter traffic. 8CYF is using a 301a with 8 volts on the cathode and 200 volts from a B eliminator. 8CYP is having schedules on 80 meters. 8CRK tried fone on the 200 band but he is back to 80 now as he likes it better. 8VE is on 40 and 20 and hopes for more traffic. 8AMU sez nothing unusual—handled lots of traffic as that's his hobby. 8ARC burned out two transformers but is now using the 450 volts sent to him by Burgess because of QSO with the plane, 9XH. 8CEO has a set of these Batts too for the same reason, FB to both of you. 8CEO will be glad to furnish the dope on wave traps to cut down interference for BCLs. He also has a keying relay to automatically key his transmitter so he can see for himself how much QRM it makes. 8GK has finally got his 40 set going and it is FB. 8AKI is busy with the local Radio Club. 8ABW and 8BGW are on the air as usual with their transmitters and would like a little traffic. An old Navy op is getting back into the game at Huntingdon so sez 8DOQ. He is going to put two 852s on 40 and 80. 8DOQ spends his spare time at the key. 8XE is putting in a 20 meter set along with the 40 and 80 meters sets. The one good thing about only a few stations reporting is that the stations that do report get more room in the report. But just the same if a station can't report, for three months, there is something wrong and per the Rules and Regulations of the Communications Department should lose the ORS. Fewer and better ORS is the motto of this SCM. Come on gang wake up and send in those reports. 8OJ is handling his own on 80 meters. He has several schedules and is handling Army Amateur traffic. 8DKS and 9BUB have had a schedule and handle family news and messages between two families. They have had good contact for three months.

Traffic: 8GI 208; 8AMU 190; 8CEO 107; 8DOQ 100; 8XE 99; 8CYP 55; 8AKI 45; 8CRK 23; 8CFR 21; 8BGW 11; 8GK 10; 8CYF 6; 8VE 6; 8ARC 4; 8OJ 90; 8DKS 19; 8ABW 2.

WESTERN NEW YORK—SCM, C. S. Taylor, 8PJ—The Western New York stations still continue to handle traffic! Many operators are holding ORS which just hang on the wall. The SCM is forgotten monthly, and Mr. Schweitzer of Illinois has issued a challenge to all SCM's to beat him. Who can accept this challenge if the hams who are ORS and operating won't just take time enough to send in their report to 8PJ. Now gang, if Western New York just wakes up we might give Mr. Schweitzer a very good run. It's up to you ORS to do your duty and do it now. Remember reports must be in not later than the 26th of each month. 8ABX is doing his bit working 7s and handling traffic. 8ADE is there too with traffic and schedules. 8AHC has a wow of a report, working Africa eg-eg and many schedules. 8AYU worked EC, EG, EF and is also interesting other hams in short wave work. 8BCM has increased his traffic. 8BFN also has taken a jump in traffic, working all districts. 8BIG works WNP. He has a new gutter pipe antenna. 8BMJ handled some traffic from flooded districts in New York. 8BQK handles traffic. 8CDC has increased his traffic and uses phone now for same. 8CNH handles traffic on 376. 8CNT works 7s easily and NG, NM. 8CNX is coming back strong again with good traffic report. 8CPC has increased traffic and works California and Idaho. 8CRF worked England on 80. 8CVJ worked EB, EF, N. S. He has several schedules and has also increased his traffic. 8CYK has a wow of a report with several schedules and worked most all districts. 8DME has several schedules and handled traffic in great style too. 8DSP has given his traffic an awful bump upwards and worked many schedules. 8UL still continues to handle traffic although reports nothing exceptional.

Traffic: 8ABX 7; 8ADE 12; 8AHC 235; 8AYU 45; 8BCM 65; 8BFN 35; 8BIG 28; 8BMJ 63; 8BQK 2; 8CDC 155; 8CNH 2; 8CNT 12; 8CNX 58; 8CPC 22; 8CVJ 54; 8CYK 3; 8DME 12; 8DSP 57; 8UL 12.

EASTERN PENNSYLVANIA—SCM H. M. Walleze, 8BQ—This is my last report as I found it necessary to resign. 8EU will handle the work until further notice is given you thru *QST*. I want to take this opportunity to thank you fellows for the excellent co-op you extended. I will greatly miss my most enjoyable contact with you. Carry on with the same spirit and you will stay on top, as we have been for quite some time back. A very Happy New Year to all and 73.—SCM. 8EU maintains the lead in our BPL gang but 3AKB gave him a merry chase. 3QP is very busy with his RM duties but says tfc is plentiful and good. A new second handed bug has 8CGZ happy again. 3QY sure shoves em thru at a grand rate. 8RQ is handling his old skeds again. The Xtal set perks for 8AVK at last and 8WJ has the bug now too. 8BIR got his QSB ironed out and it sure needed it. Hi! Night work slowed 3ADE a little but his total is FB. 3SM piled thru with an excellent total also. 3BFL is going to work on sked now. The sky wire came down for 3VF and cold WX kept it down. 8BYZ is busy fixing punkadynes. Business kept 8HH off. 4OM proves a dud for 3QM. 3CDS is busy early mornings. 3AWT wants more room for news on the cards! FB, but letters are welcome. 3AFJ is blasting haywire BCL sets. Watch ur step, those lids have the 'right-o-way' OM. 3AFW is a new one reporting and is very active. 8CW had to hand in his ORS due to too much college QRM. 8CHX is back from sea, working WGBI and 40 meters. 8BQ is off the air again indefinitely, but watch his smoke when he comes back!!

Traffic: 8EU 477; 3AKB 377; 3SM 217; 3AFW 173; 8CGZ 134; 3QP 132; 3ADE 131; 8RQ 117; 3QY 102; 8AVK 82; 8RO 52; 8WJ 37; 3AWT 37; 3CDS 29; 3VF 18; 3AFJ 17; 8BIR 16; 3ZM 12; 3HH 6; 3BFL 3; 3QM 2; 8BYZ 2.

SOUTHERN NEW JERSEY—(Report sent in by 3ZI)—3BSD of Trenton is a very active station in this Section, having handled a large amount of traffic but is not yet an ORS. 3CFG has installed a new UX852. Traffic is going fine these days so CFG reports.

Traffic: 3ZI 131, 3BSD 73, 3CFG 313.

CENTRAL DIVISION

MICHIGAN—SCM Dallas Wise, 8CEP—8AUB and the Grand Rapids gang are hard at work on the Michigan Convention to be held in April. 8CYM says traffic is light out his way. 8BHD is working two fivers on 40.5 and 77 meters and handled quite a little traffic. 9AYR is having trouble with power leak QRM but is on both 40 and 80. 8DSF has a 310 perking on 80 and wants an O.R.S. 8BRS has perked up his traffic and turned in a nice total. 8ZF says the Lansing High School gives half credit for an operators' license earned during school year. 8AMS has built a grid frequency meter for use at his shack. 8DIV is active again but says the 40 meter band goes dead early in the evening. 8AAH, a new comer is going along in fine shape. Keep it up, OM. 8DED is thinking of publishing a small paper for Michigan hams and besides being the star performer again this month works 3OZ stations. 9CSI complains of 20 meters being freakish and plans to come up to 80. 9EMB has a special radio room and promises some action from now on. 9ANT has been QSO WNP often and also QRE with the YLs. Look out OM, better stick to the transmitter. 9CE took 50th place in the Navy Day Broadcast reception. 8CHT is the station at the South Haven High School under the direction of A. Wieienga and they work on 80 between 4:00 and 6:00 P.M. on school days.

Traffic: 8ZZ 10; 8CKZ 6; 8AUB 26; 8CYM 1; 8BHD 21; 9AYR 20; 8DSF 9; 8BRS 75; 8ZF 46; 8AMS 3; 8DIV 27; 8AAH 14; 8KN 10; 9CM 2; 9CSI 25; 9EMB 8; 9ANT 2; 9CE 15; 9CEX 12; 8DED 293; 8CEP 20.

INDIANA—SCM D. J. Angus, 9CYQ—9QS is back on the air and wants schedules. 9BKJ made another swap and has his "S" tubes back. 9CSP is a new

O.R.S. 9CNC has a new 100 watt crystal controlled set on 40 and 20. 9BYI wants skeds west on 41 and 79. 9CVX now has blossomed out with crystal control on 40 meters. 9BZZ reports three new stations at Richmond, 9EPH, 9ESG and 9EKW. 9EGE has a new crystal set going on 39.7 meters. 9CVX is changing over to 20 and 40 meters. 9CMV, the station at Lafayette handling Purdue University traffic, has 10 regular ops on duty now. 9AIN is the busiest station in Indiana with all time taken up with regular schedules. 9DBJ is on both 20 and 40 now. 9ELE is starting up again after selling out for good. 9LR and 9MQ are new hams at Fort Wayne. 9BDA is putting in a 150 watt crystal controlled set. He is also a new O.R.S. 9EF is spending all his time on 20 meters. Fort Wayne will have three new stations very soon as a result of the code school run by the Fort Wayne Club. The club had an election of officers and elected 9BKJ president, 9LR vice-president and J. L. Herman, Secretary and treasurer. 9BYI has power leak trouble but gets out on 20. 9ASN and 9CEM have started up again. 9EBP taking some time off as his 50 went west. 9DDZ has turned commercial op and has a job in Florida. 9AKD has started up again. 9AMI spent Xmas at home after 18 months in the hospital. 9EFZ and 9EF want DX traffic. 9AGC wants 175 meter fone traffic. Crown Point is going full blast with 9DHJ. 9AGF and 9DWB. 9ENX and 9AIP both received 7½ watters for Christmas so hang onto ur hats around Connersville.

Traffic: 9AIN 440; 9CMV 82; 9CVX 29; 9EGE 37; 9ASX 28; 9BZZ 35; 9CVX 18; 9BYI 13; 9CNC 20; 9CSP 7; 9BKJ 7; 9BCM 18; 9BK 2; 9RS 13; 9QS 3; 9EKW 10; 9ENX 2; 9AIP 1; 9DBA 11; 9EF 40; 9DBJ 8; 9CRV 75; 9CVQ 32; 9APG 23; 9CLO 12; 9DSC 10; 9CBT 2; 9DHJ 3.

KENTUCKY—SCM D. A. Downard—9ARU—A number of new stations are springing up in this Section, some of them old timers who could not resist the call of the ether. Ex-9GX of old spark days (been out of the game since the birth og CW) was seen purchasing a new C.R. wavemeter—use your own judgment. 9BZS is back again. 9HL has gone to sea again. 9BPR lost everything in a fire. 9EP is back from a trip to Central America. 9BAZ says he is QRW with school but gets on the air occasionally. 9OX-9WV are on every night. 9ECX is a new one in Catlettsburg. 9BWJ is as reliable as ever. 9BAN is using an inside Hertz on 20 and getting out FB. 9CJW put up a Current Feed Hertz and got R-7 from his first Zedder, ex-1FE. 9CIS has changed from Hartley to TGTP. 9CRD worked French Equatorial Africa and Gautemala. 9MN is on 40 and 80. 9ATV is working on 80.

Traffic: 9OX 109; 9CRD 85; 9RWJ 66; 9ATV 12; 9BAZ 11; 9BAN 9; 9MN 4.

OHIO—SCM H. C. Storck, 8BYN—Gang, the SCM is very proud of you all this month. Best reporting for a long time, and the totals! Oh my! He wants to thank you all and keep up the good work. 8DBM leads the whole state this month. He has been doing consistently good work and deserves the $52 prize. Haven't heard from the RM 8ALU yet. Results next report. 8DIH comes second with 202, results of a flock of schedules and consistent work. FB, OM. The SCM, 8BYN, comes third this month, result of consistent 80 mx work and schedules. 8BEV kicks in with 158. He is back in Ohio again until the commercial season starts again. FB 8BAU took a lot of time to get on 80 mx and is now on 20, 40 and 80. 8DIH made the 8PL two ways, a total of 202 and delivering 130 messages. 8BAU, despite his total of 101, makes the BPL with 57 delivered, which, on consideration, shows consistent work and concentration of the job on hand. 8BAS is doing good, consistent work on 80, is a good schedule man, and a FB op. 8CFL is another station that is doing good traffic work, is on the air consistently, and boasts a good op. 8ALU, in spite of his work, duties as RM, etc., turns in a good total. 8AVB is working 40 and 80, and turns in a good total. 8DSY has Xtal control going now. FB. 8JB has schedules in every direction and says "come along with the traffic." 8GL now has power for his 50 watter, having bought a huge pole transformer, and it pepped him up so after QRP work, that he corraled 47 messages. 8CMB and 8APB got mercury arcs for Xmas, and are QRV for any traffic Cleveland way. 8CQU reports 20 mx bad for traffic. 8DJV says he is not discouraged even if 8DBM does win the tube. Hi, and FB, OM. 8DDK get a lot of traffic for 40 meters. 8ACY is on air again with two 210s. 8BOR is a coming O.R.S. 8AVX turns in 22, but has nothing to say about himself. 8BFA comes back with us again, and is QRV for traffic, rag chewing, chess and checkers. Hi. 8OQ got an awful wallop out of working WNP on 20 mx. 8ADA is on again with an entirely new set and got a nice total. 8CAU has been taking about all the traffic for Cincinnati, and is QRV for more. 8CXW will be ORS soon, and is doing good work. 8DNL, another Columbus, station, is runner-up for ORS. 8CNO only sent in report on condition that the SCM wouldn't mention her in *QST*, so he isn't. Hi! 8GZ is on with Xtal again by this time. 8AKO is back from the "Crib" and operating at his own station again for three months. 8CTD has nothing to say. 8DHS burned up all his grid leaks and has been having trouble trying to make grid bias work. 8BSC is one of these modest hams also—has nothing to say. Hi! 8BKM complains that his YL is taking too much of his time. (That's easy. Make a ham out of her, and then marry her.) 8PL reports the ex-822 tube FB in his SW receiver. 8AZO is using B Battery plate supply, 8ABK will soon be ORS. 8CLR was on only thru the Holiday vacation as he is busy at school. 8DQZ also is QRW school. He advises the SCM to keep 8ADH away from the YLs or he will be lost. He says ADH chases them as hard as if they were quarter KW tubes. Hi! 8DPF reports that the RM is up on his toes, and hams wanting schedules can not do better than to get in touch with him (BALU). 8BKQ is getting new Xtal and will then be on 21.1 mx. 8DJG QSRd a message to Akron ten minutes after he received it. FB, OM. 8DIA, 8AWX and 8SI all report too QRW to be on air much lately. A bunch of ORS have been cancelled because of inactivity and non-reporting, so the percentage for OHIO will go up. Keep up the good work OMs, this month was fine. Now that Christmas and New Year greeting messages are no more, don't let the totals drop. If we could do this every time, OHIO would be one of the leaders every month. Several sections are competing with each other to see which can have the highest percentage of active ORS. Certainly wish that we could line up for something like that also. How? This off-wave business is getting serious. Not many OHIO hams guilty so far, but watch your steps, OMs. Action on off-wavers is getting drastic, to good effect. The SCM wishes to thank all of you for your co-operation and for your Christmas and New Year's wishes. He is on 40 and 80 mx both, and always ready and willing to QSO the OHIO gang. Many stations complain of too few stations in OHIO QRV for Ohio traffic. 8DBM has gotten most of his totals by taking this kind of traffic, regardless. Let's see more of you fellows line up for it, and not only be after relays, to count up more. There are all too few stations in OHIO to QSR to, and many messages must be mailed, so it behooves the stations that are active to take whatever they can get.

Traffic: 8DBM 303; 8DIH 202; 8BYN 188; 8BEV 158; 8BAU 101; 8BAS 86; 8CFL 78; 8ALU 73; 8AVB 67; 8DSY 51; 8JB 48; 8GL 47; 8CMB 44; 8CQU 42; 8DJV 41; 8DDK 49; 8ACY 23; 8BOR 23; 8AVX 22; 8BFA 19; 8OQ 17; 8ADA 16; 8CAU 15; 8CXW 15; 8DNL 14; 8CNO 11; 8GZ 9; 8AKO 9; 8CTD 9; 8DHS 6; 8BSC 5; 8BKM 4; 8PL 3; 8AZO 3; 8ABK 3; 8CLR 3; 8DQZ 2; 8DPF 2; 8BKQ 2; 8DJG 2.

ILLINOIS—SCM W. E. Schweitzer, 9AAW—Well, fellows, Illinois has closed the book for 1927 with this report. It has been a glorious year, the most active year in its amateur radio history. More stations have reported each month as the year progressed and we are in a healthy condition. Let's all face forward to 1928. Remember to start your originated msg. number with No. 1 on January 1, 1928, and keep them going up. Report to your SCM on the 26th of each month, and let's have something interesting each time. If you want an ORS appointment ask for it and see that your station deserves it. You are eligible with your third consecutive report. Let's go. 9AAW has repaired the power supplies and is operating with 500 cycle and DC supplies. 9ACU's 7½ watter passed away and he is using a 310 nw working on 21-37.9 and 41.5 meters. 9AEG is operating evenings. 9AFA is still the contact station with WNP. He has recently installed a 1 K.W. mg with a pair of 250 watters. 9AFF is conducting the Army traffic for the Sixth Corps area operating on 40 and 80 meters. 9ALK reports a kind BCL wrecked his mast and aerial. 9AMA worked WNP—NR and NQ. 9AMN reporting for the first time, is using a 7½ watter. 9AMO

wishes the gang a Happy New Year. 9AQA has to travel DX going to his job daily. 9APY reports his OW in New York, and also reports the following: 9DPN is selling out and will go into the Army Air Service somewhere in Kansas. 9DLG is at Beloit College. 9HI will work 3GP in a chess contest. 9ASE worked 3ZM handling some rush tfc. 9AWX played checkers via radio with 9CCZ. 9BLL works sked with 9AMO—6AM—9EJQ—9DLB—9DOX —9CNY and also plays checkers with 8CSB. 9BNI worked 6BK and 1BSU. He keeps skeds with 9CDH. 9BNI, formerly used to be on the USS E-1. 9BPX with his 852 is getting excellent results on all the bands. 9BRX will be back about Jan. 15th. 9BTX received a crystal from Santa Claus and will be using it soon. 9BVP is bothered with power leaks and BCLs. 9BXB relayed a msg from Germany to Texas in 9½ minutes, FB, OM. 9CIA was kept busy with Xmas messages. 9CCZ says early morning schedules are great. 9CKM is just getting started in the traffic game. 9CNB's tube went west. 9CNY is using remote control with break-in. 9CNP is on for the winter. 9CSB finds good DX on 20 meters. 9CSL had a bit of hard luck with his tubes going soft antenna blowing down and transformer burning out. 9CUH says things went fine this month. He reports 9ANQ is coming on with a 50 watter. 9CYN is going to be on with some high power, one 7½ watter, Hi! 9DAF worked Cuba. 9DCK is working OAs on his 210 tube. 9DGA worked South America and England. 9DOX was bothered by the Chicago elevated—there was a bad arc on the road. 9DSU handles most of his traffic in the 40 meter band. 9DXG is too busy to pound brass? 9DXZ has a mercury arc rectifier going now. 9EAI helped recover a stolen auto by notifying the chief of police in near-by towns by amateur radio. 9EAJ likes the results of the tuned grid, tuned plate circuit better than the Hartley. 9EGX is rebuilding and is planning to put in a MG with 210s. 9EHK lost his outfit when a fire destroyed the entire building. 9EPX is working on 80 and is putting in a 150 meter phone. 9IZ has been skating instead of pounding brass. He says 9ERH and 9CYN work each other easily without transmitters—all they do is open their windows and holler to each other. 9KA says he never gets traffic to relay, it seems every message he received is headed for Chicago. 9MI operated by 9PU at college gets on when he is not QRMed by school work. 9NV Armour Tech has a new transmitter on 40 meters using two 852s. 9QD says 20 meters seems only good on week ends. May be there are more stations on then? 9RK was on temporarily at his new QRA. 9RP works a half dozen sixes and sevens every morning.

Traffic: 9AWX 272; 9DXZ 255; 9AMO 205; 9CIA 166; 9APY 151; 9BTX 108; 9AFA 90; 9BLL 85; 9CCZ 65; 9EAI 56; 9BPX 53; 9CSB 52; 9AMA 52; 9DGA 50; 9CNY 45; 9ASE 45; 9AAW 35; 9DSU 32; 9IZ 29; 9DCK 28; 9EAJ 27; 9RP 26; 9DOX 25; 9BXB 24; 9DKU 26; 9QD 22; 9AFF 21; 9NV 20; 9ALK 20; 9AMN 13; 9CUH 18; 9ACU 16; 9MI 11; 9KA 11; 9CSL 10; 9EGX 10; 9CKM 19; 9AEG 10; 9BNI 9; 9AQA 19; 9RK 2; 9CYN 4; 9DAF 1; 9BVP 1.

WISCONSIN—SCM C. N. Crapo, 9VD—Wisconsin has accepted Illinois' challenge in earnest. 9DTK leads again and says his schedules are all working smoothly and getting plenty of traffic. 9DLD sent in his largest report to date and is adding schedules and new equipment all the time. 9SO has schedules with 8AEE and 8DED and wants one west daily or tri-weekly. (Route Mgrs. take notice) 9ABM has schedules with 8DAQ and 9CJU and boosts his traffic by taking Market Reports for WLBL from 9DTK daily. 9LV is temporarily off the air due to BCL QRM but expects to remedy the trouble soon with the help of the new A.R.R.L. bulletin on this subject. 9BPW received his ORS certificate this month and handled a lot of traffic due to good schedules. 9DLQ has several good schedules but says it takes a lot of perseverance to get messages through on 40 meters. 9EBO a new station at Burlington sent in a good total for his first report. 9XH-EK is very busy this month experimenting with portable transmitters and receivers on aeroplanes. 9BIB had hard luck and burned out his 210. 9AZN is going good with schedules with 8ARC and 9DTK. 9BJY has a new transmitter using Aero Coils and Kenotrons. 9BAW still uses a 210 in Mo circuit but expects to have an 852 soon. 9ESM reported in person to 9VD on a trip to Milwaukee during the holidays. 9ARE worked 3ALV and 5TL with 15 w phone, and oa-3VP with 50w CW 40 meters. 9DEK is going to do his share in keeping Wisconsin on top. 9EFC is on mornings and after 10:30 P.M. on 20 and 40 m. 9AFZ, our Club Prexy, says Sunday is the only time he can find the gang on for 20 meter stuff. 9BYU says "No DX, we want traffic" and has a dandy 8 point system in operation to get it. 9BWO will send in reports for anyone who doesn't want to bother about it himself, to boost Wisconsin's total. 9ASL is trying to get out on 20 but not much luck yet. 9CFT is unable to be on as often as formerly. 9COI operating on 40 but pretty busy at U of W. 9EEF, another 20 meter enthusiast, but his traffic total shows it. Hi! 9CVI is trying hard to get back in the traffic game and will have a new mast up next month.

Traffic: 9DTK 422; 9DLD 316; 9SO 202; 9ABM 161; 9LV 136; 9BPW 129; 9DLQ 112; 9EBO 97; 9XH-EK 61; 9BIB 42; 9AZN 38; 9BJY 34; 9BAW 19; 9ESM 18; 9ARE 13; 9DEK 12; 9EFC 15; 9AFZ 10; 9BYU 29; 9BWO 8; 9ASL 6; 9CFT 2; 9COI 2; 9EEF 1; 9CVI 1.

DAKOTA DIVISION

NORTHERN MINNESOTA—SCM, C. L. Barker, 9EGU—The weeding out which has taken place in the ranks of the ORS of this Section seems to have given us a better percentage this month. Only one or two stations did not report this month, which is quite a contrast to the past months. The gang all seems to be taking a greater interest in the game now, and things are moving more smoothly throughout the Section. FB, fellows, keep the good work up. 9ABV is high man this month, working on 80 meters with GOOD schedules. 9CKI has his new 852 going and reports a big kick in working fellows that he met personally this past summer. 9KV reports that navigation on the Great Lakes is closed now, so he will have more time for short wave work. 9EGU has just received his new mercury arc equipment and it surely is fine business. A new UX852 is on duty in its socket and some good records and consistent work is now in line for the limelight. 9DPB reports that traffic was good on both 20 and 40 meter bands. 9CTW tried to build a chemical rectifier but ND. 9AKM says Winnipeg stations have lots of traffic but that it is very hard to work them. 9CF told a BCL that his call, 9CF, stands for 9 Cubic Feet. Hi. 9BMR does most of his operating on Sundays. We wonder why! Maybe the Yls have him again. 9BBT got a new ham in his city, 9CUO by call. 9CIY had business QRM during holidays but has his new 852 perking strong. 9EGN is home from the University for the holidays. 9BJD has a Hertz working fine for a while, but she went haywire. 9CWA operates 9CSU every morning, noon and night and 9CWA all day Sundays. Hi. 9EGF is trying a Hertz antenna and is busy trying to make his 50 watter work out. 9DUV has been off ever since blowing his MG, etc. but will be on soon with a 210 and mercury arc equipment. 9MF sends his report in from Chicago where he is now located. 9BMX is working hard on crystal control, with a consequent lack of traffic totals.

Traffic: 9ABV 137, 9CKI 46, 9KV 38, 9DPB 34, 9CTW 32, 9AKM 22, 9CF 21, 9EHO 18, 9BMR 17, 9BBT 16, 9CIY 13, 9EGN 12, 9BJD 9, 9CWA 6, 9EGF 5, 9EGU 2.

SOUTHERN MINNESOTA—SCM, D. F. Cottam, 9BYA—The Xmas season has brought with it the time when the gang is busy tinkering up the old junk pile. This, that and the other thing is done so traffic and DX will slip thru the air with more ease. It is hoped that a lot of stress will be put on observing other people's rights and that the old set will be made to perk in such a manner that it does not cause QRM to others. Especially those in cities should be very careful because we all are well acquainted with the BCL situation. The A.R.R.L. has fought very hard for us so let us in return do everything we can so further trouble will not be encountered. If we are not careful, it will not be long before we might be restricted to a very few hours of operation per day. Who wants that, so let us watch our step. Be sure we are right, then go ahead with care.

9COS handled some important traffic and is high traffic man. He holds 2 skeds and says it is a pleasure to handle traffic at times. 9DBW hooked up with 6DPK, an old roommate, and got a real kick out of it. 9DGE ops periodically on 40 and 80. 9EFK has been QSO WNP, Mexico, Hawaii, Aust. and N. Z. but is not satisfied with his antenna. He enjoyed a visit from 9EET recently. 9XI has cut skeds to 2 during vacation. 9DHP keeps on sked regularly, oping on

20 now. 9EFO was QSO fo-A3M. 9BTW has been heard in Brazil but has been QRW school. 9BKX on 20, 40 and 80, was QSO oz this month. 9AIR says he did not credit himself with all the rubber stamp messages this month but only the important ones. 9DBC has been QRW overtime so his total is not up as he would like to have it. 9ELA says bum weather. QSS bad on 40. 9DEQ has had trouble on 40 and is putting up a new Zep. 9DMA is on during vacation. 9BYA is still working such hours that the junk pile has to want for action.

Traffic: 9COS 46, 9DBW 30, 9DGE 30, 9EFK 28, 9XI 28, 9DHP 27, 9EFO 21, 9BTW 17, 9AIR 16, 9DBC 12, 9BHB 8, 9ELA 7, 9DMA 4, 9BKX 16, 9DEQ 5.

NORTH DAKOTA—SCM, G. R. Moir, 9EFN—9DYA finds it hard to raise anybody but seems to get good DX. He uses a CX310 with 300 volts of B batteries. 9DM is not satisfied with the Hertz and is making a change. 9CDO just got an H tube working and is getting fine results. 9CUT reports no traffic but worked everything heard. 9EFN can only get on Saturday and Sunday nights but gets good results then.

Traffic: 9DM 22, 9EFN 3.

SOUTH DAKOTA—SCM, F. J. Beck, 9DB—In spite of several feet of snow, the gang held a real So. Dak. A.R.R.L. Convention at Sioux Falls. 9DGR won second prize being high traffic man, and 9DWN won the speed contest tho 9BKV was noted best op. Pasek is settled in his new home and gave a fine talk on "HG" arcs at Sioux Falls. 9ADQ turned in a fine report and was QSO some nice DX with the 7½ watter. 9EUH has a fine signal and is steadily improving his speed. 9NM works a snag of DX and also pushes traffic FB. 9AJP has a regular BC station and is working into the state traffic net FB. 9DB managed to get home in 4 days after the convention but says the CX222's were worth it. 9BKB rebuilt and reports new call of 9DBZ-DZI as 9ETR. 9BOT has a 210 and gets out nicely. 9DLY has 3 separate xmitters and a 5 meter layout working OK. 9DES is experimenting and hunting DX. 9CJS uses low power and 9CZG is QRW college. 9BCJ is working foreigners with Belgian tubes. 9AZR is looking for skeds in A. M. Our state traffic net is working out nicely and plenty handle skeds of any variety.

Traffic: 9DGR 122, 9ADQ 115, 9DWN 105, 9NM 57, 9AJP 51, 9DB 21, 9BKB 16, 9BOT 9, 9DLY 5, 9DES 5.

DELTA DIVISION

TENNESSEE—SCM, L. K. Rush, 4KM—This seems to be our best month in years and radio has taken another boom. Tenn. was second in total messages handled last month and several applications for new ORS were received. We want more ORS that will uphold the standard. The Knoxville gang are to be congratulated for their good work and their secretary, Mr. Witt, 4SP, is a live wire. 4GL is on 80 and remote controls his xmtr two miles distant, using only two wires. 4SP is still nursing his xtal but hasn't put it in set. 4HK is four weeks old but gets good results on 20-40-80 in spite of the proverbial bum location. 4FX uses 40-80 but 80 mostly as he craves traffic and skeds. 4ABZ uses an 852 on a 40 voltage feed Hertz. 4DG uses 15 watts and has QRM from jr. op. electric stove, frigidaire, and water pump. 9DTU, 4FD, and 4FA are vacationing at home. 4FY is warming up and will be on soon. 4ABR got an ammeter storage battery and cash for Xmas, more improvements. 4ADI got a "skeeter", one of the old $15 model T bones. 4NL is a new stn., and is on 20. 4HH is on 20. 4NN has two 250 watters on 40. 4TD ex 6AGU wants on ORS. 4KX still likes 20 best but has been off the air quite a bit. Too much Xmas.

Traffic: 4ABZ 42, 4FX 30, 4GL 27, 4SP 10, 4HK 10, 4NL 9, 4KM 17.

ARKANSAS—SCM, Wm. Leonard Clippard, Jr., 5AIP—5ACA:—Things seem to be against us again this month, as several of our fellows were QRW during the Holidays either from work or YLs. Let's buck up, fellows and see if we can't get back on our feet. 5SY has a new 852 perking, but leaves us abt Jan. 10. Luck and 73 to you, OB. 5ABI has a 210 at last and says she will perculate, FB. 5AVA says ye ole radio shack is too cold to do much. Hi! Hi! 5DD is going strong on 80 meters, and 5TZ on 40. 5AAJ leads the gang this month with a total of 23. 5JK is still doing his usual fine work. 5CX blew his grid-leaks and is QRW a while. 5PX was on a bit this month late at night. 5HN is still with us. Fellows, let's see if we can't get some pep into us this month and lead the Delta gang by a large margin. Wid all the Xmas stuffs we ought to get out fb.

Traffic: 5AAJ 23, 5ABI 10, 5JK 10, 5AJY 7, 5PX 6, 5AVA 2, 5AIP 2.

MISSISSIPPI—SCM J. W. Gullett, 5AKP—5FQ is the proud possessor of a 250 watter now and will have it on 20 meters within the next few weeks. 5AYB has completely rebuilt his transmitter and receiver and is getting out much better now. 5ANP is on regularly but reports messages scarce on both 40 and 80. 5AGS will be back on 40 meters within the next few days. 5API, 5YD and 5AJJ all failed to report this month. I dislike very much to cancel any ORS certificates but it looks like I will have to drop 5AJJ at once on account of failure to report. Gang, snap out of it if you wish to keep the ORS Certificates. You must report. 5AKP handles all messages on 20 meters and says it is FB in daytime. With best wishes for a Happy, Prosperous New Year.

Traffic: 5AKP 102, 5ANP 5, 5FQ 20, 5AYB 36.

HUDSON DIVISION

NEW YORK CITY & LONG ISLAND—Asst. to SCM, J. B. Kilpatrick, 2EV—Manhattan: 2BCB is looking for 20 meter skeds in daytime. 2EV was QRW assisting SCM and building xtal set for 1QI. 2KR is also putting in xtal set.

Bronx: 2BBX was QSO West Coast on fone on 20 meters. FB. He is also QRW building a new receiver. His 2nd op is going to India on the S. S. *Arcturus* and is going to log hams on 20 and 40 meters on the trip.

Brooklyn: 2ADZ is building a new transmitter. 2ALU is all set for the transcons with a UX222 receiver and 1 KW in the jug. 2APD has been doing lots of good DX. 2BAZ has reports of somebody using his call off-wave. He and 2ARM are building a portable outfit. 2BDM has a junior op now which arrived Dec. 13. Congrats, OM. 2BO was QSO ek-4DBA for 2 hours and made various tests from a half watt to 300 input. FB. 2CRB says 20 meters has been dead but 37.6 is OK. 2CTY got a box of apples for a message delivery. Says mercury arc working FB and wants a 250 watter now. 2PF, RM for Brooklyn, sent out 25 off-wave cards during the past two weeks. FB, OM. Hope you didn't send 2BAZ one.

Long Island: 2AGU says DX has been NG lately. 2AIZ handled 3 msgs for WNP. FB. 2AYS has been doing good DX with a 201A and indoor antenna-counterpoise.

Governor's Island: 2SC is a new ORS and his 77.8 crystal controlled DC sigs are sure FB. There will be a lot more new ORS soon and some of you old ones better watch out.

Traffic: Manhattan: 2BCB 22, 2BNL 4, 2EV 60, 2KR 23. Bronx: 2AET 3, 2BBX 25. Brooklyn: 2APD 18, 2BAZ 9, 2BDM 12, 2BO 59, 2CRB 15, 2CTY 14, 2PF 12. Long Island. 2AGU 17, 2AIZ 61, 2AWQ 5, 2AYS 12. Governor's Island: 2SC 76.

NORTHERN NEW JERSEY—SCM, A. G. Wester, 2WR—A large number of stations failed to report this month. Our traffic total was fair due to the fine efforts of RM Hallahan, whose station handled 265 msgs thereby putting him in the BPL again. Any stations that need traffic should get in touch with 2CP as he has plenty to distribute to local stations of the state. 2CP is the finest traffic station that N.J. has seen in years and the fine results in traffic are due to closely kept schedules. 2CW worked 40 stations during the month. 2JC has had fine success in connecting up with African stations. 2FC still does plenty of DX work. 2KA has not yet joined the Naval Reserve as earlier reports indicated. 2ASZ is having fine results with his rebuilt transmitter. 2CJD is having trouble with the BCLs. 2AGN worked Belgium and Italy with his fone on 20 meters. 2CQZ is rendering aid to the Federal Radio Commission by checking up BCL heterodynes. 2CJX handled a fine amount of traffic and also is experimenting in the 5 meter band. 2BIR is back on the air after rebuilding the works and reports fine success with same. 2AVK was expecting a Vibroplex for Xmas but got a wrist-watch instead to help keep his log straight. Hi. 2ADL has gone to the Sunny South to spend a few weeks of the holidays. 2JX is too QRW with BCL work to get on the air. 2AOP has been having sport on 180 meters with fone and working with no QRM. 2AAT finds it impossible to get stations to keep schedules after making them. 2ARC is now an operator at 3AEQ. He has been home from college and operating his own transmitter. 2ABE was forced off the air due to antenna blowing down. However,

2ANB has offered his help in getting the aerial put up. 2BY, our YL station, is still active both in stations worked and in handling traffic. 2MD has applied for an ORS which will be issued to him during February.

Traffic: 2CP 265, 2CW 6, 2JC 15, 2KA 2, 2ASZ 24, 2CJD 2, 2AGN 12, 2CQZ 4, 2CJX 33, 2BIR 2, 2AVK 5, 2ADL 52, 2AOP 34, 2AAT 7, 2ARC 2, 2ABE 24, 2BY 6, 2MD 138.

EASTERN NEW YORK—No SCM elected—2BOW will be QRT for a few weeks as business calls him away. 2AGR is operator on the SS *Madison*, running between New York and Norfolk, Va. He expects to get a short-wave transmitter and receiver pretty soon.

Traffic: 2BOW 100.

MIDWEST DIVISION

KANSAS—SCM, F. S. McKeever, 9DNG—9CFN wins all honors in traffic this month. Better watch it, fellows, or he will win the Kansas Traffic Trophy! 9BII is still handling messages for local Hi-y. FB. 9HL reports giving Western Union Service twice and shows a good increase in traffic. 9DNG worked ARDI at the South Pole and took two messages from him. 9EBN has a sync now and is making lots of noise. 9LN is still the most consistent station in Lawrence. 9CV and 9BHR are still very much alive. CV says DX is not what it used to be. 9AEK and 9DCB are still at it but let's have more traffic, boys. 9CXW and 9BET, both newcomers, turned in good reports. The latter will be an ORS soon. 9CKV, as usual, is near the top in traffic. Keep it up, OM. 9CET is in Arkansas City, mourning the recent loss of his 204A. He'll soon have an 852 tho, so he says. 9CNT has completely rebuilt and moved his station from the garage into the house. This move became necessary when his rectifier jars froze up. 9JU has at last returned to the air. Let's hope he stays on.

Traffic: 9CFN 102, 9JU 11, 9CFW 7, 9DCB 3, 9LN 17, 9DNG 28, 9BHR 29, 9CV 9, 9BET 26, 9CNT 15, 9CKY 59, 9DXW 13, 9HL 69, 9BII 59, 9EBM 12.

MISSOURI—SCM, L. B. Laizure, 9RR—Seven St. Louis stations reported a total of 317 messages this month. 9DOE led the list. 9BEU received his ORS this month. 9DUD inquired regarding OBS appointment. 9BMU and 9EMP are two new stations in St. Louis. 9DXY was out of town too much to maintain skeds. 9ZK lost a jug and is now using an H tube. So far as reported, 9DLB is the only station in St. Louis working the 80 meter band regularly, the others being on 40. 9BQS reports ND this month due to rush of work at the post office where he is employed. 9LI made good use of his new ORS and handled a good total. 9DKG handled a few msgs. and arranged a K. C. sked on 40 meters. 9CRM is on every night on 80 handling traffic. 9ARA is working 20 and 40 and entered the International Tests. 9DMT worked the 40 meter band this month with fair results but his report shows he believes the 40 meter band is to be pinched immediately instead of in 1929. 9DAE pounded brass vigorously this month since getting a new 852 and made the BPL. 9CCQ reports some freak DX work with 201A tubes and Ford coil plate supply on 80 meters. 9DOF has also been doing some experimenting along this line. Kansas City stations reported better this month but the traffic per station was nothing extraordinary. 9BKK returned to ship operating leaving his sister to run 9BKK. 9ZD, Jr. returned from his job on the S. S. Ario for Xmas holidays. 9AHI and 9AYL, old timers, are back on the air. 9BND has moved to K. C. and works 20 meter DX. 9EEZ went to Annapolis and has a station 3ATX going there. 9DLL is a new traffic station in K. C. 9RR hooked up a small transmitter. There will be a branch office opened by the Radio Commission either in Omaha, Kansas City or St. Louis. The hams of K. C. are cordially agreeable to having this office placed in St. Louis if one has to be located in this territory. The R. M. report is practically the same as last month. Individual stations do not make any report to him and all dope reaches him second hand through the SCM which makes it late. There seems to be plenty of room for good traffic stations on 80 in this state. If the fellows would take the trouble to QSY their transmitters to 80 meters, a much better traffic total would result.

Traffic: 9DLB 46, 9DXY 60, 9DOE 113, 9DZN 20, 9BHI 21, 9BEU 11, 9ZK 46, 9LI 40, 9DKG 21, 9CRM 130, 9ARA 25, 9DMT 7, 9DAE 262, 9CCQ 15, 9ZD 12, 9DLL 12, 9AHZ 26, 9AYL 6, 9ACA 3, 9BND 26, 9BKK 20, 9BQN 2, 9RR 5.

NEBRASKA—SCM, C. B. Diehl, 9BYG—9QY is having his winter's rest with his farm work and is stepping on it now. He has lots of fun on 175 meter phone. 9EEW still blazes away on 20 and 40 when he can get the time as is having a terrible time with his railroad. 9DFR just rebuilt and blew a couple of tubes but has it fixed now and expects to walk out as per usual, after spending three nights per week teaching a code class. 'Atta boy. 9DI says cannot be on only weekends and hasn't much time that way for traffic. 9AWS says he has a notion to tear Xmas week off his calendar as it brings him too much work, for comfort. 9BOQ wants schedules east and west, says his transmitter wants to turn hand springs all the time but has a good hammer close by to train it with. Hi. 9DAC says is having good luck with his five meter work but he doesn't say anything about any QSO's down there and also has a lot of work piled up in front of him. 9DUH is very QRW with BCL work and can't be on as much as he would like. 9BBS works both coasts on 40 and 80. 9BQR says he never saw so much mail at one time—says this the heaviest mailing Xmas he ever saw and hopes that it will never happen again. 9EBL has his xtal wound up and is expecting great things from it. 9CDB was just appointed ORS and says that next month, he expects to turn in a real total. 9ANZ says power QRM is a fright or he would have done better. 9DVR turns in a score of 49 this time. 9CJI turns in a goose egg but due to moving his equipment to a new location. The SCM wishes to thank all of you for all the beautiful Xmas cards rec'd this year and hope that you got as much fun sending them as he did receiving them. Santa Claus sure found me this time and am well pleased with his work.

Traffic: 9QY 30, 9EEW 8, 9DFR 1, 9BYG 15, 9BOQ 2, 9DUH 2, 9BBS 10, 9EBL 4, 9CDB 90, 9ANZ 6, 9DVR 49.

IOWA—SCM, A. W. Kruse, 9BKV—December proved to be a record-breaker for Iowa insofar as schedules and traffic handling are concerned. The SCM certainly appreciates your splendid work, fellows, and here's hoping we can keep it up. FB. Several ORS have been cancelled for failure to report. The SCM wants every Iowa station that is handling traffic to report on the 26th. How about it, OMs? 9BWN is right on the job and keeps only reliable skeds. 9CZC is handling more traffic than ever. Keep 'er up, OM, let's see you lead the Section next month! Schedules helped 9EJQ hit the BPL. 9BKV attended the So. Dak. convention and reports an excellent time. 9DZW put an article in his paper, together with a full size message blank and invited the subscribers to send a message via amateur radio. The results were excellent. 9EHN is pushing traffic in grand style. 9DGW is keeping the ether hot with his 50. 9DEA and his Dad attended the S. D. Convention, the latter winning the liar's contest. Hi. 9PB is doing nice work on 80. 9CAC has a good bunch of 80 meter schedules. 9CJL says reception is punk on 80. 9AMG still keeps his schedule with 9BHR on 40 meters. The YL at 9EIW is keeping the air hot with a couple of UX371s, and also keeps several schedules. FB. 9EHR has increased his power to 15 watts. 9CUX has some new rectifier tubes and is again using DC with fine results. 9DPL still has QRM from the YL. 9DVL has a good start and hopes to get going strong soon.

Traffic: 9BWN 345, 9CZC 341, 9EJQ 331, 9BKV 316, 9DZW 249, 9EHN 240, 9DGW 204, 9DEA 126, 9PB 81, 9CAC 45, 9CJL 29, 9AMG 26, 9EIW 16, 9EHR 15, 9CUX 12, 9DPL 4, 9DVL 20.

NEW ENGLAND DIVISION

EASTERN MASSACHUSETTS—SCM, E. L. Battey., 1UE—This writing finds your SCM at new QRA, 39 Royal Street, Wollaston. Kindly send reports, etc., there. Unless the non-reporting stations, several of which have not reported for two successive months, show more life, it is going to be necessary to make some cancellations. We have two new O.R.S. this month in 1KH and 1AAW and look for good work from them. 1OG, we are sorry to say, has resigned his appointment as he is too QRW. 1KY, the RM, is putting in lot of work and I hope the gang is co-operating with her. Five stations made the BPL. 1FL is the star traffic station. They handled nearly all of WNP's rush traffic. 1CRA is on 80. He handled some Submarine S-4 Tfc. 1RY is en route to new location and will cut down his BCL neighbors by six in the move. Hi! 1ASI thinks his newly acquired skeds are going to be FB. 1YC handled some stuff for Halifax Radio Show. 1NK is QRT. 1RF and 1GP have school QRM so not much doing. 1ACH is still keeping E. Mass. tfc totals high. 1BDV reports 1EQ operating 1IU's station during his

absence in Calif. 1AKS is QRT due to commercial job. Relaying hockey scores for friend thrills 1ACA. 1APK has installed storage battery emergency supply. Wonder if he anticipates another flood. Hi! 1AXA worked ai-2KX at 7:30 A.M. on 40. FB! BCL work keeps 1AVY occupied. 1NV has rebuilt his entire station. 1ABA is still working some pretty DX. 1AGS worked oa-2NW and a ship in Honolulu which asked him to cut power because of his R8 sig. Wow! 1BMS in looking for Commercial job reports as many operators as Ford cars. Hi. 1BZQ handled lot of XMAS traffic. 1LM has finally made it—the B.P.L. and no extra skeds. Good work, OM. 1WV and 1KH, two old friends, and comparatively new hams, keep each other going for leadership in DX. 1BVL is busy at his new position. Well, fellows, remember the warning—WE MUST HAVE YOUR REPORTS AND YOU MUST DO SOME WORK. O.R.S. MEANS MORE THAN MERE HAM STN. IT IS SUPPOSED TO STAND FOR THE BEST THE LEAGUE HAS SO DO YOUR PART.

Traffic: 1FL 379, 1LM 335, 1CRA 309, 1AKS 226, 1ACH 216, 1BZQ 127, 1ACA 95, 1YC 87, 1UE 74, 1KY 66, 1AAW 47, 1BMS 24, 1AGS 23, 1WV 23, 1KH 20, 1ASI 20, 1GP 19, 1NK 16, 1RY 16, 1APK 15, 1AHA 12, 1AXA 10, 1RF 7, 1NV 3.

WESTERN MASSACHUSETTS—SCM, A. H. Carr, 1DB—First of all, we wish to welcome and introduce 1BWY, the Springfield Radio Assn. as a new ORS. Their address is rear of 76 Cortland St., Springfield. Anyone wishing to arrange schedules with them may do so thru our RM or thru OM Creaser of the Assn. We all wish them the best of luck with a good traffic record for the future. 1AJK is not on the air so much on account of school work. The U.S.N.R. keeps him busy one night a week, too. 1AJM has kept schedules with So. Africa and has arranged skeds with EB and FO for traffic from Asia going to Europe. He is on the air daily from 5:15 to 6:30 pm. 1AKZ says his 210 is two years old now and still going strong. 1AMZ handled all the traffic he could get when home for his holidays. 1ANI accounts his good total to local deliveries. He says 1APL and 1IP keep him busy with traffic. Good work, fellows. 1APL has started off again making the BPL. His new QRA is 146 Massasoit St., Springfield. 1BIV is rebuilding his outfit hence quietness in his neighborhood. 1WQ is also rebuilding and will be ready to keep regular skeds soon. 1ADO, a non ORS, is reporting regularly. 1LC is experimenting with xtal control. He took three messages from WYCY at Nicaragua and passed them on. 1DB has been thoroughly overhauled and will be on regularly from now on. 1GR, our RM chief, is now ready to arrange skeds and will be glad to hear from you all.

Traffic: 1ADO 9, 1AJK 4, 1AJM 39, 1AKZ 2, 1AMZ 27, 1ANI 156, 1APL 238, 1DB 30, 1LC 6, 1EO 8, 1WQ 6.

CONNECTICUT—SCM, H. E. Nichols, 1BM—After a most delightful Holiday season such as we all have enjoyed, it is a rather hard task to get back to work again and settle down to the regular routine. With the cheery season's greetings passing back and forth in the air, one is always impressed with the spirit of good fellowship and friendship that prevails and it is a real delight to operate during this period of the year. Now that the International Conference has decided that we are worth while, it is a real cause for our Christmas gladness to remain with us for some time to come. Special commendation should be given three of our southern Conn. stns. for their schedule operation in a triangular formation. The stations are 1VB, 1CTI, 1BJK and they have turned in some very nice totals. 1BGC has been working nights building a real ham transmitter and promises to be going very shortly on all waves. 1CKP reports working WNP quite consistently and also had a QSO with French Equatorial Africa. Great work. 1MK reports that Hdqtrs. will soon be going at Brainard Field with a nice 500 watt xmitter with mg supply. This will be fine and we wish you luck and dx aplenty, OM. 1BIK-1ZZA or better known to us as "BX" from Mexico, is spending a little vacation at Bridgeport, bringing a portable transmitter with him. 1ADW reports that QRM from a bad power leak has him checkmated, so much so that he is unable to find when it is stopped enough to get a chance to send out a cq. 1OS, our YL operator, reports Xmas traffic very good and we must commend her for the nice traffic total turned in this month. 1AOX says the radio fever has him again and he hopes to get back in shape soon. 1BHM reports that considerable traffic was handled recently at the Yale Exhibit at New Haven. 1PE has been helping things along very nicely and we regret that we failed to receive his totals this month as it would no doubt have been a nice report.

Traffic: 1MK 153, 1BJK 129, 1CTI 121, 1VB 118, 1OS 87, 1AFB 60, 1BHM 36, 1AOX 34, 1BWM 31, 1TD 23, 1BLF 20, 1CKP 17, 1ACD 14, 1AMC 8, 1ZL 6, 1BQH 6, 1ATG 6, 1BMG 3, 1BGC 2, 1BM 12, 1NE 14, 1VD 14, 1ASD 59, 1IM 79.

RHODE ISLAND—SCM, D. B. Fancher, 1BVB—Starting with this report we are doing away with the sections in Rhode Island and bringing all of the reports under one heading. This will do away with a lot of red tape and save space. 1OU has been busy over Xmas, hence the small report. 1MO says that he has had a very poor month and traffic was scarce. 1AQP was busy in the BCL business over Xmas and wasn't on much. 1BAT reports that traffic is getting better on 20. He collected more messages than ever on that band this month. 1AWE our DX hound says he is on every day working everything in sight. He handled some WNP traffic this month. FB, OB. 1AAL is our star station this month. He was formerly the Assistant RM or the RM of Western Mass. He uses Xtal and sure is handling the traffic. 1BQD has had trouble with his Xmitter this month and didn't do so well. He and 1BLS live in the same yard and have a fine time trying to work thru each other's QRM. Hi! 1BLS is doing fine for a new-comer tho. Keep it up, OM. Nothing exciting happened in Westerly this month. 1BVB is still dogging along at the same pace. 1AAP is slowly coming to life again. 1ANX is going again and making a healthy racket with a 210. Three stations failed to report this month but as the report was due to be sent on Xmas Day we will forgive them as due to the excitement they probably were forgotten. Don't forget next time, tho, Oms.

Traffic: 1AAL 88, 1BVB 79, 1AWE 42, 1BAT 35, 1BQD 25, 1AQP 15, 1MO 10, 1BLS 10, 1OU 8.

NEW HAMPSHIRE—V. W. Hodge, SXM, 1ATJ—The SCM is pleased to report that more traffic was handled in this Section this month than has been for some time. Seems like old times to have 1BFT high man again. He also operates 1CAN at Durham. 1IP, our efficient RM, sent in an excellent report. All his traffic is handled with a lone 201-A. 1JN thot he had hooked the Coast on 80 the other nite but it was BM-6 in NY, hi. 1AVL is on 20 and has a schedule with WNP. 1AVJ reports poor receiving conditions. BCLs have been bothering 1AOQ so he let them cool off a bit while he rebuilt his Xmitter. 1ASR is affiliated with A.R.R.L. now, and is working on 20 and 40. A bunch of tfc was originated by 1AOV. 1ANS handled quite a few. 1AEF sent in an excellent total. He has been appointed Army Amateur Control Station. The SCM wishes to express his thanks for the Xmas cards sent him by the gang.

Traffic: 1BFT 503, 1ATJ 500, 1AEF 450, 1IP 440, 1AOV 110, 1AVJ 95, 1AOQ 65, 1ANS 52, 1ASR 39, 1JN 23.

MAINE—SCM, Fred Best, 1BIG—1BFZ reports that traffic is scarce and that BPL requirements surely do not fit his neck of the woods. (Originate a few good ones and if all the rest do the same, our totals will soon be back to normal). 1BUB reports the Maine gang shy of traffic. What's the matter, gang? A real traffic station never refuses good legitimate traffic. He reports that 1LM of Chelmsford called on him during the month. FB. 1ANH has had local BCL trouble again, and he built two wavetraps and loosened coupling to four inches to beat it. That's the spriit, OM. 1BTQ is back on the air once more. Guess the twins give him more time now. Hi. 1FP hasn't had much time on the air during the past month. Here's hoping the BCL business has let up after Xmas. 1AQL reports that the Queen City Radio Club is to have its own station and call soon. FB. 1COM reported this month. Guess he survived the football season OK and we look for a good large report the coming month. 1AIT has been down on 20 for a long time, now, but is planning on rejoining the boys on 80 soon. We miss your traffic total, OM, so come on back with us as soon as possible. 1ATV and 1KL are still keeping Skowhegan on the map but have neglected to send in a traffic total. 1AKA of Waterville reports all kinds of interest in Waterville and vicinity in the phone line. 1BIG handles a few now and then just to keep his hand in. A schedule with 1ATJ keeps him in the BPL this month.

Traffic: 1BIG 240, 1BFZ 57, 1BUB 43, 1BTQ 59, 1ANH 24, 1FP 9, 1AQL 10, 1COM 5.

VERMONT—SCM, C. T. Kerr, 1AJG—Well, boys, what happened? Very few reports this month. Must

have all had too much key during the flood. You sure are entitled to a vacation, tho. 1IT hit it hard enough to take the cake with the traffic but lost two tubes. 1BEB second cake eater this month but rapped out a lot of traffic. 1FN wants to know who is on 80 now. Those following are now on that band: 1AJG 75, 1BJP 77, 1BEB 78, 1IT 79, Yep boys, I'm on 75 for business now.—SCM. 1BIQ, we hear, is back at 1YD. Let's hear from you, Charlie. 1BDX owes the SCM some dope. Please report on time!

Traffic: 1IT 90, 1BEB 44, 1FN 2, 1EZ 40.

NORTHWESTERN DIVISION

IDAHO—SCM, H. H. Fletcher, 7ST—ALD—Things have slumped during the month when they should have been most active. Only four stations reported. All you fellows seem to be resting on the laurels of last month. Better come out of it. 7HK leads with a nice total and 7QA came close behind. 7ST was only on the air two weeks and now has two portable calls, 7ST and 7ALD. 7ACN holds down his ORS at home besides operating at 7HK. 7JF reports that a cat scratched him causing blood poisoning in his arm. He is back on again now, tho. 7QA is a new ORS. 7GL is a new station in Jerome using an 852. 7IO is getting out with two 852s but no report. 7JF and 7YA both had traffic but did not report it. Guess 7QC is fighting ice jams. 7CJ is planning a new set. Now fellows, let's report for a change. 7JW, ex7OB, is back with two 210s and is doing good work.

Traffic: 7HK 148, 7QA 130, 7ST-ALD 123, 7ACN 20, 7JW 57.

MONTANA—SCM, O. W. Viers, 7AAT—7AAT takes traffic honors, even tho small for the fifth month straight. 7DD and 7AAT were the only stations handling traffic during December. Cumon gang! Let's get going together on this traffic job. 7DD wrecked four crystals but is perking FB on 80 with a 50. He wants test schedules with some one on the 150-200 meter band. Don't all speak at once. Hi. 7AHG is tracking "chickens" when he isn't tracking rabbits or weasels. Hi. He had a little accident on the ice skating rink and came to the next morning. 7AFP is still trouble shooting BCL sets so the station has been suffering quite a little, but we hope to have him with us again shortly. 7AAT is off the air now but is planning to open up for the Relay Contest in February with 250 watts. Say gang! Have you forgotten the reporting dates again? Well, the 26th of each month is the ORS reporting date so let's try to get all reports cleared up on this date from now on. This ORS business is just the date so let's try to get all reports cleared up on this date from now on. This ORS business is just the same as baseball—three misses or failure to report three months count one OUT. What say, gang?

Traffic: 7AAT 55, 7DD 24.

OREGON—SCM, R. H. Wright, 7PP—Reports are exceedingly slum this month. ORS are advised that reports are due to the SCM on the 26th of each month as they go forward to QST that date. 7AEC, again leads the state in traffic. He is also the RM for this Section and stations looking for skeds should communicate with him. 7JC is also high in traffic this month both of these stations making the BPL. 7AEK is using 6EX rectifier tubes in place of his sync. 7GQ is rushed with BCL work but will knock out some real traffic soon. 7FU, a newly appointed ORS, has shown his ability as a traffic man by his total this month. 7JO claims a YL second op now. FB, OM. 7ABH is still struggling with directional Hertz antennas. 7AGG and 7VP are rebuilding in spite of YL QRM. 7AIX is leaving for home but will be on again soon. 7PP's antenna came down, necessitating a 40 foot climb to the pulley on Xmas morning.

Traffic: 7AEC 202, 7JC 108, 7FU 103, 7JO 59, 7AEK 16, 7AIX 11, 7GQ 13, 7ACG 6, 7PP 12, 7ABH 2.

PACIFIC DIVISION

LOS ANGELES—SCM, D. C. Wallace, 6AM—Explorer Wilkins wants us to listen to his new aeroplane set which he will test in Southern Calif. on 33.3 meters. 6QF will put on code practice starting Jan. 10, 1928, from 7 to 7.30 pm on 41.5 meters except Wed. and Sun. All interested, please write for information. The parents of 7IZ were at 6BJI and BJL then worked 7IZ, much to the delight of the parents. The Radio Protective League has been formed in Los Angeles and looks like a fine live radio club with 25 members. Totals are some better this month, four stations making the BPL against three last month. 6BJX has been sick so says his Xmas total NG. 6DPK handled lots of Xmas traffic and is open for skeds. 6ALZ is using a UX852 with 2000 volts now and is getting out for a change. 6DKX reports power leak here again and says he lost some skeds on account of poor 40 meter weather and will pick them up again as soon as wx permits. 6BZC has had trouble with his set, and is going to rebuild. 6CQM worked WMO at 10.00 am 250 miles west of San Francisco. Got two messages, phoned one and gave back answer while he was QRX. 6AM reports that the shield grid tube is great and find 80 and 20 meters better now that 40 is weaker. 6ALR says has sure been active this time between handling messages, building BCL sets, and playing with the YLs. The High Schools there flooded him with messages. 6BVO sends in a good total and worked England. 6CQP has filed application for U.S.N.R. and hopes he makes it. They just finished the movie he was working on and hopes to have a larger traffic total next month. 6ZBJ has been ill with flu and pneumonia for three weeks and has our sympathy. 6QL has been convalescing, too, and did very little. He wants to know how to get a QSL from AJ. 6BZR did some emergency police work in connection with the recent murder case in Los Angeles. 6CUH is rebuilding transmitter at present. The Hermosa Beach gang sends in greetings, 6BOC, 6DLN, 6CYE, 6BXS, etc. 6DCH says 6CDY passed his first class ticket. Two new stations in operation in Venture, 6DSG, 6BCO. oh6BDL says hard to clear traffic to coast. 6ABK sends in his first report and has two skeds daily, already. 6CMQ is now on with a UX852. 6BHI has changed his QRA, and that is why all skeds were broken. 6COT has been rebuilding during the Christmas holidays. 6DGT listened in on aeroplane KHAB for three hours on 331.1 meters up to the time they were forced down on account of shortage of gas. 6BVM has been having trouble raising the fellows since bum wx set in. 6ID says he missed sked with oh6CFQ because of the bad weather, and has to keep silent hours now on account of neighbors three doors away complaining. 6CHT has been helping Uncle Sam during the Xmas holidays delivering mail. 6IH is on 20 exclusively now and thinks it a good traffic wave. 6ANN has also gone to 20 for good, as there is too much QRM and noise on 40. He and 6CBY are learning Morse. 6AKW is building new screen grid 1RF set. 6CLK has been busy with work both day and night and when he got an evening off the YL claimed it so the heap got slightly dusty during the latter part of the month. 6AGR tried out the resistance across each jar in rectifier as per December *QST*. FB. 6BXC has been very busy with work. 6BVT has no skeds this month and wants some. He reports. 6ABK a new station in Eagle Rock and 6AEC is moving back to Eagle Rock. 6CAG rebuilt rectifier and is using two 7½ watters now. 6CNV was assigned by the Deputy Sheriff to the job of organizing amateur net to handle the kidnapping case. 6DEG built *QST* tetrode all but the shield grid tube. 6BGC hopes to QRO and QSO some DX during International QSR party. 6SJ is using Hertz and worked three East Coast stations in a rainstorm so guess it is OK. 6CZT has changed his QRA, and has been very busy. 6PY is still in San Diego for the Western Electric Company. 6RF, 6AIO, and 6BHR send in reports as usual.

Traffic. 6BJX 293, 6DPK 212, 6ALZ 137, 6DKX 130, 6BZC 92, 6CQM 72, 6AM 72, 6ALR 72, 6BVO 64, 6CQP 60, 6ZBJ 59, 6QL 56, 6BZR 42, 6CUH 39, 6DCH 35, 6ABK 35, 6CMQ 31, 6BHI 30, 6COT 30, 6DGT 28, 6BVM 26, 6ID 25, 6CHT 21, 6IH 19, 6ANN 18, 6AKW 17, 6CLK 16, 6AGR 15, 6BXD 12, 6BVT 9, 6CAG 7, 6CNV 5, 6DEG 5, 6BGC 4, 6SJ 3, 6CZT 2.

EAST BAY—SCM, P. W. Dann, 6ZX—Due to the increased activities in connection with his business, the SCM is resigning as of Jan. 1, 1928, and wishes to take this opportunity of expressing his appreciation for the loyal assistance rendered by the Gang in this Section. He does not, however, intend to cease being a member of the League and any of the gang will hear him on the air as 6ZX and he will be glad to QSO any time. It is requested that whoever you elect as a successor be given the same support given the SCM. Traffic seems to have picked up and while there has as yet been no Chief R.M. appointed, there will be in the near future, as the SCM believes that he has located the right party of whom you will be advised later. 6CGM delivered four msgs by Air Mail, three being received from

China and one from P.I. He also has sked with ac-8NA. 6BUX is leaving for the southern part of the state but expects to have an ether smasher on the air on his return. 6CLZ says he's been so busy at studies, he hasn't had time for much radio work. 6AYC is back on the job now, between visits to a certain YL we know of. 6BZU has put up a new Zepp but results not much. 6SR, a new ORS of Army net, is going strong. 6BER is QRW as not much time for radio. 6CZR is experimenting with a new antenna and contemplating re-arranging the xmitter to work on new International wavelengths when effective in 1929. 6IM sure has some 1000 cycle note and if he doesn't reach Mars with it, he should be gassed. 6CTX sure pounds out with his set and good traffic station. 6COL says 20 meters for December seemed the bunk as he couldn't get anywhere. 6IT is remodelling the station so is off the air for the time being. 6AMI has gone up to 80 and says good stuff. Has an MG now. Well, gang, here's hoping all had a Merry Xmas and that the coming New Year will be a prosperous one for all and that the SCM will get 34 cards next report.

Traffic: 6BHM 45, 6CGM 41, 6BUX 6, 6AYC 73, 6BZU 39, 6SR 22, 6CZR 8, 6IM 8, 6CTX 18, 6COL 2, 6AMI 13, 6BOY 86, 6RJ 134, 6EY 3.

SANTA CLARA VALLEY—SCM, F. J. Quement, 6NX—6AMM continues to receive favorable mention in the BPL each month and right that he should. 6KVY was QRW this month, mainly because his P.I. sked with 1AD was terminated by 1AD leaving for the States. 6BMW is organizing new traffic routes and reports very few off-wave stations. 6BYH got on the air this month with good results, reports ham activity gaining in Merced. 6BNH works his antenna at the 5th Harmonic with good results. His aerial stretches 100 feet across a canyon. 6ACQ is now using his call 6BNX and wants the gang to listen for sign "WS" (his YL). 6CTE is now operating 6BAX which will soon be an ORS. 6CJD is tuned up in the 150-175 meter band and open for traffic. 6BCH hopes to get going this month. 6KG reports the UX222 tubes a great help in S.W. 6BHY found his 60 ft. lattice tower draping his garage after a windstorm. 6AAZ is a new station on the air which will be an ORS soon. 6ME in Stockton is an active traffic station.

Traffic: 6AMM 122, 6BMW 37, 6BYH 33, 6BNH 17, 6BNX 10, 6CTE 10, 6CJD 8.

ARIZONA—SCM, D. B. Lamb. 6ANO—Things seem to be perking up in the state—more new stations coming on the air. 6DCQ reports nothing new and no DX his way. 6BJF has been off nearly all month making receivers for a couple of hams. 6BWS uses a 7½ watter and worked oh with a couple of UV201As. 6DRH reports a nice traffic total and keeps several schedules. 6CAP reported by radio. Has been on air quite regularly the past month. 6SW is on the air with a 50 watter again. 6BHC is having trouble with his rectifier. 6AWH put up a new antenna. 6GS is getting started. 6CAP says we are planning on a radio club for hams. 6DLE at Tucson is heard occasionally. 6DIE is on the air working good DX. 6DIB uses Mercury Arc rectifier. He blew his transformer the other day. 6ANO uses a 50 watter now but has trouble with rectifier. Formed it too fast and it went haywire. 6AZM holds record for not missing an ORS report yet. FB, OM, keep up the good record.

Traffic: 6AZM 10, 6BWS 2, 6BJF 4, 6DCQ 23, 6DRH 104, 6CAP 20, 6ANO 127.

NEVADA—SCM, C. B. Newcombe, 6UO—6LB wants to build a set that will QSY to 80 meters. He will try it out nights. 6ABM reported this month as he wanted to put Nevada on the map. Hi. He sure made a good start, just look at his traffic total.

Traffic: 6ABM 326, 6LB 4.

HAWAII—SCM, J. A. Lucas, 6BDL—6DEY's zepp antenna is getting out fine, he worked five "S" stations the first night. 6BDL's QSSS almost gone. Games in the gym have little effect on the Hertz put up. Not on 20 these days. Air seems dead. 6DPG says the ham section of the Pan-Pacific Research Institute will be on as soon as the license can be obtained. Four to six thirty pm is about the only time we could work the coast satisfactorily in December.

Traffic: 6DEY 113, 6BDL 32, 6DPG 5, 6DCU 4.

SAN DIEGO—SCM, G A. Sears, 6BQ—6AJM leads in traffic and is the only one to make the BPL this month. He and 6OC keep the station on the air. 6BQ boosted his totals with Christmas messages. 6CUK's traffic shows a big increase. 2 skeds helped put it over. 6OP visited him during vacation. 6BYZ again is appointed RM for Orange County. He had a good total for his first report. 6BAM has 15 watts cine the last 50 departed. 6QY continues to work OP. 6FP finds time for a sked. 6OX is bothered by power leaks. 6BAS reports some traffic this month. Now that you have a ¼ kw, the traffic total should soar, OM. 6ANC sends his 73 to the gang from below (sea level) Hi. 6DGW will soon be an ORS. He reports some traffic this month. 6BXI has a new receiver. It sure perks FB. 6BFE and 6AKZ are inactive at present. Several reports are missing again this month and ORS are being cancelled. Come on, gang, it takes only a minute to fill out and mail the cards on the 26th. Let's start the new year with 100% reports.

Traffic: 6AJM 98, 6BQ 73, 6CNK 62, 6BYZ 60, 6BAM 14, 6QY 13, 6FP 12, 6OX 11, 6BAS 11, 6ANC 8, 6DGW 8, 6BXI 4.

ROANOKE DIVISION

VIRGINIA—SCM, J. H. Wohlford, 3CA—3KU continues to hammer out some traffic, but complains about being unable to QSO south. 3WM is the first Portsmouth station to work South America and South Africa. 3TN is the first Portsmouth station to work OA. 3NM reports bad QRM from school work. 3AG continues to work foreign DX right along. 3RL is attending school in Washington but is home over week ends. 3CFY is still at sea and does not get on with the set often. 3KG is second owl at 8BGS. 3BGS has QSYd to 80 meters and handling traffic. Uses 40 for DX. 3UX has been transferred to the MODOC (NIDK) for sea duty. The new junior operator will take over the 3UX station when old enough! 3CKL blew up all his tubes just before Xmas, and is waiting for more tubes now. 3APK is a new station owned and operated by ex-6CHS. 3BDZ, 3SR, 3CED and 3CKL were welcome visitors at 3CA's shack on Thanksgiving Day.

Traffic: 3KU 16, 3AG 18, 3RGS 14, 3CKL 92, 3CA 53.

WEST VIRGINIA—SCM C. S. Hoffman, Jr., 8HD—Another month and again 8VZ leads in traffic. It should be noted this was done through numerous schedules, which is an ideal way of handling traffic. 8DCM reports working sb-7AO in the presence of a shack full of hams! Quite singular! 8AUL handled some good A-A traffic stuff from 2CXL. 8DPO reports working WMO a ship off Honolulu, PWV, a Cuban submarine off Havana. 8BSU has been changed to 8HD. 8BJB and 8ACZ sent in good reports. 8CLQ reports going down to 20-meter. Glad to hear from 8ALG and 8BNF. 8VJ reports working good DX.

Traffic: 8VZ 258, 8DCM 11, 8ACZ 9, 8BJB 7, 8CLQ 5, 8AUL 4.

NORTH CAROLINA—SCM, R. S. Morris, 4JR—4OC is giving 80 a trial but reports demise of 18 fuses before reaching there. 4AB wants a schedule south. 4TS is back on with a temporary transmitter after being off for two months. 4VH is remodelling his shack. 4OH says he is off YLs forever. 4JR has been QRW working on convention matters and Christmas.

Traffic: 4AB 44, 4VH 15, 4JR 7, 4OH 6, 4OC 2.

ROCKY MOUNTAIN DIVISION

COLORADO—SCM, C. R. Stedman, 9CAA—A few changes have been made in the ORS list for Colo. this month. 9AOI is resigning as ORS due to inactivity and he is also leaving town. The ORS of 9OO is also cancelled due to inactivity. 9QL is too busy with work at KOA to keep his station on the air much of the time, so the ORS is being cancelled. Reports of traffic will be welcome from all of the above at any time that they may again become active. 9DKM and 9AJQ have gone to Raton, New Mexico to take over a broadcasting station there and will soon have a joint ham station signing a 5 call. 9ENM has been given an ORS appointment and 9EJW has made application. 9EAM leads the Section for traffic this month. He has three schedules working in fine shape. 9CAA comes in second, but will be QRW work at Phone Co. and KFXF for a while. 9DQD shot his 5 watter and is now using a 201A with good results. 9EJW will be ready to keep some

more schedules after the first of the year. 9BYC reports a new station, 9ERN may crowd him off the map before long as far as activity is concerned. 9ERN uses only 110 volts AC on plate and works Chicago with ease. 9CCM, the YL, is as active as ever on 40 and causes the SCM a lot of QRM, too. 9DGJ was home over Xmas and put his total up a little. 9DRV is putting a mean sig into the air and is doing good work. 9CAT should report his activities to the SCM. 9CAW tried to cook up a schedule with 9ENM but no soup. 9CDE reports New Mexico activity to the Colo. SCM. Hi. (5TT take notice) The SCM owes 9CDE an apology. He reported OK last month but the family of the SCM got a hold of the report before the SCM did and it was mislaid until after the report was sent in to Hq. Sorry, OM, it won't happen again. 9CDE has never missed a report since being an ORS, 1923. 9EEA's report reads, "Rectifier friz up! Remote control line shorted! Antenna fell down!!! Merry Christmas!!!" Hi. 9BQO is inactive just now on the air but has done some very commendable work in getting publicity for the hams in the newspapers. Someone borrowed 9CDW's cans without his permission and forgot to return them. The Pueblo Radio Club and the Associated Radio Operators of Denver held another joint meeting; this time in Denver. Practically every Pueblo member was up here and a good time was had by all, especially those who rode with 9BQO out to the aviation field.

Traffic: 9EAM 277, 9CAA 230, 9DQD 90, 9EJW 25, 9BYC 19, 9CCM 19, 9DGJ 18, 9DRV 16, 9CDE 14, 9CAW 9.

UTAH-WYOMING—SCM, D. C. McRae, 6RM—This month turned out to be FB for traffic and most of the gang were able to push thru quite a bunch for the Xmas season. 6DPJ, a new man at Provo, was highman this month and turned in a fine report. He has made application for an ORS. 6DPO also turned in a good report and has made application for an ORS. 7GR is the only station now in Wyoming that is doing anything. He turns in a good report and handled some traffic for the Army. 6AIK still continues to be the only station on in Ogden, altho he reports a new one on soon. 6BTX still continues to push them thru and is on four days a week on 415 meters. 6RV seems to have a lot of trouble with 210s and is back to the old reliable 5 watter again but still kicks out in good shape. 6BAJ was not able to get on much but managed to push thru a few. The station at Fort Russell will more than likely be operated as an Army-Amateur station after the middle of Jan. Call will be WVW. They put thru a good total this month. Well, gang, let's keep up the good work and see that the New Year brings more and bigger reports from all of you.

Traffic: 6DPJ 105, 6DPO 79, 7GR 36, 6AIK 12, 6BTX 30, 6RV 24, 6BAJ 7, WVW 68.

SOUTHEASTERN DIVISION

FLORIDA—SCM, C. E. Ffoulkes, 4LK—Well, fellows, Xmas has come and gone and I hope Santa left you all a 250 or (softly) a 210.—80 meters is FB for traffic, gang, let's get up there at nite and shove some traffic around. We are very glad to hear that 4NE, our past RM, is up and around after 17 months in bed. We have another job for you, OM, when you get going again. 4CK, the Pres. of the Miami Radio Club, sure does push a nasty bunch of traffic. FB, OM. 4AAO is putting Homestead on the map with an 852. Sure glad to see the Bryant Bros. back at 4BL again. Watch out for Lakeland, gang. Watch your smoke, fellows, when you QSO 4ACZ, the OW of the corp. 4OO helps the Aussies unload their traffic. 4RK keeps the moving vans busy, he has moved again. 4HY is constructing a C.C. set for NRRQ. FB. 4TR is very QRW nowadays. How's 5 meters, OM? 4LK is shedding tears over his 250 that was "soft-boiled". 4BN worked half the Cuban Navy this month. 4TK thinks the Chinese have "tin-ears". Hi. 4OB is reported DC using AC, Heaviside layer or what have you? Power leaks are arsenic to 4KC, but works Central America. Watch out 5ARG, 4MS is putting fone on 130 meters soon. When you read this, OMs, the first Florida S. E. Convention will have become a milestone in the history of Florida radio. The eats sure was fine. Congrats to the Miami gang. Here's to you.

Traffic: 4CK 68, 4AAO 45, 4BL 43, 4ACZ 35, 4OO 23, 4RK 19, 4HY 19, 4TR 18, 4LK 17, 4BN 15, 4TK 13, 4OB 8, 4KC 3, 4MS 2, 4ADB 35.

GA-S.C.—CUBA—SCM, H. L. Reid, 4KU—It seems that a good many of the fellows have lost interest entirely in traffic and consequently, can't seem to get any reports but hate to cancel their appointments. Maybe they will do better next month.

Traffic: 4RN 12, 4AAM 8, 4EI 21.

ALABAMA—5AKK came across with the goods from Birmingham this month and gives us plenty of good tidings from that city. The gang does seem to be doing some work. 5DT is deeply in love but says he is coming back with more power and fone on 20 meters. 5PD is still coming strong and is working on a transmitter at his Hi school. It is rumored that 5AXN will put in 250 watts with crystal control. 5AS, the old Morse op, is still at the brass pounding business strong. He bought 5DT's old 50 for a song. 5GG and 5OM are back with us for the holidays. Plans are for some good old local rag chewing. 5AKK is moving back next door to where he used to be a few months ago. 5AX just couldn't stay out of the game long and is now on with a 7.5 watter after selling his splendid 50 set. He still has that fine sig and note and gets out most everywhere. 5ARG, the old ship op, is still at it. 5WQ reports FB at his station with plenty of Xmas msgs passing through his hands. 5MI is rebuilding his 50 and will give us some more DX. The Birmingham Club promises some good doings in the future and hopes to show the world a picture of each station in *QST* soon. 5DT just got married. That's all right, OM, but still be a brass pounder. Hi. 5AYL of Huntsville is doing splendid work and just got his 2 852's working in harmony. We hope that 5YB sets some fine records before the year is out. All stations in Montgomery are doing splendid. 5ADA has been on 20 meters and getting out FB. 5ATS is using fone on 20 and quite some DX despite the bad conditions that have existed in this section during the month. ATS really has a splendid DC note. 5JY has been going strong and gets plenty of DX and msg handling. 5AJP has been dormant for the past month on account of business pressure. 5ATP returned from college sick but established his station and did some work before going back. 5NL is still a question. Now, gang, that the first of the year is here, let's make resolutions that we will get in good reports to the SCM by the 25th of each month with plenty of good news in them for *QST*.

Traffic: 5DT 8, 5PD 14, 5AXN 10, 5AS 13, 5AKK 22, 5AX 55, 5ARG 13, 5AYL 41, 5YB 26, 5WQ 33, 5ADA 16, 5JY 39, 5ATS 25, 5ATP 13.

WEST GULF DIVISION

SOUTHERN TEXAS—SCM, E. A. Sahm, 5YK—Reports are very few this month. Probably the holidays causes some to forget to send in their reports. We have a newcomer in 5AWW at Lufkin, Texas. 5MS reports that he is shipping out for the winter months and hopes to be back in a few months. 5ALA is moving back to Mirando City and will be going full blast in a few weeks. 5HS says that the Bexar County Radio Assn. have their club station almost completed and will be on the air soon. 5AHP is still active and reporting as usual. Harvey Wheeler of Houston has joined the Southern Texas gang. 5EW is still waiting for parts to get back on. Let us all get busy and see if we cannot have a better report next month. The SCM wishes all a very happy and DX New Year.

Traffic: 5AHP 7, 5ALA 14.

OKLAHOMA—SCM, K. M. Ehret, 5APG—5ADO and 5ANL are the only stations operating at Cushing now, one on 40 and the other on 80. 5DQ shot his 50 watter. 5AMO says "not much to say for local haywire", but hopes to have some reliable traffic lanes thru his station the coming month. 5FJ has moved his station back to Enid. 5TW is back at Hugo and will be on 40 soon again. 5ANT has been sick but managed to pile up a nice traffic total. 5AIR works on 20, 40 and 180, the latter on phone and reports some nice Canadian DX on phone. 5VH has applied for A.A.R.S. 5ZAV is working on Convention. 5QL says 40 is bum at night recently. 5AAV went to see his YL at K.C. during Christmas week. Plans are still being pushed for the big West Gulf Division A.R.R.L. Convention to be held at Norman on Feb. 10 and 11th. Notice will be found elsewhere in *QST*.

Traffic: 5APG 29, 5AAV 1, 5ADO 30, 5AMO 126, 5FJ 156, 5ANT 70, 5AIR 19, 5VH 20, 5ANL 23, 5ZAV 4, 5QL 5.

NEW MEXICO—SCM, L. E. Radka, 5TT—5TV comes ahead this month. He reports FB results with low-powered transmitter. 5APB has a new 852 perking and keeps several schedules. 5RO works

occasionally. Activities are very lax at present, due, perhaps, to the holidays. Come on, fellows, and see if we can't improve conditions and give a better account of ourselves next month.

Traffic: 5TV 38, 5APB 31, 5RO 7.

CANADA

MARITIME DIVISION

PRINCE EDWARD ISLAND—SCM, F. W. Hyndman, 1BZ—1CO has moved to Toronto for the winter. 1AP has changed his QRA to Summerside, P.E.I. where he has accepted a position with the Radio Dept. of Holman's Limited. Will be on the air again shortly. 1AA (not yet an ORS) has worked ef-8AD, oh-6AMV, eg2KK and nu's. 1BZ is rebuilding. Will be on the air by time this is published. Leaving on business trip to N.Y., Chicago, Toronto and Montreal on December 31st.

NEW BRUNSWICK—SCM, T. B. Lacey, 1EI—During the past month another new station at Fredericton has joined the N.B. gang. 1AF, one of the old timers, is selling out. There has been very little activity in this section and only two stations reported any traffic. DX conditions appear to be good and reception excellent. 1EI has been helping remodel station 1OBO and expects to give phone a try shortly. 1AX reports that he is on the air again and doing schedule duty. He has rebuilt both receiver and transmitter. 1AK reports hearing numerous foreigners on 32 but only being able to hook up occasionally with them.

Traffic: 1AX 22, 1AK 6.

QUEBEC DIVISION

QUEBEC—SCM, Alex Reid, 2BE—It was a great relief to hear from Headquarters that the amateurs of the world have been recognized and granted adequate wavebands. It is up to all of us to play the game, and stay in our alloted bands so that we will cause no interference, to other services. This Division wishes to thank all officials at Hq. and in particular, Warner and Stewart, for their good work at Washington. The first Hamfest of the season was held at 2BN's station Dec. 16th. Altho traffic was completely tied up by a heavy snowstorm, eighteen hams turned out. 2BR, our star traffic station, lost his tower during a recent storm and has been working with a temporary one, and reports poor results. 2BG and 2BE worked Australia and New Zealand during the month. 2AL is pounding away as usual. 2BB and 2DO are going strong and getting good European reports. 2AX has his Xtal working fine at his new QRA. 2CA and 2CW are both keeping skeds.

Traffic: 2BR 12, 2BB 7, 2BE 5, 2AL 8, 2BG 7.

ONTARIO DIVISION

ONTARIO—SCM, W. Y. Sloan, 9BJ—After prolonged hibernation, eastern district returns to life with a bang—increased activity manifested in southern district. Southern Dist. The get-together meeting of the W.O.A.R.A. which was held on Dec. 1st resulted in a fine turnout of the gang. The subject of "transmitters" was pretty well thrashed over. 3DZ is having real sport with a new Belgian tube. 3XI has joined 3DZ and they have a transmitter on both 20 and 40. 3IA has a new transmitter of the TG TP variety and is going to give the gang a run with it for traffic honors. 3UD is still inactive, while 3CM and 3CA are off the air through illness. Tough, fellows. 3LW is looking ahead a little and is doing considerable work with the 5 and 10 meter bands. 3CS has had a great list of DX recently and has only one more continent to work before becoming a WAC. 3FU is also stepping out on 40, having hooked ek-4XY. Eastern Dist: This month we introduce 3XM at Ottawa, who has kindly volunteered to act as our correspondent in this district and we feel that from now on, the Eastern gang will be fully and properly represented as of yore. Please cooperate with Jack, fellows, and keep him posted on your doings. 3XQ received a letter from a Spanish station that heard him but unfortunately, he does not understand much Spanish. 3JW has been moving around so much lately that he has not been able to get on the air much. 3DO, who recently moved into an apartment, couldn't take his set with him so has been off the air lately. 3XM is doing fine work at present with a lone five watt bottle. Central Dist: 3DV is getting out FB with a good note from a new rectifier and filter. 3DC works long and often on 52.5 meters using crystal control and gets out in fine style. 3PG is having a wrestling match with a new receiver and one or the other is sure to go to the mat. 3CT is only on occasionally. 3BT is getting out very well on 20 and 80 meters using Kenetrons as rectifiers. 3BL has been making some extensive changes in his layout so as to permit remote-control of his transmitter. 3CJ has had QRM from Exams. 3AD reports for the first time, Welcome, OB. Northern Dist: Winter has set in with a vengeance at Hydro and the tmeperature hovers well below zero but that doesn't stop 3HP from pounding brass. The usual DX was worked and a string of traffic handled during the month.

Traffic: 3HP 44, 3DY 19, 3CJ 18, 9AL 30, 3FC 25, 3IA 10, 9BJ 8, 3AQ 6, 3DC 6, 3DV 5, 3FU 5, 3BL 4, 3BK 17, 3EL 3, 3CS 3, 3CB 2, 3DZ 2, 3GN 1, 3BT 1.

VANALTA DIVISION

ALBERTA—SCM, A. H. Asmussen, 4GT—Things are looking up now. More stations are coming and old ones are more active. FB. 4DQ is on daily now. Hope you will make up for lost time. 4CC is very active but has the BC craze. 4IO is working consistently on 80 and would like to see more of the gang QSY for a change. 4GD and 4GL are getting out very well and will soon be in line for ORS. 4AG is on strong and should prove a real traffic station. 4XO passed his exams and will be going big when this is in print. 4AF is on 40 every afternoon and wants traffic and skeds. 4HM may be the big boy with his 250 watter and mercury arc rectifier. 4FF is a Jeweler and promised to be on more after Xmas. 4CL is now the operator at CKUA, a new BC station in Edmonton. 4CU has run short of bottles and is waiting for a quart size so look out, gang. 4HA reports lots of power QRM. 4GT is QRW looking for power QRM.

Traffic: 4FF 8, 4CU 7, 4HM 4.

BRITISH COLUMBIA—SCM, E. S. Brooks, 5BJ—5AL heads the traffic total with 40 messages. 5GO keeps a sked with 5AW at Whitehorse, Yukon. 5CO has been putting a series of articles on short wave in the Victoria "Sunday Colonist." 5AJ is on a trip to New Zealand. 5AR has lost his appendix and is getting along fine. 5AT is keeping 5AJ's set on the air. 5AU has his mercury arc working fine and reports building a new smitter. 5CT keeps skeds on 79 meters with 5AL. Has a Belgian E4M tube and says no better than a UX210. 9AJ is being remodeled and will be on the air very soon.

Traffic: 5AL 40, 5BR 28, 5GO 20, 5CO 16, 5CJ 16, 5AU 15, 5CT 7, 5CC 4.

PRAIRIE DIVISION

MANTIOBA—SCM, (Acting), D. E. Sinclair, 4FV—DX has been rather poor in this part of the country lately and a lot more is being done in the way of traffic. 4DU, our DX man, altho not on the air much, handled quite a little traffic. 4EY is our high man, using a 50 on 40 and 20 and gets out FB. 4DW works on the train but pounds brass all the time he is in town. 4CT, our new ham, sure pounds out great. He broke his new mercury arc but to retaliate, got R9 from the 6th dist. and worked oa-5CM. 4GI has been out of town most of the time but he gets the crystal-control reports with his DC note when on. 4RV, a new one,, is using his initials as a temporary call but expects his official call any day now. 4BT has returned to civil life for a while and he really has the 50 watter and xtal that he threatened us with. 4EH has been off most of the month as he is working on a MOPA set with a 50 and 250 watter. 4EK's new note is as good as his old B battery. 4DP seems fed up but is working on a 1500 volt transformer for his 210. Wow! 4BP seems to have YLitis. 4FV has been too QRW at University to be on much. His 250 with the broken filament did not pan out right. Hi. 4GI and 4DU were both reported R6 in England. 4FV got another card from Australia. The 52.5 meter band does not seem to be so good lately, tho 4DU, 4DW, 4CT and 4FV are on most every Wed. night.

Traffic: 4EY 28, 4DW 24, 4DU 21, 4GI 10, 4CT 9, 4FV 7, 4RV 5, 4EK 2, 4BT 1.

SASKATCHEWAN—SCM, W. J. Pickering, 4FC—Two new stations reported this month with nice traffic totals. 4CK is using a 210 in a Hartley circuit and being operated by C. A. Smith and Clarence Beecher and 4IH also using a 210 with B batteries and getting out good. 4EV is on the air at Milestone with a 210 and getting along fine. 4FC is on every now and again.

Traffic: 4IH 22, 4CK 14, 4FC 5.