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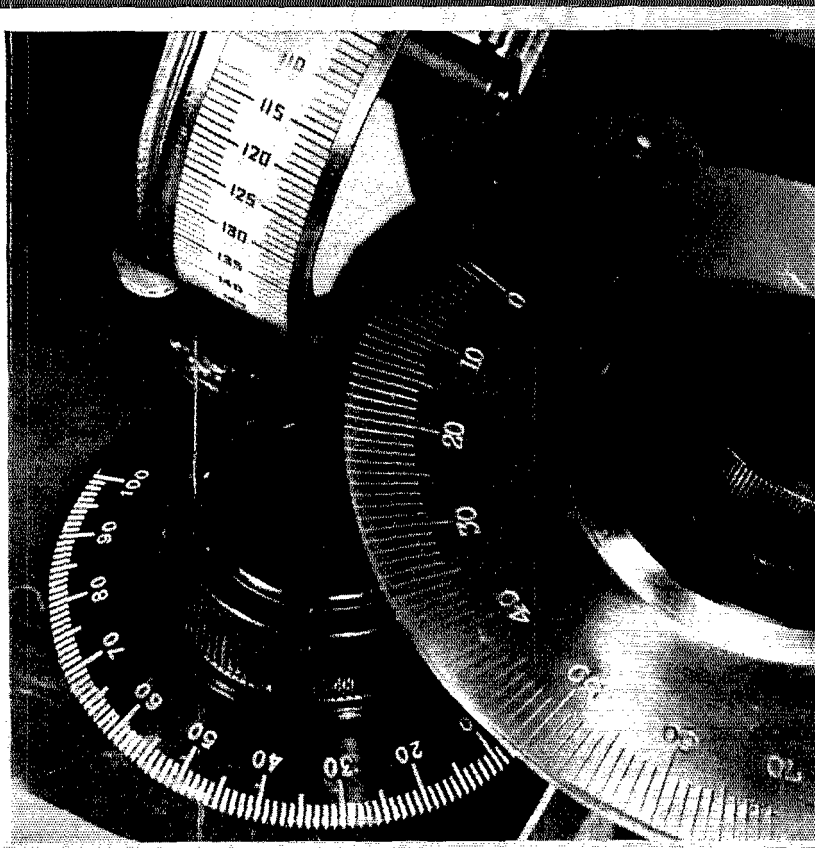

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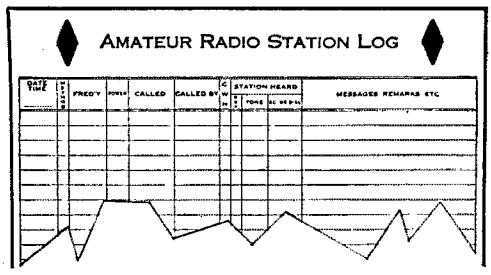

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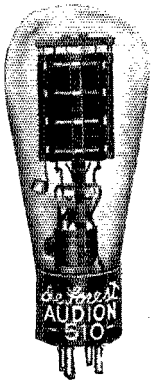

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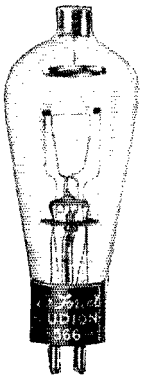

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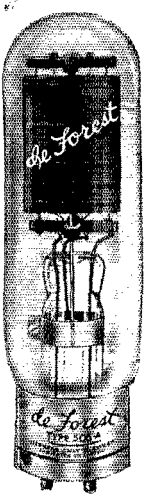

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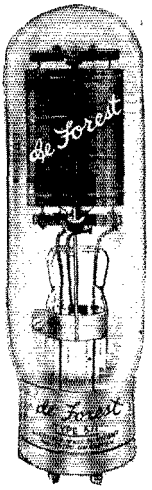

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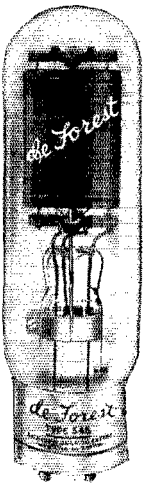

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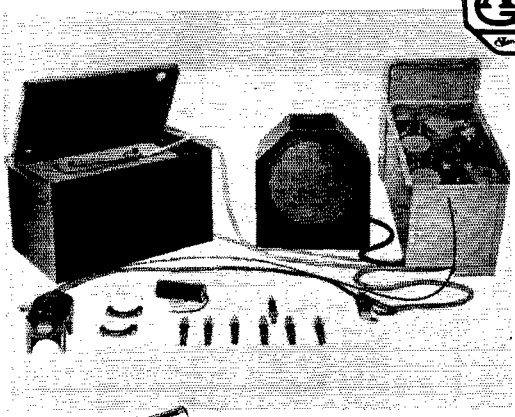

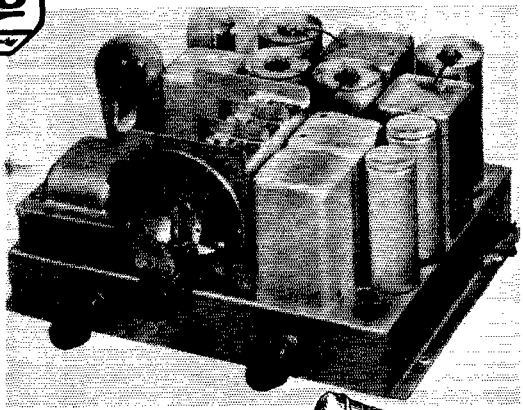

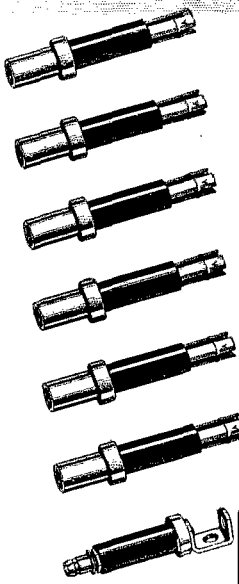

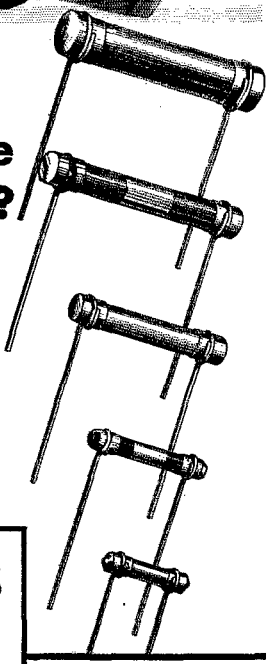

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AMATEUR RADIO

Contents

JUNE

1932

VOLUME XVI
NUMBER 6

Kenneth B. Warner (Secretary, A.R.R.L.), *Editor-in-Chief and Business Manager;* Ross A. Hull, *Associate Editor;* James J. Lamb, *Technical Editor;* George Grammer, *Assistant Technical Editor;* Clark C. Rodimon, *Managing Editor;* David H. Houghton, *Circulation Manager;* G. Donald Meserve, *Advertising Manager;* Ursula M. Chamberlain, *Assistant Advertising Manager.*

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

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

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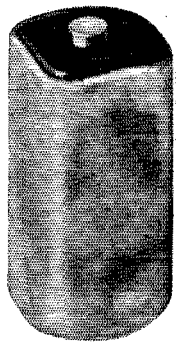

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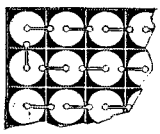

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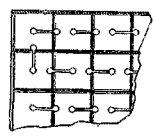

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* * * * * It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by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

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

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• EDITORIAL •

Fees

By the time these lines are in print all you fellows will have heard that our poor old Uncle Samuel is trying to charge fees for radio licenses, to get in some money to help run the country. The idea arises with the Senate Committee on Interstate Commerce which, pondering a routine radio bill passed by the House, tacked on a schedule of fees calculated to bring in about $670,000 a year to buck against the million that radio administration costs. The Congress, of course, is having a stiff job of balancing the budget, and the temptation is to lay a tax on everything in sight.

The schedule in the amended bill as reported to the Senate calls for a handling fee of $2 for every amateur station application. The various classes of commercial stations would pay application fees of $5 to $15, plus actual license fees of $10 to $5000 a year, depending upon type, power, etc. There would also be an examination fee of $1 for taking the amateur operator's test, plus a fee of $1 per year for the license itself; for commercial licenses the respective fees would be $3 and $2. Although the amateur fees may be modest in comparison with the others proposed, they are entirely too high. They would require an amateur to plunk down $5 his first year and an average of $3 thereafter. They would extract a total of $60,000 a year from the pocketbooks of amateurs, according to the government's conservative estimate, and in the aggregate the amateur fees would amount to 9½% of the total, an unjustly high percentage of a total which itself is unnecessarily high because of the over-organization of radio administration.

The A.R.R.L. believes that these fees are too high. We do not see why there should be any fees on amateur stations. We are not commercial stations, deriving income from radio. Instead, we put all our spare money into it, making of ourselves the only folks who contribute gratis to it and the only ones who aren't in it to squeeze the last dime we can get out of it. By our work we have built ourselves into a national asset of tremendous value, and it would be a pretty reward to load such taxes upon us! Our Board of Directors has voted to oppose the contemplated schedule and your officers are proceeding to that end at Washington. We shall scrap against every item of the proposed fees against amateurs and come as close to getting general exemption for amateurs as possible.

But we might as well realize that Congress seems determined to charge fees for licenses and to make no exceptions. The theory is that radio ought to stand the expense of its administration. The lowest possible fee for amateurs that would still comply with the principle of charging everybody and making no exceptions would be the nominal sum of $1 a year. If, as seems likely, it is utterly impossible to escape some fee, we should be willing to pay a dollar for each of our licenses. In fact, there are some advantages to paying a nominal fee, for then nobody could claim that we were an unjustified expense upon the Government and we would have the right to demand better service if we were paying for it. Our Board of Directors has therefore voted that it is willing, if there must be fees, to stand for a total cost to the amateur of $2 a year ($1 for the station and $1 for the operator), but no more.

By broadcasts and by special letters to the affiliated clubs and all amateurs holding any sort of appointment in the Communications Department, the League is calling upon its members to write to their senators and congressmen opposing the suggested schedule of fees and urging that they be reduced to a basis that surely will not cost the individual amateur more than $2 a year. We can lick this iniquitous proposal if we all pull together. Further broadcasts will report the latest developments. Possibly the whole issue will be decided before this is in print but we report the situation up to our "closing date" as part of our general endeavour to keep members informed on what is going on.

Temporary Certificates

Since the announcement of the Radio Division's policy of non-renewal of temporary operator's licenses in the last issue, a number of fellows have written in deploring the fact that this type of license is to be abandoned and urging us to have it reinstated. Take it easy, OM's, and read that article again — the temporary isn't being done away with. It will be issued by the Radiv, by mail, just as it always has been, but it will not be *renewed* after its one-year term has expired. In other words, you can still get the temporary op license, good for one year, but before that time is up you will have to have taken the personal examination and secured a regular first-class amateur operator's license. OK now, gang?

In our editorial last month we promised to see what could be done on behalf of the Chair Warmers Club and other such fellows who honestly can't appear for personal examination.

Mr. Terrell now advises us that, although the Radiv did not think it advisable to make any general exception in the ruling, they have it in mind that some amateurs will be genuinely unable to appear for examination, and to provide for such cases the Division reserves the right to waive such portions of the regulations as may be necessary from time to time in individual cases. So the C. W. C. is all fixed up.

The Altoona Case

DESPITE the precedents established by the League in combatting anti-amateur ordinances that interfere with federal regulation of interstate commerce, the city of Altoona, Pennsylvania, is trying its hand at one. And such a one! Having the imposition of local quiet hours as one of its objectionable features, it clearly exceeds municipal authority. A city just can't do that and the League, therefore, has already started action against it.

Back in 1927 there was a flood of these ordinances, seeking to restrict and control the operation of everything electrical, including amateur and broadcasting stations. Many of them transgressed upon the legal fundamental that when the federal government regulates a field, no lesser agency can establish conflicting laws. Portland, Oregon, had a particularly obnoxious ordinance about that time, which the League undertook to demolish through court action instituted by our general counsel. The city authorities beat us to it by hastily amending their ordinance to exempt amateurs. Then came the famous case of Whitehurst versus Grimes, the first precedent of its kind in the country, wherein the League, through its general counsel, Mr. Paul M. Segal, secured a district court opinion which in effect held invalid an anti-amateur ordinance at Wilmore, Kentucky, resulting in enjoining the enforcement of the same. Whitehurst was an amateur in Wilmore, 9ALM of those days, and his town had an ordinance requiring the town-licensing of amateur stations, with a $100-a-year fee and lots of other regulations. The League fought and won that battle in a case which is one of the landmarks in radio jurisprudence.

The precedents established in this case and its follow-ups have caused the city fathers of many a municipality to abandon an unwise attempt to exceed their authority. But now comes Altoona, equally illegally and not profiting by precedent, establishing its own radio commission (as if one weren't enough!) and a whole flock of local operating regulations. W8DYF has actually been arrested and fined $5.80 for operating outside the Altoona official quiet hours! Local amateurs organized, reported the situation to A.R.R.L., and appealed for aid. So the League again is in the fight, and as these lines are written Mr. Segal, our general counsel, is proceeding to the attack at Altoona. We cannot have cities instituting quiet hours and otherwise interfering with interstate communication as regulated by the federal government. Altoona must modify its ordinance or we'll expect to enjoin its enforcement.

Helping QST

THERE is a way in which many members can be of assistance to their magazine. Advertising is the support of any publication. More income from advertising, better magazine. While there is anything but a "repression" in amateur radio, while thousands upon thousands of new stations are coming into existence and all of us are itching to spend some money for new gear to do new and interesting things (as *QST*'s current advertisers well know), general business conditions have caused many advertisers to be hesitant and we have to work harder than ever to get advertising. We mustn't overlook any bets. *QST* has an unparalleled story to tell these advertisers, and it produces results for them. The big problem is to learn of new prospects.

There is where we would appreciate the coöperation of members. If any of you fellows know of a prospect that we might not know of through the usual channels, won't you please drop a line to Advertising Manager Don Meserve at our New York office and give him the data? One amateur recently gave Don a tip that resulted in six full pages and we feel sure there are others who could do as much. It will help a whole lot. Tnx, OM's.

K. B. W.

Bailey Elected to Board

IN THE special election held in March and April, the New England Division of A.R.R.L. elected George W. Bailey, W1KH, of Weston, Mass., as its director for the remainder of 1932, succeeding Frederick Best, ex-W1BIG of Augusta, who is now located in North Dakota. The balloting was as follows:

George W. Bailey, W1KH	350 votes
C. Bronson Weed, W1BHM	233 "
J. Henry Izart, W1AUY	172 "
Isaiah Creaser, W1BSJ	171 "

Mr. Bailey assumed office April 15th and thus represented the division at the annual meeting of the Board. Active in amateur radio, he is president of the Eastern Massachusetts Amateur Radio Association, a member of the volunteer Navy Net, has Communications Department appointments as O.R.S., O.B.S. and O.O., and is former route manager for eastern Massachusetts. In business life he is the secretary and a director of the Stedman Rubber Flooring Co. A Harvard graduate in 1907, he is treasurer of his class. He is best known to us, of course, simply as W1KH.

What's Wrong With Our C.W. Receivers?

Overhauling Our Ideas of How They Work—Double-Beat Response—R.F. Selectivity—Pointing The Way To "Single-Signal" Performance

By James J. Lamb, Technical Editor

C. W. SELECTIVITY, ancient problem that has been with us ever since there was QRM, has come to roost on our work bench again. It is with us, as a matter of fact, because the last selectivity-QRM struggle that embroiled *QST*'s laboratory no longer than six months ago left us not entirely satisfied with the complete effectiveness of the audio-frequency methods treated at that time. This dissatisfaction was suggested in Ross Hull's article in January (1932) *QST;* its roots lay not in the audio-frequency filtering method but in the limitations imposed upon the a.f. side by the inadequacies of the radio-frequency section of the receiver. For, no matter how nearly perfect the audio-frequency filtering might be made, with every known method of beat-note reception each carrier brought forth two signals of identical audio frequency; there was always the "other side of zero beat," the "image." This meant that each signal occupied more space on the dial than it should — just twice as much, to be exact — no matter how good the signal and no matter how good the audio-frequency selectivity following the detector. There was, we realized acutely, a weak spot in all our systems of beat-note reception; the simple regenerative receiver with oscillating detector or with a separate oscillator-regenerator, superhets with oscillating second detector or separate oscillator beating with the intermediate frequency — all gave what actually amounted to two signals in the output for every signal received.

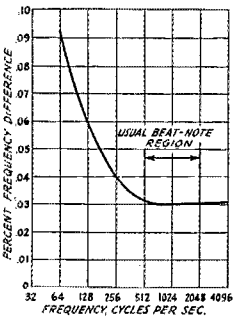


FIG. 1 — RECEIVER SELECTIVITY IS JUST AN AID TO AURAL SELECTIVITY

This curve, taken from "Speech and Hearing," by Dr. Harvey Fletcher, suggests the ability of the average ear to distinguish between tones of different frequencies. Note that the minimum percentage difference region is the one containing usual beat-note frequencies.

Admittedly this aspect of beat-note c.w. reception is not one that has been universally thought of as undesirable. In fact, its very existence has been so long part and parcel of c.w. reception that we have come to take it for granted. The suggestion that it should be remedied or even that it is undesirable, we wager, is one likely to arouse little enthusiasm and, perhaps, considerable objection. But then again this may not be so — especially when the suggestion is expanded to include that *the accomplishment of eliminating "the other side of zero beat," just as a starter, immediately doubles the potential c.w. utility of each and every amateur band, multiplies its effective width by two.* Surely there could be no objection to that. If the suggestion is further expanded to include that in the process of eliminating the other side of zero beat there is made possible simultaneously an increase in selectivity that brings what not only diagrams like "single-signal" reception but also actually sounds like "single-signal" reception for steady signals separated by as little as 500 cycles — then perhaps there also will be some enthusiasm. At least there may be enough interest in the idea to carry the reader through the story of the development. He should not expect, however, to be startled out of his boots by the disclosure of any "revolutionary" new theory nor should he be disappointed if the sum total leaves him with the impression that it must have been thought of before. That, frankly, is our own impression. Probably it has been thought of before, as undoubtedly we shall be told by some several people within not more than three days after this issue is out. But a pretty thorough search and inquiry of people who ought to know have uncovered no previous disclosure of the combination of features that, coördinated, go to make up what we believe to constitute a new order of c.w. receiver performance. The essential features that make this possible are a high order of radio-frequency selectivity in combination with exceptional over-all stability and a system of introducing the r.f. modulation to give the audio beat-note that operates without injury to the sensitivity or selectivity of the receiver. The three are completely interdependent and each is of no less importance than the other two. That their achievement individually and operation in combination are entirely practicable has been thoroughly tested for several months in an experimental receiver whose performance has met with the unqualified approval of even such exacting brass-pounders as "RP" of W1MK. But back of this period of accomplishment lies another of groundwork development, of probing for fundamental deficiencies in existing methods of reception and searching out better methods to replace those found to be at fault. This background is essential to the picture and must be painted in. Selectivity in general is the motif, so let's put it in first.

SELECTIVITY — PARTICULARLY R.F.

Defined generally, the selectivity of a radio receiver is the degree to which it is capable of differentiating between the desired signal and signals of other carrier frequencies.[1] To be noted particularly is that this definition does not specify how the selectivity is obtained, whether by radio-frequency methods before the signal is detected or by audio-frequency methods following detection. Nor does it preclude selectivity in acoustical circuits between the audio amplifier and the ear. It leaves out only the inherent "peaking" of the telephone receiver (although that might be considered part of the radio receiver) and the natural selectivity of our hearing, basic in all aural reception. This aural selectivity, our natural ability to distinguish between tones of different frequency, is considerable, as inspection of the curve of Fig. 1 suggests. In fact, the devices for which we strive are nothing more than artificial aids to aural selectivity, accounting for the small improvement often effected by filters giving perfectly swell looking curves. This is especially noticeable to experienced operators whose ears have the peculiar ability to distinguish between beat notes of even slight frequency difference, reminding us again that successful station operation is something like 10% equipment and 90% operator. The curve of Fig. 1 does not tell the whole tale of aural selectivity, either, because it is for pure tones — and it is seldom indeed that what comes from the telephone receiver is a pure tone. It is likely to be something complex, more or less rich in harmonics, often with considerable amplitude modulation. This assists aural selectivity, under some conditions, because even signals of approximately the same fundamental audio frequency will have "character" that assist in their identification — that is, with the variety of receiver that places almost complete dependence on aural selectivity. Then too, the curve does not take cognizance of background racket, static, really rotten notes that have no particular tone, "chirpy" signals, or "weepers" that climb or dive throughout every dot and dash. Nor does this picture allow for differences in intensity of signals. But it does show that the ear has a pretty good selectivity characteristic. Which brings us back to the problem in hand.

A second noticeable feature of the definition of selectivity is that it specifies differentiation between carrier frequencies; it makes no mention of modulation or side bands. It assumes, moreover, that the carriers are each of a single frequency, that there is no swiping back and forth about a mean frequency. The definition is fully applicable to modulated carriers, of course, although it will be necessary for us to consider it in that aspect to but a minor degree, because the modulation involved in c.w. communication is the relatively low-frequency kind imposed by keying. Our signals are not supposed to be modulated otherwise.

[1] *Yearbook I.R.E.*, 1931.

Methods of obtaining audio-frequency selectivity, both by electrical[2] and acoustical[3] filters, have been handled thoroughly in previous articles and the reader is referred to them. To attempt giving their details here would be superfluous. Radio-frequency selectivity, particularly as concerned with c.w. reception, has been covered less thoroughly and requires further delving into its fundamental aspects. This is going to call for what, in the mass, might seem to be a rather dull interlude apart from our main subject. But make no mistake about it. The meaning of radio-frequency selectivity and a thorough understanding of its picturization are absolutely essential for what is to follow. Of course one who is completely familiar with the subject of r.f. selectivity, methods of measuring it and all that, can skip along and leave the rest of us to catch up. Be warned, however, that getting bogged down before the end is in store for him who runs without knowing and without reading. Much of this is new and hitherto unpublished material, incidentally, and really constitutes an interesting story on its own. So let's get into it.

THE MEASURE OF R.F. SELECTIVITY

Although it is becoming common to speak of the selectivity of a receiver as being "10-kc." or some other numerical value, meaning that the receiver is capable of discriminating between signals of carrier frequencies differing by the specified figure, a completely satisfactory interpretation of the selectivity of a receiver usually requires one or more graphs. These graphs take the form of curves with signal frequency plotted against amplitude of input signal required to give an arbitrarily chosen audio power output. For instance, in broadcast receiver tests standard practice in this country is to supply the receiver, through an artificial antenna, with a signal modulated 30% at 400 cycles. The input is first adjusted to give standard audio output of 50 milliwatts into a suitable resistor connected in place of the speaker, with the receiver tuned to one of the standard test frequencies 600, 800, 1000, 1200 and 1400 kc. A record is made of the carrier signal voltage input required. The tuning of the receiver is then left fixed and the carrier frequency of the input signal is varied in suitable steps, above and below the receiver's resonance frequency, the input being adjusted at each step to give the standard audio output. Readings are taken in steps not greater than 10 kc., on either side of resonance, until a point is reached where the signal voltage necessary to give standard output is at least 1000 times (60 db above) that re-

[2] Hull, "High-Frequency Receivers," *QST*, Nov., 1928; Chinn, "A New Type of Peaked Audio Amplifier," *QST*, Feb., 1931; Hull, "Selectivity in Radiotelegraph Reception," *QST*, Jan., 1932.

[3] Bourne, "Acoustic Wave Filters and Audio-Frequency Selectivity," *QST*, August, 1928.

quired to give standard output at resonance. If possible, it is preferable that the measurements be carried out until a ratio of signal voltages of 10,000 (80 db) is obtained. The curve, drawn through points plotted with carrier frequencies as abscissas (horizontal) and voltage ratios of input off resonance to input at resonance as ordinates (vertical), represents the selectivity characteristic for that one test frequency. If the voltage ratios themselves are plotted the ordinate scale should be logarithmic; but if these ratios are converted to db the ordinate scale should be linear (equal divisions). The logarithmic nature of the decibel scale (which corresponds to the scale of intensity levels as the ear responds to them) makes its use convenient in this instance as well as in others involving hearing. That was covered in *QST* for last August, by the way, and will be encountered again before the day is over.

Similar curves are plotted for other test frequencies, preferably for all five of them. If the curves show that the signal required to give standard output at 10 kc. off resonance is at least 60 db. (voltage ratio 1000) above resonance value in every case, then the selectivity of the receiver could be specified as "10 kc." because it would take a signal 10 kc. off resonance that was equal in amplitude to the desired signal to give noticeable output and cause objectionable interference. But the curves do not always come out so nicely and usually at least three for as many different test frequencies are necessary to give a reasonably good idea of a broadcast receiver's selectivity characteristic — to say nothing of its audio-frequency response, which is something that does not concern us here.

The broadcast-receiver test method has been described in detail to contrast it with selectivity tests for c.w. receivers which are not only less common but are also less well standardized. One reason for this situation is that whereas standard signal generators and devices for measuring small radio-frequency input voltages are quite generally available for frequencies in the broadcast band, neither signal generators nor "microvolters" for the higher frequencies have reached this status. The situation is further complicated because the regenerative type receiver, almost universal for high-frequency reception, is hard to reconcile to standardized conditions long enough to make a selectivity test, let alone to stay reconciled to standardized conditions for any length of time thereafter. Signal generators and calibrated attenuators have been developed and such tests have been devised, however, and selectivity curves of high-frequency receivers have been plotted, those shown in Fig. 2 being typical.

One test method that is generally applicable to receivers intended for heterodyne (beat-note) reception employs an unmodulated signal (in contrast to the modulated signal used in the b.c. receiver test) and depends on the beat note between the signal and the oscillating detector, or separate beating oscillator, for the audio output. As in the test just described, the general method is to supply measured values of input in suitable steps of carrier frequency above and below the resonance frequency to which the receiver is left tuned, the input signal being adjusted for each frequency so as to keep the audio output constant at the resonance or normal test value. Characteristics peculiar to the regenerative receiver go to make the actual test procedure somewhat more complicated, however, because regeneration itself has a marked effect on the selectivity as well as

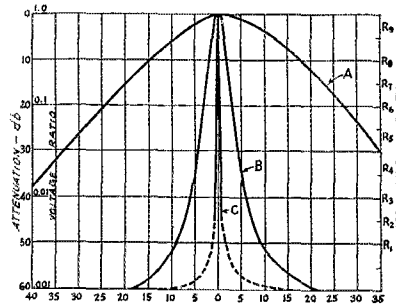


FIG. 2 — THE RADIO-FREQUENCY SELECTIVITY CURVES OF THREE TYPES OF HIGH-FREQUENCY RECEIVERS

"A" is for a receiver using one stage of tuned r.f. and a regenerative detector; "B" for three stages of tuned r.f. and a regenerative detector; "C" for the "single-signal" receiver. The db scale at the left shows the attenuation from resonance and the scale at the right shows approximately the corresponding audibility in the "R" system.

on the sensitivity. To take care of this, the test should be made with one of two recognized degrees of detector oscillation, "optimum" and "standard." Optimum oscillation exists when the regeneration control is adjusted so that the audio output is the greatest for a given input signal. This adjustment is very critical and difficult to maintain, as all who have tried to keep an oscillating detector perking "right on the edge" will testify. It is dependent for the most part on the stability of the receiver, on the strength of the signal and the skill of the operator in making the adjustment. Regenerative detectors are notoriously unstable oscillators, as oscillator stability is considered these days, and what semblance of stability they have when running idle is considerably affected when any signal of appreciable magnitude hits the grid. As evidence of this, we have the well known phenomena of the "widening of zero beat" that occurs when even a moderate signal is received and the "blocking" experienced with strong signals. The oscillator is so unstable that it allows the signal to take control of its frequency. It is pulled into zero beat with the signal and, consequently, there is no audio output. To prevent this "overloading" effect, it is necessary to make the amplitude of the test signal small enough so that the

detector is not pulled into zero beat when tuned to frequencies reasonably near to the signal frequency. For standard oscillation the receiver is first adjusted for optimum oscillation and the oscillation control is then set so that the audio output drops to 70% of the optimum value. This adjustment is more stable, being approximately representative of that used in practical operation, and is therefore recommended. The curve is plotted, as for the broadcast receiver, with carrier frequencies as abscissas and voltage ratios of input off resonance to input at resonance as ordinates, the latter being to logarithmic scale (or in db on a linear scale) as in the former case. The peak of the curve (occurring at zero beat) is filled in by interpolation as shown in the curves of Fig. 2.

SIMPLIFIED SELECTIVITY TEST

This method is applicable to selectivity measurements with either autodyne receivers or receivers using a separate oscillator to give an audio beat note (including superhets); but it requires a signal generator with an accurate frequency calibration and means of accurately measuring the input signal voltage; and few indeed are the amateurs who have such equipment on tap. Being in this fix ourselves, a simpler method that would give sufficiently good results was called for. Such a method was devised for receivers of the superheterodyne type and also should be applicable to simple regenerative receivers *using a separate oscillator to give the audio beat note and operating with the detector non-oscillating.* It is unfortunate that the simple autodyne receiver does not fit into this picture. But then, as things happen, few receivers of this type have sufficient r.f. selectivity to be worth measuring. Their very nature makes them poor candidates for high r.f. selectivity, as we shall attempt to show.

The set-up for the simplified method of c.w. selectivity measurement on a superheterodyne receiver is shown in block form in Fig. 3. In contrast to the two methods previously described, this one uses an input signal of fixed frequency and does not require measurement of input voltage. The general idea is to leave all adjustments fixed except that of the first oscillator, the one that beats with the signal to give the intermediate frequency, and to measure the audio output for the various first-oscillator settings. The second oscillator, beating with the intermediate frequency signal at the second detector, gives the audio frequency beat note whose frequency is measured. The method operates, in effect, to supply the grid of the second detector with signals of different frequencies above and below the resonance frequency of the intermediate frequency amplifier, the variation in amplitude of these signals being determined largely by the selectivity of the i.f. amplifier and second detector input, since the input circuits ahead of the first detector contribute little to the over-all selectivity for the frequency range over which the measurements are made. The major business of these input circuits is to eliminate the signal-frequency image, to prevent response to carrier frequencies beyond the oscillator frequency and differing from the wanted signal frequency by twice the intermediate frequency. That will come up again in connection with design of the complete receiver. Our present interest is selectivity in terms of a few kilocycles or even hundreds of cycles, not hundreds of kilocycles.

With the apparatus set up as shown in Fig. 3, the first step is to tune in the signal of the "signal generator," either its fundamental or a harmonic. For this signal source a stable oscillator should be used, such as a good heterodyne frequency meter or, better yet, a crystal-controlled oscillator operating at low plate voltage. If a crystal-controlled transmitter is handy, its oscillator will do nicely. The input signal reaching the grid of the first detector should be adjusted so that there is no overloading at any stage of the receiver, particularly in the i.f. amplifier or second detector, with volume control adjustments in the i.f. end "full on." To insure against overloading, it is advisable to check the plate current of the i.f. amplifier tubes with a suitable milliammeter, a "kick" in plate current when the signal is tuned through resonance indicating overloading of one or more of the i.f. stages. A similar check can be made on the second detector. If it is of the plate detection (fixed or automatic grid-bias) type, its plate current will increase when a signal is tuned in, the increase being a fair indication of signal voltage on the grid, up to the overload point. It is difficult to predict just what the detector plate current increase should be to reach the overload but it can be determined usually by experiment, especially by listening for "strangling" of the audio output. In our own case, with a Type '27 second detector fitted with a 20,000-ohm cathode resistor and operated at a plate voltage of approximately 180, plate current increase from 0.8 ma. to about 1.5 ma. is satisfactory, with the i.f. amplifier always reaching the overload point long before the detector gets there. Adjustment of the input signal can be made by changing coupling to the signal source, detuning the input to the first detector, etc.

With the signal tuned in either on the nose or "off-set" (more about that to come), the second oscillator is adjusted either to zero beat (if the receiver will stand for it) or to give a suitable beat note, say 1000 cycles. Here is where the frequency measuring scheme is introduced. The variation in audio beat-note frequency is exactly the same as the variation in radio frequency of the signal passing through the intermediate-frequency amplifier which, in turn, varies identically with the tuning of the first oscillator.

A case in point: Suppose the resonance frequency of the i.f. amplifier to be 500 kc. and the frequency of the incoming signal to be 7100 kc. Since the intermediate frequency is the difference between the signal and first oscillator frequencies, the oscillator must operate at either 7600 kc. (signal frequency plus i.f.) or 6600 kc. (signal frequency minus i.f.). Taking the "high beat," the oscillator frequency will be 7600 kc. to give resonance intermediate frequency for a 7100-kc. signal. To provide the 1000-cycle audio beat note, the second oscillator must be tuned either 1 kc. above or below the frequency of the signal coming through the i.f. amplifier. For a signal of i.f. resonance frequency (500 kc.) the second oscillator therefore is tuned to, say, 499 kc., the "low" beat being generally preferable in this case. Suppose, now, that the first oscillator frequency is shifted 500 cycles (½ kc.), from 7600 to 7600.5 kc. What is the effect? First, the frequency of the signal through the i.f. amplifier becomes 7600.5 − 7100 or 500.5 kc. This, beating with the second oscillator still going merrily at 499 kc., gives an audio beat note of 500.5 − 499 or 1.5 kc. (1500 cycles). *The change in audio frequency output is the same as the change in first oscillator frequency and identical with the change in i.f. frequency.* But what about a change in signal voltage at the input to the i.f. amplifier? Considering that at ham-band frequencies the selectivity of the input circuits ahead of the first detector is inconsiderable for such small changes, even though they be as much as 10 kc. and even though the input circuits include a stage of "preselection," and considering that the conversion efficiency of the first detector changes inappreciably for similar reasons, it is safe to assume that first detector output and i.f. amplifier input are substantially constant over the range of frequencies required for the selectivity test. The variation in audio output will be determined largely by the selectivity of the i.f. amplifier, being affected to some degree by the audio-frequency characteristics of the output circuit and, perhaps, by the second detector-second oscillator combination. But how does this kind of selectivity test match up with actual operating conditions, where we have to worry about signals of different frequencies, not one signal frequency and different first oscillator frequencies? The test gives results practically identical with those that would be obtained using a variable signal frequency with the single exception that the change in output beat-note frequency then would be opposite in sense to that obtained with varying first oscillator frequency; that is, leaving oscillator tuning fixed at 7600 kc. and increasing the signal frequency from 7100 to 7100.5 kc. would give an i.f. of 499.5 instead of 500.5 kc. and audio output of 500 instead of 1500 cycles. But the change in frequency, which is our concern, would be the same.

Measurement of the output frequency is a fairly simple matter and requires no elaborate equipment. A calibrated audio oscillator may be

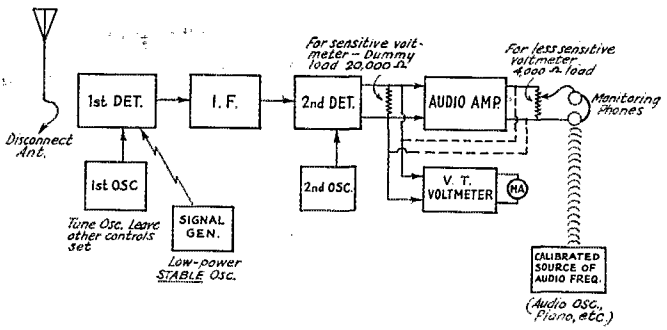


FIG. 3—SUGGESTED SET-UP FOR SELECTIVITY MEASUREMENTS ON A SUPERHETERODYNE, USING THE SIMPLIFIED METHOD DESCRIBED IN THE TEXT

used, the frequencies being matched aurally. One way to do this is to connect one receiver of a headset to the radio receiver output and the other to the output of the audio oscillator. Lacking other means, that old reliable, the family piano, may be called upon. Even a mandolin, ukulele, or other instrument that can be tuned from a pitch of known frequency will serve. Just use your head — and your ears.

For measurement of the output voltages a vacuum-tube (electronic) voltmeter, such as the one described by J. L. McLaughlin in the April issue, is most suitable. Since voltage ratios as high as 1000 to 1 are difficult to measure with a single-range instrument, it may be necessary to make the measurements at the output of an audio amplifier that will give something like 100 volts across the load circuit (4000 ohms with choke and condenser coupling to plates of a pair of Type '45's in push-pull), starting on the 100-volt range at resonance and dropping to the 10-volt range when necessary. The monitoring headset may be connected across a sufficient portion of the load resistor to give a useful audio level. A sufficiently sensitive voltmeter can be connected in the plate-circuit of the second detector, of course. The optional arrangements are shown in Fig. 3.

In plotting the curve, ratios of the output voltages for different frequencies above and below the resonance frequency (zero beat or some particular beat frequency such as 1000 cycles) to output at resonance are plotted against frequencies above and below resonance. Since it seems more desirable to have the curves represent the actual "sound" of the receiver, it is suggested

that the voltage ratios be converted to db equivalents and that the "notch" at zero beat be plotted rather than that the peak of the curve be filled in by interpolation. This will give curves resembling those shown in Fig. 4. The graphical db "loss" table shown on page 33 of August, 1931, *QST*, will be found handy for making the conversion.

FOLLOWING THE CURVES — DOUBLE BEAT RECEPTION

Establishment of how the radio-frequency selectivity curves are developed now gives the opportunity of traveling more rapidly over their interpretation and what they show about receiver performance. The curves of Figs. 2 and 4 are particularly pertinent, since they represent the selectivity of actual high-frequency c.w. receivers, those of Fig. 4 being plotted from the correspond-

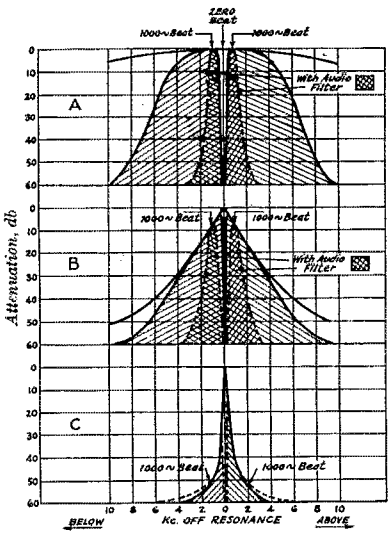


FIG. 4 — THE CURVES OF FIG. 2 MODIFIED TO ILLUSTRATIVE AUDIO-FREQUENCY RESPONSE AND THE DOUBLE-BEAT FEATURE OF HETERODYNE RECEPTION

ing curves of Fig. 2 with enlarged frequency scales. Curve "A" of Fig. 2 shows the radio-frequency selectivity characteristic of a receiver having a stage of tuned r.f. amplification, a regenerative detector and two stages of audio. Critical regeneration was used. The resonance frequency of this, and of the other curves, is 7100 kc., in the "40-meter" band. It is something of a disappointment to see that the radio-frequency selectivity of this popular type of receiver, even with critical regeneration, does not look like so much. At 5 kc. off resonance the response is only a couple of db less than at resonance, indicating that signals within 5 kc. of tune would be given practically the same reception by the detector as the desired signal. Curve "B" looks better — but it is for a receiver having 3 stages of tuned r.f. and a regenerative detector (4 tuned circuits), not a common type in amateur practice. Note that its response is down some 35 db at 5 kc. off resonance — but only a couple of db at 1 kc. off resonance. Even its relatively good r.f. selectivity wouldn't be of much assistance in separating signals within 1000 cycles of each other. These two curves were obtained by the standard test method.

Curve "C," believe it or not, is also representative of the radio-frequency selectivity of a high-frequency receiver. It is pretty well crowded by the scale to which it is plotted but its response is down some 45 db at ½ kc. below resonance and at 1 kc. above resonance. Comparing its selectivity with that of the other two receivers, taking ratios of frequency off resonance for the same attenuation, it appears to be better than "A" by more than 80 times; and better than "B" by 14 times on the low side of resonance and by 7 times on the high side of resonance. This curve is for the single-signal receiver and was obtained by the simplified test method.

The curves of Fig. 4 are for the same three receivers and show the radio-frequency selectivity, the probable audio-frequency response with the usual type of audio-amplifier and the audio-frequency response with audio-frequency filtering, the outer curve in each case being the r.f. characteristic taken from Fig. 2. And here we come to an ever-present but seldom thought of peculiarity of autodyne c.w. reception. *The detector circuit is never tuned to the signal frequency.* It couldn't be, unless it were tuned to zero beat — and then there would be no beat note to copy. One way of looking at it is that this circuit operates primarily as an oscillator and secondarily as a detector. It has a dual purpose, serving to generate the local signal to beat with the incoming signal and, at the same time, to act as a regenerative detector. Since the oscillator frequency must be different from the signal frequency by the beat frequency, as a detector the circuit is always just that much off tune. This causes it, in effect, to work against the preceding stages, partly nullifying the selectivity that they contribute. This effect is not very large, admittedly, but it does amount to something. It is particularly noticeable when the attempt is made to run a fairly strong interfering signal into zero beat, for then the circuit is more receptive to the interference, to which it is tuned "smack on," than to the desired signal, with which it is off tune. These effects would not be so noticeable with a receiver having a broad selectivity characteristic such as that of Fig. 4 "A" because, providing all circuits are accurately ganged, the signal frequency would fall on the resonance curve at one of the points marked "1000-cycle beat" (to give 1000-cycle audio output with the oscillator frequency at

"zero beat") and the response of the receiver would be essentially the same as if the signal had been tuned in at full resonance.

In the case of the receiver having the better selectivity curve "B," however, with all tuned circuits accurately ganged the signal lands on the resonance curve at either of the points marked "1000-cycle beat," appreciably off the peak, and the receiver response for the desired signal is that much reduced. Of course if all the r.f. circuits are not accurately ganged and if the detector has an adjustment that permits the oscillator frequency to be tuned beat-note frequency off the peak for all settings of the main tuning control, then the signal can be put on the peak. But this would result in some broadening of the peak, in addition to adding a tuning adjustment, because some contribution of the detector circuit to the overall selectivity would be lost.

Curve "C" is interesting only because of its weirdness. It is purely hypothetical, of course, suggesting what would result if there were a ganged-tune autodyne receiver with a selectivity curve like that of "C" in Fig. 2. But even with it the signal still could make its appearance on either of the two sides of zero beat, just as it does with "A" and "B." This means, of course, that for any one tuning adjustment, a signal a kilocycle to the other side of the oscillator frequency (the image of the desired signal's frequency) will produce a beat note identical to that of the desired signal. Shifting to the other side of zero beat to escape this QRM situation immediately suggests itself. In fact the proposal that one side of zero beat be eliminated has brought forth this very argument in favor of "both sides of zero beat" on several occasions in the course of this development. Of course the answer is that if shifting to the other side of zero beat will eliminate the interfering signal, then for that particular case of QRM the receiver was tuned to the "wrong side" in the first place! The selectivity and receiver adjustment should be such that the only occasion for QRM will be when the interfering station is on the same, or very nearly the same, frequency as the desired signal — and not 'way off the other side of zero beat, two kilocycles removed.

As was pointed out several pages back, audio-frequency selectivity, even when carried to its ultimate limit can never eliminate this double beat or audio-frequency image business. All the 1000-cycle audio-frequency selectivity in the world, for instance, would be of no avail if there should be a signal every two kilocycles all the way across the 7000-kc. band. Every tuning adjustment would bring in two at a time as long as there were two beat notes for each carrier frequency. The experience of tuning from the "left" side of zero beat on a desired signal to escape QRM there, only to find just as bad QRM from a third signal on the "right" side, is quite common. But what can be done about it? Radio-frequency selectivity by itself does not seem to hold the complete answer. It needs coördination with something other than the oscillating detector, that is certain. Perhaps a separate oscillator, relieving the detector of that duty and allowing it to tend to its detecting, would help.

"OFF-SET" BEAT-OSCILLATOR TUNING

The receiver to illustrate what a separate oscillator can do need not be one having a particularly peaked radio-frequency selectivity curve. Inspection of curve "A" of Fig. 5 shows it to be quite flat-topped with steep sides, the receiver from which this curve was obtained being a super-het with a pretty effective band-pass intermediate-frequency amplifier that was intended more for 'phone reception than for unmodulated c.w.

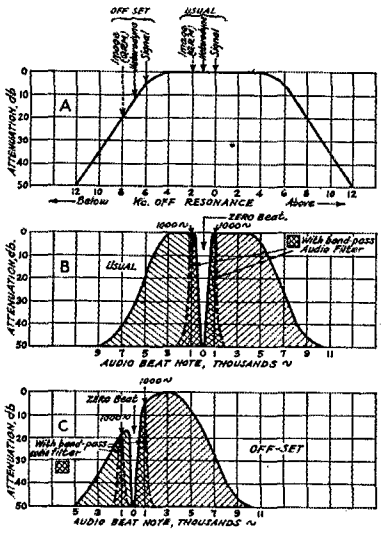


FIG. 5 — HOW "OFF-SET" TUNING REDUCES THE AMPLITUDE OF THE IMAGE AUDIO-FREQUENCY RESPONSE

But it will serve very nicely. The labeled arrows pricking the top of the curve show two settings with respect to resonance. The one labeled "usual" is, as the name implies, the one most common. Both oscillator and signal are tuned slam in the middle of resonance. What is the result? Curve "B" shows it pretty accurately. The lightly shaded portion under this curve represents the response with "flat" audio and the darkly shaded areas show the response with band-pass audio filtering. Both sides of zero beat are there, full size, and no mistaking them.

Now for the other oscillator setting. Here we have the signal frequency not in the center of the resonance curve but on the low frequency side at the point where the curve goes into a steep dive,

with the oscillator off-set to a still lower frequency. How does this work out? A glance at "C" shows immediately that things are different. One side of zero beat is considerably less in amplitude than the other. An interfering "image" signal, on the lower side of the oscillator frequency and two kilocycles removed from the desired signal, gets a much less cordial reception than it did with the "usual" setting. Audio-frequency selectivity now becomes more effective, too, the desired signal response being some 15 db above the "image" response with off-set tuning in this particular case. Then there are other improvements, and still a few deficiencies. The major improvement is that the oscillator signal, being considerably off resonance with the i.f. tuning, is less likely to affect the sensitivity and selectivity by overloading or cross modulation. The major deficiency is that although there is greater discrimination between carrier frequencies that would give the same audio beat note, the response remains the same, and in some respects greater, for carriers giving other beat-note frequencies. Even though these are eliminated from the output by audio filtering, they still can cause trouble, like the local oscillator, by their overloading or cross-modulation effects.

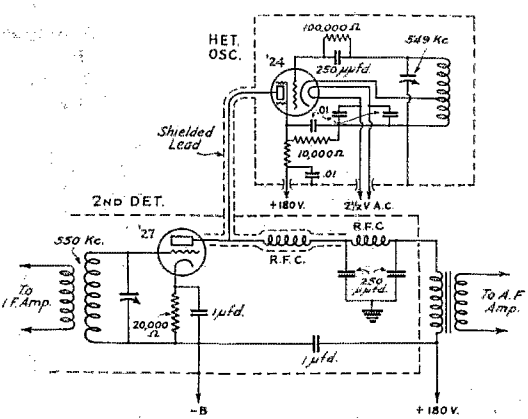


FIG. 6 — PLATE MODULATION OF THE SECOND DETECTOR IMPROVES C.W. RECEPTION WITH THE SUPERHETERODYNE

The oscillator is of the electron-coupled type. The component values shown may be modified to suit other intermediate frequencies.

Suggestion that the audio beat oscillator can make trouble brings us to a decidedly important phase of the development: The method of modulation used to produce the audio beat note in the output of the second detector.

SUPERHETS "NO GOOD FOR C.W."?

There is a generally prevalent impression that "a superheterodyne receiver may be great for 'phone but it's no good for c.w.," that it "hasn't the sensitivity of a detector and one step." We believed that for a long time, too. But it isn't so. The superhet is sensitive for weak signals and is great for c.w. as well as for 'phone — when it is given the proper opportunity. The trouble has been with the method of introducing the heterodyne to give the audio beat note. Usually this consists of little more than placing an oscillator somewhere near the i.f. amplifier and letting some of its output crawl into the i.f. circuits through the common supply leads or wherever it can. The result of this is that the oscillator signal gets into the front end of the amplifier, as well as into the middle and on second detector grid, overloads such input circuits as it can and knocks down the sensitivity of the receiver for weak signals. A consequence is the "strangled" sounding effect characteristic of many c.w. supers. One remedy for this is shown schematically in Fig. 6. The essential feature is *introduction of the oscillator signal in the plate circuit of the second detector*, a species of plate modulation. The oscillator is of the electron-coupled type, especially well suited to this job because its output circuit presents a relatively high-resistance load to the detector and because the isolation of its plate from its frequency generating circuit minimizes the possibility of occurrences in the detector output affecting oscillator operation. A radio-frequency choke, connected between the detector plate and the usual choke-and-condenser r.f. filter circuit, acts as the load impedance for the oscillator — in parallel with the detector's plate resistance, of course. Unquestionably there is some leakage to the detector grid circuit by way of the plate-grid capacity of the '27, but this is not damaging and does not impair the detector sensitivity, particularly when "off-set" tuning is used. The modulation is effected largely by the simultaneous rectification of the signal arriving via the i.f. amplifier and of that from the oscillator, the beat between the rectified components being at audio frequency. It suggested that users of superhet c.w. receivers give this system a trial, since only minor circuit changes are necessary to apply it.

With the same type of oscillator, say the one shown in April *QST*, fitted to the front end of the superhet, we are ready to go after real selectivity in a big way. This oscillator provides the stability that is absolutely prerequisite for selectivity like that of the "C" curves that have been shown, selectivity good enough to be called "one kc." and to give actual single-signal c.w. reception. Right now there is in operation in *QST*'s laboratory the superhet receiver that has this selectivity and that gives this single-signal performance, practically doubling the effective width of every

(Continued on page 90)

D.C. Plate Supply From Ford Spark Coils

By Vere Davis, W9FJV*

THE ham who has no a.c. available is up against a tough proposition when it comes to getting a plate supply for his transmitter. A high-voltage bank of "B" batteries is too expensive for most of us. Gas-engine driven generators are both expensive and apt to be unreliable. Dynamotors are also expensive. All have been tried at W9FJV—the "B" batteries wore out, the gas engine wouldn't run when it was most needed and the dynamotor burned out. Then, the old Ford spark coil was pressed into service. As "straight spark c.w." is illegal, there must be some method of rectifying and filtering the lopsided a.c. output to make a legal and respectable plate supply. That is the aim of this little story. There have been so many requests for a diagram of the power supply of W9FJV that I believe most rural hams will be interested in a "rectified Ford coil" outfit. Hams planning to build portable transmitters also will find it of interest.

The first rig consisted of a single coil with a Type '01-A as a rectifier, the output being about 6 watts. Later 12 volts was connected to the primary with an output of 12 or 13 watts. In January a second Ford coil was added and the power derived was from 20 to 25 watts—500 volts and 45 milliamperes by actual measurement. From January 21 to March 30 over 425 stations were contacted on the 14-, 7-, 3.5- and 1.75-mc. bands. All districts were worked on "40" and "80" and all but the 2nd on "160 meters." The average audibility report of 20 contacts, during three days' time on four frequency bands, was between R6 and R7. Tone usually is reported "d.c.," and occasionally there is a report of "xtal d.c." This is dope as taken from the log. On the Army-Amateur ZAG (QSO) contest of March 28th, 24 stations were contacted on "80" and 24 on "160 meters." This is not a record at all, but it does show that the ham with no a.c. to his shack is not without hope.

A complete diagram of the transmitter is shown in Fig. 1. There is little that is unusual about the oscillator, which at W9FJV is the ordinary Hartley. The plate supply, shown to the right of the dotted line, is of chief interest. It consists of a pair of Model T Ford spark coils with their primaries connected in parallel, but with a separate half-wave rectifier for each secondary. The output terminals of the two rectifiers are connected in parallel, so that the system does not comprise a full wave rectifier with each coil supplying a half-cycle, as might be thought from a glance at the diagram, but has two separate half-wave systems parallelled.

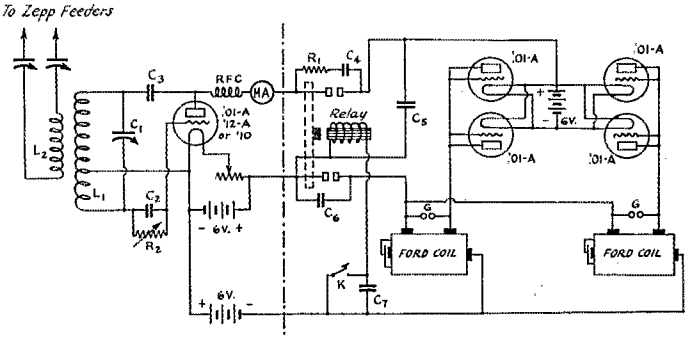


FIG. 1 — HARTLEY TRANSMITTER WITH RECTIFIED A.C. PLATE SUPPLY FROM FORD COILS

C_1 — 350-μμfd. variable.
C_2 — 250-μμfd.
C_3 — 250-μμfd.
C_4 — 0.5-μfd., 600-volt condenser.
C_5 — 2-μfd. 2000-volt filter condenser; 1000-volt rating may be sufficient.
C_6 — Low-voltage condenser, 1 to 4 μfd.
C_7 — Low-voltage condenser, 0.1 to 0.25 μfd.
R_1 — 400 ohms.
R_2 — 500 to 50,000-ohm variable wire wound resistor.
L_1 — 13 turns of copper tubing in 3-inch diameter coil for 3500 kc.
L_2 — 13 turns of No. 16 d.c.c., 5-inch diameter.
G — Safety gap; auto spark "intensifier."
Relay — 20-ohm sounder with 2 pairs of silver contacts.

THE RECTIFIER

Experiment probably will show that with two or more coils in parallel working into a common rectifier, the output is not increased much over that from a single coil. With a common vibrator for the coils the secondary impulses are in synchronism and there is an increase in power for every coil added to the circuit, but ordinary Ford or K.W. contacts were not made to stand the extra load. Hence the separate rectifier for each Ford secondary.

A pair of '01-A's or similar tubes, with their grids and plates connected together, is used in each rectifier. The plate-grid connection goes to the "spark-plug" terminal of the spark coil and the r.a.c. is taken from the filament of the tube.

* Braymer, Mo.

Full 6 volts are used on the rectifier filaments. If less voltage is used the seal of the tube is more likely to break down under the high voltage. The seals should be watched closely for arcing, and if this occurs the faulty tube or tubes should be replaced by ones with better insulation. The safety gaps "G" are adjusted as close as possible without sparking when the set is in actual operation; they are there for the purpose of safeguarding the insulation in the seals of the rectifier tubes. As a suggestion, it may be possible to use the Raytheon B-H rectifier tube and save the trouble of using a separate battery for the rectifier.

ADJUSTING THE VIBRATOR

Remove the brass stationary contact mounting from the spark coil and see that the *steel* vibrator tongue clears the core of the coil by from one-eighth to three-sixteenths inch. Cut a 2½-inch square from a post-card, fold it double (bookwise) and slip it between the steel vibrator and the core of the Ford coil. Re-mount the brass contact mounting and adjust the vibrator adjusting nut for maximum steady plate current. Don't force this adjustment too much. Sometimes it helps to put a few thicknesses of writing paper between the folds of the post-card. Adjust each coil vibrator separately. The efficiency of the power supply depends mostly upon the vibrator action, so experiment until best results are obtained. A 500-cycle note is about right for best output and least trouble. See Fig. 2.

The purpose of the high-voltage relay in the oscillator plate lead is to cut off the "tails" caused by the discharge of the filter condenser after each character. With a large filter condenser [1] the "tails" cause a sort of backwave if no relay is used. The h.v. relay contacts will arc if there is no click filter across them, and the arcing means more "tails." With the relay and click filter the keying will be clean cut. A little experiment may be necessary to find the correct values of C_4 and R_1.

The purpose of the low-voltage relay is to take the load off the bug key used at W9FJV. Connect a low-voltage condenser of 1 to 4 μfd. across the relay contacts to keep them from sticking and pitting. The low-voltage relay is not necessary if a hand key having fairly large contacts is used. Just connect the hand key in one of the primary wires as at "X" in Fig. 1, and connect the high-voltage relay in the circuit so that it closes when the primary circuit of the spark coils is closed.

[1] A second filter condenser with a choke between the two may be used with this as with any other plate supply, of course. Remember that the filtering must be *adequate*, as stated in the regulations. Enough filter must be used to give a d.c. note when the transmitter is self-excited. The higher the frequency of the ripple, as determined by adjustment of the coil vibrator, the easier it will be to filter the output of the rectifier. — *Editor.*

GENERAL ADJUSTMENT

Adjust the oscillator as you would any Hartley, but with special attention to the value of the grid leak and the position of the filament center-tap. Use as high resistance as possible in the grid and connect the center-tap as close to the grid end of the tank inductance as possible; the two adjustments will be found to be interdependent and will affect the quality and amount of the transmitter's output. Keep the plate current as low as is consistent with good antenna current. The plate voltage will go down as the plate current is increased, so there is no advantage to a large plate current; 45 mils will be found to be about right for maximum plate power and antenna current. At this current the voltage should be at least 500.

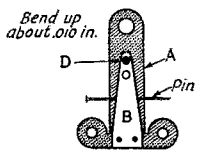


FIG. 2 — ORDINARY FORD OR K.W. CONTACT

Place a pin or toothpick between the brass reed "B" and its mounting "A". Bend the end of the brass reed away from the mounting about 0.01 inch at "D". This increases the frequency of the vibrator and increases the output from the coils.

Make sure that the low- and high-voltage relay contacts are closing at the same time; if there is to be any difference, let the high-voltage contacts close a little ahead of the low-voltage contacts. Be sure to use a click filter across the high-voltage relay contacts. If the plate current is very low and the safety gaps "G" arc, try reversing the battery polarity to the spark-coil primaries.

If a 12-volt d.c. supply is not available for the coil primaries, 6 volts will give good results, but the rectifier output will not be more than 12 or 13 watts. It is a good plan to get a Model T Ford coil-box for the coils and wire the box-connections to the rectifier and battery to save soldering connections direct to the coil terminals.

It is best to start adjustments with 6 volts on the primaries of the coils and not increase power until after the transmitter is in resonance with the antenna and everything is working as it should. Try the transmitter on 22 to 90 volts of battery for plate supply; if it will not oscillate smoothly and without chirping with 22 to 90 volts on the plate it will not work any better on higher power. If care is taken the transmitter will oscillate (when coupled to the antenna) with plate voltages as low as 10, with no change in adjustment from that with full power of 22 watts — and you might be surprised at the DX covered with 10-volt plate supply.

This "rectified Ford coil" plan is really worth trying if there is no better means of getting plate supply for a portable transmitter, or for the transmitter that is located where there is no alternating-current line.

Madrid Frequency Proposals

SOME months ago we promised to publish the proposals advanced for the international radio conference at Madrid so far as they concern the frequency bands for amateurs. We have delayed doing this, awaiting the appearance of the translation of the Book of Proposals and of various late proposals which are always to be expected, together with data which might indicate the weight to be attached to the various suggestions. Nothing further has eventuated since the appearance of the Book, however, up to this writing in late April, and it seems undesirable to keep our readers waiting any longer for the information that is available. We present, then, the terms of the proposals affecting amateur frequency assignments, grouping these under the respective amateur bands. The data on the Japanese proposals come via the Radio Society of Great Britain; on the remainder, from the Book itself:

1.75-MC. BAND

Both the United States and Canada propose 1715–2000 kc. exclusively amateur, not shared as at present specified.

Denmark and Norway jointly, and also Germany singly, propose that this entire band be taken from amateurs and devoted exclusively to maritime radiotelephony as part of an assignment of 1500–2000 kc. for that purpose.

Japan proposes reduction of the band to 1675–1875 kc., shared between mobile, fixed and amateurs. (All the Japanese proposals for amateurs center on 1775 kc. and harmonics thereof, it will be noted.)

Poland proposes that 1715–2000 kc. be shared between the fixed service, the mobile service, and amateurs in regions "sufficiently remote from the coasts."

U.I.R. (International Broadcasting Union, Europe) proposes that this band remain as now, internationally shared between mobile, fixed and amateur.

3.5-MC. BAND

The United States proposes 3500–4000 kc. exclusively for amateurs.

International Air Traffic Association (Europe) proposes that 3797–4000 kc. be assigned exclusively to aviation mobile services (as part of an assignment from 3797–4615 kc. exclusively for this purpose).

Japan proposes 3450–3650 kc. exclusively for amateurs.

U.I.R. proposes 3500–3700 kc. exclusively for broadcasting, 3700–4000 kc. remaining as at present, internationally shared between mobile, fixed and amateur.

7-MC. BAND

The United States proposes continuation of the present exclusive assignment, 7000–7300 kc.

Canada proposes expanding this amateur band to 7000–7500 kc.

I.A.T.A. proposes that our entire amateur band be assigned exclusively to the mobile aviation service (as part of a general assignment from 5172–7317 kc. for that purpose). We do not believe that this proposal is to be taken seriously.

Japan proposes 7000–7200 kc. exclusively amateur.

14-, 28- AND 56-MC. BANDS

The United States proposes the exclusive assignment to amateurs of the bands 14–14.4 mc., 28–30 mc., and 56–60 mc.

Japan proposes no change in the 14-mc. band, the narrowing of the next band to read 28–28.8 mc., and no international reservations above 30 mc.

There are various proposals about other matters, Cuba and Czechoslovakia proposing the limitation of amateur power to 50 watts, with minor indications throughout the Book that the attitude of several of the European governments is being guided by the European regional agreement on amateur regulation signed at The Hague in 1929.

Some confusion exists in amateur ranks concerning the study which Great Britain is "centralizing" on the factors influencing the choice of frequencies for different purposes. This has no direct connection with the Madrid conference. It is one of the questions left unsolved at the conclusion of the C.C.I.R. meeting at Copenhagen, and will be a strictly technical examination of all the technical factors affecting frequency allocation. Most of the governments of the world are participating, each sending its study to Great Britain, which merely assumes the duty of collecting and publishing the results. The study of all of these left-over problems is to be completed by May of this year, so that the results may be available for study at the Madrid meeting. There should be useful scientific data in the study in question, but it is outside the scope of a C.C.I.R. study to suggest the assignments of frequencies which should be made to the different services.

— *K. B. W.*

Fun on Five Meters

More Test Results—More Gear—More Possibilities

THERE'LL be a hot summer this year on 56 mc. If 10,000 hams, individually or in bunches, don't make for the woods, the mountains, the fire towers or the corn silos with five-meter gear, we'll have to make a revision of our present ideas on what a ham is and how he works. Should we have to write an article on, "What We Don't Know About 56-mc. Performance" at the end of the year it will probably fit under a "Strays" heading. What's the betting?

The airplane tests, outlined last month, are over. Most of the reports are in. But there's no peace. In every mail there are requests for a new series of bigger and better tests. Couldn't Lyman fly farther south, or farther west or higher or on Sundays or more often? The point is, of course, that Lyman is not the only amateur with a 'plane of his own — that in any case a 'plane is not essential for a 56-mc. test. Lyman has pioneered this particular brand of fun. It is up to the rest of the country to carry on.

As most East Coast amateurs know by this time, the proposed 'plane tests of the second week-end were postponed because of bad weather. Heavy rain over most of the Eastern States made test flying quite impossible. It did not prevent ground-to-ground testing, however. Most of the individuals and groups were on the air — even those who were obliged to climb to mountaintops through mud, slush and fog. The writer, with a car-full of newly rigged gear, spent the day half way up Mount Everett, Mass., trying (with middling success) to prevent the auto from sinking out of sight in a back road.

On the following week-end, the extent of the 'plane tests was curtailed by further bad weather and by the necessity of putting a rebroadcast of a duplex plane-to-ground conversation over WTIC's 50-kw. broadcast station. No better DX was covered than on the first of the tests, but equally impressive work was done over distances up to about 90 miles (low clouds limiting the 'plane's ceiling to about 2500 feet). Dreyer, W1ANC, pushed up the ground-to-ground record of these parts by locating his station on Meriden Mountain, Conn., and working DeRose, W1CND on Mt. Holyoke, Mass. It would be futile to attempt to record the other work done, as the log sheets covering it make a pile about a foot deep. It must suffice to state that hundreds of stations are operating on 56 mc. in this part of the country — that their operators are having about as much fun as if the band were the only one ever made available.

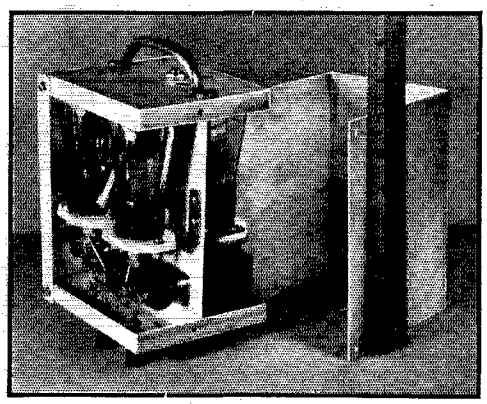


FIG. 2 — ANOTHER VIEW OF THE AIRPLANE TRANSMITTER

The three-sided cover, released with a few turns of the screwdriver, allows quick tube replacement or examination of the set.

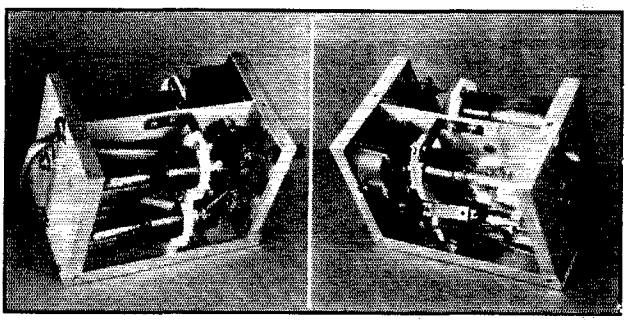


FIG. 1 — LYMAN'S MINIATURE BOX OF TRICKS: BOTH SIDES OF THE W10XB TRANSMITTER

The oscillator side, with inductances and tuning condenser, can be seen in the left-hand view. Seen from the opposite side, the modulators, speech choke and microphone transformer are visible. Now bring out your small transmitters, fellows!

Now that the activity has grown to a point where any complete chronicle of it would be impractical we might well turn to a description of some of the equipment which has been put to work with such success. All of it appears to have been developed from the apparatus described in the July and August issues of *QST* for 1931, but many of the added features are of sufficient interest to warrant mention.

Of prime interest is the equipment used by Lyman in his 'plane. Most of those who heard the walloping signals from W10XB have

asked for details of the gear used. And most of them will be greatly surprised, as we were, to learn that the transmitter was built around a pair of Type '71-A's as oscillators, Type '33's as modulators and a 135-volt "B" battery plate supply! The photographs will give a good idea of the layout of the unit — a layout which is the result of real planning. The foundation for the set comprises a center division and two end pieces. The oscillator tubes, tuning condenser and inductances are on one side of the partition, the modulators with their speech choke and microphone transformer on the other side. There is breathing space for all components, but nothing more. Particular care has been taken in making everything rigid. Both grid and plate inductances are wound on formers securely bolted to the chassis. All wiring in the r.f. circuits has been done with heavy bus. Adjustment or tube replacement is made simple by the way in which the three-sided cover is fitted. The fourth side, more or less a fixture, is fitted with an ordinary "UY" tube socket serving as the power supply intake. Two terminals are fitted for the antenna feeders leads, a jack for the microphone. The circuit arrangement, as far as we can determine, is an exact duplicate of that given in the August, 1931, *QST*. Lyman's receiver was a duplicate of the old super-regenerator described in the July, 1931, *QST*.

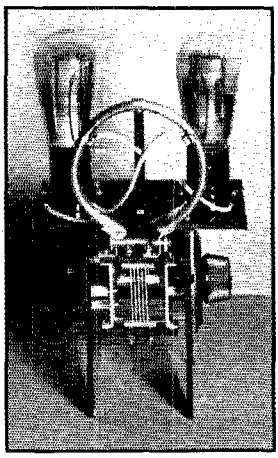


FIG 3.—ONE OF THE W1ANC OSCILLATORS: "UNITY COUPLING" PUT TO WORK

At the ground stations in this vicinity, about the only novel transmitter circuit arrangement was that used by Dreyer, W1ANC. One of his oscillators is illustrated in Fig. 3. It employs the circuit of Fig. 4 in which "unity coupling" is featured. The tank coil is a single loop of copper tubing tuned with an eleven-plate Cardwell receiving-type condenser. Threaded inside it is the plate coil, of ordinary rubber-covered flexible wire, tapped at the center and running directly to the tube plates as it emerges from the open ends of the tank inductance. Crossed grid leads pick off a desirable amount of excitation voltage through clips, clearly shown in the photograph. The tubes are Type '10's conveniently mounted on a simple bakelite shelf.

This type of oscillator, fitted with Type '71-A's, for battery operation, and with a plate modulator, is the gear shown in the pretty fog scene of Fig. 5. The oscillator is "up the pole" and fed from the car with modulated plate voltage.

Being experienced in carrying apparatus to the top of fire towers and anticipating more activity of the same sort, DeSoto, W1CBD-W9ZZF, in planning new gear for the recent tests, gave much consideration to the power supply problem. To obtain high plate-supply economy, Class B modulation was put to work. Advantage was taken of the similarity of the Type '10 and Type '12-A tubes and both oscillator and modulator were arranged to take these interchangeably. With two Type '12-A's in the modulator and another as a speech amplifier, the filament drain was still less than would have been the case with two Type '47's as modulators — the only other logical alternative. The average plate current, with Class B, was only half what it would have been with Class A modulation. Operated under the call W9ZZF at several different Connecticut high-spots, DeSoto's station was most effective. Its performance leads us to suggest that Class B modulation should certainly be applied in the modern 56-mc. portable gear. DeSoto's oscillator is illustrated in Fig. 6. It is mounted at the center of a wooden structure which serves to support the 8-foot antenna. Hinged near the center, the main stick folds up to fit inside the car when coming and going. The oscillator circuit is a conventional TNT.

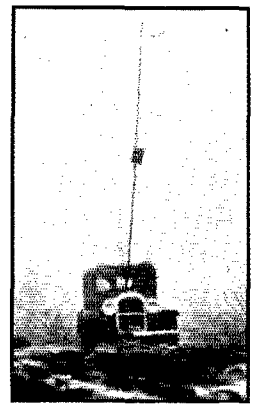


FIG. 5 — FOG-BOUND ON MERIDEN MOUNTAIN: W1ANC ON THE SECOND WEEK-END OF THE TESTS

Another station at which the oscillator and antenna form a single unit is W1SZ. In this case the whole affair is built around the tank condenser and arranged to be strung either from the attic rafters or from a tree when out in the woods. The oscillator is shown in Figs. 7 and 8, its circuit in Fig. 9. Though not showing clearly in the photographs, the mountings for the tube sockets

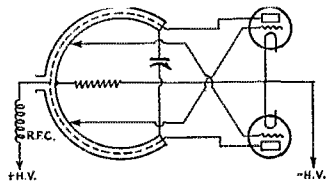


FIG. 4 — THE CIRCUIT ARRANGEMENT OF THE OSCILLATOR ILLUSTRATED IN FIG. 3

During the tests, Type '71-A tubes were used with 135 volts at 35 ma. as plate supply. The modulators were Type 45's running at 180 volts, 50 ma.

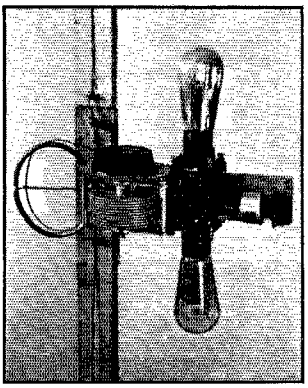


FIG. 6 — THE FOLDING ANTENNA-OSCILLATOR UNIT OF W1CBD-W9ZZF

Filament and modulated plate supplies were fed to terminals at the extreme right of the oscillator.

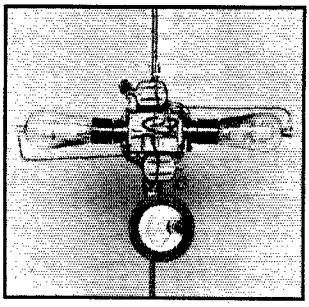


FIG. 7 — BUILT TO BE STRUNG UP: THE W1SZ OSCILLATOR AND ANTENNA

The long plate leads result from a hurried displacement of the normal Type '10's by new tubes having plate connections at the tip of the bulb. A modified layout is obviously necessary to obtain full advantage from the new tubes.

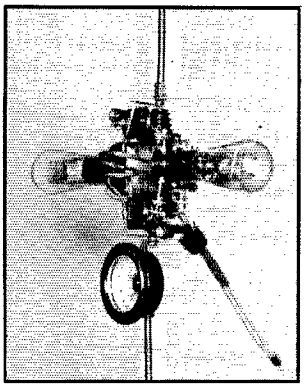


FIG. 8 — ANOTHER SHOT OF THE W1SZ OSCILLATOR

With a pair of Type '10 tubes supplied with 400 volts the antenna current is usually more than 1 ampere with the transmitter indoors — about ½ ampere when located in the open.

consist of pieces of bakelite fitted with machine screws to the end plates of the tank condenser. G.R. insulators provide suspension points for the oscillator unit proper. These insulators are mounted on the terminal screws of the stator assembly. Filament and modulated plate supply are fed to the unit through a pair of shielded leads (the shield being one filament conductor). These leads, fitted to an old UX-199 base, are connected with the aid of a UX socket mounted on the rear side of the assembly. In operation at W1SZ during the tests this oscillator-antenna was strung up from the attic rafters and fed from the radio room on the floor below. In the center photograph of this rig, a pair of Triad T210 tubes are shown in use. These tubes have the plate lead at the top of the envelope — a feature which appeared to give a marked improvement in overall efficiency at 56 mc., even though the layout of the oscillator was really quite unsuitable for tubes of this type. The tubes were tested with 600 volts on the plates continuously and an input of 50 watts per tube on 56 mc.!

Now for the details of a small 56-mc. receiver which George Grammer built up in a hurry for some test work. It is illustrated in Figs. 9 and 10. Its circuit is given in Fig. 11. No particular effort was made to reduce the size of the set to a minimum but its two tubes and associated gadgets fit comfortably in an aluminum box measuring 5 by 5 by 4 inches. The outer shell is made in two sections, the rear one swinging back (as in Fig. 10) to allow ready access to the set's insides. Most of the components are mounted on a shelf supported 1¼ inches above the bottom of the shelf. The exact location of the parts is not of much consequence except in the r.f. portion of the circuit, kept above the shelf. The tuning condenser is poised rigidly on a bakelite strip

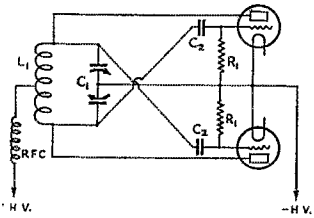


FIG. 9 — THE WIRING USED FOR THE OSCILLATOR OF FIG. 8

C_1 — Type 406B 25-plate Cardwell receiving condenser with stator split and plates removed to give 5 stator and 4 rotor plates in each section.
C_2 — 70-μμfd. fixed condenser.
R_1 — 15,000-ohm fixed resistors.
L_1 — Two turns 1½" inside diameter of 5/16-inch copper tubing.

about ¾ inch above the shelf and the inductances are attached directly to the condenser frame and stator. No plug is provided for the battery cable. Instead, the cable leads run directly to the various points of contact within the set. The receiver, by the way, operates beautifully. It was used for the reception of the 'plane's signals during WTIC's broadcast. The transmitter used on this occasion was that described in the August, 1931, *QST*. Though battered and dented from much use, the old transmitter still operates. At the moment it is re-installed, with its companion receiver, in an automobile. Plate power for the transmitter is obtained from one of the new Mallory Elkon Type 6 auto battery eliminators. In this eliminator a transformer-rectifier-filter is fed with interrupted d.c. from the car battery. The interrupter, contrary to our expectations, does not cause interference in the super-regenerative receiver and duplex working is therefore readily possible.

A few words on the antenna problem may be of interest to prospective 56-mc. workers. For out-

door operation, it would seem that about the most practical arrangement is a vertical half-wave rig with the oscillator current feeding it at the center. An alternative is a half-wave antenna fed from one end with a "Zepp." type feeder 4

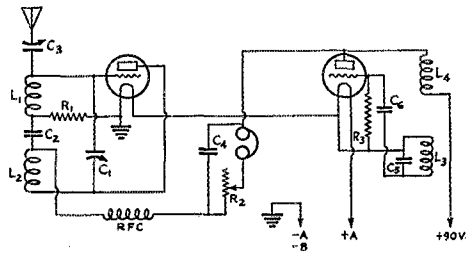


FIG. 12 — THE WIRING OF THE MIDGET RECEIVER AT W1DF

C_1 — 20-μμfd. three-plate Hammarlund midget variable.
C_2 — 150-μμfd. fixed condenser.
C_3 — Trimmer condenser (mica dielectric) set near zero.
C_4 — .001-μfd. fixed condenser.
C_5 — .002-μfd. fixed condenser.
C_6 — .0005-μfd. fixed condenser.
R_1 — 1-megohm fixed resistor.
R_2 — 50,000-ohm variable resistor.
R_3 — 50,000-ohm fixed resistor.
RFC — 30 turns of No. 26 wire on ¼" rod.
L_1, L_2 — Each three turns of No. 16 enamelled antenna wire ½" inside diameter.
L_3, L_4 — 1400 and 900 turns, respectively, of No. 34 silk-covered wire wound on a ⅜" dowel between cardboard disks spaced ¼".
The tubes are Type '30 with a 4-volt "C" battery serving as filament supply.

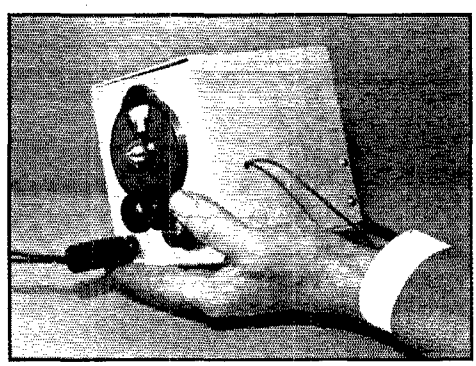


FIG. 10 — AND NOW BRING OUT YOUR SMALL RECEIVERS!

The two-tube super-regenerative 56-mc. receiver described in the text.

or 12 feet long. One method of suspending this antenna system (particularly suited for high buildings or fire-towers) is to hang the feeder horizontally from a bamboo pole projecting horizontally from the building, the antenna then dropping from the tip of the pole. Obviously, there are dozens of variations on the same theme. The antenna used by Dreyer and illustrated in Fig. 5 comprises two half-wave sections sloping away from the pole and fed at the center with a 4-foot tuned feeder. This is the scheme illustrated on page 19 of the July, 1931, *QST*. For comparing various locations with the automobile station we have been in the habit of using a quarter-wave rod against the frame of the car. This is supplemented, when serious QSO's are attempted, by an additional half-wave rod. The antenna is then a three-quarter wave affair with the antenna coil of the transmitter between it and the frame of the car. Tuning is usually accomplished in these antennas by cut and try. An extension piece sliding inside one end of the copper rod antenna is often a convenience in this work.

In describing these odd pieces of representative 56-mc. equipment, the idea has been to sketch the requirements for effective "five-meter" working. None of the apparatus can be considered as anything but experimental gear. It is not the ultimate in 56-mc. equipment by a long, long shot. The immediate future will surely reveal many possibilities for improvement. The superheterodyne, for instance, undoubtedly will be applied in amateur work. Our experimental work has shown its probable superiority in both sensitivity and freedom from noise. It is, however, relatively complex. Unless it is provided with a very broad intermediate amplifier it is unsatisfactory for the reception of the present-day modulator-oscillator transmitters. There is, then, an obvious future for the oscillator-amplifier transmitter, probably with tourmaline crystal control. Meanwhile, there is work to be done and fun to be had with our present relatively crude gear.

Strays

Here *is* one for the book. W1DGA has been on the air a short time. Up to the present time he has worked two stations, the first is a half-mile away and the other is VK3KX. Try as he does he just cannot seem to get another contact. We agree with DGA that his average mileage of total contacts (5500 miles) will stand for some time.

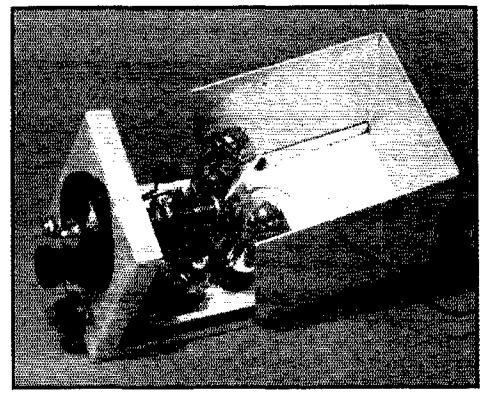


FIG. 11 — WITH THE COVER OPEN: A VIEW INSIDE THE TWO-TUBE SET

STRAYS

Good news to W hams bound for England this summer. Mr. H. L. O'Heffernan (need we add, G5BY?) writes that the "Croydon Gang" issues a most cordial invitation to all American amateurs — that one should ring CROYDON 2578 and "a most hearty welcome will be arranged for one and all."

W8SI brings a clipping to our attention from the local paper. Wanted to Buy — Radio Tubes and a Shotgun. Tubes to be UV199 and shotgun single, double or repeating — any gauge.

Murphy wants to know whether the chap is going to use Brute Force or the TNT arrangement.

Wails pour in from afar because we allowed VY73 (Connecticut auto registration) to escape into Commercial hands. If it's any consolation we *have seen* VY74, but that's as good as we can do at the moment.

From W1AOC comes one for the books. During the past winter the feeder wires ran from the second-story window some few feet below an overhanging roof. While enjoying a ragchew with a W2 the small single control xmtr suddenly sailed off the table, passed out through the plate glass window which had had two laboriously drilled holes for lead-ins, and investigation showed that the antenna held more than watts. A sheet of ice had coasted off the roof and in its downward flight had met the lead-in more than halfway!

Hams QSLing to Canada! Two cents will carry the card — not a cent less.

Forrest Wallace, W9CRT and announcer at WMAQ felt that hams were being slighted in broadcasting stations whereupon "something was done about it." Saturday, February 29th, was the first BC under the title, "Ninth District Radio Amateurs." There was no advance publicity given and, inasmuch as mail was received from many states commenting on the program, it was decided to make it a weekly affair. Nothing went on the air that didn't pertain to amateur activities. Dope on tests, frequency transmission, new ideas, QRA's, handling of traffic, 5-meter info and a wealth of material for any amateur was broadcast. The program has been suspended for the summer, but will resume in the fall with half-hour weekly broadcasts. However, other BC stations have been quick to snap up the idea, and at this time there are other stations who are finding this sort of program immensely popular.

W6DUN is back on the air at Glendale, Calif. If that doesn't sound like an event, listen to this. On April 5, 1931, DUN was piloting a motorless glider when the wings folded up and dropped him 75 feet into an orchard, resulting in a fractured skull, a broken left leg, a broken back, an infection of the right knee, four fractures of the jaw, cut lips and lost teeth, a month's unconsciousness, and hospitalization until January 20, 1932. He's on the air again now, but not on wings this time!

Nope, we haven't quit forwarding cards here at A.R.R.L. Some of our readers read the article too hurriedly then went for the axe. What we have turned up our toes at is the forwarding of *listeners' cards*. The forwarding of legitimate QSO cards is being done at the same stand, and we have prospects of handling 30,000 this year.

Doing the impossible is frequently done by an amateur because he doesn't know that it is impossible.

— *Laundry Age.*

NAA TIME SIGNALS

Those of us who are accustomed to picking up NAA's time at noon and 10:00 p.m., E.S.T., on 4015 kc. must have wondered what happened to those signals lately. The time signals are still broadcast, but they're on another frequency at those hours. Here is the latest schedule of time signals on high frequencies:

Hour	*Frequencies*
2:55 to 3:00 a.m.	4015 — 8030 — 8410
11:55 to 12:00 noon	4205 — 8410 — 12,045 — 12,615 — 16,820
3:55 to 4:00 p.m.	16,820
6:55 to 7:00 p.m.	8030
9:55 to 10:00 p.m.	4205 — 8030 — 8410 — 12,615
11:55 to 12:00 midnight	4015

W1NR wants to know why it is that nowadays ham receiving sets are called "receivers" when just a few years ago we always called them "tuners." Just another of life's little mysteries.

W9IN would appreciate it very much if the fellow using his call would use a d.c. plate supply so the real W9IN won't be accused of having a prehistoric signal.

The A, B and C of Amplifier Classifications

A Ponderous Subject Reduced to Terms of Simple Amateur Practice

By George Grammer, Assistant Technical Editor

COUNTLESS letters from amateurs indicate that there is a great deal of confusion about the identification of amplifiers as Class A, B and C. Whether or not a genuine understanding of these designations is essential to the happiness of every ham is a rather moot question; after all, these amplifier classifications are of real concern only to operators of 'phone transmitters. We do think, however, that people who insist on talking glibly about Class So-And-So amplifiers should have a better idea of what it's all about than just the amount of bias used on the tube — which seems to be the extent of knowledge in a goodly number of cases.

The Essential Definitions:

Class A — Voltage Or Power Amplifier Or Modulator: One which operates so that the plate output wave shapes are essentially the same as those of the exciting grid voltage.

Class B — R.F. Power Amplifier Or Balanced (Push-Pull) Modulator: One which operates so that the power output is proportional to the square of the excitation grid voltage.

Class C — R.F. Power Amplifier Or Oscillator: One which operates so that the power output varies as the square of the plate voltage.

First off, let's get one thing straight. The classifications didn't come into being because some bright engineer thought it would be nice to have some new definitions added to an already lengthy list. In radiotelephone transmission there is a very definite need for three types of vacuum tube operation; calling these three modes of operation "Class A," "B" and "C" is simply a method of avoiding the repetition of a large number of words, just as the "Q" signals give us universally understood practical abbreviations for radio communication. The "Q" signals save us time but the amplifier classifications save us time, space and possible confusion. The tubes were operated as Class A, B and C amplifiers long before anybody thought of labeling them.

Now let's get down to business and find out why tubes have to operate in three different fashions, which is really what we want to know.

THE CLASS A AMPLIFIER

All of us have owned or listened to audio amplifiers of some sort or another, and most of us can remember that back in the early days of broadcasting the sounds that ruined a peaceful summer night had little resemblance to the pleasing reproduction of the good modern set. People marveled at the "clarity" of those early receivers, however, except at odd moments when the loud speaker suddenly sounded as if it were being strangled. We used to blame such noises on the diaphragm, accusing it of getting too intimate with the magnet poles and things like that, which was probably true. But the diaphragm wouldn't have hit the pole pieces if the audio amplifier in the set had been doing its duty as a Class A amplifier.

Which gives us an inkling of the true nature of the Class A amplifier — *A Class A amplifier is one which gives, in its output circuit, a faithful reproduction of the signal fed into its grid circuit.* If the italics aren't plain enough, Fig. 1 should make them so. In the top drawing we have a little sine wave entering the amplifier; it comes out with exactly the same shape, but bigger. The drawing below shows the same sine wave entering another amplifier. The result is certainly bigger, but it doesn't bear much resemblance to the original. The first amplifier is operating as Class A; we don't worry about trying to classify the second one.

The mere fact that we know what the result should look like doesn't tell us much about how to get it, however. In fact, it took several years to get straightened out on the right way to operate tubes as Class A amplifiers. One of the early "discoveries" was that some negative grid bias was needed to get anything like the upper picture in Fig. 1. (Remember when "C" batteries used to be recommended to save tubes and "B" batteries?) The bias was required for a very simple reason, which Fig. 2 should make clear. Suppose we have a tube hooked up as shown, with no bias except the small amount obtained by connecting the grid return to the negative end of the filament.

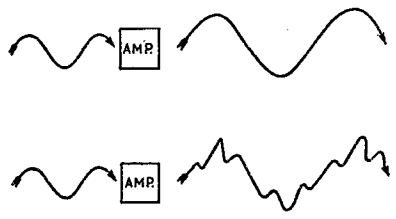


FIG. 1 — TWO KINDS OF AMPLIFIERS

The Class A amplifier gives an output wave-shape like that of the input wave, as shown in the top drawing. If the output wave-shape does not closely resemble the input wave, the amplifier is not operating Class A.

Suppose also that a signal like that at the left is impressed across the grid-filament circuit, coming from a preceding amplifier. Such a signal, which is of course a small alternating voltage, may have a value of several volts. When the signal voltage

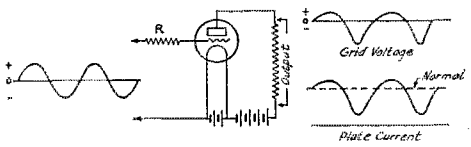


FIG. 2 — LOPSIDED OUTPUT RESULTING FROM AN UNBIASED GRID CIRCUIT

The signal from the preceding amplifier has the wave-shape indicated in the drawing at the left. On the positive signal peaks a small current flows in the grid-filament circuit of the tube, and since the current flows through a high-resistance circuit — the resistance R is made up of the internal plate resistance of the preceding amplifier as well as the circuit resistance — there is a drop in voltage at the grid of the tube. This does not occur on the negative signal peaks because no current flows when the signal voltage is negative. As a result the actual grid voltage looks like the top drawing shown at the right and the plate current has the same shape.

is positive, current begins to flow in the grid-filament circuit of the tube, just as it does in the plate circuit when a positive voltage is on the plate. On the negative peaks, however, no grid current can flow.

Now this condition would be of little harm if the signal came from a source which had low resistance, but the source is generally another vacuum tube, which very definitely has a high resistance, and this resistance acts in series with the circuit. The result is that when grid current is flowing which, we have noted, occurs only on the positive peaks of the signal voltage — part of the voltage is lost in the resistance, so that the actual voltage on the grid of the amplifier looks like the drawing at the right, and of course the output wave has the same shape. This is far from faithful reproduction, naturally, so the amplifier is said to be distorting; when the output is put into a loud speaker the sound emitted is not exactly the same as that which actuated the transmitter. It should be obvious that the way to prevent grid current from flowing is to put enough negative bias on the amplifier so that the grid will never be positive with respect to the filament with even the largest signal voltage to be handled. We can't use too much bias, however, because then on the negative signal peaks the plate current would be entirely cut off long before grid current started to flow on the positive peaks of the same signal. In this case the output would look like the sketch in Fig. 3, which very evidently is again distorted.

It is apparent that if a tube is to operate as a Class A amplifier both types of distortion must be prevented. The bias must be properly chosen and the signal voltage must be kept within the limits indicated above. Just what value the bias will take depends upon the characteristics of the tube, the resistance in the output circuit and the plate voltage. We haven't the space to go into this phase of the story more fully in this article,[1] but will simply remark in passing that these requirements of the Class A amplifier are responsible for the development of tubes such as the '71-A, '45 and '50, all of which are capable of giving fairly large power output with negligible distortion, and which can take large signal voltages in their grid circuits without drawing grid current or passing the plate current cut-off point.

Primarily, the "A" classification refers to tubes which are to deliver *power* in their output circuits, such as audio amplifiers which feed loud-speakers, modulate 'phone transmitters, and so on. Other amplifiers which must meet the Class A requirement, that of giving a faithful reproduction of the input signal, even though not considered to be delivering power, must be operated in the same way. Such amplifiers would be speech amplifiers preceding a modulator, an audio stage between the detector and loud-speaker stage, and other similar applications. Tubes of different characteristics from those mentioned are more suitable in these cases, however.

And now for the last point in connection with Class A amplifiers. We have seen that the input circuit is so arranged that no current flows in the grid-filament circuit; therefore, since voltage alone exists, no power is expended in exciting the tube. Appreciable amounts of power can be drawn from the plate circuit, however, so that the ratio of power amplification, i.e., power output divided by signal power input (not plate power input) is a finite figure divided by zero, the quotient of which is infinity. Theoretically, therefore, the power amplification ratio is infinite; actually, however, there is an extremely small dielectric loss in the grid-filament circuit of the tube which makes the ratio always less than infinity, but still very high.[2] The plate efficiency,

[1] More detailed information on the operation of the Class A amplifier and methods of determining the performance of various tubes will be found in the chapter on *Radiotelephony* in *The Radio Amateur's Handbook*, 9th Edition, and also in the following *QST* articles:

"Little-Known Tubes," Westman, July, 1929.
"The UV-845," Lamb, November, 1929.
"The Use of the Distortion Rule in Power Output Calculation," Weaver, November, 1929.
"Vacuum Tube Layouts for Telephone Modulation," Spitzer, February, 1930; Correction, page 55, March, 1930.
"The W.E. 212-D as a Modulator," Rydberg, October, 1931.

[2] This is true only when the amplifier operates without grid current, as explained. It is possible to operate as a Class A amplifier with grid current provided the input circuit is correctly designed and the preceding tube is capable of furnishing the grid power required. See "High-Power Performance from the Small 'Phone Transmitter," Lamb and Grammer, *QST*, December, 1930, p. 12. When grid current is drawn the power amplification ratio drops to a com-

which is the ratio of output power to plate input (plate voltage multiplied by plate current), is relatively low in the Class A amplifier; ordinary three-element tubes usually average 15% to 20%, although pentodes may run as high as 30% to 35%, neglecting losses in the accelerator grid circuit. So we don't actually get something for nothing.

THE CLASS C AMPLIFIER

In the alphabet B follows A, but in this story it is more logical for C to take the second place. For it is the job of the Class C amplifier to take audio output, which up until recently has nearly always been furnished by a Class A amplifier, and combine it with a steady r.f. carrier to produce a modulated signal. To do this properly it must in its turn fulfill certain conditions.

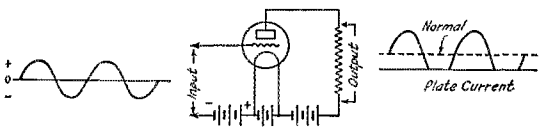


FIG. 3 — DISTORTION CAUSED BY TOO MUCH BIAS

The signal voltage is sufficient to cause plate current to cease to flow over a considerable part of the cycle; thus the output wave-shape is not the same as that of the signal.

The most important of these conditions is that the power output from the Class C amplifier must be proportional to the square of the plate voltage. Taken by itself, this bare statement may not mean much; some explanation is required. The Class C amplifier is required only when Heising modulation is being employed; we can call this system of modulation the "plate voltage variation method," a term which is more descriptive than the old cognomen "constant current." Modulation, of course, is the process of varying the amplitude of the radio-frequency oscillations generated by a transmitter in accordance with the audio-frequency signal set up in the microphone circuit. Now "amplitude" and "power" are not synonymous; amplitude refers to the value of current or voltage, but power is the product of *both* current and voltage. Since an understanding of the point involved here is essential, we have a picture of it in Fig. 4. Suppose the sine wave at the top represents an alternating voltage whose maximum value or amplitude, reached at the point marked A, is 4 volts. If this voltage is applied across a circuit whose resistance is 2 ohms, the current will take the form of the second drawing, and its maximum amplitude, also reached at A, will be 2 amperes. The power will also reach a maximum at the same instant, and will be 4 volts multiplied by 2 amperes, or 8 watts.

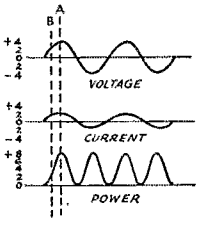
Now if we take a second point, such as B, at the instant when the voltage wave reaches the 2-volt mark, the current will be 1 ampere at the same instant, since the resistance has not changed. The power, however, will be 2 times 1, or 2 watts. The amplitudes of the current and voltage have been reduced to one-half their maximum values, but the power has dropped to *one-fourth* of its maximum. A simple transposition of Ohm's Law shows that the power varies as the square of either the voltage or current.

This relation is valid in the microphone circuit, and it must also hold in the antenna if the transmitted wave is to carry the signal with all its original characteristics. Hence with a modulation system which varies the plate voltage on an r.f. amplifier the radio-frequency power output of that amplifier must vary as the *square of the plate voltage*. This must be true for the entire range over which the plate voltage is to be varied. For 100% modulation the range is from zero volts to twice the normal operating plate voltage on the r.f. amplifier being modulated. Doubling the normal plate voltage means that the power output must be quadrupled; thus the more or less familiar requirement for 100% modulation that the transmitter must be capable of developing four times its normal carrier power on the modulation peaks.

An amplifier capable of doing these things is a Class C amplifier. Note that so far we have avoided saying anything about such things as "double-cut-off bias." As a matter of fact any properly adjusted oscillator, with self-bias, can operate as a Class C amplifier. Sometimes we heartily wish this weren't so, considering some of the atrocities foisted on our poor bands under the name of "amateur 'phones." An r.f. amplifier with grid-leak bias, properly excited, also will operate as a Class C amplifier. In fact, it makes little difference how the bias on the amplifier is secured so long as there is plenty of excitation and all adjustments have been made to secure high efficiency — efficiency being the ratio of radio-frequency power output to d.c. input to the plate. Adjustments for high efficiency in vacuum tubes call for high negative grid bias, however, and investigation has shown that approximately twice the bias which reduces the plate current to zero at the operating plate voltage is about right. But the mere fact that a tube is so biased does not

FIG. 4 — POWER VARIES AS THE SQUARE OF THE VOLTAGE

Illustrating Ohm's law applied to alternating currents in a resistive circuit. The power is positive at all times, since the polarities of both current and voltage are reversed at the same instant.



paratively low value, while the plate efficiency increases only slightly.

make it a Class C amplifier. It must, in addition, be furnished more than enough excitation to saturate the plate on the positive excitation peaks — that is, the grid voltage must go so far positive that the plate and grid together will attract all the electrons the filament is capable of emitting — and *the power output must vary as the square of the plate voltage.*

It's not hard to tell if a tube is operating as a Class C amplifier if the plate voltage can be varied. Couple the antenna or a dummy load to the tube's output circuit, adjust the coupling until the input is that desired, and run a curve of antenna current against plate voltage. An ideal curve of this sort is shown in Fig. 5; this is purely hypothetical, of course, and an actual curve is likely to show slight departures from a straight line. If the plate current is simultaneously plotted against plate voltage the result should likewise be a straight line.

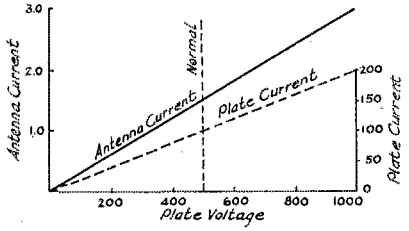


FIG. 5 — IDEAL CLASS C AMPLIFIER CURVES

Antenna current and plate current plotted against plate voltage should be straight lines from zero to twice the normal operating plate voltage. Actual curves will show some departure from the ideal, but should be within 5% or 10%.

The plate current curve indicates that, so far as the load on the plate supply — and also modulator — is concerned, the Class C amplifier can be considered to be a simple resistance whose value is equal to the plate voltage divided by the plate current, since it follows the same laws a similar resistor would. If, in Fig. 5, the normal plate voltage is 500 and the plate current 100 milliamperes, from the plate-supply and modulator viewpoint the Class C amplifier acts just like a resistance of 5000 ohms. Another point is that when modulation is taking place the voltage and current rise just as far above the normal values as they drop below them; there is therefore no *net* change in either plate voltage or plate current during modulation. The average remains the same. The pointer of the d.c. plate meter on your Class C amplifier should not budge when you talk into the mike; the antenna current alone will change. An a.c. meter in the plate circuit would, however, show an increase during modulation, indicating that the modulator is furnishing extra a.c. power to make the antenna current rise.

We can't leave this part of the discussion without saying something about the output and efficiency of the Class C amplifier. We have already pointed out that the amplifier is adjusted for high efficiency; the values generally run in the neighborhood of 70% or 80%, meaning that a generous portion of the plate power paid for is getting out into the air to do useful work. But to get this kind of plate efficiency it is necessary to run the grid of the amplifier far into the positive region, with the result that large grid currents flow. Consequently a rather large amount of power is taken from the exciting source and the power amplification ratio — defined previously — is low. Power amplification ratios around 10 are perhaps average.

So much for the Class C amplifier.

THE CLASS B R.F. AMPLIFIER

The Class B r.f. amplifier (not to be confused with the Class B a.f. amplifier or modulator) comes into the picture after modulation has taken place, which is why we have left it until last. Its job is to take the output of a modulated Class C amplifier of low or moderate power and step it up to something larger without losing or adding anything to the original modulation. To do this its power output must vary as the square of the exciting grid voltage. Anyone who has followed the reasoning thus far will have little difficulty in understanding why this must be so. It's the same story as that gone through with the Class C amplifier, except that the Class B amplifier is taking the modulated signal in its grid circuit instead of having it applied to its plate circuit.

We have already established that the power in the modulated signal varies as the square of the voltage. This applies to the r.f. voltage in the antenna (or output circuit of the Class C amplifier, which may be the input circuit of a following Class B amplifier) as well as to the audio-frequency plate voltage supplied by the modulator. Fig. 6 is a picture of what happens to the radio-frequency voltage or current during one cycle of

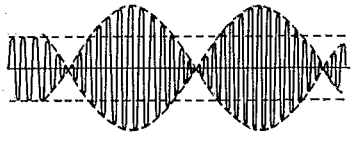


FIG. 6 — A COMPLETELY MODULATED CARRIER

The normal unmodulated carrier amplitude is that enclosed between the two horizontal dotted lines. With complete modulation the amplitude rises to twice the normal value and decreases to zero. "Amplitude" in this sense refers to actual values of current or voltage, but not to power. The instantaneous power varies as the square of the instantaneous amplitudes shown here.

the modulation frequency. The horizontal dashed lines above and below the zero line represent the limits of the r.f. voltage when no modulation is taking place; these lines are just half-way between the zero line and the maximum peak shown in the diagram, so it is evident that

the carrier must be modulated 100%. This is the sort of thing that is handed to the grid circuit of a Class B r.f. amplifier, and the power output from the Class B amplifier's plate circuit must be proportional to the square of this voltage.

The plate current of a vacuum tube is practically linear with respect to grid voltage — that is, a graph of plate current plotted against grid voltage will be an approximately straight line, as shown in Fig. 7 — over a large range, starting from the grid voltage which causes cut-off of plate current. The position of the bend at the upper part of the curve will depend upon the value of load resistance as well as on the characteristics of the tube; the lower the load resistance the longer will be the straight portion of the curve.

It follows from this fact that if a signal is applied to the grid circuit with the bias set at some point such as "A" so that the entire grid voltage swing caused by the signal lies on the straight portion of the curve, the plate current will look, when plotted out on paper, just like the original signal. The current in the load circuit will likewise have the same wave-shape. But a tube operating in this way would be a Class A amplifier.

Now the grid input to the Class B amplifier is at radio frequency; therefore we are not concerned with what happens to the shape of the individual alternations in Fig. 6 (since these alternations make no sound in the receiver), but only with the shape of the *modulation envelope* which encloses them, because this becomes the audible signal after detection. We can, therefore, dispense with everything below the reference line in Fig. 6, and what is left will still retain all the audio modulation. That is, both the positive and negative alternations of the r.f. voltage carry the modulation, so that if we eliminate one or the other group we still have just the same modulation as if both were there. We can, therefore, bias the r.f. amplifier so that when there is no excitation or signal voltage there will be no plate current, and when the excitation is applied only the positive alternations will cause plate current to flow. And since the alternating plate current will take the same wave shape as the exciting grid voltage, the current in the Class B amplifier's output circuit will be modulated in just the same way as the exciting voltage. Perhaps Fig. 8 will make this a bit clearer. It shows what happens with the tube whose characteristic is shown in Fig. 7 when the bias is set at the cut-off point and a modulated signal is applied to the grid. The plate current consists of a series of humps which are modulated in just the same way as the exciting wave is modulated.[3] In the tube's tuned output circuit the wave would look more like that of Fig. 6, however, because of a "pendulum" effect in the tuned circuit, just as the pendulum of a clock will swing both to left

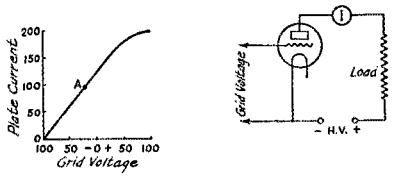


FIG. 7 — TYPICAL DYNAMIC CHARACTERISTIC

Plate current plotted against grid voltage with steady plate supply voltage source. The load resistance is supposed to be such that optimum power output is delivered by the tube. The droop at the upper end of the characteristic is dependent upon the value of load resistance as well as applied voltage.

and right of the vertical position even though the push which produces the motion is applied in one direction only. Storage of energy is responsible in both cases.

The output current, it is easy to see from Fig. 8, is directly proportional to the exciting grid voltage, so that the power output, which will be proportional to the square of the current, is proportional to the square of the exciting voltage, thus fulfilling the condition set up for the Class B amplifier. A Class A amplifier might be used for this purpose just as well; it is not used for the

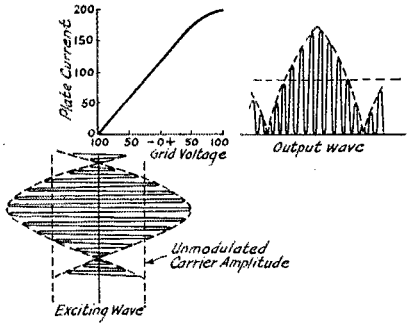


FIG. 8 — OPERATION OF THE CLASS B R.F. AMPLIFIER

This type of amplifier works over the entire straight portion of the dynamic characteristic shown. When the amplitude of the exciting wave is zero, the amplifier plate current is zero; at maximum exciting-wave amplitude in the positive direction the amplifier plate current is also maximum. The plate current will be just half its maximum value when the exciting wave is unmodulated. Only half-waves of r.f. flow in the plate circuit.

simple reason that much greater efficiency and power output can be obtained from the Class B amplifier. The Class B amplifier is biased to cut-off because that is the limit to which one can go and still have the output proportional to the square of the exciting voltage. It is obvious that if the bias is beyond the cut-off point there would be times when no plate current would be flowing

[3] For more detailed information on the Class B audio amplifier the reader is referred to "The Class B Push-Pull Modulator," Barton, *QST*, November, 1931, and "High-Power Performance from the Small 'Phone Transmitter," Lamb and Grammer, *QST*, December, 1931.

in spite of the fact that the positive peaks of the exciting wave had appreciable values, which evidently would mean distortion of the modulation envelope. The limit to which we can run the exciting voltage in the positive direction is set by the curvature of the characteristic at the upper end, which flattens off the modulation peaks if the grid voltage goes too far positive. Flattening the peaks of the r.f. output waves can be tolerated, however, so long as the output power keeps going up in proportion to the square of the excitation voltage.

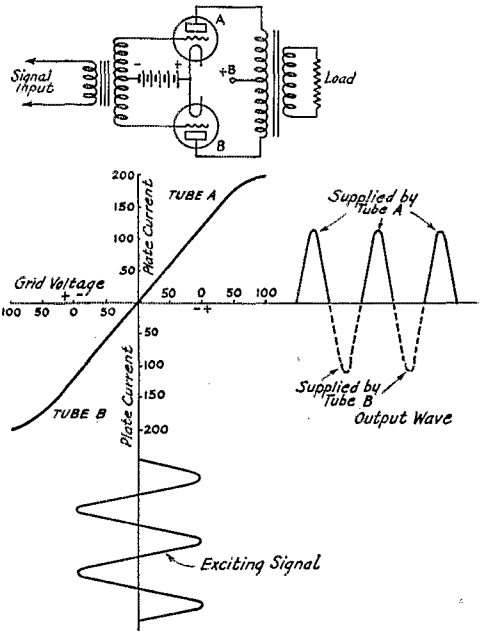


FIG. 9 — THE CLASS B PUSH-PULL AUDIO AMPLIFIER

In audio amplification it is not possible to dispense with half-cycles in the output circuit and retain the original characteristics of the exciting signal. A second tube, which alternates with the first tube in supplying half-cycles to the output circuit, must therefore be added for audio amplification. The plate currents of the two tubes are combined in the output circuit to reproduce the wave-shape of the exciting signal. The Class B audio amplifier differs from the Class B r.f. amplifier in that the plate current is zero when there is no signal, whereas the plate current in the latter varies above and below an average value set by the unmodulated carrier which excites the amplifier.

In the final analysis, then, what we want to know is how the load current — which may be antenna current or the current in a dummy load — varies with the excitation voltage. We might run a curve of this sort, assuming our Class B stage is being excited by a preceding Class C amplifier, by plotting antenna current against Class C amplifier plate voltage. The antenna coupling to the Class B stage should be adjusted to make the curve show signs of flattening off when the Class C amplifier plate voltage is twice its normal value, if we intend to modulate 100%. From this point down to zero it should be a fairly straight line. Then, when the transmitter is all set to go, the antenna current with the carrier unmodulated should be just half the maximum value so obtained.

In modulating an r.f. wave we vary the amplitude of the wave above and below a mean value which is the unmodulated carrier. The Class B r.f. amplifier is, therefore, always drawing plate current, and in the modulation "valleys" the plate current goes down below the value set by the carrier excitation (instantaneously) just as much as it rises above the carrier value on the modulation peaks. Under these conditions, there will be no *net* change in the Class B amplifier plate current as read on a d.c. ammeter in the plate circuit, just as there is no change in Class C amplifier plate current under similar conditions.

There are a good many other considerations, of course, besides those pointed out above in the adjustment of a linear amplifier, such, for instance, as maintaining good voltage regulation in the exciting wave, but such things are part of the practical operation of a 'phone transmitter and are more or less incidental to the fundamental requirements for the Class B r.f. amplifier.

In the Class B amplifier with low excitation the power amplification ratio is fairly large — often 50 to 100. The efficiency, however, is only medium. As used in 'phone transmitters, the plate efficiency for the carrier only — that is, without modulation — usually is in the vicinity of 40%. The efficiency on the modulation peaks may be as high as 75%. In the modulation "valleys," when the exciting voltage is near zero, the efficiency is low. We can, therefore, look at the Class B amplifier as being a "variable efficiency" amplifier.

So far as the tubes themselves are concerned, there is actually little difference between the Class B and Class C r.f. amplifiers. The latter is simply the Class B amplifier with peak excitation, which makes its efficiency high, and the efficiency is further increased by using a higher bias, which, as explained a few paragraphs back, cannot be done with the Class B amplifier if distortion of the modulation is to be prevented.

THE CLASS B A.F. AMPLIFIER

The Class B audio-frequency amplifier or modulator is similar in principle to the Class B r.f. amplifier, but there are quite a few differences in operation. The exciting voltage is at an audio frequency instead of radio frequency, so that we are no longer dealing with modulation envelopes which vary above and below a steady "in-between" value, but with a.c. voltages in which every other alternation has its polarity reversed, corresponding to the radio-frequency alternations in Fig. 8. We found that we could cut off one side of the r.f. wave in Fig. 8 without

doing anything to the quality of the modulation because the r.f. wave is inaudible in the receiver; we can't do that when audio voltage is applied to the Class B amplifier because *everything* that goes into the amplifier is going to be heard — or not heard, if part of the input is cut off.

The Class B audio amplifier usually is working into a load which is non-resonant, as contrasted to the Class B r.f. amplifier, the output circuit of which is always tuned. There is therefore none of the "pendulum" effect mentioned previously in connection with Class B r.f. output. Consequently, if the output from the amplifier is going to be just exactly the same in character as the input, the half-cycles which ordinarily would be missing if the tube is biased to the cut-off point must be supplied. This is accomplished by using a second tube and arranging the circuit so that each tube amplifies one side of the exciting wave, both sides being combined in the output circuit to make the signal delivered to the load circuit exactly the same as the original. This calls for a push-pull connection of the two tubes, as shown in Fig. 9. The tubes are biased to the point where no plate current flows when there is no signal input, and when a signal is applied Tube A takes one half-cycle and amplifies it while Tube B takes the *other* half cycle and amplifies it. The resultant alternating plate current for each tube flows in the side of the center-tapped primary of the output transformer which is connected to that tube, and as a result the voltage induced in the output transformer has the same shape as the original exciting signal.[3]

Attention, Holders of Temporary Op Licenses!

WE quote a bulletin of the Radio Division to all supervisors:

"After one year from April 15, 1932, renewals of temporary amateur class operator's license will not be issued. Holders of this class of license will be expected to pass the regular amateur examination during the one year term of such license, and, failing to pass this examination, the temporary amateur license held will be cancelled."

The temporary license is not necessarily a one-year license. That merely is its limit. Its function is to permit an amateur to receive authority by mail to commence operating, pending a personal examination of his qualifications. It is good only until the radio inspector makes a tour into your vicinity. In the past the Division has sometimes renewed these temporary licenses, so that an amateur would operate for two or three years before his qualifications were actually determined. Now they are no longer to be renewed. Some time during the life of your "temporary" you must take the regular examination. You don't have to wait until the end of the year, and in fact it is much better to arrange to take the exam at some convenient time during the year, and thus get a full-fledged ticket. Once you have passed the examination in person, you can always get renewals by mail.

Atlantic Division Convention

June 17th and 18th at Washington, D. C.

ONWARD to Washington — the Mecca of the United States. And what a convention the Washington Radio Club is planning, not only for the amateurs of the Atlantic Division but for the entire country. Plan your vacation for June, and spend it in the city of Washington and while participating in the Bi-Centennial Celebration attend the Atlantic Division Convention. The Mayflower Hotel has been chosen for the headquarters and the members of the Washington Radio Club will make you feel at home as soon as you arrive. A galaxy of eminent speakers will address the convention during the two days of festivities. A partial list shows Dr. Dellinger, Bureau of Standards; Dr. A. H. Taylor, Naval Research Bureau; Paul Goldsborough, Aeronautical Radio; W. D. Terrell, Chief of the Radio Division, etc. Director Woodruff will be the Toastmaster. A. R. R. L. will send A. A. Hebert, fieldman.

Bring your OW's and YL's with you and they will be well taken care of by the reception committee.

The price is $4.00 for every one. Further particulars from Miss Zandonini, Secretary, 3633 Everett St., N. W., Washington, D. C.

Strays

One ham suggests that the *Handbook* could be made even more practical if it had aluminum covers which could be used for shielding!

The 1932 edition of the "Aerovox Condenser and Resistor Manual" contains a great deal of technical data and formulas which amateurs will find useful, as well as specifications of Aerovox products. In particular, there is a handy chart which indicates the reactance of condensers and chokes at all frequencies between 10 cycles and 5000 kilocycles. Copies may be obtained free of charge by writing the Aerovox Wireless Corporation, 70 Washington Street, Brooklyn, N. Y.

W8DJV says that seeing as how Japanese sigs are as scarce in Cleveland as soap in Siberia, he's going to grab the first rattler for California, sword in hand, the next time he hears a W6E— signing his call J5—!

An aluminum pan makes a good solid chassis for a receiver and saves the trouble of cutting and assembling a sub-panel and braces.

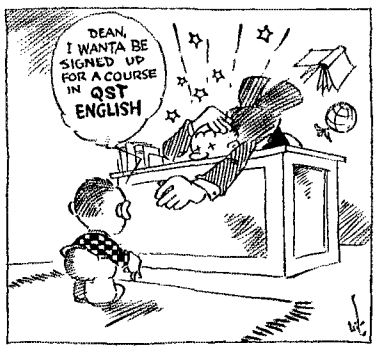
— *W1BBJ*

"QST-English"

BACK in 1925 when I went to Paris with Mr. Maxim to help form the I.A.R.U., we were surprised to find that most of the French amateurs could speak English pretty well and could understand us if we didn't QRQ too much. They had learned it, they said, from reading *QST*; they simply had to learn to read English because they simply had to be able to read *QST*.

Later, over the air, these amateurs and their fellows in many another land came into the fluent use of that abbreviated form of English that characterizes the American ham on the air. We all know what it is, a miscellany composed of Phillips Code, official radio abbreviations and much that, like Topsy, just grew. The French amateurs call it "QST-English," and that's as good a name as any.

It must be very difficult for the foreigner, with no knowledge of the sound of the word and in many cases probably not even knowing what the



basic word itself is, to master this "language" and put it together coherently. Yet they do, and how! Consider, for example, this sample of the life story of XF8FFU, a Frenchman, appearing in the Dutch hamsheet called "Rag-Chewing." It is a gem of QST-English of purest ray serene:

ELLO EVDI!

Ts is XF8FFU rcing 2 u is lifestory. Ole KK asked me 2 do it es I shud at know anni reason y nt tell it in our own lingo so jist lsn 2 ts! Tadidadida.

Saw dalite in 1902 es dere aint nil spcial 2 ts, more fellers did started Radio in 1915 wi ole Radio papa covers fst book, built up tremendous sup slider nil catch bd DX set on Xtals allowing jist 2 get sigs fm FL tower bt dnt understand morse vy gd so cudnt even rd wot I got! Nw es then gt sum DX bt vy pur.

Even trid start lw pwr coil spk set pri in aerial es vy bd agn, jist gt 2000 Mtrs not wave but DX Hi! After tt went 2 England fr 1 year es trid agn bt gt no sigs at all — cause FL 2 far es hook up still worse es miself vy big punk es got YL dere es mni 88s but no DX es WX FB in Brighton so stuck 2 88s es 99 fm radio till abt 1920. In 1920 evi btr!

Started Valeriusstreet Amsterdam bg flat roofs OK FB pt up ole Xtal set agn es gt upstairs fr ptin up aireal es jist dere came a feller walking along roofs, long tall bum wi spectacles on even longer nose es looked 2 me es ses wot u doing? Well ses I cnt u see, puttin up wireless! So e ses jist uh uh es smiles es I lied: Oh I know evthin abt it! So e agn ses U uh bt vy ld dis time es I see abt 20 miles o grin on his dielectricum es I felt e purti well knows im lying es I gt more careful es ses: Well if U know more abt it jist 4!! E ses OK babe ill 4 u. Es dis hombre wos wots nw cld PAØZN es a vy bg OM o mi!

I gt mi 4 FB es evi da our stns wkd 2gether wi hipitch buzzers es 100dreds QSQs were made btwx stn SB (stn PAØZN nw) es GS (wot wos me).

Flwd Radioschool up dere es gt me license as op in The Hague OK. On same time gt honies cls es other honies es went dwn S agn. Ltr trid get QSO fm S wi SB wi ole trench spk set 250 Wts bt no QSO es locl military stn gt vy nervus as stn AA1 (wot wos mi cll) banged up is wole set es warned Bé military in Utrecht Germans were on the job agn es Bé et me OK so tt wos indeed mi 1st DX Hi!

Still ltr started on bottle wit RAC es made mni FB QSOs specialli wi Fs es dat wos the birth of NØKY Hi!

Still ltr went to sea as ships spk op es strolled fr 2½ years all oer shop bt vy ltle ham wk, onli lce gd DX in Indian Ocean wi gochamiti QRN. Years o 99 tt came bt still folwd evi nw hk up es wos NVIR member. Few months ago gd ole ham fever caute me agn es I gt start agn es RCCer es built up in F xmitter nw knwn as XF8FFU tt X is cause im movin always es gt wot Fs cll "la bougeotte."

In few weeks lll get mi Dutch ticket es start mi PA FB agn but tn ill go 2 Germany es wk a D4 cll. Ull gt more specials abt mi life es ham es spk wk whenever u like boys, dis is jist short hook up. Nw QRT dis time. Mni RCCs es 73s 2 u all fellrs ope QSO sn all o u. If anni YL reads it dont gt cross bt mni 88s cause mi love is still divided.

Didadidadet,

XF8FFU.

We shd sa its qte a thot wen u cm 2 tnk abt it — dis biz uv a ham lingo wot evbdi gets OKR9 dadaditditdada!

— *K. B. W.*

'Phone-C.W. Consistent DX QSO's Contest

All W/VE Amateurs take part June 5th–18th—Report your 20 best DX QSO's on 1. 7-, 3. 5- and / or 7-mc. Bands

PRIZES! 30 to 45 precision quartz oscillators will be presented to the winners by the staff of W8YA, the station of the Pennsylvania State College.

Three separate contests on three amateur bands! Prizes in high, medium and low-power classes for each band! Prizes guaranteed for both 'phone and c.w. stations in each group. — EDITOR.

WHATEVER our choice of frequency bands, whether we use code or voice, whether high, medium, or low power, all of us take pride in the DX abilities of our station equipment. We have learned that a good note and real frequency stability (and in 'phone transmitters a high percentage of modulation) are more important than antenna-amperes in penetrating QRM and QRN for effective DX communication. What more natural, then, than a contest in which all of us who operate compare our best DX for certain operating periods.

All one has to do to enter is to report his 20 best DX QSO's during the period of the contest. What operator can make the best "total mileage" score (1) using 1875 to 2000-kc. 'phone? (2) using code on the 1715 to 2000-kc. band? (3) using 3900 to 4000-kc. 'phone? (4) using 3500 to 4000-kc. c.w. telegraphy? (5) using 7000 to 7300-kc. band telegraphy?

Entries submitted will be classified according to the power used to make the QSO's reported. Plate inputs (to the last stage) of 50 watts or less — low power; over 50 to and including 250 watts — medium power; over 250 watts — high power.

To take part merely get on the air in the contest period. Choose any band and power, and use either 'phone or c.w. as you please, for any given entry. Any contestant may submit lists of QSO's (20 QSO's in each list) in as many power or band classes as may be desired. All the QSO's on any one list, however, must be made in the same frequency band and power class, and with the same type of transmission.

Any station can make three or four entries if desired, under the rules of the contest, of course. However, by specializing in work in any *one* band and power class, there will be more QSO's from which to select the best 20, and that means greater chances of outstanding prize-winning work in the particular group in which your entry falls.

The contest will run for a two-week period, June 5th–18th, inclusive. (Your local standard time will determine the start and finish of contest QSO's for you.) The sum of the distances of the QSO's which you list as your 20 best QSO's will constitute the "mileage score" of your entry. Final scores may be modified by the award committee, if necessary, by a correction factor, to equalize 'phone and CWT results in each band and power class. For this purpose a factor will be determined by the ratio of the "mileage score" of the best CWT entry to the "mileage score" of the best 'phone entry, in each band and power class. All 'phone (or CWT as may be necessary) scores in each group specified in the rules will be multiplied by this equalizing factor, whatever it may be in each case.

Low-power stations will be on a plane of equal or more-than-equal opportunity with high-power stations. The award committee will divide all entries into low-power, medium-power, and high-power classes after the entries have been classified by bands. First, second, etc., prizes will be awarded in each power-class group, as stated later. At least one 'phone *and* one c.w. entry will receive a prize award in each power-class group.

PRIZES

There are prizes in quantity, and these will be awarded among the several power groups as nearly as possible in proportion to the number of entries in each band falling in each power group. The staff at W8YA, the station of the Department of Electrical Engineering, the Pennsylvania State College, is making this large donation of quartz crystals with the idea of furthering the work of the A.R.R.L. in promoting greater frequency stability in amateur transmitters. Also the donor of the prizes wishes to reach amateurs using moderate or low-power, and not to confine the awards to only high-power amateur stations — hence the classification of entries by power input.

All winners receive finished quartz crystals. *These will be furnished in either the 1.7 or 3.5 mc. bands ground to the approximate frequencies specified by the winners.*

The contacts submitted as the "best 20" may be with other U. S. and Canadian stations, or with amateur stations in any part of the world. Prearranged QSO's shall not count, only those

raised on "hit-or-miss" or general calls. The same station shall not be included more than once in the completed tabulation, regardless of the number of times worked.

So list your 20 best QSO's (all 'phone or all c.w.) for any one band and power class, using a form similar to the sample below, including the "mileage score," which is merely the sum of the distances of the 20 QSO's submitted. The distances between stations shall be the shortest "great circle" distances measured along the surface of the earth, determined as accurately as possible.

The awards to be determined at A.R.R.L. Headquarters will be based on the consideration of scores separately determined for each entry, these to be modified in accordance with the procedure for judging that will now be outlined. It is not necessary to submit QSL cards in proof of each QSO in the contest period, although this may be done on any or all the QSO's if a contestant desires, and may thus save the judges some labor in checking contacts shown on each log by mail correspondence, a procedure that will be followed insofar as deemed necessary to insure fairness to all who enter.

RULES FOR AWARDS

Within one week of the close of the contest, your report must be mailed to A.R.R.L. communications Department, 38 La Salle Road, West Hartford, Conn.

Entries must show date and time of the 20 best QSO's, frequency band, plate input, station call, location, DX in miles, etc., for each of the stations worked. All information shall be given in the following form:

My 20 best QSO's for Contest

Amateur Station..... C.W. or 'Phone.....Frequency.....

Name in full.....

Full address.....

Date and Time (Local)	Plate Input (Watts)	Station Worked	Location (City, etc)	Distance (Miles)

Penalties: Stations shall be disqualified on proof of off-frequency operation in contest work. Also a loss of 5% of the final score shall be imposed for each legitimate complaint of the use of a.c., unduly broad or illegal notes, improper operation, or for any illegal or unsportsmanlike efforts shown to have been carried out in the contest.

Procedure in making awards: These shall all be determined by the final corrected "mileage score." The scores shall first be checked.

1. The entries shall be classified according to the frequency band and power used, and type of transmission (c.w. or 'phone).

2. The distribution of prizes in each band between power classes shall then be made (regardless of type of transmission) in approximately the ratio of participation by the different power groups in the band. *At least* 10 crystals will be awarded in each band. For example: If the relative participation of the different power groups is 62%, 26%, and 12% in the low-, medium-, and high-power classes respectively, the crystal distribution will be 7, 3, and 2. Since at least one 'phone and one c.w. station in each power and band class will receive an award, *at least 2 crystals will be given in each group* regardless of how small participation may be in that power class. Obviously this does not apply to the 7000-kc. band, since there are no 'phones to be considered in this band.

3. Now in the 1750-kc. and 3500-kc. bands the highest 'phone "mileage score" is multiplied by a factor such that it will equal the highest c.w. "mileage score" (or vice versa should the 'phone score be higher in any case). All 'phone "mileage scores" will then be multiplied by this correction factor, thus placing 'phone and c.w. stations on the same basis for determining the other prizes in that power-class band. A separate correction factor shall be worked out for each power class in each band.

4. A distribution of prizes shall then be made according to the corrected scores of the stations in each power-class band until all the prizes allotted to that power-class band shall have been awarded.

Thus: (1) Differences in conditions as to DX ability of the three bands are eliminated so far as prize distribution is concerned, as *each band actually has a contest of its own* even though all run at the same time. (2) Differences in range of c.w. and 'phone transmissions are equalized as fairly as possible. (3) Differences in power are taken care of insofar as practical by having three power groups in each band. (4) Prizes are divided between the power groups in the ratio of their participation in each band. This leaves *station adjustment, modernization of equipment,* and *operating ability,* as the major factors in determining who will receive the prizes.

But let the contest judges worry about details. The essentials of taking part are extremely simple. *Stick to ONE power, ONE frequency band,*[1] *'PHONE or C.W. for any entry. Work as many stations as you can. Pick out the 20 QSO's that represent the BEST DX for that period and submit your entry based on those!*

— *G. L. C. + F. E. H.*

[1] Only work on 1.7-mc., 3.5-mc., and 7-mc. bands may be entered in this contest.

A New Group of Receiving Tubes

Pertinent Dope on the 56, 57 and 58

THREE new types of receiving tubes that promise to be of especial interest to amateurs will make their appearance in the near future, the type numbers being 56, 57 and 58. All three have indirectly heated cathodes, with heaters designed to operate at 2.5 volts and one ampere, a.c. or d.c. Included in the group are a general purpose triode, a triple-grid tube with sharp plate current cut-off, suitable for use as detector or amplifier, and a triple-grid tube of the variable-mu type.

THE TYPE 56

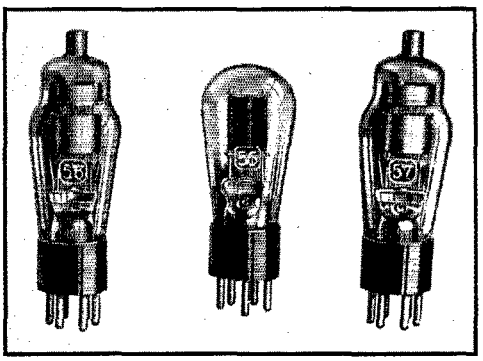
The 56 is the general purpose triode. It is intended to be used as a detector, as an a.f. amplifier with either transformer or resistance coupling, and as an oscillator. It has a small bulb — the same size as that used on the Type '37. Its plate impedance is about the same as that of the '27, but the amplification factor and mutual conductance are about 50% higher.

Following are the tentative ratings and characteristics of the 56 as a Class A amplifier:

Plate voltage, 250 volts max.
Grid voltage,—13.5 volts.
Amplification factor, 13.8
Plate resistance, 9500 ohms
Mutual conductance, 1450 micromhos
Plate current, 5 ma.

As a bias detector with 250 volts on the plate, the bias will be approximately −20 volts. The bias should be adjusted to make the plate current 0.2 ma. with no signal, requiring a cathode resistor of approximately 100,000 ohms for automatic bias. When the tube is used as an oscillator the maximum recommended plate voltage is 90 volts.

The tube has the small-size 5-pin base.



THE NEW RECEIVING TUBES

The 56 is in the center, flanked by the 57 and 58. Note the unusual bulb shape on the latter two and the shield in the dome top. These two tubes also have six-pin bases.

THE 57 AND 58

In many ways the design of the 57 and 58 represents a distinct departure from custom. Both tubes are screen-grid r.f. amplifiers which may or may not be pentodes — a rather queer sounding statement, but literally true. The tubes contain the usual control and screen grids, and have in addition a third grid adjacent to the plate which is connected to a separate pin on the tube base. If the tube is to be used as a pentode, this grid is connected direct to the cathode. It may be used for other purposes, however, if the set-builder wishes.

Bringing out separate connections from all these grids completely overloaded the old 5-prong base, so a new 6-prong base replaces it. Then too, these tubes are equipped with a brand-new type of bulb — a pear-shaped affair like that used on the Type '37 with the addition of a dome on top. This odd-looking construction has been adopted to reduce the output capacitance — and since the tubes are said to function well as r.f. amplifiers at frequencies as high as 60 megacycles, it is evident that some improvement has been effected over the older type of construction. Briefly, the outer screen which covers the plate in tubes of the '24 type has been replaced by an electrostatic shield in the dome of the bulb. The shield is connected to the cathode inside the tube.

The 57 and 58 are alike in appearance, and the following ratings are the same on both tubes:

Heater voltage, 2.5 volts
Heater current, 1.0 amp.
Plate voltage, 250 volts max
Screen voltage, 100 volts max.
Direct Interelectrode Capacitances:
Effective grid-plate, 0.010 max. $\mu\mu$fd. (with shield can)
Input, 5.2 $\mu\mu$fd.
Output, 6.8 $\mu\mu$fd.

The operating conditions for the 57 as a Class A amplifier are as follows:

Plate voltage, 250 volts max.
Screen voltage, 100 volts max.
Grid voltage — 3 volts
Amplification factor, Greater than 1500
Plate resistance, Greater than 1.5 megohms
Mutual conductance, 1225 micromhos
Grid voltage for cathode current cut-off, — 7 volts approx.
Plate current, 2.0 ma.
Screen current, 1.0 ma. max.

As a bias detector the tube should be operated with a plate voltage of 250 and screen voltage of 100. The grid voltage should be approximately −6 volts. Plate current should be adjusted to 0.1 ma. with no signal. The plate load should consist

of a 250,000-ohm resistor or a 500-henry choke shunted by a 250,000-ohm resistor.

The tube is also well adapted for use as an automatic volume-control rectifier.

The 58 is intended for r.f. amplifier circuits where comparatively large signals are to be handled and where the volume control operates on the grid bias of the tube. Its operating conditions and characteristics are as follows:

Plate voltage, 250 volts max.
Screen voltage, 100 volts max.
Grid voltage, −3 volts min.
Amplification factor, 1280
Plate resistance, 800,000 ohms
Mutual conductance, 1600 micromhos
Mutual conductance at −40 volts bias, 10 micromhos
Mutual conductance at −50 volts bias, 2 micromhos
Plate current, 8.2 ma.
Screen current, 3.0 ma. max.

The 58 may also be used as a first detector in superheterodynes, in which case the grid voltage should be −10 with the plate and screen voltages listed above.

With both the 57 and 58 the screen voltage may be obtained through a series resistor from the plate supply if the suppressor grid is connected to the cathode.

Neither tube is suited to use as a dynatron oscillator.

No definite information has been received about the date on which these tubes will be available. However, it looks as though they should be better suited to short-wave receivers than the present types, and we hope that actual tests will show them to be superior.

— *G. G.*

The New Class B Tube

THE story on the type '46 tube, started on page 14 of our last issue, was incomplete. The missing portion of the tale follows:

The plate curves for Class A operation are shown in Fig. 1. The usual load lines can be drawn in for various operating points, using the familiar method applying to other tubes used as class A amplifiers.[2] The 46 will deliver 1.25 watts with a 33-volt grid swing as against 1.6 watts with a 50-volt grid swing from the Type '45, a comparison which gives a fair indication of the relative merits of the two tubes as Class A amplifiers.

As a Class B amplifier, with the two grids of each tube connected together, the operating conditions and characteristics are as follows:

Plate voltage	300	400	volts max.
Grid voltage	0	0	volts
Plate current (no signal)	4	6	ma.
Peak plate current	150	200	ma.
Load resistance per tube	1300	1450	ohms
Max. signal voltage	40	41	volts r.m.s.
Max. continuous power output (2 tubes)	16	20	watts
Max. plate dissipation (average per tube)	10	10	watts

[2] See chapter on Radiotelephony in *The Radio Amateur's Handbook.*

Fig. 2 shows the dynamic characteristic of two 46's in push-pull as Class B amplifiers for four different load resistances, the plate voltage being 400. The optimum load is that of curve B. A typical circuit using the tubes is shown in Fig. 3.

The following table shows some Class B combinations using a pair of 46's in the output stage, this information being taken from a preliminary technical bulletin on the tubes prepared by RCA Radiotron Co. One interesting point is that a pair of Type '27's in push-pull is adequate to excite the Class B stage to full output — quite a reduction in driving power from a pair of '45's exciting a pair of '10's. The voltage ratios of the input transformers also are given, as well as the peak power efficiency required of the transformer. The efficiencies are measured at 60 cycles.

Central Division Convention

June 25th and 26th, East St. Louis, Ill.

THE Knights of Columbus Club at 15th and State Streets, East St. Louis, Ill., is the place towards which the radio amateurs within a radius of three hundred miles should turn their eyes, prepare the old 'bus, save a few pennies from now on till convention time and register bright and early Saturday morning, June 25th, for two days of entertainment, talks, trips, etc. There will be prizes for attendance, smallest portable receiver and transmitter, the neatest low-power transmitter, the best station photo and several other things. The Egyptian Radio Club is sponsoring the convention and while it has had some good "Hamfests" in the past this is the first convention undertaken.

A cordial invitation is extended to everyone and a royal welcome awaits those who come. The price is $2.50 if you register in advance or $3.00 at the door. Your inquiries should be mailed to Earl Linder, W9DZG, 713 St. Louis Ave., East St. Louis, Ill., or to Harold Jansen, W9DJG, Box 751, Nameoki, Ill.

Strays

A radiogram from VK3LP nominates H. A. Marshall, VK2HM, to membership in the H.A.M. Club. This list still grows!

And again: A radiogram from ZL via ZL4AB and signed NZART says that insufficient postage is being used on correspondence with distressing results. Five cents in stamps is the required amount.

EXPERIMENTERS' SECTION

AN INTERESTING STUNT FOR 'PHONE STATIONS

I HAVE run into a little modulation stunt that I believe will be helpful to 'phone men.

On page 755 of Morecroft's second edition we find the curves for the ordinary speaking voice reproduced in Fig. 1. Quoting from Morecroft, "If all the frequencies below 1000 vibrations per second are eliminated the speech is still 85% intelligible, yet most of the speech energy has been thrown away." Inspection of the curves will show this to be very true.

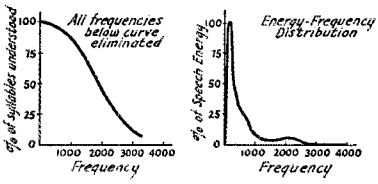


FIG. 1

Suppose a high-pass filter which cuts off at 1000 cycles is used in the speech amplifier of a 'phone transmitter. Inspection of the curves will show that at least four-fifths of the energy has been eliminated. Only 20% modulation would then be required to give the same range as 100% modulation without the filter. Or 100% modulation with the filter should give the same range as a transmitter with five times as much carrier power.

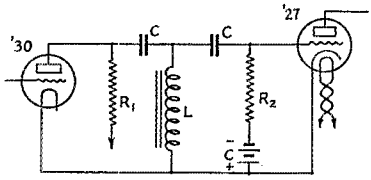


FIG. 2 — HIGH-PASS FILTER WITH 800-CYCLE CUT-OFF
R_1 — 25,000 ohms.
R_2 — 9000 ohms.
C — .022 μfd.
L — 0.9 henry.

To test this idea a high-pass filter having a cut-off frequency of 800 cycles was constructed, with terminating impedances of 9000 ohms, as shown in Fig. 2. This filter was then connected to a 'phone receiver. Voices sounded clear and a great deal of the 60-cycle grumbles and low-frequency hash in the 'phone band disappeared. The voices in many cases sounded more *human*.

The filter was then tried in the speech amplifier of W3CIJ and results were immediately noticed. The range seems much increased and the transmitter seems especially good at working through QRM, as was to be expected with the weak carrier relative to the apparent speech level. Most stations worked report better modulation with the filter. This ability to get through beat notes and QRM should make this a valuable stunt in the crowded 'phone bands.

Before putting the filter in the transmitter it should be tried on the receiver to make sure that good intelligible speech can get through it.

— *John P. Shanklin, W3CIJ.*

LOW-PASS FILTERS TO ELIMINATE INTERFERENCE

Operators of amateur 'phones are more prone to have trouble with nearby BCL's than the c.w. man because it isn't possible to apply a click filter to a 'phone set. The following letter from Millard E. Ames, W3BWD, may prove to be the solution of some of these problems:

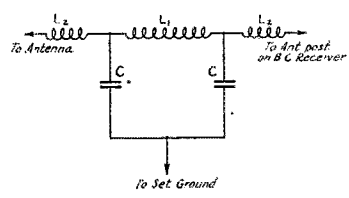


FIG. 3

"Being troubled with complaints from nearby BCL's, I have constructed a low-pass filter designed to cut off at 1600 kilocycles. Many amateurs may be interested in this untuned filter as it permits operation in all of the amateur frequency bands without resort to several wave-traps or retuning of a single wave-trap after each change of frequency. The circuit is shown in Fig. 3.

"It may be advantageous to shield the filter if it is in a powerful field. Condensers C are .0005 μfd. apiece and the inductances were calculated from the formula:

$$L_1 = \frac{\left(\frac{1}{\pi f}\right)^2}{C}$$

"The inductance L_2 should be one-half of the inductance L_1, which was calculated from the formula to be 79 microhenries. (These values are for terminating impedances of 400 ohms, probably a fair estimate — Ed.) Using a coil form 1⅝ inches in diameter and No. 24 d.s.c. wire, L_1 has 54 turns and L_2 33 turns. Of course the condensers and coils need not be exact in these measurements.

"This filter seems very effective in eliminating eighty-meter 'phone signals from a broadcast receiver here at W3BWD. The receiving antenna runs very close to the Zeppelin feeders and not more than ten feet from the flat top. No form of interference can be detected. Cross-talk is entirely eliminated. It certainly works FB. Amateurs not considering using 160 meters could design it for a higher cut-off frequency."

NEW USE FOR THE PHOTRONIC CELL

When Hertz antennas first came into vogue it used to be quite a problem to get them tuned up properly. One stunt was to put an ammeter in the center of the antenna and keep watch on it with

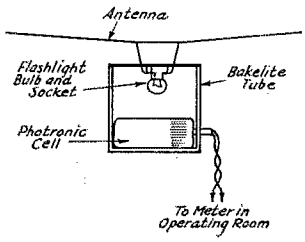


FIG. 4

field glasses while someone else made adjustments to the transmitter — or, if it was a one-man job, dash back and forth between the shack and the roof to see what happened each time something was changed. Lamps of various sorts also were pressed into service to replace the ammeter, obviating the necessity for the field glasses, but still having to be under observation.

The Weston Photronic Cell can be utilized to make the job much easier, if used in a fashion suggested by John Miller, engineer in charge of the radio division of Weston. A flashlight lamp should be shunted across as much of the antenna as is necessary to make it light with a fair degree of brightness. The lamp is placed in a short tube of bakelite or similar material at the other end of which the Photronic Cell is mounted, as shown in Fig. 4. The tube should be made light-tight, and the whole assembly is hooked to the center of the antenna. A pair of leads (ordinary lamp cord will do) is brought down from the cell to a microammeter or 0-1 milliammeter in the operating room.

With this rig the operator can see instantly the effect on the antenna current of any adjustments he may make. Only d.c. is flowing in the leads from the cell, so any reasonable length may be used. A small-size flashlight bulb (2.2 volts) will cause a deflection of about 150 microamperes on the meter when placed approximately one-half inch from the cell and lighted to normal brilliance.

FLIP-ON SHUNT

W9CTV contributes a handy kink for those who make frequent use of their d.c. meters. It is

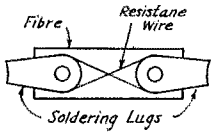


FIG. 5

a shunt which can be stuck between the terminals on the back of the meter without the necessity for unfastening any wires or using binding posts.

Fig. 5 is a drawing of one of the shunts. A small piece of flat fibre has holes drilled near each of its ends, and soldering lugs are fastened to the strip by eyelets or short machine screws. The required quantity of resistance wire is wound back and forth between the two lugs. The ends of latter are trimmed off as shown, the distance between the two ends being made just the right length to fit snugly between the meter terminals when the shunt is pushed in between them. Since the lugs are somewhat flexible the tension will hold the shunt in place. It can be flipped-on or removed in less time than it takes to tell it.

EASY QSY WITH CRYSTAL CONTROL

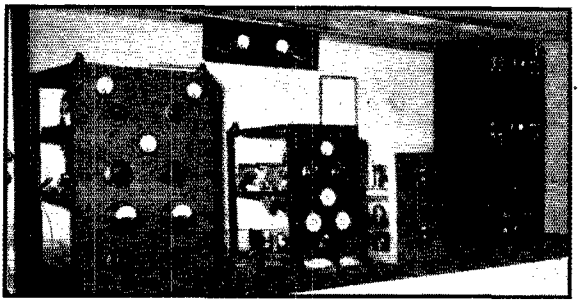
QSY with crystal control has often been mentioned in *QST*, but I don't remember ever having seen as simple a method of accomplishing the frequency shift as the one in use at this station. When it is desired to QSY out from under a station interfering with me, it is a simple matter to insert a little square of paper the size of the crystal between the crystal and the top plate of the holder. I have been using this method of QSY with a '47 pentode oscillator with about 400 volts on the plate, and the output does not seem to be affected when only one sheet of paper is between the top plate and the crystal. The frequency shift is enough with only one piece of paper to move my signals out from under those of the interfering station. With two pieces of paper in place, the output goes down a little, but the frequency shift is proportional to that caused by the first paper spacer. The output of the oscillator is still more than sufficient to excite a pentode doubler. This QSY stunt has been in operation on the 7000-kc. band for some time (using a 3500-kc. crystal) and has performed admirably.

— *Frank D. Lewis, W9AOG*

AMATEUR RADIO STATIONS

W3NT, Norfolk, Va.

W3NT occupies a building that was formerly a stable, but which has been completely renovated to suit the needs of a radio station. The first floor is occupied by the work shop, where all apparatus is built. The second floor is taken up by the operating and power supply rooms. There is also a separate small building that is used as a laboratory where apparatus is tested and experiments carried on.



THE THREE TRANSMITTERS AND POWER PANEL AT W3NT

All three transmitters are crystal-controlled. The one at the left has a 204-A in the final stage; the next a pair of 203-A's and the third, used for emergency work, a single 203-A.

In the operating room are located the transmitting and receiving equipment. The transmitters shown in the photo are, from left to right, the high-power 80-meter rig, the 40-meter set and next a medium-power emergency transmitter for use on either 40 or 80 meters. At the extreme right is the switchboard which controls the various transmitters and enables the operator to shift from one to another in a few seconds time.

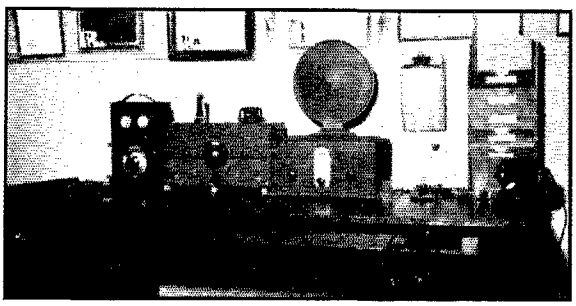
The 80-meter transmitter consists of a 245 crystal-controlled oscillator, 247 pentode buffer stage, and an 860 screen-grid amplifier feeding a single 204-A in the last stage. This set is coupled to a half wave Zepp antenna.

The 40-meter transmitter consists of a 245 crystal-controlled oscillator, 210 doubler stage and two 210's in push-pull feeding two 203-A's in push-pull in the last stage. This transmitter also works into a half-wave Zepp antenna.

The emergency transmitter has a 245 crystal-controlled oscillator, 247 pentode buffer or doubler stage and a single 203-A as amplifier. This outfit is designed for operation on either 40 or 80 meters and is also provided with a speech amplifier and grid-bias modulation for 'phone work.

The photo of the receiving equipment shows on the left a dynatron frequency meter, emergency receiver consisting of detector and two-step audio amplifier, National SW-5 receiver, transmitting keys, message files, etc.

The power room is located directly behind the transmitter bench. In it are the rectifying tubes and high tension filters, and power supplies for the oscillators and "C" bias. At the present time there are two power supplies. For the 40-meter set high voltage at 1200 volts is supplied from an RCA transformer through two Recto-bulbs and a filter. For the 80-meter set power at 2000 volts is supplied from a Thordarson transformer, through two 866 rectifiers and a filter. A third power supply is common to both the 40- and 80-meter transmitters and consists of two 281 rectifiers and a filter. This unit feeds the doublers and buffers. By means of a system of relays and the switchboard the operator is enabled to switch on any desired transmitter. After power is turned on to a particular transmitter it is then completely controlled from the operating table. The switchboard is also arranged so that any separate unit in a transmitter may be turned off or on at will for test purposes. The emergency transmitter is cut



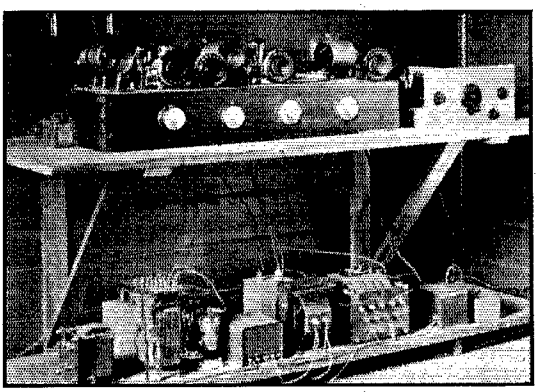
W3NT'S OPERATING POSITION

The six members of the operating force keep the station in daily operation.

into the 40-meter supply by means of auxiliary switches in the power room.

The station is manned by a personnel of six operators, and a nightly watch is maintained from 7:00 p.m. to midnight or later. There are also two station engineers, one having charge of the complicated low tension wiring and the power supplies up to the transmitters and the other having the transmitters themselves. By this arrangement the transmitter engineer is relieved of the maintenance of the entire system and can be assured of being supplied with the proper voltages for any rigs that he may build.

W3NT invites schedules and will be glad to QSP any time during its hours of operation. Everything possible is done to maintain schedules and keep the station on an efficient basis at all times. We also invite correspondence with any amateurs and will be glad to furnish additional data on any unit of the station.



VK3JK

This transmitter is a three-stage crystal outfit, with separate power supplies for each stage. The receiver is a.c. operated.

The station is the alternate section control station of the U. S. Naval Communications Reserve and when used in this capacity the call W3NB is used on a frequency of 3930 kc. In case of break down of the alternate control station located at 406 Plume St., Norfolk, this station is authorized to use the call NDK on 4045.2 and 3474.8 kc. All of the operators of the station are members of the Reserve.

The call 3NT was secured in 1913 and the station has been in active operation, with the exception of the war period, ever since that date, and has seen amateur radio grow from the old Ford spark coil and crystal detector up to its present high state of development.

VK3JK, Wangaratta, Victoria

ONE of the most consistent Aussie signals heard in these parts is that of VK3JK, the station of James K. Herd at Wangaratta, Victoria. As the accompanying photograph shows, the outfit is not unduly elaborate, using only a pair of 210's, but it is completely modern and well built.

The transmitter is the last of many attempts at rebuilding and has been evolved from a low-C Hartley using a W. E. 211-D to the present crystal-controlled outfit using 210's throughout.

The crystal oscillator is a 210, shunt-fed, and will operate on the 3500- or 1750-kc. band. The buffer-doubler stage utilizes one 210, also shunt-fed, with the bias to its grid fed through the plate inductance of the crystal oscillator.[1]

The power amplifier consists of two 210's in parallel and is fed with from 500 to 800 volts, at inputs varying from 50 watts to 210 or 220 on c.w. This stage is neutralized except when on 14 mc. when it operates as a doubler. The bias to this stage is likewise series fed, which is of special benefit on 21 meters, for until the set was changed from shunt-fed bias trouble was experienced with the grid chokes.

Modulation is accomplished by the Telefunken or grid-control method, utilizing UX-240 as a modulator, and replacing that last stage bias. The speech amplifier is a two-stage transformer coupled affair with a.c. tubes and automatic bias, and the microphone is a home-made Reiss type giving excellent quality.

The crystal oscillator is fed 350 volts from a separate transformer, the output of which is rectified by a Raytheon tube and filtered by a 50-henry choke with 8 μfd. each side. The doubler gets 500 volts from another transformer, rectified by a pair of Type '81 tubes, and a single 4-μfd. condenser across the line seems to give adequate smoothing. The final state has a transformer rated at 500 volts, giving up to 2000 volts full-wave and tapped from 500 up. The rectifiers are a pair of 866 tubes, with 8 μfd. of capacity across the output to suppress the ripple.

The transmitting antenna is a half-wave Zeppelin-type Hertz with a flat top 67 feet, 4 inches long and feeders 33 feet, 6 inches long spaced five inches apart.

This system radiates well on 80 and 20, but is not quite so efficient as on the frequency for which it was designed.

The receiver is a three-stage a.c. job with Philips 4-volt tubes — one screen grid r.f., detector and one audio. The whole set is built on an aluminum chassis, and is enclosed in the same material. The receiving aerial is a piece of No. 16 d.c.c. wire 15 feet long and is sufficient to copy all stations at comfortable strength.

All continents have been worked, including something like 52 countries.

[1] This arrangement is similar to that described on p. 22, November, 1931, *QST*.

• I. A. R. U. NEWS •

Devoted to the interests and activities of the

INTERNATIONAL AMATEUR RADIO UNION

President: H. P. MAXIM *Vice-President:* C. H. STEWART *Secretary:* K. B. WARNER

Headquarters Society:
THE AMERICAN RADIO RELAY LEAGUE, West Hartford, Conn.

Conducted by Clinton B. DeSoto

A MARK of distinction reserved for receiving stations only has been created by the D.A.S.D. in the form of a certificate to be awarded to those of its receiving stations logging amateur stations from all over the world on all the amateur bands. In addition to the reception requirement, which must be proven by the submission of 36 QSL cards from foreign amateurs acknowledging reception reports, the applicant must also submit a theoretical dissertation or investigation of a problem concerning high frequency radio to the D.A.S.D. The certificate awarded successful applicants will be known as the "DEM diploma," the letters "DEM" standing for "first-class German receiving station," and its holders will form a club analogous to the WAC Club. The letters "DEM" on their QSL cards will express the highest qualification and recognition that can be attained by the receiving amateurs of the country.

In consequence of their expectation that many German receiving stations will strive to achieve this honor, the D.A.S.D. requests of all foreign amateurs that they promptly acknowledge any report of some value that may be received from a DE (German receiving station). These acknowledgment QSL cards will go a great way toward helping amateur radio in Germany.

Although there is apparently no intention of the Wireless Institute of Australia to abandon its original policy of seeking membership from all branches of the radio industry, commercial as well as amateur and experimental, the latest report from W. G. Sones, federal publicity officer of the W.I.A., indicates that since amateur interests constitute the basis for activity in practically all of the Institute's divisions, each division can decide for itself how closely it will adhere to the original "open door" policy.

"For many years we have believed that because of our limited membership field in Australia our strength could be greatly augmented by attracting to membership, men and women interested in every branch of radio development and industry. Thus, in any negotiations in which we might become involved, our fighting strength would be greater if we could say that radio engineers, servicemen, traders, manufacturers, research workers and experimenters, etc., were behind us in our deliberations," was the belief.

Arising principally from the determinations of the Sydney Convention of November, 1931, however, the conclusion was reached that in practice the scheme has not worked out quite so satisfactorily excepting in the case of the New South Wales Division, which has a considerable "industrial" following. The remainder of the states have practically none, except in the membership of professional men who are amateurs as well in spirit or inclination. The reason is probably because N.S.W. in recent years has witnessed a gradual concentration of manufactures in Sydney.

The situation, in effect, then, was that the policy on which the constitution was modelled, as set forth above, and which also provided, reciprocally, that the smaller sections of the art or industry would be able to back up their own arguments with the considered weight of amateur radio behind them, was not working out as satisfactorily as expected. Activities, also fashioned as

a matter of policy to make them attractive to the people most interested, could under these circumstances logically be nothing but amateur activities.

Therefore, "it would appear that in the future, giving effect to this item of policy (although it again received enunciation at the Sydney Convention) will depend entirely on local conditions — 'amateur' and 'experimental' interests will comprise the basic activities of nearly all divisions."

Another group of changes to the QSL Bureau list published in the February, 1932, issue and amended in each subsequent issue. The Australian QSL Bureau, it appears, is back at 312OP, G.P.O., Sydney, N.S.W. YI6KR, too, is back near his old Mosul QRA; he should now be addressed K. S. J. Rancombe, R.A.F. W/T Section, 30(B) Squadron, Mosul. The latter correction comes from Barbara Dunn, G6YL.

The March issue of "Radio R.E.F." contains a communication from G. Daussy, F8MD, Chief of the Moroccan Section of the R.E.F., stating that the QSL address commonly given for his country — and reported in this department of the April issue of *QST* — is incorrect, and that all Moroccan cards should provisionally be sent to him. The address of F8MD is: G. Daussy, Ecole des Roches Noires, Casablanca, Morocco.

From F. Castro Herrera, Secretary of the Liga Mexicana de Radio Experimentadores, comes word that his society has taken over the forwarding of all cards for Mexico, in place of Mr. Carlos G. de Cosio, X9A. The address of the Mexican League is: Sinaloa 33, Mexico City.

Sweden is being troubled with "pirates," reports Erik Malmberg, Hon. Secretary of the S.S.A., who requests the coöperation of amateurs generally in aiding the Society to see that the pirates are severely and rightly punished. For the information of QSL card senders, their Bureau will not forward cards to unlicensed Swedish stations.

Swedish amateurs are licensed in seven districts at the present time, and all existing calls are between SM-RA and SM-ZZ. New calls are now issued only under "Z," until no call under this letter is free, then under "Y," and so on. Calls such as SM9A, SM123, etc., are illegal, and their unmasking is an object of the Society.

Two proposals were adopted at the Annual Meeting of the N.V.I.R. held at The Hague on March 20th. The first was a request of the I.A.R.U. to cause the prohibition of telephony in the amateur 7-mc. band, inasmuch as at the present time many European "phone-hounds" create a great deal of interference on that band. The second was concerned with the splitting of the 3.5-mc. band into two parts, one for 'phone and one for c.w., as is done on the North American continent at the present time.

The PA amateurs received good news from their government at this convention, exults C. A. Gehrels, PA0QQ. Licenses for use of the 1.75-mc. band are now available for special experimental purposes. FB, N.V.I.R.! A lot of activity in the new territory is anticipated, since it will undoubtedly prove ideal for national work in the Netherlands.

More and more frequently we receive letters containing sections similar to the following: "Wouldn't it be a worthwhile idea to run a correct list of the countries of the world having amateur stations and their intermediates, for the guidance of amateurs generally?" Then, more recently, the following plea has been added: "Can't we have an accurate, comprehensive table in *QST* of the new postage rates to all parts of the world?"

It's somewhat of a problem to do either of these things, particularly the latter, owing to the constant flux and change over any considerable period of time, but we have attempted below to present the latest information available in such form as to make it readily usable. Reactions on the usefulness of this table will be appreciated.

Berne Distribution	*Amateur Prefix*	*Country or Dependency*	*Postage Letter oz.*	*Postcards*
	AC[1]	China	5¢	3¢
	AR[1]	Syria	5	3
	AU[1]	Siberia	5	3
CAA-CEZ	CE	Chile	3	2
CFA-CKZ	[VE]	Canada	3	2
CLA-CMZ	CM	Cuba	3	2
CNA-CNZ	[F8[2]]	Morocco	5	3
CPA-CPZ	CP	Bolivia	3	2
{ CQA-CQZ[3]		Portuguese Colonies		
{ CRA-CRZ	CR4	Cape Verde	5	3
	CR5	Port. Guinea	5	3
	CR6(CT6)	Angola	5	3
	CR7	Mozambique	5	3
	CR8	Port. India	5	3
	CR9	Macao	5	3
	CR10	Timor	5	3
CSA-CUZ	CT1	Portugal	5	3
	CT2	Azores	5	3
	CT3	Madeira	5	3
	CT6(CR6)	Angola	5	3
CVA-CVZ	CV	Roumania	5	3
CWA-CXZ	CX	Uruguay	3	2
CZA-CZZ	CZ	Monaco	5	3
D	D	Germany	5	3
EAA-EHZ	EAR	Spain	3	2
EIA-EIZ	EI	Irish Free State	5	3
ELA-ELZ	EL	Liberia	5	3
ESA-ESZ	ES	Estonia	5	3
ETA-ETZ	ET	Ethiopia (Abyssinia)	5	3
	EU[1]	U.S.S.R.	5	3
F		France & Colonies		
	F3	Martinique	5	3
		Tahiti	5	3
	F8	France	5	3
		Morocco	5	3
	FI	French Indo-China	5	3
	FM4	Tunis	5	3
	FM8	Algeria	5	3
G		United Kingdom		
	G	England	5	3
		Scotland	5	3
	GI	Northern Ireland	5	3

(*Continued on page 72*)

[1] These prefixes are carry-overs from the old I.A.R.U. Intermediates system; amateurs in these countries would be better advised to use the prefixes indicated by the Berne Table of Distribution.

[2] Moroccan amateurs formerly used the prefix CN, but this has been officially denied them by the French Government.

• CALLS HEARD •

ZL2HR, Arthur Stevens, 75 Wilson St., Hawena, New Zealand

3500-kc. 'phone band

(Heard March 21st, 0630–0830 G.M.T.)

w1adf w1bes w1bje w3bms w3cef w6bih w6brf w6ctk w6etm w6fdo w6fmq w7aqx w8dsx w9edw w9fld w9gdc w9gle w9gvc w9hyo

W1CBT, Ralph E. Benson, 46 Chilton Rd., West Roxbury, Mass.

14,000 kc.

ce1ai ce3ch cm1by cm1fm cm2fc cm2jm cm2jt cm2mm cm2sh cm2sv cm2wa cm2wd cm2ww cm8az cm8uf ct1aa ct1ao ct1bx cx2bt ear96 f3mta f8bx f8ex f8rs f8ug g5by g6lk hc1fg hh4h i1ri k4kd k5aa k5ae lu3de lu3fa ny1aa on4au pa0bq py1ba py2ay py2bn rx1aa ti2ags ti2fg ti3la ve5aw vo8aw vo8z w6ahz w6am w6ann w6azx w6bfc w6bkx w6chy w6cyr w6dbt w6dcu w6eii w6ezl w6fh w6kh w6so w6zt w7afe w7aul w7bce w7un x1aa x3a x9a ys1gx

HB9Y, A. V. Wattenwyl, Kirchenfeldstrasse 84, Berne, Switzerland

14-mc. band

(Heard during March)

au1de ce1ai ct2aw cx2bm frear 149 hc1yl hi8x k4ph k5aa lu2ca lu4dq lu9dt ny1ab py1ba py1cr py1di py1ff py2aj py2az py2bq py2qa py3ad py3bq rx1aa st2d su1aa tf3tp ve1bv ve1dl vo8mc vs3ac vu2ug vu2df w1bhm w1bsk w1lz w1ph w1tw w1vc w1zj w2abr w2aoy w2arb w2bak w3buf w3cdk w3dc w3md w4agr w4ajx w4ce xm2a (19/20.3.32) yi2dc xyi6kr yi6wg zc6jm zs4m zs6aa zt1t

7000-kc. band

ct2ax ct2ba ct3ab et8fa frear 149 hh7c k4es k4ry py1ff su1ec vk2oc vk2yr vk3es vk3xi vk3zb w3apn w3es w4aby w4mk w8pj zl2ab zl2ci zl2cw zl2fi zl2gk zl2gn zl2gq zl2ho zl2je zl3ah zl3aq zl3as zl3aw zl3az zl3cc zl3cs zl3ct zl4am zl4ao zl4ap

3500-kc. band

w3zzi

Clarence Grimm, Mt. Prospect, Ill.

w1aub w1auj w1bes w1bic w1bnr w1cwh w2acg w2ahu w2aih w2cif w2coj w2cqn w2dka w2dok w2go w2kr w2rq w3alz w3aqr w3aqt w3bfz w3bfg w3zj w3zy w4aad w4ad w4acy w4amj w4fi w4fk w4ka w4lc w4mu w4pw w4qz w4rs w4tm w4zf w5anx w5ali w5awg w4awp w4bho w5id w5kx w6cjq w6crs w8alc w8ahf w8aol w8arq w8axb w8bds w8bm w8ckg w8cln w8cmf w8cpf w8cul w8dk w8dsw w8ege w8fm w8fuk w8fsc w8jk w8rd w8rs w8wf w8wm w9aai w9amv w9ani w9bbr w9bhm w9bjf w9bon w9bpq w9chd w9cju w9ckz w9csh w9cxx w9czm w9daq w9dkm w9dwm w9eca w9eca w9edw w9eld w9ej w9etq w9exj w9fcl w9fdi w9fgx w9fke w9fqu w9fsy w9gay w9gfu w9gii w9gs w9gtt w9ian w9ji w9md w9ph w9wl w9wah ve3oc

W2WC, Frank Anzalone, 138 Pine St., Cliffside, N. J.

14,000-kc. band

(Heard during March and April)

ce1ai cm2jm cm2jt cm2lc cm2na cm2og cm2ra cm8az ct1aa ct1cb ear96 ear185 ear224 ei8b f8ex f8tv f8wb g2bm g5by g5fv g5ml g6qb g6wn hb9k hc2jm hj1ak k5aa k5ac k5ae lu2ca lu3de ny1ab ny1ws oa4z pa0xf py2ag py2aj py2az py2bk py2bn py2bq (fone) py9an ti2db ti2fg ti2rc ti2tao ve4gu vo8lc vp1ja vp2pa x1aa xk2a zp6ab

7000-kc. band

cm1am cm2op cm2wd cm5ry ct1az ear96 ear185 ear141 ear224 hc2jz hk1da k4aop k5aa k5ab k5ac k5ad ny1aa sm7rv ti2tao ti5fi vk2hq vk2oc vk2tx vk3jf vk3lq vk3vp vk3xi vk3zx vk4bb vk5gr vk5yk x1aa x1d x1u xla1s yn1nic ys2cn zl2ab zl2bs zl2ci zl2cu zl3az zl3cc zl4ap

W9ARH, Bob M. Simmons, Milan, Mo.

(Heard during April)

cm2do cm2fn cm2gu cm2jm cm2jt cm2lc cm2mg cm2mj cm2rc cm2sg cm2ss cm2wa cm2wd cm5of cm6sz cm7sh cm8yb hc2jz hh7c k4rk k5aa k5ab k5ac k5ad k6abf k6ain k6aja k6alm k6arb k6auq k6bow ny1aa ny2ab rx1aa ti2tao ti3la ti5fi vk2nr x1ax x1mc x1r x1u x1v x5a x9a yn1nic zl2gw zl4rm rase

W6BME, Craig Burton, 4115 Supreme Court, Los Angeles, Calif.

7000-kc. band

w1bnm w1mk w2bcj w2bda w2doy w2dm w2fa w3avo w3aty w3aj w3bej w3bfx w3ej w3fj w4aca w4ajj w4aqd w4qo w4ut w5aep w5anz w5aja w5ahw w5ayl w5axy w5bcp w5brv w5byy w5ct w5rv w7baa w7bkc w8aqh w8awk w8bi w8cut w8emv w8esh w8rj w9abs w9aqh w9azm w9ag w9bay w9bwd w9cmd w9dct w9eqc w9fsk w9fur w9gky w9mc w9mh w9rh w9st k6acw k6bmy k6cmc k6ero ve4bq ve4dk ve4du ve4el ve4ew ve4fr ve4is ve4it ve5fc ve5fe ve5fo ve5eh hc1fg

W3BBB, L. W. Haesler, 1416 Alsace Rd., Reading, Penna.

14,000-kc. band

ce1ai cm2jm cm2op cm2sh cm8az cm8yb cn8mi? cn8mj ct1aa ct1av ct1as ct1bg ct1bx ct1cb ear96 ear169 ear185 ear224 ei8b f3mta f8ex f8eo f8fo f8fr f8swa f8tv f8vj fm8eg g2bm g2bq g2vq g5aw g5bj g5by g5la g5lw g5ml g5qa g6ew g6qb g6vp g6yc g6yk g6xb g6xn hb9y hc1fg hc1rf h2cjm hj1ak hk3rg k5aa k5ad k5ae k6aja lu2dd lu2ca lu3de lu3dh lu9dt oa4q oa4u oa4z ok1na on4aa on4au on4bz on4gn on4jb paøll paøqq py2ak py2bk py2bf py2bm py2bn py2bq (fone) vp1ja vp2pa ti2ags ti2fg ti2rc ti2tao ti3la (fone) x1aa x9a

7000-kc. band

ce3ag cn8mk ct1az ct1gu ear38 ear96 ear121 ear123 ear177 ear184 ear185 ear224 ear227 f8jd f8pz hc1fg hc2ea k6boe k6dvz py1ff su1ch ti3fg ti3la ve5hr vk2bq vk2fq vk2lx vk2ns vk2oc vk2px vk2pz vk2sa vk2yr vk3bq vk3bw vk3ka vk3lq vk3jt vk3vp vk3wl vk3wx vk3wy vk3xi vk3zw vk3zx vk3zz vk4fb vk4ju vk4wo vk4xn vk5lc vk5lr vk5bp vk5jo vk5my vk5rh vk6ow vk6rl vk6wi vk7ch vk7jk x1aa x1d x9a zl2bi zl2ce zl2cj zl2gn zl4am zl1aa zl1gq

W3AAJ-W3WS, R. N. Eubank, 2817 Montrose Ave., Richmond, Va.

3500-kc. band

k4rk g2qb x2ln w7adf w7bov w6bjf w6djs w6dpj w6feb w6fgq w6fmq ve3gt

7000-kc. band

ear1 ear96 ear177 cm2vk cm5of k4kc k5aa k6cqz vk2jo

(*Continued on page 82*)

THE COMMUNICATIONS • DEPARTMENT •

F. E. Handy, Communications Manager — E. L. Battey, Asst. Coms. Manager

Mr. Terrell Warns Operators Violating Regulations

OPERATORS of unlicensed stations and those who are tempted to "bootleg" the call of some other licensed station are issued advance warning by W. D. Terrell, Director of Radio, Department of Commerce, Washington, D. C. Mr. Terrell points out that such violations of the Radio Act are punishable by a fine of five thousand dollars and/or five years in prison. The same publicity release containing this warning points out that two men have just been sentenced by a Brooklyn, N. Y., judge for operating a station illegally. Also an individual in Washington, D. C., who wrongfully appropriated the call signal W3BJD has just been apprehended by the Radio Division, with evidence against the operator committing this violation accumulated over an eight-month period.

Radio Division Threatens More Stringent Restrictions If Abuses Continue

NOT only is the Radio Division out to wipe out call bootlegging by making examples of offenders but Mr. Terrell asks amateurs to coöperate in eliminating all types of infractions of the government regulations. Quoting sections of a recent press release citing complaints he received from every part of the country:

"Two violations predominate, Director Terrell said. They are the 'bootlegging' of call letters by men who wish to avoid detection of off frequency violations while adjusting sets, and the other is the indiscriminate playing of phonograph records. The use of call letters other than those assigned a station is a very serious offense. Besides, those who use the call signals of another are working a hardship upon fellow amateurs with the possibility that innocent amateurs may lose their licenses as a direct result of such unsportsmanlike conduct. Amateur stations may transmit phonograph records or music only for specific testing after establishing contact with another station. A number of cases have come to the attention of the Division recently where phonograph records have been used continuously for more than one hour without contacting any station, or without breaking the transmission to announce the call at frequent intervals required in the regulations. Such operators also are handicapping other amateurs in the use of their stations.

"Amateur radio operators have been given more freedom in the United States than in practically any other country, Director Terrell said. Some are taking advantage of the liberal attitude on the part of the government and abusing these privileges. Amateurs, as a class, face the possibility of severe restrictions being placed on them if they continue to ignore the laws, declared Director Terrell. These changes could be effected through the Congress or they may be considered at the International convention to be held this fall in Madrid."

Traffic Briefs

The Plant City Radio Club installed an amateur radio station (W4PBX) at the Florida Strawberry Festival, handling a total of nearly two hundred messages in five days. About twelve schedules were maintained each day. The work was very successful in spite of the interference of many electrical devices, which made operating difficult. The club's transmitter (W4AQT) '10 osc. and '52 amplifier was used at W4PBX. The club plans to have a low power 'phone station at the next festival and relay messages by 'phone to the club station, where they can be relayed on by both 'phone and c.w.

ORIGINATING STATIONS: Every once in awhile we receive a complaint about "worthless" traffic that is floating around the country. Read the comments by W2AUS below. Make *your* Traffic count for something worthwhile. O.R.S. do — why not you?

"My main purpose in writing is to put in a kick against what I call "Traffic Padding." A number of times lately I have been stuck with boys who think that any message is a message, even if it means nothing to either the addressee or the addressor. The case in point, which made me boil over, is the case of W8——, who after CQing East one morning last week, informed me that he had thirty messages, all for Philadelphia. Thinking there was something doing, I told him to "GA all." (This man is a good op, too.) All the first five messages were addressed to the same person, and signed by the same person in Mr. 8's town, and each message consisted of one sentence, such as "Hope your headache is gone," "Keep your feet dry," "Please write soon," and so on. Is there any reason on earth why a man should expect to help himself or anyone else in cluttering up the air with junk like this?" — W2AUS, O.R.S.

BEGINNERS: Don't pad totals like this! If you have these things to say, put them all in *one real* message that an operator can be proud to handle as such.

Lt. Harry W. Wells of PMZ-Borneo fame, is now Comm. Officer, 8th Pursuit Group, Langley Field, Va. His old friends may reach him through W3EJ.

Good Operating

FROM "The SCM's Corner", courtesy the Portland (Maine) Sunday Telegram. A word from Section Manager John Singleton, W1CDX.

"Ge om ur sigs surely fb hr-never thot fist work could be so perfect — just like an omnigraph with life behind it." Did the other man ever talk to you like that?

Does the amount of traffic you pass on per hour depend on your sending skill or on the other man's receiving ability? No matter how good the receiving operator is, it is just too bad if he has to do too much guessing. Sloppy talking, running words together, sliding short words and sloppy sending are in the same class. The sloppy sender makes no distinction between "as" as a request to wait and "as" in a sentence; between "ar" as indication of the end of a message and "ar" as a syllable in a word. He even sends the word "the" like a figure "6"; "msg" to him is "7g"; W1CDX comes off his key as W1CXU.

Another sloppy fist is one that can't send three, four, or five dots in a row without one of them reading like a dash. His B, F, H, L, V and numerals are QSO, especially when an operator is abbreviating to the limit. Of course a friend can get used to such a fist.

We are proud of the precision of our language, the neatness of our clothes, the culture of our general manners, the dash glitter of our flivver, the rhythm and smoothness of our golf swing, the standing and ability of our friends. Why shouldn't we be proud of the perfection and rhythm of our

fist? Speed is desirable but not at the expense of spaces omitted. Break-in is fb but not when it prevents one hearing one's own signals. In no other way can you perfect your style of sending.

ARTICLE CONTEST

We invite contributions on every phase of amateur *communication* activity. New ideas and viewpoints, criticisms of and remedies for conditions, hints on DX, suggestions concerning radio club organization, information on interference elimination, exceptional two-way communication work covering emergencies, athletic games and trips, timely attention to operating practice, commentary on the place of radio-telephony, experimenting or development work in present-day amateur radio, data on low-power possibilities, 1750-kc. operation, etc., *all* are needed. There is plenty of romance and real accomplishment in amateur work. Read these contributions. Then give us some real operating stories or the benefit of your views on different subjects.

Each month the article believed to have the greatest value to amateur radio is selected as prize winner. The winner has his choice of (1) a copy of *The Radio Amateur's Handbook* bound in leather cloth, (2) six pads of message blanks, or (3) six of the new type A.R.R.L. log books. This offer will continue until further notice. The article by Mr. Robertson, W6BNX, wins the prize this month.

— *Communications Manager*

"QRG?"

By Walter J. Robertson*

AFTER all the articles that have been published in *QST* on the subject of frequency measurement, it would seem superfluous to attempt to add anything to what has already been said. However, after reading nearly all the available material on the subject, the writer decided to contact such amateurs as were within range of his low-powered transmitter and to determine for himself what success they were having with their frequency meters, dynatrons, etc. Hence, it became almost a ritual with this operator to ask the other station, "QRG?" And now for the peculiar part of the experiment — practically none of the stations were capable of giving any sort of an accurate frequency check! Similarly, nearly all of them were extremely uncertain as to their own frequency, the exceptions were a few crystal-controlled stations. In the course of over a hundred QSO's, but two stations were found that could give even an approximate check on the frequency. The balance of the contacts afforded such precision checks as "Ur abt ten divisions fm the top of band," or, "Ur sigs abt in middle of band."

Fellows, this condition must stop. If this operator's experience is at all representative of conditions existing in other parts of the country, the amateur had better throw the power switch and take inventory. With the present crowded conditions in the amateur bands and with the ever-present danger of working on some commercial's frequency, the need for accurately constructed and calibrated frequency measuring instruments cannot be stressed too strongly. With alarming frequency, *QST* is publishing reports of amateurs who have been charged with violations of the Radio Act of 1927 as a result of straying off-frequency. In view of the ease with which an amateur can keep his station within his proper bands, such cases are inexcusable.

The construction of a good frequency meter is an exceedingly simple matter — very much easier than the building of a transmitter or a receiver. The calibration is also a relatively simple proposition considering the abundance of good marker stations and standard frequency transmissions. It is surprising to learn of the degree of accuracy that may be obtained with such home-made measuring devices. A local amateur "threw" a dynatron together out of spare parts about the station and when his calibration was compared with a check made by a Department of Commerce Monitoring station, the two agreed to the second decimal place on points in the 3.5 mc. band! This case is cited to illustrate what might be done with even old parts so long as a rigid type of construction is followed. The old reliable monitor, if carefully constructed and operated, will provide a moderately accurate means of checking frequency. At any rate, its degree of precision is considerably better than a report to the effect that "Ur sigs abt in middle of band, OM."

Finally, gang, it's for our own good that we provide ourselves with accurate frequency measuring instruments. It not only places the amateur on a distinctly higher operating and technical plane, but at the same time demonstrates to the Federal Radio Commission and the Department of Commerce that we're behind them in their efforts to maintain the amateurs within their allotted frequencies. In actively coöperating with these agencies, we not only make the game infinitely more interesting to ourselves but in addition we will be safeguarding those precious few kilocycles we are pleased to call our own.

* W6BNX, 2015 South California St., Stockton, Calif.

Prehistoric Signals

3500-kc. band: W1AJB*, W1BEV*, W1BGW, W1BU, W1DIX*, W1DVZ*, W1NS*, W2AQE*, W2BDN, W2BIA, W2CGD**, W2DCV*, W2DIU, W2DJE*, W2DNR*, W3AKV*, W3BCL*, W3BLE*, W4AID, W4HU, W4VF**, W5AHP, W5AUL, W5BMI, W6APZ*, W8AAD, W8ALX*, W8ASY*, W8ATO, W8BPI, W8BRO, W8CAR, W8CJB*, W8CJF, W8CK, W8CKX, W8CNM, W8CUK, W8CYU*, W8DIE*, W8DPI, W8DRA, W8DRJ, W8DUA*, W8DYF**, W8EEX**, W8EHD, W8ER, W8ERA*, W8FAS, W8FEJ*, W8FFQ, W8FGV, W8GIX*, W8HF, W8KA, W8OK**, W8UO, W9ABY, W9AJ, W9OAB*, W9ARX, W9BCJ, W9BLL*, W9CAD, W9CZH*, W9DKD*, W9DQR, W9DRH*, W9EUK, W9EYX*, W9GVP, W9HNX, W9HZB*, W9VH, VE3DW*. 7000-kc. band: W4PQ.

The above stations have been reported from two or more sources as having *Prehistoric Signals* (a.c., broad r.a.c., chopper, etc.). Asterisks denote the number of extra times (above two) that each station was reported. In order to "make" this list it is necessary that a station be reported from *at least* two *different* sources. There is *no excuse* for an unnecessarily broad or out-of-date signal! High power enthusiasts should have a suitable filter before going on the air. Otherwise, they should remain on low or medium power out of consideration for other amateurs, and in respect of the regulation which specifies, "adequately filtered d.c. plate supply." Very few reports have been received recently covering any but the 3500 kc. band. Send in your lists of "prehistoric signals" heard consistently on *all* bands. Lists should be classified by frequency bands.

Traffic Briefs

June 26th is the date set by the Fox River Radio League for its fifth annual hamfest. Write to the Secretary, Dwight S. Young, Oswego, Illinois, for complete details.

VE3TW says every man is his own voltmeter; to measure your transmitter voltage grab the high voltage terminals in your hands — you will jump back one foot for every hundred volts; i.e., if you have 500 volts on your tube, you will jump back 5 feet, and so on. These figures were compiled after an exhaustive series of tests by VE3JW! Hi.

During the Sino-Japanese trouble, a Japanese amateur told OM1TB, a Marine in Guam, that in case they both got in the fight, OM1TB was to hang a sign around his neck with his call in big letters on it, and he, the "J," would be sure to shoot around him!

Relative Traffic Standings

(MARCH–APRIL)

Messages Per Station (25%)		*Stations Reporting Traffic* (25%)		*Gain or Loss (Traffic Reports)* (25%)		*Traffic Total* (25%)		Standing Based on Average of All Four Ratings %		Leading Section in Division
Atl.	117.6	Cen.	305	Cen.	+27	Cen.	22209	Cent.	96.4	Michigan
Delt.	91.9	Pac.	182	Hud.	+18	Atl.	16943	Atlantic	83.9	W. New York
Cen.	72.8	Atl.	144	S. E.	+13	Pac.	12933	Hudson	71.5	E. New York
Hud.	71.4	N. E.	133	Dak.	+ 1	N. E.	7897	Pacific	69.7*	Los Angeles
Pac.	71.	Mid.	126	Roa.	u	Mid.	6947	New Eng.	66.1	E. Massachusetts
N. E.	59.3	N. W.	100	Can.	− 3	Hud.	6285	Northwest.	55.4	Washington
Mid.	55.1	Roa.	91	Atl.	− 4	N. W.	5410	Midwest	51.9	Missouri
N. W.	54.1	Hud.	88	N. W.	− 7	Roa.	4306	Roanoke	51.9	Virginia
W. G.	50.3	Dak.	79	N. E.	− 9	Dak.	3815	Dakota	50.1	S. Minnesota
Dak.	48.2	S. E.	71	R. Mt.	−11	W. G.	2922	Delta	37.5*	Arkansas
Roa.	47.3	Can.	65	Pac.	−13	Can.	2677	Southeast.	35.7	Ga.-S. C.-Cuba-etc.
R. Mt.	45.9	W. G.	58	Delt.	−13	Delt.	1838	Canada	33.9	Maritime
Can.	41.1	Delt.	20	W. G.	−15	S. E.	1606	West Gulf	28.5	S. Texas
S. E.	22.6	R. Mt.	12	Mid.‡ (+44)	−71	R. Mt.	531	Rocky Mt.	17.8*	Utah-Wyoming

THE TEN HIGHEST SECTIONS — S. C. M.

P. I.	284.	Mich.	119	Mich.	+29	Mich.	9176	Michigan	75.	Stephenson, W8DMS
M.-D.-D.C.	217.5	Los Ang.	69	Ga.-S. C.-etc.	+14	Ohio	5390	W. N. Y.	52.5	Farrell, W8DSP
N. M.	203.6	Ill.	63	N. N. J.	+12	W. N. Y.	5302	Illinois	50.	Hinds, W9APY
Alaska	148.2	Va.	57	W. N. Y.	+ 7	M.-D.-D.C.	4785	Ohio	42.5	Tummonds, W8BAH
Ark.	121.6	Wash.	56	Ill.	+ 7	Ill.	4191	M.-D.-D.C.	40.	Ginsberg, W3NY
San Joa.	115.8	Ohio	52	N. Y. C.-L. I.	+ 6	Los Ang.	3189	Los Angeles	35.	Nahmens, W6HT
W. Penn.	108.9	W. N. Y.	52	Maritime	+ 5	E. Penn.	3074	Philippines	25.	Liner, KA1SL
Ohio	103.6	Mo.	43	N. C.	+ 4	E. Mass.	2668	Ga.-S. C.-etc.	22.5	Davis, W4PM
W. N. Y.	101.9	S. Minn.	36	Ala.	+ 4	Mo.	2638	Virginia	20.	Eubank, W3AAJ
Idaho	99.3	E. Penn.	33	Hawaii	+ 3†	Virginia	2636	N. N. J.	20.	Wester, W2WR

The Banner goes to MICHIGAN for the second consecutive month. This is the first Section to carry the Banner more than once under the new rating system. Good work, Michigan! Michigan leads three of the four columns, the fourth, "M.P.S.," being headed by the Philippines. The CENTRAL Division leads all others with an over-all average of 96.4% — not far from 100!!

During the traffic reporting month March 16th–April 15th, 1474 stations originated 20,009; delivered 16,774; relayed 59,556; total 96,339 (83.7% del.) (65.3 m.p.s.). This shows an improvement over the previous month in the number of stations handling traffic, the volume of traffic, and the percentage deliveries.

The listings above show the relative standings of each Division and the ten highest Sections in (1) M.P.S., (2) stations reporting traffic, (3) gain or loss in traffic reports, (4) traffic total, and (5) average of all four ratings. The sixth column shows which Section led each Division, and gives the S.C.M. of each of the ten highest Sections in our whole field organization.

How does *your section* stand? If your section is not listed it indicates the need of more organized effort on the part of all stations within your territory. Work toward "making" all of the columns! Get busy and put *your section* at the top!

Invitation to All Live Amateurs: Send your report (DX, traffic, 'phone, r.c.c., experimenting, etc.) to your S.C.M., address on page 5, on the sixteenth of each month for the work of the preceding thirty days. Get behind your S.C.M. Make your Section a leader and keep it a leader by regular reporting.

Official Broadcasting Stations

(CHANGES AND ADDITIONS)

Local Standard Time

W1BEZ	3525 kc. (c.w.) Mon., 1:00 a.m.; Sat., 3:00 p.m. Also various other periods during week. 3925 kc. ('phone) Sun., 2:00 p.m. Nearly every afternoon sometime between 2 and 4 p.m.
W2AMT	7020 kc. Sun., 9:00 p.m.; Weekly, 8:00 p.m.
W3AOO	3507 kc. (cc) Tues., Thurs., Fri., 6:00 p.m.; Sat., Midnite.
W5ABO	14194 kc. ('phone) Sun., 3:30 p.m. 3964 kc. ('phone) Once per week (no set time).
W5AVF	3500 kc. 9:00 p.m. Any day. 7100 kc. 9:45 p.m. Any day. 14200 kc. 12:30 noon. Any day.
W5CT	7292 kc. (cc) Daily, except Sat., and Sun., 5:30 p.m.
W6AFU	3550 kc. Tues., Thurs., Sat., 6:30 p.m.
W6BJF	3800 kc. (c.w.) Daily 6:45 p.m.
W7AYH	3526 kc. Sun., 2:30 p.m.; Wed., Fri., 10:30 p.m. 7052 kc. Sun., 3:00 p.m.; Wed., Fri., 11:00 p.m.
W7FL	3958 kc. ('phone) Mon., Wed., Fri., 6:00 p.m.
W8AJ	3542 kc. (c.w.) Tues., Thurs., 6:00 p.m. 1850 kc. Mon., Wed., 12:30 p.m., 6:30 p.m. 3530 kc. Tues., 6:30 p.m. 14380 kc. Sun., 12:30 p.m.
W8DQP	3889 kc. Mon., Wed., 6:00 p.m.; Tues., Thurs., Sat., 5:00 p.m.; Fri., 5:30 p.m.
W9CJU	3908 kc. ('phone) Tues., Thurs., Sun., 7:00 p.m. 3800 kc. (c.w.) Tues., Thurs., Sun., 7:15 p.m.
W9EKM	3790 kc. (cc) Tues., Thurs., Sat., 7:30 p.m.
W9EQX	3680 kc. (c.w.) Wed., 8:00 p.m. 3915 kc. ('phone) (cc) Sun., 7:00 a.m.
W9GDL	1.7 mc. band ('phone) Tues., Thurs., Sun., 8:00 p.m. 3.5 mc. band. Wed., Fri., Sun., 5:30 p.m.
W9VD	3620 kc. (cc) Mon., Tues., Wed., Thurs., Fri., 6:45 p.m.
CM8YB	7220 kc. Tues., Fri., Sun., 10:15 p.m.

* No reports were received from the San Diego, Louisiana and Colorado Sections for this month. † No report was received from Hawaii for February–March, so for comparison of "gain or loss" Jan.–Feb. figures are used. ‡ See May *QST* Table. The *standing* is determined by comparison with the January–February figures for Missouri and the Midwest (since there was no Missouri report last month). Actual "gain or loss" from February–March is given parenthetically and used in computing "gain or loss" for the whole field organization.

Traffic Brief

The leader of a recent expedition writes us as follows: "After my experience in the South Sea Islands last year, I am never going to take anyone with me as a radio operator except an amateur. I took two professional operators with me and they were so lost on short-wave work that we were out of communication a good share of the time." Speaks well for amateur operators!

QRG SERVICE — ALSO MARKS 3893 KC.

W1BZI, station of F. S. Huddy at Chepachet, R. I. (four ops), opens June 1st and will give frequency measuring service to all amateurs who request it. Mr. Huddy is the A.R.R.L. Official Observer of the Rhode Island Section, and will use a dynatron frequency meter continuously calibrated from a 100-kc. standard good to five parts in a million.

W1BZI (and W1ZS until June 1st) will also act as a "marker" for the 'phone band edge, using a crystal-controlled transmitter on 3893 kc. At this writing arrangements are being made to check this frequency at the Hingham monitoring station of the Radio Division, so that this frequency will be given with the degree of accuracy during operation.

ELECTION RESULTS

Valid petitions nominating a single candidate as Section Manager were filed in a number of Sections on or before the closing dates that had been announced for receipt of such petitions. As provided by our Constitution and By-Laws, when but one candidate is named in one or more valid nominating

petitions this candidate shall be declared elected. Accordingly election certificates have been mailed to the following officials, the term of office starting on the date given.

Hawaii	C. D. Slaten, K6COG	March 15, 1932
Alabama	L. D. Elwell, W4KP	March 15, 1932
Georgia-South Carolina-Cuba-Isle-of-Pines-Porto Rico-Virgin Islands	Chas. W. Davis, W4PM	April 15, 1932

In the Northern Minnesota Section of the Dakota Division Palmer Andersen, W9DOQ and Frank Vowles, W9BBL were nominated. Mr. Andersen received 38 votes and Mr. Vowles 21 votes. Mr. Andersen's term of office began March 14, 1932.

ELECTION NOTICES

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

(The list gives the Sections, closing date for receipt of nominating petitions for Section Manager, the name of the present incumbent and the date of expiration of his term of office.) This notice supersedes previous notices.

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

Section	*Closing Date*	*Present SCM*	*Present Term of Office Ends*
Wisconsin	June 15, 1932	C. N. Crapo	July 1, 1932
Western Pennsylvania	June 15, 1932	Robert Lloyd	July 1, 1932
Santa Clara Valley	June 15, 1932	Frank J. Quement	July 1, 1932
New Hampshire	June 15, 1932	V. W. Hodge	July 1, 1932
Missouri	June 15, 1932	L. B. Laizure	July 1, 1932
Illinois	June 15, 1932	Fred J. Hinds	July 1, 1932
Nebraska	June 15, 1932	S. C. Wallace	July 1, 1932
Nevada	June 15, 1932	Keston L. Ramsey	May 15, 1932
Saskatchewan*	June 15, 1932	W. J. Pickering	May 15, 1932
New York City and Long Island	July 1, 1932	V. T. Kenney	July 15, 1932
Northern New Jersey	July 1, 1932	Arthur G. Wester	July 12, 1932
South Dakota	July 1, 1932	Howard Cashman	July 12, 1932
North Carolina	July 1, 1932	H. L. Caveness	July 15, 1932
Indiana	July 1, 1932	George Graue	July 15, 1932
Kansas	July 15, 1932	John Amis	July 28, 1932
Southern Texas	July 15, 1932	H. C. Sherrod, Jr.	July 28, 1932
Ohio	July 15, 1932	Harry A. Tummonds	July 28, 1932

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

1. You are hereby notified that an election for an A.R.R.L Section Communications Manager, for the next two-year term of office is about to be held in each of these Sections in accordance with the provisions of By-laws, 5, 6, 7, and 8.

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

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

(Place and date)

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

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

(Five or more signatures of A.R.R.L. members are required.)

The candidates and five or more signers *must* be League members in good standing or the petition will be thrown out as invalid. The complete name, address, and station call of the candidate should be included. All such petitions must be filed at the headquarters office of the League in West Hartford, Conn., by noon of the closing date given for receipt of nominating petitions. There is no limit of the number of petitions that may be filed, but no member shall sign more than one such petition.

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

— *F. E. Handy, Communications Manager*

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

BRASS POUNDERS' LEAGUE

Call	*Orig.*	*Del.*	*Rel.*	*Total*
W3CXL	112	316	1248	1676
W3ASO	178	150	1143	1471
KA1HR	334	359	646	1339
W9IU	77	74	1014	1165
W8DDS	133	193	782	1108
W8PP	61	63	899	1023
W8EMW	99	50	754	903
W6ALU	207	243	434	884
W8BEN	50	46	762	858
W6AOA	135	54	653	842
W4AIS	500	136	198	934
W5BMI	32	41	625	698
VE3GT	63	82	516	661
W8PQ	17	19	620	656
W2BZZ	8	11	634	653
W3BWT	120	134	357	611
W9VS	240	125	238	603
W8CUG	8	234	358	600
W9FSS	46	139	410	595
W8BYD	162	72	360	594
W8AXV	104	76	408	588
W8EWT	21	50	511	582
W7BB	148	273	154	575
W5AOD	46	32	476	554
W3MC	55	90	406	551
W9HK	63	60	418	541
W8BAH	202	108	228	538
W7KG	63	46	427	536
W8DYH	16	38	478	532
W5VQ	19	10	498	527
W2UL	50	32	440	522
W9SE	480	13	18	511
OM1TB	284	107	89	480
W1ASF	50	256	144	450
W9BNT	108	164	177	449
W2ADQ	182	244	8	434
W9NP	21	330	74	425
W8AJE	24	131	263	418
W2WP	25	106	234	365
W6CFN	202	121	28	351
W3CXM	36	102	211	349
W8FX	67	158	120	345
W6AMM	136	167	—	303
W6FEX	76	154	29	259
W9GCG	34	117	103	254
W6MV	35	140	58	233
W7WR	68	103	45	216
W6HM	63	129	1	193
W8AVY	3	172	6	181
W6YAU	12	117	4	133

Month of March 16–April 15. Note the stations responsible for above *one hundred deliveries.* Deliveries count!

A total of 500 or more *bona fide* messages handled and counted in accordance with A.R.R.L. practice, or just 100 or more *deliveries* will put you in line for a place in the B.P.L. Why not make more schedules with the reliable stations you hear and take steps to handle the traffic that will qualify *you* for B.P.L. membership also?

DIVISIONAL REPORTS

ATLANTIC DIVISION

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA — SCM, Harry Ginsberg, W3NY — The Atlantic Division Convention is almost here. The members of the Washington Radio Club are doing all in their power to make this Convention the biggest and best ever held in the East. Gang, we owe it to ourselves to go and make it a record turnout. Remember the dates — June 17 and 18. Applicants for ORS appointment must now come recommended by the RM in his Section. W3AOO is RM for Western Md.; W3ASO is RM for D.C. and Southern Md.; W3BAK is *new* RM for Eastern Shore of Md. and Delaware; W3BWT is our Chief RM. All will coöperate with ORS applicants. These non-ORS are showing some of you ORS how: — W3HT, W4BND, W3JK, W3AFF, W3ADO, W3AJX, W3WI, W3AVD, W3WN, W3CJS, W3AMI, W2CDG. The Frederick Amateur Radio Association has been formed by 8 charter members. W3BNL is president, W3BJV vice-president, W3ABA secretary, W3WN treasurer. Meetings are held on first and third Friday of month. W3WN and W3AOO are new OBS. W3WI, our 'phone OBS, is coming on with 250 watt peak, Class B modulation and crystal-control. W3DG holds code class every Tuesday night. District of Columbia: W3CXL leads with a peach of a total. W3ASO has completely shielded his 150 watt crystal MOPA. Everything is perking OK at W3BWT. W3NR has

been busy with work. Maryland: W3SN has changed QRA to Fort George Meade, Md. W3NY breaks his traffic record again. Hi. Everything is running "smooth as oil" for W3HT. W3BND says "ga" despite desire to quit the game. Hi. W3AOO has trouble with keying. W3JK is out for ORS. W3LA is working DX. W3ADO says radio club at Naval Academy has 60 members. W3AFF doesn't desert traffic even as non-ORS. W3BOX is active in Eastern Shore Traffic Loop. W3BBW is QRL Broadcast Checking work. W3BGI is rebuilding. W3AJX is finally getting d.c. reports. W3ZD is busy with Convention plans. W3CDG is falling in with new plan for ORS applicants. W3WN is lining up the Frederick gang. Not much doing at W3BKC. W3CJS is new ham in Baltimore. W3AMI is trying to get his 56 mc. 'phone to perk. W3AVD has cleared up his license trouble. W3BOE reports. W3DG has 56 mc. receiver working FB. W3ZK is rebuilding transmitter and frequency meter. W3AHG is drawing plans for a completely new station. W3BAT has ORS in "storate." Delaware: W3BAK, new RM, is using MOPA. W3HC wants temporary suspension of ORS. W3ALQ is using 1750 kc. 'phone. W3WI is getting FB reports on his OBS work.

Traffic: W3XCL 1676, W3ASO 1471, W3BWT 611, W3SN 220, W3NY 218, W3HT 130, W3BND 121, W3AOO 89, W3BAK 78, W3JK 28, W3LA 27, W3ADO 23, W3AFF 20, W3BOX 16, W3BGI 16, W3AJX 12, W3ZD 6, W3CDG 5, W3WN 4, W3BKC 3, W3NR 2, W3BBW 9.

SOUTHERN NEW JERSEY — SCM, Robert Adams, 3rd, W3SM — W3ARN is high man this month, with W3APN a close second. W3SM handled most of his traffic directly with the West Coast and West Indies. W3AEJ kept three consistent schedules. W3BPD reports that Cumberland County Club now has thirty-five members. W3ADL is on all bands. W3ZI won second prize in the Army Amateur Contest on April 12. W3BWC, W3BPT and W3BQN are all working for ORS. W3BEI is building a new crystal outfit. W3ARV has been acting as Route Manager for the northern half of the Section. W3SY, W3BUB, and W3ACD were active in USNR work. At the last meeting of the Radio Association of Southern New Jersey, several of the Bloomfield gang were present and showed pictures of their 56 mc. activity. Will all those in this Section who are planning to attend the Atlantic Convention in Washington, please advise me. Let's have a good attendance from Southern New Jersey. I am again asking that Radio Clubs in this Section advise the dates of their meetings, so that I may attend.

Traffic: W3APN 319, W3ARN 378, W3BWC 18, W3ADL 7, W3ASG 34, W3BEI 20, W3SY 24, W3BPD 21, W3BPT 43, W3ARV 51, W3ZI 7, W3AEJ 32, W3BQN 17, W3SM 306.

WESTERN PENNSYLVANIA — SCM, R. M. Lloyd, W8CFR — W8CUG leads the section this month; his total for the past six months is 2184, which takes the pair of '66s offered by the SCM in the traffic contest. Congrats, Shorty, W8AJE wins the log books this month on deliveries. W8DUT reports two new hams: W8CHO and W8GKQ. W8YA expects to be on a trunk line soon. W8AVY visited some of the Ohio gang. W8DKL has a new TNT rig. W8KD is using a pentode oscillator. W8DZP asks "Why don't schedules show up?" W8FKU is speeding up his code. W8DXI says the EARC is back in the "Y" again. W8EDG, W8DVA, and W8ELG all have MOPAs. Our Director, W8CMP, is still handling traffic. W8CQA is changing to crystal. W8DML's report just got under the wire. W8CRK's 8 mc. antenna works best on 3.5 mc.! W8DRO is hunting traffic. W8FHN reports W8GQW is a new ham in his part of town; both W8DQN and W8AQU are active there, too. W8CPE is rebuilding. W8AQY reports for W8BPW. He says, too, that he heard all continents in a week's time on 14 mc. "Complete reconstruction about finished" — this from W8DLG. W8APH wants schedules. W8CEO expects to schedule W4JR again; these two once kept a schedule for five years! W8DVZ reports the news from Huntingdon — W8CEE, W8AGG, and W8ASE are all on the air. W8WQ reported via radio. W8DYL has four crystal frequencies in 3500-kc band.

Traffic: W8CUG 600, W8AJE 418, W8YA 381, W8AVY 181, W8DKL 130, W8KD 115, W8DZP 73, W8FKU 69, W8DXI 60, W8DUT 57, W8EDG 46, W8CMP 38, W8CQA 36, W8DML 34k W8BUC 32, W8CRK 24, W8DRO 18, W8FHN 10, W8CPE 9, W8BPW 5, W8CFR 5, W8DLG 2, W8DYL 162.

WESTERN NEW YORK — SCM, Don Farrell, W8DSP — W8BEN is high traffic man in the ORS group. W8DBX keeps eight schedules. W8DSS is rounding up a bunch of stations that are eligible for ORS. W8DES still has trouble with his schedules. W8BFF reports from Elmira. W8DHU reports that the Glens Falls gang is having some FB "get-togethers." W8DSP is working on new 56 mc. apparatus. W8AGS is rebuilding. W8AHK is now ORS and OO. W8BQJ has a new AC receiver. W8DEQ has a fine daily schedule with W3AHD. W8DQP keeps five schedules. W8BWY reports some one using his call. W8AED has a complete new station. W8CJJ reports a new ham in Wellsburg, W8GPR. W8BDK says the Gloversville gang have a new club-room. W8AOW is building a new transmitter to be used at the New York State Fair this year; the call is W8GNW. W8CPC is still on 14 mc. phone. W8FTB reports things pretty slow. W8AQF wants schedules east and south. W8GPP is a new ham in Elmira. W8DXF is QRL. W8EUY worked K6AJA on 3.5 mc. W8FOL is a new ORS. W8DME keeps busy with Naval Reserve. W8BR reports two new stations in Walton, W8GFT and W8GPO. W8CMW is returning home from Independence, Kansas, where he has been using portable W8ZZT. W8DSA is going on 14 mc. W8DHQ reports that his second op now has a station of his own with the call W8CUG. W8AFY handled some traffic for Spain. W8BGN cracked his crystal. W8BHK gets on the air now and then. W8BLH is disgusted with conditions on 7 mc. W8ABX is doing some wonderful work on 56 mc. W8DEJ is still working sixes. W8AFM has been off the air for a month. W8CSW is using 'phone on 1930 kc. and experimenting on 56 mc. W8BFG says conditions on 14 mc. very poor. W8EMW turns in the highest traffic total for the section and also the highest total any Syracuse station ever had! W8EWT makes BPL. W8EAC is working on a new 56 mc. receiver. W8CYG and W8FME have new MOPA. W8ERZ worked Africa on 14 mc. W8DMJ handles some traffic regularly. W8CSE has new three stage crystal rig. W8CGU wants a schedule with Rome. W8AN was heard at W1QR using loop-'phone. W8ECF wants ORS. W8AWM reports from Jamestown. W8FDY wants schedules with Albany and Buffalo. W8EWE is very QRL in the sugar-bush. "Hi." W8AOR handles a few messages. W8GQ is experimenting with stamp size photos to paste on QSL cards. W8AKX has a new push-pull type '10. W8JE is back in the traffic game. W8CP is on with a 50 watter. W8DEB, Father Mallette, visited the SCM and reports the club in Malone going FB. W8DGR, W8GBN, W8FSG, W8GAR are all members of the Malone Club. W8EWC is QRL. W8BLO has new 250 watt MOPA. Let's go, gang, for Western New York and the Atlantic Division!

Traffic: W8BEN 858, W8DBX 426, W8DSS 335, W8DES 269, W8DFF 176, W8DHU 133, W8DSP 130, W8AGS 101, W8AHK 74, W8BQJ 68, W8DEQ 64, W8DQP 61, W8BWY 60, W8AED 56, W8CJJ 50, W8BDK 40, W8AOW 40, W8CPC 36, W8FTB 30, W8AQF 25, W8DXF 24, W8EUY 22, W8FOL 17, W8DME 13, W8BR 11, W8CMW 10, W8DSA 8, W8DHQ 6, W8AFY 6, W8BGN 4, W8BHK 3, W8BLH 2, W8ABX 1, W8EMW 903, W8EWT 582, W8EAC 237, W8CYG 66, W8JE 57, W8ERZ 51, W8DMJ 45, W8CSE 35, W8CGU 30, W8AN 28, W8ECF 24, W8FME 20, W8AWM 13, W8FDY 13, W8EWE 12, W8CP 10, W8AOR 9, W8GQ 6, W8AKX 2.

EASTERN PENNSYLVANIA — SCM, Jack Wagenseller, W3GS-W3BF — Twenty non-ORS reported this month. Many thanks, OMs. In the future all new ORS must be recommended by one of our RMs, W3NF or W3MC. If you are interested in becoming an ORS, write for application blanks. W3MC makes the BPL with only three weeks on the air. W3NF is moving his station. W3AHD keeps six schedules daily. W3OK has much YL QRM. W3BEY is new ORS and OBS. W8FCB worked a lot of DX. W8CVS is sure stepping out. W3AKB reports new QRA of Frankford club: Cheltenham and Oakland Sts. W8CFI had a three-way QSO with a couple of high school classmates out in Chicago. W3AAD says that the Quakertown Club station, W3CHW, will soon be on consistently. W3NU has a new pentode

crystal rig. W3BRH reports. W3APH is installing crystal. W3AQN is moving to a new QRA. Somebody is using W8VD's call. W3MG is preparing for high power. W3AIP reports for the first time. W8CFF is back to low power. W3EO schedules CM8AZ daily. W3BCD is QRL farm work. All W3QP's traffic is from Australia. W3CFA made a 15 minute delivery. W8FLA is now on with MOPA. W3BNY is on with low power. W8DPQ is experimenting with pentodes. W3ANZ is busy on 56 mc. W3AKS is the armory station of the 108th field artillery. W3BUH is on 7 mc. W3BOL is rebuilding. W3BUI is having trouble with key clicks. W3BTP is QRL 1750 kc. 'phone. W3AMR is off while A.C. is being installed. W8EU reports zepp hundred per-cent better. W3BF is off until local QRM from sign flasher is eliminated. Two new radio clubs have been formed: "The Norristown Radio Club" and "The Overbrook Radio Club."

Traffic: W3MC 551, W3NF 394, W3AHD 278, W3OK 273, W3BEY 267, W8FCB 212, W8CVS 174, W3AKB 139, W8CFI 93, W3NA 91, W3AAD 72, W3NU 62, W3BRH 55, W3APH 45, W3AQN 43, W8VD 41, W3MG 39, W3BF 28, W3AIP 25, W8CFF 23, W3EO 22, W3BCD 22, W3QP 20, W3CFA 18, W8FLA 16, W3BNY 14, W8DPQ 14, W3ANZ 12, W3AKS 9, W3BUH 7, W3BOL 6, W3BUI 5, W3BTP 4.

CENTRAL DIVISION

KENTUCKY — SCM, J. B. Wathen, III, W9BAZ — Believe it or not, the power behind W9BWJ's sigs is only couple '10s, pushpull. BAZ covered most of Eastern Ky. on "business trip." W9JL has started to add crystal to their outfit. W9OX tied for high honors in 5th Corp Area ZAG contest. W9AZY turns in a greatly improved total. Dependability is keynote of W9BZS. W9BAN is almost convinced he can get up to 3.5 mc. W9CRJ is in line for an ORS tag. "Higher traffic totals" is promise of W9CDA. W9HAX wants 1750 kc. schedules. W9AQV and W9ERH are also on that band. W9ABV has lost the 14 mc. band. W9BOF applies for ORS. W9AYH is only on in the A.M. W9BOZ is one of Western Ky. mainstays. Welcome to W9CIM. W9QT got himself a new QRA. We regret the loss of W9EDQ as RM of Northern Ky. Applications for the office should be sent to the SCM at once. W9EDV is moving station. W9VB is having trouble neutralizing new transmitter. W9GON has another new antenna. W9FKM suspects that his missing copper-tubing inductance is serving a better purpose in a moonshine still. Here's a hot one — W9ICE is located in Winchester. W9CNE is getting married June 11th. Congratulations, Stew. We wish stations in Ashland, Berea, Maysville, Owensboro, Paducah and from Mills Point to the Big Sandy would report. W9DK just got on with new transmitter. W9IQK rises to say western Ky. is on the way.

Traffic: W9BWJ 271, W9BAZ 231, W9JL 86, W9OX 86, W9AZY 47, W9BZS 40, W9BAN 36, W9CRJ 30, W9CDA 22, W9HAX 19, W9ABV 14, W9BOF 14, W9AYH 11, W9BOZ 11, W9CIM 11, W9QT 7, W9ERH 4, W9EDQ 1.

INDIANA — SCM, George H. Graue, W9BKJ — W9GJS, ORS-RM, has resigned and is leaving for Chicago on a commercial job. W9DHJ is putting in a low powered 'phone and c.w. rig on 1750 kc. W9TE is getting the 'phone bug. W9AXH is dabbling with Amateur Movies. W9FHB has changed to an "X" cut crystal. W9GGJ is again going to try his luck with crystal. W9GZB, W9GFS and W9HKH are building crystal rigs. W9CHA's new crystal rig is working out FB. W9FKE reports lots of DX on the new 3.5 mc. 'phone band. W9CKB will soon be on with crystal. W9BOS' new AC receiver isn't so hot. W9EGE is building new transmitter. W9ABW reports being on from W9EJT. W9IDP and W9IHD are new hams in Bloomington. W9FQ expects to have his own station going soon. W9FKI is trying to make his sigs stretch across the pond. W9AB has a 75 watt crystal rig. W9HUO's tubes are going haywire. W9HHI is changing QRA. W9DWX' 50 watter went west. W9FKK are the call letters of Eastern Indiana Short Wave Club. W9FUT is getting crystal reports with the MOPA. W9YB reported direct to HQs.

Traffic: W9FUT 167, W9HBG 103, W9FAK 95, W9GJS 35, W9DHJ 29, W9EXL 28, W9QB 23, W9DZJ 21, W9BXT 18, W9TE 15, W9AXH 10, W9FHB 9, W9AKJ 7, W9GGJ 7, W9CHA 6, W9FKE 6, W9CKB 3, W9BOS 3, W9EGE 2, W9EEO 17, W9FKI 13, W9YB 295.

ILLINOIS — SCM, F. J. Hinds, W9APY — RM, E. A. Hubbell, W9ERU — W9DZG is out of the hospital after appendicitis operation. W9CKM is trying morning schedules. W9FJB is back with the '10s in PP. W9GDE sends in his first report. W9BXB is on again. W9HOS has a 6000 V transformer. W9DIL has crystal on 3580. W9ABL uses '10s. W9IIZA uses '45s. W9CMG is building an AC receiver. W9DPD is a new ORS. W9DZU says traffic is scarce. W9CZL snagged several VKs. W9GEP is moving from first to second floor. W9HPQ is not changing QRAs as mentioned in last issue of QRT. W9ERU is trying silvered crystals. W9GFY is back on 3.5 mc. W9BIK pounds at W9IMQ's new MOPA. W9NN wants the old timers to take the young squirts, who are off frequency, for a ride. W9VS, W1VS and W6VS are trying a three cornered circuit. W9BTU says morning DX is fine. The OW at W9BTU is soon to be on the air. W9HPK has a new PP rig. W9IAB, W9GBO and W9ISK are new stations at Pinckneyville. W9ISK has a new PP Crystal under construction. W9BKI is off the air temporarily. W9DPH will soon be on with high power. W9DAX has a new Class B that looks and acts like a first class commercial outfit. W9DEV is building a class B. W9GIB is building a new power amplifier job. W9DGY is ironing out his speech amplifier. W9IMG, W9IBC and W9BYL have been grinding crystals. W9FO handled Alabama Red Cross Traffic. W9CIH and W9BIR are 100% CW men. W9CRT is announcer on WMAQ Ham Program "ARE YOU LISTENIN'?" at 5:15 p.m. Daylight CST every Saturday afternoon. W9PK was heard by D4AAP. W9HNK is on again. W9DOU will soon try 56 mc. Trouble with crystal at W9FXE. Now that the political campaigning is over, W9BYZ is back on 3500. W9FDQ is installing crystal controlled outfit. W9GYO is using auto tubes in the receiver. W9ACU has new transmitter. W9BRX reports weather conditions poor on 14 mc. 'phone. W9ALA holds code practise on 900 kc. crystal 'phone and CW at 8 p.m., daily except Sat. and Sun. W9DGK has a new crystal. W9CFV is joining the USNR. W9EWN is doing fine traffic work. Congratulations to W9IU this month for being high traffic man in Illinois. W9DBO has some nice schedules. W9KA is doing fine work. W9FGD did excellent QSP on Terre Haute, Ind. "Rose Show" traffic. W9APY had a special schedule with W5YG for Rice Institute "Engineering Show" traffic. W9FLH reports poor DX but W9FUR worked ZU1U on 7 mc. W9BLD is putting in crystal. W9FXE, W9HUX and W9ACU had a fine 3-way QSO. W9GAI is building a new 'phone. W9JO is now off the sick list. W9BPU is switching to morning 7 mc. work. W9CUX is still getting VKs. Skip effects have played havoc with W9FCW's schedules. W9BSR has had a bad power leak. W9AVB says the new receiver is finished. W9GIV hopes to go on the Lakes this summer. W9FRA is finishing up the 3.5 mc. crystal. W9ISN and W9ILE are newcomers in Cicero. W9IJX is doing fine traffic work for a beginner. W9AFB and W9CSB made a flying trip to Minneapolis. W9IEP is doing splendid work. W9RO says messages are hard to get. W9AXM has a 7000 kc. Zepp. W9BON handled all of his traffic on 'phone — congrats, OM. W9ALK is on after a long vacation. W9ACE has receiver troubles. W9AMO is for CW 100%. W9AFN used low power 'phone on 14 mc. W9DRA is a new station with class B modulation and a crystal. W9DYG is celebrating 17 years on the air. W9GFU is now AARS. W9FUR says, "Worked ZU1B on 7 mc."

Traffic: W9IU 1165, W9VS 603, W9FO 335, W9CGV 280, W9ERU 256, W9APY 157, W9FGD 134, W9EWN 105, W9ALA 84, W9IBC 78, W9FYZ 74, W9DOU 73, W9DYG 63, W9FCW 49, W9CRT 48, W9FXE 47, W9SX 47, W9CZL 45, W9GYO 45, W9GFU 40, W9FJB 39, W9AMO 28, W9CSB 25, W9DBO 25, W9DZU 25, W9ACE 22, W9HOS 22, W9AFN 21, W9HPK 20, W9BPU 17, W9FRA 16, W9ACU 15, W9CKM 15, W9AVB 14, W9CUH 14, W9FTX 13, W9KA 12, W9IEP 10, W9RO 10, W9GDE 9, W8GAI 9, W9PK 8, W9DZG 7, W9BON 6, W9IUB 6, W9JO 6, W9CEO 5. W9BSR 4, W9BTU 4, W9BYZ 4, W9GIV 4, W9BVP 3, W9CUX 3, W9FDQ 3, W9FLH 3, W9HNK 3, W9HUX 3, W9BIR 2, W9DPD 2, W9IJX 2, W9WR 2, W9AXM 1, W9FPN 1.

MICHIGAN — SCM, Ralph J. Stephenson, W8DMS — Thanks, gang, for the biggest month yet (we say it each month), with 140 reporting stations and 119 of them handling traffic. This big total is also helped by the fact that many attending the hamfest, Sunday the 17th, handed in reports that otherwise would have been missing. The hamfest also was the biggest in our history, with a total registration of 399 hams from all over Michigan, Indiana, Illinois, Ohio, and Ontario. One "Four" driving by, saw a lot of QSL cards in windshields parked so dropped in to see what was going on. Our principal speaker was Director "Doc" Woodruff, W8CMP, and as usual he had his Bag (Golf) of tricks. His talk on pentode oscillators was thoroughly enjoyed, and to wind up, he bent a bar of steel with a piece of string. Other speakers were W9FO of call book fame, Lieutenant Stevenson of the Naval Reserve (not the SCM), W8BAH, Ohio SCM, and Lieutenant Glatzel, also of the Naval Reserve. Prize awards and the ever-popular auction followed, winding up an enjoyable day. W8FX was drafted as master of ceremonies and program director, while the rest of the committee was busy taking care of the gang. The R. I. was present giving examinations to some twenty or twenty-five candidates for licenses. Our old friend W8BPT, now W9HGC, showed up Saturday evening and made personal contact with many of her QSOs. W9FBC and W9BBP *bummed* their way down from the Upper Peninsular coming via Chgo thus making close to a thousand miles. There's the ham spirit. The crowd was saddened to learn of the silencing of the key of W8FTX, John Fatsco, 2924 Grant St., Detroit. Twenty-three of the ninth district reporting this time which keeps up their percentage. Four of the RMs made the BPL this month with W8PP topping the list as usual. Larry, W8PQ, ran him second and is after Hal's laurels. W9EGF sends in news from his territory and says the gang wants corset springs. You'll have to look up some of the OTs, OM. Perhaps W8FX has some stored away in his attic. W9VL also comes thru with newsy letter. W8BMG finds time to keep the Western Michigan crowd lined up. He reports another addition to our menagerie with W8GNU. This gives us CAT, COW, APE and GNU in Michigan, and W8FUR was in attendance at the hamfest. W8AZQ uses '10 while repairing his '52 power supply. W8DCT is working some of his AA schedules on 1.7 mc. W8DED sends in his list of "Hi-quality sigs." W9HK sends in a map showing the U.P. nets with their outside contacts. W8EVC devoted his time to traffic. W8FIO reports Kalamazoo hamfest big success. WDAB corrects my attempts at French. Accepted. Jackson club is now affiliated with ARRL, and other clubs in state all active. W8RF says he can hear his own 56 mc. signals but that's all. W8DAQ heard W4UC telling W3CXL what ZLAA means. W9GJX has been under the weather. W8GA has a crystal with the "jitters." W8AIU helps run down "bootleg" stations. W8ALN handles no traffic as he is married. How about the SCM with 20 years of it? MIM. The D.A.R.A. is sending April issue of the "Bull" to everyone that registered at hamfest, and all reporters. The "Bull" covers everything and everyone and is sent to each reporting station. Are you getting it? Had to call in W8DYH and Miss W8DZ, W8FX and his YL, and W8PQ to help get this big report out!

Traffic: W8PP 1023, W8PQ 656, W9HK 541, W8DYH 532, W8BMG 461, W8EVC 443, W9VL 399, W9FX 345, W8DED 274, W8AZQ 231, W9BBP 242, W8FSK 233, W8QT 225, W9EGF 215, W8CST 214, W8EGI 165, W8CSR 158, W8DAQ 136, W8CPH 130, W8VMZ 125, W8CEU 124, W8DZ 112, W9CE 109, W8FRW 106, W8AVQ 103, W91HM 80, W8AKN 77, W8FTT 72, W8FTW 70, W8EHD 69, W8BIU 67, W8DA 66, W9DAB 62, W8AYO 59, W8CFZ 58, W8BJG 55, W8DCT 52, W8ERX 49, W8DV 45, W8DFS 44, W8GHP 44, W9EXT 36, W9HIS 34, W8DOS 33, W8CLL 30, W8BTJ 29, W8AAD 29, W9CSI 28, W9GQF 28, W9CWR 27, W8CFM 26, W8FIY 26, W8CUX 25, W9HSQ 24, W8DMF 18, W8DWL 18, W8PY 18, W8JO 18, W8DHA 17, W8CWK 16, W8DLX 16, W8GA 16, W8ZN 16, W9GJX 14, W8DWB 13, W8BTK 12, W8COW 12, W8EFI 12, W8AF 10, W8GBB 10, W8VS 10, W8WR 10, W9CDJ 10, W8DSX 9, W8DWC 9, W8HL 9, W9ADV 9, W8ACW 8, W8AJT 8, W8AIU 8, W8DBP 8, W8DKO 8, W8EWO 7, W8FTV 7, W8BIK 7, W8JX 7, W9CEX 7, W9GGD 7, W8COQ 6, W8SY 6, W9DPQ 6, W9FBC 6, W8ARR 5, W8BWB 5, W8DCT 5, W8GP 5, W8NR 5, W9EEM 5, W8DYR 4, W8GQS 4, W8WO 4, W9AIO 4, W8CEV 3, W8DOI 3, W8FLU 3, W8FUR 2, W8FXB 2, W8GQB 2, W8SH 2, W9AAM 2, W8ALL 1, W8ATO 1, W8CAT 1, W8EBQ 1, W8FGW 1, W8GDR 1, W8KJ 1, W8LU 1, W8DMS 49.

OHIO — SCM, Harry A. Tummonds, W8BAH — W8DDS, W8AXV, W8BYD and W8BAH made the BPL this month. District No. 1: We can't remember when we haven't seen W8DDS in the BPL. Have you heard the new quarter KW rig at W8AXV? W8BYD joins the O.N.G. at Cleveland. W8EBT had a bad oscillating tooth removed. W8RN got a job as operator on the lakes. "Fine time on 'phone," reports W8BNC. Look for new crystal signals from W8BON. W8BMX says second op. now has station, W8GTO. W8CIY handled traffic from K6AIN. DX tests played havoc with schedules reports W8EBY. Nice total from W8EQU. We welcome report from W8CZT. W9CU was visitor at W8UC. W8FGC wants some good schedules. W8BFT is organizing a Ham band for Cleveland Convention. Report received from W8FSS. W8ENJ puts Sandusky on the map. W8EEW is active in the Lakewood Radio Club. HQ. Co. O.N.G. station W8AGL reports. W8EXA is rebuilding. West Technical Radio Club station W8CQF reports. W8CIO is busy on O. O. work. W8FRR is a new reporter. RM W8DVL has the new rig finished. District No. 2: W8BKM's new rig is FB on 3505 kc. A new reporter from Ashtabula is W8GHD. W8EJY handles traffic! Thanks for report, W8DMK. District No. 3: W8BTT sends nice report. District No. 4: Under the leadership of RM W8EEQ this district is doing things. W8PO is making veteran reports. W8OQ reports. W8UW is going again. W8QQ is QRL studies. W8ATV reports spring fever. You really ought to be an ORS, W8HT. W8DTW, thanks for fine reports from Fostoria. District No. 5: W8EFN is now on CW. W8EXI reported by radio. W8DVE burned out antenna meter. "Shooting at the 500 mark next month," reports RM W8DFR. District No. 6: W8ARW has new 'phone license. W8BBH is an Official Trunk Line station. "Busy on Mine stuff-traffic, all official ONG," reports W8GZ. W8PBN is a new reporter from Columbus. District No. 7: W8CKX is active on 7 mc. W8ANS has been under the weather lately. RM W8VP is ready for emergency traffic from coal field. W8ALQ would like couple of schedules. W8ENH joined the USNR. "All traffic handled on 'phone," reports W8CUL. W8EDY and W8FA send reports. RM W8CGS is looking for good schedule into Columbus. District No. 9: Report from W8ANZ. W8EQB is busy on 7240 kc. W8BAH has schedules daily with W8PQ, W8AXV, W8BZL, W8EBT, W8ANS, W8PO, W9BWJ, W8DFR. Cleveland Committee of the Cleveland Amateur Traffic Assn., which is sponsoring the Central Division ARRL Convention at Cleveland, Ohio, September 2 and 3 are working "full speed ahead" on the programme. The Air City Radio Club has changed its name to Dayton Radio Relay League. Officers are W8BUY, president; W8BNY and W8WI, vice-presidents; W8AZH, secretary; W8FUN, assistant secretary; R. J. Bowers, treasurer. W8DEL is chairman of the technical committee. They are out to make the D.R.R.L. known as a real traffic handling outfit and are desirous of obtaining schedules at the HQs station, W8MK. Give 'em a hand, fellows. Note number of Michigan stations handling traffic this month!! Let's go, Ohio!

Traffic: W8DDS 1108, W8AXV 588, W8BYD 594, W8BAH 538, W8EBT 360, W8DFR 327, W8GZ 209, W8EEQ 185, W8DVE 172, W8PO 180, W8BBH 128, W8CGS 92, W8RN 82, W8EDY 78, W8CUL 74, W8VP 57, W8BNC 56, W8BON 55, W8BMX 51, W8DTW 50, W8BKM 38, W8EQB 28, W8BPN 27, W8CIY 27, W8EBY 26, W8EQU 25, W8DMK 23, W8EXI 21, W8ANS 21, W8ENH 19, W8EJY 18, W8CZT 18, W8UC 15, W8HT 14, W8ATV 12, W8QQ 8, W8UW 8, W8FGC 8, W8BTT 7, W8ARW 6, W8CKX 6, W8BFT 5, W8OQ 5, W8FSS 4, W8ENJ 4, W8FA 4, W8EEW 3, W8GHD 2, W8ALQ 1, W8AGL 1, W8EXA 1, W8ANZ 1.

WISCONSIN — SCM, C. N. Crapo, W9VD — W9FSS is now a member of trunk line "A." W9DKA has been trying all known types of antennae. W9AN schedules W9BN,

W9GZP, W9HZT and W9HZ. W9GVL applies for ORS. W9EYX-ITM is building a new MOPA. W9ZY-AZN has QRM from power leaks. W9BXZ has pair of '10s in PP. W9EOX schedules W9DKA. W9HSV is looking for schedules. W9DNU, formerly 9OM is now at Platteville. W9HMS wants early a.m. schedules. W9HMY is new station at Galesville. W9FDI is keeping things moving at Elroy. W9BUP is making tape recorder. W9ESZ changed to 3813 kc. crystal. W9HTZ is now ORS. W9FAA is very QRL. W9FAF wants to keep Badger news going. W9AKY is experimenting with reflector type antennas for 14 mc. W9FIX schedules W9GNW daily. W9FSQ is handling traffic. W9BIB was saving his nickels for the QSO Party. W9CFP has changed to 7000 kc. W9SO has "checker" schedules with W9IAQ and W9FCO. W9IQW is new station at Hancock. W9DJQ was sick with the flu. W9CJU is changing to break-in on 'phone and CW. W9AVG is on 14 mc. daytimes and 3.5 mc. evenings. W9EAR is on occasionally. W9FAW has been chasing DX. W9GFL's OB was copied in Germany on 14 mc. W9DRO, W9ANJ and W9AMR are experimenting. W9HSK is new ham at Lacrosse. W9ABM hasn't missed a QSO Party for six years. W9IQB is new station at Elkhorn High School. W9HAH has '10s PP. W9IEA is on 7 mc. W9IFL is new station at Union Grove. W9AHJ is building a portable. W9VD burned a hole in his 3535 crystal. The Lacrosse Club is active with twenty members meeting once a month.

Traffic: W9FSS 595, W9DKA 296, W9AN 136, W9EYX-ITM 69, W9GVL 69, W9ZY-AZN 52, W9BXZ 52, W9EOX 35, W9HSV 30, W9DNU 28, W9HMS 26, W9HYM 22, W9FDI 22, W9BUP 22, W9ESZ 21, W9HTZ 15, W9FAA 14, W9FAF 16, W9AKY 10, W9FIX 8, W9FSQ 7, W9CFP 7, W9SO 6, W9IQW 5, W9DJQ 5, W9CJU 4, W9AVG 4, W9BIB 4, W9EAR 3, W9FAW 1, W9VD 15.

DAKOTA DIVISION

NORTH DAKOTA — SCM, Guy L. Ottinger, W9BVF — This is the last report that I will have the pleasure of writing for the N. Dak. gang as SCM. I am hereby taking this chance to thank the gang for their FB coöperation during my term of office. W9EVQ and W9FMC are new ORS. W9BAY has sold out. W9HJC and W9DGS are again high traffic handlers. W9HRP, the JRRC station, is on the air. W9DFF is now a full-fledged AARS. W9EGI blew the tubes in his '45-'10 pushpull combination. W9DYA does most of his work in daytime. W9CRL has been out of town. W9DM is still on 7 mc. W9BVF works W9BNT on schedule. W9ECJ and W9GER visited the SCM.

Traffic: W9DGS 307, W9HJC 188, W9CRL 51, W9BVF 48, W9EGI 9, W9DFF 6, W9EVQ 5, W9DYA 5, W9DM 4, W9FMC 2, W9HRP 2.

SOUTH DAKOTA — Acting SCM, Stanway Gough, W9DNS — For the fifth time W9HZT takes traffic honors. W9IQD is new ham in Huron. W9HBA reports good DX. W9FDD says reports are better since he put in a '12A. W9BJV spent a week in Cincinnati. W9DKL had another antenna pole come down. An Amateur Radio Club has been formed at Aberdeen. The Watertown gang is working hard on convention plans. The Sioux Falls club is putting on their annual spring picnic. W9BZI worked W9FLI using 22 volts on the plate. W9IRS is an old timer with a new call at Pierre. The Pierre gang were visited by W9CGH. W9BLZ, W9DNS and W9DES went down to visit W9HHW and found him tearing down his outfit to move. W9DNS, BC fan, boasts of hearing 2YA at Wellington, N. Z. using no antenna. W9HJU kept a schedule with W9BLZ on 14 mc. at midnight.

Traffic: W9HZT 377, W9HHW 202, W9IDW 108, W9DKL 83, W9FLI 62, W9HBA 24, W9BJV 20, W9BLZ 14, W9DNS 12, W9FDD 11, W9HSH 10, W9CRY 7, W9DTZ 2, W9CFU 2, W9CAU 1, W9IEK 1.

SOUTHERN MINNESOTA — SCM, H. Radloff, W9AIR — W9BN continues good work on Trunk Line "A." W9BKK and W9HCW were royal hosts to a hamfest at Lamberton. W9BNN makes one antenna do for four bands, 1.75, 3.5, 7 and 14 mc. The Minnesota Army Amateur Radio system completes a most successful drill season thanks to W9BKX as State Control. W9HFF gathers the following incomplete list of new stations in Minneapolis: W9IAT, W9IUD, W9IJN, W9IKN, W9IKF, W9IKL, W9IAL, W9IX, W9IJD (YL), W9ITQ and W9IPX. W9AIR is going to "saw off" for 56 mc. this summer. W9DEI divides time on 'phone and CW. W9FCC handled important traffic. W9ERT is getting new license. W9DH reports two nights of good DX. W9LN has Unlimited Broadcast ticket. W9HGN keeps some fine schedules. W9GFH worked his first W6. W9GZQ would like to work 1750 kc. W9DRG put up 60 foot lattice tower. W9QE is active on three bands. W9HRH keeps AARS schedules on 1750 kc. W9EPD sells tourmaline crystals. W9HXR rebuilt transmitter. W9FCS and W9GFA coöperated to keep W9DNU informed of a sick relative at Rochester. W9FFY has Commercial 2nd ticket. W9COS drops radio for tennis. W9GUX installed Crystal. W9HMV reports W9IOD a new ham at Spring Creek. W9EPJ has new crystal rig. W9FNK raises his power again. W9GLE uses a glass of water with two copper electrodes as bleeder resistor. W9CPP had to move to another room. W9DRK reports W9EZJ joined AARS and W9BGG lost his appendix. W9YC totals suffer on account of the ops turning to the finer things in life — tsk! tsk! W9EGG finds pentodes FB. W9FJK is laid up with infected key fist. New hams and first reporters are W9CVA, Adams; W9CSJ, Tracy; W9AFR, Fairmont; and W9FXS, Mankato. W9BQF and W9ATP will try 56 mc. 'phone this summer. W9EFK turns to golf. W9EYL finishes night school. W9DBC reports W9GMU of Chi located in Minneapolis. W9HKI is ready to announce the coming out of two new hams. W9EAT is still kicking. W9FMB started a multi-stage transmitter. W9EJR returned to hospital. W9CKU leads two bands and an orchestra. W9FPY and W9BNF put Luverne on the active list. W9CYA works all his DX before bedtime. W9EEB installed 32 volt power supply. W9FXV had the misfortune to lose his equipment in a fire. W9DGE now operates at WRBN.

Traffic: W9BN 462, W9BKK 374, W9BNN 273, W9BKX 123, W9HFF 120, W9AIR 67, W9DEI 35, W9FCC 32, W9DH 27, W9LN 25, W9HGN 24, W9DRG 20, W9QE 16, W9HRH 15, W9GZQ 25, W9EPD 13, W9HXR 12, W9FCS 11, W9FFY 10, W9COS 10, W9GUX 9, W9HMV 9, W9EPJ 7, W9GFA 7, W9FNK 6, W9ERT 6, W9GLE 3, W9CPP 3, W9DRK 2, W9YC 2, W9EGG 2, W9CVA 1, W9AFR 16, W9CSJ 1, W9HCW 10, W9EFK 1.

NORTHERN MINNESOTA — SCM, Palmer Andersen, W9DOQ — W9EGU has come on with 14 mc. 'phone. W9FNJ is on with new crystal rig. W9ADS crystal controls a pair of '52s. W9HDN is doing fine 56 mc. work. W9BBL's house is being remodeled. W9HEN reports 8 hams at Anoka. W9BAR spends much time on the air. W9HRB reports three new "I" calls active: W9IPR, W9IMI, W9IPO. W9BRA reports W9IAA, W9IBN, W9IFQ, W9IGO. W9HIE reports over the air. W9BBH is catching off-frequency boys. W9EOZ is trying new 'phone band. W9BRA reports much activity. W9IAK is changing QRA to Minneapolis. W9AH and W9GYH are now on 3500 kc. W9CTW is inactive for the summer. W9BVI works a lot of DX. The Arrowhead club was entertained by the generous contributions of literature from W9CTW at a recent meeting. As your new SCM, I want to thank you all for the fine coöperation my first month on the job, and hope it will continue through my term; in return, fellows, my best efforts will be yours.

Traffic: W9EOZ 3, W9BRA 61, W9FNQ 68, W9HIE 34, W9BBL 130, W9BHH 2, W9AH 38, W9DOQ 11, W9BVI 6, W9HEN 16, W9IAA 24, W9BAR 22, W9HRB 4, W9GBM 32, W9IAK 9, W9GYH 13.

DELTA DIVISION

MISSISSIPPI — SCM, William G. Bodker, W5AZV — Amateurs residing in the vicinity of Jackson, who would like to appear before the Radio Inspector to stand examination for regular operators license, etc., please communicate with the SCM; if as many as six applicants are desirous of standing examination, the RI will hold examination in Jackson. W5ANX, our RM, is now in the BCL repair business. W5BUI is QRL. W5VJ handles quite a bit of traffic. W5BNW has a new MOPA. W5BGS is a new ham at Yazoo City. W5BZG's local power plant burned down. W5AWP is on the new 3.5-mc. 'phone band. The Hamfest at

Monroe, La., Apr. 2nd–3rd was attended by a number of Mississippi hams, including W5AAY, W5ACS, W5APR and most of the Jackson gang. Everyone is looking forward to the next, to be held at Pine Bluff, Ark., under the auspices of W5SI, the first weekend in August.

Traffic: W5AZV 80, W5ANX 20, W5BUI 127.

ARKANSAS — SCM, Henry E. Velte, W5ABI — W5BMI is on two trunk lines and gets lots of traffic — see his total! W5IQ is also handling a nice total. W5FM does most of his work on AA nights. W5BDW says the wind blows his antenna very badly. W5BRI intends to try 14- and 1.75-mc. bands. W5AAJ reported by radio. W5BDR has six schedules three times each week. W5JK is using a TNT. W5CR is using crystal control. W5MJ and W5BHH are new hams. W5BDB is operating at KGTB. W5DI, ex-W5ABY, is on the air again. W5BED is a new AA station and alternate ALN station; his new portable call is W5CEP. W5ABI is on 3.5 mc. W5VK is a new station in LR. We need more ORS and would like to receive applications from anyone interested.

Traffic: W5BMI 698, W5ABI 216, W5IQ 179, W5BDR 43, W5BED 22, W5JK 12, W5CR 19, W5BRI 16, W5AAJ 10, W5BDW 1.

TENNESSEE — SCM, James B. Witt, W4SP — W4AFM sends in best report. W4AAD likes the new 'phone band. W4EX has rebuilt transmitter. W4OI and W4ABY left for 15-day U.S.N.R. cruise in Gulf of Mexico. W4CW has obtained license for transmitter at school under call W4BIJ. W4BDB is a new station at Cleveland.

Traffic: W4AFM 281, W4AAD 30, W4RO 41, W4EX 28, W4OV 8, W4SP 4, W4BDB 3.

HUDSON DIVISION

EASTERN NEW YORK — SCM, R. E. Haight, W2LU — Again W2BZZ goes over the top. He reports two new hams, W2DWO and W2DYQ. W2UL is again honored in BPL. W2LU can't seem to make the grade for that BPL. W2BKM reports nice total. W2BJA makes urgent request for better judgment to be used in routing traffic. W2OP visited W2BJA. W2BLU is QRL instructing new hams in code. W2CFU has a good signal. W2ANV uses crystal on 3579 kc. W2CTA reports 56 mc. receiver perking FB. W2BVR is QRL at WOKO. W2BZW promises traffic increase. W2ATM reports latest arrival, W2DVF. W2KW visited W8ACI. W2DXV enters the ham game in Schenectady. W2COQ spent a weekend at old QRA in New Hampshire. W1HO comes to Schenectady. W2DEL joined the V. C. R. W2CGO is DXing for Rainbow Trout. W2BWF is out for traffic. W2BJP is new ORS and wants some good schedules. W2CJS is breaking in a new ham. W2BLL is using one 211E in a Hartley. W2AVS reports FB Radio Club at Stevens Tech., W2BSC; oprs. W2AFV, W2ADB, W3BQN, W2CDY, W2CQB, W2BXU, W2CIL, W2AMV and ex-2CFN. W2BTW contacted CX2BM on 14 mc. Operating on 7000 kc. W2ACY reports FB DX. W2ZZBF-W2CQH can be heard from Elmira, N. Y. W2BYV is working out FB on 1750 kc. 'phone. W2BGB is going to go on CW. W2BWG, W2BCO and W2BYF have obtained unlimited 'phone tickets. W2DOS can't get the bugs out of his transmitter. W2CGT, W2CVT, W2BYM, W2AEQ and W2BJX coöperated in putting low power station at Boy Scout Panobajidem at State Armory in Poughkeepsie. W2AZZBG, portable call of W2BJX, was used. Mid-Hudson Amateur Club is running three contests, DX, traffic, and 'phone. W2AXX is going to use pair of '52s in P.P. S. A. R. A. is running a DX and traffic contest with Gloversville Amateur Club. W2CKY, ex-W2CEA, is back again. W2SZ reports R. P. I. Radio Club elected following officers: Pres., W2AXM; Secy-Treas., W3BHT-W3AWZ-W2DMH. W2DWO of Oakwood School is active. W2DQT is building a new transmitter. W2DUG is a new ham in Schenectady. W2CAZ received unlimited 'phone license. W2BKW joined the V. C. R. boys. W2ACB is enroute to West Coast. W2BER and W2CBX are lost in the QRM. What has happened to W2AMM? W2BSH is QRL in Albany.

Traffic: W2BZZ 653, W2UL 522, W2LU 342, W2BKM 180, W2BJA 177, W2BLU 115, W2CFU 44, W2ANV 37, W2BJX 37, W2CGT 36, W2CJS 34, W2CTA 33, W2BVR 26, W2COQ 20, W2BZW 19, W2ATM 16, W2KW 16, W2DEL 15, W2CGO 14, W2AXX 14, W2BWF 14, W2BJP 12, W2BLL 11, W2AVS 11, W2BTW 8, W2ACY 3, W2ZZBF 3, W2OP 3, W2CJP 3, W2DUG 2.

NEW YORK CITY AND LONG ISLAND — Acting SCM, E. L. Baunach, W2AZV — Due to urgent business, W2BGO has asked me to take care of his job until his term as SCM expires in July. Please, until further notice, send all traffic reports to W2AZV, 7823 Tenth Ave., Brooklyn, N. Y. Applications and new appointments for ORS are in order. Any station interested in tying in with the NYC Traffic Net will please get in touch with me as soon as possible. Manhattan: W2BHL, brother of our old friend, W2OV, leads this boro in traffic handled. W2ANQ starts his ham activities in traffic work. W2AOY is fooling around with 56 mc. stuff. W2VNL tells us of the activity on 56 mc. of W2CTF, W2BJT, W2VH, W2AG, W2CUZ, W2CXF, W2CJJ, W2DB, W2DDP, and W2CYD. Bronx: W2BGO manages to keep a few schedules. W2CYX is digging up recruits for the Navy. W2FF is looking for a schedule with Scranton, Pa. W2BTI says the New York University Radio Club is on the air with the call W2DSA. W2QM is the call of ex-W2BPQ, RM for the Bronx. W2LW is anxious to make schedules on 3.5 mc. W2VG is back again with crystal. W2CWP sends traffic report. Brooklyn & Queens: W2NO is RM for this section and reports plenty of activity in his net on 7 mc.; W2AF, W2TO, W2DHN, W2DPV, W2AEN, W2AQN, W2DMI and W2DLO are all with him every night. W2BAS is going to try an MOPA. W2ASG has oil burner QRM. W2AGC wants to know how to report. W2BEG and W2AZV are still trying to make receivers work without QRM. W2CCD expects to be a lawyer soon. W2BXJ just got his ORS. W2TI is working hard for the Radio Club of Brooklyn. W2AIQ, our trunk line man, wants a schedule on 56 mc. W2BRB is operating W2ZZBO on 56 mc. W2ADQ can still handle traffic for Central America. W2DBQ can be heard on 3520 with a crystal. After 20 years on c.w. W2BO is going to try 3500 kc. 'phone. W2PF's transmitter is now nicely situated behind panels on a steel rack. W2DOI is a new ham. W2BNW is new ORS. W2RK is batting signals out at Police Hq. W2AC prefers a TGTP. W2WT is going to take a summer rest. W2AEX is measuring skip effect. W2IS, W2BOY, W2CGA, W2AEC and W2BMM are school men. W2DIS is very active. W2LB is trying to organize his Naval unit. W2BVB worked a couple of "bootleggers." (What kind, OM? Hi.) Long Island: W2VL, W2DL, W2AOV and W2CJA keep 7 mc. hot. W2AXV takes care of 3.5 mc. W2BSP is busy with his club. W2AST and W2CRG are looking for traffic. W2AKL has a fifty watt stage perking. W2OT keeps a schedule every day. W2AUS is on 3.5 and 7 mc. with 150 watts. W2DQK worked a Six. W2DOG is still barking. W2BFG was off due to illness. The Sunrise Radio Club at 232-14 Merrick Rd., Laurelton, L. I., is operating a 3.5 mc. 'phone under call W2SV. W2AHZ is president, W2BKZ secretary. Meetings are held Friday evenings — visitors always welcome. Staten Island: W2WP, our YL RM, again makes the BPL. W2ACZ and W2CF are working DX on 3.5 mc. 'phone. W2BYU "hears" everything. W2COK and W2CKW are DX hounds. W2ADB and W2AFV operate W2BSC at Stevens Tech. The S. I. R. C. meets at W2AMO's shack every Friday night. W2CEN sends his first report. W2SC reports traffic.

Traffic: Manhattan — W2BHL 16, W2ANQ 6, W2AOY 1. Bronx — W2BGO 187, W2CYX 45, W2FF 27, W2DSA 21, W2QM 8, W2CWP 15. Brooklyn — W2NO 236, W2DBQ 141, W2AIQ 118, W2BO 63, W2AZV 42, W2PF 18, W2BAS 27, W2ASG 17, W2LB 6, W2BRB 3. Queens — W2ADQ 434, W2AUS 87, W2DIS 49. Long Island — W2AKL 58, W2DQK 26, W2OT 9, W2DOG 50. Staten Island — W2WP 365, W2CEN 10, W2SC 199.

NORTHERN NEW JERSEY — SCM, A. G. Wester, Jr., W2WR — W2AEY is donating 75 message delivery cards to the station in this section who handles the most traffic from May 16 to June 15. W2AGX has changed his address. W2CJX worked 15 countries within one week. W2BBU handles a fine lot of schedules. W2CNL reports that the Palisades Wireless Club now has over 35 members. W2BPY, our RM, handles the greatest amount this month. W2AGO handled a fine amount of traffic. W2CFY is studying for a commercial ticket. W2AIF worked a few VKs.

W2DQE has moved to Vermont and now signs W1CGV. W2DCP advertises in his local paper for traffic. W2DIU is installing crystal control. W2CPR lost his antennae. W2CMY builds radio equipment. W2CMP delivered a message to a Chinaman. W2AKW handles plenty of traffic. W2ABT is located in Verona. W2CLX is on with a new C.C. transmitter. W2ABW handled over 100 messages. W2CIZ wants amateurs to put their ages on QSL cards. W2DQQ is a new station in Milburn. W2DJC and W2DJE are jointly building a high power transmitter.

Traffic: W2CWK 10, W2AGX 4, W2CJX 18, W2BBU 89, W2CNL 27, W2BPY 310, W2AGO 286, W2CFY 1, W2AIF 30, W2BIJ 2, W2BRP 4, W2CPR 6, W2AEY 4, W2DIU 254, W2DCP 7, W2BQT 94, W2DQE 97, W2CMP 1, W2BSE 3, W2ACL 10, W2BBR 3, W2DJE 6, W2DQQ 53, W2DJC 31, W2CIZ 41, W2ABW 130, W2AKW 40, W2ABT 2, W2CLX 18.

MIDWEST DIVISION

NEBRASKA — SCM, S. C. Wallace, W9FAM — W9BNT is still holding up his batting average. W9DMY has been rebuilding. W9FUW is our champion 'phone traffic handler. W9EHW is still on the AA job. W9DGL put up new antenna. W9DFR is QRL regular duties. W9BBS says RR business slow. W9EWO says besides trying to get away with half of the Hotel fixtures at Convention he has the mumps now. Hi. W9FWW blew part of transmitter. *W9BQR is still on the job. W9DI* spent weekend at St. Louis. W9DXY is still keeping schedules despite bad QRN. W9DTH is experimenting on 14 mc. W9HZC, W9APJ and W9EYE turn in FB reports. W9BB is doing some nice traffic work. W9DHA is working on new transmitter. W9HTU is experimenting with 56 mc. W9HYR blew filter and tubes. W9FAM won the grand prize at the Convention — the loving cup. I sure want to thank you fellows for the honor.

Traffic: W9BNT 449, W9DMY 130, W9FUW 66, W9EHW 56, W9FAM 62, W9DGL 33, W9DFR 21, W9EYE 19, W9BBS 25, W9EWO 12, W9FWW 10, W9BQR 5, W9DXY 48, W9HZC 48, W9BB 31, W9DHA 21, W9HTU 12, W9APJ 6, W9HYR 5.

IOWA — SCM, George D. Hansen, W9FFD — New RM W9BPG heads the list. W9FFD pecks at it on Monday and Friday nights with Army and Navy. W9BJP reports new hams in his town, W9INM, W9DJY and W9IQE. W9DMX reports the new regs played the deuce with his schedules. W9DNZ *still* quarantined away from home. W9ABE says lots of school QRM. W9ERY antenna blew down in high wind. W9GWT is QRL work. W9GP says busier than the proverbial cat. W9ACL reports listening in on *WMAQ ham broadcast on Saturdays at 5:15 p.m.* C.S.T. W9GFQ is going through a process of remodeling. W9IO QRL school. W9GXU has new power supply. W9BWF plays chess via radio with W9ABH. W9FYC is still active in AARS. W9CWG reports that 1.75 mc. is full of QRN. W9EFU is now on 7 mc. W9DFZ has a job now. W9FEB keeps intermittent schedules. W9ECB is building MOPA for CW. W9AFQ is a new OBS appointee. W9EOE gets busier every day with farm work. W9FZO was getting all set for the ORS party. W9AHQ handled death message for local delivery from China. W9HMM is new ORS. W9GPL receives excellent reports using type '01A tubes. W9ABH is a first reporter. W9AHX gives us the sad news that he is leaving us and in the future will reside in Calif. W9DJX built a new monitor. W9AYC reports new ham, W9IBK, in his town. W9CYL has been pecking away on 7 mc. W9DIB, the ole DX hound, reports that he still has hopes. Hi. W9HNA is looking for reliable schedules. W9EJQ, the old Maestro, says all he has is "Absolute Zero." W9AEW says QRL job. W9DFK says "you tell 'em"; yeah, FFD and DFK are making crystals. We now have two RMs to help us, W9BPG at Monona to service the eastern part of the state and W9EIV at Sioux City to help in the western section. They are both awaiting your advice and will endeavor to aid in your every wish regarding good schedules and traffic. Drop them a line.

Traffic: W9BPG 119, W9FFD 104, W9BJP 75, W9DMX 65, W9DNZ 64, W9ABE 58, W9ERY 55, W9GWT 53, W9GP 48, W9ACL 45, W9GFQ 44, W9IO 44, W9BWF 42, W9FYC 37, W9CWG 37, W9EFU 26, W9DFZ 25, W9FEB 23, W9ECB 22, W9AFQ 20, W9EOE 19, W9FZO 14, W9AHQ 13, W9HMM 6, W9GPL 4, W9ABH 4, W9AHX 3, W9DJX 3, W9AYC 3, W9CYL 3, W9DIB 2, W9HNA 1, W9ANO 10.

MISSOURI — SCM, L. B. Laizure, W9RR — St. Louis: W9PW is rebuilding. W9HVJ sent in another of his blanket reports. W9HHK is just out of hospital. W9HWE succeeded in working VK. New hams are W9EJO and W9EJW; our previous report of W9BHF being a new ham was in error — some one got the wrong call letters. W9HEL is a bug waggler. W9BHI registers kicks about deadness of 14 mc. W9TA is on with new MOPA. W9HVJ is trying new antenna schemes. W9HWT is a perpetual mover. W9HWF and W9FCH are new hams. W9HEL has a breakdown. W9GUQ is sporting a liar's license (?). W9GRT is sporting new QSL cards. W9CGB is a DX hound. W9HVC is rebuilding for higher power. The SCM is trying in vain to locate street address of W9HVJ — Help!! W9GTK is an ORS applicant. W9CCZ is back to TNT. W9FWQ got his extra first. W9GSO is still trying. W9HVP tried about two gross of 50 watters. W9GTK joined AARS. W9ILI is a new ham. W9CCZ sent a bunch of reports. W9FTA shifted his berth from the U. S. Dredge *Thebes* to the *Selma*. He says he was home and loaned W9GDU enough wire to fix his wireless. W9GHH hollers for report cards. W9DZN resigned ORS. W9DHX is building new 'phone rig. W9EDK down at *Vicksburg, Miss., State News: W9DVV is on 3.5 mc.* W9GQY got license renewal. W9ASV put up a pair of 50 footers. W9GXT reports bad power line QRM. W9EYG-HCP lists ten schedules. W9FSL had QRM from school. W9CJB consolidated with W9GJF. W9CJR reports much QRM from litigation in circuit court spring term — he's court clerk. W9AIJ was appointed unit commander for USNR Unit 16 at Marceline. W9EDI-IDH is new ham. W9BJA crawled out of bed for first time since Christmas. W9FJV is a bear for traffic. W9BAU applied for ORS. W9HUN is a new ham. W9GMI is keeping one schedule. W9DHN ground new rock. W9FYM kept schedule with W9FJV. W9FSU lost schedule when W5ASF quit. W9HNM is waiting license renewal. W9ECE is set to handle traffic from convention in his town. W9BGW is rebuilding. W9ENF kept five schedules. W9CUT is a new ham. Kansas City: W9AUC is on 7 mc. for traffic. W9GXM moved to Michigan. W9GCG worked 17 VK and ZL stations last night of the contest. W9AQX kept all USNR schedules. W9TJ is on 7 and 14 mc. W9FLT and W9EDT are trying 56 mc. 'phone. W9DQN says job QRM. W9AOG kept a string of schedules. W9BMA got in on the DX contest. W9FIO handled a good total. W9GOM is taking a trip out on West Coast. *W9FHV is on Trunk Line "B." W9BMA is on Trunk Line "H."* W9CVT says traffic scarce. W9KG is a new one, formerly W9AYK. W9FQF handled traffic. W9RR has been doing much traveling for USNR. W9EHS, W9FYU and W9IZO are new hams. W9EYG is hoping to organize USNR net in Southwest Mo.

Traffic: W9PW 59, W9HVJ 12, W9HWE 6, W9HVC 3, W9GUQ 5, W9GTK 149, W9CCZ 4, W9GHH 6, W9DHX 17, W9DVV 5, W9ASV 9, W9EYG 72, W9HCP 60, W9FSL 36, W9CJR 44, W9AIJ 56, W9FJV 230, W9BAU 26, W9HUN, 6 W9GMI 7, W9DHN 29, W9FYM 2, W9FSU 15, W9HNM 2, W9ECE 183, W9BGW 215, W9ENF 87, W9AUC 12, W9GXM 59, W9GCG 254, W9AQX 30. W9TJ 61, W9RR 11, W9ZZ 3, W9NP 425, W9CFL 4, W9ELS 14, W9AOG 64, W9BMA 112, W9FIO 50, W9FHV 178, W9CVT 9, W9FQF 7.

KANSAS — SCM, J. H. Amis, W9CET — W9SE has a total of over 500 due to Engineers' open house at KSC. W9FLG has six nice schedules. W9CXW reports by radio. W9AWP is working both 7 and 3.5 mc. W9BGL is QRL. W9DNG is back from Germany. W9CET has a new receiver. W9GHI used automatic sender in DX tests. W9JA is on with a '52. W9BEB is moving to 3.5 mc. W9DEB has changed QRA. W9CFN has two crystals. W9PB has a new crystal rig. W9FMX is having trouble with his MOPA. W9GXD worked a ship in mid-Atlantic on 3.5 mc. W9GCL is grinding a crystal. W9CKU is complaining about spring fever. *W9APF won a WE 100 watter at the Manhattan Convention.* W9CUF has changed from '45s to '10s. W9FKD is

spending lots of time with radio. W9ESW visited the SCM. W9HLE is going strong. W9NI handles the usual amount of Nat'l Guard traffic. W9FRC has rebuilt. W9BYV and W9IEW are first reporters. W9CHX controls everything with relays. W9CJT is on with a '10. W9BXP is on 'phone. W9EYY lost his antenna in a wind storm. W9FVQ is on 7 mc. W9DVQ is having trouble with QRN. W9ESL has a new '03A. W9NL is handling lots of USNR traffic. The Midwest Division Convention will be held at Topeka, Sept. 3rd and 4th. The KVRC is making plans for the best and largest convention ever staged in the Midwest Division. Make your plans to attend. Let's have those reports on the 16th of each month.

Traffic: W9FLG 269, W9HSN 92, W9CXW 17, W9HWW 78, W9AWP 28, W9APF 24, W9BGL 14, W9GHI 45, W9ATR 18, W9JA 115, W9DEB 111, W9CET 61, W9CFN 28, W9BP 27, W9HLZ 65, W9GXD 59, W9FPX 3, W9DDV 26, W9GCL 30, W9CKU 24, W9CUF 65, W9APF 24, W9HLE 12, W9NI 77, W9FRC 29, W9SE 511, W9BYV 5, W9CHX 70, W9DVQ 34, W9IEW 53, W9NL 145.

NEW ENGLAND DIVISION

MAINE — SCM, John W. Singleton, W1CDX — W1BOF takes the throne of Lord High Message Pusher this month. The SCM is moving to Wilton, Maine, April 27. Be sure to send your reports to the new QRA. W1CFG says conditions are not so hot down his way. W1EF has been appointed ORS. W1BEZ has a FB 'phone going strong on the new band. W1BEU rendered a mighty fine message service to the ministers and delegates attending the Methodist Conference in Waterville. W1BUO will soon be an ORS. W1APX has reliable schedule with W1BOF. W1CIP has a new job. W1BWS sends in his usual fine total. W1AQW says QRM is much too much. Unit one U.S.N.R. have a fine leader with W1ABQ as commander. W1BWB was busy getting his speech all prepared for the hamfest. W1BAE is still going strong. W1DHE and W1DHD report for the first time. W1AXJ reports a new ham, W1DXI, in Belfast. W1CRP wants some 1750 kc. activity. W1DPR is in line for ORS. W1BLI is on now and then. W1BFA will be 16 years old April 24 — he was 14 when he got his ticket. W1QH has a new "Chevie." W1AQL says the Queen City Club is going along swell. W1BTC has a nice signal.

Traffic: W1BOF 373, W1CDX 202, W1CFG 149, W1EF 128, W1BEZ 119, W1BEU 100, W1BUO 78, W1APX 51, W1CIP 51, W1BWS 49, W1AQW 37, W1ABQ 22, W1BWB 20, W1DHD 18, W1BAE 19, W1AXJ 11, W1CRP 10, W1DPR 9, W1BLI 8, W1BFA 8, W1QH 6, W1DHE 5, W1AQL 1, W1BOZ 67, W1CEQ 8.

VERMONT — SCM, Roy L. Gale, W1BD — W1DAJ has applied for ORS. W1ATF again leads in traffic. W1BJP is tinkering with crystals. Ever notice the scheme that W1BNS uses to QSO a station that is signing off? W1CGX claims that "single" outfits are best. The W1CGV brothers have returned to Vermont. W1CBW is holding a traffic contest with W1BNS and wins by a hair. W1AXN has been in a hospital for an operation. We all extend our good wishes, OM. W1DTF is a new station operated by Sgt. Bonneau at Ft. Ethan Allen. W1BD uses two-band operation for schedule with W1ATF. You are urged *not* to stop sending reports merely because summer is near. Let's keep going, gang!

Traffic: W1ATF 119, W1CBW 62, W1BNS 61, W1AXN 36, W1BD 26, W1BJP 23, W1CGX 21, W1DAJ 4.

WESTERN MASSACHUSETTS — SCM, Leo R. Peloquin, W1JV — W1ASY's hat is in the ring for the office of SCM. W1AZW is a link in Trunk Line "G." W1AUQ is President of Worcester Radio Assn. W1ARH and W1AFI are new ORS. W1BPN is awaiting license renewal. W1AJD has new 4 tube S.G. Receiver. W1BXF will operate with a portable this summer. W1AQM is active again. W1AIF was off the air awaiting license renewal. W1OF is having the time of his life on 56 mc. W1APL spends about half his time on 14 mc. W1BWY is on with new crystal rig. W1BNL is now at new QRA. W1CCS has been hit with Spring Fever. W1BVR has never missed reporting yet. W1CVN reports regularly. W1CCH handled an important message about sickness to party in Maine and got reply within twenty minutes. FB. W1DBH, W1BKQ, W1ATK and W1BVP send in much appreciated reports.

Traffic: W1ASY 120, W1AZW 106, W1AUQ 62, W1ARH 38, W1BPN 34, W1AJD 33, W1BXF 30, W1AQM 25, W1AIF 20, W1OF 18, W1APL 16, W1BWY 15, W1AFI 13, W1BNL 13, W1CCS 11, W1BVR 11, W1CVN 11, W1CCH 10, W1DHB 10, W1BKQ 5, W1ATK 5, W1BVP 4.

NEW HAMPSHIRE — SCM, V. W. Hodge, W1ATJ — W1IP is the "big traffic man" again. The YLs keep W1BBF from the key. St. Paul's School Radio Club, W1DNC, is back on the air. W1CCM is trying 1750 kc. 'phone. W1BAC is experimenting with 56 mc. W1APK went to the convention with W1AVG. W1BMM is vacationing. W1AVL reports DX rotten. W1AXL is now ORS. W1UN is busy drilling USNR Unit in Gorham. W1BAB reports several fellows studying for their temporary tickets. A new station in Manchester is W1DUB. W1AVJ is going back to a smaller tube. W1CUW is on again. W1CAC is building new transmitter. W1BVJ is keeping three schedules daily. W1CGJ has rebuilt his crystal rig. Three new hams in Derry: W1DPZ, W1EAK and W1EAL. W1DMI is keeping good schedules. W1CGP is back with CW. W1AEF is building a rack for new transmitter. W1BST reports a new Jr. op, his fourth. FB. W1BFY is back from a trip to the west coast as ship op. W1DQU is now on with a crystal rig. W1DVG is on with a '01A and 180 V. B.

Traffic: W1IP 335, W1UN 188, W1BVJ 107, W1AXL 39, W1APK 19, W1DMI 17, W1CGJ 13, W1BAB 7, W1CCM 7, W1CGP 6, W1BBF 4, W1DNC 3, W1BXU 4.

CONNECTICUT — SCM, Fred A. Ells, Jr., W1CTI — W1MK missed the BPL by a hair. "FH" and "EV" (W1UE) keep the tubes hot at W1BDI. W1CJD went to the Providence Convention with W1BGO and W1ARB in W1BHM's car. W1AMG QSY'ed when the 'phones moved to his frequency. W1ES keeps *eight* schedules. FB. W1BEO reports a new station, W1EAR, in Portland. W1AOK says this is his last report as an ORS as his membership has expired. W1YU handled several one-day QSP's from China via W3CXL. W1CTI rebuilt his receiver. W1BHM had a fine time in Providence. W1QV reports for seven (7) of the gang in New London. W1ASP built a hum-free power supply for his receiver. Glad to have W1BOD back with us again. W1APZ is now ORS. W1EAO has just been issued to Official Observer Woodward. W1BNB says depression so bad he can't find ink or envelopes in his shack! W1BGJ got his report in early. W1APJ lost his '81s and a transformer. W1AVB has gone in for DX on 14 mc. W1TD is trying hard to reach out of a poor location. W1NE printed up a stack of W1CBA's QSL cards in miniature with the calls of all the club members. Conn. Brasspounders Assn. was represented at the Providence Convention by W1FL, W1APZ and W1CDR. The Amateur Radio Club of Middlesex County (Conn.) increased its membership 100% in a little over a month. W1BFB, W1CTB and W1BEO are in charge of the code practice broadcasts sent Sundays at 11 a.m. on the 3500 kc. band. W1CJD will design one of his famous QSL cards for the Conn. station handling the greatest total of messages for the month ending June 15th. Here is your chance to get a classy QSL card and help traffic totals in the section. All messages must be handled in accordance with the "R. & R." and message files must be saved subject to call by the SCM. Let's go! At the annual meeting of the Amateur Radio Research Club of New London the following officers were elected for the coming year: President, W1QV; Vice Pres., W1DBU; Secy., W1ABN; Treas., M. Van Ness; Comm. Mgr., G. Hanson; Tfc. Mgr., W1DCM; Chairman Board of Directors, W1DCI. W1CIG, W1CUH, W1ADW and W1BIX report traffic.

Traffic: W1MK 300, W1BDI 292, W1CJD 286, W1AMG 161, W1ES 123, W1BEO 88, W1AOK 77, W1YU 55, W1DCI 26, W1BHM 24, W1CTI 24, W1QV 22, W1ASP 14, W1BOD 10, W1APZ 8, W1BFW 8, W1BNB 8, W1BGJ 8, W1ABN 8, W1APJ 6, W1BFU 5, W1CTB 4, W1CTO 4, W1CUH 4, W1DBU 4, W1ADW 56, W1CIG 4, W1BIX 38.

EASTERN MASSACHUSETTS — SCM, Joseph A. Mullen, W1ASI — W1ABG's air activities have been hampered by BCL complaints. W1WU reports sick. W1WV has landed his 54th country. W1AGA says 1750 kc. is the cream of the bands for local traffic work. W1BZQ is also working up there. W1LM keeps right on with his high traffic level.

W1CAW says W1CCP is getting an itchy fist once more. W1CHR has not been on much due to other activities. W1ATX went traffic hunting. W1BGW doesn't get on much these days. W1BFR is having antennae trouble. W1AK is going crystal. W1CUO reports W1CAW as the first Norwood station to get new 'phone license. W1CFI is in New York. W1VS is batting out some sweet traffic totals. The new reporters and applicants for ORS appointment line up as follows; W1APF with a new c.c. rig; W1ABF with a bum receiver; W1BBY who reports by special delivery; W1ASF who handled some urgent traffic for a snowbound party in N. H.; W1CFU whose '10 has gone to rest; W1BEF had an unwelcome message carrying the story of death. W1BJM is back after that ORS ticket again with fire in his eyes. W1NC is the fellow with the sweetest crystal signal in the section. W1CUY was sick. W1DHG and W1CGB has set out for their ORS. W1DVD is back in ham radio again. W1DFU just got his ham outfit finished. W1BBX is now under construction at the WAAB transmitting station. W1VA has been commissioned an Ensign in the Naval Reserve. W1AJK is on the carpet for appointment as Ensign. W1CWA is punching out his CQs with a crystal rig. W1ASI has blown up his high voltage supply along with a pair of '66s. Eastern Mass. is now the proud domicile of the New England Division's new Director. W1KH expresses his deepest thanks to all those who supported him in his campaign. We all wish him the best of luck. W1DIH is stepping right along as a traffic man. W1AAL has 'phone on 1.75 mc. band for local traffic. W1BO worked 20 foreigners in two weeks. W1EAQ is now on the air in Melrose and wants schedules.

Traffic: W1ASF 450, W1VS 457, W1LM 284, W1ASI 182, W1ABG 179, W1WV 175, W1BJM 121, W1BBY 69, W1BEF 66, W1ABF 63, W1NC 59, W1BGW 55, W1BZQ 32, W1DVD 32, W1CUO 28, W1AGA 27, W1BFR 16, W1CAW 16, W1APF 14, W1CUY 13, W1WU 12, W1CGB 9, W1AK 8, W1CHR 8, W1ATX 7, W1DHG 2, W1CFU 2, W1DIH 185, W1KH 72, W1AAL 25.

RHODE ISLAND — SCM, N. H. Miller, W1AWE — W1AWE is getting lots of traffic. W1CAB is high man this month. W1BUX is working good DX in his location. W1BLJ and W1BMU have new outfits. W1AFO, W1ZZB, W1GV and W1EX are experimenting on 56 mc. W1AXS is going strong. W1AJP and W1CNZ are on after a long absence. W1DDY is on 3550 and 1750 kc. W1FU is doing Naval duty at the compass station in Newport. W1BES gets out FB. W1ATM is still on 3.5 mc. W1AQ wishes to thank all those who attended the convention and who made it a great success. W1BCR, a 100% 'Phone man, won the high speed code contest at the convention. W1BOP is heard pounding out ham sigs when not at WJAR. W1BML is the frequency checker in Providence. W1AMD did a fine job on the convention committee. W1AMU is operating at WPRO. W1BOY has 6 schedules and would like to have more still. W1ASZ is a proud possessor of a new ticket. W1BTP has applied for ORS appointment. W1BGA has a nice signal on 3.5 mc. W1CPV is joining the Navy net. W1DW is doing lots of experimenting. W1BQD is doing lots of service work. Be sure to report on the 16th of each month, gang.

Traffic: W1CAB 123, W1BOY 44, W1GV 42, W1AWE 41, W1BTP 30, W1BLJ 14, W1ASZ 8.

NORTHWESTERN DIVISION

IDAHO — SCM, Oscar E. Johnson, W7AKZ — W7AT is studying for commercial exam. W7ACP is trying 1750 kc. If some of you fellows don't think that keeping schedules is a pretty good stunt, look at the traffic total that 13 schedules a week netted W7KG! W7BKA is rebuilding. 3.5 has proven a lure to W7AFT. W7BNJ has joined the AARS. W7BBE is building new MOPA. New stations in Idaho for this month are: W7BME, Idaho Falls, W7BFK, Ririe, W7BZZ, St. Anthony, and W7BWZ, Sandpoint. W7ACO has new crystal outfit. W7QD is moving into his garage. W7AJQ is still plugging along. Now that KGKX is silent W7ALW will have more time to devote to ham radio. W7AKZ built new receiver.

Traffic: W7AJQ 14, W7AKZ 10, W7ACO 8, W7BKA 6, W7ACP 22, W7KG 536.

MONTANA — SCM, O. W. Viers, W7AAT — W7ASQ has been keeping a daily schedule with the SCM. W7CU is busy digging nuggets. W7AHF just received his new license. W7BBS reports a new Helena station, W7CAI. W7BGC turns in a neat total. W7BHB finally got his transmitter perking. W7BW is our newest ORS. W7AFS is awaiting license renewal. W7BKM has his '10s going. W7BNU is putting in crystal. Three new prospective stations are coming up at Whitefish. FB! W7AYG has joined the Navy Net. W7AST is still using his '01A and 135 volts. W7AIR now has a job. W7AKD would like some local 3.5. mc. schedules. W7CBX is a new Kalispell station. W7FL is heard on the air. W7AOD is putting out a beautiful signal on 3.5 mc. W7AAT is planning on fixing the crystal transmitter for rapid QSY from 7 to 3.5 mc. W7ASB is on 14 and 3.5 mc. New stations are invited to send in their reports.

Traffic: W7AAT 190, W7BGC 68, W7AKD 58, W7ASQ 58, W7BW 41, W7BHB 25, W7CU 17, W7AFS 7, W7BBS 5, W7AYG 2, W7BKM 1, W7ASB 39.

OREGON — SCM, Dr. Dolph L. Craig, W7ALO — Some fine traffic totals this month! W7ACH leads with fine total. W7WR makes the BPL on deliveries. W7AVT still has YL trouble. W7IF has new plate supply. W7AWO is catching up sleep. W7BLF says school and radio hard to combine. W7AEJ has been ill. W7AHJ has been QSOing from bed while ill, using remote control. W7AJX constitutes her technical staff. W7ZD is building stations. W7AZK enjoyed AARS ZAG contest. W7AWL says, "14 mc. ain't what it used to be." W7UK and W7WL are going to the Convention. W7AMF works all bands. W7QY is leaving for Alaska. W7AEM is granted ORS. W7BOG makes a good report. W7ACH is QRL work. W7AYV wants to be ORS. W7PE is doing a lot of O.O.ing. W7AWH has some fine schedules. W7MQ has rebuilt to crystal. W7AUL handles most of this traffic in Navy Net. W7HD reported on a fancy post card. W7ED sure hooks the DX. W7ALO is on 3.5 mc. entirely. New hams this month are W7BVY, W7BWD, W7BUF, W7BXD and W7CBA. Welcome, OMs.

Traffic: W7ACH 293, W7WR 216, W7AWH 193, W7AZK 174, W7AYV 124, W7AEM 115, W7AUL 106, W7ALO 94, W7ED 69, W7PE 56, W7QY 54, W7UK 37, W7EN 32, W7AMF 28, W7SY 25, W7AWL 24, W7BOG 20, W7HD 21, W7WL 13, W7AHZ 5, W7MQ 3, W7CBA 2.

ALASKA — SCM, Richard J. Fox, K7PQ — K7BND is high traffic man. K7BLI schedules are all shot. K7PQ just returned from a vacation in the States. Let's have a report from every Alaska amateur next month!

Traffic: K7BND 251, K7FF 200, K7BLI 135, K7PQ 7.

WASHINGTON — SCM, John P. Gruble, W7RT — W7BB takes the lead in state traffic. W7OI changed to a Colpitts circuit. W7BRE helps keep Tacoma on 7 mc. Farm work keeps W7AFD busy. W7BHH is new ORS. W7BHW is experimenting with crystal. W7BYV plays in Vic Meyers' Orchestra. W7TZ and W7AZA are replacing W7ABN and W7NO in Navy Net. W7WY and W7RL boost Vancouver. W7IG reports via radio. W7OV is just back from a trip as commercial op. Don't forget to listen for W7AVM on Official Broadcasts! W7LD reports for W7GN. W7TX keeps schedule with Alaska and California. W7AJI has been recommended for OBS. W7BPV is busy moving. W7ABX is op at KFPY. "Traffic welcome," says W7AZI. W7AF left for North, leaving his sister in charge of '01A rig. W7CH is employed on fishing boat. Power leaks keep W7AHO down. W7BMU is the sole reporter from Everett. W7AHQ is thinking of going on low power 'phone. W7BZB and W7NV are working with 1 kw. set. W7BG is busy with director work. W7BBL has changed QRA to 950 North 86th, Seattle. W7AGW has BCL troubles. W7TP is using portable W7CCJ at Wapato. W7AIT schedules K7, W6, and ZL. W7AFC is rebuilding into 50 watts MOPA. W7BSX handles the traffic for K6 and K7. W7BCV reports new hams at Walla Walla: W7BKW, W7BZM, W7BYW. W7BRS has portable call W7CCZ. W7AQB is to try 14 mc. W7ADS reports. W7MM, XYL op, reports for the Bremerton bunch. W7LQ, W7BTB, W7VE and W7GM work on 7 mc. W7BWI is new man. W7BON sticks to 3.5 mc. W6ZZA dropped in on the Seattle and Bremerton boys recently. W7AIE handled important rescue work traffic. W7HS got report from Germany! W7AG, W7APS, A7KO, W7JT,

W7AAP, W7ANP, and others keep the ether hot around Seattle. W7JT changes from self-excited to MOPA. W7EH was responsible for the traffic at W7AWP. W7QI, RM, was married recently. We wish him and the "Mrs." luck and happiness. The RM's new QRA is 9046-14th N.W., Seattle. W7KQ turns in a nice traffic report. W7FA, W7RB, and W7ACU are connected with the National Forest Service radio hook-up, extending from Seattle to Longmire. W7BID hooked a K6. W7JA and W7ACQ are installing '52s in PP. W7OR is on 14 mc. and 7 mc. W7BAO belongs to Navy Net. W7BNI upholds the AARS. W7CAC asks for QSOs with other new operators. W7BHG and W7BWW work on 3.5 and 1.7 mc. Out of town visitors at the SCM's recently: W1CBP, W7LT, and W7ARI. W7TS and W7VG conduct tests on 28 mc., and would like to hear from others on that band. W7APR applies for ORS appointment. The Seattle Interscholastic Radio League recently staged a city-wide treasure hunt. The object was to find a hidden transmitter. W7AEA won the first prize of a crystal. W7AYO reports for the Yakima gang. W7ANF is on the new 'phone band. W7CAM, ex7NV, is latest addition to Yakima gang. W7AEX has case of YLitis. W7BUQ is building — as usual. W7BRI has completed a crystal rig. W7BUW worked a VK. W7ADS got R8-9 from a K6 on 3.5 mc. W7AYO has been knocking off some DX. W7AUC worked a new state. W7BUX is building crystal MOPA. K7PQ and W7ADO were visitors at W7AYO. W7BBH is in Seattle often on business. W7IC is on the road much of the time. W7AIX is grinding crystals. W7AQ has plans for an MOPA. W7BQH has moved up into the mountains. W7BCS is QRL at his ranch. The Yakima gang throws a hamfest every four weeks. W7BCI is rebuilding. W7AWX is on 3.5 mc. W7AGV worked his first "X." Still in the future, but coming: Yakima Convention! Have you noticed the increase in Washington activity? Do your bit by reporting regularly, OM. Thanks.

Traffic: W7BB 575, W7WY 257, W7BHH 152, W7BCV 151, W7TX 144, W7KQ 127, W7OV 71, W7ANP 70, W7BDD 52, W7BSX 44, W7AIT 34, W7GN 31, W7HS 29, W7AG 26, W7BZB 24, W7AFD 12, W7BAC 12, W7IG 12, W7QE 12, W7AVM 11, W7AHQ 9, W7NV 9, W7ABX 9, W7BMU 8, W7KO 7, W7AFC 6, W7AWP 6, W7AZI 6, W7BPV 6, W7ADS 5, W7AGW 5, W7BID 5, W7RL 4, W7TZ 4, W7BRE 4, W7APR 3, W7OI 3, W7BRG 3, W7BHL 2, W7RT 2, W7BHW 2, W7AHO 2, W7QI 2, W7LD 2, W7AAP 1, W7JT 1, W7BUW 10, W7BCS 4, W7AJV 12, W7BUQ 1, W7IC 5, W7BUX 4, W7BRI 5, W7AQ 1, W7AUC 1, W7AIX 1.

PACIFIC DIVISION

SANTA CLARA VALLEY — SCM, F. J. Quement, W6NX — It is no more than right that we should pay tribute each month to the veteran of Trans-Pacific communication — W6AMM. Bruce Stone continues to make the BPL. Consider the labor of mailing 167 messages, add to that the skill and stick-to-it-iveness necessary to maintain schedules with the Philippines, then you have an idea of just what Trans-Pacific communication is! Our own Director, W6HM, is heart and soul in this Trans-Pacific amateur communication — witness his totals each month. W6NJ leads the Santa Cruz gang this month, closely followed by W6YG. The following SC hams are on 1750-kc. 'phone: W6CUZ, W6CEH, W6CEI, W6CCJ, W6CNI, W6DSZ, W6DRU, W6BYW, W6CME, W6ESY. The Santa Cruz Club has been reorganized with W6CEH as President; Vice-President, W6BYW; Secretary, W6DSZ; Treasurer, W6CEI; Reporter, W6CUZ. W6CEO and W6EI compete against each other in Trans-Pacific message handling, with W6CEO winning this month. W6FBW built a portable. The Watsonville gang — W6DNY, W6DBQ and W6DCP keep the ether hot — they celebrated W6DXU's birthday in proper fashion. W6BDR rebuilt his receiver to AC. W6NX has a 56-mc. trans-receiver under construction.

Traffic: W6AMM 303, W6HM 193, W6NJ 99, W6YG 95, W6CEO 68, W6FBW 34, W6EI 28, W6DNY 27, W6DBQ 14, W6DCP 9, W6BDR 7, W6NX 10.

SAN JOAQUIN VALLEY — SCM, E. J. Beall, W6BVY — W6BUZ put in 15 days at NPG. W6BIP worked two South Africans. W6DQV is on again. W6EPQ is off due to dead '66 . . . W6FRH, an old-timer, is on again. Modesto Radio Club staged the quarterly Section Hamfest on April 2nd. About 125 present included the New Division Director, Chief R. I. Linden, Prof. Martin and Lieut. Huppert, U.S.N.R. W6AV is President of the Stockton Radio Club. W6BRV is getting his 56-mc. going. W6AME is Comdr. of Unit No. 1, Sec. No. 3, U.S.N.R. W6CLU and W6BWK worked their first VK6. W6BRU, W6DIY and W6DJQ are on 15-day cruise. W6ENA, BLB and KB are clicking with the Js. W6BIL-AEQ is starting out FB with traffic and reports. The new Lodi Radio Club consists of: W6AV, W6EXB, W6CNM, W6CUL, W6AL, W6EBH, W6EHD, and W6FLS. They have 21 altogether. W6DZN ran up a FB total. W6BBC has crystal on '52. W6DXL is getting out OK. The Stockton Radio Club is building a gas engine portable for use in case of emergency. W6SF blew his crystal. W6BXB is doing FB work. W6EXH is off the air temporarily re-hashing. W6COJ, President of the MARC, practices what he preaches; good sig, helps beginners and stays in the assigned bands. W6BVY, the SCM, copped a lot of honors in the transcons both on 1.75 and 3.5 mc. W6AHO represents Fresno on the air. W6AOA, the RM, claims Trunk "F" is the fastest in the U. S. W6CLP was QSO Spain, Chile, Japan, etc.

Traffic: W6BUZ 27, W6BIP 83, W6DQV 10, W6EPQ 3, W6FFU 117, W6AME 151, W6CYY 5, W6BIL 17, W6DZN 483, W6BBC 28, W6BFH 9, W6BXB 4, W6SF 18, W6BVY 152, W6AOA 842, W6CLP 14, W6BQC 6.

SAN FRANCISCO — SCM, C. F. Bane, W6WB — W6MV makes the BPL on deliveries. W6BNA turns in a nice total. A new SW5 is being tried out at W6NK. W6PQ ran up a fine total. W6EKC at new QRA started moving traffic in his regular style. W6EYN has caught up with the reporting date. W6BVL reports a couple of nice schedules. W6WF reports the transmitter turning over OK. W6CZK says school kept him busy. W6BIM reports for first time. W6DHE has finally gotten his crystal to say "Uncle." W6DFR and W6IU report extensive rebuilding. W6CAL is busy learning the ropes as Route Manager. Anyone looking for schedules can quickly get reliable ones by seeing him. W6ADK reports rebuilding. W6WB is still wrestling with his super. The section meeting held at the Bellevue Hotel was a real event, with Col. Foster, Ralph Heintz and other notables present.

Traffic: W6MV 233, W6BNA 218, W6EKC 206, W6NK 128, W6EYN 88, W6BVL 37, W6WF 14, W6CZK 11, W6BIM 9, W6DHE 9, W6DFR 6, W6CAL 4, W6ADK 2.

EAST BAY — SCM, S. C. Houston, W6ZM — W6EDO again leads the section. W6BPC is consistently in second place. W6BIS sends in a nice total and ORS application. W6ATJ, the CRM, has a new job. W6BGR is an applicant for ORS. W6ZM has moved again and is now located at 2523-23rd Ave. W6CDP has been having trouble with the crystal rig. W6FQE is a new reporter. W6RJ has been QRL with 00 work. W6DUB sends in his first reports as ORS. W6BKM has overcome his amplifier trouble. W6AF has rebuilt both transmitter and shack. W6AOH got a portable call, W6AQL. W6CDA says he wants a reliable K6 schedule. W6CYD has been QRL college. W6EJA runs a Public Address system at Neptune Beach on Sundays. W6FII is getting the habit of reporting regularly. W6CSV and W6DKJ are two new reporters. W6AUT is considering 50-watt crystal rig. W6BYS is back on the air with a 1-KW tube. W6CZN is still QRL bridge work. W6CBE reports. W6EDR has to give up his ORS on account of not having time. W6ENX is coming on 7 mc. soon with 500 watts. W6PB is having a hard time finding time to rebuild. W6AN has been appointed Assistant Director for Sacramento, San Francisco, East Bay and Nevada Sections by Director Foster, W6HM. The April section meeting was addressed by Mr. Girard, who gave a talk on transmitting condensers. On May 8th a large number of the members of the section made a pilgrimage to KWO, the trans-Pacific Phone station. We expect to have some kind of a trip like this every month. Get in touch with the SCM for details. The Oakland Radio Club has been conducting a membership campaign with the result that a number of the old-time members are coming back in the fold again. The Berkeley Radio Association is now meeting in the Y.M.D. room at

the Berkeley Y.M.C.A. on the 1st and 3rd Wednesdays of each month.

Traffic: W6EDO 255, W6BPC 101, W6BIS 89, W6ATJ 80, W6BGR 61, W6ZM 43, W6CDP 23, W6FQE 38, W6RJ 38, W6DUB 34, W6BKM 28, W6AF 16, W6AOH 27, W6CDA 11, W6CYD 10, W6EJA 7, W6FII 5, W6CSV 4, W6DKJ 3, W6AUT 1, W6CBE 1.

ARIZONA — SCM, Ernest Mendoza, W6BJF — The Arizona Section placed fourth in the Pacific Division for the month of January–February. We can compete successfully against any other section if you fellows will only send in your monthly reports. Beginners and non-members of the A.R.R.L. are also urged to drop a card with the dope. Don't forget the address the 16th of each month, 1434 East Madison, Phoenix. W6ALU is looking for a 50- or 75-watter. W6BJF was fined 60 bucks by the power company 'cause their wattmeter would register only when he desired it to! W6DOW has worked five countries with his '45s. W5ZZB hails from Clarkdale, Arizona, and New Mexico. W6CVR kept a fine daily schedule with W6DOW. W6CKW is to put in a crystal rig. W6CVW has worked 20 foreign countries. W6CAP is installing a 50-watter. W6BEP is rebuilding for 1935-kc. crystal 'phone. W6BVN will soon be on air frequently. W6BRI is handling a little traffic. W6DJH has a new portable call, W6FSP. W6BYD is on 1960 kc. with 'phone. W6CQF reports W6BQW and W6FGG are increasing voltage on their '10s. W6AEK has rebuilt into a crystal rig on 3912 kc. W6DPS is a new ham in Phoenix. W6DSQ is on 1940-kc. 'phone. W6EKU is on 1920 kc. W6DCQ is rebuilding his 'phone. W6DKF has an unlimited amateur 'phone license. W6GZ worked TI on 14,000 kc. W6AND is again going strong. W6EFN may have to move to New Mexico, as movie manager. W6EJN is in the same boat! W6CDY-W6CPX is before the F.R.C. in Washington, D. C., on behalf of two Arizona BC stations. W6BWS-W6VV, former SCM, has been promoted to chief of radio operation for the airline division comprising Columbus, Cincinnati, and Indianapolis American Airways. W6ANO is spending a month's vacation in Mesa and Phoenix. W6DRE has lifted the code restriction on his commercial ticket. W2API is in Phoenix. Hummel, 2nd op. at W9AAO and W9DOE, attended the Radio Club while passing through en route to the Pacific Coast. W6EFC will soon be the possessor of a commercial 2nd ticket. W6CEC promises plenty of 'phone and CW activity. The RI while in Phoenix passed 30 out of 32 applicants on the code test. The following may soon have a nice green ticket on their shack's wall: W6EKP, W6CCN, W6BZO, W6BVN, W6CEC, W6DXC, W6DRE, W6EL, W6DVJ, W6FIL, W6EKU, W6CBA, W6DKU, W6EBP, W5ZZB, W2API, W6EL's xYL, W6DSA. W6BCD again tried for a 2nd class commercial. W6CEC, W6CCN and W6BJF struggled with the unlimited 'phone. W6FKX has sold out his forty-eleventh transmitter and receiver. W6DRX has remodeled his old PP TNT. W6AYW replaced his '45s with '10s. W6CPF has returned to Scotland, via W9HAA, old Tucson W6DGN now in Chicago. W6EOF is back in Phoenix. W6EUT was in the hospital ill, but is mending out in the desert home. Mr. Stone, Professor at P.J.C., gave an interesting talk on the electron theory at a meeting of the Phoenix Club. W6BLP has his 1750-kc. crystal working to his complete satisfaction on 7 mc.

Traffic: W6ALU 884, W6BJF 201, W6DOW 59, W6DRE 21, W5ZZB 17, W6AND 16, W6CVR 15, W6CKW 14, W6CVW 14, W6CAP 12, W6BEP 9, W6BVN 8, W6BRI 7, W6DJH 6, W6BYD 3, W6CQF 3.

LOS ANGELES — SCM, H. E. Nahmens, W6HT — Just missed the banner by a hair last month! Every ham who reads this, mail a report to me on the 16th of every month! Every reporter get a new man to report next month! LOS ANGELES COUNTY: W6FEX lined up a flock of schedules. W6ETJ says changing of 'phone band put trunk line "F" out of commission for awhile. 9NW of 1916 vintage is now signing W6ETL. W6BJA worked his 43rd country. W6CVZ now has a '52. W6EKZ is installing crystal. W6ACL has nightly schedule with Hawaii. W6BPU has been appointed assistant RM. W6OJ just returned from pleasant visit with K6 gang. Crystal rig going in at W6AKW. W6EGH is shifting to 14-mc. 'phone. W6ETM has a beautiful sig on 3.5 mc. W6FGT and W6ADH are putting Pomona on the traffic map. W6ADH now has extra first ticket. W6BLS continues schedules. W6EBK craves eastern schedules. W6DKM is in L.A. studying for a commercial ticket. W6EUV reports two new hams, W6FQK and W6EQX. W6FT is now putting 500 watts into the sky wire. W6DPB is building a 56-mc. receiver. W6WO has new SW3 receiver. W6DLI now has c.w. rigs on 3.5, 7, and 14 mc. and 'phone on 3.5 and 14 mc. W6CXW is moving to Long Beach. W6CZZ has an ac super that's a honey. W6AGF is a prospective ORS. W6DWP has qualified for ORS appointment. Trying to put section at top keeps W6HT off air. W6CUU moved heap from house back to shack. W6AM now has unlimited 'phone license. W6EEA has '03A crystal rig. W6ON reports ham activity at peak in Pasadena. W6CVF now has 1-KW job. W6TE longs for return of 1925–26 radio conditions. W6FGQ is learning to operate bug. Portable W6ZZA successfully took part in Hongkong DX Contest from hotel in 'Frisco. W6EHO wants pair of trained cans to hear all sigs R9 except W6DDE. Hi! W6BVZ says my 3rd cousin (W3HT) gave him R8 on 3.5 mc. According to W6DSP, an Army Net Club is active in Glendale. W6EXQ got a new transformer for his '52. W6FJT is stepping out in fine shape. W6AFU has been transferred from the Sacramento Section. W6RZ craves traffic. W6OF reports the arrival of a new junior op. Congrats! W6ESA has set out to win a few golf championships. W6FQK is a brand-new ham. W6CWT is off air due to change of QRA. W6AIF is on the go most of time. W6DNA is recovering from sick spell. W6BJZ was QSO just one station, J1EE, this month. W6CGP worked portable X26A. W6EJZ is President of the S.E.R.E.A., which meets every Friday evening at 4109 E. Gage Ave., Bell, Calif. On April 11th, *1931*, W6ANN was issued a license investing him with all authorities of the office of "OM" and subjecting him to the rules and regulations of the "OW," the former Miss Grace Budgell. Congrats! RIVERSIDE COUNTY: W6CFN-W6NF leads the entire section! W6DLV is rebuilding transmitter. W6EFY has made the grade for ORS appointment. W6ZP has new rock crusher. W6AZY has moved to Long Beach. SANTA BARBARA COUNTY: W6YAU leads the county. W6BZF is kicking out FB on 1750-kc. 'phone. W6EDZ has nice total. W6DFG and W6DEJ are getting out FB now. Four new calls have been received by S.B.A.R.C. members, W6CNO, W6EGS, W6EOF and W6EMY. W6EZK is still swamped by power leak. W6FFC is now op at KDB. W6DYQ is hampered on 14 mc. by power house QRM. W6AWY is net control station for Army Net. SAN BERNARDINO: W6CVV worked all VK districts except 8th and 9th. W6BIK is off air due to burning out much junk. SAN LUIS OBISPO: W6DWW has MOPA going. W6ALQ is laid up with a pulled muscle received in 220-yard dash. No reports received from VENTURA, MONO or INYO Counties YET! You don't have to be an ARRL member to report! Let's have 100 reporters next month!

Traffic: W6CFN 351, W6FEX 259, W6ETJ 234, W6ETL 210, W6BJA 158, W6CVZ 156, W6YAU 133, W6BZF 119, W6BYF 102, W6EKZ 106, W6ACL 93, W6EQW 81, W6BPU 81, W6OJ 70, W6AKW 66, W6BP 62, W6EGH 60, W6SN 60, W6ETM 53, W6FGT 42, W6BLS 39, W6BVD 37, W6EBK 33, W6DKM 31, W6EUV 30, W6FT 30, W6DPB 28, W6WO 25, W6ADH 22, W6EDZ 22, W6CVV 21, W6DJS 20, W6AWY 19, W6EZK 18, W6DLI 17, W6CXW 16, W6CZZ 16, W6AGF 16, W6DWP 15, W6HT 13, W6CUU 13, W6CZT 12, W6DOZ 12, W6AM 12, W6DJC 12, W6EEA 11, W6ON 10, W6AKD 10, W6EGJ 9, W6BME 9, W6CVF 9, W6TE 9, W6FGQ 8, W6ZZA 8, W6EHO 8, W6BIH 7, W6BCK 6, W6ERL 6, W6TN 6, W6DLV 6, W6EFY 7, W6BVZ 6, W6DSP 5, W6EHZ 5, W6EXQ 6, W6DQG 4, W6FJT 4, W6MA 4, W6VO 1.

HAWAII — SCM, C. D. Slaten, K6COG — The Oahu Amateur Radio Club held a big chop suey dinner. Contests were held, K6IR winning the tube drawing. K6ACW won the liar's contest. K6EST walked away with the QLF honors. K6ADZ is new YL op in Hilo. K6DV has gone to the Coast. KA3AA came through Honolulu on his honeymoon and paid K6CIB a visit. K6DSF is working fine DX. K6AIU moved to a new location. First ham to open up on the Island of Kauai is K6CCO, with K6CQV coming on soon. K6FCX has been changed to K6PM. K6EWB is now K6EWQ.

K6DBN is a new call in Honolulu. K6FWS is a new license at Schofield Barracks. K6FAZ has just been licensed in Maui.

Traffic: K6AIU 75, K6AUQ 173, K6AJA 163, K6BOE 160, K6COG 122, K6CRW 25, K6AIN 24, K6EDH 23, K6CIB 19, K6DSF 14, K6CRU 6, K6ERO 4.

PHILIPPINES — SCM, I. S. Liner, KA1SL — KA3AA and bride are now in Baguio. All Philippine hams extend welcome. KA1RA has nice note. KA4HW reports good DX, KA1SP is QRX a 'phone examination. KA1JR has good daily states schedule. KA1DP is in Davao until June using call KA8DP. KA1RT is building hundred watt push-pull. KA1XA has fine schedule with W6HM. KA1WR is getting crystal-minded. OM1TB shovels out the traffic. KA1HR has schedule with Peru. KA1SL moved into haunted house where reception is FB.

Traffic: KA1HR 1339, OM1TB 480, KA1JR 83, KA1NA 80, KA1SL 43, KA1SP 14, KA9DP 11, OM2TG 222.

NEVADA — SCM, Keston L. Ramsey, W6EAD — W6AJP is putting a 211 in final stage. W6CRF and W6BYB are going in for high-power 'phone. W6ATN is specializing in measuring equipment. W6FMS built a super heterodyne. We have two new stations at Elko, W6FKY and W6FME. W6YAR has a 211 now. W6EAD is trying to get enough voltage to tickle a '52. The Nevada Amateur Radio Association is conducting a drive to make its members A.R.R.L. members.

Traffic: W6AJP 49, W6UO 8.

SACRAMENTO VALLEY — SCM, Paul S. Farrelle, W6AXM — RM, Bernard F. Herzog, W6AIM. W6APJ leads the section in traffic. W6TM has FB schedules with KA1HR, OM1TB and K6AVL. W6AIM is working on prospective ORS. W6CUE keeps a schedule with W6DDD. W6EPH is a new man. W6EMK has been rebuilding. W6FEJ is building P.P. TNT. W6CUM has a 5-watter on 3.5 mc. W6DGS is QRL college. W6CRN is playing with MOPA. W6CBU has an FB crystal rig. W6FBS has a new YL. W6FKM has 150-watt C.W. W6EDA is on new 'phone band. W6BHM is using crystal control. W6CBR has 3.5 mgs 'phone. W6EPB is on 7 mc. W6DVD is using 3.5 mc. W6BYB is using P.P. TNT. W6CMA was rebuilding. W6EJC went back to work. W6ERW is building crystal rig. W6ADS has spring fever. W6AID is on often. W6GR is on 14 mc. W6UM is heard CQing K6. W6EOU has a new shack. W6CTH will soon be new ORS. W6DVE is in line for ORS. W6APJ is moving from this Section so we lose a good traffic station. W6EJM rebuilt his station. W6FMX is handling traffic. W6ECN reports via radio. W6QT is playing with new crystal rig. W6EOC is back with crystal. W6DON is selling out. W6FW and W6APE are in the A.A.R.S ExOM1TB is back in town. W6ELC is working DX. W6CFB was heard on the air. W6BLX finds time to pound brass. W6DDV is heard working locals. W6CAW has a pretty d.c. signal. W6ENC is QRL college. W6EFM is experimenting with single wire Hertz antennas. W6NT is on the air. W6DKW is using a pair of 5-watters. W6AUO is QRL with Telephone Co. W6EDV and W6BEL have 'phone on 3.5 mc. W6BBW is at the Trans-Pacific Telephone station. W6ATM is a new station. W6AXM has been studying for commercial examination. W6BKB will be a married man by the time this is printed. W6FH is fooling with 14 mc. 'phone. W6DGQ is using a pair of '10s. W6DLB may stage a come-back. W6AHN is using low power crystal. W6GF is QRL radio service. W6GX works some DX. W6LO is using the aged '52. W6ER says being married interferes with ham radio. W6IC is running a radio shop. W6CDC is commodore of the local boat club. W6EWB is prexy of the S.V.A.R.C. W6DDV is using low power. W6AXT blasts loose with his 'phone rig. W6DYF is at Ft. Benning, Ga. W6DDU uses '10 on 7 mc. W6AK has a good total. W6AFE took amateur exams. W6FRP is a new call.

Traffic: W6AK 178, W6AIM 30, W6DVE 22, W6FMX 21, W6CMA 9, W6ECN 15, W6TM 109, W6EJC 4, W6AXM 6, W6APJ 193, W6EJM 18, W6CTH 17.

ROANOKE DIVISION

WEST VIRGINIA — SCM, C. S. Hoffmann, Jr., W8HD — WLH3 — W8OK — WLH1 tied for prize for first place in the 5th Corps Area during recent A A R S contest. W8TI is going to CMTC at Ft. Harrison, Ind., with portable rig. W8CSF's miles-per-watt record is 85. W8AZD reports 1500 QSOs during his first year's operation. W8BKG says gang out his way are going in for 56 mc. 'phone. W8CXR has also built such a transmitter, for portable work. W8DPO reports a "DX-repression" on 14 mcs.! W8GB is a new ORS. W8EL is getting out FB with new crystal job. Old W8DNN is now W8CTM and CE5C. USNR. W8DJD graduated to a '10. W8BDD, W8EJZ, W8FAA, W8FFO and W8HD are rebuilding. New ORS: W8BKG, W8EZJ and W8GB.

Traffic: W8GB 151, W8EL 27, W8CSF 26, W8ELO 24, W8CTM 21, W8BDD 17, W8AZD 10, W8DPO 12, W8EZJ 8, W8BWK 15, W8BKG 2, W8FFO 1, W8HD 1.

VIRGINIA — SCM, R. N. Eubank, W3AAJ — S. T. Terry, Jr., W3AGH, RM — Virginia was third highest rating section in country last month. FB, gang. W3FJ is planning some 'phone work W3NT is consistent traffic man. W3EJ is applying for ORS. W3WO is back in old stride. W3BAI is planning 56-mc. work. W3AGH handled message to President Hoover. W3BLE is working on 7 and 3.5 mc. W3BAD is building FB rig for schedules. W3AJA is with us regularly. W3CHE and W3BJX want Virginia schedules. W3CAH is now ORS. W3NE works when he finds time. W3APU is changing to crystal. W3ADJ works plenty of DX. W3BSM and W3BJE are on 7 mc. W3AVR is rebuilding. W3BMN is planning big shack. W3TJ is doing lot of listening. W3OM is changing location of shack. W3ATY has new receiver. W3APT is planning crystal. W3BTR is still plugging DX. W3BSB is on 3690 kc. W3BAG has nice crystal rig. W3HJ visited SCM. W3BLJ, W3BUO, W3BEN, W3CCU and W3BWA send first reports. W3CHR handled message about Lindbergh baby. W3ACN has been commissioned in USNR. W3GE is on air plenty. W3AGY and W3RFQ are going to take commercial exam. W3ZU is after commercial ticket. W3BAN is doing FB O.O. work. W3AAJ's wife has been very sick. W3GY is now ORS 'phone. W3ACN has ORS. W3CIS is new 'phone. W3BGS works mostly in early AM. W3BZ is back with us on 3820. W3BRY is going to take first class exam soon. W3AHW wants traffic schedules. W3FZ is going in for 56 mc. W3CA is rebuilding. W3CFL is building crystal rig. W3BBX is working DX on 7 mc. W3BSE is on 3550 kc. W3AIJ, W3ZA and W3QN report inactive at present. W3YD is back on 3.5 mc. W3AGT is working lots on 56 mc. W3BRA is QRL business. W3BBE is lacking power. W3CXM made BPL on deliveries! W3ARD is active on 7 mc. W3AGF is building crystal. W3NO will soon be on with 100 watts. W3FE passed first class exam with 96%. W3BPR is on regularly. W3MQ, Radio Supervisor, gave exams in Richmond April 23. W3AGT lays claim to best DX on 56 mc. for Virginia — 5 to 8 miles. Compton of Manassas talks of starting club there. W3BDN, on 56 mc. wants 56 mc. Virginia men to write him. QRA Onancock. W3AGW is new station. The following report traffic: W3CEP, W3API, W3BPR, W3BEK, W3AHC, W3RS, W3BEV. Please report so that it reaches me by 20th of each month. — W3AAJ.

Traffic: W3CXM 349, W3FJ 308, W3NT 384, W3EJ 276, W3WO 231, W3BAI 110, W3AGH 169, W3AAJ 94, W3CAH 70, W3ZU 65, W3CEP 53, W3ATY 41, W3GE 38, W3BUY 32, W3BSM 30, W3BJX 27, W3BJE 22, W3ADJ 21, W3BLE 21, W3OM 18, W3BEN 17, W3BAN 15, W3YD 15, W3BUO 14, W3CCU 13, W3CHR 12, W3FZ 12, W3AHW 11, W3BGS 11, W3BWA 9, W3BSB, 10, W3AHQ 10, W3APT 8, W3AVR 8, W3GY 7, W3BAG 6, W3CAK 6, W3CHE 6, W3AJA 5, W3BMN 5, W3BEK 5, W3AHC 5, W3APU 4, W3BZ 4, W3API 4, W3ACN 3, W3BLJ 3, W3NE 3, W3RS 3, W3AGY 2, W3HJ 2, W3BRY 1, W3BTR 1, W3BPR 1, W3BEV 1, W3ARD 3, W3CEY 32.

NORTH CAROLINA — SCM, H. L. Caveness, W4DW — Take a look at W4AIS' traffic total!! W4AGF scored 90 points in the April ORS QSO contest. W4DW finally got his power transformer replaced. We rejoice to have W4JR back with us! New stations reported this month are: W4BBS, W4AMF, W4BHR, W4BIU, and W4BHP. W4AAE got his second class commercial ticket. W4AVE and W4AVT visited W4AAE this month. W4TP is using an MOPA. W4IF has changed his QRA to the high school. W4ABT

and W4OG are on occasionally. W4ZN and W4AHF pound away regularly. W4IY may be heard early in the mornings. W4AGD gets more than his share of QRM. W4ATS is having trouble with new crystal rig. W4RX is putting out 200-watt crystal signals. W4AEL has been working VK's. W4BCG has been appointed ORS. W4ZH says W4AOE has had receiver trouble. W4TR has a new transmitter and receiver. W4AVT is interested in forming a North Carolina net on 3500 kc. for traffic handling. FB. Who else is interested? W4ABW has moved to 510 Oak Street, Gastonia. W4MR has changed his '45 oscillator to a '47. W4VB sends in a first report. W4ACY has had many favorable reports on his OB service. W4RV has been appointed OBS. W4GC is still plugging away with his TNT. W4AOJ is now W9IAP in Illinois. W4AFE has a portable license, W4PDF. W4ANU has been doing some experimenting. Send me the news, fellows, so we can have bigger and better reports in *QST* each month. Our slogan — "A Report from Every North Carolina Amateur."

Traffic: W4AIS 834, W4AVT 110, W4JR 82, W4DW 82, W4BCG 81, W4AAE 28, W4TR 23, W4MR 21, W4AEL 14, W4AOE 14, W4ACY 13, W4AGD 12, W4ANU 12, W4VB 7, W4RA 5, W4TP 5, W4ZH 4, W4ATS 3, W4IF 2, W4RX 2, W4AFE 1.

ROCKY MOUNTAIN DIVISION

UTAH-WYOMING — SCM, C. R. Miller, W6DPJ — W1ZZA is leaving for an eight months' cruise to the South Seas and the Orient on a three-masted schooner yacht. W6DAM will probably be inactive this summer. W7AWG is sending code practice daily. W6DPO at last has his crystal-control set going. W6APM and W6DAM are "minute men" in the A.A.R.S. W6BTX resigns as ORS. W6DEU has joined the A.A.R.S. W6FAE likes 1.75 mc. W7HX is on with a bigger and better signal. W6FPJ and W6AVW are getting on the air. W7ADF says everyone around Casper is busy. W7NY is picking bugs from his transmitter. W7AMU and W7ACG are having good results. W7BXS has three schedules. W6EXL reports late. W6BSE says his '45s are soft.

Traffic: W6DPJ 216, W1ZZA 150, W7AWG 84, W6DAM 41, W6EXL 20, W6FAE 15, W6APM 15, W6DPO 4, W7AMU 3, W7ADF 1, W7ACG 1, W7BXS 1.

SOUTHEASTERN DIVISION

ALABAMA — SCM, L. D. Elwell, W4KP — W4FI is the new OO. W4RS lost an antenna in the storm. W4LT has quit for good. W4ASM forgot to renew his ticket. W4AJP is rebuilding. W4RS won the AA ZAG Contest in the Fourth Corps Area. He was closely trailed by W4AHU. W4AGI, W4AP and W4AXU now on the new 'phone bands. Our past SCM, W4AHP, has had bad luck with the '66s. DX is holding up W4ADJ. New receivers are prized by W4AZH and W4AWQ. A TNT type '45 rig is perking at W4BEO. W4BEP and W4BFP are new hams in Birmingham. A new crystal rig is in construction at W4ALA. The new ham in Decatur is W4BEI. W4AYK and W4BAI are headed for 56-mc. 'phone. W4AIZ burnt out his mike using loop modulation. W4AV rebuilt. W4AIZ finds his 7 mc. Hertz works FB on 3.5 mc.

Traffic: W4KP 72, W4BAI 8, W4APU 8, W4AYK 7, W4AP 5, W4BEO 5, W4ALA 4, W4BFP 3.

EASTERN FLORIDA — SCM, Ray Atkinson, W4NN — The Plant City Radio Club wins this month's heat in the Wouff-Hong Contest. W4PBX was set up at the Florida Strawberry Festival. Many messages were relayed through W4ZV at Plant City. The transmitter was an MOPA from W4AQT. During the Festival, the following were visitors: W4AII, W4AJK, W4AEF, W4VA, W4ATA, W4BL and W4AKO. W4ZU and W4ZV are experimenting with 1.75-mc. 'phone. W4ATA, W4GQ and W4BL were recently visited by W4ZU and W4ZV. A new ham in Plant City is W4BDR. W4ASA has been at Palm Beach this winter. W4AGN is on 3520 kc. with crystal. W4GS is a very busy station, keeping many schedules. W4ASQ is working on a new crystal 'phone. W4GS says it's a peach. Frank Orcutt sends in a good traffic total. W4TK is DXing again. W4AEM-PBM will soon be back in Jax. W4BBB is moving to New York. Look for him at W8FFU. Lake Helen has a new station, W4BGL. W4VP reports that "6's" and "7's" are coming in as good as "4's." W4ASR is building an MOPA. W4BDM is getting results with his new rig. W4GR is attending Officers Training School, Naval Air Reserve, at Pensacola. Pat, M.O. of the Knights of Kilocycles, reports that most all the Florida 'phones are busy rebuilding for the new 'phone frequencies. W4ACZ has a fine 'phone. W4MF has a beautiful 'phone and CW job. W4NN and W4AGB are installing 50 watt modulators. W4NN won the JAROC DX Contest with W4UX giving him fits. W4AJX is dividing time between DX and traffic. W4ABL is still ill. W4CI is off the air for repairs. W4ALP is handling lots of traffic. W4BDN is also in the traffic swim. Let's all aim at a 100 per month total! W4ZV has good total.

Traffic: W4BPX 188, W4NN 106, W4AGN 35, W4BDN 50, W4JO 33, W4AER 29, W4WS 29, W4AEM 25, W4ALP 23, W4DE 22, W4ALI 20, W4AKH 17, W4AGB 20, W4BBB 4, W4VP 4, W4ZV 119.

WESTERN FLORIDA — SCM, Eddie Collins, W4MS -W4ZZP-Route Manager, W4ACB-W4PCN — This month we report five new stations: W4BGA, W4BGB, W4BFD, W4BJF and W4BKD. W4ALJ-W4CV has already worked all districts. W4ASV-W4ZZW has gone on another USNR cruise in the Gulf. The second op from W4OA was a visitor to the Pensacola stations. W4GR was also a visitor. We hear that W4ASG is dead timber as far as ham radio goes. W4AUV and W4AUW have been doing some experimenting with antennas. We hear that W4ADV and W4AWJ are again tinkering with their stations. W4MX was "on again off again." W4AUA hooked his transmitter to his BCL antenna. W4SC reports traffic. W4ML is all set in the new 'phone band. W4AFT can't hear Europe. W4BCB has a real 1932 signal. W4AXP has moved to 7000 kc. W4AOO has moved up to 1750 kc. W4AQY steps out nicely. W4ART sticks to 3500 kc. School keeps W4ARV busy. W4BGB is W4ART's brother. W4UW-W5NO has gone on the USNR cruise. W4BJF is testing different transmitters. W4KB has moved his 'phone into the new bands. Mrs. W4KB has been copying USNR drills for code practice. School has kept W4AGS hopping. W4AXF has been trying to QSO W6MA. W4ATN wants a '10 that will stand 2000 volts. Hi. W4QU has been on 7000 kc. W4BEW is about ready to go on the air. W4VR, the old timer, is on again. W4OE is kept busy at WCOA. W4FV-W4ZZR flew up to his home and W9AQ for the week end. Hi. W4QR is planning a new shack that will fit inside his antenna tower. Hi. We understand that ExW4AAX is now a W3. W4AUW has been on the sick list. W4ACB-W4PCN reports a '52 knocking them cold. W4HQ-W4PBW-NDD is heard regularly Sunday afternoons. W4ABJ was home over the week end. Railroading keeps W4QK quiet. W4BFD is on at dinner time and late at night. W4BGA has been having trouble with transmitting tubes. W4BKD has a TPTG PP set using '12As. W4MS-W4ZZP has a new QRA and a brand new shack with two 60 foot lattice masts under construction. W4FV has been planning 56-mc. sets. W4AUW and W4ACB are contemplating crystal control.

Traffic: W4AUW 4, W4AUV 2, W4QR 2, W4SC 9, W4AQY 1, W4KB 21, W4ML 3, W4AFT 7, W4AGS 14, W4ACB 21, W4FV 47, W4MS 16, W4QU 5, W4ALJ 5, W4ASV 3, W4AXP 5, W4UW 20, W4BGA 1, W4ATN 8.

GEORGIA-SOUTH CAROLINA-CUBA-ISLE OF PINES-PORTO RICO-VIRGIN ISLANDS — SCM, J. C. Hagler, Jr., W4SS — This is the last report that W4SS will send in for this Section. I wish to thank all of you for the fine spirit of coöperation and help that you have given me in this work. Let's all give our new SCM, W4PM, our good wishes and aid. CM2WW sends the OBS in Spanish as well as English. CM2WW has been elected Pres. of the short wave transmitter section of the Radio Club of Cuba. CM2JM worked Costa Rica on 14-mc. 'phone. CM2CA is sporting a new QRA. CM5RC, CM2VC and CM2DO are all new hams. CM2SH is in Havana on vacation from Mass. Inst. of Tech. CM8AZ is rebuilding for 14-mc. 'phone. CM8YB sends in a nice traffic total. W4HN is working FB DX on 3900-kc. 'phone. The Ga. A.A.R.S. Phone net has been combined with the Ala. Phone net with W4RS NCS. W4AZT sends in his first report. W4QZ and W4AQN are about the only two left in the Ga. A.A.R.S. Phone net since the

new regs. W4AHG is having plenty trouble with his key clicks. The Atlanta Radio Club met at the home of W4BO. W4SO is new Secy. of the Club. W4APX is working good DX. W4BW almost forgot his report. W4AHT is going to the CMTC camp in Charleston, S. C. W4ACQ is new throughout; with a new MOPA, remote control and new QRA. W4UC came in second in the AARS ZAG contest. W4BAT is the newest born of the hams in Statesboro, Ga. W4IS is usually on 3500 kc. W4AEV has just finished a station at the Volunteers armory in Macon. The call is W4BKF; QSL to W4AEV. W4MA is having his share of trouble with crystal MOPA. W4APW is still getting out. W4ADA worked 4 countries and a ship, XLAIS. W4GY has a few schedules. W4MN's work at the U. of S. C. keeps him busy. W4AAS, with portable W4PAK, did some fine work at the Macon Hobby Show. W4AUU was also on deck with a lot of help. W4AAY handled some important traffic during the storm. The Amateur Radio Club of Augusta is conducting a traffic contest. W4DL has a portable transmitter complete with power supply in a box 6" x 6" x 8½". W4AUU worked, and received QSL from ZU6W. W4PJ is still hamming. YLs, flu, and the F.R.C. kept W4AUT off the air. W4GB has two crystals in the 3500 kc. band. W4DX is going to Atlanta to get his commercial ticket. W4KU is working the 3500 kc. 'phone boys. W4ATZ has a new zepp. W4BGU, W4BGY, W4BEX and W4BFK are the latest additions to Hamland in Augusta. The one year clause took W4BAR off 3500 kc. 'phone and put him on CW. W4ASZ is working gobs of stations. W4GT is QRL work. W4DV can't radio on account of golf and bridge. '10s in PP are struttin' their stuff for W4BED. W4BDA and W4TE are rebuilding. W4AMG printed the membership certificates for the Amateur Radio Club of Augusta. W4WB received his A.B. from Mercer University this spring.

Traffic: CM8YB 57, W4BO 51, W4AAY 45, CM8AZ 24, W4AUI 33, W4PAK 20, W4PM 23, W4DL 21, W4AZT 19, CM2WW 17, W4SS 11, W4HN 11, W4ACQ 10, W4GB 9, W4GY 9, W4AUU 8, W5QZ 8 W4APX 11, W4APW 7, W4IS 6, W4BW 3, W4MA 3, W4PJ 2, W4AHG 1, W4AAS 2, W4ATZ 1, W4WB 96.

WEST GULF DIVISION

SOUTHERN TEXAS — SCM, H. C. Sherrod, Jr., W5ZG — The new address of the SCM is 2609 Ave. 0½, Galveston, Texas. Houston: W5TD is one of the new RMs. W5ADZ has been QSO VK and ZL with a pair of '45s. El Paso: W5AAU has gone to Lubbock on business. W5EAC has fishing fever. W5AEP lost his antenna in a wind storm. W5AFN is one of the new O. B. S. W5AFS hears South Americans and "J's" regularly. W5AUI is using '45s. W5AOT has license trouble. W5AUZ is working on a loop receiver. W5BAD — ? W5BCD still has no antenna. W5BL is looking for a filament transformer. W5BNJ is on occasionally. W5BOD is rebuilding. W5BQU is playing tag with antenna. W5CCQ is on with '45s. W5DE was QSO three VK's. W5ES traded '52 for an auto. W5NT is busy with O.O. work. W5BKM is exW6ATR. W5GI is on with a portable. W5AFR is coming back. ExCE3DE is now in El Paso permanently. W5AH and KA3AA were recent visitors to El Paso. Corpus Christi: W5MS is keeping a schedule with OM1TB. W5BZW, a YF, is a new ham. W5BOY and W5HP are also newcomers. Austin: W5CT is keeping schedules with K6AUQ and W6ATW. W5AXY and W5BLJ are newcomers. Bay City: W5BZO is using a 211-D. J. O. Serrill has applied for a license. W5CAZ is operating at W5ABH. College Station: Hats off to W5AQY, who has received a WAC. W5AUT is getting out well with W5AUT and W5BBG at the key. San Antonio: W5MN is handling a pile of traffic. The San Antonio Radio Club held a boiled owl party on the night of April 16th. W5RV, W5UX, W5BQH, W5ABQ, W5MN, and W5NU are on quite often. W5CS has his 75 watt MOPA going fine. W5BVG gets out well. W5FP is a new ham. W5CCF is operating W5YL. W5BEP is using a pair of '10s. W5AWY has a fifty watter. The San Antonio Radio Club meets at the St. Anthony Hotel every Friday night at 8:00 p.m. W5CCF is building a new dynatron. San Benito: W5AHJ reports for the first time. W5ATW is on at Harlingen. W5CCR and W5BY have schedule every afternoon for code practice. Mrs. W5BY will soon have her own call. W5AEV has two '52s in a 'phone rig. Mrs. W5AEV got quite a thrill from talking to her mother in Laredo. W5AHJ is using a 50 watter in the last stage of a crystal rig. G. P. Rumble is W5BBB of Edinburg. W5AGF has quite an antenna at Donna. Get those reports in on time, fellows.

Traffic: W5AQY 60, W5AUT 103, W5MS 32, W5YL 7, W5MN 246, W5BVG 23, W5BUV 27, W5ABH 2, W5CT 65, W5EAC 4, W5AFN 2, W5AUI 15, W5AOT 2, W5BQU 15, W5CAW 4, W5DE 7, W5NT 21, W5GI 2, W5TD 4, W5ADZ 6, W5AEV 24, W5AHJ 70.

NEW MEXICO — SCM, Jerry Quinn, W5AUW — W5AOD, our RM, again leads in traffic. He reports a new ham in Clovis, W5MP. W5BVC worked his first "X." W5AOP is playing around 1750 kc. W5AOE has been granted unlimited 'phone license. W5ASR has a bad attack of YLitis. A new ham is reported in Albuq., W5AAX. W9CDE and W5AUO were visitors at W5AUW. W5ZM is in Arizona. You who crab about the length of our reports, why not get the rest of the gang to send in their cards? Out of 42 stations in New Mexico we get only 5 to report!

Traffic: W5AOD 554, W5AUW 388, W5BVC 41, W5AOP 20, W5AOE 15.

NORTHERN TEXAS — SCM, Roy L. Taylor, W5RJ — W5AVF is new OO and OBS. W5AXT comes through with a nice report. W5BKH wants an ORS. W5AUL has cancelled schedules. He reports for W5JA. W5BTU has been away from Big Springs. W5CAM reported late for W5AXT and himself last month and it didn't get in *QST*. W5BII expects AARS schedules soon. W5AJG reports W5FL and W5BMS are new ones in Dallas. W5WW reports a drive to build up AARS is under way. W5CF reports more sickness in family. W5HI has a new '52. W5ARV is still DXing. W5BYN and W5BIV handle a few. W5IT has a homemade condenser mike. W5BXW handled message regarding sickness from K5AB to W5BXW to Houston via 'phone and back same route in 20 minutes. W5AZC talked to VE3IB for the fifth time. W5ANU works plenty of DX. W5AHM has 50-foot poles for his zepp. W5HY has been busy with journalism class. W5QY has a new 'phone ticket. W5AID says he will graduate in May. W5BGC is a fireman. W5RH reports W5AMO, W5OY and W5BGC are all at Nacogdoches. W5NW sent messages to New Zealand to the Jungle boys of Java. W5BCW has Extra First Commercial "rating" with his YL. Hi. W5LY wants foreign schedules. W5BOC reported too late last month to make *QST*. W5SH plans a big 50-watt 14-mc. 'phone. W5BT is a new reporter. W5AAO has been appointed District Net Control Station of the AARS. The Wichita Falls gang reported via W5IA. W5RJ has been busy with SCM race and business. The Wichita Falls Amateur Radio Club had their annual banquet at the beautiful Wichita Club April 19th. There were 60 hams and their YLs attending. Director Corlett of Dallas, SCM Taylor of Ft. Worth, L. M. Chaffin of Fredrick, Okla., Dave Clark of Wichita, Thomas W. Hall, Jr., and J. W. Robbins gave talks and a very delightful time was had by all. Keep the reports coming, fellows.

Traffic: W5AVF 81, W5AXT 79, W5BKH 70, W5AUL 68, W5BTU 44, W5BII 61, W5AJG 52, W5CAM 22, W5WW 17, W5CF 5, W5HI 2, W5ARV 2, W5BYN 5, W5IT 8, W5BIV 10, W5BXW 6, W5AZC 1, W5ANU 6, W5HY 9, W5QY 1, W5BGC 9, W5NW 2. W5LY 1, W5SH 2, W5AYX 2, W5ARS 2, W5BAH 6, W5BJX 9, W5RJ 23, W5JA 31.

OKLAHOMA — Acting SCM, Norman B. Drake, W5ASQ — W5AYF still pounds brass with the crystal. The Tulsa Amateur Radio Club is meeting regularly. W5ALP left again to reside in Houston, Texas. In Ponca City, The Key Clicker's Club still holds forth. W5VQ reported a good total direct to HQs. W5ABK swears to work a "7" with his MOPA. W5AMS tossed all caution aside and became a married man. Congratulations, OM. W5BWN has inherited two "H" tubes. W5BVN is on early a.m.s. W5ASW has an MOPA. W5ASQ has evolved a crystal rig and a new receiver. Due to the resignation of Mr. Gentry, this report has been prepared by W5ASQ. No traffic reports were received at W5ASQ. Kindly send all reports to W5ASQ pending the outcome of the election.

Traffic: W5VQ 527.

CANADA

MARITIME DIVISION

NOVA SCOTIA — SCM, A. M. Crowell, VE1DQ — VE1BV is high man this month with another record-breaking total. VE1AX wants schedules in or near Columbus, Ohio. VE1BF sends in interesting report. VE1BT is pounding out on 14 mc. VE1BY works on 3.5. VE1DQ is still getting out on 14 mc. 'phone. VE1DH dropped in for chat recently. VE1DI is now giving more time to traffic. VE1ER is pleased with his new zepp antenna. VE1CW reports good DX. VE1DM reported in person. New Brunswick: VE1AE sets the pace for the N. B. boys. ORS tickets will be issued to reliable stations on recommendation of your RM. VE1AU is poking out after DX on 14 mc. VE1CY turns in a nice total. VE1CL is having good luck with 1750 kc. VE1DC is rebuilding. VE1DT schedules VE1DS. VE1DW spends 95% of his time on c.w. VE1AB is off minus power. VE1DR is using low power on 7 and 14 mc. VE1DL is working DX on 14 mc. VE1BR is going to rebuild. VE1BM reports for the Sydney gang: VE1CD has been transferred to the Ice Patrol boat, S.S. *Montcalm*, ice breaker. VE1AL is handling traffic. VE1CK still has YL QRM. VE1BN has plans for high power 'phone. VE1CN is new ham. Every Maritime amateur is urged to report his activities to the SCM each month on the 16th.

Traffic: VE1BV 253, VE1AE 136, VE1ER 80, VE1AX 63, VE1CY 24, VE1BF 24, VE1DI 23, VE1DC 13, VE1DQ 12, VE1CL 3, VE1DT 2, VE1BM 13, VE1AL 35, VE1DW 5.

NEWFOUNDLAND — Acting SCM, James Moore, VO8AW — We are pleased to report two new stations, VO8LC and VO8O. VO8MC lost a '52 and an '04A. VO8K is testing with VO8MC on 28 mc. VO8WG still keeps his daily schedule with VO8Z. VO8AE is on 7 mc. occasionally. VO8Z is still our busiest traffic man. VO8C has an experimental broadcast license. VO8AW worked a few.

Traffic: VO8K 19, VO8AW 6.

ONTARIO DIVISION

ONTARIO — SCM, H. W. Bishop, VE3HB — Please note that the SCM's address has been changed to 49 Eastman Ave., London, Ont. Be sure to send your reports to the new QRA. The "All Ontario QSO Parties" will be discontinued until further notice. VE3GT says the trunk line is running 100%. VE3HA, VE3GB and VE3HN will soon be returning to Ft. William. VE3BC, VE3GU and VE3AQ are busy writing exams at the University. VE3ET has been busy with receiver construction. VE3MR will be busy with VE9DI until end of October. VE3GX will soon be leaving for the north. VE3HV branches out with crystal control on 3618 kc. VE3IQ is busy building a series of MOPA rigs. VE3HK will soon be on with 200 watts crystal. VE3HM has a new antenna system. VE3DB has exhausted the tube supply in Brantford! VE3CP is a new ORS. VE3MM is building an a.c. receiver. VE3AD reports activities increasing in Hamilton. VE3JI was away most of the month. VE3SA says school work is holding up construction. VE3JW is rebuilding a 50-watt crystal, 100% modulated outfit. VE3QB is studying at Normal in Ottawa. VE3ZQ and VE3BP have been experimenting with 56 mc. VE3AU has been reported QSA 5 R5 in Australia using a '45. VE3IX will soon be on with crystal. VE3JK handles some west coast traffic. VE3CD says school exams and ham radio don't mix. VE3DW is not excited over 7 mc. VE3PT is getting out fine business. VE3FB is going OK with '10 and 315 volts "B" batteries. VE3IW tried indoor antenna on 14 Mg. VE3IR is working a push-pull job and says VE3JB is too lazy to report. VE3HB handled traffic for Japan, China, Australia and India.

Traffic: VE3GT 661, VE3CP 78, VE3GX 72, VE3MR 59, VE3GK 38, VE3HV 35, VE3HB 24, VE3JI 25, VE3DW 18, VE3IX 16, VE3HK 8, VE3DB 7, VE9AL 7, VE3AD 5, VE3HM 5, VE3SA 3, VE3AU 3, VE3IR 1.

QUEBEC DIVISION

QUEBEC — SCM, Alphy Blais, VE2AC — This division has gone "phone conscious" and the gang is doing wonders also. VE2BE, VE2BG, VE2AP, VE2AB, VE2AX, VE2EM, VE2CM, all of these are heard regularly during the Sunday morning QSO party. VE2BB is still handling plenty traffic. VE2CU, VE2CO, VE2AQ, VE2BO are studying hard these days for the university degree. VE2CA will be the next one on with high power c.c. VE2AB is active on 'phone. VE2DW is getting along fine. VE2AP is doing post-graduate studying. VE2HV has an assistant YL at the key and the mike. The following are on consistently: VE2CD, VE2CX, VE2BD, VE2AG, VE2DQ, VE2BH, VE2DX. Congratulations are due our CGM, Alex Reid, VE2BE, for the way he handled the 'phone question with Government authorities. VE2CQ is on regularly. VE2AC operates mornings only. Please, gang, be more in the spirit of the game and give me the news, each of you individually. VE2DP is a new amateur.

Traffic: VE2AP 88, VE2BB 75, VE2AC 61, VE2BG 9, VE2DW 3, VE2BE 26.

VANALTA DIVISION

ALBERTA — SCM, C. H. Harris, VE4HM — VE4DT is still the star traffic station. VE4EI and the OW have changed QRA. VE4FJ is still hoping for a license. VE4BD and VE4JQ are QRL on the farm. VE4GT QSOd Costa Rica and Argentine. VE4EA is getting ready for 'phone. VE4HM hooked a ZL. VE4BV and VE4FR are working on crystal control. VE4GD reports for the Calgary gang. VE4CY will not leave 14 mc. 'phone. VE4HQ is on 3.5 mc. 'phone. VE4GD is on CW again. VE4JK rebuilt. VE4IQ and VE4JW are on some. VE4JI and VE4JX live so close they are QRM. VE4GP is building MOPA. VE4DX is having a rest. VE4HV is using '45 TNT. Please let me have reports from every Alberta station, and keep our section to the front. VE4EC built new receiver and transmitter. VE4JP reports as new ham.

Traffic: VE4DT 53, VE4EI 21, VE4HM 7.

BRITISH COLUMBIA — SCM, J. K. Cavalsky, VE5AL — VE5HP still leads the gang with traffic. VE5AG is out to make Hep take a back seat. VE5AL blew a tube during the DX Contest. VE5EH and VE5FG have been working DX. Welcome back, VE5EC. VE5HR flipped his rectifier. VE5AC says conditions are not so hot. VE5BR is using storage battery plate supply. VE5EI is complaining of the monopoly on the 'phone band by the higher power stations.

Traffic: VE5HP 111, VE5AG 83, VE5FG 35, VE5AL 22, VE5AC 8, VE5EC 18, VE5EH 18, VE5BR 36, VE5HR 15.

PRAIRIE DIVISION

MANITOBA — SCM, John L. Green, VE4BQ — Am very pleased to announce two new ORS appointments, VE4IS and VE4AG. VE4CI leads in traffic this month. VE4AG has added 1 RF to his receiver. VE4DK, VE4IC and VE4FP have been QRL "U" exams. VE4DK is thinking of a '52 for his MOPA. VE4DJ worked ZL2GR and K5AD on 7 mc. VE4FT was QSO CE7, TI2, and K5. VE4AE is back on 7 mc. VE4GL is installing crystal. VE4GQ uses a fifty in MOPA. VE4AR transmits on 1750 kc. VE4BQ is experimenting on 7 mc. VE4DU has his new crystal outfit perking on 7 mc.

Traffic: VE4CI 49, VE4DJ 6, VE4DK 4, VE4AG 4, VE4BQ 3.

SASKATCHEWAN — SCM, W. J. Pickering, VE4FC — VE4BB is working on 3.5 mc. VE4IH sends a nice report. VE4GV is putting in an '03A. VE4AI says VE4AZ, VE4IJ and VE4AG (YL) are on the air at Viscount. VE4EL sends the sad news that VE4HO has passed on. The Saskatoon Amateur Radio Assn. staged a QSL card contest during May. VE4BF had an experience with a new receiver and a lady friend. (Ask him about it.) VE4HX is sore at the wx. VE4EM and VE4FC are rebuilding.

Traffic: VE4BB 54, VE4IH 40, VE4AI 27, VE4EL 11, VE4GR 6, VE4HX 5, VE4FC 2, VE4AC 1.

LATE AND ADDITIONAL REPORTS

W4GS, Eastern Florida, is handling traffic. W7CBY, Bozeman, Montana, is a new ham and would like some QSOs.

Traffic: W4GS 68.

• CORRESPONDENCE •

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

Eliminating QRM with S.F. Transmissions

151 North 12th St., Newark, N. J.

Editor, *QST:*

The service rendered by the Standard Frequency Stations is one of the finest things we amateurs have, but how in the world is the fellow who wants to calibrate some piece of apparatus from their transmissions going to do it when the QRM offered by certain amateurs prevents you from hearing the signals? I consider it pretty good when I can get three points on the 7-mc. transmissions and perfectly astounding when I can get all four.

The other day I was copying PDT on 7350 kc. when in burst a nice r.a.c. note calling CQ and signing W3 — . When he quit I went back at him. He gave me the regular report on my sigs and then explained to me that he thought he never would raise anyone. He was QSA5 R9, but yet he could not work anyone. Now you guess the reason! Well I told him why and he, of course, confessed he didn't know it. I'll bet he never owned a frequency meter — or maybe if he has one he will have to wait for several transmissions from our Standard Frequency Stations before he can plot all the necessary points and draw a suitable curve.

We have all heard of cases similar to the above before, of course. However, I think the fellows would welcome a solution to this QRM problem, and with this in mind I am suggesting the following. We all know that our O.R.S. are the most law-abiding stations we have. Why not enlist them into the service of quenching the interfering stations by sending out a QST call fifteen minutes before the Standard Frequency Transmissions commence, asking all stations to QRT for Standard Frequency Transmissions. If this could be done I think we would have a much better chance of getting a quiet period while the transmissions are in progress. I firmly believe that the hams who do make all the disturbance do not do so willfully but are ignorant of the transmissions, either because they have not read about them in *QST* or have forgotten about the time of transmission.

Let's get some more suggestions and get this trouble of calibrating frequency meters out of our way.

— *John Glauber, W2CPE*

More on the Sunspot Cycle

909 Page St., San Francisco, Calif.

Editor, *QST:*

I have been very interested in the articles that have appeared in *QST* regarding the eleven-year cycle, and the following are my observations covering about four or more years. These are not exactly observations, but just what my log shows since 1927.

As we all know, the peak year for 7-mc. signals was 1928, after which year they rapidly dropped off. By the latter part of 1929 DX was rotten. The J's came in best about 7:00 a.m. The Aussies and Zedders were few and far between compared to the previous year, and the Philippines were good from 4:30 a.m. to about 7:00 a.m.

During 1930 and the first part of 1931 conditions were even worse, but things seemed to perk up a bit during the winter of '31. Now 1932 is beginning to be like the early part of 1927. The J's are often heard as early as 11:30 p.m. The Philippines also come through that early, while the Aussies and Zedders are sometimes copied as early as 10:30 p.m., all with good signal strength.

Due to moving and rebuilding I have been forced to be off the air for periods ranging from four to six months, so that each time I return to the air each change in receiving conditions stands out much more than if I had been operating continuously.

In Captain A. M. Houston Fergus' letter in December, 1931, *QST*, it is stated that we shall see the peak in 1933, with subdivisions of 15-month cycles, until the other peak is reached in 1938. The data taken from my log certainly seems to uphold this theory, at least for the 7-mc. band.

QST has always asked for any information that may be had on such subjects, so here's my drop in the bucket.

— *L. M. Gentry, W6DFQ*

A Practical Suggestion

1058 Nelson St., Vancouver, B. C.

Editor, *QST:*

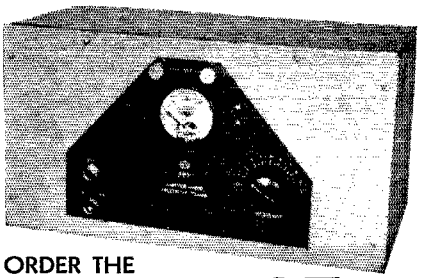
Having been on the air for less than a year, I hesitate to encroach on your time, but if the following suggestion is worthless you have your WPB handy, no doubt.

Here it is: Why couldn't hams adopt the habit of ending a call (in response to a CQ) with a re-

OH WOTTA THRILL! 5 METERS!

JOIN the fast increasing number of amateurs who are enjoying the five-meter band. No static. No skip effect. No day or night effect. Plenty of room in the band. No QRM. The ideal band for local "rag chewing." REL announces a receiver and transmitter of unique design for the five-meter "Ham" band. Simple to operate. Rugged and lightweight. Use it at home or cart it around for portable work. Commercial built and tested. Ready for immediate use without any further "cut and trying." At a price that will not warrant building your own. Equip yourself with the "296"–"297" combination at once.

The "297" radio telephone transmitter effectively covers the five-meter band indicated on a calibrated scale. No need for special five-meter frequency measuring devices to set the transmitter in the band. Highest quality modulation. The "297" can be used with either one of the following tube arrangements: Two-01A and two-33 pentodes (which require 6 volts filament and 135 volts plate) or two-45 and two-47 pentodes (which require 2½ volts filament and 250 volts plate). No need for a special antenna. Your present one will do.



ORDER THE "297" PRICE $27.75
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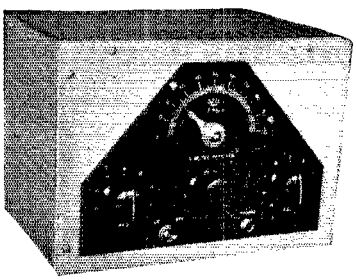

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The "296" receiver spreads the band over the entire tuning dial. Requires two type-37 and one type-38 tubes. Power required 6 volts filament, 135 volts plate. Simplified circuit arrangement gives astonishing results. Operates with any available type of antenna.

If your dealer cannot supply you, order direct. Immediate shipment upon receipt of your money order.

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100 WILBUR AVENUE LONG ISLAND CITY, NEW YORK

Export Department: 116 Broad Street, New York City

port of the first station's readability? Surely by generally adopting this procedure, much needless QRM could be eliminated and QSO's would be snappier and more business-like.

To explain more fully — ABC calls CQ and XYZ answers in this manner: ABC ABC ABC de XYZ — - - - — R7 AR. ABC knows immediately then that his signals are coming in FB and proceeds with the QSO sending single. Should ABC's signals only be about R3, XYZ could end his call with QSZ.

I guess we have all had high blood pressure at times when a station whose signals are about R9 gives a long report and rag-chew sending double.

Thanking you for a FB publication, I am,

— *John M. Hicks, VE5FE*

Better Traffic Handling

Dallas, Texas

Editor, *QST:*

This morning (April 1st) I overheard VK3RJ ask a W station to please QSP two messages to W9UM. He must have refused or blown a tube, because in a few moments I heard VK3RJ QSO a W2 station, telling him that he had asked ten "W" stations to QSP, but results were nil. This seems to look very bad for us "W" hams, as I am quite sure that in these ten contacts, one ORS must have been hooked who could have taken the traffic from VK3RJ. Neither do I believe that QRM or QRN could be the excuse, as I, on my junk heap, copied practically all transmitted from VK3RJ, and QRN from the street cars was pretty bad. What if some part of the text *had* to be repeated? There is nothing wrong with that, as I have had to request a repeat lots of times. I believe we hams should coöperate more with our foreign friends in this respect, as I feel sure VK3RJ formed a very bad opinion of our ORS and hams in general.

While on the subject of traffic handling, I wish to mention some good work on the part of W5BXW here in Dallas. On March 29th he contacted K5AB, taking an important sick message for Houston, Texas, some 300 miles away, and in turn calling over long distance, getting a reply back to K5AB in 20 minutes.

To me, this is the spirit we "W" hams should have, and would like to see more dope on traffic handling in future issues of *QST*. Let's have more coöperation with our foreign friends.

— *L. A. Walker, W5LY*

Electrical Interference

514 East 88th St., New York City

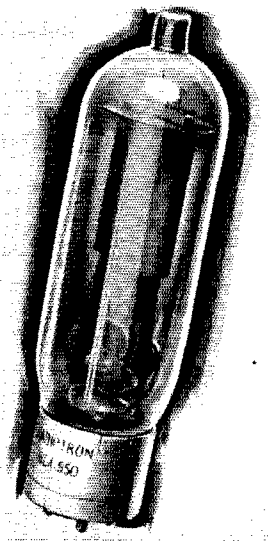
Editor, *QST:*

The article on eliminating interference caused by electrical equipment in the March issue is just another instance of the helpful articles published by *QST*.

The information proved very successful in my case in eliminating QRM caused by my motor-

RCA-850 Announcing

A new 1000 volt Screen-Grid Transmitting Radiotron



Features of the RCA 850 that will interest amateurs

1 No expensive neutralizing condensers are necessary.

2 Less costly filter condensers required in plate supply.

3 Economical of space.

4 Designed for high frequency operation.

Class B rating:

Maximum Operating Plate Potential	1250 Volts
Maximum Unmodulated DC Plate Current	0.150 Ampere
Maximum Plate Dissipation	100 Watts
Maximum Screen Dissipation	10 Watts
Maximum RF Grid Current	7.5 Amperes
Typical Operation: Eb = 1000, Ec = −8, Ed = 175 approx. Ef = 10 volts	
Unmodulated DC Plate Current	0.10 Ampere
Peak Output	120 Watts
Carrier Output-Modulation Factor 1.0	30 Watts

Class C rating:

Maximum Operating Plate Potential—	
Modulated DC	1000 Volts
Unmodulated DC	1250 Volts
AC (RMS)	1000 Volts
Maximum DC Plate Current	0.175 Ampere
Maximum DC Grid Current	0.040 Ampere
Maximum Plate Dissipation	100 Watts
Maximum Screen Dissipation	10 Watts
Maximum RF Grid Current	7.5 Amperes
Typical Operation: Ed = 1000, Ec = −150 approx., Ed = 175 approx., Ef = 10V	
Output	100 Watts

Amateur Class "B" Modulator Kit

An economical and efficient system for modulating Amateur Fone Transmitters was described in an article* in the November 1931 issue of Q. S. T.

The kit described below is capable of supplying over two hundred watts of audio power (i. e., it will modulate 100% an input of 400 watts to the Class "C" stage).

Two points are especially noteworthy:

1 The modulation transformer has two secondary windings which can be connected in series to modulate 2,000 volt tubes such as the UX-852 or UX-860 or in parallel for 1,000 volt tubes such as the UV-211 or RCA-850.

2 The secondary windings are designed to carry the plate current of the modulated stage (no reactors, condensers, or dropping resistances required).

Amateur Modulator Kit

consisting of

One Special Class "B" Audio Input Transformer
One Special Class "B" Modulation Transformer
Two Matched Radiotrons Type UV-203-A
Price Kit complete as above, $74.25 F.O.B. Camden, N.J.
Price Kit without tubes, $28.75 F.O.B. Camden, N. J.

(Prices subject to change without notice.)

*"The Class B Push-pull Modulator" by L. E. Barton

RCA Victor Company, Inc.

A Radio Corporation of America Subsidiary

CAMDEN, N. J.

"RADIO HEADQUARTERS"

generator set to BCL receivers due to just the conditions outlined in Professor Larsen's article.

Many thanks to both the author and yourselves for the publication of this article.

— *C. M. Spengler, W2BXW-CXQ*

For Better Operating

Madera, Calif.

Editor, *QST:*

Some of the letters printed in April *QST* gave me some ideas. Here they are:

When calling someone, it seems to me it would be more satisfactory not to sign your call except at the end of the call. Of course this does not mean to lengthen the call, the length of it depends on how fast you send. I don't think it would be good to sign your call only once during a CQ, at the end, because a fellow wants to know who is calling without having to wait until he finishes.

A good scheme in CQing is to shut your fist and open one finger for each CQ until you have your whole hand open again, which will mean five CQ's. Then sign your call three times. This should be repeated for about three minutes.

Another thing, about QSL's. How do we know where to send a card if the other OM doesn't give his address? Lots of times a fellow will say, "Please QSL," and not say where to send it. We can't make forwarding places do all the work. I, for one, won't QSL unless the other fellow sends me his card first or tells me his QRA. Then I will always QSL.

— *Keith Daulton, W6EPQ*

Those Selfish Signals

1321 Spruce St., Indianapolis, Ind.

Editor, *QST:*

The R.I. has started war on unfiltered sigs. What say the gang all jump in and help him win!

So far quite a few hams have not paid any attention to the regulation about broad and unfiltered notes. The time has come for a show down. I know of several hams who operate their transmitters without *any* filter and some who take their filters off because they think they get out better, regardless of the other fellow's endeavor to get a sharp signal.

I think that *QST* can find space to run a list of punk sigs *every* month, and it would be well worth the space used. Call it the Black List and let the R.I. see the list of stations that clutter up the air.

Another thing that can be done is not to answer any station with an a.c. note. In the good old days they drove the spark sets off by not answering them, so I've been told, so why not do the same with the punk sigs of to-day?

What say, gang, will you get in on this war and help clean the air of these prehistoric notes?

— *Arthur L. Braun, W9TE*

The Call Snatchers

St. Louis, Mo.

Editor, *QST:*

I have noticed quite a few complaints from different hams about the illegal use of their calls. I

Take a *good* look at real QUALITY

★ **Look for the three tube set** — not a one or two tube receiver. The **HAWK** employs **three tubes;** Screen Grid R.F., Screen Grid Det., Pentode Audio.

★ **Look for the most recent development in low loss coils — three wound Isolantite coil forms** with convenient grips are included with the **HAWK.**

★ **Look for the best in condensers** — The three variable condensers used in the **HAWK** are Isolantite insulated.

★ **Look for quality parts thruout** — The **HAWK** was designed for absolute efficiency, hence no expense was spared and you will find only the finest materials in the **HAWK** receiver.

and take a good look at the low price **$22**

A set of matched 6 volt tubes tested in your set **$3.60**
6 volt filament transformer **1.75**
Write for descriptive circular

HAWK supplied assembled, unwired, $16.50

Don't Miss This Opportunity.

HOYT meters at a price. These are not to be confused with the usual meter "bargains." 2" mounting hole, flange 2⅝" diameter, supplied in the following types: 10 M.A., 100 M.A., 150 M.A., 250 M.A. and 12 Volt A.C. **$1.60**

Barrel type ribbed antenna insulator 2 for **15c**

Bliley Quartz Crystals

recognized as the finest on the market. For 80 and 160 meters **$5.50**

Tourmaline Gem Crystals

for 20 meters **$14.00**
for 40 meters **12.00**
Special holders for above **$2.50**

NEW ISOLANTITE COIL FORMS

These Hammarlund coil forms have sufficient holes for any winding. Beware of the cheap type without this feature . . . **58c**

COPPER TUBING INDUCTANCES
WOUND AND ENDS DRILLED FREE

Inside dia.	*3/16"*	*1/4"*	*5/16"*
1⅝"	7c turn	8c turn	
2⅜"	7c turn	8c turn	12c turn
3⅛"	10c turn	12c turn	14c turn

---

only **90c** *for a dandy transmitting key*

Nice clean job — real bargain — silver contacts — best key you have ever seen at the price.

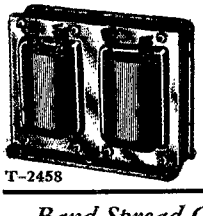
Yes! We have the New Hammarlund Comet "PRO" on demonstration and ready for immediate delivery. Write for our special price.

WARD LEONARD RELAYS

Single pole single throw **$3.50**
(for keying)
Double pole double throw **4.50**
Time delay type **7.50**
(for use with mercury rectifier power supplies)

THORDARSON Heavy Duty
DOUBLE FILTER CHOKE

consists of two 18 Henry 250 mil chokes, D.C. resistance only 108.5 ohms. Size 3" x 7" x 5½". BRAND NEW. Ideal for choke input filter systems. Saves the price of an extra choke. Especially suited for use with that class "B" power supply to give better regulation and pass heavy current. **Only $7.50**



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Band Spread Condenser

Isolantite insulated single hole mounting. Extremely compact. 100 mmf and 20 mmf (see our ad May *QST*) **$2.10**

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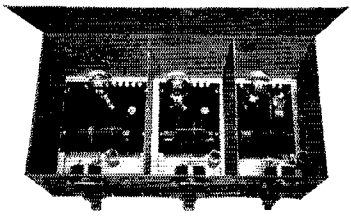
10 Volt Filament Transformer

at 7½ amps. to be used with a C.T. resistor for accurate work. Get them while they last only **$1.25**
(include postage for 6 lbs.)

High power Class B transformers

for the 204-A or two to four fifty watters 50,000 volts insulation. **$32.50** per pair.

The GC-30
a real transmitter bargain
CRYSTAL CONTROL



your choice 210 oscillator 210 buffer 210 amp. *or* Pentode oscillator 210 buffer 210 amp. Completely assembled ready for you to wire with three Readrite meters **$29.50**
with three Weston meters **$42.50**
Write for descriptive circular

LOOK THESE OVER!

Neutralizing condensers 50 mmfd . . . . . **$.25**
Weston D.C. Milliammeters 2" bakelite case any range from 10 to 500 m.a. . . . **4.46**
Kurz-Kasch 2¾" dials . . . . . **.45**
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50 watt sockets side wiping contacts . . . **1.50**
Federal 1424-W Anti-cap. switches **1.90**
7" natural bakelite spreaders . . . . . **.25**
Sheet aluminum 1/16" 7/10c, 3/32" ⅝c, 1/8" 1c.
Monitor with batteries, coils and tube . . **10.50**
Enamel copper antenna wire No. 14 any length . . . . . **30c** 100 Ft.
Enamel copper antenna wire No. 12 any length . . . . . **45c** 100 Ft.
Enamel copper antenna wire No. 10 any length . . . . . **90c** 100 Ft.
280M mercury full wave rectifiers **$1.25**
281M mercury half wave good up to 1200 V **2.00**
866's guaranteed firsts **2.95**

A COMPLETE LINE OF STANDARD AND "HARD TO GET" PARTS

"JERRY'S PLACE"

25 WARREN STREET, N. Y. C. TELEPHONE BARCLAY 7-6698

Gross RADIO

think it's about time someone put in a real squawk about this sad situation. I have a portable call, W9EWT, which I have not used since the cold weather set in. To date I have received 20 cards from hams I have never heard, let alone worked.

Why can't these would-be hams get calls of their own instead of appropriating those belonging to others? I wonder whether these nitwits know that they are breaking the Federal Radio Laws? I think that the fellows who appropriate calls should have all the cards that they receive shoved down their throats. Guess we'll have to get out the Wouf Hong and Rettysnitch and put 'em to work again.

— *Wells R. Chapin, W9DUD-EWT*

An Oddity

210 Laurel Ave., Milford, Ohio

Editor, *QST:*

W8AQH came up to spend the week-end with me a short time ago, and didn't want to take a chance on any of my half-dozen pairs of 'phones, so he brought his with him, telling me that his were more sensitive than mine. So I says, "Lemme try them fones of urs," and I put them on and walked toward my receiver, and when three feet away from it with no connection whatever, I heard sigs in the 'phones. I called Butler and told him to slip on the cans, whereupon he was as astonished as I had been. Then he said he knew his 'phones were better, but I put on a pair of mine and the same thing happened.

We could copy about a dozen different signals half way across the room from the receiver without any kind of connection to the receiver. We are both operators at WLW and no one there would believe our story. But that's it and for proof just pay a visit to W8DL.

— *T. Paul Jordan, W8DL*

Raising Technical Standards

1420 Q St. N. W., Washington, D. C.

Editor, *QST:*

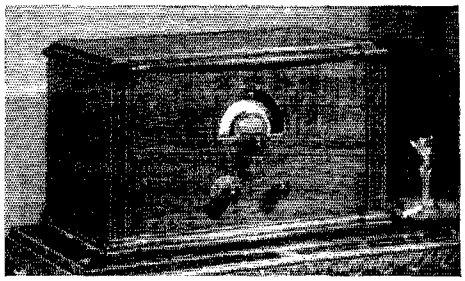
The Federal Radio Commission in its new special examination for the privilege of unrestricted radiophone operation on amateur frequencies takes another definite step toward raising the standard of the amateur operator and cleaning house in our 'phone channels; three rousing cheers! And may I dare take the risk of saying that I hope this extra examination is only the impetus to more stringent requirements for amateur operators of all classes?

When there were less of us and when a transmitter might swing back and forth over several bands without creating a great deal of interference, there was no need of the measures we must take in this day of narrow operating bands and an amateur population of approximately 25,000 in this country alone. Amateur operators should now possess better technical qualifications than are required to pass the present code test and

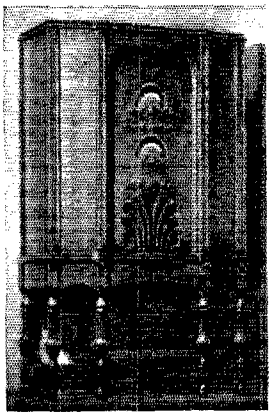
ACCURATE EASY TUNING

—WITH CHARACTERISTIC SPARTON PERFORMANCE—

DISTINGUISHES THIS FINER SHORT-WAVE CONVERTER



Sparton Model 60 SHORT-WAVE CONVERTER—*Transforms any standard AC broadcast receiver into a short-wave Superheterodyne by simply plugging into light socket and connecting the aerial and ground wires. To change the frequency band it is not necessary to change coils in the Sparton Multi-Wave Receiver. All frequency changes are made automatically by the Band Selector Switch. This permits the rapid selection of the frequency band desired. Full AC operation, with integral voltage and current supply system.*



Sparton Model 16 AW—
A de luxe 12-tube Superheterodyne in a console of characteristic Sparton richness. Two separate tuning controls provide exceptional operating simplicity. A turn of the band selector and control knob instantly adapts this super-modern instrument for either long or short wave reception. Supersonne chassis, Automatic Volume Control, Tone and Static Control, Phono Pick-up Jack and all other latest Sparton features.

TEDIOUS tuning in the old "cut and try" way—chief bugaboo of short wave reception in the past—is completely eliminated by the new Sparton Short-Wave Converter and the new Sparton Multi-Wave Receivers.

In the Sparton Converter there is an interlocking of the oscillating circuit with the tuning circuits.

Each of the three tuning coils has four windings, and the Band Selector Switch—an advanced Sparton feature—permits each winding of the oscillator coil to serve a dual purpose.

A dial drive ratio of 30 to 1 also contributes to ease of control.

All the Dependability of Sparton Police Radio

Sparton Automobile Radio has been adopted as standard equipment by more police departments than any other make.

In the long period of development work, which made possible this leadership, Sparton engineers gained unequaled short wave experience. At the same time they laid the foundation for the remarkable achievements recently revealed in the Sparton Converter and Sparton Multi-Wave sets.

Your nearest Sparton dealer invites you to examine and test these history-making instruments in his store or your own work shop.

THE SPARKS-WITHINGTON COMPANY
(Established 1900)
JACKSON, MICHIGAN, U. S. A.

SPARTON RADIO

"Radio's Richest Voice"

Only Sparton has the Musical Beauty of Sparton

Radio · Refrigerator · Home Movie-Talkies · Automobile Radio · Tubes · Automobile Warning Signals

(784)

theoretical examination necessary to secure the ham ticket.

I look hopefully to the day when the amateur applicant will be made to sit down to a rigid technical test, or even to a practical examination, and when *a permit to build an amateur station* will be created and awarded only after the applicant shows that he wishes to erect a transmitter that conforms in every particular to modern demands. The argument might be raised here that the Government has not sufficient facilities for inspection and certification. True, but why not deputize a few reliable and proficient amateurs of long experience to examine the plans and later the completed station?

— *Rufus P. Turner, W1AY-W9FZN*

That High-Power Question

3308 E. Broad St., Richmond, Va.

Editor, *QST:*

In reply to the letter from Mr. M. W. Weeks, W1WV, published in the March issue of *QST*, I would like to say that I do not agree with him on the limit of power.

He is certainly right about a lot of these new boys playing with the key for no good reason at all. But when it comes to limiting the power, I can't agree. The fellows who know enough to build a high-power rig should have enough knowledge to operate it. It is out of the question that hams who have put their money into apparatus of this type should have to throw it away. I do not say this because I am putting out 500 watts, but because it seems to me that some of the gang with 210's are letting Old Boy Green Eye get the best of them.

My suggestion to eliminate some of the QRM is to have anyone using over 75 watts here to pass a special examination in person before the Radio Inspector. This examination should cover the use and maintenance of high-power apparatus. All checking on a high-power transmitter should be done on a dummy antenna, and all such transmitters should be crystal controlled.

Now, about the situation in England. The British Government will issue special licenses to operators who qualify. How about G5BY? He has used two 150-watt tubes in his final stage. If anyone has one of his latest QSL cards this is stated on it.

It is not a question of the power, it is how the transmitter is built and the operator behind it.

— *G. W. Hudson, W3AEW-ABD*

An Amendment to McLaren's Suggestion

Chicago, Ill.

Editor, *QST:*

A. K. McLaren's letter in the April issue is just about the solution for stations fighting the QRM.

RED HOT AMATEUR RADIO SPECIALS

Reduced Prices, This Month Only

Heavy Duty Mercury Vapor Rectifiers

866 7500 VOLTS INVERSE PEAK 600 MILS NORMAL **$1.95**

888 or 871 — 3000 volts — 300 mils normal.....$1.95
280M or 282 — 300 mils — Full Wave.....$1.25
281M — 300 mils.....$1.75 872 — 2.5 amps.....$11.95

RECEIVING TUBES

2v. tubes		6v. Auto tubes		2½v. AC tubes		201A	$.40
230	$.69	236	$.89	227	$.25	226	$.45
231	$.69	237	$.69	224	$.40	222	$.95
232	$.89	238	$.89	247	$.60	200A	$.40
233	$.89	239	$.89	235	$.55	171A	$.40
234	$.89	6v. pilot	$.10	245	$.45	199 UX-UV	$.55

TRANSMITTING TUBES

UX210's — 15-watt output.....$1.50
UX250's, UX281's.....$1.25
50-WATTERS 203A — 211 or 845's, each.....$12.00
CG1162 Navy Transmitting Tube, 550 Plate, 7.5v. fil.....$.25
All tubes unconditionally guaranteed ninety days

MORRILL TRANSMITTING CONDENSERS

Test Voltage	2000v.	3000v.	4000v.	6000v.	10,000v.
Working Voltage	1000v.	1500v.	2000v.	3000v.	4,000v.
1 mfd.	$1.50	$2.55	$3.90	$6.60	$15.00
2 mfd.	$3.00	$4.65	$6.90	$10.05	$24.30
4 mfd.	$6.00	$7.80	$11.90	$19.50	$45.00

Condensers, guaranteed one year against defects.

Standoff insulators, Bechive type. Each, **$.09**, Doz.....$.83
Dubilier Condensers, 8 mfd. 500 volts working.....$.65
¼ KW Silver Contact Transmitting Keys. Each.....$.95
Latest Amateur Call Books.....$.85
Pilot plug-in coil forms. Complete.....$.39
85-watt grid leaks, 10,000, 15,000 ohms. Each.....$.65
20,000, 50,000, 100,000, 250,000 ohm potentiometers.....$.50
Copper coil, 3" diameter, ¼" tubing, per turn.....$.07
CT resistors, 10, 25, 50, 75 ohm.....$.15
85 millhenry RF chokes.....$.15
Electric soldering irons, heavy duty.....$.95
100 Watt Bleeder Resistances (5,000, 10,000, 20,000 ohm.....$1.40; 50,000, 75,000 or 100,000 ohm.....$1.80; 75,000 ohm with six adjustable taps.....$1.90; 100,000 ohm with six taps.....$2.00) **9½" long**
Mica Condensers — 800 volts — .00005, .0001, .00025, .00035, .001, .002, .004, .005, .006. Each.....$.15
Western Electric No. 18 solid tinned push-back hook-up wire. 25' roll.....$.15
WE VT2 5-Watters. Each.....$.75
1000v. 1 mfd. oil impregnate condensers, uncased.....$.15
GE ¼ — ½ — 1-watt neon lamps.....$.55
Pilot Midget var. condensers, 100, 50, 25 or 15 mmfd. Each..$.60

NEW AMATEUR PHONE BAND CRYSTALS
3900–4000 KC pure Brazilian Quartz, "X" cut, 1" square crystals.....$4.40
Radiobuilders plug-in crystal holders. Each.....$1.50
Crystals anywhere in 80-meter band. Each.....$4.40
Calibration accuracy guaranteed 1/10 of 1%.

Radiobuilders Modulation and Filter Chokes — Open frame mount, weight is all choke. Beautiful jobs. Fully mounted. Dynamic steel core.
200 mils — 30 Henries — 12 lbs......$4.50
300 mils — 30 Henries — 17 lbs......$8.00
400 mils — 30 Henries — 24 lbs......$11.50

Radiobuilders Class B Modulation Transformer for UX210's. Largest core used in any Class B transformer. Compare weights. Type A, per pair, weight 11 lbs. Price.....$8.00
866 transformer. In beauty of a case with Stand-off Insulators — 2½ volts, 10 amps, center tapped. Price.....$4.00
7.6 volt unmounted Transformers.....$1.00
Thordarson Filament Transformers, 50 watts, fully mounted. Following voltage combinations: — 2½ and 2½ volts — 2½ and 5 volts — 2½ and 7½ volts — 7½ and 7½ volts. Price, each.....$1.75

PLATE POWER TRANSFORMERS

250 watts — 750–0–750 7½ and 7½.....$5.50
250 watts — 750–0–750.....$4.90
350 watts — 1000–0–1000.....$6.95
500 watts — 1500, 1000–0–1000, 1500.....$9.25
850 watts — 2000, 1500–0–1500, 2000.....$12.75
900 watts — 2500, 2000–0–2000, 2500.....$14.25
Fully mounted in aluminum case. Terminals on natural bakelite panel.

5-METER RECEIVER

Completely wired and tested super regenerative receiver — extra sensitive. Built on aluminum chassis. Aluminum panel with full-vision dial.....$18.50
Available in kit form.....$13.50
5-meter push-pull 112 — 245 or 210 transmitter — wired and tested.....$9.45
Available in kit form.....$5.45
UX210 tubes that oscillate on 5 meters.....$1.75
Write for details on above

Keying Relays operate on one dry cell. Remote control your transmitter. In cadmium plated case. Each.....$.95
Transmitter variable neutralizing condensers .05" spacing. Each.....$.35
Centralab 75,000 ohm potentiometers. Each.....$.30

Accurate black flange flush panel mount meters.
Milliammeters 0–10, 0–50, 0–100, 0–150, 0–200, 0–300...$1.00
A.C. Voltmeters, 0–3, 0–5, 0–7½, 0–10, 0–15. Each....$2.50

ALL MERCHANDISE GUARANTEED. Visit our store when in town. We are authorized distributors for Weston and Jewell Meters, Flechtheim, Dubilier, Morrill, Aerovox & Siemens & Halske Condensers, Franklyn Transformers, Cardwell Condensers, National Products, Pilot SW parts, Lynch Resistors, Amertran Transformers, Littlefuses, Arcturus Transmitting Tubes and Clarostat volume controls. Order it. We have it at lowest possible prices. New 64-page catalog will be out shortly. GET YOUR NAME ON OUR LIST.

TERMS: CASH OR C.O.D. **ALL PRICES F.O.B. NEWARK, N. J.**

Being a beginner and using a 7½ watter, I find that 7½ watts cannot compete with 200 watts. As an addition to Mr. McLaren's suggestion, why not also divide the time for low- and high-power stations? This would give the low-power stations, who are often beginners, an even break for DX QSO's.

More than one of the newcomers is beginning to feel disgusted because of the QRM and too much competition with high power. This scheme would also be a boon to the high-power stations because they would not have to deal with "pesky beginners."

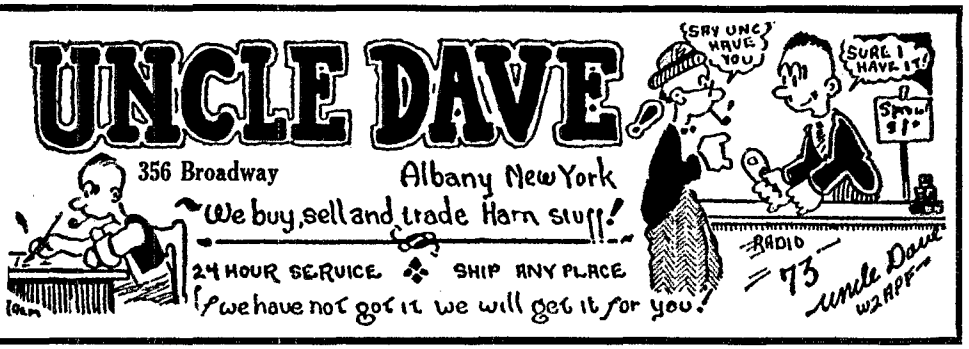
What say, OM's, wouldn't that just about fill the bill and square things? Let's have a few more comments on this!

— *Tom Rebik, W9ICP*

I. A. R. U. News

(*Continued from page 42*)

HAA-HAZ	HAF	Hungary	5	3
HBA-HBZ	HB	Switzerland	5	3
HCA-HCZ	HC	Ecuador	3	2
HHA-HHZ	HH	Haiti	3	2
HIA-HIZ	HI	Dominican Republic	3	2
HJA-HKZ	HK	Colombia	3	2
HRA-HRZ	HR	Honduras	3	2
HSA-HSZ	HS	Siam	5	3
HVA-HVZ[8]		Vatican City	5	3
I	I	Italy and Colonies	5	3
J	J	Japan	5	3
K	[W]	United States	2	1
	K4	Porto Rico	2	1
		Virgin Islands	2	1
	K5[4]	Canal Zone	2	1
	K6	Hawaii	2	1
		Guam (U. S. Samoa)	2	1
	K7	Alaska	2	1
	KA	Philippine Islands	2	1
LAA-LNZ	LA	Norway	5	3
LOA-LVZ	LU	Argentine Republic	3	2
LZA-LZZ	LZ	Bulgaria	5	3
M	[G]	Great Britain	5	3
N	[W-K]	United States	2	1
	NN[1]	Nicaragua	3	2
	NY[4]	Canal Zone	2	1
OAA-OBZ OCA-OCZ[3] OFA-OGZ[3]	OA	Peru	3	2
OHA-OHZ	OH	Finland	5	3
OKA-OKZ	OK	Czechoslovakia	5	3
	OM[1]	Guam	2	1
ONA-OTZ	ON	Belgium	5	3
		Belgian Congo	5	3
OUA-OZZ	OZ	Denmark	5	3
PAA-PIZ	PA	Netherlands	5	3
PHA-PJZ	PJ	Curacao	5	3
PKA-POZ	PK	Dutch East Indies	5	3
		Java	5	3
		Sumatra	5	3
PPA-PYZ	PY	Brazil	3	2
PZA-PZZ	PZ	Surinam	5	3
(Q-Signals)				
RAA-RQZ RRA-RUZ[3]	RA[5]	U.S.S.R.	5	3
RVA-RVZ	RV	Persia	5	3
RXA-RXZ	RX	Panama	3	2
RYA-RYZ	RY	Lithuania	5	3
SAA-SMZ	SM	Sweden	5	3
SPA-SPZ	SP	Poland	5	3
STA-STZ[3] SUA-SUZ	SU	Egypt	5	3
	ST	Sudan	5	3
SVA-SZZ	SV	Greece	5	3
TAA-TCZ	TA	Turkey	5	3
TFA-TFZ	TF	Iceland	5	3
TGA-TGZ	TG	Guatemala	3	2
TIA-TIZ	TI	Costa Rica	3	2
TSA-TSZ	TS	Territory of the Saar	5	3
UHA-UHZ	UH	Hejaz	5	3
UIA-UKZ	[PK]	Dutch East Indies	5	3
ULA-ULZ	UL	Luxembourg	5	3
UNA-UNZ	UN	Yugoslavia	5	3
UOA-UOZ	UO	Austria	5	3
UWA-UZZ[2] VAA-VGZ	VE	Canada	3	2



Used G.E. 0–500 milliammeter, $2.75—New ones	$3.75
Crocker-Wheeler Aero. Gen. (extension shaft for attaching to any motor, del. 25 volts and 275 volts, each	2.39
Eveready UX245 power amplifier unit	8.75
RCA 1000-watter UV-851, NEW, $200.00—SL. USED AND GUAR.	69.00
RCA 250-watter UV-204A, NEW, $69.00 — Sl. Used	38.00
RCA UV-211, NEW, $15.00 — Used	10.95
Mercury Vapor UX-280 (588 type)	1.10
Cunningham Mercury Vapor 82, new type	.69
Pilot A.C. Super Wasp, slightly used with pack	26.50
New Pilot Wasp D.C. Kit	21.00
Esco 2000-volt 300-watt Motor Generator (3 units), Cost $260.00 — SPECIAL	75.00
Arsco 5-meter receivers, fully wired assembled, built to QST, 1931 specif., Super regen., $17.95—In kit form	**12.00**
Arsco Junior model 5-meter transmitter, Push-Pull, built to QST, July 1931, specif., $8.95—In kit form	**5.00**
Arsco mounted, shielded sin. button mike transformers	1.95
Double button microphone transformers	2.95
5-meter Super Reg. rec., oscillator coils	.90
DeForest 510–15 watters, new	4.20
1 only 1P-500 receiver with Cardwell detector and two-stage amplifier, tunes 600–6000 meters	65.00
Tube and coil shields, 15c each — 5" x 9" x 6" metal cabinets	.95
Kodel microphone cases, easily made to fit any mike	1.49
Milliammeters, black flange type, flush mounting, 25, 50, 100, 150, 200, 300, 400 mills	.65
AC voltmeters, 0–10 or 0–15 volts, each	1.50
Thermostats for crystal ovens	.95
Right angle thermometer (bent) for Xtal ovens	1.65
Arsco Junior TNT 245 transmitter complete with power supply and tubes ready to go	13.95
Arsco Sr. push-pull 245 transmitter complete power supply and tubes	18.95
Arsco 2 tube Junior Receiver with 2 volt tubes	8.75
Jewell 0–100 volts DC meter, $4.00 — Weston pattern 301 0–50 milliammeters	3.75
Arsco Temperature Control Ovens comp. with crystal ground to frequency holder, $13.35 — Oven only	9.25
Standoff insulators, 10c each — Per dozen	.75
REL short-wave receivers	26.00

NEW PHONE BAND CRYSTALS!

Crystals ground to any frequency you specify, also the new 3900–4000-kc. fone band. FREE moulded bakelite dustproof, adjustable holder — extra special	$4.50
Your present phone crystals exchanged for new bands	2.00
Your pet crystal ground to any higher frequency	2.00
Arsco finished and oscillating crystal blanks, guar.	2.00
Arsco unfinished blanks, guaranteed	1.20
Arsco bakelite, dustproof, adjustable crystal holder	.89
Arsco same as above, but plug-in crystal holder	1.15
Arsco comm. precis. plug-in Xtal holder, beautiful job (G.R. plugs)	1.50
Relays, Arsco unmounted, 1000 uses, will follow — 40 WPM, double one-eighth inch contacts	.79
New Samson Pam 16–17 Amplifiers	25.00
Heavy duty MV 866 tubes, guaranteed 1st quality	**2.50**
Extra heavy duty MV 866 tubes, our own Arsco brand, 1000 hrs. unconditional guarantee	**3.35**

ARSCO TRANSMITTING CONDENSERS
One Year Unconditionally Guaranteed

1500 volt	*2000 volt*	*3000 volt*	*3500 volt*
1 mfd...$1.95	1 mfd...$4.50	1 mfd...$8.50	1 mfd...$9.50
2 mfd... 3.50	2 mfd... 6.50	2 mfd...12.50	2 mfd...14.00
4 mfd... 5.25	4 mfd...12.50	4 mfd...22.00	4 mfd...26.00

Very sturdily built, finest material, all cont. working d.c. voltage

600 volt	*800 volt*	*1000 volt*
1 mfd.....$.20	1 mfd.....$.30	1 mfd.....$.50
2 mfd.....25	2 mfd.....40	2 mfd.....70
3.5 mfd.....35	3.5 mfd.....50	3.5 mfd.....1.00
4 mfd.....40	4.5 mfd.....60	4 mfd.....1.50

The New National SW3 d.c. or a.c. New National SW5 d.c. or a.c. National power pack and all other National products in stock.

Write for Lowest Prices in the Country

Mercury Vapor 280M tubes	$1.00
Genuine new Pilot Universal all-wave Super Wasp A.C. complete in cabinet, list, $95.00 — 6 tubes, special	32.50
New type R3 rectobulbs, each	6.00
New type R-81 rectobulbs, each	3.50
Arsco calibrated monitors with three coils and individual calibrated charts, tube	9.35
Arsco Calibrated wave meters, $6.25 — Arsco R.F. transmitter chokes	.50
Arsco 50-watt sockets, 95c — 75-watt sockets, $1.35 — 204A sockets	1.95
Arsco socket for 212A or D tubes	3.50
Universal microphones, Model X, $5.65 — Model BB, $14.00 — Model KK, $28.00 — Model LL	40.00
15-dial omnigraph, used, $12.50 — 5-dial omnigraphs	6.50
Write for special prices on Cunningham tubes.	
Silver Marshall Round-the-World Four, $17.50 — National 4-tube Thrill Box	17.50
Arsco 1000-1500 volts each side C.T. 375 watts	8.00
Arsco 1500–2000 volts each side C.T. 850 watts	11.00

ARSCO FILAMENT TRANSFORMERS

2½ volt 10 amp.....$2.25	10 volt 6½ amp.....$2.25
5 volt 10 amp..... 2.25	11 volt 6½ amp..... 2.25
7½ volt 7 amp..... 2.25	12 volt 3½ amp..... 2.25

Power transformer, Arsco, with voltages: 575 each side of C.T. 2–7½ v. C.T. filament winding, 1–2½ v. 12 amp. C.T. winding, special	5.00
Power transformer, Arsco, with voltages: 350 each side of C.T. 2½ volt 12 amp. fil. winding, 5 volt, C.T. filament winding, special	3.75
National coils for SW-3 or 5 up to 2000 meters	SPECIAL
Monitor cans 5 x 6 x 7 covers drilled, ready to go	1.20
UX 222, UX 210, UX 250, special guarantee	.95
Duraluminum .001" and .002" thick, SPEC., 80c per 6" square for condenser mikes.	
Arsco fully mtd. 1500–2500 v. each side of C.T. 850 w	14.20
G.E. 5-watt tubes for 5-meter work, made for U. S. Coast Guard, Spec., 3 for	1.00
281 Mercury Vapor tubes, $1.95 — Genuine Brandes Superior phones	1.49
Pilot or Silver Marshall blank coil forms	.33
Flechtheim 2-mfd. 1500-v. cond. (Pigtail leads), list $8.50—$3.25; 4-mfd. 1500-volt cond. Porcel. insul.	6.50
Anti-capacity switches, 90c each — Latest Amateur Call Books	.80
Electric soldering irons, 95c — Arsco 10,000-ohm 100-watt trans. leaks	.69
25,000-ohm 100-watt bleeders	.79

Western Electric 211E's, Slightly used, each $3.89

INCLUDE POSTAGE WITH ALL ORDERS AND 20% DEPOSIT AGAINST C.O.D. SHIPMENTS

OPEN EVENINGS

Visit Uncle Dave's New Radio Shack When in Town. Good Time Assured, hi! Four Story Building with over 35,000 square feet of space, devoted to nothing but parts. For Goodness' sake, what do you need? We sure got "it." — What have you for sale or trade?

Write for FREE HAM Sheet

WE CARRY EVERYTHING FOR THE HAM IN STOCK — MORE FOREIGN TRADE SOLICITED

We also carry a tremendous stock of used parts, etc. Write in on special requirements and we shall be pleased to take care of you.

UNCLE DAVE'S RADIO SHACK

356 Broadway — *Long Distance Phone 4-5746* — ALBANY, NEW YORK

VHA-VMZ	VK	Australia	5	3
VOA-VOZ	VO	Newfoundland	3	2
VPA-VSZ		British Colonies & Protectorates		
	VP[6]	Bahamas	5	3
		Barbados	5	3
		Jamaica	5	3
	VP	British Guiana	5	3
	VP1	Fiji	5	3
		Ellice Islands	5	3
		Zanzibar	5	3
	VP2	Bahamas	5	3
		Barbados	5	3
		Jamaica	5	3
	VP4	Trinidad	5	3
	VP9	Bermuda	5	3
	VQ1	Fanning Island	5	3
	VQ2	Northern Rhodesia	5	3
	VQ3	Tanganyika	5	3
	VQ4	Kenya Colony	5	3
	VQ5	Uganda	5	3
	VS1	Malaya Straits Settlements	5	3
	VS2-3	Malay States	5	3
	VS6	Hongkong	5	3
	VS7	Ceylon	5	3
VTA-VWZ	VU	British India	5	3
W	W	United States	2	1
XAA-XFZ	X	Mexico	3	2
XGA-XUZ	XU[7]	China	5	3
YAA-YAZ	YA	Afghanistan	5	3
YHA-YHZ	YH	New Hebrides	5	3
YIA-YIZ	YI	Iraq	5	3
	YK	Formosa	5	3
YLA-YLZ	YL	Latvia	5	3
YMA-YMZ	YM	Danzig	5	3
YNA-YNZ	YN	Nicaragua	3	2
YOA-YPZ[3]	[OV]	Roumania	5	3
YSA-YSZ	YS	El Salvador	3	2
YVA-YVZ	YV	Venezuela	3	2
ZAA-ZAZ	ZA	Albania	5	3
ZBA-ZHZ[3]		British Colonies	5	3
	ZC1	Transjordania	5	3
	ZC6	Palestine	5	3
	ZD	Nigeria	5	3
	ZE1	Southern Rhodesia	5	3
ZKA-ZMZ	ZL	New Zealand	5	3
	ZK	Cook Islands	5	3
	ZM	British Samoa	5	3
ZPA-ZPZ	ZP	Paraguay	3	2
ZSA-ZUZ	ZS, ZT, ZU	Union of South Africa	5	3

[3] Provisionally assigned by the Berne Bureau.

[4] Amateur stations are not licensed in the Canal Zone; these are a special military classification using the prefix K5 for convenience sake, but without the regular official sanction. NY is also used.

[5] EU is the prefix actually used (AU in Siberia). See Note 1.

[6] Amateurs in these countries using the prefix V1 would be better advised to conform with the VP district practice, and use VP2.

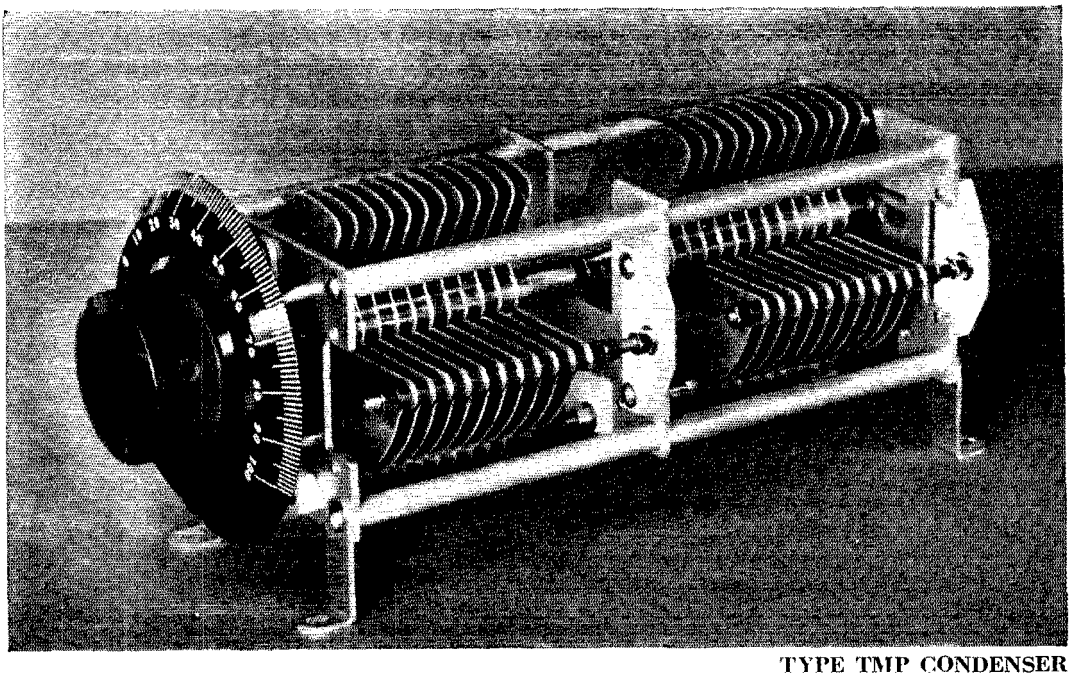
[7] AC is customarily used; see Note 1.

The letter oz. rate applies to each ounce or fraction thereof in the case of the 2- and 3-cent rates; the 5-cent rate is for the first ounce, each additional ounce or fraction being 3 cents. The rate for double post cards is, of course, twice that for single cards.

From the above it can be seen that about 135 countries have designated prefixes, either from the accepted Berne distribution or developed through amateur usage. If there are any other countries not listed above, that you feel should be included, kindly inform this department. Incidentally, this list might be regarded as an unofficial standard against which "countries worked" can be checked.

Strays

W4AFG has a suggestion that should interest members of the ham fraternity who are also



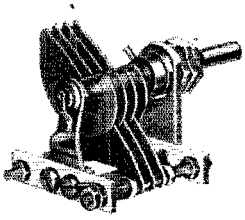
TYPE TMP CONDENSER

NATIONAL TRANSMITTING CONDENSERS
with the Polished, Round Edge Plates

THESE condensers are especially suited for push-pull transmitters working at 56 MC, and for "High C" circuits. They are built on the standard NATIONAL TM Transmitting Condenser Frame, which has been employed with complete success for a number of years, and is designed to maintain the electrical characteristics of the condenser under wide variations of mechanical strain and temperature.

Plates are made of heavy gauge polished aluminum with well rounded and polished edges to reduce corona losses, for uniform electrostatic field, and for uniform surface resistance.

Insulation is CROLITE or ISOLANTITE placed where the field intensity is at a minimum. As a result, dielectric losses are exceedingly low.



TYPE SEU DOUBLE SPACE CONDENSER

Isolantite Insulation. *Heavy* 270° plates, polished and rounded, double spaced. Insulated front bearing, constant low impedance pigtail, standard capacity 25 mmf. For ultra S.W. tuning or neutralizing in low power transmitters.

SPECIFICATIONS

Type No.	*Each Section Capacity*	*Voltage Rating*	*Plate Spacing*
TMP-230	.00023	3000	3/16″
TMP-100	.0001	3000	3/16″
TMP-100A	.0001	6000	3/8″

Write for NEW LOW PRICES and our SPECIAL BULLETIN No. Q-6 on Amateur and Transmitting Equipment.

NATIONAL COMPANY INC.
ENGINEERS AND MANUFACTURERS
61 SHERMAN ST., MALDEN, MASS.

service men. Blown condenser blocks from b.c. receivers will nearly always be found to have a good section or two, and such sections can be assembled in series-parallel to make high-voltage condensers for the low-power transmitter. Perhaps some hams who aren't service men can pick them up from radio stores and make up a filter for practically nothing.

Silent Keys

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

William F. Bell, W9GWU, Plymouth, Ill.
J. M. Burke, Sr., W4ZW, Cedartown, Ga.
G. G. Galletti, ACSGG, Shanghai, China.
Charles H. Horton, W1MS, Manchester, N. H.
Carl H. Kaempfer, ex-9DJY, West Bend, Wis.
Dan L. McFarland, W6BNC, Duarte, Cal.
D. L. Thompson, VE4HO, Regina, Sask.

A Useful Calculator

ALTHOUGH cut-and-try always has, and from necessity always will play a part in the design of tuned circuits for the amateur bands, a good deal of it can be saved if we can know in advance such things as approximately how many turns to put on a coil form to cover a given amateur band with a condenser of known maximum and minimum capacity, or what frequency range we can expect to cover with a given coil and condenser. Formulas are always available, of course, but leave many chances for errors in arithmetic, and besides it's generally "too much trouble."

All the work has been taken out of these computations in a calculator recently designed and marketed by W. P. Koechel, W9BNE, of Owensboro, Ky. The frequency range covered is from 500 to 150,000 kilocycles (2-600 meters). Inductance values may be determined within the limits of 1 and 1000 microhenrys, including coil diameters between ½ and 5½ inches and coil lengths from ¼ to 10 inches, wire sizes from No. 0 to No. 36, and from 1 to 120 turns per inch. The capacity scale runs from 1 to 1000 $\mu\mu$fd. The amateur bands are specially set off on the frequency scale.

The "Lightning Radio Calculator," as it is called, undoubtedly will save a good deal of time and trouble for those who like to build things. The specifications obtained from its use are surprisingly accurate, especially in view of the small quantities involved in high-frequency tuned circuits and the effects of stray capacity and inductance.

— *G. G.*

That April Sale Went Over BIG—

Hundreds of our customers have begged us to extend the time limit. April prices will hold good on whatever merchandise we still have left from the big sale. Write us quick—if you need anything.

Telegraph Key Navy Type List $3.60

Navy knob — 3/8" Tungsten contacts. While they last..... **$1.25**

Genuine Type C Baldwin Phones

$12.00 List — Mica diaphragm. Limited quantity—only 2 pair to a customer. Special..... **$3.95**

Erpe imported 4000 ohm feather weight phones. Special..... **$1.75**

$5 Eiseman Head phones; 2500 ohms; brand new; complete with head band and cords..... **1.00**

Hammarlund COMET PRO

An 8-tube short wave custom built, high frequency, super-heterodyne; 14 to 200 meters. List $150.00 without tubes. Our special price... **$88.20**

8 DeForest tubes. List $9.20. Special net..... **$4.14**

We carry complete line of Hammarlund parts at lowest wholesale prices.

Duovac — 203A — 50 watt tube, only firsts, tested before leaving our store. Extra special **$10.00**

At Last a Band Spread **Monitor Frequency Meter** employing 230 tube; electrostatically and magnetically shielded in a crystalline finished steel box, with an easily removed cover; 80 division spread on 80; 35 on 40 meters; 20 spread on 20 meters. Complete with batteries and DeForest tube..... **$9.95**

Amplion imported, large, type A.R. 19 brand new magnetic horn unit. Bought from Custom house. Regularly sold for $15. Special..... **$1.00**

Small short wave R.F. honeycomb choke. 60c list. Now each..... **.19**

R.F. detector plate choke..... **.25**

Plug-in coil forms, 4 and 5 prong; fits standard sockets, marked with different colors at top; each..... **.20**

Amrad Midget variometer as described in Short Wave Craft, each..... **.50**

Black Crystalline finished steel monitor can with removable cover..... **1.25**

National factory wired S.W. 3; A.C. or D.C. Less coils..... **$20.88**

National factory wired S.W. 5; D.C. Less coils..... **38.22**

National factory wired S.W. 5; A.C. Less coils and pack..... **40.87**

All type National coils can be bought singly or in pairs at lowest wholesale prices. Write for Details

LITTLEFUSES—Complete assortment of sizes at Special Prices

Leeds 888 — A tremendous response to our introduction of the new 888 rectifier described in our April advertisement indicates a general change to this remarkable rectifier tube in all but the largest power supplies is in order. Sold at $2.00 each with a 30 day guarantee..... **$2.00**

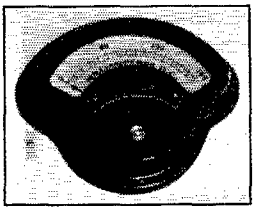
LEEDS 866 Mercury Vapor Tube..... **2.95**

Dubilier Dry Electrolytic Condensers

8 mfd. Special..... **$ .60**

8-8 mfd. Special..... **1.10**

8-8-8 mfd. Special..... **1.60**



WESTON METERS

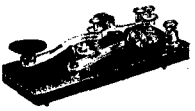
Model 267 — List $16.25

Front panel mount. There are only a few of the following numbers left.

0–15 V.D.C..... **$3.95**

0– 20 M.A.D.C.
0– 30 " " "
0–150 " " " } **$5.00**

Other sizes at **$16.25** net



$2.00 List Franklin Transmitting Key

Mounted on base without switch. Big special **85c**

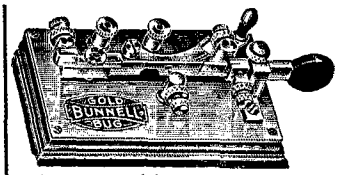
A New 5 Meter Transmitter

Described fully in the May issue. Completely wired and tested. **$12.45**

Western Electric Mike Cord

Reg. $19 for outdoor use over gravel, pavement, or in water. 3 wire, cotton braid, braided copper shield, heavy rubber cover over all; 1/4 inch in diameter. Sold in 100 foot lengths only. Our special price $6. Get yours while they last.

$6



No. 398 Gold Bug Automatic Transmitting Key

$12.50 List. Simple in construction, correct mechanically, and electrically rugged and durable 3/32" contacts, complete with cord and plug. Brand new in original cartons. While they last..... **$4.45**

No. 10202 Extra heavy 3/16" contact..... **$5.45**

Esico Electric Soldering Iron

Just secured a large quantity of these 85 watt soldering irons. Long life, well made, guaranteed. Usually sells for double our price. Special..... **$1.75**

Standard 50 watt soldering iron... **95c**

The time-tried Super-regenerative receiver. See May 1932 issue for details. Complete kit... **$13.95**

Wired and tested baseboard model..... **$19.95**

Ward Leonard Midget Relays

See our May 1932 advertisement for description and special prices.

R.E.L. No. 278. Band Spread Receiver — The loud speaker signals this set brings in clearly from everywhere are almost unbelievable. Contains 18 important features. Complete with 20–40–80 meter band spread coils. Specially priced..... **$26.45**

Other coils available. Write for complete data

Two DeForest No. 436 tubes — One DeForest No. 438 tube. List $2.75 each. Now $3.72 net for 3 tubes.

LEEDS Crystal Control Equipment

Crystals, Y cut, guaranteed within 1/10 of 1% of specified frequency, in 160 or 80 meter band..... **$4.50**

Oscillating Crystals, Y cut, completely finished, just outside the 80 meter band..... **2.25**

Crystal holder, dustproof, usually $2.50. Now..... **1.89**

Crystal holder, dustproof, type A— usually $3.50. Now..... **2.25**

$10 precision type..... **3.45**

Filament Transformer 2 1/2 v. 10 amp for 27 and 24 tubes only. Special..... **$1.25**

Leeds mounted 866 filament transformer; 2 1/2 v. at 10 amps, 10,000 volt insulation..... **$2.95**

Leeds mounted filament transformer; 7 1/2 v. center tapped; 5 amps..... **$2.95**

Leeds special 866 filament transformer; our latest model; steel encased with Bakelite panel at top; tapped primaries; 2 1/2 v. 10 amps. 10,000 volt insulation..... **$3.95**

For other transformers see April issue.

Hundreds of other items at Big Special Prices. Constant changing of prices and merchandise makes it impossible for us to issue a catalog. Let us quote you on your needs

LEEDS — The Home of RADIO

45 Vesey Street, New York City

New York Headquarters for Transmitting Apparatus

WHEN IN TOWN VISIT OUR STORE

MAIL ORDERS FILLED SAME DAY

10% Cash
Must Accompany All
C. O. D. Orders

New England Division Convention

"PROVIDENCE HO!" was the cry of New England Division amateurs as the long awaited dates came around and the trek started to their annual convention held April 8th and 9th (Friday and Saturday) at the Biltmore Hotel, Providence, R. I., under the auspices of the Associated Radio Amateurs of Southern New England.

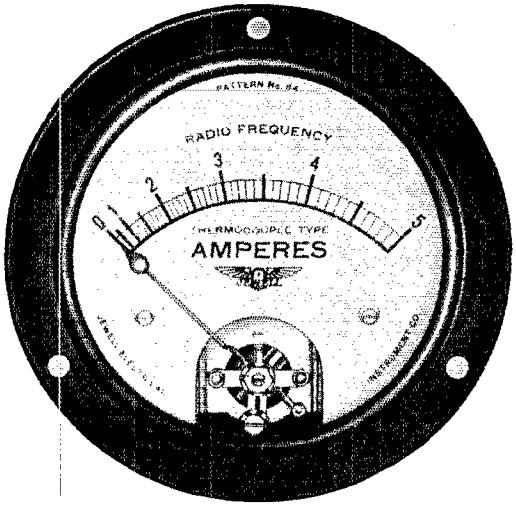
The delegates began to assemble Friday morning and by early afternoon there was a sizable group registered. Activities started with a word of welcome by H. W. Thornley, W1AMD, President of the A.R.A.S.N.E. A "Communications" meeting was conducted by ACM Battey, A.R.R.L. This was followed by a discussion on "Neon Lamps" and other types of tubes by H. T. Himeon, Triad Tube Company. Lt. P. G. Haas, U.S.N., put in a timely word regarding the U.S.N.R. while Major J. C. Platt, U.S.A., upheld the honor of the A.A.R.S. Ensign Young, W1CAB, commented briefly on U.S.N.R. work in Rhode Island. R. Y. Chapman, W1QV, gave an impromptu talk on the causes of and cures for "Power Line QRM." L. S. Fox, National Carbon Company, brought the afternoon session to a close with an instructive description of a low-powered all-battery-operated transmitter.

Friday evening was devoted to contests and stunts, and there was something for everyone. Woody Darrow, W3JZ, in a manner common only to "Woody," explained a sure-fire (?) method for ending the "depression" by the use of "radio control." W1QV presented an amusing skit in which he demonstrated his portable trans-receiver and the untold value of such portables to the "traveling man." The Springfield Radio Association presented a short "comedy-playlet" entitled "The Radio Inspector." An alumni meeting of the R.O.W.H. was held late in the evening — "behind closed doors." Hamfesting lasted well into the wee sma' hours.

Saturday morning found license aspirants bent over the Radio Supervisor's examination table, and over sixty passed the ordeal! A trip over the city by airplane proved a big attraction to many of the gang. Others inspected the Triad Tube Company's plant, and local ham stations.

A 56-mc. demonstration under the leadership of John Dwyer, W1AOX, started the afternoon session. Two-way 56-mc. communication was maintained with local amateurs from a station at the convention hall, and part of the conversation was broadcast over local BC station WPRO. Lt. Reinartz, U.S.N.R., W1QP, gave a lantern-slide lecture in which he told of his experiences as radio operator in the far north with the MacMillan Expedition. A worthwhile talk on the various types of modulation was given by Professor Andrews of Brown University, after which the gang had a better conception of just what happens in the modulator. A meeting devoted to the interests of the 'phone man was held under the supervision of C. N. Kraus, W1BCR, and Walter S. Rogers, W1DFS. L. W. Hatry of Hatry

Going fast—nowhere !



That's just what is happening to the power in transmitters not provided with adequate regulating and indicating equipment.

With Jewell Instruments in the critical power circuits of your transmitter, you can always tell whether every circuit is operating at maximum output — and, too, you can quickly observe dangerous overloads before valuable equipment is damaged.

"The Transmitting Trio"

Jewell Patterns 68, 78, and 88, 2¾ inch case diameter instruments embody every mechanical and electrical need of the amateur transmitter. With the addition of the Pattern 88 Rectifier Type A. C. Instrument, the famed Jewell "Transmitting Trio" is being chosen for more amateur transmitters than ever before.

Write for the complete list of ranges available in the Jewell "Transmitting Trio."

Pattern 88 Direct Current

Single and double range voltmeters
High resistance voltmeters
Ammeters, milliammeters, microammeters
Rectifier type A. C. voltmeters

Pattern 78 Alternating Current

Single and double range voltmeters
Ammeters, milliammeters

Pattern 68 Radio Frequency

Thermocouple ammeters, milliammeters

Jewell Professional Radio Service Equipment

Radio servicemen find that greater profits and increased customer confidence result from the use of Jewell Radio Service Instruments. Write for the latest catalog showing the complete line of 1932 instruments.

32 YEARS MAKING INSTRUMENTS

JEWELL

JEWELL ELECTRICAL INSTRUMENT COMPANY
3 Haynes Avenue, Newark, New Jersey

Gentlemen:
Please send me descriptive literature on the following items:

- ☐ The "Transmitting Trio"
- ☐ Pattern 444 Set Analyzer
- ☐ Pattern 563 Oscillator

Name .....
Address .....
City ..... State .....

& Young reviewed the qualifications for new 'phone license. A general discussion wound up the afternoon session.

Everyone was on time for the Banquet, and after the Pawtucket High School Band had paraded around the banquet hall, and demonstrated how a band should "band," all proceeded with no further ado to the business of partaking of "one swell feed." A "red hot" orchestra kept the gang in proper spirits throughout the "eating period." Toastmaster Hebert introduced the various speakers, with A.R.R.L. President Maxim delivering the principal speech of the evening. Radio Supervisor C. C. Kolster tendered a few friendly words of advice in "amateur to amateur" style. The anxiously awaited prize distribution and drawing followed the speeches, and many a ham went home well pleased! Hartford was chosen as the seat of next year's convention, and with an expression of appreciation to the committee which staged such a splendid convention, the 1932 A.R.R.L. New England Division Convention was officially closed. C U in Hartford next year!

— *E. L. B.*

The Midwest Division Convention

THE Hotel Yancy, Grand Island, Nebr., was the Mecca of Hamdom on Saturday and Sunday, March 26th and 27th, respectively. Everyone was amazed at the large attendance, and the registration committee was kept busy. Dr. E. C. Johnson, president of the Chamber of Commerce, gave the welcome address. Director Kerr responded for the division. Mr. Francis M. Baer gave an illustrated lecture on radio geophysical explorations and discussion drew out the possibilities for amateurs to follow this line as a vocation. Mr. George K. Rollins from the Monitor Station followed, with a talk on the work of recording both amateur and commercial stations. The convention was fortunate in having Prof. J. C. Jensen of Wesleyan University, Lincoln, who spoke on plate supply and filters.

The Radio Division was represented by Mr. William McDonnell, who was kept busy with examinations. L. B. Laizure, S.C.M. for Missouri, whose great interest in the Volunteer Communication Reserve is well known, made extended remarks on the U.S.N.R. Lieut. H. P. Roberts, U.S.A., and three ops from W9BNT, were present, and "YX" can always be depended upon to say the right thing. The Banquet was fully enjoyed and gave a chance for several other speakers to be heard, amongst which Bill Graham of the Omaha *World-Herald*, E. R. Wightman of Doane College, Louis Leuck, W9ANZ, SCM Hansen of Iowa and SCM Wallace of Nebraska. The latter was presented with a silver loving cup, donated by the Grand Island Chamber of Commerce to the amateur who had done the most for the Nebraska amateurs. The award was such a surprise to Sam that it left him speechless.

A number of questions were asked of Director

Kerr during the convention and answered fully. A wonderful trip was made to the monitoring station where Mr. Wolf and his assistants extended a cordial reception and for which the thanks of the delegates are herewith given.

With the distribution of prizes, for which thanks go to the manufacturers, the convention came to an end with appreciation to the convention committee.

— *H. W. K.* — *A. A. H.*

Calls Heard

(*Continued from page 43*)

vk3hl vk3tm vk3zx vk4ou vk5wk vk7ch x1d x9a zl2ab zl2ci zl2fe zl3cc zl3ex zl3dn zl4ba

14,000-kc. band

ear9 ear96 g5yh x1aa

W5ADZ, Bradfield Beard, 3030 Quenby Rd., Houston, Texas

14,000-kc. band

b7x ce1ai ce7aa cm2cf cm2jt cm2op cm2sv cm2xr f3mta fp6yt hc1fg hi8x hj1ak ear96 ear185 k4ug k4rj k5aa k5ab k5ac k5ad k5ae k6aja lu1ba lu2ca lu3fa lu4da ny1aa ny1ab oa4j oa4u oa4z oa5p on4wk py1ba py2bn py2aj rx1aa ti2ea ti2fg ti2rc ti2tao ve1dq ve2be ve2ch ve2ca ve3bm ve3fw ve3gs ve3hw ve3jv ve3rf ve3wm ve4au ve4az ve4dk ve4ft ve4is ve4hu v1bb vp1ja x1aa x1af x1ax x1b x1d x3a x9a xla1s zpi3x zxa4a

7000-kc. band

cm2lc cm2mm cm2op cm2jt cm2sf cm2ss cm2sv cm2wd cm2ww cm2jm cm5ag cm5ea cm5fc cm6cp cm8az cm8yb ear96 ear224 fa5 hc1fg hh7c hi8x j1ee j1ec j1ek j1ep j1dm j1do j1dy j3dk j5cc k4rk k4rj k4ry k4ug k4aop k5aa k5ab k5ac k5ad k5ae k6alm k6aug k6auq k6baq k6dsf k6ebr k6etf k7atf ka1cm ka1co ka1lg ka1jr kdv5 kdz5 kgeg lu2la oa4d oa4u om1tb om2ma om2tg *on2tn* rx1aa ti2fg ti3la ti5fi ve2ca ve2eq ve2dr ve3bm ve3bv ve3cf ve3eo ve3gt ve3hc ve3ha ve3ib ve3it ve3ih ve3ij ve3kj ve3ll ve3nr ve3oc ve3rf ve3tm ve3wk ve3yh ve3zz ve3fa vk2tx vk2dr vk2bv vk2pz vk2hq vk2hm vk2oc vk2ic vk2no vk2bu vk2br vk2xf vk3rg vk3jt vk3wl vk3rj vk3kn vk3or vk3hl vk3wz vk3cw vk3mx vk3ml vk3aj vk3tm vk3rs vk3cx vk3hl vk3xi vk3lz vk4ju vk4us vk4wt vk4wx vk5wi vk5aw vk5rh vk5wr vk5gr vk6fl vk6wi vk6gf vk6jk vk6rx vk6rl vk6wm x1aa x1ax x1d x1g x1m x5c x3a x9a x21a x23a x29b z11ar zl2be zl2gr zl2cu zl2gw zl2gq zl2hi zl2gn zl2gs zl2cw zl2cl zl2jx zl2kl zl3ct zl3cs zl4db zl4xc

Homer Biedebach, 560 N. Garfield Ave., Pasadena, Calif.

3550-kc. 'phone band

(Heard from October to March)

k6baz k7kn w1avk w1bes w1bje w1cbx w1crw w1id w2aih w2ahp w2fi w2go w2hs w2kr w3aex w3ahq w3ain w3aqr w3aqt w3avl w3bms w3buf w3ccf w3gy w3hm w3vu w3zj w4aad w4acz w4aed w4aja w4amq w4axz w4bam w4fi w4lb w4lj w4lu w4mk w4mv w4sg w4tm w5aan w5abf w5agp w5ais w5aji w5ajo w5alf w5ali w5anb w5anw w5anx w5aru w5atb w5atc w5ato w5avt w5azq w5bbl w5bex w5bg w5bgf w5bhu w5bie w5bmn w5boo w5bpl w5bpp w5bqx w5btb w5bvz w5bxo w5gg w5gy w5id w5js w5ks w5kx w5pp w5yh w8aeo w8akw w8arq w8awq w8axb w8bae w8bkb w8bmi w8bre w8bxb w8byr w8cfu w8chp w8ddd w8dfv w8dk w8eym w8fuk w8fwe w8fee w8feq w8go w8il w8nx w8rl w9aai w9ade w9aei w9aeq w9aev w9avb w9axz w9bei w9bhm w9blr w9blx w9bnx w9bxr w9cdm w9cgh w9cjc w9cjj w9ckz w9cmn w9cmz w9cns w9cou w9czm w9daq w9dcx w9dhi w9dhx w9dqs w9drq w9drs w9dsd w9dtp w9edl w9edw w9ehd w9eim w9eo w9eod w9esl w9etd w9evq w9exj w9fcm w9fhw w9fke w9flt w9fqu w9frp w9frq w9fuj w9fwr w9gcu w9gfq w9ggn w9ggt w9gim w9gju w9gku w9gmf w9gmv w9gob w9goy w9gqh w9gs w9gyk w9hdt w9hmr w9hnj w9hvi w9hyo w9iu

w9pv w9qc w9yh ve4cg ve4gm ve4gd ve4hq ve5ai ve5bw ve5ef ve5er

W2AQQ, Alfred W. Hecht, 285 Lincoln Ave., Cypress Hills, Brooklyn, N. Y.

14-mc. band

cm1pw cm2jt cm2mg cm2op cm2ww k5aa k5ae py1cr ti1rc ve4bq ve5fx vp2pa w6dre w6ebo w6eqb w7bgh w7rg

7-mc. band

cm1cm cm2jm cm2lc cm2na cm2og cm2rd cm2sv cm2wa cm2wd cm5fc cm5of cm8yb cn8md ear185 hc1fg hi1l k4aan k4ry k5ab kfr6 la1s py1ff sm7rv ti2fg ti3la ve9sj vk2oc vk3wl vk3wp w6afy w6cuh w6cut w6cvf w6cxw w6ddd w6ebg w6fcl w6gn w6mv x1aa x9a xla1s z1lar zl2bx zl4ao zl4ap

3550-kc. 'phone band

w1abz w1bes w1ls w1sl w2acg w2acr w2au w2cqn w2lv w2rq w4fk w4hn w4ib w4mu w4qz w4tm w5anw w5bho w8rs w9ark w9bhm w9cju w9drs w9ehd w9etq w9gxi

W9DLW, Ross J. Konchar, 6602 N. Ashland Ave., Chicago, Ill.

7000-kc. band

cm1oe cm2jm cm2xa cm2sh cm8yb f8er kfr6 k4dk k6dcu k6vw k7afx nn7c vk2oj vk3es ve1br ve2am ve2ce ve3bw ve3dd ve3bk ve3gt ve3gf ve3kp ve4ho ve4fd ve4gq w6awg w6ati w6ax w6axm w6ayg w6ass w6bzr w6bdn w6bik w6bkx w6by w6byb w6btk w6cqz w6ceo w6cbp w6cdv w6cih w6cbr w6ctk w6cjn w6czk w6car w6ccx w6ccz w6dkc w6dpj w6dcu w6djj w6dgv w6exq w6eab w6egm w6emk w6eva w6ewf w6epz w6ebg w6ecc w6bpj w6drx w6fbi w6lo w6oj w6ph w6sc w6wb w6yb w6ye w7ahw w7aag w7afb w7aao w7bg w7bd w7mb w7mo w7vww w7vy w7zze

14,000-kc. band

cm1fm cm1by cm2sh cm2ay cm2cf cm5cx cm8uf f8fo g2nh hc1fg k4kd lu4da oa4q oa4z py1cr py2az py2bq py2qa ti2fg vo8z xw2ll ys1fm ce3cn cn8mi w6asd w6aqj w6awy w6bjn w6bsn w6bax w6bxv w6bpj w6cxw w6czs w6dln w6dhp w6drx w6ejt w6ejc w6eu w6eug w6etr w6wi w6vz w7aew w7afx w7pv w7vy

3500-kc. 'phone band

w1aby w1aox w1cu w1id w2abf w2asq w2abk w2aih w2bca w2cbe w2cay w2hy w2hs w2lo w2qx w3aex w3ain w3aqj w3aqi w3bca w3bqb w3oo w3zj w4ap w4ala w4bs w4aad w4fa w4ib w4lu w4mu w4pw w4rw w4rs w4tm w5abf w5acq w5abo w5awg w5aem w5aki w5ali w5btm w5bbm w5id w5kx w5ql w6cjq w6cz w6can w8aou w8ahz w8agh w8apj w8arw w8bke w8bye w8bic w8bfx w8azo w8bri w8bgc w8bdq w8bso w8bbz w8bwh w8bxy w8bjg w8bxm w8cwu w8drt w8dec w8cye w8cym w8cul w8cpk w8ce w8chp w8ccw w8cbg w8dce w8fm w8gie w8ih w8pw w8rd w8rw w8tw w8tca w8wf w9acu w9aai w9ajh w9aas w9aei w9ata w9bfe w9bmm w9bag w9bnw w9byt w9bde w9bfo w9bbw w9ckw w9cku w9cgd w9cii w9cmz w9dcq w9daq w9dgb w9dkm w9emf w9eso w9epd w9eng w9etz w9ewx w9etd w9fua w9fuu w9flz w9flm w9fqu w9ffz w9fcl w9ful w9fdq w9gw w9gku w9gay w9ghx w9ley w9mm w9ceg w9paz w9qi w9usl

14,000-kc. 'phone band

w1axa w1bjd w1gr w1id w1uh w2amh w2aso w2ba w2bbo w2qn w3dy w4agr w4uj w5mm w5ql w6aj w6ahp w9def w9ld ve1dq ve4ar

W6EOH, 4785 W. Pt. Loma Blvd., Ocean Beach, Calif.

7000-kc. band

w1abl w1bbq w1biu w1cph w1csy w1kc w1me w1mk w1zg w2ab w2adw w2afr w2alp w2arv w2axp w2bch w2bkt w2bt w2cjm w2ckw w2clc w2cwc w2deo w2dkv w2dm w2doy w2drk w2vh w2wh w2zs w3ahj w3aic w3buy w3cdk w3ceu w3egn w3cjn w3md w3qt w4abw w4ald w4alm w4ajc w4ajg w4ajj w4ajy w4ami w4apj w4aqd w4arl w4fi w4gw w4jg w4kh w4mk w4pbb w4rx w4si w4tj w4ty w4uc w4uv w4ux w4wj w4zh w8ady w8ale w8anw w8bda w8bi w8bjd w8cau w8cbf w8cir w8cra w8ctp w8czt w8dfh w8dj w8djb w8dnp w8dxd w8ela w8euq w8exa w8fap w8faq w8fcq w8fey w8fym w8ib w8je w8si w8wl w8zn w8zv cm2fn cm2ww hh7c j1dm j1de j1ee j1ek j1eo j1ep j1kc j2ce j3dp ka1cm ka1co k6aja k6cmc om1tb oxye pk3bq ti5fi ve3cf

ve3go ve4bq ve4dk ve4gd ve5bh ve5eh vk2oc vk3gj vk3je vk3ka vk3rj vk3wz vk5mb vk5wr vs6ag vs6an x29b z12cu z12gn

W8JB, Edmund J. Papierski, 77 E. Doughty St., Dunkirk, N. Y.

3900 to 4000-kc. 'phone band

(April 1st to April 20th)

ve3oc w1auy w1bes w1bic w1bnr w1id w2acg w2ahm w2amd w2aoe w2asq w2au w2bok w2btz w2bub w2bwg w2cf w2cif w2coj w2dka w2fi w2go w2li w3acv w3aex w3alz w3aqz w3bfz w3ud w3zj w4aad w4acy w4ad w4aee w4fi w4fk w4hn w4ib w4mu w4oc w4pw w4qz w4rs w4tm w4zf w5anw w5awp w5ay w5on w6fdm w7bzb w8afq w8ahf w8aol w8arq w8arw w8ayg w8bgm w8bng w8bwr w8bxb w8ccs w8ci w8cmf w8dk w8ege w8ffc w8fm w8gpk w8ih w8jk w8rd w8rl w8rs w8wm w9aai w9ark w9awn w9bhm w9bpq w9bsz w9chd w9cju w9csh w9cxx w9czi w9czm w9daq w9drs w9ehd w9ej w9etq w9fke w9flt w9fqu w9gii

7000-kc. band

(March 20th to April 20th)

cm1am cm2lc cm2op cm2sv cm2ww cm5fc he1fg he2ea he2jz k4acf k4bu k4ry k5aa k5ab k5ad ve1cy ve4ci ve4dk ve4dt ve4it vp2pa w6acl w6ahp w6aig w6am w6aor w6axn w6ayw w6bau w6bc w6bja w6bkm w6bme w6bqp w6bsv w6by w6cal w6cix w6coe w6cqs w6cuu w6cvf w6cxw w6dfu w6djv w6efc w6egh w6ehy w6eii w6ek w6etg w6etl w6evq w6fbi w6fcl w6fmo w6kh w6ly w6tc w7aho w7ako w7bb w7bjs w7buw w7fl w7vt x1aa x5c

E. D. Miller, U.S.S. "Whippoorwill" Pearl Harbor, Hawii

14,000-kc. band

w5ai w6abb w6am w6bhp w7nr w8cra w9ggy ve5cp j1dp j1dv

7000-kc. band

w1dci w2bxa w3zd w4ajk w5acy w5bez w5bsf w6bdp w6dfu w6ble w6dlu w6clu w6djv w6dip w6cxw w6dva w6dep w6arp w6ahz w6bkl w6ahp w6dsz w6bbc w6ehi w6cri w6dzz w6lr w6bip w6alx w6cal w6ss w6cfi w7arw w7agl w7ait w7axo w7qe w7qj w7lpc w7akq w8zn w8ano w8eik w9bma w9ghx w9io w9gcx w9ga w9ebe w9eul w9fno ve4gd ka1hr ka1jm k7bmc j3dh j3du j1ep j1ea j2cd j1ee j1ed j3cc j3zb j1do j1dr j1ct j3dp j5ce j1dh j7cb j5ew vs6ah vs6ag vs6an vk2sb vk2xu vk2dr vk3zz vk6wi vk2vc vk3ek vk2da vk7jk vk2jz vk3je vk2oj vk2bh vk3or vk2ba vk2ah vk2bu vk2br vk4nl vk4kh vk5gk vk3ka vk2lj vk3tm zl4ap zl3bj zl2cj zl2ap zl3ai oa4u au1kab au1kaa au3ea au8kal au8at ac8we ac8sl ac8hr ae9zc vzx4x xau2pn

CX1FB, C. E. Jucic, La Paz, Colonia, Uruguay

14-mc. band

ce1ai ce7aa py2bn py2aj py2bf py2bq py3aj x1aa x1af x1ax w2fd w2wc w2byx w2vd w3pc w3cfd w3ccf w3apn w3cdk w4agr w4si w5caw w6fal w6azx w6bja w6cjq w6bfc w6ahp w6bc w6so w6asd w6ccz w6am w6yu w6coq w8fua w8zy w8qg w8djv w9gv w9gfz w9dku w9adg

W1CNU, Ralph E. Nichols, P. O. Box 202, Stamford, Conn.

14,000-kc. band

cm2jm cm2lc cm2mg cm2ra cm5by ce1ai earl85 f8bs f8sx f8tv g2bm g2dw g2xh g5aw g5bj g5fv g5la g5pj g6wn g6wt g6wy g6yc g6yk k5aa k5ad k5ae on4bz py2ag py2bq pa0xf ti2db ti2fg ti2rc ti2tao ve4bq ve4ci ve4dk ve4ed ve4fx ve4hr ve4hu ve5cp vp1ja vp2pa x9a ny1ab cm5ry

7000-kc. band

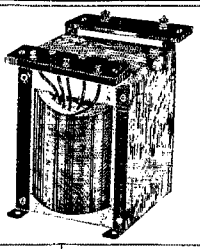
cm2wd cm2lc k5ae ny1aa ti2tao ti3la

Victoria Short Wave Club, Victoria, B. C., Canada

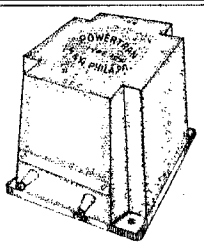
(Heard between March 6th and 19th)

14-mc. band

ce1ai ce7aa cm2jm cm2jt cm2ra cm8az he1fg he2jm j1do j1dp j1ec k5aa k5ae k6bfi k6dmm k7awn k7ez lu1ca lu2ca lu3dh lu4da lu8bz lu8dj lu8djc ny1ab py1ba py2ac py2aj py2ak py2az py2bn py2bo py2bq py2hk py3ad py3wj ti2fg ti2tao ve1dr ve2eh ve3bk ve3bm ve3cm ve3fq ve3gf ve3gj ve3go ve3gs ve3he(f) ve3ib ve3jx ve3wa ve3wm ve3yo ve4ac ve4bq ve4dj ve4fx ve4is ve5cp ve5eg w1ae w1ail w1akv w1bei w1beo w1boi w1bsk w1bxc w1cjd



UNUSUAL TRANSFORMERS



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2212	2½V 10A	7½V 3A			$6.00	$9.50
2213	2½V 10A	7½V 3A	10V 7A		$8.25	$12.00
2214	2½V 10A	7½V 3A	7½V 3A	10V 7A	$10.10	$14.25
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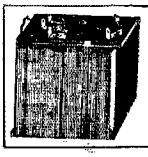

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w1cmx w1cpm w1ddb w1diz w1eqr w1jo w1lz w1mk w1pg w1vc w1wu w1zj w1zp w1zw w2ad w2adh w2adq w2ae w2ail w2ais w2ajg w2ajp w2akk w2api w2apx w2apy w2aqh w2aqs w2atu w2avo w2ax w2bak w2bcx w2bg w2bhw w2bjo w2bok w2bpg w2bqg w2brb w2brl w2bsg w2bsr w2bss w2bux w2byx w2cay w2cfw w2cgj w2cjx w2cta w2ctu w2cwn w2cyr w2ddl w2dgu w2djo w2dk w2fl w2gw w2hf w2le w2rr w2rs w2vd w2wu w3ai w3ana w3apn w3apo w3aqk w3ars w3ayn w3bbb w3bdo w3bet w3bhr w3boy w3bso w3bvn w3ccf w3cdk w3cfd w3cm w3dc w3djy w3fq w3fx w3gw w3ib w3lu w3md w3ne w3on w3pf w3pn w3sm w3vb w3wk w3zx w4abq w4abr w4abz w4adg w4adx w4aji w4ajx w4akh w4al w4ams w4aqu w4arp w4asw w4auu w4auw w4bfk w4ce w4dz w4ej w4hv w4jn w4mi w4mr w4ot w4si w4to w4wi w4wj w4vl w8abd w8abs w8adr w8alb w8alh w8anb w8anr w8ant w8aps w8ayc w8bcw w8bda w8bfg w8bfp w8bhd w8bjx w8bkp w8bl w8bor w8bul w8bwj w8byd w8cap w8ccw w8cie w8cir w8ckx w8cmh w8cpc w8cra w8crb w8css w8cte w8cwk w8xr w8cyl w8cyz w8ded w8dgp w8dhc w8dv w8dvb w8dwu w8ebv w8egc w8eiz w8ekh w8epc w8erz w8euo w8eys w8fca w8fco w8fhz w8fqe w8frn w8fzc w8ggu w8mq w8pe w8si w8tp w8zy w8zzt

7-mc. band

aulkau ce3ag cm2jm cm2ww hh7c j1ct j1dm j1dn j1ee j1ep j1ez j3cr j6cb k5pk k6aex k6agi k6aja k6alm k6arb k6aux k6avq k6bea k6bmy k6cmc k6cq k6cqq k6cqz k6dv k6fab k7aac k7bli k7boy k7dob k7ff om1tb om2tg pk1ac ve3bm ve3ek ve3gu ve3ib ve3wa vk2ax vk2bv vk2cr vk2gv vk2he vk2hq vk2hr vk2lj vk2oc vk2od vk2wo vk3bj vk3by vk3ek vk3es vk3fw vk3lz vk3nm vk3qx vk3sp vk3tr vk3vp vk3wz vk3zx vk4ez vk4ju vk4nw vk4pk vk4rb vk4zx vk5aw vk5gl vk5wj vk7ch vk7gd vk8bc vs3ab w1aaw w1bc w1bdi w1bxc w1cph w1dc w1dx w1mk w1mx w1vc w2aas w2acl w2afn w2afr w2aix w2alj w2awk w2bg w2bqg w2brb w2bst w2bxj w2byx w2cbg w2chr w2cnx w2cph w2dz w2hg w2lz w2uk w2vd w2vv w2wc w3agf w3aic w3aiu w3apn w3aqi w3bbb w3bop w3bpy w3buy w3bzq w3ccf w3cdn w3cff w3cga w3chp w3cjn w3dq w3if w3lm w3md w3my w3rky w3sm w3tyu w3wd w3zx w4aai w4abs w4abt w4adt w4agr w4ahu w4ajj w4ajq w4ajx w4akh w4alm w4am w4amb w4ami w4ams w4and w4aoy w4av w4axc w4az w4bdd w4be w4doy w4dt w4dw w4ei w4ga w4jx w4lt w4mk w4nn w4onu w4ot w4pu w4qf w4qo w4tm w4to w4ty w4ux w4vc w4zh w8adh w8af w8afw w8aiy w8alt w8aob w8aok w8avq w8azu w8bbg w8bc w8bgy w8bis w8boo w8bos w8btd w8bty w8bua w8bxj w8bxp w8caa w8cau w8cbf w8chh w8cif w8cki w8cnm w8cnr w8cod w8cpb w8css w8ctl w8ctv w8cu w8cuk w8cws w8cyi w8daj w8dck w8dej w8dfh w8dgp w8dnf w8dnx w8dpe w8dqv w8dsa w8duk w8dv w8dvd w8dxd w8dye w8dyk w8edn w8edp w8edx w8egq w8enw w8eqv w8ex w8faa w8fap w8fcl w8fco w8ff w8fhz w8fic w8fij w8fim w8fiv w8fnz w8ftm w8fv w8fw w8fxf w8gfa w8gur w8jo w8led w8ll w8mc w8mo w8pj w8qc w8qg w8rj w8ya w8yak w8zy w8zzw x1aa x1n x1u x9a x29b z1aa z1ar z1ck z1cp z2ac z2gn z2gw z3ac z3aj z3aq z3aw z3ac z3ca

3.5-mc. band

k6cqz

D4UAO, DE 1342, H. Haffmans, Ettal near Oberammergau, Germany

7000-kc. band

au8kal au7kao ct2an ct2ap fm4ab fm8cr fm8eg fm8ev fm8ih fm8rix f3fha hc1fg hc2ea k4ac k5ab(qra?) su1ec vo8mg w1afa w1abn w1coi w1bo w2at w2aya w2exp w2tw w3amr w3bf w3cse w4nk w8cjj ys1fm zl4am zl2gq zl3az a9 xla1s xffnfh(Oran?)

14,000-kc. band

au1kaa cn8mi fm8eg f3mta pk1ac pk3bq pk4at st2d vs3ac yu2df veldy ve1bv veldb ve1xmm w1cjd w1bvh yb w2akk w2av w2bah w2lp w2te w3aqd w3ccc w3ckt w8blp w8ccw w9eg xzn2a xzn2b yi2dc yi6kr yi6wg zc6jm zs6y vo8mc

3500-kc. band

fm8ht w3bo

Norman A. Cameron, 2124 Walnut St., Bellingham, Wash.

(Heard on all bands during month of March)

w1kc w1me w1zj w2hd w2acc w2bhw w3cm w3bet w3ccf w4nn w4si w4adx w4azb w5awu w5dx w5ct w5kk w5ms

w5aej w5auj w5avf w5vq w5bdx w5bgl w5btb w5cdc w6am w6bc w6ke w6ne w6pc w6rj w6ro w6tm w6vq w6wx w6yo w6yu w6kh w6mh w6ke w6aax w6acl w6afv w6aep w6ahp w6ajc w6aju w6akd w6akx w6asr w6atj w6bbo w6bdr w6bfc w6bfl w6bgq w6bhm w6bhx w6bif w6bja w6blb w6blm w6bls w6bmn w6bmu w6bnc w6bqk w6bxc w6bxk w6bze w6bzk w6cae w6ccz w6ceu w6cgp w6cml w6cnb w6cod w6cri w6ctm w6ctp w6cvv w6cxn w6cxw w6czk w6czq w6dao w6dbd w6dbg w6dce w6ddd w6dlt w6dnq w6dve w6dwe w6eep w6egj w6ekz w6emu w6 erl w6ewy w6ezh w6fal w6fbc w6fcg w6fff w6fgq w6fjq w6yau w6zza w6zzd w7af w7bb w7aj w7bw w7cs w7ct w7dp w7en w7fp w7ia w7if w7ip w7kc w7kf w7kq w7kz w7mm w7mp w7my w7ne w7nf w7nr w7ov w7pe w7qf w7sl w7ts w7vs w7yg w7yc w7aaq w7abx w7abz w7acj w7ach w7aek w7aem w7afp w7ahf w7ahj w7ahq w7aig w7ako w7aul w7awe w7azb w7azk w7bbb w7bbh w7bbp w7bbz w7bei w7bdq w7bfb w7bfl w7bfo w7bhh w7bjb w7blx w7bmu w7bnb w7bnu w7bnr w7bog w7bon w7bom w7bor w7bpe w7bpq w7bpt w7btn w7buk w7bul w7bux w7bvo w7bwe w7bwg w7bwu w7brp w8si w8ajr w8aku w8ant w8cau w8crb w8eif w8ehy w9do w9gv w9ih w9ji w9ox w9awb w9bfx w9bif w9bnt w9bto w9cjj w9cgc w9cnd w9dds w9dgq w9dnt w9fkn w9fyq w9gee w9gfz w9hzu w9hzg k6aiu k6arb k6boe k6cib k6fab zl1ab zl1bm zl1bn zl1bt zl1ck

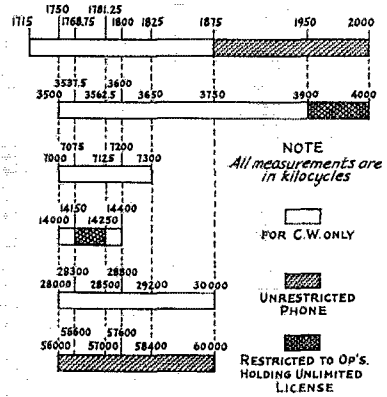
What's Wrong With Our C.W. Receivers?

(Continued from page 16)

c.w. band. There's just room here to mention its salient features: Electrical and mechanical stability; single-signal c.w. selectivity; improved 'phone selectivity; reduced overloading and cross-modulation effects; high sensitivity with better signal-background ratio and less tube hiss — and without too many tubes. The practical essentials of how these and a number of other new developments are combined in one job will come in a succeeding issue. Completely modern in every detail, from coil switching to dome-topped tubes, this receiver will appeal to every advanced amateur.

Strays

Here is a handy chart showing the harmonic relationship of the various amateur bands and their subdivisions. It is especially helpful for choosing a crystal frequency that will double



into the right part of a higher-frequency band, either for c.w. or 'phone purposes. We are indebted to W8CU, of the Bliley Piezo-Electric Co., Erie, Pa., for permission to reproduce it.

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(6) A special rate of 7c per word will apply to advertising which, in our judgment, is obviously non-commercial in nature and is placed and signed by a member of the American Radio Relay League. Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, if by a member of the American Radio Relay League takes the 7c rate. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and takes the 15c rate. Provisions of paragraphs (1), (2), (4) and (5) apply to all advertising in this column regardless of which rate may apply.

PLATE power for your set, the very heart of its performance, for quietness, DX ability, lifelong permanence, absolute dependability, lowest ultimate cost, no other plate source even approaches the achievement of an Edison steel alkaline storage B battery. Built painstakingly; every joint pure nickel, upset electrically welded. Genuine Edison Electrolyte. Our list describes complete batteries, construction parts, enameled aerial wire, silicon steel. Available immediately, filament and plate transformers for the new 872–866 rectifiers, complete plate power units. Rectifier Engineering Service, 4837 Rockwood Road, Cleveland, Ohio.

THE finest in radio for amateur, broadcast and marine. The most modern short-wave receivers. Four to ten tube designs. Radiophone cw transmitters of any power or type. We make a complete line of apparatus, including speech amplifiers, filter coils, inductances, power units, etc. Any special apparatus, designs, built to order, using your parts if desired. Prices on request. New bulletin lists complete line of apparatus. Write for copy. Ensall Radio Laboratory, 1527 Grandview St., S. E., Warren, Ohio.

TWELVE pages latest parts for stamp. Over six pounds data, 50¢. Prepaid. Kladag, Kent, Ohio.

OPERATORS — commercial and amateur. $1.00 brings you the latest issue of Radio Amateur Call Book, with press and weather schedules, high frequency commercials, fones, thousands of newly issued amateur calls from all countries. Issued Quarterly. Annual Subscription $3.25. W9FO — Room 506, 610 S. Dearborn, Chicago, U. S. A.

POWER transformers — chokes. Coils wound for your core. Condensers, crystals, holders, meters, postal brings quotation any part. W6ELA, 105½ E. Ave. 38, Los Angeles.

RADIO — marine, broadcast, aviation, television, engineering. Residence and home study. Endorsed by government and radio officials. Expenses low — can earn part. Catalog free. Dodge's Institute, Wood St., Valparaiso, Ind.

QSL cards, send 15 cents for samples. New ideas. Good printing. Exchange, P. O. Box 607, El Monte, Calif.

QSL's — Photograph well. Extra heavy stock does not curl. Printing cards since 1927 and we know our stuff. All samples we can mail for 2¢ free. W8CUX, Millington, Mich.

CRYSTALS: 1" sections good oscillators, 0.1% accuracy. X cut $6. Y cut $4. Finished blanks, $2. Money back guarantee. R. L. Tedford, 3838 Columbia Ave., Cincinnati, Ohio.

QSLs and stationery. W8AXD, Smethport, Pa.

Transmitting tubes, new, fully guaranteed firsts DeForest 545, 511, 503a — $15 each, 552 $23, 510 $4.20, 866 $4. New receiving tubes 46–90¢, 56–75¢, 57–96¢, 58–96¢, 82–75¢. Duplex crystal oven only $12.10, outstanding value. 2½v. 8 amp. filament transformer $1.87, 280M full-wave, mercury vapor, 500v. 300ma. tubes $1.98. Hatry and Young, Hartford.

WATT hour meters: 110 or 220 volt, 5 amp., 60 cycle, Fort Wayne type. Accurate. 3 bucks or what have you? K. A. Gennett (W1DOH), 57 Woods Ave., Holyoke, Mass.

RECTIFIER (miniature) for converting direct current milliammeter into alternating current voltmeter. $3. postpaid. Leo Taussig, 3245Q–37th St., Astoria, L. I., N. Y.

SUPER, factory built, 10–550, complete, a. c. supply, $20. Vario mu, electric, sw $17. 12 watt xmter, meter and supply, $14. Battery ham receiver, $10. W3ARA, A. Adamo, 236 Landis Ave., Vineland, N. J.

GUARANTEED Microphone Repairs — Any make or Model — 24 hour service. Stretched diaphragm double button repairs $7.50. Others $3.00. Single button repairs $1.50. Write for 1932 Catalog with diagrams. Universal Microphone Co. Ltd., Inglewood, Calif.

$15 — 7 tube superheterodyne, completely assembled, semi-wired. W9FWN, Red Wing, Minn.

QSL complete, May 1925 to date, $15. I. R. E. complete, July 1927 to date, $15. Both $25. F. O. B., Hamilton, N. Y. W8BQV.

QSLs, stationery. Samples. W6DOU, 1562 B Street, Hayward, Calif.

SACRIFICE National DCSW5 factory wired, in original package, with Eveready tubes, thirty-nine dollars. Two RCA UV845s in original cartons, $17. each. W4RS.

SELL Leeds 7½ watt Hartley, includes Jewell plate and antenna meters. Also 410 tube, $25. Wayman, 32 Woodland Ave., Bronxville, N. Y.

QUE Ess Ells, distinctive. Samples. Roth Printing, Jamaica, Long Island.

D. C. super wasp, band spread, $16. W8DBQ.

W9ZA selling out — 204A, 228A, Weston, GR Laboratory equipment, meters, receivers, standards very cheap. Stamped envelope for details. Marco, 2020 Farragut, Chicago.

FOR sale or trade: WE212, 50 hours service, $20. $65 broadcast modulation choke, 70 henry, 200 ma, $20. Condenser mike $10. Want portable typewriter, Vibroples. W2CBM.

ENGRAVING, receiving, transmitter tester panels scales, station plates in bakelite or aluminum Arrow, T560, Washington, Chicago.

CRYSTALS: Brazilian quartz. Finished crystals, $3.95. Blanks X or Y cut, $1. C. O. D. Bill Threm, 68 E. McMicken Ave., Cincinnati, Ohio.

WILL trade Brazilian quartz finished crystals or blanks for what have you? W8FN, 4021 Davis Ave., Cheviot, Ohio.

QSL cards printed as you want them. Samples? W8DED, Holland, Mich.

WANTED: Western Electric speaker units, type 523W. W. L. Thompson, 4795 Rapid Run, Cincinnati, Ohio.

SELL or trade crystals, blanks, holders, radio frequency chokes. 30 Henry ¾ ampere filter or modulation choke, 35 lbs. Bargain. J. H. Dardis, 7206 Wise Ave., St. Louis, Mo.

BEST offer takes 204A, 212D, 500 volt 200 watt Westinghouse motor generator, 2000 volt 800 watt power supply, 600 volt power supply. W9ER, Timken, Kansas.

NATIONAL a.c. sw5 tubes, power pack, $50. 75 watt transmitter $80. Vinson, 2123 Broadway, Little Rock, Ark.

NOVEL-yes-cheap-yes-photo QSLs-yes-samples-yes-2¢-Southern 664–W University, Ala.

TRADE — ¼ kw. xmtr for used auto. W. Y. Morris, Mill Creek, W. Va.

ECONOMICAL crystal control! Finished crystals, 0.1% accurate, $3. Oscillating blanks, $1.50. Silvered crystals, $4. Absolute guarantees. W8AKU, W8CTN, W8BBV, 320 South Aiken Ave., Pittsburgh, Pa.

TRADE crystal for 100A R. C. A. magnetic speaker. W9CVT.

VIBROPLEX, $9. Jewell 0-15 a.c. voltmeter, $3.50, several xtals, $3.50 ea. Monitor complete, $5. 210 pp transmitter, complete, $25. Other surplus. W9BUA, Carthage, Ill.

203As, brand new, Westinghouse or G.E., $12.00. Tested W.E. 387 mikes $15.00. Brand new condition Cardwell 166B $22.50. Class B transformers, pair 210–$8.50, pr. 203A–$13.50. 10,000V 866s–$3.25. 2.5V, 10Amp., ct. fil. transformers–$2.50. Brand new RCA 250s–$2.25. .002, 5000V Sangamos-.45 ea. Variety Weston type 301 milliammeters $3.75 (some new, all new cond., almost all ranges). New 852–$16.00. 204As and 212Ds. List. We buy transmitting equipment. (Wanted 203A sockets.) E. Ewing, Jr., 1057 Pratt Blvd., Chicago, Ill.

TRADE practically new $70 Gibson mandolin for fifty watt transmitter or what have you? W9AKK.

ATTENTION phone hams! Condenser microphone heads with an average response curve from 50 to 8000 cycles. Guaranteed. No background noises, $15. W5ABO, 2924-West 21st St., Oklahoma City, Okla.

SHIELDED microphone cable. Braided covering. 5 wire, 15¢ ft., 3 wire 10¢ ft. Guaranteed satisfactory. E & H Radio Supplies, 2924 West 21st St., Oklahoma City, Okla.

DURALUMIN .001 inches thick. Plenty for two microphones, $1. W5ABO, 2924 West 21st St., Oklahoma City, Okla.

PHOTO QSLs, message blanks, wall cards, etc. Hillcrest, Cranesville, Pa.

MAKE your own crystals. Finished oscillating blanks, $1.25. Specify band. W9CVT, 702 Shukert Bldg., Kansas City, Mo.

SELL complete new portable station, $17.50. Complete postpaid. W9DKF, Peoria, Ill.

RADIO equipment, simple baseboard layout or fully mounted commercial type, designed and built to specification. Your parts used if desired. Engineering and construction guaranteed. Write for quotations. State your requirements in detail. Holmes C. Miller, Radio Engineer, Box 105, Palo Alto, California.

SELL — Hartley c.w. xmitter; 250 volt power supply; a.c. screen grid receiver, complete. Well built, $30. New, 15 watt 100% modulated MOPA "fone." On 3 aluminum panels in oak rack 4 meters and $18 worth tubes. Less power supply, $35. Trade for resistance box and galvanometer. W9DFQ.

COMPLETE 210 xmitter for sale. Also a receiver. Kenneth Sunderman, LeSueur, Minn.

SELL — dynatron frequency meter. Write for particulars. W7BGC.

211E's, $5 each. Satisfaction guaranteed. Write for details. The Franklin Radio Corp., Dayton, Ohio.

CRYSTALS and rectifier tubes. See our advertisement page 89. Precision Piezo Service.

SALE — Pilot a. c. superwasp, power unit, tubes, Booster, $22. M. Rulon, Phoenixville, Pa.

QSL cards, two colors, $1 per hundred. Free samples. W8DTY, 257 Parker Ave., Buffalo, N. Y.

VIBROPLEXES, all models. Rebuilts, $8. up. Guaranteed. Frank Lydeard, 28 Circuit, Roxbury, Mass.

FOR sale: 210 push-pull transmitter as in November 1930 QST with 500 volt power supply, coils for "80," 15 a. c. Jewell voltmeter, separate filament transformer, 510, 310 and 5–281s for $35. cash. Postage extra. Also 1927, 1928, 1929, 1930 and half 1931 QSTs with three QST binders all for $5.50 cash. Binders alone worth $4.50. Postage extra. Also two stage speech amplifier-modulator unit. Uses 2–227s and 250 modulator. With two RCA 227s, $15. cash. Postage extra. W1ACO, T. Robinson, South Natick, Mass.

QSLs, 90¢ per hundred, two colors. W9DGH, 1816 Fifth Ave., N., Minneapolis, Minn.

BEGINNERS look — 4 tube, a. c., band spread, screen grid detector, speaker, phone jack, factory wired, complete with tubes $18.90, postpaid. Southern 664–V University, Ala.

QSL cards, message blanks, stationery, snappy service. Write for free samples today. W1BEF, 16 Stockbridge Ave., Lowell, Mass.

QSLs, two color, 90¢ per hundred. Free samples. W9DGS, Jamestown, N. Dak.

WANTED — portable 35 mm. movie projector or good 16 mm. projector. Will trade for transmitting apparatus or buy at reasonable price. W1JJ.

100 QSLs, 50¢ up. W9HFQ, Wisner, Nebr.

QSLs, two colors, 90¢ first hundred. Superior workmanship. Prompt service. QSL Service, 2220 Linden Ave., Baltimore, Maryland.

MONITORS and power supplies built. Best parts used. Send for list. Don Henrie, 334 E. 8th St., Berwick, Pa.

CRYSTALS: Guaranteed excellent oscillators. 80 and 160 meters, $1.25. Include postage. Fisher Laboratory, 210 Taylor St., Sandusky, Ohio.

WESTON, Jewell, Readrite meters, Electrad, Cardwell, Yaxley, Flechtheim, Frost, National, Ward-Leonard, Shallcross, R.E.L., Speed-bug, Signal keys, Bliley crystals, technical service. National, R.E.L. receivers. Built-to-order service. Stock probably largest in New England. Hatry and Young, Hartford.

ALUMINUM shielding. Lowest prices. Silver dip Alcoa stock. 5x5x5, 90¢. 9x6x5. $1.45. 10x7x6, $2. 12x7x8, $2.60. 14x7x9, $3.75. Special 18x10x7, $4.75. Specials to order. Transformers, 2½v. 10 ampere $1.75. 7½v. 4 ampere $1.75. 10 volt 4 ampere $1.95. All c. t. Triangle Radio, 831 N. 6th St., Phila., Pa.

HAMS! Look! 300 neat two color QSLs, $1.85. T. Vachovetz, Elmsford, N. Y.

CRYSTALS: 1750 band, $3.50; 3500 band, $5; blanks one reference side, $2; A–1 blanks, $1.25. All crystals unconditionally guaranteed. QSLs, two color 200, $1.50. Samples free. Meter tested and guaranteed 245, 247, 50. State your needs, we have it. M & K Radio Supply, Riverdale, Ill.

TOURMALINE crystals. Prices on request. W9CVT.

PIEZO-electric oscillators. Unconditionally guaranteed. Each plate tested to deliver at least five watts radio frequency energy from crystal circuit. Random frequency within 80 or 160 meter CW or phone bands, $3.00. Better than 0.1% of specified frequency, $5.00. Plugin dustproof holders, $1.75. W8GB, 221 Grant Avenue, Moundsville, West Virginia.

GOOD crystals. Fair prices. Hollister Crystal Laboratories, Merriam, Kansas.

OMNIGRAPHS, Teleplexes, converters, meters, Vibroplexes, receivers, tubes. Bought, sold, traded. Ryan Radio Co., Hannibal, Mo.

ANNOUNCING a new and better receiver, 3 tube, a.c. or d.c. compact, shielded, $11.50 takes one. Edbern Radio, 1340 Merriam Ave., New York City.

LIQUIDATING. Crystals and plug-in mountings. 80–160 — and new phone bands. Crystals $4.75, mountings $1.75. Immediate shipment. C & R Labs., 3134 Long Blvd., Nashville, Tenn.

TRADE station for motorcycle. W9DSS.

ORIGINAL QSLs. Two color, 100–85¢. Also special made. Free samples. W8AKY, Cleveland.

WESTERN Electric 509W headsets, 2200 ohms, 12 pair, fine condition, $2. pair. W1NJ.

QSLs. Request our samples and prices before ordering. Maleco, 1512 Eastern Parkway, Brooklyn, N. Y.

TRANSFORMERS — 250 watt 1100–1500–2000 c. t. $8.25; 400 watt 1500–2000–3000 c. t. $10; 600 watt 4000–5000–6000 c. t. $15, etc. Polyphase, 25 cycle transformers. W9CES, Frank Greben, 1917 S. Peoria St., Chicago, Ill.

CRYSTALS — Best Brazilian Quartz — Guaranteed strong oscillators. Calibrated 0.1% accuracy $3.50. Oscillating Blanks $2.00. Ross Roberts — W5ID, Canton, Mississippi.

"4MOST" an entirely new and better QSL. Four big features make it handy-practical-systematic. They're the coming cards of tomorrow. Send today for your free samples. Address "4-most," Drawer E, Camden, New York.

FOR sale — 1932 a.c. National shortwave receiver, coils, tubes, power pack, and speaker. Best offer takes it. Jack Czajkowski, 2821 N. Springfield Ave., Chicago, Ill.

BUILD your accurate temperature crystal oven for less than $10.00 from complete drawings and specifications sent postpaid for $1.50. Satisfaction guaranteed. Will furnish k.d. parts, thermostat unit or complete oven, prices on request. Radilectric Development Laboratories, Box 1255, Spokane, Wash. W7BEV.

UV204A with sockets, $30. W8DGV, Chas. Drescher, 1145 Erieview Rd., Cleveland Heights, Ohio.

WANTED: 212Ds, 203As, 1000V power transformer filter condensers, condenser mike, etc. Have Buescher saxaphone trade. W9EXJ, Atkinson, Nebr.

MONITORS — calibrated band spread, 20, 40, 80 meter coils, with RCA tubes, batteries, $7.75. Receivers (metal cabinets) screen grid detector 2 audio, band spread calibrated coils, for battery or a.c. tubes, $12.50. Five meter receiver kits, $12.75. Wired $16.75. Everything precision built and guaranteed. Crystals 80–150 meter, $4.25. We design and build anything to order. Write details for quotations. Precision Radio Labs., 477 Amsterdam Ave., New York City.

PREPAID — receivers, both 15–550 meters. SW3, Pilot wasp coils, tubes, $12.50. SW1, metal box, selective, tube $5. Trade, Want PP245 xmitter. Oscar W. Olsen, Jr., Box 456, Hartington, Neb.

ALUMINUM cabinets — 7 x 12 x 6 — machine pressed, 16 gauge, hinged cover, handsome satin finish, completely assembled, bracketed for subpanel. Limited number available. $5 postpaid. Money back guarantee. Write for illustrated description. Rim Radio Mfg. Co., 695 Grand St., Brooklyn, N. Y.

56 mc. receiver per July QST. Complete with tubes, wired and tested. In aluminum cabinet, $18. W3BGU.

SELL dynatron frequency meter, $15. Also five meter receiver chassis. Write for photographs. Millett Morgan, Hanover, N. H.

SUB-DEPRESSION prices. New ¼" copper tubing 1⅝", 2", 2½" coils, 5¢ per turn; 3", 5½¢; 3½", 6¢; 4", 7¢; 5", 8¢; 6", 12¢. Lineal foot 4¢. Low prices — cash. Include postage please OM. W2AZB, 5 Beechwood Rd., Summit, N. J.

FIRST class rectifiers. 90 day guarantee. Standard characteristics. 866s, $2. pair $3.75, 872s, $8, pair $15. Include postage. Harry Payne, 747 Adams Ave., Elizabeth, N. J.

CRYSTALS: QRG crystals are guaranteed. 80 and 160 meter, $4 each. C.O.D. 0.1% tolerance. QRG Crystal Labs., Roseland, N. J.

TWO 211D, $8. each. 212D, $25. Guaranteed oscillators used very slightly. W2BEQ, 1641 Edison Ave., New York City.

SCHEMATIC diagrams — All essentials for government license examinations including complete explanations. Master oscillator, Power amplifier; MOPA with radiophone attachment; self excited vt transmitter; complete arc transmitter. Price $1.00 each, complete set $4.00 postpaid. Engineering Service Bureau, 1114 Mission Street, San Francisco, Calif.

QSLs, 90¢, SWLs, stationery, samples. W3BHG, 3536 Roland Ave., Baltimore.

MODERN Radio, outstanding experimenters magazine edited by Robert S. Kruse and L. W. Hatry, useful information every issue. Hams recommend it everywhere. Articles by Reinartz, Phelps, Batcher. Only 20¢ copy, $2 year. Modern Radio, Hartford.

FREE QSLs — get our proposition. W8BVE, Ben Franklin Press, Franklin, Pa.

SELL: National AC–SW5, complete with tubes and power pack — new. $50 complete. Want extra-wide-spaced variable transmitting condenser. W8DIL, Oil City, Penna.

TRADE new Samson PAM–19 amplifier, 1–226, 2–210 for new W.E. 212D. W1BIC.

SELLING out: Short wave converters, parts of 100 watt transmitter, power transformers, condensers, coils, eliminators, relay, etc. Write for list. Bargains. W1AMX, Richard F. Shea, 27 Howard St., Arlington, Mass.

"B" eliminator, humless on short wave sets, $1.90. Condenser mike new; meter rectifier; Flewelling short wave converter; filament transformer; sell or trade. Edison portable cells, 85¢. Robert E. Snyder, Richmond, Ind.

SELL — Teleplex, $11; R.C.A. Institutes radio course, $15; Weston 0–8–200 d.c. voltmeter, $4; Hammarlund inductor coils, 14–225 meters, $4; I.C.A. filter volt, st., $5; American, English, and German aviation magazines, 1916 to date, 75¢ year. Carl Fastje, Denison, Iowa.

NORTHERN (Western) Electric R-41 superheterodyne, 6 W.E. peanut tubes; pushpull output stage, using 171As. Excellent condition, $50. F. B. Walker, 108 S. Main St., West Hartford.

"R9," new national ham magazine, emphasizes what others slight, solicits articles all subjects interesting amateurs. Prepublication subscription rate 18 months, $1. Box 777, West Los Angeles.

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W4AGH-W4PDC — N. A. Jennings, 315 Grimes Dorm, Chapel Hill, N. C.

W9IUF — Ralph Taraba, 4540 Clarendon Ave., Chicago, Ill.

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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 the page opposite the editorial page of this issue. We should like to have you become a full-fledged member and add your strength to ours in the things we are undertaking for Amateur Radio. 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.

A bona fide interest in amateur radio is the only essential qualification for membership

AMERICAN RADIO RELAY LEAGUE
West Hartford, Conn., U. S. A.

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, $1.25 of which is for a subscription to *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.

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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*?

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Thanks

For Your Convenience

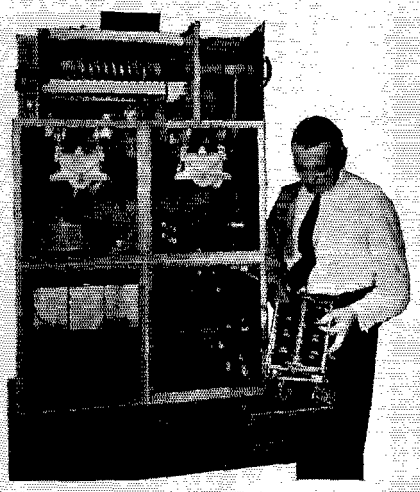
QST'S INDEX OF ADVERTISERS IN THIS ISSUE

—NOT FOR THE WEALTH OF CROESUS!

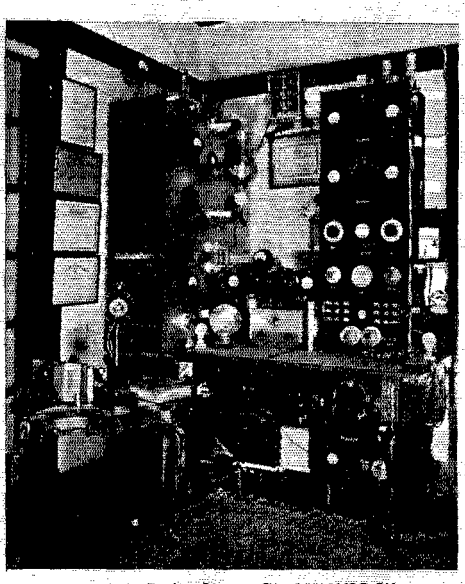
No matter how elaborate the transmitter or receiver you have planned, or how modest, only the best of components will enable you to experience the fullness of satisfaction that comes from a job well done.

Not every Ham can afford a station de luxe but *any* Ham can afford the satisfaction of equipment that is "CARDWELL condensered."

CARDWELL condensers *cost* no more than others, but they are fundamentally right, and the fabled wealth of Croesus could buy no *better*.



The 500 Watt Linear Amplifier at W9CDX uses 3 Cons. Design No. 166 B Cardwell Condensers.



Amateur Radio Phone Station W9DCX

Designed and built by Frank L. Brittin, W9DCX, 1409 Rosemont Avenue, Chicago, Ill. The 500 watt linear amplifier is described in the June 1932 issue of Popular Mechanics Magazine. Station log shows nice reports from Amateur stations located in 42 states and reported heard in Germany.

The particular design of the CARDWELL condenser is of far greater importance than can be realized by the average user. That is why, for more than a decade, the unique electrical efficiency of the CARDWELL design has never been surpassed. You can't *see* it but it's *there*. (See adv. Q. S. T. for January 1932, page 2 for details).

Receiving condensers, Transmitting condensers for high, medium and low power, and the now famous Midway Featherweight condensers (all aluminum, none over seven ounces in weight) receiving and transmitting, for aircraft and portable equipment and neutralizing purposes.

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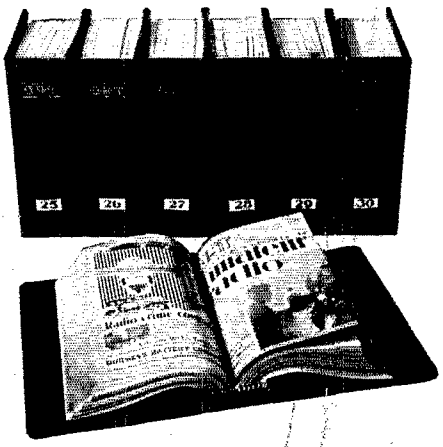

QST HAS BACK-COPY VALUE

In the ham-ad section of March QST $12.00 was offered for a back copy. The offer was for the very first issue of QST (and how rare it is!) but all back copies are valuable. Moral: You should have a binder for each twelve issues—and the yearly index. You'll like the new binder, too.

A Dupont fabrikoid material of waterproof and oilproof imitation leather in a rich wine color, which matches the color of your present binders. Instead of metal wires, it has well-designed strong metal strips to conveniently place your copies in the binder—13 such strips, too—12 for the yearly supply of QST and one for your QST index. It doesn't cost any more either.

Right now you should have at least two of them—one for your complete 1931 file of copies, and one for each 1932 issue as published.

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(Holds 12 issues of QST and index)

$1.50 each, postpaid

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Once upon a time there were no guide-posts in amateur radio. The sum total of all human knowledge of the subject was negligible. Then people began discovering things. Principles and practices were established. Knowledge of the progress of development became available in printed form. Eventually publication of QST was started. And at long last came The Radio Amateur's Handbook. It represents today a careful sifting of all the world's accumulated knowledge of amateur radio. It is the only fundamentally important book to any radio amateur. Its two hundred pages contain all the guideposts to modern amateur radio. The price is one dollar, postpaid anywhere in the world. The American Radio Relay League, West Hartford, Connecticut, U. S. A.