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These two de Forest 75 watters may be used as oscillators and radio frequency power amplifiers. They are particularly suited for stable r. f. amplification at either low or high frequencies.

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<th>Weight</th>
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<td>334-Z</td>
<td>500 ( \mu \text{uf} )</td>
<td>( 3\frac{1}{2} \times 3\frac{1}{4} \times 11 \text{ in.} )</td>
<td>( 3\frac{1}{4} \text{ lb.} )</td>
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<td>*334-R</td>
<td>250 ( \mu \text{uf} )</td>
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<td>*334-T</td>
<td>100 ( \mu \text{uf} )</td>
<td>( 3\frac{1}{4} \times 3\frac{1}{4} \times 4 \text{ in.} )</td>
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The American Radio Relay League

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

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

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

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

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ADDRESS ALL GENERAL CORRESPONDENCE TO THE EXECUTIVE HEADQUARTERS AT HARTFORD, CONN.
WHENEVER our morning mail discloses an envelope with the writing all snarled up because of the frenzy of the writer, we know what it's about before we open it. It's some member writing in to *QST* to give us the devil for publishing some article which he thinks "too technical." Whenever we publish even the simplest algebra we retire to our bomb-proof dugouts for a week after the issue is out. And we know by long experience that if an article isn't A-B-C in style, with complete specifications for building something or other, there are far too many amateurs who won't try to understand it, irrespective of its merits, but who, more or less vocally, are displeased with its very appearance in our pages.

We think that *QST* is an intensely practical magazine; it is famed for the direct help it brings to practicing amateurs. But amateurs should know something about radio, should be able to think some for themselves, should not have always to follow constructional specifications blindly. Partly for these reasons, partly because there are some subjects not yet reduced to successful practice, *QST* also has articles which deal with the theoretical side of things radio, and it is these stories which are so often scorned by the practical amateur. Fortunately, not all amateurs scorn them, and it happens that right now we're able to point to practical benefits from the "too technical" articles that ought to satisfy all hands. For instance, in our July issue there was an article on a better, more efficient and compact chemical rectifier which places the "chem" right up in the front row as a unit in ham plate supplies. It was directly based on Kryter's theoretical article on rectifiers in April of last year. There are important developments on the fire right now in the dynatron frequency meter, soon to appear in *QST*. They are based on an out-and-out "too-technical" article, "The Dynatron," which we published last February. The filter portion of Grammer's rectifier and filter yarn in June is based on Zottu's "too-technical" article which ran in April.

These practical follow-up constructional articles would never have been born without the fertilizing influence of the "too-technical" articles. They may be castor oil to some of us, but they're good for the system. We shouldn't think we're being "gypped" because we don't understand them all. Other amateurs of greater experience will take up these articles and sooner or later bring practical how-many-turns stuff to *QST*'s pages which means an otherwise unattainable advance in amateur technique.

There is increasing indication of a change in the way amateurs go about their developments — the *QST* staff believes that we are in a period of transition in amateur practice, transition from blind experimenting and empiricism to real research. We don't mean research of the pure-physics variety as much as intensely practical research. Surfeited with merely knowing how to assemble apparatus which works well, we amateurs as a group seem now to be starting back over the route to find out what makes our circuits tick. In the process we are finding out a lot of things and again definitely improving our apparatus and technique. The push-pull transmitter described in our June issue was an excellent example of this; the dynatron exploration now under way is another; so are the recent developments in 28-mc. and directive transmission work, requiring as they do a knowledge of pure physics for their intelligent attack. The moral in all this is that the amateur who has thrown his old high-school physics book in the junk-box had better fish it out and read up on electron theory, light, reflection and refraction, and so on — all of which are pertinent to amateur radio of today.
Not that QST means thus to announce that it is going in for more and more theory. Far from it, it is simply that fundamental appreciation of what's happening in radio circuits will help every department of a practical amateur's work. QST's articles will always be "of, by and for," because that's our very purpose in life.

We notice, by the bye, that a couple of other magazines are claiming a little too loudly that they have "short waves" by the tail and are the only reliable purveyors of information thereon.

Well, well! Ain't that somethin'!

K. B. W.

Central Division Convention
Dayton, Ohio, August 30th-31st
(Ohio Section)

Whooppee! Open sesame! The Central Division Convention is to be held in Dayton, Ohio, Saturday, and Sunday, August 30th and 31st, at the New Biltmore Hotel, under the auspices of the Dayton Amateur Radio Association. While there will be some good technical talks it is the intention of the Committee to give every one 90% good times. It being the desire of the Committee to start things early Saturday it is planned to have something for those who reach Dayton Friday evening. The best of it all fellows is the price — it is only $3.50. The headliners for this convention are: D. J. Angus, the new Director; K. B. Warner, Secretary and General Manager, and C. C. Rodimon, Managing Editor, QST.

A cordial invitation is extended to all amateurs in the Division as well as those in other sections — show up and you will see what we will do for you. Send word to Mr. L. E. Furrow, General Chairman Convention Committee, Post Office Box 76, Dayton, Ohio.

Northwestern Division
Convention
August 29th-30th at Spokane, Wash.

Northward to Spokane, Wash., fellow amateurs, to attend the annual A.R.R.L. divisional convention to be held Friday and Saturday, August 29th and 30th, at the Hotel Dessert, which is being sponsored by the Radio Operator's Club. Those of you who attended the last convention here three years ago well remember the very fine affair given, and the committee this year feel that the visiting members will be treated to a program far in excess of anything yet attempted. There will be plenty of entertainment and a banquet supreme for the last night is being arranged for at the "Oasis" in connection with the Dessert Hotel.

We are hoping to have Mr. A. L. Budlong, Assistant Secretary, A.R.R.L., as Headquarters representative; if not, Fieldman Hebert will be here. We are doing our best to secure Howard F. Mason, of Seattle, who has been with the Byrd Expedition, as our guest of honor. There are many other things in the wind, but we cannot make the announcement at this writing. Rest assured, however, that a cordial reception awaits all delegates. Just drop a line to J. L. Moon, Secretary, W. 3823 Heroy Ave., Spokane, Wash.

Pacific Division Convention
Honolulu, T. H., August 8th-10th
(Hawaii Section)

Greetings! The Hawaiian Section of the Pacific Division, through its Section Communications Manager, extends to all amateurs a cordial invitation to attend its first convention to be held in Honolulu on the 8th to the 10th of August. Radio your reservation to L. A. Walworth, SCM, 2737 Ferdinand Ave., Honolulu, T. H.

Mr. W. D. Terrell, Chief of the Radio Division of the Department of Commerce, has announced the creation by the Secretary of Commerce of the post of Traveling Radio Supervisor and the assignment thereto of Mr. Arthur Batcheller, for many years the Supervisor of Radio at New York.

Mr. Batcheller's new duties are those of an executive liaison officer, coordinating the activities of the twenty field establishments maintained by the Radio Division -- the nine district offices, ten sub-offices, and the Grand Island (Neb.) monitoring station. His successor in the Second District has not been chosen at this writing.
Probably the first thing you fellows would ask if we were all able to get together would be, "How did you happen to get the lucky break"—so let's start off with a football game.

If I hadn't decided to return to Washington from Pittsburgh, where I had been working with the Westinghouse Company, in the fall of 1928 for the homecoming game of the University of Maryland with the University of Virginia, the following events would never have happened; to me anyway.

The day following the game I noticed a news dispatch concerning the All-American Lyric Malaysian Expedition which would go in the near future to Borneo with a small party of scientists for the purpose of making a study of the primitive natives, to obtain geographical data, and also to make observations on tropical and equatorial radio conditions.

Through the medium of the clipping I got in touch with Mr. Theodore Seelmann of Chicago, the leader of the project. It developed that he was looking for someone with certain operating and practical experience as well as technical training, and I was lucky enough to get the appointment.

So, early in 1929 I proceeded with the selection of the various equipment required by our party. In connection with this I wish to offer particular thanks to Dr. J. H. Dellingen of the United States Bureau of Standards and Mr. Lawrence Hyland of the U. S. Naval Research Laboratories, whose timely suggestions were of considerable assistance.

It was considered advisable to have three complete and separate transmitting and receiving units: the first a fairly long-range and semi-portable outfit; the second an emergency transmitter to be used in case of any serious breakdown; and the third the portable job to be used by the advance parties for contact with the base.

The main transmitter unit was a fifty-watt t.p.t.g. Marine Corps type outfit supplied "in toto" by the firm of Heintz and Kaufman, short-wave radio specialists of San Francisco. Plate and filament currents were supplied from a small duplex 240-cycle generator driven by a single-cylinder two-cycle gasoline engine.

This complete equipment, comprising transmitter, gas-engine generator, receiver, telescopic mast and odd parts, weighed less than 200 pounds packed in sturdy canvas containers and could be erected by several men in a very short time.

The emergency transmitter was a bread-board high-C Hartley incorporating a UX-210, the plate supply of which was obtained from a 12-to-350-volt dynamotor. This was built and tested at W3ZD.

Our portable job was a Burgess aircraft type unit comprising two 201-A tubes in a m.o.p.a. circuit with the power supplied entirely from batteries.

Wherever possible, every piece of equipment was especially sealed or impregnated as an added protection against the disastrous effects of the tropical moisture.

Preparations were completed by the latter part of March and our party of four Americans including Mr. Theodore Seelmann, with Mr. and Mrs. John H. Provinse of the University of Chicago, embarked on April 3 from Seattle. Mrs. Provinse was to accompany her husband as far as Java.

By keeping the strictest personal supervision over the shipping and handling of our equipment we were able to get everything to Borneo without any serious mishaps. Our nearest calamity occurred when a Dutch mate slowed the box containing the storage battery acid upside down in the hold. Luckily, when the mistake was discovered several days later the corks were still holding.

*219 East Poplar St., San Mateo, Calif.
1 This set is identical with that used by W6OJ in his African adventure and was described in July QST.—Editor.
The voyage outward was made by way of Japan, China, Philippine Islands, the Celebes and Java. After just two months we were to get our first glimpse of Borneo. However, that long awaited moment didn’t present a very enticing view. The heat seemed to come rolling out to meet our small coastwise steamer. The shoreline was indefinite and appeared as a rather depressing maze of swamp and jungle.

On our arrival at Bandjermasin, the capital of Dutch Borneo and a town of 40,000 population, of which only a few hundred are whites, we proceeded with the final preparations for our trip into the interior. There we were also initiated into our first crocodile hunt.

On the boat from Sorobaya to Bandjermasin we had become acquainted with a skin buyer who thrilled us with strange tales of Borneo’s huge snakes and wild life and promised to take us with him to places near by where one could see hundreds of crocodiles in an evening. So one afternoon we packed a large boat with guns, lamps, provisions, and started out. We paddled until dark through the myriads of interconnecting rivers and canals in the vicinity of Bandjermasin, then selected a deserted stretch of river lined only by unbroken jungle as our hunting grounds.

An auto spotlight was connected to a storage battery in the bow. One man took his position there and, as the boat gently drifted through the stillness of the tropical night, cast the light upon the river banks. Another man, with the sights of his rifle whitened, was stationed immediately behind the light quietly awaiting the tell-tale bright red reflection of the crocodile’s eyes. When one was spotted we would maneuver the boat within range and he would then take a dead bead on the eyes only, for that is the most vulnerable spot. In the course of the evening we saw dozens of crocodiles both large and small, but most of the old boys were a little too smart for our amateurish methods and we were only successful in bagging several of the smaller ones ranging from 4 to 7 feet in length.

FIG. 1.—WHERE IT ALL HAPPENED

"PMZ Shrine" marks the journey’s end; here was left the official PMZ flag emblazoned with the A.R.R.L. emblem. The arrows indicate approximate great-circle directions to the U. S. A., Manila and Eastern Australia. Captain DeQuant was marched only an hour’s March from PMZ’s base at Poeroek Tjahoe.

The trip up the Barito River proved most interesting. At times the progress of the little Dutch river boat, Negara, would be almost completely blocked by vast quantities of water hyacinths which would form a solid mass from bank to bank. The strange jungle odors, the bright-hued tropical birds flying overhead, the herds of chattering monkeys playing along the banks, the occasional wild boar or deer seen cautiously quenching its thirst, the crocodiles or snakes gliding through the muddy, sluggish water, all seemed to be crying, "This is the road to adventure and the real things of life."

One week after leaving Bandjermasin our boat pulled into Poeroek Tjahoe, the last Dutch military outpost on the Barito, some 250 miles from the coast and directly on the Equator. Here the entire white population, consisting of the post commander, Captain J. C. DeQuant, two young lieutenants and a doctor, turned out to welcome our party to the place which was to be our headquarters for the coming months.

At 3:30 in the afternoon we started unloading equipment. Naturally I was anxious to get PMZ on the air as soon as possible to establish contacts, start getting schedules arranged and also to determine with what sort of conditions we would have to contend. We all dropped everything else and commenced unpacking the radio equipment.

The unusual burst of activity in that ordinarily quiet and slow-moving community attracted considerable attention among the natives; word rapidly spread that some strange and new white man’s wonder was about to be demonstrated. Soon the entire population of the kampong was quietly and expectantly squatting around my network of wires and instruments.

Finally all was ready. The gas engine started on the second spin. The transmitter was roughly tuned to the 7-mc. band. I put on the "cans" and picked up a fair signal through a terrible mess of QRN.

"CQ CQ CQ de W6BYY W6BYY ... AR."

Ted gave the gas engine a twist and off she...
roared. I answered with a long appealing call — the first time on the air for PMZ. (We would soon know what that little outfit would do.) By all that’s holy in ham language, W6BYY came right back at us! Those thousands of miles which separated our little group in the heart of wildest Borneo had vanished into the ether. Gentlemen, that was a thrill.

To the brown-skinned natives the gas engine was the greatest curiosity and the news quickly scattered that we were doing wonderful things in Pecorco Tjahoe and had a contraption which would make a noise like thunder and revolve like lightning. Whole families travelled for days through the depths of the jungle merely to watch our activities. The radio, of course, was far beyond their comprehension, so they preferred to believe that by means of this apparatus we were able to induce friendly “ants” or spirits to carry forth our messages.

Our first QSO’s were not very satisfactory from an operating point of view because the humid atmosphere affected the carburation. In spite of all possible adjustments, every time I would shut down the engine to listen in, it would invariably become so badly chocked or flooded that when I’d want to come back at the other station it would be necessary first to pull the spark plug and wipe that off before the engine would start. During the intermission the QSO would be lost.

It did not require much foresight to see that if PMZ were ever to be a success on the air this condition would have to be corrected. Accordingly as the erection of our base camp progressed, I developed a method of shielding the ignition so that reception could be obtained without any noticeable electrical QRM while the engine continued running at slow speed with the clutch disengaged.

Reliable schedules were soon established with the Philippine Islands and California. The majority of our traffic, such as the daily report to the Chicago offices, was handled through the P. I. stations of Sergeant Paul Holbrook, KAIAPF, and Commander S. M. Mathes, KAIHY. Mr. L. R. Potter, W6AKW, and Colonel Clair Foster, W8HM, took most of the messages to be sent direct from PMZ to the U. S. A.

As had been expected, the moisture and static were our chief persecutors. It is interesting that the equipment which has been especially sealed and impregnated held up 0. K., but that a transformer which was exposed for a test developed an open circuit within two weeks.

There were invariably thunderstorms in the vicinity, so several types of so-called “quiet” antennas were tried in attempts to reduce the noise level, but the ancient Beverage type, long and low, was the one which gave by far the best results. This antenna was about 300 feet long, never over eight feet above the earth, and grounded at the far end through a resistance of 200 ohms. The free end was pointed in the general direction of the U. S. A. and gave a decided directional effect.

The transmitter antenna used at the PMZ base was a single wire about 200 feet long and 30 feet high, fed by a quarter-wave “ladder,” for 7320-ke. operation. This arrangement put one and a half full waves on the radiator.

After gradually becoming accustomed to the heat and direct rays of the sun, we started plans for our first real exploration trip. The Dutch Government had very courteously offered military assistance whenever possible, so it was agreed to make an attempt to reach the headwaters of the treacherous Murung River — territory never before seen by a white man — while at the same time making a search for the most primitive of natives, the nomadic Puman Dyaks.

Some tests on the portable transmitter showed
that the Philippine Islands could be worked with an adaption of the W3ZD emergency set using one 201-A with 300 volts of batteries at an input of seven and a half watts. It was decided, therefore, that instead of using the portable jobs

merely for contact from the field party to the base, we would attempt direct QSO with the P. I. This course was advisable since in the short time available it was impossible to train any other member of the party sufficiently in its operation.

The transmitter, complete with batteries and tray containing wires, tubes and spare parts, was packed in a water-tight metal box. The H. & K. inspector’s kit receiver was protected by its stout wooden casing and a heavy canvas bag. The two units comprising our complete transmitting and receiving apparatus weighed some 60 pounds, just making a good load for one coolie.

By the middle of July all was in readiness for the start. Captain J. C. DeQuant, post commander and controleur of a portion of Central Borneo larger than all of Holland, was in charge of the party. Seidmann and myself completed the white personnel. Five convicts, who were serving time at Poeroek Tjahoe for murder, were assigned to assist in the paddling and do the cooking. Our Chinese boy, Lim, was not interested in seeing any wilder people. Other natives were secured to help paddle our boats from one kampong to the next. Everything perishable was packed in those five-gallon gasoline tins which are so indispensable in the tropics.

For the first days our two heavily laden boats plowed through rather sluggish muddy water, but on the third day the banks became higher, the water faster and by that evening we were on the edge of the Kiahun Hatas, Borneo’s longest single rapid — 600 yards of water fury.

The ensuing month was one continual story of man’s battle with the elements. There were days of hard paddling — days of roasting in the intense heat; sudden showers would soak us through; then the slightest breeze would chill us to the bone; swarms of insects gave one little rest. Rapids, waterfalls, narrows and whirlpools had to be encountered, where the slightest error in judgment might spell destruction for all.

We were too busy and tired to heed any rumours of unfriendly natives. At one village we were successful in capturing a Malay trader who had murdered a Dyak only the day before. That night the murderer was chained by the neck to a post in the center of a shack. Our camp beds occupied the other space. The Malay was afraid to sleep on the floor because he thought the Dyaks might spear him from underneath. Personally, I could only think, “Gosh, what if they miss him?” That canvas spread on my bed felt awfully thin . . . I have passed more restful nights. But evidently the Dyaks were satisfied that we keep the prisoner, for nothing untoward occurred.

Three days later we arrived at Toembang Topus, the last village on the Murung and practically at the headwaters. The next day it was necessary for Captain DeQuant to make an overland journey to another isolated kampong. Little PMZ portable had been stepping out in good shape. We made setups every few days, or whenever conditions were favorable. KA1CY was on the air every evening at six-thirty looking for my little warble, but the sked proved a little early, and several times it was impossible to raise the Philippines until later in the evening. However, results were quite good since QSO’s were made from every installation. The transmitting antenna generally consisted of about 100 feet of wire, anchored onto a handy palm tree, current fed with a quarter-wave “counterpoise.” A separate aerial was used for the receiver so that a break-in system was possible.

After signing off we’d tune in some short-wave broadcast and let the group of curious natives listen to the white man’s magic. The stolid Dyaks would show little surprise on hearing the moaning of a saxophone or the melodies of an orchestra for the first time — mostly amusement and curiosity. To show them that the music was
being picked from the air I would disconnect the antenna and then put it back, bringing in the signals again. But when I tried to explain that it only required a fraction of a second for the impulses to travel thousands of miles, they gave up and preferred to think that we were powerful beings who controlled kindly spirits to carry out our desires. Toy phonographs also went over big, but some one would invariably try to climb inside the horn to see where that noise was coming from.

I was often bothered by a crowd of natives gathering around the set-up and getting tangled in the wiring or knocking something out of adjustment, so on one occasion I let one of the more troublesome boys feel the terminals of a Burgess PL 108-volt battery. He jumped back yelling "panas" (hot), and after that they were afraid to come within ten feet of the outfit.

The QSO with KA1CY on August 6th was fairly decent and we were able to clear considerable traffic, so we left the outfit under guard and early the next morning Seelmann and I started our dash to the headwaters, while De Quant was away. No white man had heretofore penetrated this territory. With the four of us (counting two Dyaks) paddling steadily our light boat made good time. The water soon became so shallow that it was necessary to wade. Logs and overhanging creepers impeded our progress, but by afternoon we had reached the actual uncharted headwaters. Here a small clearing was cut in the virgin jungle and a shrine erected to the Goddess of Fate who had safely guided us so far. A signed statement was sealed inside a gourd: our homemade PMZ flag bearing the A.R.R.L. emblem was raised, and an old battle-ax and a radio tube were left on the raised platform. Several salutes were fired into the air. The Dyaks seemed deeply impressed by our solemn ritual.

The return to Toembang Topus was managed by nightfall and we had the following message ready: "Reached destination. Starting back tomorrow. Batteries getting low so expect next QSO from base station."

But as it happened the batteries were a little too low—we had already obtained double the expected usage. To make matters worse, Manila was in the throes of a typhoon and the message never got off. The next day we were obliged to start back, having given the dead batteries to the natives as souvenirs.

After a week had elapsed with no word from PMZ, the Manila papers came forth with the stories that we were lost, strayed, and even eaten; and when these reports were reproduced in the American press considerable anxiety was caused. Luckily we reached our base just two days later and notified all that we were safely returned, although slightly the worse for wear.

PMZ took to the jungle on numerous occasions, but to go into detail here might be boring. At one time our party arrived in a kampong to find the men armed to the teeth with knives, spears, and blow guns. The women and children were cowering in their huts, afraid to venture out of doors. Their report was that an enemy tribe of 200 warriors was hiding in the jungle preparing to attack and massacre them all. One man had been shot at with a poison dart. However, nothing more happened while we were there, nor did we ever hear any more of these headhunters.

What I believe to be a record for portable transmitters was established on the night of September 14th when Potter of W6AKW copied PMZ's signals from a temporary setup at Nanokliwon, two days away from the base camp. At the time of Potter's reception I was working W9AB near Singapore and using a 201-A tube with 800 volts on the plate.

On another occasion with the same W9ZD transmitter PMZ was in direct two-way contact from the base camp with Colonel Clair Foster, W6HM, of Carmel, California.

On the 14-me. band conditions were quite good for working Australia and New Zealand. The ZL's were raised several times when the portable was using an input of only two and a half watts. The air line distance approaches 4000 miles.
Last year on Queen Wilhelmina’s birthday the Resident Governor of Borneo and the Commander in Chief of the Dutch Forces there made a special trip to Poeroek Tjahoe from Bandjermasin as guests of Captain DeQuant. They were all very interested in the progress of our expedition and were out to our camp one evening for “chow” after which they listened to some short-wave broadcasting. They were quite surprised to learn that such small transmitting equipment could furnish direct contact with America. When it came time for the sked with “CF” of W6HM I told him that we were entertaining the “royalty,” so Colonel Foster very thoughtfully sent them a message of greeting from the radio amateurs of America which was greatly prized. The evening was quite a success.

Some time later when Captain DeQuant was so brutally murdered only one hour from the base, amateur radio again came to the fore and performed invaluable service for our party and the Dutch Colonial Government. The quickest possible time in which word of the tragedy could have been sent to the coast by boat and an answer received would have been two weeks. In the event of a serious uprising the whole place might have been wiped out in the meantime. But on Christmas eve at six o’clock PMZ gave the first message for the Dutch authorities in Bandjermasin to KA1AF of Fort Mills, who immediately relayed it to KAICY of Manila. Mathes rushed it to a cable office, so that the message reached its destination on the very night of the disaster.

Replies were cabled to KA1AF, who shot them on through to us.

Considerable official government traffic was handled, saving several months’ time and suspense for all concerned, and possibly averting what might have developed into a serious uprising. The work was appreciated immensely and the Colonial Government has very sincerely thanked all the parties concerned.

A short time after conditions had returned to normal, our expedition activities were completed and PMZ said good-bye to its numerous friends of the air. It was with a rather sad feeling that I shut down the little gas engine for the last time knowing that she would never again disturb the ether of Central Dutch Borneo.

In the June issue of QST a letter from Ted Seelmann was published expressing our intense appreciation of the hearty cooperation given our party by the members of the American Radio Relay League and I shall not attempt to add more.

Amateur radio, like many other finer things of life, is not always duly appreciated in one’s daily routine. Not until you can stand off at the far ends of the earth and view the coordinated workings of every little cog is one likely to realize fully what a wonderful and staunch machine it is, carrying us all forward into the realms of science and adventure.

Midwest Division Convention
Topeka, Kansas, Sept. 6–7
(Kansas Section)

All aboard for Topeka, Kansas, where the Kaw Valley Radio Club is sponsoring the annual convention of this Division. Something new is being tried this year — the Convention will be held on Saturday and Sunday, September 6th and 7th. The Chamber of Commerce is the headquarters for the convention. Registration will take place Saturday morning and the big official banquet is scheduled for early afternoon Sunday. A.R.R.L. Headquarters have promised a representative, but as this announcement is being written it is still undecided as to whom it shall be; it may be A. L. Budlong, Assistant Secretary or A. A. Hebert, Fieldman.

We will have some good technical talks, plenty of good stunts, visits to interesting places and a general all around good time is planned for the delegates. We will do our best, but after all the success of the convention will depend on your attendance. Come!

Please don’t forget to write to Frank K. Tiffany, Secretary, Kaw Valley Radio Club, 919 King St., Topeka, Kans.

Strays

The signal strength with the popular 4-tube receiver (described in November, 1928, QST, and in the Handbook) can be greatly increased, according to W9FPD, by substituting a tuned circuit for the antenna coupling resistor. W9FPD uses a 2¾” diameter coil of 5 turns of No. 18 wire, tuned by a 250-µfd. condenser, this combination covering both the 7000- and 14,000-ke. bands. Tuning is not critical, since the antenna is directly coupled. The size of the antenna will influence somewhat the amount of inductance and capacity required.
Dummy Antennas

By Guy C. Omer, Jr.*

ONE of the greatest problems now confronting the amateur is that of interference. The Technical Development program has made possible stable transmitters; taking up but little space in our crowded spectrum, but a necessary feature in obtaining operating stability is the careful adjustment of the transmitter under load, with constant monitoring. The load employed in about 99 cases out of 100, however, happens to be the most logical one, the regular antenna system. The interference caused thereby is of serious proportions. Moreover, the widely prevalent practice of warming up the transmitter under load and of experimenting with different arrangements, also with transmitter loaded, contribute their full share to the present day QRM. Although the method in general is highly commendable, the load employed should be a non-radiating one— in other words, a dummy antenna.

Besides effecting a great saving in the wear and tear on the vocabulary of the fraternity, the dummy has other uses. As long as your transmitter doesn't radiate, you are bound by no regulations. So if you wish to see how your transmitter will behave at such and such a frequency without the amateur fold be or if you wish to test out that 'phone with a phonograph record— reach for your dummy!

HOW A DUMMY ANTENNA WORKS

All right, now let's see what makes the wheels go around. As far as the transmitter is concerned, the antenna system is nothing but a closed circuit containing reactance and resistance. When the antenna system is in resonance with the tank, the reactance is close to zero and the resistance is mainly “radiation.” Now, if we replace the antenna system with a closed circuit containing nearly the same values of reactance and resistance, the transmitter will continue to oscillate merrily on, all unsuspecting. No fellows, the idea is not new—it's as old as radio.

PRACTICAL TYPES

W9EBF-W9FSC is a 15-watt station operating on a frequency of 3700 kc. using the 150-foot high KMMJ antenna at its fifth harmonic. At its fifth harmonic, this antenna has a resistance of approximately 275 ohms. The dummy used here is about the simplest possible, since the resistance also doubles as the inductance. This combination inductance-resistance is wound with about 60 feet of steel wire, which was used because it was handy. It is mechanically strong, has fairly high resistivity and fair permeability. The latter factor helps along the skin effect, thereby adding to the radio frequency resistance. One dime procured twice as much wire as was needed.

THE DUMMY ANTENNA MOUNTED ON THE WALL OF THE SHACK

Iron wire wound on strips of wood furnishes the necessary inductance and resistance.

The steel wire is wound on three soft-wood forms of a cross section measuring about 5/16" by 2". Two of these forms are 20" long and have windings of 50 turns apiece and the third form is 9" in length and has a 20-turn winding. The amount of resistance cut into circuit is readily variable by a clip. The correct resistance was found by trial and error and these values will not fit your dummy.

An old 250-mfd. variable condenser was dug out of the junk box and, with the resistance, was fastened to the wall behind the transmitter. The schematic of the dummy, what there is of it, is given in Fig. 1.

When putting the dummy into service, it is first adjusted to duplicate the characteristics of
the regular antenna system. Tune up your transmitter on normal frequency under normal conditions. Note the values of plate and antenna currents and record them. Now, leave all other adjustments alone and substitute the dummy for the regular antenna system. Tune up your transmitter on normal frequency under normal conditions. Note the values of plate and antenna currents and record them. Now, leave all other adjustments alone and substitute the dummy for the regular antenna system. Tune the dummy to resonance with the tank and cut enough resistance into circuit so that the same plate current flows previously and the same current flows through the dummy as flowed into the antenna. When making this adjustment, better take steps to protect your antenna current meter because heavy currents may flow in the dummy before you get the right amount of resistance cut into the circuit. Retune the dummy, of course, after each change of resistance since it also acts as an inductance.

Now the dummy duplicates the regular antenna system for the frequency and any warming up or tuning you wish to do may be done with perfect silence for the ham in the next block. I tune my transmitter to my dummy, but check the resonance of the antenna with the tank while sending the first "ka" because the dummy has considerable d.c. resistance and it therefore has a broader resonance peak than the antenna. The dummy duplicates the regular antenna only for frequencies close to the one tuned up to. At other frequencies (for an exact duplication) retune the dummy.

The resistance should be readily variable since the resistance of an antenna system varies with frequency changes. The fundamental of the dummy does not have to resonate with the tank and harmonics can be used just as easily. Therefore, the values of inductance and capacity are rather unimportant. If the fundamental of the dummy is in the 1715- to 2000-kc. band (or lower) it can be used in all amateur bands, making a very flexible system.

For the amateur who wants a better dummy, the inductance, capacity, and resistance should be separate. The resistance wire should be wound non-inductively. A non-inductive winding may be made by doubling the wire and winding it on a form, taking care that the turns do not short. The field of one half of the wire cancels the field of the other half with this type of winding. The tuning up of this type of dummy is similar to the method given previously but is much simplified, since the dummy is brought into resonance with the tank and left alone while the resistance is varied until the correct value is arrived at. It would be best to check for resonance after this, however, because the resistance may have a slight effect on the tuned circuit.

In stations using a feeder line to couple the antenna to the tank, the dummy would be coupled best, directly to the tank. In some commercial installations, a feeder line is used to couple the dummy to the tank to more closely duplicate actual operating conditions, but this is a useless expenditure for the average amateur.

The resistance may be wound with any wire — nichrome, iron, German silver, or anything on hand that will work. The resistance may be any size or shape — it only must be able to dissipate the power. It may be home-made or obtained ready made. Western Electric uses the Ohm-Spun resistors for dummies. In one of the R.C.A. dummies, a water cooled resistor is used and to determine the output of the transmitter, the rate of flow and the rise in temperature of the cooling water are measured!

MONITORING

Monitoring is simple and straightforward. The regular monitor is used in the usual way except that it should pick up the signal from the dummy and not from the tank. For average power, bringing the monitor into proximity with the dummy probably will prove sufficient. For lower power a closer coupling may be obtained by a single wire, one end in the neighborhood of the dummy and not from the tank. For average power, bringing the monitor into proximity with the dummy probably will prove sufficient. For lower power a closer coupling may be obtained by a single wire, one end in the neighborhood of the dummy and not from the tank. For average power, bringing the monitor into proximity with the dummy probably will prove sufficient. For lower power a closer coupling may be obtained by a single wire, one end in the neighborhood of the dummy and not from the tank. For average power, bringing the monitor into proximity with the dummy probably will prove sufficient. 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The Third International Relay Competition

By E. L. Battey, Assistant Communications Manager

W

WOOPS!! Now it comes out! The various committees which have been working on the Third International Relay Competition have at last completed their work and turned in their reports. And the reports surely are eye-openers!

The task of checking over the logs fell to the lot of the Award Committee. Those certificates were too good to distribute carelessly, so the committee labored carefully, spending many days going over the reports to see if all rules had been complied with, and that was some piece of work! It was a ticklish undertaking, too. When a fellow has put in a lot of time and worked hard, it is mighty disheartening to him to find, when the scores are calculated, and note the many points that had to be kept you guessing any longer. Here goes — it’s too good to distribute carelessly.

We know that every one wants to know who won and who has the largest score, so we won’t keep you guessing any longer. Here goes — it’s probably a case of “he who lost the most sleep ran up the highest score.” W6BAX heads the list with a total of 3210. W2CXL comes next with 2945, having worked 83 stations in five continents. What a score! W2CXL comes next with 2945, having worked 83 stations in five continents. Incidentally, no station succeeded in working the six continents. And who is third?

None other than W1ASF, the “old reliable” of international tests. He has a total of 2925. Not a bit bad for a one-man station! “Windy,” W8GZ, gave the gang a fast race to the tune of 2135! W6AAZ ran up to 2180. The sixth and seventh high are W4PT and W2FP with 1000 and 1495 respectively! Seven is a lucky number so we will stop there and list below the twenty-five highest scoring stations in the United States and Canada.

The Twenty-Five High Stations

W6BAX, 3210; W4PT, 1600; W0DEF, 1420; W8DJV, 1140; W1AZE, 1065; W2CXL, 2945; W2FP, 1495; W7BE, 1368; W8AXA, 1112; W6MZ, 1060; W1ASF, 2925; W9UM, 1476; W7MO, 1305; W3DH, 1104; W6BSN, 976; W8GZ, 2435; W3ECZ, 1440; W6B2D, 1260; W6EPZ, 1092; W6CCW, 915; W6AAZ, 2150; W1CMX, 1430; W9YC, 1236; W9DGZ, 1098; VE2CA, 856.

There are some mighty impressive scores in that list! It is particularly interesting to note that the high stations are well distributed throughout the country. This leads us to believe that the system of weighted credits, which was tested out in this contest, is somewhere near what we are looking for. But after all this was not a contest between stations throughout the entire country. It was, rather, a competition between the stations in each A.R.R.L. section of the United States and Canada, and between the stations in each foreign country and outlying district where the intermediates “W” and “VE” are not used. A station on the east coast was not trying to out-do one on the west coast, but was trying to defeat all other stations in its particular A.R.R.L. section. Certificates will go to the leading foreign-contact station in each section and to the highest scoring station in each foreign locality. A complete list of final scores is given at the close of this article.

Now, what about the foreign participants’ scores? CMSUF not only leads the stations outside of the United States and Canada, but also has a score higher than any United States or Canadian station! The score is 3564!! Zowie! CMSUF exchanged messages with 98 stations in the nine United States districts and with 4 stations in three Canadian government inspection districts. HC1FG would have beaten CMSUF’s record had VE9AL counted as another district, but Canadian...
"9" stations count for the district in which they are located. In VE9AL's case this is the second Canadian district. As it is, however, HC1FG's score is a humdinger — 3510 — a score any station owner should feel proud of. HC1FG contacted more districts than any other station — 9 United States and 4 Canadian. A well-known Porto Rican comes third — K4KD with 3300 points! A total of 3278 gives X9A fourth place. ZL2AC has 2981, and here is G5BY with 2552! We wonder what would happen if G5BY wasn't found with the leaders? There are twenty-nine countries represented in the list of scores following the United States-Canada totals.

**MR. VASCO ABREU SEATED AT HIS STATION PY1AW**

Before we go on, let's see what we can find in some of the letters received from participants. The first and foremost cry is, "I had a whale of a time in the tests. When are the next ones" or words to that effect. Let us consider the United States and Canadian comments by districts. First district: W1ASF found 14 mc. to be the best frequency. European and South American signals came through very poorly. Australian and New Zealand contacts were plentiful. W1AFD says, "Only the very high powered stations came through." W1RY found many foreigners who didn't understand about the tests. Second district: W2CXL reported the off-frequency "W" stations more prevalent than in the tests two years ago. More about that later! Third district: The number of "W" stations answering his "CQ test message" calls, W3A1Y was led to believe that many United States barns have recently come in from foreign countries. Hi. W3ATJ heard many stations which ordinarily use d.c. using raw a.c. during the tests. He started to list the stations heard out-of-band, but had to give up as it left him no time to operate. Fourth district: Oceania appears to be the easiest continent worked in this district. Fifth district: W5WW had his troubles with a power leak, R5-6 in strength, which was on constantly from February 22nd to 28th. Sixth district: W6BAX contacted all continents except Africa on the first day of the tests. European signals were very weak. W6CUH reports 7000 kc. was FB and 14,000 kc. very poor. W6CTP had a good time with one. Type '12A. W6BYH blew a couple of fifties during the excitement. Seventh district: W7DP lost several good foreign QSOs due to broad a.c. signals of United States stations. He says that weather conditions were not the best; 14 mc. was absolutely N.G. after 7:30 p.m. W7ACD, the only Idaho station submitting a score, used a single Type '10. W7AHX found a scarcity of foreigners on 7 mc. Eighth district: W8BYT says, "Bad weather and QRN." W8DED did not hear as many foreigners as in the previous tests. Ninth district: W9AUH bewails the number of stations using raw a.c. on 14,000 kc. W9AJA has some interesting comments, which we quote: "On the two week-ends that the station was on the air for European and African contacts, perhaps the outstanding feature was the absence of signals from those localities, and the terrific QRN from the east coast. . . . A significant proof of the fact that foreign stations rarely answer American CQs is shown in the list of QSOs from this station during the tests, as every station that was worked from here was raised by first listening and finding the foreign station. . . . More intelligent use of the receiver and less use of the transmitter will result in more foreign cards on the station wall." Canadian second district: VE2CA and VE2AC report conditions very poor during the contest. Europeans were almost entirely absent. Only five South Americans and no Asian and African stations were heard. Australian stations were numerous but weak. QRN was very bad. They also mention the raw a.c. notes on 14,000 kc. VE2AC says, "I appreciated the general patience and good humor of my foreign QSO parties in answering my numerous calls for repetitions and fill-ins. These fellows were real sports." Canadian fifth district: Northern lights bothered VE5AW. The first six days of the tests he did not hear a signal.

Now let us look over the comments from for-
eign participants. Activity was highest in Australia and New Zealand. From ZL2AC: “We all had a very enjoyable time and met many an old friend during the course of these tests.” ZL1FC did some fine work with 50 watts input to four type ‘O1As in push-pull. VK4DO says QRM was the worst factor to contend with during the tests, and that during the first week “W” stations were not at all strong. VK3JK says, “The lesson of these tests is that a pure d.c., steady note will let a lot more of us work together in the band at the same time.” Several participants complained that many “W” stations did not have test messages. According to VK2NS, the best United States signals came from W2CXL, with W8GZ second best. The 14-mc. band was found rather unsatisfactory by the VK and ZL stations. Conditions in Great Britain were very poor all during the contest. G5BY says this was especially true on 7 mc. G6LK was unable to contact any “W” stations on 14 mc. because of adverse conditions. G2GM states that only the high-powered stations came through with any consistency. CT2AA found it extremely difficult to get reply messages. ON4BC found DX conditions good. HAF8B was troubled by very strong, broadly tuned western Europe stations, and by QRN. HAF3C tells us that United States signals came through very well but stations in Hungary had a hard time reaching America. OZY says that February is a bad month for Denmark-United States contact, and that consequently he was unable to exchange many messages. South American participants didn’t give us any dope on conditions there, but we should judge from scores that they were quite favorable. Conditions in China, except for QRM, were very good. V86AH says, “The ‘W’ stations came in at good strength, the reports given by this station averaging R7, QSA5. Crystal control stations, even when R3 or less, ‘scored all along the line’ for ease of message exchange.”

We should like to go on now and list the scores, but there is something else we must consider first, something which will probably leave a bitter taste in the mouth of some participants. We are speaking of the report of the Irregularities Committee. After all that has been said in QST during the past year, after all the advice and warnings that have been given, there is very little excuse, if any, for off-frequency operation. And yet, 14 participants in the tests were logged out-of-bounds! Sufficient evidence was presented to the Committee to disqualify fourteen of this number!! While each case of off-frequency operation was considered separately and on its own merits, a single observer’s word never constituted sufficient evidence to warrant disqualification. The one exception to this rule was in the case of observations made by a member of the headquarters staff. Inasmuch as the unquestionable accuracy of his reports was known, a single off-frequency report made by him meant “disqualification.” W5ANA, W6CNX, W8DED, W9AYZ, W9B6U and VE5AW would have each received the certificate for their section had they been more careful in staying within the amateur channels. The other stations disqualified for off-frequency operation, although having scores too low to receive certificates, are: W2AYJ, W2UK, W2AEY, W5AQY, W6EAK, W6DPJ, W7EK and K4AN. There are several other irregularities to consider in addition to the off-frequency cases. One amateur was disqualified on two counts—not only was he working outside the bands, but...
frequencies. 7 mc. was the popular band in Australia and New Zealand. Throughout the other countries it seems to be more or less of a toss-up between 7 and 14 mc., with, perhaps, a slight leaning toward 14 mc. Of the “W” and “VE” stations, 17 succeeded in contacting five continents; 14 worked four continents; 42 worked three; 35 worked two; and 21 worked one continent only. The leading stations so far as number of contacts is concerned are W2CXL in the United States and Canada, and CMSUF in the foreign group. W2CXL exchanged messages with 83 stations and CMSUF with 102.

**SCORES**

**The Third International Relay Competition**

Asterisks denote stations reporting but not entered in contest.

**E. Massachusetts**

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**W1AJD** | 12 |
**W1ACH** | 9 |
**W2CXL** | 2945 |
**W2CJX** | 2945 |

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**W1SHA** | 1060 |
**W1BHGM** | 117  |
**W1DF** | 42   |

**Connecticut**

**W1SZ** | 1060 |
**W1BHGM** | 117  |
**W1DF** | 42   |

**N. Y. C. L. I.**

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**W2AVO** | 91  |
**W2CJX** | 70  |
**W2FLL** | 66  |
**W2BPY** | 30  |
**W2AWE** | 6   |
**W2BYY** | 6   |
**W2AEB** | 3   |
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(Continued on page 80)
get the gang together, have them pipe down, get their heels together, look me in the eye, and I’ll spin a yarn that’s never been told. Kitty, make fast over to leeward and close aboard — my aim isn’t what it was.

On the wall at A.R.R.L. Headquarters, over the Secretary’s desk, in a glass-covered case, since the days of Tuska, lies the Wouff-Hong. It is a fearful and wonderful instrument of torture. It is old and worn smooth from years and years of use. Every ham in radio, old or young, stands in awe of it. Since the beginning of amateur radio it has meant “The one or the other” — either law and order or the Wouff-Hong, take your choice. Have a squint at the illustration.

On the wall, at the United States Naval Academy, at Annapolis, Maryland, in the historic auditorium, since the early days of a previous century, hangs a blue silk flag. On it appear, badly faded, an olive branch, a fearful and wonderful instrument of torture and an inscription. Take a squint at the illustration of this historic old flag and read the inscription. It says those same words, “The one or the other.”

In the long ago there lived some especially offensive dark-skinned whops on the southerly shore of the Mediterranean. They used to make a business of stopping every merchantman that passed and collecting a wad of gold or capturing the ship and putting the crew and passengers into slavery. They were known as the Barbary Pirates. For centuries they worked this graft.

In the early days of our country there was a United States naval officer named Stephen Decatur. Steve was a double-listed double-distilled hellion. The Navy in those days was mostly hellions, whether ashore or afloat, having just finished off the British Navy in the unpleasantness of 1812. It was Stephen Decatur who put into immortal words the thought that appeals to every properly-built male American. Looking up at the Stars and Stripes he said, “My Country — may she ever be right, but right or wrong, my country!” It’s that kind of stuff they put into a man at the Naval Academy and it’s the same stuff that has made these United States of America what we are to-day. Stephen Decatur came from the U. S. Naval Academy and he had soaked up a lot of it. Well, after some American ships and American citizens had been seized by the Barbary Pirates, the Navy Department assigned a squadron to Decatur and told him to go the limit.

Decatur shoved off and decided to go to the mat on the matter at once. He picked up a couple of pirates off Algeria, shot up the whole works, killed the admiral of the Algerian navy, took (Continued on page 80)
The Operating Characteristics of Vacuum Tube Detectors

A Graphical Study of Grid and Plate Detection for Triode and Screen-Grid Tubes

In Two Parts—Part I

By H. A. Robinson, W3LW*

It is the purpose of this paper to present to the average amateur radio operator, in terms which are within his grasp, the general fundamental principles underlying the operation of vacuum tube detectors. The effects of varying detector characteristics and circuit constants are considered and presented in graphical form for both triodes and screen-grid detector tubes, Type '27 and Type '24 being specific examples of these two classes of tubes. It is hoped that a better understanding of the operating characteristics of detectors, together with a knowledge of the desirable circuit constants, will enable amateurs to secure improved performance from this all-important element of the receiving equipment.

Generally, in radio reception it is the function of the detector in some way to transform the impressed radio-frequency signal into an electrical impulse varying at an audio frequency. Vacuum tubes as usually employed depend upon the non-linear relation between their inter-electrode currents and voltages for their detecting performance. This relation is shown by the diagram of Fig. 1. Here a typical dynamic characteristic is shown. This curve may represent the relation between grid current and grid voltage from

* Silver Lake Farm, Willow Grove, Pa.
which grid detection is obtained; or it may be the variation of plate current with grid or plate voltage, corresponding to plate detection. The departure of this dynamic characteristic from a straight line, at least at certain parts, satisfies the requirement of non-linearity necessary for detector operation.

Let us consider, for example, the operation of the tube as a plate detector, the principles of grid detection being analogous. Then the dynamic characteristic of Fig. 1 will be the so-called mutual characteristic, showing the relation between grid voltage and plate current. Remembering our fundamental detector requirement of non-linearity between current and voltage, let us choose an operating point in the region of greatest curvature as at "0." For a given tube, the general shape of the dynamic mutual characteristic will be similar to the curve of Fig. 1, although this is dependent also on the plate voltage and plate circuit load impedance \( Z_p \), of Fig. 3.

The operating point "0" is fixed for a given plate voltage (and given screen-grid voltage as well, in the case of a screen-grid detector) by the value of negative grid bias voltage. For any given operating point there is a corresponding d.c. plate current, indicated by \( I_0 \), in the diagram. However, when the impressed signal reaches the grid, the grid potential varies around the bias voltage as a mean, depending on the character of the signal. The simple case of a pure sinusoidal signal is shown in the diagram, and by projection the resulting plate current variation is obtained (\( v_{ip} \) of Fig. 1). Because of the curvature of the dynamic characteristics, this resulting plate current variation departs considerably from a pure sine wave superimposed on the steady d.c. plate current \( I_0 \). By mathematical (see appendix) or graphical wave analysis this plate current variation can be shown to be composed of a direct current component (\( \Delta I \) in the diagram), a component of the fundamental frequency of the impressed signal and components of higher harmonic frequencies. Only the fundamental component and the d.c. component are shown in the diagram at the extreme right. Thus, if the signal impressed on the grid is one of radio frequency, the resulting plate current will have a radio-frequency component which will not affect the headphones or audio amplifier, but is usually by-passed around them. However, the d.c. component \( \Delta I \) will energize the headphones resulting in a dull plop similar to a key thump when the impressed signal is interrupted. This d.c. increment of plate current (\( \Delta I \)) which adds to the steady d.c. plate current \( I_0 \) when a signal is impressed, can be read on a d.c. meter in the detector plate circuit, providing the impressed signal is of sufficient amplitude.

The curves of Fig. 2 show the variation of this d.c. plate current increment \( \Delta I \) with the amplitude of the impressed r.f. grid voltage. These measurements were made using a Type 27 tube at 1500 kc. The steady d.c. plate current \( I_0 \) of 2.71 ma. was balanced out and only the plate current increment \( \Delta I \), due to the impressed signal, read on the plate milliammeter. The mathematical analysis \(^1\) of the detector action, for small signal voltages, shows the detector output to vary as the square of the impressed voltage, neglecting distortion terms. To check this conclusion, the d.c. plate current increment \( \Delta I \) and the impressed r.f. voltages were plotted on logarithmic scales resulting in curve A of Fig. 2. This is a straight line, the slope of which is 2.1, thus giving an experimental check on the square law detection factor. Curve B shows the same current-voltage relation plotted with uniform scales.

It should be noted at this point that in the usual detector application, it is not this d.c. plate current increment which produces the useful output signal. However, the audio-frequency plate current variation produced by modulated or heterodyne reception, results from this curvature of the dynamic characteristic in a similar though more complex way.\(^1\)

In the case where our operating point is not at a region of considerable curvature on the dynamic characteristic, as at "0" in Fig. 1, the plate current variation is identical with or approaches the grid voltage swing in wave shape. Thus the output is of the same frequency as the input and we have straight amplifier action (\( e_{ip} \) and \( i_{ip} \) of Fig. 1).

In the case of a grid detector, the curve of Fig. 1 would be the dynamic grid characteristic showing the relation between grid current and grid voltage. For this type of detector the operating point "0" is determined largely by the

\(^1\) See appendix following Part II.
potential of the grid return to the filament and the resistance of the grid leak. The detection principle is exactly the same. Here the audio-frequency components of grid current, produced by the curvature of the grid characteristic when receiving modulated or heterodyned signals, cause audio-frequency variations of the grid potential which affect the plate current through pure amplifier action. Thus the detector performance depends on the curvature of the dynamic grid characteristic at the operating point. Usually, for small signal voltages this grid characteristic curvature is more pronounced than the curvature of the plate characteristic, resulting in greater sensitivity for grid detection. However, this cannot be taken too rigorously, since other factors which we will now consider also affect the detector performance.

It will be noted from the diagram of Fig. 1 that the effective curvature of the dynamic characteristic throughout the region of grid voltage variation (a-o of Fig. 1) depends on the magnitude of the impressed signal voltage. Thus the operating point for maximum detector performance may be considerably different for low signal levels than for relatively high signal levels. It is usually this factor that limits the use of grid detection to relatively low signal inputs whereas plate detection is usually employed for detection at signal inputs greater than two volts — so-called "power detection." The consideration of distortion becomes of prime importance in the case of the reception of voice-modulated signals and may determine the choice between grid and plate detection.

It would perhaps be well to note here that the terms grid and plate detection, as applied to vacuum tube detectors and as used throughout this paper, refer to the detector action resulting from the curvature of the grid or plate characteristic respectively. In the case of grid detection, detector action also may occur in the plate circuit — a condition which usually is undesirable and which will not be considered here because of its complexity.

The diagram of Fig. 3 shows the equivalent circuit of a triode, or three-element vacuum tube. Here the inter-electrode capacities are shown as well as the internal grid and plate impedances of the tube (\(r_g\) and \(r_p\)). \(Z_e\) is the external plate load impedance.

In the case of plate detection, the grid is usually negatively biased to get down to the region of greatest curvature of the dynamic mutual characteristic curve and hence the grid does not draw current. The internal grid impedance (\(r_g\)) is then very high, a condition which results in greater selectivity in the tuned circuit across which the detector is connected. In a circuit arrangement in which a tuned input circuit is also the coupling impedance of a radio-frequency amplifier, an increase in amplifier gain usually results when using plate detection. However, this increase was slight — but five per cent — for a screen-grid
The Type '24 amplifier giving a voltage gain per stage of 80 at 1500 kc.

As mentioned before, the curvature of the dynamic plate characteristic is affected by the plate voltage (and the external plate load impedance $Z_l$), thus influencing the detector performance.

Considering the plate circuit of Fig. 3 it is apparent that the equivalent voltage acting between the plate and filament, resulting from the signal impressed on the grid, reduces to the simple consideration of a generator of internal impedance $r_p$, equal to the tube plate impedance, in series with the external load impedance $Z_l$. Thus for maximum detector power output (but not maximum undistorted power output) the familiar relation holds: The external plate load should be a pure resistance equal to the tube plate impedance. However, as usually employed, the detector output swings the grid of a succeeding audio amplifier tube and the detector output voltage across the external load impedance is the primary consideration. It can be shown readily that for the maximum output voltage across the load $Z_l$ the internal plate impedance of the tube ($r_p$) should be negligible in comparison with the external load impedance. Hence the detector performance depends on the values of external load impedance and internal plate impedance.

Moreover, the internal plate impedance of the tube is a function of the plate and grid (and screen-grid) voltages, and all these factors enter into the consideration of detection by means of vacuum tubes.

To demonstrate experimentally the variation of vacuum tube detector performance with the tube parameters and circuit relations as considered above, an extensive series of measurements were made. The experimental set-up employed in this study of detector operating characteristics is shown by the block diagram of Fig. 4. A General Radio signal generator Type 203-B supplied the modulated radio-frequency signal of a known percentage modulation and of a known and conveniently adjustable voltage. A screen-grid radio-frequency amplifier stage of known voltage gain was inserted between the signal generator and the input to the detector whose characteristics were being measured. The detector audio output (having the original modulating frequency) was magnified by an audio-frequency amplifier of known gain. The amplifier's output was measured by a vacuum tube voltmeter of the thermo-couple type.

Two representative types of vacuum tubes were employed and their characteristics measured as both grid and plate detectors. The Type '27 tube was selected as the typical triode detector because of its increasing use in receivers employing alternating current for filament heating. The rugged element structure of this type tube and general operating characteristics recommend it for use as a detector, as well as an amplifier, for applications requiring a three-element tube. The
operating characteristics and detector performance curves which follow apply in principle to other types of standard three-element tubes, such as the Type 901-A, 12-A, etc., with some modifications.

The popular Type 24 tube was taken as the typical screen-grid detector because of its excellent operating characteristics and increasing use as a detector as well as a radio- and audio-frequency amplifier.

Tubes having average constants for tubes of their type were selected and several tubes were employed to check the performance. The greatest performance variation between tubes occurs (as would be expected) for tubes operating as grid detectors, since the grid characteristics of tubes of a given class are subject to considerable variation — more so than the plate characteristics.

All of the following measurements were made at a carrier frequency of 1500 kc. A 400-cycle modulation frequency was employed with thirty per cent modulation of the output carrier except where measurements were made to determine the effect on the detector output of changing the percentage modulation. Although these conditions are not identical with those encountered in amateur e.w. reception, the detector performance is quite similar.²

²The measurements made by the author are for detectors without regeneration. Regeneration in the detector circuit will increase the over-all gain by increasing the ratio of alternating grid voltage to signal voltage, particularly at small values of signal voltage. The gain of the detector tube

TRIODE PLATE DETECTOR

We will consider first the Type 27 as a plate detector. The schematic diagram is given by A of Fig. 5. In this and the following schematic diagrams the circuit constants not listed were changed during the measurements and the detector operating characteristics determined for different values. Each performance curve indicates the operating voltages and circuit constants under which the measurements were made.

Detector gain is a convenient figure for comparing detector performance. It is simply the ratio of the audio-frequency output voltage of the detector to the radio-frequency input voltage to the detector. It should be noted that this gain factor is directly proportional to the percentage modulation. This should be remembered when referring to the performance curves which follow.

The series of curves of Fig. 6 shows the variation of audio output voltage (across an audio transformer primary used as the detector coupling impedance) with variation of radio-frequency input voltage. The effect of changing the operating point as a result of shifting the negative grid bias is clearly evident in the detector performance. The related series of curves of Fig. 7 shows the variation of detector gain with r.f. input for several values of negative grid bias. The maximum detector gain obtained for the particular value of plate load impedance employed in these measurements occurs with an r.f. input of three volts r.m.s. and with a negative grid bias of 20.5 volts. These values depend on the plate voltage and plate load impedance as well. It is evident from these results that the Type 27 as a plate detector requires a rather high r.f. signal voltage level for favorable operation. A radio-frequency input voltage level of two or three volts would have seemed impractical at these frequencies before the advent of the screen-grid radio-frequency amplifier with its high voltage gain per stage, but such detector signal levels are feasible, however, should be approximately the same with and without regeneration. For information on the effect of regeneration on the received signal strength see the paper of that title, by Balth. van der Pohl, Proc. I. R. E., Aug., 1928.

—Editor.
quently realized in modern broadcast receivers and demand "power detection."

From the curves of Fig. 7 it will be noticed that the maximum detector gain is obtained with different bias voltages, corresponding to different operating points on the dynamic characteristic, for increased r.f. signal input.

The curves of Fig. 8 serve to compare the performance characteristic of two different Type '27 tubes. From the curves of Figs. 7 and 8 it is apparent that the detector gain reaches a maximum for a certain input signal level (depending on the tube characteristics, electrode voltages and circuit constants) and then with increasing signal input the detector gain decreases. The importance of securing the proper detector operating conditions for the signal level at which one plans to operate for maximum detector gain is evident.

The curves of Fig. 9 show the variation of detector gain with negative grid bias for several different output voltage levels. These curves serve to give quantitative data on the performance of a Type '27 plate detector but are by no means complete.

**Triode Grid Detector**

The performance of this type of triode as a grid detector is of greater interest to amateurs and is more closely related to amateur application. The schematic diagram of this detector arrangement is given by B of Fig. 5. It will be noted that the grid returns directly to the cathode of the tube through the leak, \( R_p \).

The series of curves of Fig. 10 show the variation of detector gain with r.f. input for several values of plate voltage, and the corresponding series of curves of Fig. 11 show the audio output voltage variation under the same conditions. Again the detector gain reaches a decided maximum as in the case of plate detection; however, it should be noted that this peak gain is considerably higher than that previously obtained and is reached at a signal voltage level of 0.5 volts or less for the grid detector of this type. The increase in detector gain with increased plate voltage is also well demonstrated, although a further increase over the values employed is not justified from the standpoint of either tube life or performance.

The curves of Fig. 12 show the effect on the detector gain of changing the value of grid leak resistance. The improved performance at the lower signal voltage inputs obtained with higher grid leak values is apparent, but the differences are rather slight. Curve 2-A shows the typical output voltage variation for these conditions.

The effect of the capacity of the grid condenser is clearly illustrated by the detector performance curves of Fig. 13. Here the audio output voltage variation with r.f. input is plotted and the increased output with smaller grid condenser capacity is evident, though the effect is not great for grid condensers ranging from 100 \( \mu \)fd. to 300 \( \mu \)fd. At higher modulation frequencies (above 400 cycles) even better performance is obtained with the smaller grid condensers.

**Triode DETECTION**

Fig. 14 shows the variation of audio output voltage with detector plate voltage for several input signal voltages. It is evident that for the low signal inputs—of the order of a quarter volt—there is little improvement in detector gain with increased plate voltage, but that at higher input signal levels the audio output increases considerably with increase in plate voltage.

The curves of Fig. 15 compare the performance (Continued on page 82)
Naval Reserve Coöperates With Red Cross

Instructions Drafted for Emergency Communication in Disasters

A plan has been worked out between the Navy Department and the American Red Cross for the employment of the Naval Communication Reserve in times of emergency, when the Red Cross functions to bring relief to distressed communities. Detailed instructions have been drafted to govern the work of each participant in such work. We believe this question is of much interest not only to members of the A.R.R.L., who are also members of the Naval Reserve, but to all amateurs. It will be noted that Communication Method C-1 (referred to in Table A and in the text) provides for using amateur stations not affiliated with the Naval Reserve in case of emergency.

It is important to understand that this plan in no wise supersedes the Army-Amateur Radio System for emergency communication. The Army is the agency of our Government chiefly and directly concerned in acting towards the relief of the population in time of disaster. The Army-Amateur system exists as a method whereby individual amateurs in the scene may contact direct with the Army, from whom relief is to be expected. Of course every branch of the Government desires to be of assistance at such times. That normal desire, and the wish to give communication aid specifically to the Red Cross, are the activating motives in the present Naval Reserve plan. For details on the functioning of the Army-Amateur net in time of disaster, see page 1, Communications Department section, QST for February, 1930.

The complete text of the Navy Department instructions follows:

NAVY DEPARTMENT
OFFICE OF CHIEF OF NAVAL OPERATIONS
WASHINGTON

7 June, 1930.

From: Chief of Naval Operations.
To: Commandants, All Naval Districts.

Commandant, Washington Navy Yard.

Subject: U.S. Naval Communication Reserve — instructions covering employment in emergency in connection with American Red Cross relief.

1. The National Headquarters of the American Red Cross conferred with this office on the subject of emergency communication in time of disaster when normal lines of communication are inoperative. Under such conditions, the Naval Reserve communication organization including individual members of the Naval Reserve owning and operating radio stations can be of very great help in saving life and relieving suffering.

2. The American Red Cross through the medium of its 3,500 local chapters is developing disaster preparedness plans so that when a disaster occurs in a given community the local chapter, through its disaster relief forces previously organized, can function immediately with the greatest degree of efficiency. Among the several sub-committees operating as a part of each local chapter’s disaster preparedness plan is the Sub-Committee on Transportation and Communication. It is on this Sub-Committee that the American Red Cross designates members of the Naval Communication Reserve to be appointed as local liaison representatives of the Naval Communication Reserve.

3. In furtherance of the above, the following plan has been submitted to the Headquarters of the American Red Cross and has been approved by them. The Commandant of each Naval District will make appropriate arrangements so that the Naval Reserve Communication organization in his District, including each individual Reserve owning and operating an amateur radio station is furnished with complete instructions as to what to do in case of emergency.

4. Few serious local emergencies occur, but when they do arise, each Reserve should have the information that is necessary to permit instant and appropriate action.

5. Types of Disasters. — The types of disasters that may occur are divided into the following two major classifications:

(a) Predictable disasters; such as
   (1) General flood.
   (2) Hurricane.

(b) Unpredictable disasters; such as
   (1) Fire.
   (2) Earthquake.
   (3) Tornado.
   (4) Sleet storm or blizzard.
   (5) Bursting dam, landside, volcanic eruption, cloud burst, etc.
   (6) Explosion.

6. Preparations for handling emergency communications for predictable disasters are not a difficult matter. Heavy rains or melting snows are usually responsible for floods. Hurricane centers can be located and the probable course predicted in advance. Under such conditions, Commandants of Districts involved should notify the Communication Reserve personnel of the District to prepare to man the Reserve stations of the District. Duty performed under instruction from the Commandant must be on a voluntary basis and without pay.

7. Unpredictable disasters, usually of a purely local character, are the most difficult to provide for. Being entirely unexpected, no specific preparations are possible. In case a local disaster occurs, any Naval Reservist should attempt to send a report of the disaster to his Commandant at Naval District Headquarters, routing the message as follows:

(a) To any Naval Reserve radio station that is prepared to forward despatches immediately to the Commandant of the District in which the disaster has occurred, Table A (Method A).

(b) By calling the Naval District Headquarters on a regular Navy high frequency upon which a Naval District Headquarters is known to maintain a continuous listening watch, Table A (Method B).

(c) If (a) and (b) fail, by communicating with any radio station (amateur or commercial) on any frequency...
that will result in communication. Table A (Method Cl-C2).

(d) If case methods (a), (b) and (e) fail, by communicating with the nearest Army Corps Area Headquarters station. Table A (Method D).

8. When loss of life or serious injury occurs immediate assistance, in general equivalent to an "SOS" at sea, every means to effect communication should be adopted.

9. The foregoing plan provides for the delivery of emergency reports or messages to the Commandant of the Naval District in which the disaster occurs. The Commandant will take such action as he deems necessary and will also immediately file an urgent despatch by District in which the disaster occurs. The Commandant will take such action as he deems necessary and will also file an urgent despatch by

10. All Naval Reserve radio personnel will be informed that the following information is desired when reporting a disaster:

(a) First message to report: type of disaster, location and as much additional information as is immediately available.

(b) Second message to report: area covered by disaster. Number of persons dead. Number of persons injured. Number of persons temporarily homeless. Number of homes destroyed. Number of homes damaged. Number of families affected.

11. As soon as any of the above information is obtained, it should be immediately forwarded as outlined above. Additional messages will be forwarded as rapidly as information is procured. Personal messages should not be handled until official messages concerning relief messages have been cleared.

12. The American Red Cross is advising all its chapters of the above. Messages to the affected area will probably have to be handled by the emergency channels until the regular channels of communication are established. For instance, from Red Cross area office to Commandant, to Reserve station or amateur station which handled the outgoing despatches. For this reason, it is very important that each station inform each other station in the chain of their operating conditions, frequencies upon which they will receive and transmit and what schedules will be guarded.

13. The American Red Cross is advising all its chapters of the above plan.

14. Each Commandant is directed to disseminate the foregoing throughout the Naval Reserve organization in his District and to all individual. Reserve Officers of classes C-V (8) and V-3.

W. H. STANDLEY, Acting.
Standard Frequency System News

Pacific Coast Standard Frequency Station Appointed—
Headquarters Standard in Operation

It is our pleasant duty to report decided progress in the improvement of the League’s Official Frequency System during the last month. The new Elgin station, W9XAM, is well on the way to completion and Mr. Urie writes that inauguration of their standard frequency transmissions can be expected in September. While the transmitter is being built and tested at Elgin, the station’s secondary frequency standard is being assembled by General Radio at Cambridge.

THE PACIFIC COAST S.F. STATION

Our fondest hopes have been fulfilled. We are happy to announce the appointment of the Official A.R.R.L. Pacific Coast Standard Frequency station. This station will be operated by the Don Lee Broadcasting System (KHJ) of Los Angeles, Calif., with Mr. Harold Peery, W6AQG, Chief Engineer of KHJ, in charge. Associated with Mr. Peery in the S.F. work will be Mr. Ernest G. Underwood, W6DS, Technical Director of KHJ; Mr. Robert W. Murray, W6CTB, and Mr. Dean Moffatt. The assumption of Standard Frequency Transmissions by this group is made possible through the interest of Mr. Don M. Lee, owner of the Don Lee Broadcasting System, in the technical advancement of radio and of amateur radio in particular.

The call of the new station has not been assigned at the time of this writing. It will take several months to get the necessary frequency standard and transmitting equipment assembled but October should see the beginning of transmissions. Tentative schedules may be announced in the October issue of QST.

The frequency standard for this station will be on a par with that of W9XAM and the transmitter power will be similar to that of the other stations in the System. The strategic location of the Pacific Coast Station will make possible effective transmitters for amateurs in Oceania and the Far East. It is hoped that early morning schedules can be arranged for amateurs in those parts of the world.

THE HEADQUARTERS’ STANDARD

The League’s Official Frequency Standard has arrived in Hartford, after being calibrated at the Bureau of Standards in Washington, and is now set up in the laboratory. It has specified accuracy of 0.005% (1 part in 20,000). A special receiver to be used in conjunction with the standard is being built and frequency checking operations should be under way by the time this issue of QST is distributed. A complete description of the whole Headquarters’ Standard Frequency set-up will appear in an early issue of QST.

W1AXY PROBABLY TO CHANGE CALL

The M. I. T. Laboratory at Round Hill has an application for a new license pending and it is quite probable that this station will be using a new call for the Standard Frequency Transmissions within the next month. The new call will be W1AXY. This call will not be used for the QRG service, however, because the experimental license permits operation in the amateur bands for the transmission of Official A.R.R.L. Standard Frequency Schedules only. The old call, W1AX, will be used for the QRG service described on page 77, May QST, and page 21, July QST. More fellows should make use of this direct calibration service as well as of the Standard Frequency Transmissions — and be sure to QSL. We always have plenty of S.F. report blanks here at Headquarters, yours for the asking.

The next two issues of QST are going to contain some of the finest articles on frequency measurement and frequency meters we have ever published, (if we do say so ourselves) and an entirely new and better type of frequency meter will be disclosed. Even though you may already have a frequency meter of an accuracy of within 0.15% or better, you cannot afford to miss this dope. Of course calibration from Standard Frequency Transmissions is an important consideration in new development in frequency measurements. Get the habit of listening in on the S.F. schedules now and be ready to use them intelligently on your own meter next fall.

STANDARD FREQUENCY SCHEDULES FOR AUGUST

<table>
<thead>
<tr>
<th>August 8, Friday</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>August 15, Friday</td>
<td>B</td>
</tr>
<tr>
<td>August 22, Friday</td>
<td>C</td>
</tr>
<tr>
<td>August 31, Sunday</td>
<td>C</td>
</tr>
<tr>
<td>September 19, Friday</td>
<td>B</td>
</tr>
<tr>
<td>September 26, Friday</td>
<td>B</td>
</tr>
<tr>
<td>September 28, Sunday</td>
<td>C</td>
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<table>
<thead>
<tr>
<th>Time (p.m.)</th>
<th>Frequency, kc.</th>
<th>Time (p.m.)</th>
<th>Frequency, kc.</th>
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</thead>
<tbody>
<tr>
<td>8:46  8:50</td>
<td>8400  7200</td>
<td>4:30  4:50</td>
<td>7000  14,000</td>
</tr>
<tr>
<td>8:46  8:50</td>
<td>5500  7100</td>
<td>4:38  4:58</td>
<td>7100  14,100</td>
</tr>
<tr>
<td>8:16  8:24</td>
<td>3000  7200</td>
<td>4:16  4:24</td>
<td>7200  14,200</td>
</tr>
<tr>
<td>8:24  8:32</td>
<td>3700  7300</td>
<td>4:21  4:32</td>
<td>7300  14,300</td>
</tr>
<tr>
<td>8:46  8:50</td>
<td>2800  7200</td>
<td>4:32  4:52</td>
<td>7200  14,400</td>
</tr>
<tr>
<td>8:16  8:24</td>
<td>3000  7200</td>
<td>4:16  4:24</td>
<td>7200  14,200</td>
</tr>
<tr>
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<td>2800  7200</td>
<td>4:32  4:52</td>
<td>7200  14,400</td>
</tr>
</tbody>
</table>

...
The time allotted to each transmission is now 8 minutes, divided as follows:
2 minutes — QST QST QST de W1AXV (or W1XPI).
3 minutes — Characteristic letter “G” broken by call letters.
1 minute — Statement of frequency in kc. to nearest integral figure and announcement of next frequency.
2 minutes — Time allowed to change to next frequency.
The frequencies announced by W1AXV are accurate to within 0.01%.
The time is E.S.T. 8:00 p.m. at W1AXV is 0100 G.C.T. and 4:00 p.m. is 2100 G.C.T.
European listeners are urged to use and report on schedule BB which is transmitted particularly for them.

OFFICIAL MARKER STATIONS

Several applications for appointments as Marker Stations have been received and a number of others have signified their intentions of bringing their frequency measuring and transmitting equipment up to the standard necessary for Marker Station appointment. See July QST for details.

— J. J. L.

New England Division Convention
Portland, Maine, August 22-23.
(Main Section)

We are all set, fellows, for this year’s Maine Convention to be held at Portland on August 22nd and 23rd at the Eastland Hotel. The Portland Amateur Wireless Association extends a cordial invitation to all hams; their mothers, fathers, brothers, YL’s and OW’s to be with us.
While there will be good talks, the committee contemplates plenty of entertainment; trips, moving pictures, etc. The Radio Supervisor or one of his deputies will be present. Everett L. Battey, Assistant Communications Manager, of A.R.R.L. headquarters, will be the official representative from Hartford.
Make your plans to attend and write Manley W. Haskell, 15 Hemlock St., Portland, Maine.

The Midwest Division Convention

IOWA STATE COLLEGE, Ames, Iowa, again extended a warm welcome to amateurs on May 9th and 10th for the annual Midwest Division A.R.R.L. Convention and Ninth Radio Amateurs’ Short Course. Thanks are due Mr. D. C. Faber, Director of ISC’s Engineering Extension Service, for the courtesies extended by his department. President Huntsinger of the Campus Club, Mr. Konkle of WOI, A.R.R.L. Director Huber, Section Manager Kerr and all others who assisted them and extended cooperation should receive credit in due proportion for the success of this convention.
The first day brought a record registration, and there were about 140 present at the banquet Saturday. The sessions in the engineering building got under way on scheduled time Friday afternoon. George Hansen, W9FFD, of the Tri-State Club presiding, Section Communications Manager H. W. Kerr, W9DZ-W9GP, officially opened the convention, and following his remarks Director Huber gave an account of the subjects considered and action taken at the A.R.R.L. Board of Directors’ meeting in Hartford, from which he had just returned. Ensign “Chuck” Morgan, W9FFH, spoke interestingly on the U. S. N. (C.) R., clearly explaining the organization and its purposes. R. J. Rockwell of Omaha gave a good talk on practical methods of calibrating and adjusting condenser microphones. Mr. Walter of the Jewell Electrical Instrument Company next spoke on measuring instruments. F. E. Handy of A.R.R.L. headquarters discussed the new regulations, log-keeping, operating procedure, and reported on the seasonal characteristics of amateur activity. J. P. Dobyns, W9DXP, spoke on the Army-Amateur Net organizations. The afternoon ended with a discussion of directive antenna systems by Technical Editor Lamb of QST.
The evening was devoted to inspection trips and informal “hamfesting.” All departments of the college were open for inspection with special demonstrations in connection with VEISHEA, the college’s annual exposition showing the work of the several departments of the university to the public. For the most part the interest of “hams” was in the electrical lab., in W9DI and in the Campus Club shack where W9DTI was in full operation, and the wealth of convention prizes donated by generous manufacturers was on display.
The second day of the convention opened with a plea for frequency observance by F. V. Sloan of the Radio Supervisor’s Office, who had devoted his time two previous days to giving commercial and amateur operator’s license examinations. Causes and effects of off-frequency operation were discussed by F. E. Handy, A.R.R.L. Communications Manager, leading up to the different parts and types of amateur transmitters and the effect of each on frequency stability. Professor J. K. McNeely of Iowa State College lectured on radio interference. This was made doubly interesting by the display of his equipment and slides showing oscillograms identifying different sources and types of interference.
After lunch, the meeting was resumed with
Vernon Holmes, of the University of Iowa Amateur Radio Club, presiding. A movie showing amateur stations was run off. The subjects for the afternoon disclosed an unusual amount of valuable technical information. E. O. Johnson, Service Engineer for R.C.A.-Victor, spoke first on "Transmitting Tubes." Carl Menzer, Director of WSUI, gave an intensely interesting and informative talk on "Improving 'Phone Transformers," full of valuable tips for the proper handling of microphones and stations. J. W. Doty, KOH-W00GDG, discussed the work of Mr. Tyberg and himself on "Screen-Grid Detectors." F. H. Schnell, Chief of Staff of the Radio and Television Institute, spoke interestingly, stressing frequency observance. After showing the details on blackboard and screen, his new shortwave receiver was demonstrated. J. J. Lamb, Technical Editor of QST, followed with a discussion of oscillator-amplifier transmitters as the final subject of the afternoon.

The Campus Radio Club deserves hearty thanks for the banquet at the Hotel Sheldon-Munn on Saturday, which proved the climax to this most successful convention. Director Huber kept things moving in his capacity as toastmaster. The banquet speakers were S.C.M. H. W. Kerr (Grandpa to the Iowa boys), Headquarters' representatives including Technical Editor Lamb and his bride, Lt. Bellew, Ensign Morgan, J. P. Dobyns and F. H. Schnell. Everyone enjoyed the Cleveland Air Race Film which was a special feature of the program. The Liar's Contest extraordinaire was won by Dobyns, W9DXP, who displayed greatest "inventiveness." The entertaining stories spun by Sadilex, W9APM, and a dozen others added to the fun, and competition was keen. Phil Konkle of WOI auctioned off some big power tubes to the highest bidder. Then came the wholesale distribution of prizes including apparatus of all descriptions! There will be some fine signals on the air with all the power supplies and other station equipment put into use. (We hope the recipients will not forget to drop a suitable note of thanks to the manufacturers.) The convention ended at a late hour that night, some of the discussions lasting into the next day. Many are already planning on next year's Ames Convention again to benefit from the "short course" and renew friendships made over the air.

—F. E. H.

Strays

W1NX had an unusual experience recently. His chemical rectifier is installed in the cellar, and one day he noticed that his input was below normal and the signal was very unsteady. An investigation of the rectifier disclosed that a snake had crawled into the jars to keep warm. This snake got all the warmth he wanted — and more!

While experimenting with screen-grid detectors, W1ADF found that the secondary winding of a 3 to 1 Thordarson audio transformer makes a suitable coupling impedance for the plate circuit of the detector. The regular transformer connections cannot be satisfactorily employed because of the low impedance of the primary compared to the tube impedance.

The pocket testing device manufactured by the L. S. Brach Manufacturing Corp., Newark, N. J., contains a small neon lamp which will be found useful around the station. About 90 volts will start the bulb glowing.

—K6ECL

Finding the Expeditions

<table>
<thead>
<tr>
<th>Expedition Station</th>
<th>Frequency (ke.)</th>
<th>Call Signal</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schooner Bocaina</td>
<td>5555, 8330, 11110</td>
<td>WDDE</td>
<td>MacMillan Expedition to Labrador, Greenland, and Iceland, Paul Davis of W9ADU, Operator.</td>
</tr>
<tr>
<td>Yacht Antares</td>
<td>8300 (200 watts) d.c.</td>
<td>WODK</td>
<td>Left Bermuda June 20 for Southampton England. Will go down coast of France to Gibraltar, then to Azores. Chance of W3A1Q, Operator.</td>
</tr>
<tr>
<td>Yacht Mepelia</td>
<td>6670</td>
<td>DAIV</td>
<td>Summer cruise through the West Indies during July and August, Count von Luckner and party of fifty American boys. J. Pasek, Operator.</td>
</tr>
<tr>
<td>Greenland (east coast)</td>
<td>7330, 13040</td>
<td>NORC</td>
<td>Second Roumanian Arctic Expedition, H. L. Bassett of W06BB, Operator. Will start operation about Aug. 15 and be on lookout for all W signals.</td>
</tr>
</tbody>
</table>

* Count Felix von Luckner is offering a cup to be presented to the amateur operator who gives the best communication service to and from the Mepelia during this course.

** A worthwhile award is to be made to the amateur performing the greatest service for this expedition during its several months on location in Greenland.
The First Conviction Under the Radio Act

St. Louis Amateurs Cooperate in Running Down an Unlicensed Station

By Porter H. Quimby, W9DXY*

In St. Louis the amateurs, through the agency of the O.B.P. Radio Club, maintain what is called an interference committee. This committee operates in conformity with the A.R.R.L. policy of self-regulation. It investigates complaints against amateurs and makes recommendations for correction of interference, cooperating fully with the Department of Commerce in its endeavor to keep everybody happy under the Radio Act of 1927. The secretary of this committee is appointed by the club. He receives notice from the Radio Inspector, the broadcasting stations or the Radio Trades Association of St. Louis whenever one of these bodies receive a complaint of amateur interference. He investigates the complaint, calling on the club for men and materials to help him. If he finds amateur interference he makes the necessary recommendations for its correction, and usually gets immediate results. This or any other trouble he may find is reported to the club and also to the source of complaint. In this way very little policing is required from the Department of Commerce.

In November of 1929 a station started up in St. Louis, using the call letters W9ZJR. It was being operated by one George W. Fellowes at 3033A Gravois Avenue, on about 1565 kc., broadcasting music, voice, telephone conversations, etc., and rebroadcasting such other programs as could be picked up out of the air.

Mr. Art Janssen, a neighbor of Fellowes, was unable to use his receiver when Fellowes was operating because the latter's signals covered about 75% of the dial and blanketed out other programs. Janssen asked Fellowes to correct the trouble and was quickly told where to go, with the comment that the station W9ZJR was put up under the personal supervision of the Federal Government and must not be disturbed. Janssen then wrote a letter of complaint to the Radio Inspector, who referred it to our interference committee. The committee secretary called up Fellowes and asked him to correct the trouble. He also asked how he could broadcast music and entertainment on an amateur license, and whether he had such a license. He was told the station had been licensed by the Federal Radio Commission as an experimental station and could do about as it pleased, and if B.C.L.'s were interfered with it was just too bad. The secretary then reported his findings to the Radio Club and to the Radio Inspector. He also reported the matter to the then Director and asked that I take steps to correct the matter. I wired the Supervisor, and action started.

Radio Inspector William J. McDonnell appeared on the scene, made a survey and referred the matter to the U. S. District Attorney's office, which in turn called on the Department of Justice to make an investigation and collect evidence for a prosecution. The Department of Justice assigned their special agent, John E. Brennan, W9AC, to the case, who requested cooperation from W9DXY, W9BEQ, W9PW, W9DLB, W9ZK, ex-W9AOT and others. Under the direction of Radio Inspector McDonnell these men were deployed to various points to receive and record the transmissions of W9ZR.

The investigation established that W9ZJR was operating on or about 1565 kc. with a radiophone which caused interference throughout St. Louis and was heard as far away as Park's Airport, near Cahokia, Ill., and in the Federal Building at East St. Louis, Ill. The ingenuity of the amateurs made possible the recording of the complete program transmitted from W9ZJR. Brennan of W9AC is to be especially commended for his work in this connection.

When the necessary evidence had been obtained, warrants were secured from the U. S. Commissioner for the arrest of Fellowes and a search of his premises. These papers were served on December 10th by Deputy U. S. Marshall Norton, with the assistance of the R. I. and amateurs deputized for this work. The station was found in operation at the time and the apparatus dismantled and confiscated, and Fellowes lodged in jail. At a hearing January 16, 1930, before the U. S. Commissioner, sufficient evidence was introduced to cause the defendant to be bound over to the Federal Grand Jury. On February 12th this body returned a criminal indictment against Fellowes, charging the operation of a radio station for communication between the States of Missouri and Illinois without station or operator's license; that this station interfered with the reception of signals emanating from a licensed station of another state; that he rebroadcast programs of a duly licensed station without the necessary consent of such station. The maxi-

*Past-Director, Midwest Division, A.R.R.L., St. Louis, Mo.
mum punishment on conviction of any of these charges is a fine of $5000 and a sentence of five years' imprisonment.

The case went to trial before Federal Judge Faris on May 6th in St. Louis. This being the first criminal prosecution brought under the Radio Act of 1927, Paul D. P. Spearman, Assistant General Counsel, John E. Baron of the engineering staff, and George I. Smith of the Licensing Bureau, all of the Federal Radio Commission, were in attendance. Mr. Spearman assisted U. S. Attorney Stattler with the prosecution, while Messrs. Baron and Smith were called as expert witnesses. Operators from KSD and KMOX and a number of amateurs were called on to testify. Every claim that was made by Fellowes was met by government witnesses, composed largely of amateur operators, and resulted in his conviction by the jury in less than an hour.

The court commented at length on the necessity and value of a law regulating radio communication, and upon the wisdom and fairness of the Radio Act of 1927, stating that enforcement of this law was vital to the welfare of society. He stated that a violation should receive a substantial punishment, and thereupon sentenced the defendant to a term of one year and one day in the United States Penitentiary at Leavenworth, Kansas.

While the defendant was not an amateur, and was not using an amateur frequency, he had usurped an amateur call and was using typical amateur equipment and calling himself an amateur broadcast station. It was therefore important to the amateur fraternity that he be shut down and prosecuted, as he was flying false colors and calling down the wrath of his neighbors upon the amateurs. We, as amateurs, should feel highly gratified with the effort made by the several departments of the Government in removing from our midst a station that was operating to our detriment. The Government, on the other hand, should and does feel highly gratified with the whole-hearted cooperation afforded by the amateurs, as is attested by letters I have received from Mr. Stattler, U. S. District Attorney, Mr. Spearman, Assistant General Counsel of the Federal Radio Commission, and Mr. H. D. Hayes, U. S. Supervisor of Radio at Chicago.

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**Dummy Antennas**

*(Continued from page 16)*

dummy and the other end in the neighborhood of the monitor. An untuned link circuit could be used for that super-low power set.

Monitoring for 'phone is also quite straightforward and may be done in the same way as for c.w. A system of continuous aural monitoring used universally in broadcast transmitters is shown in Fig. 2. It consists of a vacuum tube linear rectifier coupled to the antenna circuit and feeding a loudspeaker or headsets through an output transformer.

The commercial monitor has a big job. It actuates a signal relay, furnishes excitation for an oscillograph and operates a half dozen or so speakers through a one- or two-stage amplifier. Consequently, commercial monitors use tubes ranging up to the 50-watt size so as to supply sufficient power.

However, for our use we will find a Type '16-B or a Type '81 more than big enough to operate a loudspeaker, and a Type '01-A with grid and plate tied together will rectify sufficient power for headset operation. The filament supply for the monitor tube can be obtained easily from the transmitter filament supply, dropping the voltage by resistors if necessary. The size and the number of turns on the pick-up coil are relatively unimportant. For headset or small speaker operation, the output transformer might be done away with by using a by-pass condenser across the headset or speaker.

When using a dummy, phonograph records make a very good method of checking up on an amateur radiotelephone set. Lacking facilities for that, an assistant speaking into a microphone in another room might be substituted.

Come on fellows, help reduce the QRM! Two bits and a trip to the junk box will fix you up with that dummy antenna.

---

**Strays**

The International Resistance Company has prepared a booklet entitled "Resistor Replacement Guide," which is a compilation of circuit diagrams of popular broadcast receivers marketed during the past three years, with particular reference to resistors. Power ratings and resistance values of all resistors used in the sets are indicated, so that the proper type of replacement unit to choose can be quickly determined.

Copies of the guide will be sent free of charge to dealers and service men on request. Inquiries should be addressed to the above company at 2006 Chestnut St., Philadelphia.

The range finder of an ordinary Kodak makes a first-rate microscope for examining the edges of a crystal for small cracks and chips, since it has a great deal more magnification than the ordinary reading glass. The crystal should be held next to the finder and the latter close to the eye.

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*Ex-W6BOY, W6BZW*
Experimenters' Section

7-MC. CRYSTALS

By Herbert Hollister, W9DRD*

THE old order changeth, and our 1.75-mc. quartz plates are now in a class with our last summer’s golf pants. They are not only obsolete, but they just won’t fit.

Doubling into the 14-mc. band with 1.75-mc. plates requires too many tubes and more plate power than the result justifies. The trick is still being done with 3.5-mc. oscillators, but now that the 28-mc. band has been dished up to us on a platter by the pioneers, we are faced with the same old problem.

All of which forces attention to those terribly fragile little beastsies, the youngest useful members of the piezo family: 7-mc. crystals. With plates of this frequency it is possible to operate in the 7-mc. band by straight amplification, the 14-mc. band by doubling once, and the 28-mc. band by doubling twice. It is the purpose of this article to emphasize the fact that these ultra-thin plates are in every way practical and desirable.

The few 7-mc. plates which have been used during the past three years have been almost without exception cut on the thick axis (“X cut”). Plates cut on this axis average about 2.6 meters per .001” of thickness, which means a 7-mc. plate will finish up about .016” thick. This would seem to be a very desirable advantage over the .011” thickness of the thin-cut plates of the same frequency.

However, the thick-cut plates have earned for themselves rather a shady reputation through their erratic behavior. After nearly three years of jiggling the holder to make the plate start up, carefully washing the plate in Carbona at least every third day and grinding out the burned spots on the holder plates once a week, the idea finally occurred to us to do something about it.

After reviewing the advantages of the thin-cut plates over the thick-cut ones at 3.5 mc, it seemed logical that the same advantages might hold for 7 mc. It was recalled that the thin-cut plates would oscillate more readily than the thick-cut ones even when the thickness of the plate was not exactly uniform. Edge finishing on the thick-cut plates was also much more important than on the thin cut. The “proof o’ the pudding is in the eating,” so a thin-cut blank was ground down to about .011” thickness. From its first test in the oscillator, this little wafer has shown no tendency to develop the idiosyncrasies of the thick-cut plates.

Obviously a plate so thin requires careful handling, but even so it is easier to grind a useful 7-mc. plate from a thin-cut blank than from a thick-cut one. About the only precaution to be observed is to keep from grinding the center of the plate thinner than the edges. This is very apt to happen, because a plate so thin is quite elastic and will bend with the pressure of the grinding finger unless it is reinforced by a flat piece of glass or metal. A piece of microscope slide about one inch square, ground flat on a new piece of plate glass with FFF abrasive, makes a fine backbone for the grinding job.

The blank should first have one face carefully finished with FFF or No. 500 Alumum or Carboumndum grain. If the plate is held so as to reflect light from an electric lamp, it will be possible to tell when the entire face is smoothed up. From then on all of the grinding is done on the other side. When a thickness of about .025” is reached it will be necessary to moisten the crystal with a drop of water and stick it to the previously prepared section of microscope slide. If this is not done it will be impossible to keep the hills and valleys out of the plate. After .020” is reached the pressure of the finger should be somewhat lighter than before or the crystal may be crushed to pieces against the abrasive. Down to about .015”, No. 150 grain may be used but from there on nothing coarser than FFF will do. The finished plate may well be .003” thicker in the center than at the edges.

The slab used for 7-mc. plates should not be too large, because of the danger of breakage and the greater difficulty of obtaining a plane surface. The ideal size seems to be about 3½” square, for there seems to be no greater output obtainable with larger sections.

Many of these very thin 7-mc. plates have been ground here and a few have been broken, so we feel competent to point out the most likely points of danger. Probably the easiest way to break a crystal is to catch it in the micrometer while checking it for thickness. Another excellent method of making little ones out of big ones is to bear down hard while finishing up the edges on a carborundum stone. But by and large there is nothing prohibitive in the grinding of a 7-mc. plate, and it is our opinion that anyone who can turn out a good oscillator at 3.5 mc. can do the same thing with a 7-mc. plate. Just a little more patience is required.

*Edwardsville, Kansas.

1 This conclusion does not agree with observations of other experimenters. The “thin” or “X cut” crystals often resonate at two frequencies fairly close together, whereas the “thick” or “Y cut” crystals do not exhibit this characteristic. See page 41, April, 1930, QST. — Ed.
One very interesting fact has been noted while testing these 7-mc plates in various holders. It seems that the size and surface condition of the holder plates has a decided effect on the frequency of the oscillator. It has been possible to change the frequency of a 7-mc plate by as much as 16 kc. by simply transferring the plate to another holder. No attempt has been made to learn the reason for this, but that it is a condition which has advantages and disadvantages is quite evident.  

Most any sort of a holder that works well with thicker plates will do for the 7-mc plates but a rather light top plate is desirable. About 200 volts on the plate of a Type '10 oscillator seems to suit the thin crystals very well.

**BIAS FOR THE POWER AMPLIFIER**

The problem of obtaining fixed bias for an amplifier following a crystal controlled oscillator without investing in several blocks of "B" batteries has been solved by R. B. Lawrence, W6DIK, who uses the plate supply to the crystal tube to provide the bias for the amplifier. The circuit diagram is shown in Fig. 1, and here are his remarks about it:

"While constructing a piezo-electric controlled transmitter recently the item of negative bias for the amplifier came under consideration. The price of the number of 'B' batteries prohibited their use, and a 135-volt 'B' eliminator is not entirely satisfactory. Consequently, it was necessary to dope out some form of circuit whereby the oscillator power supply might be made to perform a double duty and supply bias for the amplifier.

"The circuit diagram herewith sufficiently illustrates the idea. The constants of the circuit are the same as in ordinary practice. The only noticeable difference between this circuit and the usual oscillator-amplifier circuit is that of a separate filament supply for the oscillator and a grounded positive supply for the oscillator plate voltage.

"This circuit may be keyed in any fashion the individual may prefer. I have shown keying in the negative supply lead to the amplifier but did not illustrate a key-thump filter as it would be up to the individual to decide upon the form satisfactory for his installation."

**SOME HARMONIC PECULIARITIES**

Most of us have, at some time or another, listened to our transmitters on receiver harmonics, or tuned the receiver to a harmonic of the transmitter, and wondered why a note which was always reported pure d.c. on the air had so much r.a.c. in it in our own receivers. The natural inclination is, of course, to doubt the veracity of the other fellows and believe our own ears. However, it may be that the ears are at fault and the audience is right! The following letter from E. G. Watts, Jr., of Miami, Florida, explains why:

"Most of us have used a receiver with one of its harmonics beating against another oscillator, and have noticed that some of the receiver harmonics produce beat notes having a queer twang quite unlike the ordinary pure beat note. It sounds like nothing so much as the 'meow' of a cat. I wonder how many of us ever stopped to figure the phenomenon out. I ran across it several years ago while checking crystal oscillator performance on the harmonics of a broadcast receiver. I have never seen mention made of it in any publication. It is very simple, and perhaps well known, but I would like to offer my version of the explanation.

"If the second harmonic of a receiver of the ordinary autodyne type is made to beat against the fundamental of an oscillator having an unmodulated output, in the absence of appreciable oscillator harmonics the beat note produced will be the ordinary pure whistle; to all intents and purposes, a single frequency. Let harmonics of strength comparable to the fundamental now be added to the oscillator. The receiver harmonics are already assumed to be of this strength. The second harmonic of the oscillator will now form a beat with the fourth harmonic of the receiver, and so on down the line, with all the even harmonics. While this collection of beats is at zero beat simultaneously, at any other audible beat frequency no two are alike. The frequency of the beat produced on any given harmonic is greater than that which would be produced on the fundamental (none is being produced on the fundamental in this example) by the number of the harmonic. Thus in an instance where harmonics of both receiver and oscillator are strong, we hear a composite collection of frequencies simultane-
ously, caused by the harmonics as well as fundamental, instead of the single pure tone ordinarily heard. These tones combine and recombine, beating together to form new tones not fundamentally present, and the result is the queer sounding twang, which is quite unique. It is worth the effort to hook up the apparatus just to hear it. The usual crystal-controlled oscillator and the ordinary receiver have sufficient harmonic components to produce the effect noticeably. The reason it is present on some of the receiver harmonics and not on others, is that the even harmonics each produce a beat, while a little thought will show that only every third odd harmonic forms a beat, with the result that the effect is not usually discernible on odd harmonics. Therefore, we have in this a means of distinguishing even harmonics from odd.

"It is also plain to be seen why a monitor working on harmonics, either its own or those of the transmitter, cannot be relied upon to give an accurate indication of what the transmitter sounds like at the distant receiver. When a receiver harmonic is beating against a modulated source (transmitter with ripple, for instance) where the harmonics of the latter are also present appreciably, the note will sound worse than it actually is, due to the multiple beat effect and the combination of the modulation products. This effect will be greater on the even harmonics of the receiver than on the odd, because of the larger number of harmonics in the former case, which are effective in producing multiple beats. When the monitor is tuned to a transmitter harmonic the note will again sound worse than it actually is, since the defects in the transmitter wave are multiplied directly by the number of the harmonic.

"I have been repeatedly surprised at the number of otherwise well informed amateurs who are under the impression that harmonics exist on both — i.e., low and high frequency — sides of a fundamental oscillation. That harmonics exist only as multiples, and not fractions, of a fundamental, is clearly demonstrated by the following effect, which is useful as well: Tune an oscillating receiver to zero beat with an oscillator. Then tune another oscillator to five times this frequency, or any other high harmonic, as the effect is more clearly defined the higher the harmonic. Adjust for zero beat as heard in the receiver, and then detune the receiver, noting the beats. One will extend over a wider range than the other. In fact, the ratio of the two ranges is equal to the number of the harmonic to which the second oscillator is tuned. If the receiver dial can be read closely enough to compare the two ranges, as measured from inaudibility on one side, through zero beat, to inaudibility on the other, and the ratio thus determined, an unknown harmonic can be evaluated. The effect is due, of course, to the fact that the receiver covers more territory on the harmonic, in proportion to the degree of the harmonic. Now, if a harmonic existed at one-fifth the oscillator frequency, as well as at five times, it would obviously cover the same range as the beat from the first oscillator, which is in resonance with the receiver. But it does not.

"Occasionally a quartz crystal in the process of grinding will cause its oscillator to generate myriads of frequencies which set up countless beats either side of the main oscillation. This is a condition of super-audible parasitic oscillation, of frequency generally between 10 and 40 kc. If the adjacent beat notes overlap slightly the frequency is likely near 10 kc., and if spaced apart, higher. The beats are the side bands of the super-audible frequency and its harmonics, beating against the fundamental frequency. The extent to which the beats extend either side is dependent on the strength of the harmonics. Since they usually extend several hundred kilocycles, harmonics as high as the 25th must be appreciable. This parasitic oscillation is probably a mechanical action in the vibration of the crystal, or may be a beat between two higher frequencies. I have known of several crystals producing audio frequencies in this same manner, sufficiently sustained to nicely modulate the wave. The tone was also audible directly from the crystal mounting. The lowest frequency I have heard thus produced was below 500 cycles."

SCREEN GRID DETECTORS IN PUSH-PULL

The use of the screen-grid tube as a detector for high-frequency reception is increasing rapidly, and some experimenters have been searching for means of obtaining oscillation at higher frequencies than the usual detector connections will allow. J. S. Cebik, W1ATG, found that the tubes would operate satisfactorily in push-pull on frequencies where a single tube could not be made to oscillate. He writes as follows:

"It has been occasionally mentioned that screen-grid tubes do not oscillate readily on frequencies above 18 or 19 mc., because of the internal capacity between the elements. A way to get around this is to use screen-grid detectors in push-pull so that the tube capacities are in series.

"It will be noted in the diagram, Fig. 2, that the tuning capacities are in series so that the capacity of each section of the double condenser must be about twice as large as the size normally used in a single-tube detector circuit.

"The rotor plates of condensers are grounded, thus allowing the inductance and the circuit to find its own electrical center and making it unnecessary to match tubes in this circuit.

"The screen-grid voltage has been found to be critical. Without the correct adjustment the circuit will not oscillate properly. A variable resistor in the plate circuit is used to control oscillation.

"The inductances are wound on tube bases and
the antenna coil is made adjustable to obtain best results. The receiver should either be completely shielded or the filament and plate supply be spaced at least three feet from the receiver to eliminate a.c. hum. This circuit requires a larger tickler to make it oscillate than the single tube detector circuit.

"The writer would be interested to hear from others who have done any experimenting along these lines."

CONVERTING THE SINGLE CONTROL TRANSMITTER TO PUSH-PULL

Dallas Johnston, W9AAG, of Viola, Ill., writes us that the push-pull version of the "TNT" transmitter described in December QST has better frequency stability with changes in plate voltage, as well as greater power output, than the original single-tube outfit. He has been using a pair of Type '12 tubes in the set with about 400 volts on the plates.

The circuit at W9AAG is shown in Fig. 3. The set has not been used on 3500 kc., so no constants are given for that band. As an approximation, L1 should have 14 turns of copper tubing 2 1/2 inches in diameter, and L2 about 60 turns of No. 30 d.c.c. on a 1-inch tube. It must be remembered that the grid coil dimensions given in Fig. 3 are for Type '12 tubes, and other types will probably require some modification of these coils. The number of turns on each should be adjusted until best output is secured.

The two grid coils may be combined into one center-tapped coil, if desired. Approximately the same total number of turns will be required.

This arrangement was used in the oscillator portion of the low-power oscillator-amplifier transmitter described in September, 1929, QST.

W9AAG has been successful in working both coasts consistently with this outfit, and the signals are often reported "crystal d.c." A good d.c. plate supply is used, of course.

AN A.C.-OPERATED RECEIVER WITH D.C. TUBES

A California experimenter, who wishes to remain anonymous, writes as follows:

"I should like to call to your attention a method of constructing an a.c.-operated short-wave receiver which I have found quite satisfactory. It uses Type '99 tubes, with filaments, plates, and grid biases all supplied from a 'B' eliminator. Fig. 4 shows the circuit.

"A Clarostat is inserted, if necessary, between the eliminator and the set, and R4 is adjusted so that no mA are drawn. The resistance R1 may be 307 ohms, R2 50 ohms, and R3 1000 ohms. These resistances are conveniently made by winding them one after another on thin bakelite strips about an inch wide, using No. 40 Advance wire and giving a coat of shellac after adjustment to the proper values. The wiring of such a set is very unobstructive and simple, and because of complete separation of currents in the various stages, feedback is eliminated without any filtering. Of course, a second audio stage can be added using the same system; and it is also simple to put a screen-grid tube before the detector if desired. The DeForest people make a screen-grid tube, the
422-A, the filament of which draws only 60 ma. The freedom from hum of such a set is all that could be desired, particularly if the 'B' eliminator is so constructed that a choke is placed in each of the leads of the filter. But sure, of course, that the B eliminator will give 40 ma. at the voltage needed. It is better to use a Type '80 tube than a Raytheon in the eliminator, since many small crackling noises are thus avoided, but a Raytheon will do quite well. The detector grid return works better on the negative filament lead of the '99 for me; but this seems to depend on the amount of plate voltage supplied to the detector. Fringe howl may be taken care of by any standard method.

"The main advantage of such a receiver is that it perks right away, without waiting for a Type '27 to warm up."

THREE-WIRE REMOTE CONTROL WITH MERCURY VAPOR RECTIFIERS

By Eugene A. Hubbell W9ERU

The average amateur is generally quite aware of the advantages of remote control, but is discouraged at the prospect of running a pair of wires for the keying relay, a pair of wires for the power supply, and, if he owns a mercury-vapor rectifier, another pair of wires, or at least one more wire, for the filaments of these tubes. In the remote control system to be described three wires perform all these functions.

Fig. 5 shows a pair of 6-volt relays, arranged to turn on the power and also key the transmitter. Relay No. 1 consists of a single long electromagnet, with two armatures, each with separate spring tension adjustment. One armature is set with a loose spring, so that it will close with approximately three volts applied to the magnet, while the other is set with a stiff spring, and does not close until nearly the full six volts are applied. This relay can be constructed from any old magnet, and since it will remain in the circuit drawing current as long as the rectifier tubes are on, it should have comparatively high resistance, so the battery will not discharge quickly. The relay at W9ERU was bound with No. 30 d.c.e. wire, some 1500 turns on a soft iron core, and has approximately 12 ohms resistance. This draws a half ampere continually, which is but the equivalent of two Type '01-A tubes, and will run a transmitter a long time on a single charging.

The return wire from one side of the power relay is connected to one side of the keying relay, No. 2. In series with this center lead, a six-volt battery is connected. The other lead from the keying relay returns to one side of an ordinary jack, into which the key is plugged.

The dotted lines indicate the control box, which takes the form of a 1-inch cube at W9ERU.

The center wire connected to the two relays with the six-volt battery in series at one side of a single-pole single-throw switch on the control box panel. The other wire from the power relay terminates at the other side of the single-pole, single-throw switch, S2, with a resistance in series of a value sufficient to cut the voltage on the relay down to about three volts, or whatever value will allow both armatures to work satisfactorily, yet not close the armature controlling the plate supply until nearly the full six volts is applied. The second single-pole single-throw switch, S3, shorts the resistance out. It is impossible to close the circuit of the plate transformer until the rectifier filaments have been lit, although the circuit may be closed immediately after, with consequent damage to the tubes. Since the total amount of resistance in the relay circuit when the filaments of the rectifiers are lit limits the current to a small value, there is no need to build trick relays to lessen the drain. If good magnets are used, with a bar of iron at E-F, indicated by dotted lines, the full amount of current used to operate the transmitter should total not more than one-half ampere at any time.

3 During a QSO switch S5 may be left closed, thus keeping the filaments of the rectifier tubes hot while receiving. Plate power is then switched on and off simply by throwing S6. If a separate filament transformer is used for the transmitting tubes, its primary may be put in parallel with that of the rectifier filament transformer. — Ed.
depending quite a bit on the keying relay, of course.

The contacts for the 110-volt circuit may consist of heavy silver, or any metal of good current-carrying capacity which will not burn easily. At W9ERU carbon and steel contacts have been found very successful. The relay must be covered, however, or sparks may fly occasionally.

MOUNTINGS FOR TRANSMITTING COILS

Theodore Stahl, of Jackson, Mich., sends us a suggestion for mounting copper-tubing coils which not only provides for convenient changing of coils and good electrical contact but also allows variation of coupling.

A drawing of the mounting is shown in Fig. 6. It is made from a brass block 1½ x ½ x ½ inches, and can be constructed with the aid of a few tools of the type usually found in the home workshop. Two of these blocks are of course required for each coil.

The tapped holes are fitted with screws which serve to fasten the block to a sub-panel or bracket. The screw which is threaded through the right-hand hole should be long enough to project through the 3/16" hole in the upper section of the block, and a nut is put on it to allow adjusting the tension on the coil end when inserted in the ¼" hole. A wing-nut will be handy for rapid changing of coils.

If the ends of the copper-tubing coil are straightened out for a length of four or five inches the coil may be slid back and forth in the blocks, thus allowing coupling to be varied.

RE: SCREEN GRID DETECTOR

Amateurs having troubles with screen-grid detectors may profit from the remarks of E. B. Redington, W3AJ, of Savannah, N. Y. His difficulties were many, and he writes concerning their cure as follows:

"Remember in QST a few years back the article entitled If You Only Try? I have been very much reminded of that while doing some work with screen-grid regenerative detectors.

"I built the receiver described in the April QST in the article, 'The Superiority of Screen-Grid Detectors.' Apparently every screen-grid outfit is a problem in itself. Mine didn't perk at all well. I tinkered with the detector leak resistor and finally it worked after a fashion with 15 megohms but had a bad fringe howl. If I tried 10 or less, it had a hangover of from 4 to 5 degrees on 3500 kc. and 20 degrees on 14,000 kc. Too many, said I. Furthermore I was forced to use a 100,000-ohm leak in the audio stage. The amplification was terrible, however, and I can believe everything I have read about such receivers.

"It also had a bad tendency to howl if I brought my hand near. I cured this by shielding the control grid lead with copper tubing and grounding. But still the fringe howl and the need for such a high leak value. This may sound like a fairy story and apparently there is no reason in this madness of mine at all, but it worked. I built a shield for the detector bias battery, leak and condenser and put them all in it. I also shielded the r.f. plate leads and grounded them. Presto! I can use any value of grid leak down to 5 mgs. and any plate voltage from 90 to 200 on the detector and the smoothest and quietest operation obtain. Even with the filaments lighted with 12.5 cycle current (½-wave 25-cycle rectified by a trickle charger) there is absolutely no hum. Normally I use either a storage battery or 25-cycle a.c. The filaments are in series.

"Measurements with a vacuum tube voltmeter show that my Type '01-A set is only about a quarter as sensitive as the screen-grid outfit. That is, signals which give one scale division deflection with a Type '01-A will show 4 to 5 with the screen-grid receiver. I found, however, that Type '24's are not very uniform when used for detectors on short-wave work.

"Here is a stunt which the gang may find useful. I use an 8-plate Pilot model taken from my old plug-in Handbook outfit and also the 3-plate Pilot, connected in parallel. On the 3500-ke. band I tune with the big condenser and use the small one as a vernier. For the 7000-ke. and 14,000-ke. bands I use the big condenser to bring the coils for these bands up to the proper point and then use the small one to tune. This way I get full-scale coverage on any band. Furthermore, I can run up to 9000-ke., and down to almost 5000-ke., with unbeatable tuning conditions."

Another experimenter, George E. Tower, W3DGF, had trouble not with the operation of the set itself, but with noise from the a.c. line. Here is his letter:

"I have been experimenting with a high-frequency a.c. receiver since I received my April QST and encountered more troubles than I could record. I cleared them one at a time until but one was left.

"I was getting a weird noise that was halfway between a power leak and a spark transmitter with a rough note. Trying to detect its origin in any one part of the set proved futile. The only
thing that would cure it was eliminating the a.c. from the heaters and using d.c. on them. But I could not continue very long with a 7-amp drain on my battery, so I tried using a Type '24 tube as detector and two Type '01-A's as amplifier, using a.c. on the detector and d.c. on the amplifiers. This worked very well and was free from noise.

"I thought my noise must have been coming from the a.c. amplifier so I constructed an amplifier just like the one I had used in conjunction with the first a.c. set. The noise was not there, but as soon as I connected it to the detector it would reappear. So there I was; the two segments were quiet, but put them together and the little demon would appear. I then started anew, carefully shielding every detail and proceeding with caution, but all to no avail; the noise persisted. I tried by-pass condensers everywhere I could possibly put them. I almost gave up the idea of ever having a successful a.c. receiver. Then I found that my trouble was really coming from the line even though it did not show itself readily there. I tried the most unusual types of line filters, but they were only partially successful.

"I gave this up and after trying everything under the sun I found the only thing that would totally eliminate it --- a single 1-µfd. by-pass condenser connected from one side of the 2.5-volt a.c. filament leads to the receiver shield. The odd part of it is that the noise is not eliminated if the condenser is connected to the grounded center-tap of the filament transformer, but only when connected to the receiver shield."

It is possible that the lack of success when the condenser is connected to any other grounded part of the set except the shield is caused by some local condition in the receiver itself. A good many of the measures taken by some experimenters to get satisfactory operation do not seem quite logical, but after a few days of sweating over a hummy receiver one is ready to try almost anything, logical or not!

The Hudson Division Convention

WITH expression on every hand of the "best convention ever held," the fifth annual convention of the Hudson Division came to a close late Saturday, May 24th.

From the very beginning when Dr. A. L. Walsh, Director of the Division, greeted the delegates and speakers, until the closing event, every minute was taken up with interesting subjects. Mr. Heller of the Insuline Products had a wonderful exhibit of television apparatus; Mr. D. E. Replogle of Television Corporation gave a fine lecture on "Television for the Amateurs," and those listening to him realized what progress has been made in that particular field. It seemed good to see so many old-timers present renewing acquaintances and with the younger amateurs taking part in the stunts so well managed by C. E. Sargeant, W2BCA. The interspersion of the stunts between some of the lectures was a good thing and helped to keep the fellows together.

A. A. Hebert of A.R.R.L. spoke on legislation and the new regulations, emphasizing the importance of keeping within the amateur frequencies. One of the surprise speakers was David Grimes, formerly a radio consultant but now with the R.C.A., who gave a most interesting lecture on "Short Wave Radio Receivers," and if the number of questions asked afterwards was any criterion of the interest the speaker should feel gratified.

George Grammer, Assistant Technical Editor, QST, made his formal appearance as a speaker and covered the ground very thoroughly on the subject, "Avoiding Interference with Broadcast Receivers and Other Radio Services," being the concluding lecture Friday evening, but every one seemed loathe to disperse and groups were seen here and there "hamfesting" until late into the night.

With the weather much cooler on Saturday, the afternoon session started practically on time with A. O'Hara, W2OG, in charge. Clark C. Rodimon, Managing Editor, QST, was the first speaker and gave a very good demonstration on how QST is printed and the trials and tribulations of an editor before the magazine is ready for distribution. Mr. George Fleming, one of the engineers of Loftin-White Co., spoke convincingly on "Amplifiers," being followed by Chief Radioman Pomranz, U.S.N.R., who discussed naval reserve and the advantages of enrolling.

The big event of Hudson Division conventions is always the banquet, and this year Frank Frimmerman, W2FZ, outshone all previous affairs with one of the finest dinners with dance music by Ed Berlin's Orchestra between courses. As there were more YL's and OW's present this year, this feature of the dinner was enjoyed by a large number. Several professional entertainers kept up the interest with songs and specially dances, one of which was extremely interesting because of the fact that the performer was one of our "hams" — none other than Eddie Green (W2AKM) of the R-K-O vaudeville circuit, presenting his comedy act, "Sending a Wire." The speakers of the evening were Director Walsh, former Director Larry J. Dunn, Col. J. B. Allison for the U. S. Army; Capt. Overstreet of the Navy, who recounted his experience when the Battleship Oregon made her eventful trip at the beginning of the Spanish-American War, and radio was unknown in those days. A. A. Hebert, A.R.R.L., and last but not least, G. E. Mears, W2VQ, who in a humorous skit presented his "1935 Transmitter." The Long Island City, Bronx, Brooklyn and Bloomfield Radio Clubs were present with large attendance.

(Continued on page 52)
W9ANZ
A Pioneer 14-Mc. 'Phone Station

W9ANZ, owned by Louis F. Leuck, 1718 So. 14th Street, Lincoln, Nebraska, was one of the first stations\(^1\) to use 'phone on the 14,000-ke. band when it was first opened for that purpose three years ago. Even after the privilege was rescinded, Mr. Leuck was so certain that the band would once more be opened for amateur telephony that the modulator unit was allowed to remain unmolested on the operating table and ready to go at a moment's notice, although telephony was not used in any other band. In the interim the set was used for c.w. on the 7000- and 14,000-ke. bands, although now used largely for 'phone on 14,000 ke. since the adoption of the present regulations some months ago.

The transmitter at W9ANZ is crystal-controlled, as most of the best of the present-day amateur 'phone stations are. In fact, as many amateurs have found from experience, crystal control is a practical necessity if the transmitter is to be really suitable for 'phone work, particularly on the 14,000-ke. band.

Digressing for a moment, W9ANZ had his first taste of amateur radio back in 1912, with an E. I. Co. receiver and an old ignition coil. This qualifies him without doubt for a place in the roster of old timers—anyone who cut his teeth on the old E. I. Co. catalog is eligible!

During the war he made his acquaintance with c.w. and telephony while serving in the Signal Corps, and opened up in 1922 under the present call with a 5-watt tube. Since that time the original outfit has been greatly enlarged upon.

One of the photographs shows a view of the station, which is located in a sun room on the second floor. W9ANZ says that there are at least four kinds of electromagnetic waves making their home in the operating room—sunlight, heat in summer, power QRM from three different power companies, and radio waves. The transmitter is on the top shelf above the table, and consists of two units, which will be taken up in more detail later. The lower shelf holds three frequency meters of various types, one of them a heterodyne meter. The filament transformer for the transmitting tubes is suspended to the left of them from the upper shelf. On the table itself are the modulator, the receiver, the microphone for the set, and the wire 'phone. The power supply equipment is in a separate room.

**THE TRANSMITTER**

The transmitter was originally built as a 7000-ke. crystal-controlled outfit, and an addition was made to allow it to be used on either 7000 or 14,000 ke. The two units are shown in separate photographs. The fundamental frequency of the crystal used is 1763 ke.

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\(^1\) QST, September, 1927, page 62.
The output of the second tank is fed into an amplifier working on the same frequency and consequently this tube must be neutralized. The output of this amplifier furnishes the excitation for the 7000-kc. doubler, which in turn feeds the output tube always works on the same frequency as the tube exciting Type '03-A. When the set is to be used on 14,000 kc, this switch connects the 7000-kc. doubler output to the grid of the 14,000-kc. doubler, which is a Type '10, the output of which excites the power amplifier on the same frequency. The

FIG. 1.—THE C.W. PORTION OF THE TRANSMITTER

<table>
<thead>
<tr>
<th>Circuit</th>
<th>Description</th>
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<tbody>
<tr>
<td>C₁</td>
<td>350-µfd. variable</td>
</tr>
<tr>
<td>C₂</td>
<td>Double-spaced variable of approximately 50-µfd., maximum capacity.</td>
</tr>
<tr>
<td>C₃</td>
<td>Double-spaced variable with approximately 100-µfd., maximum capacity.</td>
</tr>
<tr>
<td>C₄</td>
<td>200-µfd. variable</td>
</tr>
<tr>
<td>C₅</td>
<td>18-plate midget</td>
</tr>
<tr>
<td>C₆</td>
<td>12-plate midget immersed in oil</td>
</tr>
<tr>
<td>C₇</td>
<td>Double-spaced Cardwell cut down to 6 plates</td>
</tr>
<tr>
<td>C₈</td>
<td>280-µfd. variable</td>
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<tr>
<td>C₉</td>
<td>100 µfd.</td>
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<tr>
<td>C₁₀</td>
<td>50 µfd.</td>
</tr>
<tr>
<td>C₁₁</td>
<td>500 µfd.</td>
</tr>
<tr>
<td>C₁₂</td>
<td>400 µfd.</td>
</tr>
<tr>
<td>C₁₃</td>
<td>400 µfd.</td>
</tr>
<tr>
<td>C₁₄</td>
<td>50-µfd. midget</td>
</tr>
<tr>
<td>C₁₅</td>
<td>1 µfd.</td>
</tr>
<tr>
<td>L₁</td>
<td>7 turns of 1/8&quot; tubing wound into coil 2 1/4&quot; dia., 2 3/4&quot; long.</td>
</tr>
<tr>
<td>L₂</td>
<td>25 turns of No. 18 d.c. wire in a 4&quot; tube to tune to 7000 kc, in conjunction with C₉.</td>
</tr>
<tr>
<td>L₃</td>
<td>5 turns of No. 14 wire wound into coil 4&quot; dia., 1 3/4&quot; long.</td>
</tr>
<tr>
<td>R₁</td>
<td>10-ohm rheostat</td>
</tr>
<tr>
<td>R₂</td>
<td>5-ohm</td>
</tr>
<tr>
<td>R₃</td>
<td>10,000-ohm variable resistor</td>
</tr>
<tr>
<td>R₄</td>
<td>100,000-ohm</td>
</tr>
<tr>
<td>R₅</td>
<td>9000 ohms</td>
</tr>
<tr>
<td>R₆</td>
<td>100,000-ohm variable resistor</td>
</tr>
<tr>
<td>R₇</td>
<td>100 ohms, center-tapped</td>
</tr>
<tr>
<td>RFC₁</td>
<td>1 1/4&quot; long by 1/4&quot; dia., wound with No. 30 d.c.</td>
</tr>
<tr>
<td>RFC₂</td>
<td>3 1/4&quot;</td>
</tr>
<tr>
<td>RFC₃</td>
<td>1 1/4&quot;</td>
</tr>
<tr>
<td>RFC₄</td>
<td>1/4&quot;</td>
</tr>
<tr>
<td>RFC₅</td>
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<td>RFC₉</td>
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<tr>
<td>RFC₂₀</td>
<td>1/4&quot;</td>
</tr>
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</table>

The antenna and counterpoise are also shifted to L₉. The same '03-A is used in each case, simply being placed in the proper socket for either 7000- or 14,000-kc. work.

It will be noted that the output of the second tank is fed into an amplifier working on the same frequency and consequently this tube must be neutralized. The output of this amplifier furnishes the excitation for the 7000-kc. doubler, which in turn feeds

For 7000-kc. work the antenna and counterpoise leads are clipped on L₉, in which case the switch in the output lead from the 7000-kc. doubler is thrown to connect to the grid of the
Neutralization of the output tube is therefore required, but it was early found in the experiments with crystal control at W9ANZ that the output was much higher when the power amplifier was excited on its operating frequency than when used as a doubler — a conclusion which has been checked by many other experimenters. Efficiency and power output both increase when plenty of excitation is available.

The plate voltage for the 14,000-kc. doubler is obtained in a rather unusual manner. A 200-watt keso generator furnishes plate power for the transmitter, and is a double-commutator machine, 400 volts being taken off one commutator and 1000 from the other. The entire winding is rated at 200 milliamperes. When the 7000-kc. section of the transmitter is running, the oscillator and doublers take about 90 m.a., while the '03-A takes 125 m.a. The total load on the 400-volt part of the winding is thus 215 milliamperes, which is an overload small enough to be carried without difficulty. However, the addition of another tube would exceed the safe limit, so the part of the generator winding between the commutators, which on 7000 kc. only carries the current required by the '03-A, is used, by the simple expedient of making the 400-volt commutator the negative terminal for this one tube, the 1000-volt tap being connected to the plate. This requires the use of a separate filament transformer, which in this case is a special one working from the 10-volt filament supply to the '03-A tube, and drops the voltage down to 7.5 for the Type '10 doubler. The windings must of course be insulated for the full plate voltage. A 100,000-ohm resistor, provided with a sliding contact, is connected across the 400-volt part of the machine, and furnishes variable "C" bias for the 14,000-kc. doubler also.

The plate supply generator and its driving motor are mounted on a wood base which is suspended by four screen-door springs, one at each of the four corners of the base. A home-made coupling, made of heavy hose, connects the shafts of the two machines. The coupling and method of mounting have completely eliminated chattering and vibration. A separate filter is provided for the 400-volt supply, in addition to the 100-volt filter.

The main filament transformer is a special job with excellent characteristics. It will handle 160 watts continuously, and the efficiency at full load is 90%, while the regulation is only 5%. The low regulation is very much of an advantage with this transmitter, because the small voltage change when the load varies makes it possible to switch the modulator tube filament on and off without necessitating a readjustment of the voltage on the other tubes. The other primary of the transformer is tapped to allow adjustment of the secondary voltage.

All the transmitting tubes with the single exception of the 14,000-kc. doubler are lighted from the same filament transformer. A pair of variable resistors is connected between the '03-A and the two '10's in the 7000-kc. portion of the transmitter, dropping the voltage to 7.5 for these tubes. Further resistors are used to drop the voltage to 5 volts for the filament of the Type '12.

Bias for the oscillator and first two doublers is supplied by a combination of batteries and resistors. The exact arrangement is shown in Fig. 1. Bias for the '03-A when used as a 7000-kc. ampli-
troubles. A trap tuned to the operating frequency is placed in the lead from the grid to the key, in addition to the usual form of r.f. choke.

On 14,000 kc, the key is placed in the lead from the filament center-tap of the doubler tube to the positive side of the 400-volt supply. This corresponds to ordinary center-tap keying. The bias on the output amplifier is sufficient to reduce its plate current to zero when the key is up and excitation is removed. With this keying method no back wave is emitted and key clicks are negligible.

MODULATION

The modulation system at W9ANZ is the improved Heising arrangement in which the modulator tube is operated at a higher plate voltage than the modulated amplifier. The modulator differs from the more common system used to obtain a high percentage of modulation, however, because a voltage booster is used instead of a dropping resistor.

Several advantages result from this. No power is wasted in a dropping resistor, for one thing, and the r.f. tube is operated at the same plate voltage for both c.w. and 'phone without the necessity of changing connections. The '03-A is operated at 1000 volts, the nominal rating, in both cases.

The voltage booster is a power pack which furnishes 300 volts at about 75 milliamperes. The output of this power pack is connected in series with the plate supply generator, making a total of 1300 volts available for the modulator tube. The booster employs a transformer and Type '80 rectifier, with the filter shown in Fig. 3. Since the negative side of the booster power supply is at 1000 volts potential above ground, the insulation of the transformer must be sufficient to stand the full plate voltage. A further consideration in the design of this particular transformer is that the capacity between the primary and secondary windings must be low in order that voice frequencies will not be by-passed to ground during modulation; for this reason the two coils are wound on separate legs of the core. The filament winding for the '80 rectifier is small and its capacity to the primary is negligible; therefore this winding is put on the same leg as the primary.

The modulator tube is a UV-211, which gives good results when working into the load furnished by a Type '03-A, and is more suitable than another '03-A would be for this purpose. Since the transmitter was built other types of tubes have been made available for modulation purposes, but the results with the present layout have been so satisfactory that the old tubes have been retained.

A Type '40-high-µ tube is used in the speech amplifier, and has given very good service. It is impedance-coupled to the modulator tube through a combination of inductances which has been used for a very definite purpose — namely,
plate circuit of the speech amplifier tube. The audio transformers are rated to carry 10 milli­
amperes in their primaries, and since the trans­
formation ratio of both is 3 to 1, it was judged
that the secondaries would carry 3 mils without
difficulty. The actual plate current is 2 to 2½ mils
and the transformers have carried this without
any sign of burning up. The primaries of the
transformers are left unused to avoid saturation
of the core from the d.c. plate current.

The plate voltage on the Type '40 is
370 and, surprising as it may seem, the tube handles it nicely.

The coupling condenser between the
speech amplifier and modulator is a
1-µfd., 1000-volt condenser. The im­
pedances in the grid circuit of the
modulator are also audio transformers, but in this case both primaries and
secondaries are used, since there is no
d.c. flowing and consequently no dan­
gers of core saturation.

The microphone is constructed from
parts of three different mikes. The
button was taken from an aeroplane
microphone, the carbon granules from a
desk-type mike, and the remainder of the parts from still another desk
mike. Before assembling, the button and granules were thoroughly cleaned with
carbon tetrachloride. This com­
posite microphone has given very
good results; it is a great deal like an
aeroplane mike in that it picks up
very little background noise, and is
sufficiently sensitive in conjunction with the speech amplifier, since the
modulator tube can be easily worked
to full output.

The modulation transformer was
home-constructed by utilizing parts
from an old Ford coil. The core was sawed in
half, and 250 turns of No. 26 wire wound on it.
One of the secondary coils from the Ford coil was
slipped on top of this winding and serves as the second­
ary. A trap tuned to the operating frequency is placed in one of the
filament leads to the modulator tube to prevent radio-frequency feedback
into the modulating system. When this trap is
correctly tuned there is a noticeable decrease in
the plate current taken by both the modulator and
speech amplifier, proving that some r.f. gets back.

**ANTENNAS**

By means of three antennas of different lengths
it is possible to get a number of combinations for
work in any amateur band. One is 15 feet long,
one is 45 feet, and the third is a two-wire flat-top
antenna 75 feet long. Ordinarily the second
harmonic is used for 7000-ke. work, and the fourth
harmonic for 14,000 ke.

**THE RECEIVER**

A diagram of the receiver is shown in Fig. 4.
The set uses a Type '01-A regenerative detector,
A Type '40 in the first audio stage, and another
'01-A second audio. Impedance coupling is used
between the first and second audio stages.

The regeneration control is a variable resistor in
series with the detector plate battery. In addi­
tion to the usual r.f. by-pass between the battery
side of the tickler and the filament, a variable
condenser is placed in parallel with this by-pass
condenser and serves as a vernier tuning con­
denser or beat-note control. A pure d.c. signal
occupies about 25 degrees on this condenser dial.

The grid tuning condenser is in series with a
small fixed capacity for band-spreading, and the
fixed condenser may be short-circuited by a small
switch to increase the tuning range.

The Type '10 tube in the first audio stage
lends itself well to peaked audio amplification,
and a tuned impedance is therefore included in its
plate circuit, in series with an audio-frequency
choke which serves as a coupling for straight
audio amplification. By means of a two-point
switch, either impedance may be short-circuited,
thus selecting either peaked or quality amplifi­
cation. The tuned impedance peaks at 770 cycles,
and when in use a pure d.c. signal occupies only
about two-thirds the space on the tuning dial
that it does with the straight amplification.
Fig. 5 is the diagram of the heterodyne frequency meter. This meter is calibrated from standard-frequency transmissions, and covers the range from 6000 to 7600 kc. All batteries are contained in the box, and a filament voltmeter is incorporated for adjusting the filament voltage to the correct value. The tube is a Type '99.

W9ANZ did not mention the other frequency meters shown in the station photograph, but from their appearance it is probable that they are of the absorption type.

**OPERATION**

The various filament voltages and plate currents are measured with the same meters wherever possible by utilizing plugs and jacks. The exact arrangement of the jacks and the various meters is shown in the diagrams of the transmitter.

Shifting from one band to another can be accomplished in a few minutes. It is simply necessary to place the '03-A in the proper socket, transfer the antenna clip from one pick-up coil to the other, tune the antenna condensers to predetermined settings, transfer the output of the 7000-kc. doubler to either the 14,000-kc. doubler or the 7000-kc. output stage as the case may be, and set the tank condenser of the 7000-kc. doubler to a marked value. The key is, of course, plugged in the proper jack at the same time.

When changing from 14,000-kc. 'phone to c.w. the switch S, Fig. 2, is closed, thereby short-circuiting the modulation choke and the filter choke; S2 in the modulator diagram is then opened, removing the filament voltage from the speech amplifier and modulator, and at the same time causing a relay in the power-supply equipment to open and disconnect the primary of the voltage-booster transformer, which in effect opens the plate circuit of the modulator and removes it from the circuit. The relay for this purpose is constructed from an old 150-ohm telegraph relay. The coils were connected in parallel instead of series, and it was found that 10 volts a.c. was sufficient to operate the relay satisfactorily. The relay coils are connected across the modulator filament switch, and when the switch is closed the relay is not energized, the contacts being closed in this case. When the switch is open the full 10 volts is across the relay, as the impedance of the modulator tube filament is negligible compared to that of the relay, and the contacts open.

W9ANZ hardly needs to be introduced to anyone who does any listening on the 14,000-kc. band. When conditions are favorable, it is possible to hold perfectly satisfactory QSO's with both coasts and Canada. Reports of "perfect modulation," "perfect reception," and "100% readable" have been received 75% of the time, even through QRM. Up to the time of this writing contact has been made with 25 foreign countries on c.w., and the 14-me. 'phone has been heard in Brazil, Mexico, Chile, Peru, England, Prince Edward Island, Mexico and Spain. Phone QSO's have been established with some of these.

(Continued on page 80)
We are becoming overwhelmed with the increasing preponderance of 28-mc. material in the individual reports that are sent into this department as special contributions, along with WAC Club applications, and hidden in other and more general correspondence. These individualistic, personal reports are greatly appreciated, and many times result in valuable and interesting items. But lately they have concerned themselves with little but 28-mc. stuff, and inasmuch as there are other places in QST where a special department on international ten-meter work would be more fitting, we can make no further acknowledgment or use of them than this general expression to all contributors.

A study of the material received brings out some most interesting points. 28-mc. work is more and more becoming a de-nationalized and international affair. The use of this band for practical communication purposes is now found to exist chiefly in those countries where general traffic handling is prohibited or limited. Whereas in the less restricted areas experimental and developmental work on this band is confined to certain experimentally inclined persons possessing necessary talent and equipment, and who in most cases make use of the better developed and more familiar bands for ordinary communication, a lot of amateurs in those unfortunate places where undue governmental restraint is exercised use the 28-mc. band exclusively for all their communication. And they are getting a very fair share of DX QSO's too.

This leaves us in a position to ask, who is going to be the first to achieve a special 28-mc. WAC Club membership? We obviously cannot institute many different grades and classes of membership in the WAC Club, and must normally content ourselves with the single exception of the WAC for 'phone, but if it will add a little incentive to this work we will be happy to honor the first application received for WAC for 28-mc. as a special and extraordinary event. How long will we have to wait?

Continuing with the WAC Club, the second WAC for 'phone certificate was issued to Hilton L. O’Heffernan, G5BY. He considers himself doubly honored in that his is the first such certi-
The QSL Forwarding Bureaus maintained by the amateur organizations of the world are a system mutually cooperative, performing a great service, and productive of much good to amateur radio in general. Linking units are found in every recognized continental area, and in nearly all the important countries permitting amateur two-way communication. The work they do is worthy of praise and heartfelt thanks.

Spots on the globe still remain where amateurs are found in comparatively large numbers, and it is in reaching the new and unlisted stations in these places by mail that difficulty is experienced. This is a request to amateurs residing in such localities to do themselves and their fellow amateurs a great service by volunteering to receive and forward wherever possible communications intended for stations in their areas. May we have volunteers for this service? All present forwarding agencies have been listed in QST.

**BELGIAN SECTION**

*By Paul de Neck, President of the Reseau Belge*

Apart from the habitual European contracts, and some good DX on the 7-mc. band, the principal activity is found near 43 meters where all our phone hams assemble and hold long conversations with Spain, France, Italy and North Africa.

Two good records in low-power phone work are recorded: ON4WY, with 16 watts in a push-pull circuit and choke modulation, was in contact with PY1AX of Rio de Janeiro on 42 meters. His modulated signal was received R5. ON4Q8 with only five watts was heard R7 on 52 meters by EAR20.

On the 14-mc. band DX is always good with the exception of some dead spots where none but European stations are received.

Our friend ON4BU is now working from Kalina, near Leopoldville, in the Belgian Congo, with the call letters ON4CAA and about 100 watts input on 14,030 kc. His first contact was with WIBUX QRD R8! The next was W4MK, who received him R4. Afterward the following Belgian amateurs were worked: ON4JC, ON4UU, ON4RO, ON4FP, ON4WW and ON4Z2Z.

ON4JC in one glorious day worked the following DX: ZT2B (R6), FBSPHI (RS) of Madagascar, F09SR (R7) and VS6AF (R5) of Hongkong. All contacts were made with 20 watts input, a Zeppelin type antenna, and took place in the period from 1800 to 2000 G.C.T.

After midnight (2400 G. C. T.) the Japanese stations J3CR, J3CF and J3FR are now heard full strength.

On the 28-mc. band nothing has been done yet, but several Belgian hams are preparing their sets for the June tests.

Sunday, May 7th, we had the pleasure of a visit from a good U.S. ham, W3AVK of Philadelphia, Pa., who together with several Frenchies came to a local meeting we held in Ciney (Namur district).

**DUTCH SECTION**

*By W. Keeman, Traffic Manager N.V.I.R.*

Reception generally has been poor this month. In most cases, however, those stations which were heard were easily worked. On the 14-mc. band conditions for VK and ZL communication were far worse than last month. During the night South Africa comes in regularly with good strength, and most countries of this continent have been worked by our membership.

Good "W" conditions existed on May 1st, 2nd and 3rd. On the other nights practically no "W" signals came through. The writer notices that during the last half year "W" could be worked during short periods of a few days, separated by intervals of about 26 days (one revolution of the sun). In easterly directions only a few outstanding contacts have been made, but still several new Dutch stations have worked their PK countrymen, while PA4ZF worked China. On May 3rd PAfDW, our well-known DX-station, worked all continents; PA4QF established this record some time ago. On 28-mc. the first PA-W contact was made by PA4QQ on May 16th. As to DX, 7-mc. was a complete washout.

The news that the British Postmaster-General had opened the 3.5-mc. band to the English amateurs was received here with great satisfaction. Practically no difficulty now remains to prevent the I.A.R.U. from putting into action the uniform regulations for the use of the several bands, as proposed by our traffic department about two years ago and brought to the attention of I.A.R.U. Headquarters by the R. E. F. The general complaint of hams working in the 3.5-mc. band is the small number of foreign stations working there. Still PA4QQ reported several good contacts, his best DX being Petrograd in Russia. Much trouble is caused by several commercials working inside our bands, i.e., FYA, FYZ, PPX, PLJ, RKV, RVA and I00. PPX has even announced himself as being on 43 meters while actually working on 7,150 kc. A beginner hearing such an announcement and considering it correct, would regard it as a standard, thereby resulting in off-wave operation, interference with official traffic and a complaint to the Berne Bureau protesting against "those amateurs" working outside their bands, thus risking further restriction at Madrid.

When RKV and RVA are both working, the greatest part of the 14-mc. band is covered with their broad r.a.c. or super-regenerative signals, backwaves and clicks. If possible something ought to be done about this matter. As no traffic

(Continued on page 78)
The Springfield Air Races

The dedication of the new Bowles Airport at Springfield, Mass., was the occasion of the Springfield Air Races held on May 30th, 31st and June 1st. The Springfield Radio Association had been approached a few weeks prior to those dates to furnish radiophone communication between the pylons and the timing stand for the purpose of reporting the progress of the planes around the course, and for checking them to see that they did not "cut off" at the turns. As usual, amateurs were not found wanting and at the start of the races the stations which we shall describe in the following paragraph were in operation.

The control station, located at the Timer's Stand (Pylon No. 1) used the call W1OF. This station used a combined transmitter and receiver with the tuned plate-tuned grid circuit. Cushing, W1AAM, was operator at W1OF. Station WIDE was located at Pylon No. 2 with WIBVR, WIBSN, W1BSN and WICCH as operators. The equipment at WIDE consisted of a portable transmitter-receiver owned by W1IP; the transmitter being a 15-watt affair using grid modulation. 540 volts of "B" batteries feeding the tubes and 450 volts of R batteries on the plate. Loop modulation was used on approximately 3850-kc. The receiver was a three tube job using Pilot coils.

The pylons were made of wood and were about thirty feet in height, shaped like pyramids. Four by four timbers were used as supports, and a cross lattice-frame. Each pylon was covered with black and yellow burlap and had a checked flag at the top of the mast. At each pylon a tent was put up to house the station assigned to that point. Special tables had to be constructed in the tents to hold the equipment.

The first day of the race cooperation, Friday, May 30th, found all the stations in readiness. The weather was cold, raw and very windy. WIDE and W1AWW contacted W1OF at the Timer's Stand every fifteen minutes. Races were reported at 4 p.m. On May 31st three races were reported. W1OF, the control station, would announce when the planes had left on a race and then stand by for reports from Pylon No. 2. As the planes went by Pylon No. 2, WIDE would call out the numbers of the planes passing okay. Reception was so good that the roar of the motors as the planes passed the pylons could be heard at the Timer's Stand. After the planes had passed Pylon No. 2, W1AAM would begin reporting them as they passed Pylon No. 3, calling off the numbers of the planes passing. After this W1OF would O.K. the reports received. Four races were reported on Sunday, June 1st.

In addition to the regular reporting of the races several other interesting things happened during the three days at the field. The new Arbella, KHIJQ, the Boston Herald good will plane, visited the field and arrangements were made to work KHIJQ in the air. Contact was made without difficulty and after the ability of receiving the plane had been demonstrated the mike was turned over to the regular announcer on the ship and the receiver was in turn plugged through the loud speaker system at the airport. The announcer on the Arbella talked to the audience for about fifteen minutes while flying 3000 feet above the ground.

The wind became so strong on the last day of the races that Pylon No. 3 was blown down. As the antenna-counterpoise system of W1AWW was fastened to the pylon, it also came down and rested on the ground. W1AWW still got through but reports were very weak. This condition did not last very long, however, as two of the operators immediately went out to correct the situation, one holding the antenna up with a pole and the other the counterpoise.

You can't stop a ham! Hi.

All in all the Springfield Radio Association's cooperation at the Air Races was a decided success. Each member took a personal interest in the work, and the resulting spirit of unity has tended to make the SRA 100% stronger.

The above report is furnished through the courtesy of T. F. Cushing, W1AWW, Percy C. Noble, WIBVR and Harry Fike, W1DR. Thanks are due the National Carbon Company, the National Guard, the Wetmore-Savage Electric Supply Company and the B. H. Spinney Company for apparatus and supplies furnished.

DAIV

The schooner yacht Mopolis has left New York carrying a party of fifty boys on a two months' cruise through the West Indies. J. Pascal, W2CEV-W9AQD, is radio officer in charge of the 100-watt high frequency installation aboard which will operate under the call DAIV. DAIV is expected to have frequencies adjacent to our 3500-, 7000- and 14000-kc. bands, but the only definite frequency known at the present time is 4007-kc. (45-meters). There will be plenty of traffic and Count von Luckner, owner of the Mopolis, is offering a cup to the amateur radio operator who gives the best service in providing communication with the yacht. The cruise offers a splendid opportunity to show what we can do and all amateurs are urged to listen for DAIV on 45-meters and cooperate in every way possible.

Traffic Briefs

Send for the 15th (June, 1930) edition of the Rules and Regulations of the Communications Department. This contains the full text of the new amateur regulations, lists of Q code, international prefixes, information on the qualifications and duties of different classes in the A.R.R.L. field organization, how elections for Section Manager are held, etc. A postal will bring you the latest up-to-date edition of this information for your operating table free of charge.

Mail it today.

VE5AW is the first Canadian "five" to work all continents. He also believes he is the second in Canada to do this, FB, OMI.
Among the several transcontinental traffic routes in operation is one running W1KH and W2SF to W8CNO to W9PX to W9EJQ to WOBOQ to W11FAM to W1CAA to W2BJF. Most of the stations on the route have numerous other schedules making quite an extensive hook-up.

The New Arbella—KHIHQ

The seven-passenger monoplane New Arbella left Boston in early April on a tour sponsored by the Boston Herald in connection with the 300th Anniversary of the founding of the Massachusetts Bay Colony and the forthcoming American Legion Convention. The plane was equipped with a wire antenna, a 75-watt Hartley, and good modulation, plus a 30-watt M.O.P.A. at Pylon No. 1.

VQST

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LONG BEACH AIR MEET

W6DQI of the Associated Radio Amateurs of Long Beach, Calif., sends us the following account of communications furnished by the A.R.A. at the Long Beach Air Meet held at the Long Beach Municipal Airport on May 25th and 26th.

At the regular meeting of the club on May 23rd Hal Nahmens, W1EJ, was appointed chief operator, and Foster Strong, W2ELZ, liaison officer. Early Saturday morning all the equipment was in place—a 30-watt M.O.P.A. at the judge's seat and operated without an antenna; a 7½ watt Ultra Audion at Pylon No. 1 operated with what amounted to a “hunk of wire” for an antenna; a 7½ watt Hartley at Pylon No. 2 using a Zepp antenna and a Ford Coil plate supply; and a 7½ watt T.P.T.O. with a Zepp at Pylon No. 3.

All stations were in working order and had been well tested prior to the first race at 10 a.m. Saturday, May 21st. They were in almost continuous operation all day Saturday and Sunday furnishing communication between the pylons and the judge's stand. The operations were as follows: At Judges' Stand W1EJ and W6DQI; at Pylon No. 1 W6DJ and W6EQO; at Pylon No. 2 W6CZJ and W6DQI; at Pylon No. 3 W1VCH and W2EEJ.

The A.R.A. was highly spoken of by Army, Navy and Airport officials for the work of its members at the Long Beach Meet.

Official Broadcasting Stations

CHANGES AND ADDITIONS

W1CFV (5730 kc.) Mon., Wed., Sat., 7:00 to 7:25 p.m.; (7100 kc.) Mon., Wed., Sat., 7:30 to 8:00 p.m.; (5750 kc.) Fri., 9:00 to 9:15 p.m.; (7100 kc.) Fri., 9:20 to 9:35 p.m.

W1CME (4000 kc.) Tues., 7:00 to 7:15 p.m.

W2HED (7100 kc. and 11,300 kc.) Wed., Fri., 5:30 p.m., H.S.T.

W4AHX (1580 kc.) Tues., Thurs., 7:40 a.m., 8:30 p.m. C.S.T.

WIMK

A.R.R.L. Headquarters' Station W1MK operates on frequencies of 3255 kc. and 7150 kc. Robert B. Parmenter, W1MM, is the chief operator; his last is familiar to most of the amateur fraternity. Occasionally other members of the Headquarters' staff operate at W1MK. Their personal calls may be found in the QRA Section of QST.

Throughout the following schedules Eastern Standard Time will be used.

OFFICIAL AND SPECIAL BROADCASTS are sent simultaneously on 3255 kc. and 7150 kc. at the following times: 3:00 p.m. Mon., Tues., Thurs., and Fri. 10:00 p.m. Mon., and Fri.

12:00 p.m. (midnight): Sun., Tues., and Thurs.

GENERAL OPERATIONAL periods have been arranged to allow every one a chance to communicate with A.R.R.L. Stations. These general periods have been arranged so that they usually follow an official broadcast. They are listed under the two headings of 3255 kc. and 7150 kc. to indicate whether the watch is devoted to listening on the 50-meter band or to the 10-meter band.
August, 1930

DIVISIONAL REPORTS

ATLANTIC DIVISION

Western New York — SCM, John R. Blum, W3CSC — WSBCZ leads the last this month. W3CSC has built several screen grid a.c. receivers that work very well. W3AFM reports the off-frequency situation much better on 14 mc. WA6AZ is leaving filter trouble. WS3AB has received for his off-frequency phone to transmitter, WS2DSP has increased power to an 852. WSBCZ is monkeying with 28 mc. WSBBW took a trip to the east, and will be QSOs with and at least one major station. A traffic summary showing the standing of the various divisions for the last 10 days is above. Where does yours take it? What section will carry the banner next month and help its division lead the list?

Traffic Summaries

(MAY-JUNE)

Pacific led by Los Angeles . 8240
Central led by Illinois . 3119
Atlantic led by Western Pennsylvania . 2193
New England led by N.H. . 1651
Southeastern led by Florida . 1255
Hudson led by Eastern New York . 1152
West Gulf led by northern Texas . 113
Northwestern led by Montana . 660
Paciific led by South Dakota . 570
Midwest led by Missouri . 38
Delta led by Tennessee . 278
Rocky Mountain led by Utah-Wyoming . 16
Ontario . 33
Yukon led by British Columbia . 23
Pririe led by Manitoba . 17

Traffic: WS6BB 5758; delivered 4839; relayed 11,669; total 21,741. (47.7% del.)

The Los Angeles section continues to take the race and once again claims the Traffic Banner. This banner goes each month to the section with the largest total of completed reports. A traffic summary showing the standing of the various divisions for the last 10 days is above. Where does yours take it? What section will carry the banner next month and help its division lead the list?

BRASS POUNDERS' LEAGUE

Call . Org. Del. Tot. Total

K6MRK 230 . 575 . 757 6186
W9DKM 186 . 178 . 468 852
K4ASH 288 . 125 . 413 865
W6GP 97 . 72 . 368 557
W9FM 106 . 7 . 173 286
W8MK 49 . 67 . 310 456
W8SDY 36 . 49 . 371 416
W5YA 256 . 49 . 305 404
W9BM 95 . 105 . 198 383
W2PM 138 . 146 . 5 328
W8CWS 94 . 98 . 146 234
W8IBM 43 . 50 . 233 325
W5GUD 259 . 282 . 124 . 305
W9WA 82 . 211 . 7 200
W9RM 95 . 28 . 123 208
W9DUM 144 . 34 . 184 322
W6MZM 15 . 18 . 242 275
W8DFP 27 . 57 . 291 375
W6AAU 6 . 24 . 748 328
W6CD 16 . 27 . 449 403
W6WY 114 . 12 . 130 195
W6AN 22 . 16 . 138 281
W3AMO 79 . 29 . 125 233
W6AXY 11 . 98 . 112 120
W6WGC 71 . 128 . 190
W6SRG 67 . 45 . 112 144
W6CFL 9 . 60 . 12 81

All these stations appearing in the Brass Pounders' League are eligible for their membership in the League, and we will be happy to accept applications from any station that has completed at least 100 relayed reports. A special credit should be given to the following stations who have completed at least 100 relayed reports in the last 10 days:

W9DRG, W9ZOM, K6DUD, W4PM, W9ZQ, W9ZEM, K4ASH, W6EGH, W6DEP.


Eastern Pennsylvania — SCM, Don Lusk, W3ZP — Now that hot weather is here and DX or traffic work are not so good let's turn our efforts toward bettering our station for the coming radio season, by strengthening the bond or chip in our note, calibrating our meters and getting all set for good WX, so that you will be a credit to both the League and our section. We have a nice bunch of ORS in this section and there are several prospective ones in the making so we should have little or no trouble winning the traffic banner. The SCM is proud to welcome home all of the traffic bound. W3KQD seems to be bothered with tennis, spring fever or what have you. Miss W3AKB has at last succeeded in getting a 14-megacycle Xmtc peking and now she's after DX. W3EU
thinks that the great open spaces with YLs are heaps more appealing than these DELUXE warm evenings. WSDHT has a new antenna and an a.c. receiver perking FB. W3NF is in route E. New Jersey — SCM, Bayard Allen. W6 ASSJ is back at the school now and promises better totals. W3MC reported by telephone when the time got late. W3UH is proving he is entitled to an ORS. W3UX is using the 7- and 14-megacycle bands for the summer. W3ZF is fooling around with 14-M. Traffic: W3GS 140, W3ZF 123, W3NF 69, W5EU 47, WSDHT 31, WSCWO 24, W3AKB 5, W3HJ 57, W3MC 55, W6UX 22, W8AKO 4.

NEW JERSEY — SCM, Bayard Allen. W6 ASSJ — W8SM, our new Route Manager, makes the BPL with his first report of the year. He handled 322 with his 500 watt phone. FB! If you want skeds, drop him a line at 502 Oaklyn Ave., Oaklyn, N. J. W6 ASSJ has been very busy in the law office and only handled a few. W3AK is off the air two weeks due to blowing his receiver tubes. W3BAN is still flitting with Old Man Hard Luck. Traffic: W3SM 322, W8 ASSJ 10.

WESTERN PENNSYLVANIA — SCM, A. W. McAnulty. WSCOE is going as SCM for this section. As I turn over the work to my successor, Mr. Robert Lloyd, WSCFR, I wish to thank all of you for your cooperation and friendship. I am sure that you will do your own good work under the supervision of Mr. Lloyd. I shall be glad to hear from any of you through the mail and station WSCOE will be kept on the air as heretofore. W8BYN will be keeping a building a 210 outfit for 750-kc. traffic work. The club is organizing a 28 me. dub? Write us. W8CAT is the new SCM, Bayard Allen. W8JFM is a new man on 3.5 mc. with a 210 at Yorkville. W8CYC blew out the old mercury arc. A buffer stage Xtal Control outfit is being installed at W8DAR to go with a 10-dB White speech amplifier. W8DAX has logged 221 stations on the 1750-kc. band so far in 1939. W8EIR is home from school and pounding brass very hard now. W8GF is still the Fifth! 2210 has been helpful to him and he has worked 12 countries with it. W3ASSY and W8GF will lunch-lake to the Pacific Coast this summer. W8BDW is on again with a 303-A in L.H. Hartley with 1900 V. for 7.5 mc. W8DOK in Air, logged in England on 28 mc. FB, O.T., W8ASSY and W8CYC both have new 2-c. mobile grid receivers. W8FUR has just received a Deforest 503-A which will play on 14, 7 and 3.5 mc. W8DZM stayed home all month and put his time to good advantage by hanging up a total of 852 QSOs. That is a nice total for all to shoot at, Om.'s. W8BYK was the host at a hamfest of the Peoria R.R.L. and nearby hams on May 31. W8JS has sold his high power outfit and is on 3.5 mc. with low power. W8APN is using a 2500-kc. detector, but is using it better now. W8ASD, W8SFJ, W8JAM, W8EIR, W9EGF, W8BRS and W8DYN — unload on them for efficient QSP. W8FEX-City-of-Staits fame is alive again. W8BPL is at 1740 Cadillac, Detroit. W8DYN still sends code practice 3-12 WPM? Sunday, 7 p.m. EST Tuesday and Thursday on 3000 kc. and has lotta customers, including YLs! Mark THAT 16th of each month on your calendar now, and send in the reports. Let's knock 'em dead, Michigan.


ILLINOIS — SCM, E. J. Hinds. W8APY — W8DZM and W8DAX are attending camp at Camp Grant. (Hickford, Ill.) W8DXZ is rebuilding for fall traffic. W9AGO has his speech at uplifier. W8DAX has logged 341 contacts on the 1750-kc. band so far in 1939. W9EIR is home from school and pounding brass very hard now. W8GF still has the Fifth! 2210 been helpful to him and he has worked 12 countries with it. W3ASSY and W8GF will lunch-lake to the Pacific Coast this summer. W8BDW is on again with a 303-A in L.H. Hartley with 1900 V. for 7.5 mc. W8DOK in Air, logged in England on 28 mc. FB, O.T., W8ASSY and W8CYC both have new 2-c. mobile grid receivers. W8FUR has just received a Deforest 503-A which will play on 14, 7 and 3.5 mc. W8DZM stayed home all month and put his time to good advantage by hanging up a total of 852 QSOs. That is a nice total for all to shoot at, Om.'s. W8BYK was the host at a hamfest of the Peoria R.R.L. and nearby hams on May 31. W8JS has sold his high power outfit and is on 3.5 mc. with low power. W8APN is using a 2500-kc. detector, but is using it better now. W8ASD, W8SFJ, W8JAM, W8EIR, W9EGF, W8BRS and W8DYN — unload on them for efficient QSP. W8FEX-City-of-Staits fame is alive again. W8BPL is at 1740 Cadillac, Detroit. W8DYN still sends code practice 3-12 WPM? Sunday, 7 p.m. EST Tuesday and Thursday on 3000 kc. and has lotta customers, including YLs! Mark THAT 16th of each month on your calendar now, and send in the reports. Let's knock 'em dead, Michigan.


MICHIGAN — Acting SCM, K. F. Conroy, W8DZY. We regret that WSCFP is leaving us as SCM, but he claims he will be pounding brass more now, so all is well. Here is this month’s total. W8AXM, W8CVU, W8CRR, W8DRD, W8ASEM, W8BF, W8CST, W8BPL and W8THT are all new reporters. Welcome. Om's. W8AXE sez, "YLS." W8C2EZ is keeping a few skeds. W8BRS claims 7 mc. Radio Frequ is just that. (Freaks). W8BYG and W8ASSJ both want their ORS certificates sealed for a YL. W8DFS is pounding brass at sea by now. W8DJO is trying 11 mc. W8SJ is just opposite to most of the gang — he reports tlc but says nothing. Some one raised with WSCFP about something! Hehe-heh. W8DSN will be on with new xmr. and rrvr. and promises big things. W8BRO and W8C say QRU, W8DSD sez he’s a RC now. W8DQV likes AA work in a large way. W8EAQ says QRL but his total says different. W8BYG will be on all bands soon. W8ACJ claims a cold wet tlc-mail Miss W8GDX sea swimming is all wet, but she likes it. Say, Gang, did you get any cigars from W8DRB? (914 lb.) YL. FB! W8DEN says if the off-freq. 3.5 mc. phones would learn to talk with their hands, QHM would be more endurable. QMR needs 6 or 8 more continents for a WAC. W8CWLK was the host for getting the gang for the C.H.A newa. They will then be forwarded in a bunch to the SCM. Traffic: W8YA 401, W8DLS 48, W8C2EZ 47, W8CST 24, W8GU 20, W8CSE 17, W8AGO 6, W8DUT 6, W8AVY 14.

CENTRAL DIVISION

August, 1930

The Convention will be held here in Dayton the last few days of August, and already plans are underway. Better plans to come, because it's going to be good. Get further details from the Dayton gang via the air. W9LT, Ohio State University, has been selected as the center this month with 160. W9FAJ will come next with 126, W9CGO has gone on a visit again this summer, and only had part of a month to work. W9BAC rolls up 70, which is not at all bad for hot weather. W9DFF is left a bit unexplored. September should go back to Purdue. W9NY, the faithful, turns in 51 without help of schedules. W9DU, another "o" to come to the "8th" is located in Columbus. W9BKM is still working fast and furious with AA and gets most of his traffic off W9DAs has a number of reports. W9DGMX also for 8.5 mc. W9CSS is taking a portable call with him July 14th to 28th. W9TK is leaving us for the summer. W9BFX and W9C5K are keeping in touch with each other by radio while W9CX is away for the summer. W9BEF reports by phone. W9DUR reports he and W9DXX took some messages, W9DMX calling the party on the phone, and enabling W9BNX to talk to his father. FB worked, OAM. W9FXU suggests that we run a "CQ Hound" column in QST. Hi. W9CFL is still plugging along. W8ARP leaves for Valparaiso. Ind., for the summer, but will be back in the fall. W9DQF is going well, and the club is going to continue through the fall. A first time for him. FB. W9WJ finds his time on the air very limited. W9DXX is off the air altogether on account of the YLs. W9BRR is still inactive, and dazed if I blame him much. No "spanking" for you this time, W9ACF. W8PL says air dead. W9RN is still on KP, and is happy because he has been offered several prizes to Warren amature for number of QSOs. W9DYY won first prize and W9MFE second. FB. Well, gang; this is a short report, but when so few reports, there's not much I can write.


KENTUCKY — SCM, J. B. Wathen HN, W9BZ — Host Waves vs. Radio Waves. A knockout for the former. Get your old-fashioned mint-juleps at W9AZT; be wise the Red Eyes have a show tonight. W9EAB has a special at $5.00. W9EYH says he was disappointed at the small bunch at the last meeting of the A.R. T.S. W9ACR is warming up and we hope he will be with us often from now on. W9AHN will celebrate the fourth by opening up with Xtal. W9BWW requested ORS dues for the time being. W9AWK had a nice trip and visited several of the Section hands. W9QX went fishing and got tanned. W9ARU with two ops and no traffic. How come? W9DQD dropped to 14 kc. W9ABD has a new man in South Minneapolis with "beautiful" a.m. apparatus. W9FYJ has an AC receiver going. W9AZF has one hummer. Hi. W9GAL expects to have xtal shortly. W9CHR will be going as soon as his two new masts are up. W9HAN changed to push-pull with gratifying results. To the ORS having the largest total of traffic from June 15th to Sept. 15th, the SCM will donate an ORS A.R.R.L. pin. There are many active stations in this Section who never report. Give us a little dope once in awhile, OAMs. Gled to see any of the gang if they get to Louisville. Just time Belmont 2148, L.L.'s acceptable, and bow.


INDIANA — SCM, D. J. Angus, W9CYY — SCMUD has just completed and delivered the crystal temperature control and the power supply for W9LAP at Louisville. W9FXN is at the Valparaiso Radio School. W9DXX, W9DGMX, and W9DDZ and W9FRRF are back from school and operating the home stations. W9DDB is now on with W9DDF at Cincinnati. W9BEK and W9DXX are new stations at Elkhart. W9CVH has been appointed chief radio officer of union one, section three, U.E.N.R. W9PMF has moved to South Bend. W9FFB is a new ham at South Bend. W9GJG had three more tubes go west. W9WY is the new call of the Training School at Valpo. W9RN is now the portable call for the school. W9EAB is in the location of his own business, doing commercial operating. W9PFI reports for the Richmond gang. W8MCQ says the Richmond Police Dept. received their O.K. from the F.R.C. and as soon as appropriations are completed work will begin on a 50-W. Xtal control transmitter. W9FFZ is on the sick list. W8FXM is back on 7000 kc. after a trip to the hospital. W9FXO works 14 mc. every 15 min. W9EFD is still plugging along. He's ready to go back to Purdue. W9NYP, the faithful, turns in 51 without help of schedules. W9DU, another "o" to come to the "8th" is located in Columbus. W9BKM is still working fast and furious with AA and gets most of his traffic off W9DAs has a number of reports. W9DGMX also for 8.5 mc. W9CSS is taking a portable call with him July 14th to 28th. W9TK is leaving us for the summer. W9BFX and W9C5K are keeping in touch with each other by radio while W9CX is away for the summer. W9BEF reports by phone. W9DUR reports he and W9DXX took some messages, W9DMX calling the party on the phone, and enabling W9BNX to talk to his father. FB worked, OAM. W9FXU suggests that we run a "CQ Hound" column in QST. Hi. W9CFL is still plugging along. W8ARP leaves for Valparaiso. Ind., for the summer, but will be back in the fall. W9DQF is going well, and the club is going to continue through the fall. A first time for him. FB. W9WJ finds his time on the air very limited. W9DXX is off the air altogether on account of the YLs. W9BRR is still inactive, and dazed if I blame him much. No "spanking" for you this time, W9ACF. W8PL says air dead. W9RN is still on KP, and is happy because he has been offered several prizes to Warren amature for number of QSOs. W9DYY won first prize and W9MFE second. FB. Well, gang; this is a short report, but when so few reports, there's not much I can write.

to thank those of you who reported regularly. Howard Cusman, W2DNS, Sioux Falls, is our new SCM. Give him lots of support and help him put the South Dakota Section on the map.

**DELTA DIVISION**

ARKANSAS — SCM, Henry E. Veite, W3ABI — With the arrival of the hot season it seems that most of the hams in this state have deserted their radio shack for outdoor sports which reminds us that W2CQ has seriously taken up miniature golf, while W3AB5 is getting in as much fishing as possible. W5AGB and W5ADB are two new stations in Little Rock. Welcome, Oma. W3AY is the quiet mother of a new baby boy. Congratulations! W5BLG has been rebuilding. W5BHI has a new generator and has increased power. W5ABI is getting out well with a DC note. W5LY, our Route Manager, is rebuilding a sta controlled rig. W5BKT is on the 7-mc band and looking for traffic. W2ACM is the proud owner of a new second class ticket and is operator at KFPW at Siloam Springs, Ark.

Traffic: W3AHI 27, TENNESSEE — SCM, James B. Witt, W4SP — Here with traffic report for the month of June. W4KH handled traffic from OMITB and VK. W4VK has installed xtal. W4HK is moving his rig to roof of ten-story building and should have a good starting point for traffic. WACG is a collared report for MOPA. W4FX is watching W4DG to see how it's done. Knoxville will graduate three new hams this month. Come on, fellows, let's keep the amps flowing and let the SCM know what you are doing. W4SP is on a two weeks' auto trip through Canada and the East. W4AGG is a new station.


LOUISIANA — SCM, E. M. Witts, Jr., W6GFM — Summer is here and with it comes reports of less traffic and dx. W5RLA leads in traffic this month. W5ANA is installing a xtal control outfit. W5WY reports that most of the ops have gone home for the summer. W6KCM is home from L. U. S. U., now. W5RR (the old man) is on 7 mc. and is getting out lb with his 50 watt. Hl, W3RHH will be at W5WY for the summer. W6KBL is pounding out on 7 mc. continuously. W5HBY is now in the Army-Amateur net. W5WLF will be back in a few days from a new location. W2AF worked Canadian General Manager Reid, VE2BE, for the first contact on the Directors net for his station. The Shreveport gang is going to throw a big hamfest the latter part of the month and the personnel in Louisiana, Eastern Texas, Arkansas, and Southern Arkansas and Western Mississippi are cordially invited to attend. Also, any others who desire to come please write. More particulars later.


**HUDSON DIVISION**

EASTERN NEW YORK — SCM, H. Rosenthal, W2QJU — With the coming of summer, the reports have fallen off and those reporting show a marked decrease in the amount of traffic handled. QRS are expected to report each month, even if no traffic is handled so if you are away on vacation when the 15th rolls around send in a picture post card instead of the regular one. W2QJ makes the BPL with all foreign messages. W2LU is promoting on the new Vibroplex presented to him by the local power company in appreciation of the help he gave them during the December ice storm. W2BKN says every time he books a foreign station, it turns out to be one of the U.S. Marines on foreign duty. W2WA1 is downhearted. He heard AC31E, CQing and missed him. W2AYK spent his time on active duty with the Naval Reserve copying the Grad Zepplin. W2ACB isn't sure whether it's good or bad luck to send in a report with thirteen messages for the total. W2AVCJ reports copying the Grad every night on its way to Lakehurst. W2ANZ reports exams interfered with traffic this month. W2BAJA reports the air dead during daylight hours since spring started. W2QJU handled traffic for the Yankee place on its South American good will flight.


NEW YORK CITY AND LONG ISLAND — Acting SCM, V. T. Kenney, W2BSO — Manhattan: W2AFQ leads his boro with a total of 21. W2BDJ, a new op, tells us there are still plenty of good-QRPs around here. Local DX is also being reported asPortable W2ZZH, which will be operated along the Atlantic Coast. Bronx: After getting lots of traffic from RX1AS, W2AFI had to quit the sked on account of QRN. Religious group presents with W4FYG a good total. W2AET tells us of W5BDY stopping at his shack and seeing the sights in N. Y. C. W2AQG complains of other activities keeping him away from the set. W5VQ QSOQ W1XM and received a report from a New Zealander, W2APV still skeds W2AWS and HI7CO. Brooklyn: W2ACQ has been rebuilding. W2HIV promises better traffic totals. W2ATZ is working lots of VK and K6 stations, W2ARQ is keeping 6 skeds a week. W2PF is off the air for a month while he attends Ft. Monmouth military training. W2APF has a third op-puch-hitting for him while he is on a vacation. W2BVE has for-saken 3.5 mc. until the QRM lets up. W2BO is closed down for the summer. Long Island: As usual W2APV, RM for L. I., leads that part of our section and nominates W2AET for the office of ORS. W2AET is in Long Island. W2ARQ is on the Directors net. W2AET tells us of WRBDV leaving W2ARQ for the latter part of the month. W2AET promises better traffic totals. W2APV reports that the South Dakota Section has ECS, T. Kenney, W2BGO — Manhattan: W2AI0 is busy with BC affairs duties. W2TQX only operates on 7 mc. and W2WJQ tells us that some hams are still busy with BC affairs duties. W2TQX only operates on week ends. W2BY took a 10-day trip to Canada with another YL. Following are notes on the activities of the Bloomfield Radio Club. The following stations are all on line and with xtal control: W2CC, W2FL, W2EF, W2QY, W2AH, W2MA, W2FP, W2FRG and W2IC. W2FRG steps out with W2ARQ at his home at Sett Run, Pa. Ten members attended the Raritan Valley banquet. W2BH does not give any further information.


**MIDWEST DIVISION**

NEBRASKA — SCM, C. B. Diehl, W9BYG — W2ANZ is again laid up in the hospital. W9BYF had to take down antenna on account of roof repairs. W9BEEF is very busy at this time. W9BFB is rebuilding KMMJ. W9PAM is still rebuilding W9RDF and winter tic in mind. W9BEEH is experimenting with antennas. W9HN is on vacation. W9DI built a new receiver, W9BOQ is very busy with farm work. W9HWL is on 7000 kc. again. W9CJU sends first report as OBS and works mostly on 1800.
August, 1930

Iowa — SCM, H. W. Kerr, W0DZ - W9CKQ keeps sked with W3KQG and has 393 QSOs to date; by special permission of the Radio Inspector in VK they are handling traffic between the Dept. of Research in Terrestrial Magnetism, Washington, D.C., and the Magnetic Observatory, Waikroo, West Australia. W0JY is out for an ORS, W9FFD reports qso with W9FY, W9EQQ finds carpenter work in VK is in spite of earlier claims. W9PZO got his gel from a K8 and plans to rebuild. W9ACL adds his bit to Davenport's reputation. W9GKL finished his school, visited the Iowa City gang and got a bit of time on 3500 kc. W9DPL saw that getting the 80 band cond in the Ames convention he needs PTC reports. W9CKQ schools at Valparaiso for a cool ticket. The Tri-State Club have a treasure cruise with the


Missouri — SCM, L. B. Laison, W0RJ - W3DZN is still operating for the Miss.-Warrent Service, QRA 8S Wymoak, Kansas. In the first place W9PFO should have been infty for a month's time from St. Louis, W9PTA followed close with a majority of delivered messages. The balance of the activity came from W9HG, W9AMR and W9DYJ. W9AMR reported twice to make sure of getting in, as did W9GAR. Kansas City: W9WJ, W9EFD and Egbert Lawe are still at W9ACR; were on a cruise at Great Lakes with the U.S.N.R. and report a very pleasant trip. W9DQN lost his second op, as W9ECS went to Dodge City for the W. U., W9DQN handles a good many messages for him in his absence. W9DCW was getting ready to leave, nothing to move but kept one sked going, W9DPA is on 14 mc. W9CFL is kept busy working U.S.N.R. skeds, W9DHN took a neat off and went back to 3.5 mc. looking for old friends. W9GAR is still pouting about as usual. W9JBA says there is still some traffic moving. W9VEY sold his tune to W9FM and is now using 3.5 mc. CW again. W9EPX just got back on the air. W9GQN reported QRX for filter to arrive. W9EMM is planning active organization of a U.S.N.R. unit in St. Joseph. W9QDO was busy to operate much but still has hopes. The following will cruise with the U.S.N.R. on the Great Lakes or have already done so: W9FFL, W0RJ, W9AJW, L. G. Riddle.


Kansas — SCM, J. H. Amin, W0CET - W9CET feels that he has finally been on for the 28,000 dec. tests. Any one going on the fourth U.S.N.R. cruise please get in touch with W9BV, W9BTG has left for the Gulf Radio school. A 3000-volt MG is the plan of W9DFE for fall. The YL, W9JAG, says she is ready for big business now. W9QGI has come to the harvest fields. W9DJB has his xmitter at the U.S.N.R. Armory as a temporary unit post. W9FLO is working long hours so doesn't get to be on much. W9HIL is forced to resign his ORS and we sure hate to lose him. W0ExU is out of town most of the time so is on little W9HHR is working on a new idea in frequency meters. The KVRG report that plans for the Division Convention in Sept. at Topeka are progressing nicely.

Traffic: W0CET 45, W9BWY 25, W9TG 6, W9FDY 3.

New England Division

Connecticut — SCM, Fred A. Ellis, Jr., W9CTJ — With a twist, W9BU sends in their usual high total and continues to occupy space in the BPL. W1AHP has a daily schedule with W9QG and is experimenting on 26 mc. W9HP is taking a portable on a trip to Vermont with W1AZP. W9IHF was visited by W9KN. W9FTD wants no know where the gang are on CTNITE. (So does the SCM.) W1AMG is active in the T.C.R.C. W1ADW has been playing with 25 mc. but doesn't hear anyone. He will use same call with his portable this summer. W1BHM won the Third International Contest certificate for Conn. F.R. and congrats. W1UE is inactive but busy at Home Service. W9QCM is baring good luck with his low power set and will increase during this period. W1BUW sends in his first report and applies for ORS. W1BWW reported in person. W1CTI and W1BV attended a meeting of the T.C.R.C. at New Haven. W9QL and W1UE were on hand from Headquarters. The T.C.R.C. is to be committed on their new clubhouse. They will have a station in operation with a lot of ops in the very near future. W1AW is to be placed on the inactive list for two months. W1VIN reports, W1AUX, a new station in Middletown, W1HIM 19 for this section, reports several off-frequency stations. Only twelve stations moving traffic this month. Let's see if we can do better than that and give Eastern Mass. a little competition.

Traffic: W1AMQ 235, W1MK 426, W1AFB 39, W1RP 10, W1HQ 12, W1TD 12, W1AMG 6, W1AZG 2, W1BHUR 7, W1CTI 1, W1HWW 6, W1AQB 8.

Eastern Massachusetts — SCM, Mills T., Weeks. W1WY - A number of the ORS forgot to report this month so our total has suffered in consequence. W1CMZ shows his usual consistency and is in the only one to make the SPL this month. Most of the gang are either vacationing or rebuilding during this period. Several ORS have been on 15 days' duty with the U.S.N.R. and reports visiting Portland hams during one of his cruises. W1LM is playing with 14,000 kc. but says spark plug QRM is bothering him. W1JAS is keeping several skeds on 3500 kc. A "filter" in the transmitter is doing duty on W1CAG. A good set of results. W1BOS reports by radio from Europe, where he is making NAMS on 7000 kc. W1WIW has built a new receiver. A newcomer is W1AEG who has been working some good QRS besides a 10 mc. traffic schedule. W1AJN submits his initial report. W1WVH has acquired a fine cabinet in which to house one of his Xsters and has re-built accordingly. The new Norwood hams, W1CQP and W1CQN, are a good group with their transmissions but is having trouble with some traffic. W1QZ has resigned his ORS due to what he calls "incompatibility complex." W1KX reports being QSO with HAF1C. A change of QRA for the summer he will not be on the air much until fall. W1QJ is active again on 3500 kc. Now is the time, gang, to be making your arrangements for good skeds, better traffic routes, and a good time to get the bugs out of your equipment.

Traffic: W1CQMZ 275, W1ACW 118, W1AJI 70, W1BZ 27, W1WY 23, W1FFH 57, W1EMH 51, W1CD 23, W1YB 16, W1DAK 5, W1QCM 4, W1CCP 3, W1WWU 1.

Maine — SCM, G. C. Brown, W1AQ1 - W9DQ has just received from Chairman W. Haskell, of the Committee on Arrangements, that the Maine Convention has been approved by Headquarters and Director Fred Best. A fine list of speakers has been lined up and there will be a real "bang up" time for everybody. A word of warning to the boys. Make plans now to attend and help the Forest City gang put it over. W1BH6 and his gang of hit-and-run ball players recently enjoyed a fine week-end at the Naval Station at Cape Elizabeth. The boys had a chance to inspect the station and visit one of the Eagle boats, which was in the harbor. The Queen City gang have organized a ball team and expect to take on the Augusta boys for a hot game sometime during the latter part of July. W1FQX recently enjoyed a two weeks' training trip at Fort Monmouth. W. J. W1CDX is on a two weeks' cruise at Cape Elizabeth. W1AHY is moving his station to Peaks Island, Portland, for the summer. W1QJ is working for the W.U. in Northeast Harbor for the summer months. W1FZ5 is in a hotel in New York, with a phone. W1QJ was a recent visitor to the Queen City. W1OG, formerly W1ATI, is on the air with a crystal now and has a new signal. The many friends of Phil Gould, of W1LZ, are very much interested in his health and illness of several months. The station of the SCM is undergoing a rigid reconditioning prior to the fall rush of traffic. W1BPZ is high man this month. F.R. Mel. W1QJ comes in second and reports conditions still very poor. W1ARA, of Lynn, Mass., has been assigned the power out of GBF on operator at station W4AM, Hanson. Welcome, OM.

Traffic: W1BF7 41, W1OH 9, W1LQ 2.

Vermont — SCM, Clayton Paulette, W1T - A
wonderful time was enjoyed by W1BD, W1CCX, W1BCK, W1BDX, W1TJ and W1WT at our annual hamfest held at W1HH’s camp on Lake Memphremagog. I am going to try to extend the summer vacation to all Vermonters who wish to come next year. Only one station this month, W1BD of Barre, turns in a report. He is joining the Army net, and also says he will have a low power outlet in Burlington this summer. W1AMQ is to be anorn in the Navy net. He is moving to WO and will wire in QSO any of the Vermont gang as soon as possible. We have a new amateur on the air in Hinesburg, vt. now. Please extend a helping hand to him. His call is W1ATF.


WESTERN MASSACHUSETTS — SCM, Dr. A. Tesserow, W1BVR knew his fifty and is now back using his 3-yer.-old Meiller 30 wattter. W1ADO is still building his long-waited-for xtal fone. W1BEG is having a hard time trying to make his filament transformer keep cool on his 211 tube. W1BZJ reports that he will spend his vacation in Washington, D. C. W1HJ finally put his 50-watt xtal outfit on the air and is getting out fine. Rumor has it that W1AM has a 250-watt xtal fone under construction and will soon join the ranks of the “Fone Boys” on 3000 kec. W1WJ divided his time between selling bonds and pound­ing brass.

Traffic: W1BWX, W1B2X.

NEW HAMPSHIRE — SCM, V. Hodge, W1ATJ — As I read these SCM reports before you for your amusement and ask for your cooperation in making this section one of the best during the coming two years. Congratulations, O.M., and best wishes.

Traffic: W1NS 94, W1BZ 4, W1BVR 40, W1BEG 10, W1BZI 10, W1AST 2, W1A4 19, W1BEE 10, W1B5 6.

RHODE ISLAND — SCM, C. N. Kraus, W1BCH — W1M0 built the push-pull job in June QST and has it going on 14 mc. W1BIL has a portable set. W1GHS has a sked with WSBU. W1AWE is building a new sky hook. W1BCR is on 14 mc, with an 852. Members of the Radio Club of R. I. are designing a new crystal control 500 watt CW and fone set which should be ready in the late summer or early fall. It is also planned to have television modulation on this transmitter, Hollis S. Baird, Chief Engineer of the Short Wave and Television Labs. of Boston, W1XAY-W1WX, addressed the club at an open meeting held at Brown University. Mr. Baird described his system of horizontal beam transmission using a steel tape held in a drum replacing the conventional scanning disc. He received pictures on one of his receivers from W1XAY and W1MKX. W1FHP has a low power outlet and expects to be active this summer, W1AWE is taking some of the Naval Reserve summer cruises and is having a fine time.

Traffic: W1MO 18.
PACIFIC DIVISION

SANTA CLARA VALLEY — SCM, J. E. Quenence, W6QX -- Congratulations are in order this month for W6QAX who ran up the highest score in the National Tests. The SCM is mighty proud of this achievement, bringing as it does such favorable publicity to the Pacific Division. W6QAX closed up for the summer on June 15th with a nice traffic total putting them in the BPL. W6QDQH, the SCM, is working with Army net and Boy Scout work -- FB. W6ALW will have xtal 203A soon. W6AEO, the Fort Bragg Police, plans for Slate River, W6EBC, a new arrival in this section, is working on 14,000 kcs. W6AME moved again and between that and answering the lure of the trout streams, radio will be ND for the summer. W6QA is now on with a new QO job. W6NX's xtal set will soon be completed. W6HLM is vacationing in British Columbia for the summer.


EAST BAY — SCM, J. Walter Frakes, W6CZR — Conditions in traffic handling this month point to the fact that the entire section has moved to the country for the summer or that it is so concerned with present economic conditions that there is no time left for that type of work. W6TTL was high man for the section during the past month, handling in a particularly high total before departing for Seattle to join the U. S. Geodetic Survey boat, W6ALX. The next high man has been holding an interesting schedule on 7-m. with reports that he is busy in the National Parks of the West under the guidance of Ansel Hall of Berkeley. The Scouts have a Heintz and Kaufman portable transmitter which is putting a strong signal into the section. Their day by day schedule of the traffic being handled is furnished by a San Francisco newspaper. W6AOU is a new candidate for an ORS. W6RJ has been working a great deal on the plans for the "hidden transmitter" stunt of the Oakland District. W6ARR is getting after the Fourth of July. W6BU, the Berkeley Scout who are fond of DX, is busily occupied with a newspaper.

W6AOU is now on "Vacation." W6EBC at Concord reports that the weather is too hot in his secluded valley for consistent traffic work. W6BUW is planning on building a gallon for Lake Merritt and as soon as it is finished he will install a transmitter and receiver on it -- if the boat doesn't sink. W6BNA says that his cause is almost finished, and he may be back on the air soon if he is not too busy using it. W6AOU has been doing his usual amount of work as an Official Observer, but reports the traffic as nil. W6CCM reports that he and W6DJI have been trying to get some DX with a fish line and sinker near Rodeo. W6QNS reports from New York that the Rochester DXCC is not doing too well and that his friend is staying on the east for a while. W6CZR and W6ARR have been too busy with the arrival of a new junior op -- a YL this time — to think about putting the old coffee percolators back on the air. W6ARR plans to send out a "QST of thanks" soon for the flowers sent her in the hospital by the section members. W6AN has his transmitter on the air and plans to open his first schedule soon on 2100 kc. W6QOQ has been keeping a sked with a Lake Merritt Ferrari and is on a camping trip with a party of scouts in the mountains. W6AAG is working hard on plans for installing a traffic station at the Pacific Aerocraft Exhibition at the Oakland Airport. The Northern California Pre-Convention Round Up and HandiFair was held by the Section at KTAR and was a huge success. San Francisco, Modesto, San Jose, and Sacramento sent delegations. W6RJ acted as master of ceremonies and James Warner of KTAB fame was one of the principal speakers. Despite the inclement weather, W6CCM, reader of the decisions of the Board of Directors, and there was much entertainment by professional and ham talent. W6BAA affiliated as usual with Oscar, the dummy.


SAN DIEGO — SCM, H. A. Ambler, W6EOP — W6ANX leads this month and makes the BPL. FB, QSL, W6QX is very QRL with none. The SCM visited W6PP in Oceanbeach and W6BGT in Pacific Beach and had a FB time. W6GCT graduated from the Fullerton J. C. and says he will have more time for FB. W6AAB was also visited by the SCM. W6BGL is now on. W6EOP is troubled with power leaks. W6EOP says no more time for QSL and requests cancellation of his ORS. W6CZT is heard on four now. W6JAM is a reminder now, and says he will bring to light on those frequency meters and he will calibrate them for you. W6EOS is still building the xtal xmitter. The A. A. T. club had their semi-annual banquet and all had a fine time eating and drinking. Those present included the ORS W6JAM, W6DAl, W6RE and others.

Communications: W6AAX, W6EOP, W6EWP, W6DAM and W6JPL.


FRESNO, CALIFORNIA — SCM, B. Shorttman, W6BWS — We welcome a new man to the game in the person of Bob Shorttman, Jr., of W6EFP and W6CZT from Los Angeles. He comes to Arizona to take up duties as second operator at K6SI. W6DTU leads the state in traffic. W6AUL operated by W6DAM is receiving a lot ofQS DX. W6AVJ is waiting for his 1-kw. W6DAM built the new a.c. receiver and says he was working on it for a month after a hard trip to Mexico City via automobile with an expedition and L.P. The following make the BPL-four of them working on it: W6QP, W6BZY, W6WA, W6EPJ. W6AOU, W6MAY, W6BDW is suffix the list with six skeds. The section's message total is 3569. W6KD worked JizB on 26 mc. on June 8th. The Tri-County Club sponsored the quarterly banquet held June 7th at Pomona with over 100 in attendance. W6EFP tells us of a new ham coming on at Pomona with xtal, W6WY has a good sked with Hawaii which puts him in BPL. W6KGH says 95 per cent of his large total was handled with foreign countries. W6AAW missed the BPL for the first time in many months due to illness. W6BZL is keeping in touch in the intercity, W6HEEP and W6EAF renewed his code transmissions for beginners. W6ETU, the new Chief Route Manager, is a live wire and can provide skeds for you. W6DAM is resuming sked with W6BAM and W6EBE in connection with his duties in the summer months. W6EAF and W6EAM have the section working. W6AAM is at Pomona and handling 49 messages. W6AVJ is waiting for his 1-kw. water cooled tube to be repaired. W6ESA has rebuilt entirely. W6EOP is using low power tone. W6BZY is also using tone. W6JSLC sends in his first report and reports new club at Santa Monica, FB. W6WY sends in list of 392 and prehistoric size. W6DZL complains about his plate block going up in smoke. W6AM has new QRA and is utilizing two 90-foot telephone poles. W6FP is working nights in teleh. W6EOP is working nights in talkies at Hollywood hence low total for one. W6CZT deserted 11th for 7 mc. W6CZT was heard in Switzerland and worked 15th country. W6EFP is a member of the new Santa Monica Wireless Club. W6ALC will soon be on with xtal. W6N is busy at KFOX but promises total soon. W6EFP is re-building with such zeal. W6ID is coming back on air after a long absence due to drilling. W6BZY has weather-vane note and gets different QSL with each QSO. Two former Navy ops have put W6WY on the air on 3000 kc. W6BZY is in Chicago for a few months. W6EFP is going to get a 2000-watt transmitter. W6CZT's operator comes thru W6AAX this month; W6CTN is rebuilding. W6GQK is still working on new shack. W6DQV is working good DX. W6AAB is trying push-pull with W6WY. W6melon is being married. Best of luck and hope she becomes a YL op.
Hakersfield Club belongs to the Naval Reserve and will be stationed and will keep some older stations working to keep him up. By donating a nearly complete file of exchange list for our paper, K6DUD is a very active new swarm. KBAVL and K6BXW are leaving for Calif. All unlisted stations are making big progress in the section. All active amateurs plentiful drop your SCM a line and let the rest of the section know Nevada is ahead. Traffic: W6DZ 55, W6TO 11, W6AG 4.

HAWAII — SCM, L. A. Walworth, KCJB — In the following appointments were made in getting new machinery in operation. Broadcasting in Honolulu, Route Nine, Official Observer, KE6EW: ORS appointments, KCJB, K6JAM, KE6RH; Official Observers, KE6RO, KE6DY, K6DUD, K6EQQ, and KCJB, Spt. J. C. Bailey of EWB edited Ham-Aloha for June and the boys say he is "past master of printers." The A.R.R.L. of Los Angeles is the first exchange list for our paper. K6DUD is a very active new station and will keep some older stations working to keep alive. The Lahainaluna Ham Club is publishing an Amateur Radio Call Book. Your SCM boasts six new hams. Interest is increasing in 3500 kc. for transcontinental work. ZL3AI says he likes Ham-Aloha. KCQF, former SCM, sent special radio from Aberdeen, Wash., to send him his Ham-Aloha regular as it's good reading while at sea. K5AVL and KE6BW are leaving for Calif. All unlisted Hawaiian stations will receive all QSL cards addressed to KCJB, whose call is correct in the Amateur Radio Call Book. Your SCM has heard a big buzzing during a CQ session and wondered what had gone wast this time. It was only a swarm of bees, so he took 'em in reporting three stings. Ten stations reported with message total of 2097. We had our stride, that K4 gang and W6 bus will look like 300-foot rooster dogs.


ROANOKE DIVISION

WEST VIRGINIA — SCM, Don B. Morris, W6JM — The following hams lose their ORS tickets because of illness to obey the rules of an ORS: W8SP, W8CCLQ, W8SDCM and W8AZC. W8CBV and W8BWK, both of Wheeling, are new ORS stations. W8DPO was winner in Third International Contest for this section. W8DPO is going to Europe in July for his vacation. W8CDV's 209-A went "West" after five years of service. W8ACL, Ex8RR, passed commercial and is going to sea. W8JM had pleasure of meeting W8HD, W8BUV, W8ATE, W8TI, and old W8 during the last month. O'con, Gang. Shoot those reports in the 16th please.


NORTH CAROLINA — Acting SCM, John F. Bivins, W4EWE — The section will regret to learn of the resignation of Hal S. Justice, W4TS, as SCM of this state. We hate to lose Hal and hope that he will still continue to lend us his moral if not material help. Yours truly will pinch hit until a new SCM is elected. W4BZ was visited by lightning with disastrous results. W8ALW is still sweating a lot of static over the xtal. W4JR is getting a lot of kick out of the AA net. W4AA reports a lot of activity in Greensboro with several new stations on the air. W4DW has recently been appointed for N. C. W4BP is looking for a holiday and checks in for active duty. W4AHH had a lot of tuff luck with his antenna and receiver lately and seems about "regusted" with the works. We are glad to welcome W8BV back on the air after an absence of a few months. It seems that the gang is going on a roll and the following have recently acquired commercial licenses: W4A1W, W4AJL, and W4ABB. W4OC is now the proud owner of an Amateur Extra First ticket. W4AAU sea makes way for his new xtal set.


VIRGINIA — Acting SCM, Ted P. Mathewson, W3FJ — Director Gravely of W3BZ visited the Richmond gang. W3CA is still working hard on his transmitter. We extend our sympathies to W3ZA on the loss of his brother. W3KI: taking his ham outfit with him to N. Y. C. where he is taking a new job. W8EKG and W8BGs are together now using a 1000 kc. Come back in W8EU, the QRM is out of here. W3HDZ has completed a new receiver. W3AWH keeps a three-weekly sked in Morrison, Va. W3HT is working in Quincy, Mass. W3IQ promises us great things from the Mass. panic in the radiator this week. W3RZ is still very active in the AA net. W3SLC has a fine traffic report. McDonald of W3ARU is now in Pa. behind W8CUD. W3HY is working at NKF and helping Hunton keep W3AG on air. W3HI is with the Gen. Motors Radio in Dayton, O. W3TJ visited W3RZ and has a nice gadget with Greavy. W3ASA is putting 200 vts on 20 and it works fine. W3AEV is pursuing an MA degree at Duke Univ. W3FEF met some of the Toronto gang on his visit up there. W3ALL and W3AQB are new hams in Richmond. W3AJL, W3AVU and W3FJ urge you to route your traffic via Richmond. W3AJJ will soon be on with a 250 watter. Oh! Oh! The SCM appreciates the way you fellows came across this month. Let's all plan to attend the State Convention in Richmond in September.


ROCKY MOUNTAIN DIVISION

TAHOE-WYOMING — Acting SCM, C. R. Miller, W6JDP — During the following month, only two ORS reporting. There are several active non-ORS in the section who do not report. Let me hear from you fellows. The section needs your support. W7AAb has been working 12 to 13 hours a day, but reports a good total. W6DPJ is operating as W6ZZZ for the summer. W6DPO, whose ORS was cancelled by request, continues to report. W6EKF is using fone on 3000 kc. W6JW of Stockton reports his crystal control working fine. W6BTX is studying in California this summer.


COLORADO — SCM, C. R. Stedman, W9CWA — W9CWA is moving again. W9CDE is busy examining friends for promotion on the railroad. W9CLC says his ticket expired, so he hasn't been on the air. W9CSR is busy decorating the house and car. W9EDM is at the National Guard Camp now and will be going full blast soon at the Boy Scout Camp with a portable. W9EFH is busy with farm work. W9EMK says fishing is fine. W9CAB is on the air now.

Traffic: W9CLU 1, W9FEF 1.

SOUTHEASTERN DIVISION

ALABAMA — Acting SCM, Carroll Kilpatrick, W4AHR — W4AHP, our SCM is at the C. M. C. T. C. in Anniston. W4AHP is aflicted by hot weather. W4AKM has been off the air lately. W4AHH is building an MOPA. W4PM is putting out a strong signal with xtal control. We welcome W4YJ back after an absence of seven months. W4TI is still very active in the AA net. W1DS is
punching the ether with his 201A. W4DHF is building a new xtal set. W4IA is back in Selma for the summer. W4APIF is troubled by local QRM. W4AJR has just been made Alternate C-S, for the 1st Alabama area of the AA system. W4AKB is still trying to find a new transmitter, and W4UIU is busy adjusting his crystal set. W4AQQ is contemplating buying a xtal. W4AHT is working at the local swimming pool. W71Z reports the organization of the Trout Radio Club. W71ZT is on 14 mc. most of the time. W4AIZ is on in Dothan.


GEORGIA-SOUTHERN CAROLINA-CUBA-ILE OF PINES — SCM, M. S. Alexander, W71ZH — Hot weather and vacations have taken their toll of the traffic and other work in this section. W4AIJ says he can’t hear any hams in Atlanta. W4SSS has requested an ORS appointment. J. W. Hickman reports that due to the death of his brother in a distant state he has not been on the air for some time. We must take this opportunity to extend our sympathy in his loss. W4AOK is a newcome-r in Augusta, Ga., and we welcome him. W4AHG has finally got a transmitter in Cuba for the February International Convention. W4TBB is punching the ether with his 201A. W4DKS is building a new Crystal set for Cuba in the February International Convention. W4AHG is trying for a Crystal set for Alabama area of the AWA Section. W4AQL has been W4ALF. W4TGP says he is thinking of building that new radio. W4XHJ has a new portable rig. W4ZZA, W4OZ, W4WZ, W4TO is on the air with the weather is giving too much QRN lately. W4AFT sends a RFI for W4ATH. W4VBG is keeping his Army-Amateur sked and W4ATC is still trying to get on the air it seems. W5JF has finally got the big xtal job going. We need a Route Manager who can handle the job. We also welcome a new XYL Operator. W4KQ can handle the job. W4AVG reports new Crystal is on the air with his 201A. W4AIK is still thinking about a new radio. W5GJ has a new Crystal set. W5AS H. V. another new ham.


PORTO RICO-VIRGIN ISLANDS — SCM, F. W. Mayer, K11KD — K11KD handled a few as well as worked DX. K11AKK reports good DX but no traffic. K11KD wins another contest and you fellows let him get away with it without turning him bad. K11AKK is the lone delinquent ORS this month. More once and you’re out. SCM says you fellows can probably figure out why this report is so short. It’s up to you to turn in the news, otherwise we have no report.


FLORIDA — SCM, Harvey Chatin, W4AK, W4PAPW — For the second consecutive year the Jacksonville Naval Communication Reserve Unit has been awarded the Lee Cup trophy for maintaining the highest degree of efficiency during the year in the Florida area. The first report this month was from W4AIJR in Jax, a YL operator. Congrats. Miss Hardin. Florida welcomes all new amateurs. W4TT is operating the Naval Reserve Station at Tampa. W4CAK handled a few more, this month. W4JU in Miami is keeping the Operating Reserve Station from Section Three, W4TV, on the air with a good “DX” this month. W4JU has a new 75-watt xtal transmitter on 7 mc. W418K was in Tampa this month. W4MM says he is putting $250 worth on his 50 watt rig. W4JU is the Army-Marine xtal and W41T2 in his 50 watt rig skipped every Monday night. W4WW and his brother have gone to Detroit, where they will stay until next fall. W4AIJ says the weather is giving too much QRM lately. W4AFT sends in his second report with a good total. W4AKW is going to school seven hours a day and does not get much time for radio. W4QL has a new portable call. W4ZZA, W4OK says the Naval Reserve Station is enlarging its membership every month. Last month’s QST has the call W4AKL. It should have been W4AIJ. W4OK says he is thinking of installing xtal. W410N has rebuilt his Schenkel receiver like W4AIA’s. W4ADP is still thinking of building that push-pull transmitter. W4OKK sends for W4AKX and W4AIY. They all promise a larger report next month. The following ORS appointments will be cancelled if your report does not come in this month: W4TV, W4OK, W4ZQX, W4WD and W4ID. W4OD is on the air with his tone set again. W4AIJ is changing his 14,000 kc. tone to 3600 kc. Send in your report, fellows, so we can have a clear idea of what is going on within our section. Your QTA can be found on page 5 of this QST.


WEST GULF DIVISION

NORTHERN TEXAS — SCM, Roy Lee Taylor, W5A1Y — SCM, Ray Hardy is taking over the ORS, turns in a good total. W5WW has a new receiver. W5BDF reports a new station, W5BLN, in Nacogdoches. Welcome, OB. W5AS, another new ORS, has a fine total and is relief up on KOKO. W5BAM has been on vacation, due to his dropping his 201G and W5US and W5US, in the rounds. W5RG has a new S.G. receiver. W5AY, another new ham, shows wp. W5SHJ has a d.c. note now. W5AEE is still pounding out a few. W5JW is also putting in xtal. W5BLU, after a new one, is doing fine. W5CF has a grid leak and a 210 but handled some. W5LY reports a new station. W5ALA, in Dallas, W5BAD is working for W.U. at Dallas and will be on with portable W5AAS. W5JG graduated from school. W5NZD has rebuilt. W5AKP can’t get on the air it seems. W5JF has finally got the big xtal job going. We need a Route Manager who can handle the job. Also another efficient Official Observer. If you can handle either of the above, let me hear from you at once.


SOUTHERN TEXAS — SCM, Robert F. Franklin, W5CX — I am sorry to report that the A. M. & College station, W5AQY, is off the air until school starts again in September, Bill Evans, W5EO, was elected Club Pres. of A. M. for the next term. Congrats, OB. W5KW is pretty busy as Secretary of Houston’s new radio club. W5EI has just been appointed Route Manager for this Gulf Division. On the way to Texas, W5FT, OB, turned in a good report. W5UX has two transmitters, one on 14,000 kc. and one on 7000 kc. W5B reports activity slow out way. W5ZG reports for California as follows: W5AGC is doing BC work here he expects to be in touch with a new transmitter soon, W5ZLR has a pair of 112’s in a push pull rig. W5AFP is using his portable until he can get his xtal controlled 900 going. W5GG reports his new Zepp working 16. W5MS is to be congratulated for his new Crystal, W5ZX is YL-struck! W5AHI is having trouble making a new receiver work. BC work has been keeping W5MX busy. W5TO is up at a BC station in Corpus, W5ATY, another new reporting “Ham” in Corpus Christi, is using a OK250 with 15W from a 15W from a 14L ZFTG, W2ALD, who is working for Shell Oil Co., out of Houston, has a new portable call, W5AOJ. The Houston Radio Club is in full swing again with a very good attendance. The officers for the coming year are Robert F. Franklin, W5ZLS. Pres. Jim Hunt, W5TG, V-Pres., Lee Havard, W5WRC, Sec. and Treas. We want everybody to come to the fourth West Gulf Convention to be held in Houston. There are a lot of nice things planned. Make your plans now. Send in your reservations to W5OXY or W5BRW.


NEW MEXICO — SCM, Leonworth Wheeler, Jr., W5AHI — A number of stations have shut down for the summer months, W5AJL is building a new crystal control outfit. W5TV is on a three month’s vacation. W5JZ is a new station on a ranch eighty miles out of Roswell. W5AHI will remain inactive for several more weeks.


OKLAHOMA — SCM, Win. J. Gentry, W5AVW — W5AVW is getting along with the crystal switching on the SCM. W5C6B is too hot to do much work handling. HI, W5MM is sure going good on 14,000 kc. fone. W5QI is still the ham commercial in Okla., with that power. HI, W5SW seems to be overworked in the elec. business. W5IM has our friend Harl Farewell from KP9 visiting him. W5AQY, our RM for Northern Oklahoma, is parking right along now. W5QV reports working W6AY from 1000 miles west of
Panama. W5AAV reports graduating from OUI. Follows. I want to remind you of a FB West Gulf Convention coming soon at Houston, Texas, Sept. 4th, 5th, 6th. Sure want to see you there. W5GF is building a 14,000 kc. set now and is going gud on 7000 kc. wid a 210. Glad to hear from a new Ham, W5AOG, of Okla. City. Let's have more reports, gang. Traffic: W5AUA 48, W5AQ 26, W5AF 10, W5O 11, W5AQQ 8, W5CB 4.

CANADA

Only a very few reports have been received on the number of messages handled during the Prince of Wales Birthday Greeting Relay. The Quebec boys made a fine record for their division and their SCM should be proud of them. GSML was on the receiving end and copied twelve messages from Montreal. I would be very pleased if all those who took part in this relay would report direct to me, so a complete check could be made and a letter of thanks forwarded to the RSGB for the part they played in the Relay.

Reports from all Canada are greatly reduced this month. Old man static must be getting in his work, as he is reported the chief offender. Come down on 14 mc. boys, and try Wednesday nights for Canadian contacts.

Your SCM will be glad, if you intend visiting Montreal during your vacation, to have you call on him, Telephone Harbour 5131 and visits to local stations will be arranged.

CANADIAN GENERAL MANAGER

QUEBEC DIVISION

QUEBEC — SCM, Alphy Blais, VE2AC — Through the efforts of our SCM we are welcomed to do ‘phone work on 14,100-14,300 kc., under certain restrictions. VE2BE is working DX and handling traffic in spite of all the GCM work. VE2AC is back from his honeymoon. VE2CA has a 28 mc. sked, with VE2AU. Congrats to VE2AP who got his B.Sc. degree. Mrs. VE2CA powers away as ever. Our old faithful VE2BB is handling traffic and has a fine d.e. note. VE2BE got in a new tank condenser. VE2RH is using xtal on 7244 kc. VE2BG is going to put up new fuses but the fellows will give him a hand. VE2BB had a visit from VE2BY, a YL operator. Hi! Hi! Two new men join us this month: Crawford, VE3EM, and Bennett, VE2YX in St. John, former VE2YV. Welcome Boys. Pleasant vacations to all.

Traffic: VE2BE 28, VE2AP 8, VE2BG 7, VE2CA 8, VE2BB 12, VE2AC 25, VE2EM 5, VE2YX 2.

ONTARIO DIVISION

ONTARIO — SCM, E. C. Thompson, VE4FC — VE4AEL is still maintaining his two regular schedules, and holds his lead in traffic totals. VE4GK is active on 3500 kc. VE4G0T says that ZL and VK come through FB in early mornings. VE4AD is hitting the trail with a 7000 kc. portable to Cedar Wild Hotel in Maskoka. VE4OC used 14,000 and 3300 kc. during the month. VE5ST is still plugging away at Beamsville with fine results. VE4FC is experimenting with AC tubes on high frequencies. Northern Dist: G. V. Lawrence, VE5ET. Acting SCM — VE5IU shot the 50 watt back on with an 852 booster and a sound DC plate supply. VE5BG lost one of his 50 wattaters. VE3HD continues to bet son out. VE3ET met VE3AX and is looking forward to a visit from him and VE3RG. VE3HH will soon have some B Batts. for his 210. VE3DI's new THT is peking FB with a 201A. VE3AR has a terrible noise in his receiver. What happened to VE3AG, VE3BD, VE3CO, VE3CR, VE3GC, VE3GD, VE3GG, and VE3KH.

Traffic: VE3AL 17, VE3GT 13, VE3GK 10, VE3EC 5, VE3DW 2, Northern Dist: VE3HU 6.

PRARIER DIVISION

MANITOBA — SCM, A. V. Chase, VE4HR — VE4FX, whose QSA is Fort Churchill, Man., was in Winnipeg recently. VE4DR is moving to Camp Rorden for a further course in flying. VE4BO found it impossible to operate his set this month on account of bad QRM. A newcomer has started up in Winnipeg using the call VE4AG.

Traffic: VE4BH 8, VE4HR 3.

SASKATCHEWAN — SCM, W. J. Pickering, VE4PC — The Regina gang are planning a convention to be held in Regina on August 1st. VE3BB managed to squeeze a few messages through. VE4AH reports a brat .. e of cards from Sanders and a beast card from an Aussie. His brother is second op. now. VE4AF has a combination 50-watt xtal and 250-watt TGTP. VE4GD and VE4BQ were visitors in Edmonton on the 24th of May. VE4QG recently moved to Calgary, where he is setting up a 250-watt oscillator and 250-watt power amplifier rig. VE4GD has just completed rebuilding his xmitter and is now using a TGTP and VE4BQ says it's hard to beat for a beautiful job. FB. He wants to say that VE4QG and VE4DX are newcomers on the air, and VE4CJ and VE4CY are back with us again. Looks like Calgary might rival Edmonton again with active stations.

BRITISH COLUMBIA — SCM, J. K. Cavaisky, VE5AL — VE5AAR has been off all month. VE5BA is back on sked with VE5GT. VE5DR has moved to Powell River. VE5BE is talking super het and a high-power transmitter. VE5CL is on regularly now with a very nice signal. VE5CF is on more experiments with push pull detectors and AC tubes. VE4EI and VE5EI are visiting Vancouver with VE5AH. VE5AL has had several qso's with ZL and VK stations. VE5AC still finds time to handle the odd message. VE5AJ pulled off some snappy relay work recently. VE5BB wants a 3040 kc. sked with someone in Vancouver. VE5GT at Prince Rupert says he is the only active station there just now, VE5AW in the Yukon is still leading the DX hounds.

Traffic: VE5BR 1, VE5AC 7, VE5AL 21.

MARITIME DIVISION

NEWFOUNDLAND — Acting SCM, E. V. Jerrett, VOZQ — VOZQ paid us a visit and has a very interesting layout on board. Good luck to Manley. VOSAE will be operated all summer by a ham from Prince- town while McNeil goes north. VOSAN reports a brand-new transmitter with a pair of 860's. VOSMC is doing same reporting for the RSGB and wants some reports from the area. VOSAW can be found most every evening on 14,000 kc. VOSWG will be kept going this summer by a volunteer ham from U.S.A. VOZQ spent an interesting hour on board the Mersey looking over VOQH.

LATE AND ADDITIONAL REPORTS

KAHR is keeping seven schedules.

Traffic: KAHR 527.
Out-of-Band Policy
Hartford, Conn.
May 13, 1930

Mr. W. D. Terrell, Chief, Radio Division,
Department of Commerce,
Washington, D. C.

Dear Mr. Terrell:

The Board of Directors of the American Radio Relay League was in session in Hartford on May 2nd and 3rd. These Directors, sixteen in number, come from all sections of the country, and in preparation for the meeting had made a thorough canvass of amateur radio conditions in their respective territories and informed themselves on the needs and desires of our members. It had been announced in advance that one of the most important items of business to be considered this year was a consideration of the amateur "off-wave" situation and a study of ways and means to keep amateurs within their allocated frequency bands.

The radio amateurs of the United States consider that the present situation on off-wave operating in the amateur bands is serious and that there is very little excuse for it. Our Directors report that our members in every section of this country are in favor of a more strict enforcement of the penalties of law provided in this matter. Every one of our Directors reports his membership in favor of a program whereunder the law will be demonstrated to have teeth and where, upon establishment of guilt, penalties will be meted out. Amateur radio wants more complete enforcement at the hands of the Department of Commerce, to aid in putting our house in order against the international situation which will confront us at Copenhagen and Madrid, and to protect ourselves against complaints from other United States services. Under the regulating of operator licenses, the Department of Commerce has the duty of thus controlling the operation of stations.

I am instructed by my Board to advise you that it is the desire of the American Radio Relay League that the Secretary of Commerce comply with Section 5 (D) of the Radio Act of 1927, as amended, by immediately putting into effect the policy of suspending the operator's licenses of all persons consistently violating the regulations of the Commission by operating outside the frequency bands prescribed for amateur services.

This office will be pleased to be of any assistance that it can to you in the carrying out of such a policy.

Our Communications Manager has also been instructed by our Board of Directors that, in all cases where the Communications Department of the League acquires evidence satisfactory to it of consistent off-wave operation, he shall forward such evidence to the Secretary of Commerce with a specific request for suspension of the operator's license. From time to time, as data accumulate here, our Communications Manager will correspond with you direct. If you have any instructions to give us concerning such cases in general, we shall be pleased to receive them.

It is earnestly hoped that the Radio Division now has the facilities to give some attention to amateur radio. Although we are to a huge extent a self-policing and self-disciplining organization, it has been so long since amateurs have felt the police power of the government that there is now the widespread feeling amongst the great majority of amateurs who are law-abiding that our activity should not be permitted to suffer from the wanton or careless sets of a minority, and we feel obliged to call upon the government for assistance.

I shall be very pleased to receive your advice, and with kindest regards to you and Mr. Downey.

Respectfully yours,

K. B. Warner, Secretary and General Manager

DEPARTMENT OF COMMERCE,
RADIO DIVISION
WASHINGTON, D. C.
May 15, 1930

My dear Mr. Warner:

Receipt is acknowledged of your letter of May 13th, in which recommendations are made as a result of your annual meeting, with respect to the enforcement of the regulations governing temporary operator certificates and the penalizing of operators for operating outside of the prescribed amateur frequency bands.

I am forwarding a copy of each of these letters to the Supervisors of Radio, with the intention that such recommendations be carried out.

Respectfully yours,

W. D. Terrell, Chief, Radio Division
These Filament Heating Transformers have a voltage regulation within 5%. Note insulation test voltage.

### Filament Heating Transformers

<table>
<thead>
<tr>
<th>Type</th>
<th>V.A.</th>
<th>Cycles</th>
<th>Line Volts</th>
<th>Sec. Volts</th>
<th>Sec. Amps.</th>
<th>Test Voltage</th>
<th>Tube</th>
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<tbody>
<tr>
<td>H-4648</td>
<td>12½</td>
<td>50/60</td>
<td>200/230</td>
<td>2.5</td>
<td>5</td>
<td>12,000</td>
<td>-66</td>
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<tr>
<td>H-66A</td>
<td>25</td>
<td>50/60</td>
<td>100/115</td>
<td>2.5</td>
<td>10</td>
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<tr>
<td>H-4649</td>
<td>37½</td>
<td>50/60</td>
<td>200/230</td>
<td>2.5</td>
<td>15</td>
<td>12,000</td>
<td>-66</td>
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<tr>
<td>H-4650</td>
<td>50</td>
<td>50/60</td>
<td>100/115</td>
<td>5</td>
<td>10</td>
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<td>-72</td>
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<tr>
<td>H-4651</td>
<td>50</td>
<td>50/60</td>
<td>200/230</td>
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<tr>
<td>H-4653</td>
<td>150</td>
<td>50/60</td>
<td>200/230</td>
<td>5</td>
<td>30</td>
<td>12,000</td>
<td>-72</td>
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### Plate Transformers

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<th>Type</th>
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<th>Cycles</th>
<th>Line Volts</th>
<th>Sec. Volts</th>
<th>Sec. Amps.</th>
<th>Test Voltage</th>
<th>Tube</th>
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<tr>
<td>P-4656</td>
<td>290/415</td>
<td>50/60</td>
<td>100/108</td>
<td>2360</td>
<td>0.175</td>
<td>6,000 two 211</td>
<td>845</td>
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</table>

The above Plate Transformer is designed to deliver 1000 volts D. C. with the average filter. Other Plate Transformers can be furnished upon receipt of specifications giving your requirements.

### Choke Coils

Choke Coils for these rectifiers can be supplied.

Amertran Radio Parts have long been recognized as the highest quality. Amateurs who have obtained the best results realize their value. Write for bulletin No. 1066.
Marine Radio Operating

Editor, QST:

In practically all radio magazines one will find advertisements painting in glowing colors a delightful picture of the life of the marine radio operator. While the statements made are not direct falsehoods, they are sometimes misleading and do not present to the prospective student a representative idea of the conditions actually encountered by the average marine radio operator. For the benefit of those amateurs who are contemplating marine radio operating as a means of making a living, I will try to present, in an unbiased and truthful manner, the conditions that actually exist in that field at the present time.

At least a year of practical experience is necessary before the radio school graduate can be classed as an expert and efficient operator. The Department of Commerce requires a person to copy twenty-five words a minute in Continental Morse and to have at least twelve months’ experience in “stations open to public correspondence” before he is permitted to take the examination for a first class commercial license. In order to hold down a job on a passenger vessel it is necessary to have an intimate knowledge of the “Q” signals and operating procedure as well as the ability to copy from twenty-five to thirty words per minute on a typewriter.

Living conditions on board ships vary greatly. Large freighters, tankers, and passenger vessels usually provide their operators with fairly decent quarters, although many of them are not too well equipped with washing or bathing facilities. On smaller vessels, such as “steam-schooners,” fishermen, and tow-boats, the quarters are usually far from satisfactory and, in some cases, almost unfit for human habitation. The meals on freighters and tankers are nothing to go intoestasises; there is usually plenty of plain, and more or less wholesome food. Steamship companies only allow their ward’s from forty cents to one dollar per man per day for rations, so it is evident that there cannot be very much “turkey and trimmin’s.” There are a number of notorious exceptions, popularly known as the “starvation lines,” which skimp on everything, and it is well for anyone to steer clear of these. At sea, nearly all passenger ships serve excellent food and the officers are given the same meals as the passengers, but when port is reached and the paying guests depart, the decrease in quality and quantity of the meals is astonishing.

The salary of a radio operator on a one-man ship will vary from $65 to $120 per month, most jobs paying either $90 or $105. As would be expected, the aforementioned “starvation lines” are the ones which pay the $65 and $75 salaries. There are a few vessels on which the operator, in addition to his regular duties, does the work of a freight clerk or purser and receives as much as $175. On all except the largest passenger ships chief operators are paid from $105 to $150, second
The Star Spangled record of Cardwell Condensers stands on a high peak, alone. They have always been the choice when Performance was the prime factor, when human life was at stake, when a condenser was needed that could stand up when the going was tough!

With Byrd over the North Pole—with Dyott in Brazil—with Byrd again making history over the South Pole—what a record!

With the Army and Navy, Signal Corps and the Coast Guard, Used by General Electric and Westinghouse. Are they good enough for you?

Transmitting Condensers for Amateur, Broadcast

Receiving Condensers in a wide range of types and capacities. Order direct if your dealer does not stock. Write for literature.

The Allen D. Cardwell Mfg. Corp.
81 Prospect Street, Brooklyn, N. Y.

"THE STANDARD OF COMPARISON"

Say You Saw It in QST — It Identifies You and Helps QST
The filter condenser in the power pack of your transmitter can be made to do more than merely present a capacity to the circuit. It can also act as a very effective protective device for itself and its associate equipment against voltage surges.

In the filter circuit of the radio transmitter, voltage surge effects are present to a considerably greater extent than in the comparatively low voltage filter circuits of a receiver. There are heavy surges due to keying, surges when the plate voltage goes on and when it goes off — surges that have caused the untimely end of many a tube, resistor and condenser.

The Mershon Electrolytic Filter Condenser is SURGE PROOF. Without in any way short-circuiting the power source, it offers a path for the dissipation of the surge (when it occurs) and thus protects its associate apparatus. Immediately the surge has passed, the condenser HEALS ITSELF and continues in normal operation. It cannot create heavy charging surges, such as commonly occur in transmitter filters.

This SELF-HEALING characteristic, together with its LARGE CAPACITY per unit and its almost unlimited life in service, has caused its adoption for filter work by a large number of prominent radio receiver manufacturers.

More than 3,000,000 Mershon Condensers are in use today.

A constantly increasing number of Amateur Station Operators, also, are employing Mershon Condensers in their transmitters. The characteristically Pure D.C. note obtained is attributed to their use.

With Mershon Condensers, at their new low prices — and the discounts allowed Licensed Amateur Operators — you can re-build the filter circuit of your transmitter to one of high effectiveness — at a very reasonable cost.

The booklet "Puncture Proof Filter Condensers," tells how this can be done. It explains the principles of construction of the Mershon Condenser, illustrates its newest developments, and shows the most effective circuits for its use.

A complimentary copy will be sent you on request.

---

THE AMRAD CORPORATION
285 College Avenue, Medford Hillside, Massachusetts.

Send me booklet "Puncture Proof Filter Condensers."

NAME .................................................................

STREET ..................................................................

CITY ................................................................. STATE

68 Say You Saw It in QST — It Identifies You and Helps QST

* There is, we understand, a shortage of marine operators at present in the lower-paying positions. Because the better-qualified and more industrious operators have landed berths ashore in commercial radio, broadcasting, etc.
RCA
RADIOTRON
UX-860

One of the well known Screen-Grid transmitting tubes

For the amateur or others having transmitters working at high frequencies (above 3000 kilocycles) this tube will be found advantageous, since its internal shielding obviates difficulties due to feedback and self-oscillation.

This Radiotron is primarily designed for power amplification at Radio frequencies. It is not generally satisfactory as an audio frequency amplifier or modulator, for which purposes other Radiotrons are available.

The user will find Radiotron UX-860 possesses the same rugged construction and performance qualities as the well known UX-852.

75 Watt
Filament Volts . . . 10.00
Filament Amperes . . 3.25

Instruction book giving further rating and data information will be gladly forwarded on receipt of request giving the call letters of your station.

Firm net price, $37.50.

RCA VICTOR COMPANY, INC.
ENGINEERING PRODUCTS DIVISION
233 BROADWAY
NEW YORK, N. Y.
**Special for This Month**

<table>
<thead>
<tr>
<th>Power Type Crystals</th>
<th>Power Type Crystals</th>
<th>Power Type Crystals</th>
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<tr>
<td><strong>Slightly used R.C.A. 211s.</strong></td>
<td>$17.00</td>
<td><strong>Crounri to 0.1 nf one-percent precision in the 3300 K.C.</strong></td>
</tr>
<tr>
<td><strong>Gold Seal UX 280.</strong></td>
<td>$1.05</td>
<td><strong>Fifty cents to one dollar for broadcast bands.</strong></td>
</tr>
<tr>
<td><strong>Thordarson key</strong></td>
<td>$1.50</td>
<td><strong>Rectobulbs mercury vapor 281 new type list $ 7.50 net.</strong></td>
</tr>
<tr>
<td><strong>Temperature control box complete.</strong></td>
<td>$20.00</td>
<td><strong>Crystals ground to specifications.</strong></td>
</tr>
<tr>
<td><strong>Victor power trans., supplies filament for four 204A.</strong></td>
<td>$50.00</td>
<td><strong>Rectobulbs mercury vapor 281 net. $7.50.</strong></td>
</tr>
<tr>
<td><strong>Signal high frequency buzzer.</strong></td>
<td>$0.95</td>
<td><strong>Mint condition standard and special frequencies.</strong></td>
</tr>
<tr>
<td><strong>Signal Corp</strong></td>
<td>$0.39</td>
<td><strong>Premium killing power.</strong></td>
</tr>
<tr>
<td><strong>Fleethheim 1500 volt porcelain insulator, 2 mfd.</strong></td>
<td>$4.50</td>
<td><strong>List $2.00, Net $1.20.</strong></td>
</tr>
<tr>
<td><strong>Fleethheim 1500 volt porcelain insulator, 4 mfd.</strong></td>
<td>$7.00</td>
<td><strong>No. 12 solid enameled aerial wire $1.75 a hundred feet.</strong></td>
</tr>
<tr>
<td><strong>Unmounted Splitdorf fil. trans. with follow voltages, two 15-5, one 20-5, and two 71/2 C.T. fil. windings, special $1.45.</strong></td>
<td>$12.00</td>
<td><strong>Four only, Exide six volt.</strong></td>
</tr>
<tr>
<td><strong>10,000 ohm wire wound grid leaks 1/4&quot; x 6&quot;, 50 watt special $0.60.</strong></td>
<td>$35.00</td>
<td><strong>AMP storage batteries. $14.75.</strong></td>
</tr>
<tr>
<td><strong>25 Only U.X. 281s tested and guaranteed to function, while they last.</strong></td>
<td>$2.50</td>
<td><strong>C.R.A. voltage regulator 1X14.</strong></td>
</tr>
<tr>
<td><strong>Signal Corp 3/16&quot; silver contact key.</strong></td>
<td>$0.95</td>
<td><strong>Four only, Exide six volt.</strong></td>
</tr>
<tr>
<td><strong>Also aluminum panels and corner strings for any size cabinet.</strong></td>
<td>$4.00</td>
<td><strong>To be viewed through the porthole of a tanker. Or do tankers have portholes? — Furrow.</strong></td>
</tr>
<tr>
<td><strong>Fleethheim 1800 volt porcelain insulator, 2 mfd.</strong></td>
<td>$2.25</td>
<td><strong>One 20-2 volt, and two 71/2 C.T. fil. windings, special $1.85.</strong></td>
</tr>
<tr>
<td><strong>Fleethheim 1500 volt porcelain insulator, 4 mfd.</strong></td>
<td>$7.00</td>
<td><strong>High - hittin' me,&quot; was the way it really looked.</strong></td>
</tr>
<tr>
<td><strong>Used Marshon condensers.</strong></td>
<td>$1.75</td>
<td><strong>The difficulty was located. The station, located in an apartment house, really had a handicap.</strong></td>
</tr>
<tr>
<td><strong>New National 3000 volt cond., .00045 with velvet vernier dial.</strong></td>
<td>$9.50</td>
<td><strong>A well-grounded metal roof was soaking up every speck of radiation obtained — which most of the time wasn't much.</strong></td>
</tr>
<tr>
<td><strong>Jefferson 300 volt center tapped trans.</strong></td>
<td>$1.65</td>
<td><strong>At length a high Hertz station license was granted and the time the station actually was QSO.</strong></td>
</tr>
<tr>
<td><strong>Pilot A.C. super wasp complete with pack.</strong></td>
<td>$45.00</td>
<td><strong>During that period exactly seven transmitters and no end of antenna systems were constructed. They appeared to function from every indication ever outlined in the Handbook or elsewhere. But no answers.</strong></td>
</tr>
<tr>
<td><strong>Allen-Bradley Radoglas new type &quot;500 Watt.&quot;</strong></td>
<td>$5.50</td>
<td><strong>Local clubs were heard and called day after day, with this adjustment and that, but no QSO. Until, at length, the disheartened op (?) arrived at the conclusion that those fellows had forgotten their early struggles and couldn't be bothered answering a feeble chirp originating in the same district. “High-hattin' me,” was the way it really looked.</strong></td>
</tr>
</tbody>
</table>
| **Silver-Millard coils.** | $3.00 | **Another Angle on the Beginner Problem**

Detroit, Mich.

Editor, QST:

Perhaps the experience of one of the greenest of green beginners may be of some benefit to others in a similar position. It should in fairness to the great mass of amateurs be brought home to the fellow breaking in, lest he arrive at the same mistaken conclusion I did.

About two months elapsed between the time a station license was granted and the time the station actually was QSO. During that period exactly seven transmitters and no end of antenna systems were constructed. They appeared to function from every indication ever outlined in the Handbook or elsewhere. But no answers. Local clubs were heard and called day after day, with this adjustment and that, but no QSO. Until, at length, the disheartened op (?) arrived at the conclusion that those fellows had forgotten their early struggles and couldn't be bothered answering a feeble chirp originating in the same district. "High-hattin' me," was the way it really looked.

Then the difficulty was located. The station, located in an apartment house, really had a handicap. A well-grounded metal roof was soaking up every speck of radiation obtained — which most of the time wasn't much. At length a high Heriz with a well-insulated feeder turned the trick. And a more cordial, considerate bunch of fellows doesn't exist than those behind the big, sweet notes in the Eighth District!

This isn't important except to warn others: If you don't get your first answers, you must and can look for the reason anywhere except in the hearts of the boys you call.

— Frank H. Pipp, W6BJ
Hoffman & Mix, the well known short-wave experts, designed this AERO SHORT-WAVE Automatic TUNING UNIT

(Protected by patents pending)

A Marvelous Improvement

NO PLUG-IN COILS

Easiest tuning short-wave receiver known. The tuning unit consists of two controls. The right-hand control, which will be termed the shift control, and the left-hand control, the actual tuning device. In addition to these two controls it will, of course, be necessary to have a regeneration control. For those who desire to employ it for television or the upper phone band, a special attachment may be secured.

OPERATION

The tuner is operated in the following manner: As a specific example, with the right-hand dial set at nine degrees, revolving the left-hand dial through 180 degrees, you will cover from 19.1 to 22.6 meters. The next step will be to move the shift dial to 13 and tuning over 180 degrees, as before, this time covering from 21.9 to 25.7 meters. This process is continued through 180 degrees on the shift dial until you have reached the maximum available wave length, which is 90 meters.

You will note that the tuning dial, in the first instance, when tuned through 180 degrees, covers only 31¾ meters whereas ordinarily when using plug-in coils your tuner, when passing through 180 degrees, generally covers a minimum of 25 meters. This same speed of tuning is maintained throughout the entire short-wave spectrum, and it is for this reason that this tuning arrangement surpasses any known method. This unit is furnished completely assembled to the amateur, and may be built into any short-wave converter or receiver.

For those desiring to go from 90 to 200 meters a special device may be had, making its range then from 15 to 200 meters. Net price, $5.00.

A general chart is furnished with each unit, specifying the settings for the shift dial, which will enable you to approximate the wave length for each setting on the shift dial.

This tuner is not sold through the usual trade channels, but is sold to amateurs only direct from factory at special low net price. Be sure to send post office or express money order for $19.50 with your order. Shipments will be made in the order received. Be first to order. Attach your money-order to coupon below and mail today - NOW!

AERO PRODUCTS
INCORPORATED
4611 E. Ravenswood Ave., Dept. 370, Chicago

Dear Sirs:
I want to be one of the first to secure the new Aero Short-Wave Automatic Tuning Unit. Enclosed is money order for $19.50 which is your low offering and sales to amateurs only.
I am also interested in the following AERO PRODUCTS:

[A blank space for name, city, and state]

Say You Saw It in QST — It Identifies You and Helps QST
Less than a dozen hams have less than $30.00. Also in the future, as in the past, the A.R.R.L. should make recommendations that would give the amateur who is really an expert more stringent tests than for c.w. because it is harder to operate at the high frequencies. After all good operating is only governed by technical ability, and I am sorry to say a bunch of hams have less than zero. Also in the future, as in the past, the A.R.R.L. should make recommendations that would give the amateur who is really

Under the new regulations all amateurs must use an adequately filtered D.C. current supply.

P. R. 866 and P. R. 872, both mercury vapor rectifiers, besides emitting a wave form easy to filter, furnish a stable source of plate voltage—full load or no load, because both tubes possess a low and practically constant voltage drop. The unusually long life of the P. R. 866 and P. R. 872 is due to the low operating temperature of the oxide coated filament combined with the extremely low voltage drop resulting from their mercury content.

Use these Perryman rectifiers, famous for their rugged strength, in bringing your station in line with the new regulations.

Attractive prices for licensed amateurs

<table>
<thead>
<tr>
<th>P. R. 866</th>
<th>P. R. 872</th>
</tr>
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<tbody>
<tr>
<td>Fil. Volts - 2.5</td>
<td>Fil. Volts - 5.00</td>
</tr>
<tr>
<td>Fil. Amps. - 5</td>
<td>Fil. Amps. - 10</td>
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<tr>
<td>Peak Inverse</td>
<td>Peak Inverse</td>
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<tr>
<td>Volts - 5,000</td>
<td>Volts - 6,000</td>
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<tr>
<td>Peak Plate</td>
<td>Peak Plate</td>
</tr>
<tr>
<td>Amps. - 2.5</td>
<td>Amps. - 6.6</td>
</tr>
<tr>
<td>Voltage Drop - 15</td>
<td>Voltage Drop - 20</td>
</tr>
<tr>
<td>Overall</td>
<td>Overall</td>
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</tbody>
</table>
| Length - 6 1/2" | Length - 8 1/2"
| Diam. 2 5/16" | Diam. 2 5/16"
| Price - $8.00 | Price - $18.00

More Stringent Regulations for 'Phone?

Editor, QST:

Wheeling, W. Va.

In view of the fact that there seems to be much arguing to and fro relative to the 'phone amateur and his rights, I thought I would write a few words to Headquarters giving my sentiments.

I do not believe that anyone should be permitted to obtain an amateur telephone license as easily as they are obtained today. Especially does this hold good for operation on 3500 kc. It must be remembered that modulating signals even at broadcast frequencies is difficult when men are engineers. And then think of the additional troubles when transmitters are set to 3500 kc! Especially when the operators have little or no idea of theory and never intend to study it. If a fellow beginning in telephony would stay on 1750 kc. there would be no need of kicking.

I sincerely believe telephony should never be permitted when the amateur has only a temporary license, excepting on 1750 kc. Operating on the present 'phone band should only be permitted when a first-class amateur license, or higher, is held, except in cases when an amateur is extremely isolated from any town of license examination, whereupon positive evidence of technical ability should be furnished. In the case of c.w. positive evidence of technical ability should be furnished when only a temporary license is held.

I do not think the 3500-ke. 'phone band should be widened. The fact is, as stated above, that the majority of amateurs crying for this concession should never be permitted to use telephony, or if permitted should be on 1750 kc. for lack of technical ability. I even believe the 'phone band should be moved to the upper end of the present 3500-ke. band, retaining its present width, so code stations could work 3500-ke. crystal sets on all three bands.

To substantiate the above, it should be noted that the greatest use of 3500-ke. 'phone is by those who should never be permitted its use. To listen to their poor modulation, poor carriers, poor signals, and poor operating, the whole spectrum would soon be too small for them. I could name a score that know nothing of the principles of amateur radio and who are using telephone, and who do not even know the code. All of these operators have secured their temporary licenses through nothing less than pure perjury.

In other words, I believe that the amateur should be permitted 'phone, but only when he knows how to use it. Regulations for its use should be more stringent than for c.w. because it is harder to operate at the high frequencies. After all good operating is only governed by technical ability, and I am sorry to say a bunch of hams have less than zero. Also in the future, as in the past, the A.R.R.L. should make recommendations that would give the amateur who is really...
Crosley Brings NEW Beauty, Originality, Individuality and Distinction to Radio Cabinet Design and Construction

The Sensation at Atlantic City

The NEW Crosley radio receiving sets are NEW in every respect. New chassis, new power speakers, new cabinet designs, new cabinet construction, new low prices for the big values offered and the super-performance delivered.

Eye-filling beauty, startling originality, distinct individuality, outstanding performance, astonishingly low prices—these describe the NEW Crosley sets to the extent that it is possible for words to do so. Actually to see the marvelously designed and executed cabinets, to feel the supreme sensitivity and selectivity of the sets, to hear the astonishingly true tone of the speakers is the only way to gain a full appreciation of these truly exquisite and gorgeous new radio receiving sets. Neither mechanically nor from the standpoint of appearance is there the slightest earmark of anything that has gone before.

As an example of the beauty, value, originality and distinction of the NEW Crosley line, look at The CROSLEY ARBITER shown to the right. An electric phonograph and radio combination at only $137.50! A highly sensitive and selective Screen Grid, Neutrodyne, power speaker, A. C. electric receiving set housed in a delightfully designed and executed cabinet—all—an electric phonograph and pick-up. Never before has such an outstanding value been offered in radio. The beauty of the cabinet in self-evident. The latest type Crosley moving coil dynamic speaker is used. The automatic volume control maintains a uniform volume all over the dial. The tubes required are: Three Screen Grid type -24, one type-45, two type-5, and one rectifier tube type -80. Dimensions: Only 35” high, 23½” wide, 14¾” deep.

The PAL

$69 50

Less Tubes

Screen Grid Neutrodyne Power Speaker A. C. Electric

The NEW CROSLEY PAL, illustrated at the left, is another indication of the wonderful eye and money-value to be found in the new Crosley receiving sets. This magnificently beautiful cabinet is only 25½” high yet it houses the Crosley NEW Companionship Series radio receiving set and the newest type Crosley electromagnetic power speaker. The set is highly sensitive and selective due to the use of three Screen Grid tubes. The tubes required are: Three Screen Grid tubes type -24, one type-45, one type -80 rectifier tube. At the amazingly low price at which it is offered, The CROSLEY PAL will be one of the most sensational sellers the radio world has ever seen. Dimensions: 25½” high, 21½” wide, 10¾” deep. Get in touch with your Crosley distributor today!

The Crosley Radio Corporation

POWEL CROSLEY, Jr., Pres. Home of “The Nation’s Station”—WLW
CINCINNATI, OHIO

YOU'RE THERE WITH A CROSLEY

CROSLEY RADIO

Say You Saw It in QST — It Identifies You and Helps QST
The True Test is the Test of Time

Cunningham RADIO TUBES have met the test and proved their faultless overall performance for the past fifteen years.

Standard since 1915

E. T. CUNNINGHAM, INC.
New York Chicago San Francisco
Dallas Atlanta

trying to operate a good station the preference and chance to experiment to the fullest extent.

This letter is written without prejudice, and my purpose is simply to submit what I believe to be a cure for a growing evil in amateur radio.

— C. S. Hoffman, Jr., W8UD

One for T. O. M.

San Francisco, Calif.

Hi! Old Man:

Father says it takes the Old Man to get a rise out of mother, and I guess for once he is right. Yesterday was Mother's Day, and when my son handed me May QST opened to your "Say, Son" page and said "Here, Ma, this is for you," it was the best Mother's Day present I received.

You know, OM, we have moving pictures in our home too, the pictures move to the floor and the frames move to the "shack"; but who cares! The radio mother has long since passed the "why mothers age" stage and keeps in tune with her young hopeful.

When she finds the pilot light missing from the B. C. L. set, she immediately goes to the shack and invariably finds it in the wavemeter.

God bless their hearts, what if we do have to go and buy new paraffin every time we make jelly, and hold our breath when they try to reach the sky, putting a high pipe on top of a clothesline pole. Sometimes I think my son could qualify as a flagpole sitter. Then, again, the hams do not always tiptoe through the tulips, but after radio club sometimes tiptoe through the hall to the shack in bunches, looking for DX, and it is then the radio mother has a tough time holding the OM in bed when his slumber is disturbed. Yes, the radio mother enjoys the QSL cards and can overlook the days when she picked radio tubes, coils and what not from the dinner table, mantel, and every nook and corner of the house. Believe it or not, watching a real ham start at the bottom and go up is one of the best thrills a radio mother can get.

Well, OM, here is where I have the last word, and Booth Tarkington has nothing on you when it comes to knowing your hams.

Here's to all the radio mothers, QST and you, OM (not forgetting the cat).

— A Radio Mother

Mental Fading

354 Hunter Street, Ossining, N. Y.

Editor, QST:

During the past month I have been spending much of my spare time as a disciple of William James. It is difficult to imagine any subject more remote from radio, and it must be this very remoteness that prompts me to write you these lines, for I have just realized how many times I have fooled myself into thinking a signal was fading when actually there may have been no variation in the signal strength at all. How many others, day after day, feel like spitting on the Old Man's cat because a weak, elusive signal
And why not? It's a bang-up little console-quality receiver, but every inch of it is especially designed for its job. No "toy machinery," either. Like a locomotive—it's all engine.

Get this: three screen-grid tubes (yes, it's s-g. power detection)—sensitivity eight microvolts per meter—selectivity that slices 'em right off—real console tone—"vest-pocket" size (12"x7½"x6¼")—and direct tuning like its big-brother Silver-Marshall radios. All there!

You don't need a jig-saw to get it in the car, either—it doesn't even touch the instrument panel. You mount it under the cowl, to the right of the driver's seat. And if you want to take it out to trade in the car, not a mark will show!

The cost? It's way down. The list price is only $112 wired, without tubes—and that includes the receiver, a hot little speaker that will threaten to win you back to magnetics for life, battery box, brackets, spark suppressors, and everything you need to install it.

Tubes required: 3—'24, 1—'12A, 1—'71A.

The Receiver—S-M 770 Auto-Set (only), factory-wired and RCA-licensed, $79.50 List. Parts total $61.40 List.

The Speaker—S-M 870 Automotive-Type Magnetic Speaker, $15.00 List.

Accessories for Installation—S-M 771 Accessories, including all other required equipment except tubes and batteries, $17.50 List.

Get in touch with your jobber for the low-down on price and performance!

**The Short-Wave Bearcat Is a Bearcat!**

Designed to lick anything in the short-wave class, the 737 Bearcat does—and how! It has two screen-grid tubes—will reach out and drag 'em in by the heels—is plenty selective—and you can spread the ham bands without taking the set apart and throwing half of it away. It's completely shielded—has its own cabinet—and its own built-in power supply!

Eight specially-designed plug-in coils (included in the list price) cover from 16.6 to 200 meters—all foreign and American short-wave broadcasting as well as the ham bands. Four extra coils ($5.50 List) cover the American broadcast band. What more could you ask?

Tubes required: 2—'24, 1—'27, 1—'45, 1—'80.

737 Short-Wave Bearcat, completely factory-wired and tested, less tubes and speaker, $139.60 List. Parts total $119.50 List.

Silver-Marshall, Inc.
6409 West 65th St., Chicago, U. S. A.

Say You Saw It in QST — It Identifies You and Helps QST
Weston model 425

thermo instruments
for
SHORT WAVE Radio Service

THE public is as yet little aware of the functions of short wave radio which occur in that mystic band below 200 meters where the middle man of distribution — the broadcasting station — is seldom required. But science and engineering know and appreciate its multitudinous services.

In aviation — for weather reports and beacon signals; in the marine — for land and sea communication; in railways — for long freight hauls in government service — for coast guard boats, tugs and tenders; for police alarms and for all manner of civil and commercial uses where quick and unlimited conversational contact is essential, two-way short wave communication is now in universal vogue.

For the operation of short wave transmitters it is necessary to employ a radio frequency ammeter to accurately gauge the amount of energy imparted to the antenna. In industry, also where radio frequency currents are used, such as in bombarding of tubes, and induction furnaces, the same type of instrument is required. It is used in telephony, in television, by manufacturers of a variety of radio apparatus such as crystal control equipment and, of course, by amateur transmitters the world over.

For all these services the preferred testing equipment consists of the Weston Model 425 thermo instruments made as ammeters, milliammeters and galvanometers, together with accompanying voltmeters — Model 301 for D.C., and Model 476 for A.C. service. All instruments are matched in size and appearance — 3 3/4 inch diameter — for flush panel mounting.

For complete descriptions and prices write for Circular JJ

Weston Electrical Instrument Corp.
602 Frelinghuysen Ave. Newark, N. J.

seems to drift in and out of audibility, apparently due to unavoidable QSB, when actually the trouble is not with magnetic storms, atmospheric conditions, wave polarization or other \textit{causes phycho}, but with the thin layer of cortical cells overlaying the brain of the operator himself! Psychology gives us a very interesting description of the power of “paying attention” and it may explain away many instances of annoying QSB.

Let us assume that we are listening to a very weak signal from a crystal-controlled transmitter. We can barely distinguish the dots from the dashes. We concentrate our attention upon the signal. Perhaps we close our eyes or darken the room, and we find that this helps. (It shuts off light-stimuli that would produce sight-sensations to interfere with the sound-sensations, thus eliminating a great obstacle to concentration.) First we are able to catch several words, and then the signal seems to fade out and we miss several words. In a few seconds the signal seems to fade in and we catch a little more. This continues indefinitely.

Now psychologists tell us that attention is a state of consciousness which cannot endure over any but the shortest periods. In fact the average person is able to concentrate for only 5 or 6 seconds at a stretch. Oftentimes when we seem to be attending for a long period of time to some one thing, our attention is really drifting and wandering all over the background of our mind without our knowing it. When we find it hard to concentrate, it may be some consolation to know that no one has ever succeeded in maintaining strict attention over stretches of more than 24 seconds.

To a psychologist the reason for this is simple, and by an apt analogy any radio operator may understand it. The control brain cells receive the sound-sensation telegraphed over the nervous system from the ears in the form of a charge; and immediately “explode,” just as an electrolytic condenser receives a charge at a pressure so great that the dielectric punctures or “explodes.” When a cortical brain cell explodes we “get an idea”; i.e., we are conscious of hearing a signal. Thus, each dot and dash is telegraphed over a nerve fibre from the ear to the brain, and explodes a cortical cell. When a cell has exploded it must take time to recover; it cannot explode again until its “dielectric” repairs itself so it can hold another charge, just like the electrolytic condenser. When these cells are repairing themselves they will not respond to sound-sensations, and we are not conscious of hearing any signal until some sound cell in the cortex starts working again. That is why attention is interrupted, why we can concentrate for only a few seconds at a time, although we sit and stare into the darkness for hours at a stretch, “concentrating.” The spurts of our attention correspond to the successive explosions of cortical cells, and as our attentions spurts, the signal fades in and \textit{vice versa}.

If anyone should doubt this, here is a simple experiment to prove that attention is interrupted, not continuous:
Don't worry about condenser problems. If they involve 8 MFD or more—let the Sprague electrolytic condenser take care of them. For this new, perfected condenser is the most adaptable and efficient unit you ever saw. Only 1 3/8" in diameter and only 5" height overall. Yet it rates 8 MFD capacity with peak voltage of 430 DC.

It has an exclusive, one-piece, round-edged anode without a single soldered or welded joint anywhere. The individual screw socket mounting makes it easily adaptable to use in any set.

And because of the Sprague standardized unit construction—you buy just the amount of capacity you require, without paying a premium for useless excess or for "special built" jobs.

Write for illustrated folder on the Sprague electrolytic condenser.

SPRAGUE SPECIALTIES COMPANY
QUINCY, MASS.
Manufacturers also of the well-known SPRAGUE PAPER CONDENSER

Capacity 8 MFD
Peak Voltage 430 DC
Can Negative

Sprague Electrolytic Condenser

Say You Saw It in QST — It Identifies You and Helps QST
AN EVER INCREASING NUMBER OF BROADCAST STATIONS AMATEURS, EXPERIMENTAL LABS ARE USING FLECHTHEIM EXCLUSIVELY SUPERIOR CONDENSERS

REASON #1 — HIGHEST QUALITY

Only the very best materials are used — and then only after the most rigid tests. They DO stand up!

TYPE VM 200-2 MFD.
5000 V D.C.-3300 rms R.A.C.

Send for Catalog #29

A. M. FLECHTHEIM & CO., INC.
136 Liberty Street
New York, N.Y.

THE A.R.R.L. LOG SHEET

New Regulations Require Station Log

The new amateur station regulations of the Federal Radio Commission, announced in May QST, oblige every amateur station to maintain a log of operating activity. Every station ought to keep a log. A.R.R.L. has been preaching it for years. Now it becomes compulsory under the regulations.

A well-kept log gives proof of station transmissions. It is invaluable in checking up the records of your work. Its presence identifies your station as a systematic one. The Government now requires it as a record of transmitting activity.

Being purchased now in large quantities, the price of the Log Sheet has been substantially reduced. The new low prices:

- 100 sheets .................. 50c
- 250 sheets .................. $1.00
- 500 sheets .................. 1.75

(Postpaid)

THE AMERICAN RADIO RELAY LEAGUE
Hartford, Conn., U.S.A.

More Truth Than Fiction

75 New Haven Avenue, Milford, Conn.
Editor, QST:

Just a few words about things in general — especially 85-meter 'phone. There was a time once when you would only hear about thirty 'phones in any one day and everyone was having a good time working the same fellows; in other words, just like a great big family. (Ask W2GJ — hi.) Then suddenly everyone else goes 'phone-crazy and now look at the band! At least ninety fellows on regularly, and who works whom and how is more than most of us can figure out. I can't now — I used to.

I overheard some 'phone man once dissing on handling traffic on 'phone. He said that he couldn't see anything in it. But look at what some fellow out west in the wide open spaces (thank Heaven there are a few in that 'phone band!) did on the band with traffic — made the B. P. L.! I myself handled over fifty messages on the 'phone outfit with W1AJ at Naugatugck, who is one of the best traffic men on 'phone within the State. All these in two nights.

Alas for the 'phone hand! After a very pleasant two months on the air, my poor 250 and 227 stand deserted in their sockets, while ye 210 is up to his neck in milliamperes down on the good ole twenties where you can come up for air whenever you feel like it.

Guess that's all this time but maybe I'll find something else to spill soon.

— Emil F. Scholz, W1AMQ—W1FJ

I.A.R.U. News

(Continued from page 50)

is ever handled by these stations we can't help thinking it rather unnecessary to spoil our hands in this unscrupulous way.

GREAT BRITAIN

By J. Claricoats, Hon. Sec'y R.S.G.B.

It will be remembered that in our last notes mention was made of the fact that our licensing authorities had once again opened up the 80-
Just Off Press

5TH REVISED EDITION

"Radio Theory and Operating"
By Mary Texanna Loomis

America's best known and most successful radio instructor; President, Loomis Radio College; Member, Institute of Radio Engineers. This text has been enlarged to 1,000 pages and over 800 illustrations, and is made up of the same high class paper with red kraft leather stamped in gold. The book is written in a systematic style and is right up to date, thoroughly covering much new material on circuits required for obtaining Government licenses of different grades, amateur short waves, broadcast transmitters and receivers, aircraft radio, television and talking pictures. No other radio book is so comprehensive. In use by all Government radio schools, leading radio schools in U. S. and Canada and over 400 universities, technical colleges and high schools.

Price $4.25
Postage paid this and foreign countries

This book is written in such a clear manner that the principles of radio can be easily grasped by anybody reading at home. While this is the standard text book in a great many educational institutions, it is not necessary to attend a radio school in order to gain a practical knowledge of radio from its contents. The users of this book are found at the top in every branch of radio work — some as designing and constructing engineers, many in research laboratories and talking movies, and a great many in broadcasting stations and on the ships. Recognized by radio experts as the book of outstanding merit in the radio world. The reputation of this book is so well established that each edition has sold out before the next edition was ready to deliver.

The 5th edition will be for sale by leading bookdealers in this and foreign countries

Enclosed find $4.25, price in full, for which please send me one copy of Radio Theory and Operating.

Name..........................................................}
Street and Number...........................................
City and State..................................................

LOOMIS PUBLISHING CO.
405 Ninth St. N. W. Washington, D. C. Dept. 3
**FROST-RADIO**

engineers have banished *noise* from wire-wound volume controls!

The necessary use of wire-wound Volume Controls in high gain Radio Receivers has presented fresh problems to the manufacturer of potentiometers and rheostats. Previous standards and methods of manufacture having proved to be wholly inadequate, radically new and different materials and processes were required, and it remained for FROST-RADIO Engineers to develop these.

They have perfected an automatic device for rounding and polishing the contacting edge of the wire. This process so perfectly forms the wire edges that there is not one ten-thousandth of an inch difference in height between any adjacent wires. A velvet smooth contacting surface is thus provided.

They have proven that the new FROST-RADIO Volume Controls will withstand a fatigue test of two hundred thousand half-cycles, at a speed of thirty per minute, without evidence of wear on wire edge or contact arm, and that they are as perfectly noiseless at the completion of test as before being subjected to fatigue.

A complete treatise on the subject of volume controls has been prepared by our research laboratory. We will be glad to send a copy to any interested engineer.

**HERBERT H. FROST, INC.**

Main Offices and Factory: ELKHART, IND.

---

**PROCRASTINATION**

is a 75c word

But you’ll lose more than that if you don’t get your Handbook soon. You KNOW Handbook must be had. It’s EASY to get. Don’t procrastinate. Proceed as follows:

(1) Fill out below, tear off.
(2) Tap pocketbook for U. S. A. $1 bill.
(3) Clip together, mail us.

A. R. R. L.
1711 Park, Hartford
Send Handbook Immediately

---

Say, Son—

(Continued from page 28)

what was left into the port of Algiers and told the head devil there that if ever again an American ship was molested he would come back and bust the entire place wide open. A treaty was signed with some penalties in it that would make you think you had got a shot of bad home-brew.

Steve ambled on along the coast, found some
Ideal Amateur Receiver!

NEW NATIONAL A. C. THRILL-BOX

DOUBLE SCREEN-GRID

Easily assembled by anyone with genuine NATIONAL Radio Products

New type SE-100 S. W. Condensers. Insulated bearings, constant impedance pigtail, straight frequency line plates.

The coil-forms used in the new THRILL-BOX are made of R-39, the low-loss coil-form material recently developed by Radio-Frequency Laboratories.


NATIONAL CO. INC.  SHERMAN, ABBOTT AND JACKSON STREETS, MALDEN, MASS.

QST Oscillating Crystals

REduced PRICES EFFECTIVE APRIL 1st, 1930

AMATEUR BANDS:

Summer is coming, and no doubt you are going over your transmitter removing those weak links so as to get the most possible efficiency from your set.

One item of great importance is the frequency stability of your set. Does it stay on one frequency? If not, our power crystals will solve that problem. Scientific Radio Service crystals are known to be the best obtainable, having ONE single frequency and highest output. With each crystal is furnished an accurate calibration guaranteed to better than a tenth of 1%. New prices for grinding power crystals in the amateur bands are as follows:

1715 to 2000 Kc band ...... $15.00 (unmounted)
3500 to 4000 Kc band ...... $20.00 (unmounted)
7000 to 10,000 Kc band ...... $40.00 (unmounted)

BROADCAST BAND:

Power crystals ground in the 550-1500 Kc band accurate to plus or minus 500 cycles of your specified frequency fully mounted for $35.00. In ordering please specify tube, plate voltage and operating temperature. All crystals absolutely guaranteed regards to output and frequency and delivery can be made within two days after receipt of your order.

CONSTANT TEMPERATURE HEATER UNITS:

We can supply heater units guaranteed to keep the temperature of the crystals constant to better than a tenth of 1 degree centigrade for $410.00. Two matched crystals, ground to your assigned frequency in the 550-1500 Kc band with the heater unit complete $410.00. More detailed description of this unit sent upon request.

ATTENTION AIRCRAFT AND COMMERCIAL RADIO CORPORATIONS:

We invite your inquiries regards your crystal needs for Radio use. We will be glad to quote special prices for POWER crystals in quantity lots. We have been grinding power crystals for over seven years, being pioneers in this specialized field, we feel we can be of real service to you. We can grind power crystals to your specified frequency accurate to plus or minus .03%. All crystals guaranteed and prompt deliveries can be made. A trial will convince you.

SCIENTIFIC RADIO SERVICE

"THE CRYSTAL SPECIALISTS"

P. O. Box 86  Dept. P-12  Mount Rainier, Maryland
Radical Improvements that meet Modern Demands in this New Rheostat

One hand operates the HH Tubular Rheostat.

1. Gripping slider knob automatically disengages screw mechanism for rapid sliding. Release restores screw engagement as soon as knob is turned.
2. Screw adjustment mechanism is self supporting, self aligning. No binding.
3. Heavy phosphor bronze contact shoe maintains firm contact with wire but cannot tear it.

Write us for COMPLETE DETAILS

TUBULAR RHEOSTATS
HARDWICK, HINDLE, INC.
218 Emmet St. Newark, N. J.

Are YOU willing to work for further success in Radio? Have YOU had enough experience to know that you can't get, for nothing, something worth having?

If so, clip this out and send in your name and address — it will bring you our new booklet, MODERN RADIO, describing an advanced course in PRACTICAL RADIO ENGINEERING — a course that is being studied by hundreds of experienced Radiomen in all parts of the world — a course written and conducted by engineers with years of experience in practical radio work and in instruction work in ADVANCED RADIO.

Name ........................................
Address ........................................
Branch of Radio ................................

CAPITOL RADIO ENGINEERING INSTITUTE
Incorporated
3166 Mt. Pleasant St., N.W.
Washington, D. C.

Tripolitan pirates and put on the same act with them. At Tunis he played another one-night stand and then, washing up, came on home.

In 1815, when Steve got home, they gave him a blue silk flag. This identical flag is the one that hangs in the auditorium at the Naval Academy today. Don't any ham with red blood in him ever go anywhere near Annapolis without going to that flag and standing at salute just a moment.

The instrument of torture hanging on the wall at A.R.R.L. Headquarters and the instrument of torture shown on Stephen Decatur's flag are suspiciously alike. Their meanings are exactly alike — a he-man type of law and order, or the works. And now, you all ask, whence came our Wouli-Hong? Thereby hangs another tale, lads.

The Operating Characteristics of Vacuum-Tube Detectors (Continued from page 28)

of two tubes of this type as grid detectors under similar operation conditions. A greater variation than in the case of plate detection is evident, as would be expected from the greater variations in grid characteristics of the tubes.

The effect of changing the percentage modulation of the input signal upon the detector output and gain is shown by the curves of Fig. 16. It is apparent that the output, and hence the detector gain, is directly proportional to the percentage modulation as long as the detector is not greatly overloaded.

(The second and concluding part of this article will appear in the next issue. — Editor.)

The Hudson Division Convention (Continued from page 43)

And then came the distribution of prizes to those who participated in the stunts; also attendance prizes. The prizes far exceeded the anticipation of the Committee, but lack of space prevents us from giving the names of all the contributors; proper acknowledgment is, however, made and appreciation expressed to all those friendly manufacturers who helped so much to make the convention a success.

The report of this convention would not be complete without extending the thanks of all the delegates to Dr. Walsh, A. O'Hara, Ed. Finek, Dave Talley, Frank Frimmerman, C. E. Sargeant and other members of the Committee for making possible the best convention ever held in New York City.

— A. A. H.
Vitrohm Stabilizing Resistors

When the plate potential of radio transmitters is supplied by filtering rectified A. C. it is common practice to connect a stabilizing resistor across the output of the plate supply.

The advantages are:

1. Protects the filter condensers from high peak voltages, which lengthens their life.
2. steadies the note.
3. Tends to eliminate chirps.
4. Discharges condensers when key is open.

Send for circular 507, describing Vitrohm Resistors for radio. It will be sent without charge upon request. You will find in this circular Vitrohm Resistors to meet every radio requirement.

<table>
<thead>
<tr>
<th>Output Voltage</th>
<th>Total Resistance</th>
<th>Vitrohm Resistors</th>
</tr>
</thead>
<tbody>
<tr>
<td>250</td>
<td>25,000 ohms</td>
<td>1—Cat. 507-65</td>
</tr>
<tr>
<td>550</td>
<td>50,000 ohms</td>
<td>1—Cat. 507-68</td>
</tr>
<tr>
<td>1000</td>
<td>50,000 ohms</td>
<td>2—Cat. 507-65 in series</td>
</tr>
<tr>
<td>1500</td>
<td>60,000 ohms</td>
<td>3—Cat. 507-5 in series</td>
</tr>
<tr>
<td>2000</td>
<td>80,000 ohms</td>
<td>4—Cat. 507-5 in series</td>
</tr>
</tbody>
</table>

WARD LEONARD ELECTRIC CO.
Mount Vernon, New York

Send for a copy of our latest Radio Bargain Bulletin No. 31

American Sales Company 19-21 Warren Street New York City
A large number of reports have been received via mail, about two-thirds of which were from amateurs not worked or from short-wave BCL's. One of the latter wrote as follows: "I heard your station W9ANZ in communication with another station whose call I understood as CO. Please verify!"

W9ANZ

(Continued from page 48)

L.A.R.U. News

(Continued from page 60)

NORWEGIAN SECTION

By G. H. Petersen, Vice-Pres. N.R.R.L.

During April we organized local sections of our League in Oslo, and in Bergen the hams have long ago united to form a Society. While the number of Norwegian amateurs is still not very great, we sincerely hope that the formation of Sections will give the social side of the League work also will stimulate interest between members and non-members alike.

Our second WAC member is LAIW. He is a very active amateur, and incidentally has the first transmitting license issued and still in force in this country, so his WAC will be well deserved. His report points out that conditions on 11-mc. have been very bad during the last weeks, at least for DX, nothing but European contacts having been made. However, our President, LAIG, disagrees with him, still keeping up his list of ZL and VK's, and now deeply regrets that the world was not made bigger! The Oslo gang has got a big addition in LA1H, the Oslo Sailor School, who with its 500 watts is working all the world.

The Bergen gang also is still getting out. LIAR now works exclusively on 11-mc. and for DX, recently "made" two "W's" in an evening.

We are making our best efforts to improve the QSL service to Norway, asking all other hams to cooperate.

Conditions during May, as judged by our reports, have been distinctly bad, the only QSO's reported outside Europe being Australia and South Rhodesia by LAIG. However, the activity among Norwegian amateurs luckily shows no tendency to decrease with the approaching summer, several of our boys striving hard for the WAC Club membership. The general movement to the 11-mc. from the congested 7-mc. band is still going on. Wonder how the 11-mc. band will be in some months if the movement is general?

Our bi-annual General Meeting will be held at Oslo on August 9th and 10th, and we will try to combine it with a hamfest of the latest pattern. We want to repeat our invitation to all foreign hams to join us, if they should happen to visit our Land of the Midnight Sun at that time. In this connection we want to present our thanks for kind invitations to several conventions and congresses this summer. We certainly regret that we are probably unable to send special delegates, but
NEW GOVERNMENT REGULATIONS!

"Adequately filtered D.C. power supply or arrangements to produce equivalent effects must be used."

(Copied from Official Broadcast NRJ33, April 4.)

One sure way to comply with these new regulations is to put an ESCO Motor-Generator behind your transmitter.

They are not expensive and they give you "More Miles per watt."

Write for bulletin 237G, listing over 500 combinations. If you haven't already received your copy of Filter Facts write for it today — it's yours for the asking.

Type MG-200, 2 bearing motor-generator set

ELECTRIC SPECIALTY COMPANY
225 SOUTH ST. STAMFORD, CONN.
Manufacturers of motors, generators, dynamotors and rotary converters

DURHAM METALLIZED RESISTORS & POWEROHMS INTERNATIONAL RESISTANCE CO.

TRANSFORMERS
Guaranteed - Mounted - Complete
2 kw 2000—2500 each side ........................................ $40.00
700 watt 1000—1500 each side .................................. 14.50
220 volt 500—750—1000 each side ................................ 11.50
unmounted $10.00; mounted $11.50
Auto-Transformers, Chokes, Polyphase and 25-cycle Transformers. Add $2.00 for fl. winding

W9CES FRANK GREBEN
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It's probably lost!

Would you believe it? Nearly 4,000 new type QST Binders have been distributed within a comparatively short period of time. They must be good. They are good — and good-looking too.

A splendid tribute to the reference value of QST, and an indication, we believe, that you should resolve to keep past and future issues in a

QST BINDER
$1.50 each postpaid

1711 PARK STREET QST HARTFORD, CONN.
Super Akra-Ohm
Wire Wound Resistors

accurately wound and calibrated with precision to insure an accuracy of 1%, are especially adapted and highly recommended for use in property controlling the complex and complicated circuits required in the radio, audio, video and industrial applications of the electron tube and photo-electric cells. They are also valuable for Laboratory Standards, High Voltage Regulators, Telephone Equipment, Grid and Plate Resistors, etc.

Bulletin 100-C completely describes in many charts and diagrams the many uses for Super Akra-Ohm Resistors.

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Fascinating-Profitable
LEARN TELEGRAPHY
This Easy Way —

Learn AT HOME — with TELEPLEX — the Master Teacher — by sending and hearing real messages. Simple — Quick — Thorough.

Many licensed operators practice regularly with TELEPLEX to perfect their sending and receiving.

Used by U. S. Government and many leading schools.

Write for Folder Q-8
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76 Cortlandt Street
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Would you like to have a transmitter designed and built to your own specifications?

If so, write us—we will incorporate all these pet ideas of yours.

Calibrated Short Wave Wavemeter $12.50

14 to 220 meters

Audio Oscillator ..................... $17.50

40 to 5000 cycles

Wireless Egert Engineering, Inc.
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Say You Saw It in QST — It Identifies You and Helps QST
S END FOR THESE BULLETINS

A brand new line of transformers and chokes

Acme has a new line of transformers and chokes — 43 different items. Just drop a card today to the Acme Apparatus Corporation, Cambridge, Mass., Dept. Q-2, ask for Bulletins 110, 111 and 112 and learn all about this new apparatus.

Since vacuum tube transmission began, Acme has been making transformers and choke coils, and everyone remembers the Acme Spark Transformers in the early days.

Modern Short Wave Broadcasting Station

Brand New — Never Used
Complete in every detail
12 Kc. output — 10 to 30 meters — 2 stage amplifier, 2-3 k.c. 110 v. d.c. motor generators furnishing filament and plate voltage. Reserve parts, 5 extra tubes, 2 stage switchboards, regulators, measuring instruments, starters, valves, etc. Ideal for college, experimenters, ships, etc. Price only one-third factory list.

*Write for more information for—Mr. Charles Mitchell, Room 605, 347 Madison Ave., N. Y. C.*

**QUANTUM OSCILLATING CRYSTALS**

Scientifically Prepared for Maximum Power and Unconditionally Guaranteed

Buy and Save. Get the following frequencies at the following prices:

<table>
<thead>
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<tr>
<td>75-100</td>
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(Accurate Calibration furnished with each crystal)

Sections of any practicable dimensions made to order.

(Charge for grinding to exact frequencies given on request)

**J. T. Rooney, R. Sc., 4 Calumet Bldg., Buffalo, New York**

"Fifteen years' crystallographic experience"

**"A pioneer crystal grinder"**

**BARGAINS — ARMY & NAVY RADIO SURPLUS**

Motors — 1-30 H.P. back geared 110 A.C. variable speed, auto reversible (Secor oil burner type) has over one thousand uses, a real buy at...

- **Condensers, Dubilier, mica, etc.,** 250 volt 200,000 ufd., $5.00
- **Motor generator, Crouch Wheeler or Holter Cubby, 110-220 A.C., 500 watt, 500 cycle, Ball bearing—**...
- **Ammeter, R.E.O., 10 amp., zero adjuster, 4 in. diameter,** $20.00
- **West. Elec. Dynamotor, C.W. 927, two D.C., 12/J50 volt dynamo motors in noiseless hangar. Used in parallel gives 160 volts, series gives 80 volts, 700 watts, suitable for..., new low price—**...

Write Dept. 08-1 for resistor and voltage-controlled data.

175 Varick St., New York, N.Y.

**ELECTRAD**

Lighting Switch, High Grade W.P., Heavy Copper Blade and Contacts. Size 7 x 8 x 6 high. While they last...

Send for transmission

**ACME ~ for transmission**

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A brand new line of transformers and chokes

Acme has a new line of transformers and chokes — 43 different items. Just drop a card today to the Acme Apparatus Corporation, Cambridge, Mass., Dept. Q-2, ask for Bulletins 110, 111 and 112 and learn all about this new apparatus.

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**"A pioneer crystal grinder"**

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175 Varick St., New York, N.Y.

**ELECTRAD**

Lighting Switch, High Grade W.P., Heavy Copper Blade and Contacts. Size 7 x 8 x 6 high. While they last...

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Coils — Magnet Wire Wound
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IT’S MY BIRTHDAY
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SEE INSIDE BACK COVER
THIS ISSUE OF QST

David Houghton
QST Circulation Manager

mitted without licenses. In 1921 we had contact with YS7XX in Ragusa. In 1926 YS7KK in Velika Kekinda, YS7MM, YS7DD and YS7XO in Zagreb joined the above-mentioned station. The military station YS7WW joined also. It was located in Petrovaradin and worked amateurs. After a time we had the best stations in Europe and everyone was interested in us because of this. Most of our transmitting was in the Balkans and we were working ‘under cover.’

“After 1928 the stations EJ700 and EJ7QQ in Zagreb and EJ7SS in Belgrad joined us. The Central Station for the short wave transmitters in Yugoslavia is EJ7KK in Zagreb.

“In the same year we tried to get permission from the Postmaster to license our stations, but received a negative answer.

“We received QSL cards from Wien ‘via Radiowelt.’ A notice was printed in a magazine and we got into trouble with the Government.

“The station EJ7SS in Belgrad read the notice in the magazine and warned us so the Commission could not find anything. After this the Government did not make any more trouble for us. We wanted to organize a society but the Government would not give us their permission. We got together and drew up a constitution on December 23, 1929.

“The results of the organizing of this society depend on propaganda and we cannot tell what they may be.”

The stations listed on the letterhead of the society are these: 7AA, 7CC, 7DD, 7EF, 7GG, 7JJ, 7KK, 7LL, 7MM, 7NN, 700, 7PP, 7QQ, 7RR, 7SS, 7UU, 7VV, 7XX, 7YY, 7ZZ. The address is Poslovnica: Zagreb, Puskanac 15B-22.

It should be borne in mind that these stations are not officially licensed, and all communications, QSL cards, etc., should be sent under cover.

WWV Standard Frequency Schedules

T

HE Bureau of Standards announces a new schedule of radio signals of standard frequencies, for use by the public in calibrating frequency standards and transmitting and receiving apparatus. The signals are transmitted

BECOME A RADIO OPERATOR

See the World, Earn a Good Income,
Duties Light and Fascinating
LEARN IN THE SECOND PORT U.S.A.

Radio Inspector located here. New Orleans supplies operators for the various Gulf ports. Most logical location in the U. S. A. to come to for training.


Literature on request.

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844 Howard Ave. New Orleans, La.
Oscillating Quartz Crystals

For Commercial Stations
For Dealers
For Amateurs

POWERTYPE CRYSTALS ARE RECOGNIZED AS THE BEST
No off frequency operation with a POWERTYPE crystal,
Guaranteed — easy oscillators, carefully selected for maximum output, and ground to your approximate frequency which is stated accurately to within one-tenth of one percent.

<table>
<thead>
<tr>
<th>Frequency Range</th>
<th>Price</th>
</tr>
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<tbody>
<tr>
<td>1715-2000 Kilocycle band</td>
<td>$10.00</td>
</tr>
<tr>
<td>3500-4000 Kilocycle band</td>
<td>$15.00</td>
</tr>
<tr>
<td>One-inch oscillating blanks</td>
<td>$4.00</td>
</tr>
<tr>
<td>Dust proof, plug-in crystal holders</td>
<td>$6.00</td>
</tr>
</tbody>
</table>

We also supply "POWERTYPE" crystals to broadcast and commercial stations.

With all crystal blanks we furnish grinding instructions.

FREE
Simply send name, no obligation,
for full information on crystals, holders, blanks, heater ovens, etc.

"CLEAR AS A CRYSTAL"
American Piezo Supply Company
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EVERY SIZE AND PRICE FOR EVERY POSSIBLE USE
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preferred and specified by experts the world over, for . . . .
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THE DAVEN COMPANY
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Resistor Specialists

"Standards of Efficiency"
5 to 5 million ohms; guaranteed 1/2% tolerance

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Transformer specialists since 1892
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75-watt transmitting tubes.
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ARCTURUS PHOTOYTIC CELL
The Electric Eye for Every Industry
MADE BY THE MAKERS OF ARCTURUS BLUE TUBES

(Please continue on page 91)
The ACME of smooth performance

Capacitated silently into the air, the glider taking advantage of every tiny air current, scans noiselessly and gracefully up and down the air valleys at the touch of the control stick. It's the acme of smooth performance.

The modern radio receiver, if it is CENTRALAB equipped, figuratively speaking, rides the ether waves smoothly and noiselessly. For real adventure in radio reception insist on CENTRALAB volume control equipment.

Write Dept. 320-F for Free booklet, "Volume Control, Voltage Control and Their Uses".

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RCA or Stromberg-Carlson Condensers Designed for use in low-power transmitters and all high voltage socket power devices and power packs. Black metal case, terminal connections to terminal board. Deliveries 2000 Volts center-tapped. 6 CT., 10 CT., and 20 Volts, 14 lbs. Ideal for transmitter, Power Amplifiers, etc. SPECIAL PRICE $7.95.

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Power Amplifiers, Special Price. RCA 5000 ohm, 50 watt grid leaks with mounting rod — $.48. Two for $.89. RCA 5000 ohm. 500 watt grid leaks with mounting rod — $.48. Two for $.89. RCA 5000 ohm, 50 watt grid leaks with mounting rod — $.48. Two for $.89.

250 ohm, 50 watt grid leaks with mounting rod — $.48. Two for $.89.

Qualify for that land station job in a few weeks!

Send 35 wpm or more with less effort than you now send 10. Increase your speed from 10 wpm to 30 or 35. Double your typing speed. It's easy.

The Candler System of High-Speed Telegraphing Shows How

The Candler System is a system of Physical and Mental Coordination for Radio and Morse Operators who want to acquire skill and speed in sending, receiving and listening with pen and typewriter. It relieves and prevents cramps and paralysis and makes the arm strong and fast for both hand and machine sending. Develops the power of Concentration. Gives you confidence by making you sure of yourself at all times. Qualifies you to work any Morse or Wireless job.

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These letters are typical of thousands in our files praising The Candler System. (Theo. McLennan, World's Champion Radio Operator, England.) "Improved 188% in two weeks after beginning The Candler System." (Frederick Greasser, U. S. Air Force, Dayton, Texas.)

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If you really want to increase your speed and qualify for that land station job in the shortest possible time and with the least effort buy now, write at once, for FREE particulars of The Candler System of High-Speed Telegraphing. Give present speed (Morse and Continuous). No obligation. Write NOW!

THE CANDLER SYSTEM CO.
Dept. R. L.
6443 South Kedzie Avenue
CHICAGO, ILLINOIS
HARM-ADS

(1) Advertising shall pertain to radio and shall be of nature of interest to radio amateurs or experimenters in their pursuit of radio activities.

(2) No display of any character will be accepted, nor can any advertising be accepted where all or part capital letters be used which would tend to make it advertising from the other.

(3) The Ham-Ad rate is 15c per word, except as noted in paragraphs (4) and (5).

(4) Remittance in full must accompany copy. No cash or contract discount or agency commission will be allowed.

(5) Closing date for the second month preceding publication date.

(6) All copy will be subject to advertising, in our judgment, is obviously non-commercial to be accepted and will neither accept nor print any part of such commercial advertising.

(7) For quietness, ease, DX ability, life-long permanence, absolute dependability, lowest ultimate cost, arrange for the new S7-J Generator, complete with power units, built to order, using your parts if desired. Prices on request. (贻. Ewing, Jr., 29 S. LaSalle St., Chicago, ll.

(8) Guaranteed tubes, at any day free replacement, $2.75, 1 kw tubes -- water uooled -- two color $100. Stationery, samples, WOCKA, P. O. Box 702, Bath, N. Y.

(9) Trade for transmitting apparatus -- Beauchere C models, silver satin finish gold bell, saxophone, Norvelle Devon, 301 South Broadway, Pittsburg, Kansas.

(10) Guaranteed Electronic CG1011255 type five watters for use as other oscillators or modulators. Up to 750 volts on plate. $1000 on deposit, buyer agrees to pay Remainder. F. H. Sent e.o.d. E. P. Hufnagel, 579 S. 16th St., Newark, N. J.

(11) Guaranteed tubes, 30 day free replacement, X250-$2.75, X200-$2.50, F210-$2.50, X201-$2.50. Used and for sale by an individual or apparatus offered for sale or advertising inquiring for special equipment, if by a member of the American Radio Relay League the 15c rate. An attempt to deal in apparatus in quantity for profit, even if by an individual, is considered a violation of the rates, rules, and regulations.

PLATE power for your set, the very heart of its performance. For quietness, DX ability, life-long permanence, absolute dependability, lowest ultimate cost, arrange for the new S7-J Generator, complete with power units, built to order, using your parts if desired. Prices on request. (E. Ewing, Jr., 29 S. LaSalle St., Chicago, I1.

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(13) Guarantee tubes, at any day free replacement, $2.75, 1 kw tubes -- water uooled -- two color $100. Stationery, samples, WOCKA, P. O. Box 702, Bath, N. Y.

(14) Guaranteed Electronic CG1011255 type five watters for use as other oscillators or modulators. Up to 750 volts on plate. $1000 on deposit, buyer agrees to pay Remainder. F. H. Sent e.o.d. E. P. Hufnagel, 579 S. 16th St., Newark, N. J.

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(16) Guaranteed Electronic CG1011255 type five watters for use as other oscillators or modulators. Up to 750 volts on plate. $1000 on deposit, buyer agrees to pay Remainder. F. H. Sent e.o.d. E. P. Hufnagel, 579 S. 16th St., Newark, N. J.
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