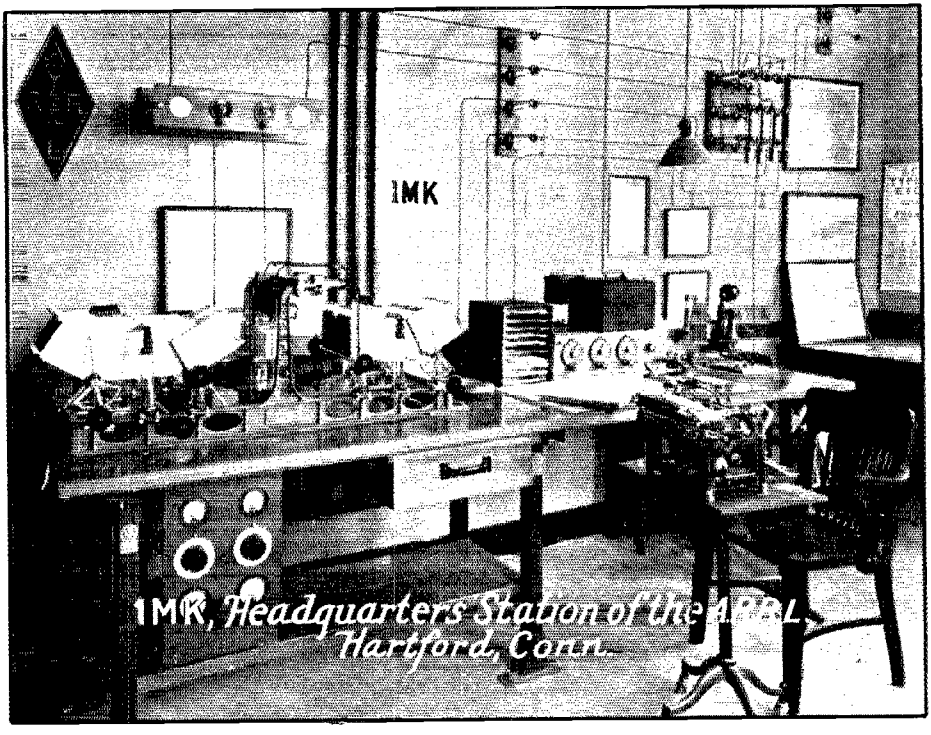
QST

DEVOTED ENTIRELY TO

AMATEUR RADIO

PUBLISHED SINCE 1915 BY THE AMERICAN RADIO RELAY LEAGUE INC.

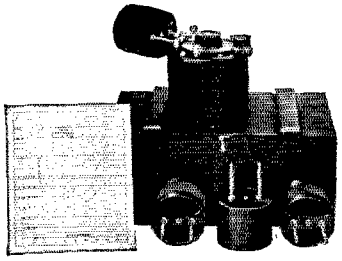


1MK, Headquarters Station of the A.R.R.L. Hartford, Conn.

JUNE 1928

25c

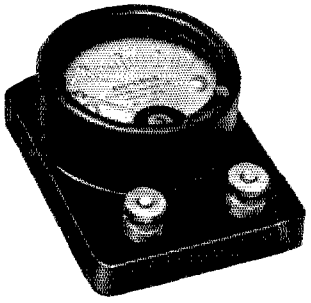
AMATEUR EQUIPMENT



TYPE 358 AMATEUR WAVEMETER

The Type 358 Wavemeter is especially designed for amateur use in checking wavelengths. It covers a range from 15 to 220 meters by means of four coils of low loss construction. Each instrument is individually calibrated.

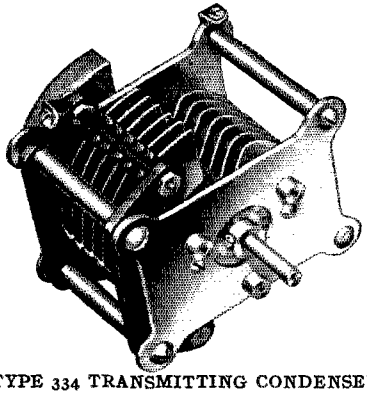
Type 358 Wavemeter with Calibration Chart $22.00



TYPE 127-C HOT WIRE AMMETER

The Type 127 Hot Wire Ammeters are equally accurate on direct or alternating currents of any frequency. They may be used for measuring filament currents, antenna radiation and have many other purposes.

Priced from $7.25 to $9.00, according to range.

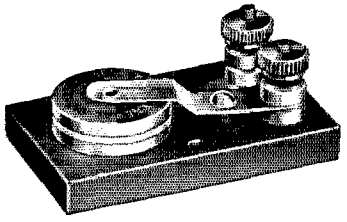


TYPE 334 TRANSMITTING CONDENSER

The Type 334 Transmitting Condensers may be used in short wave transmitters with voltages up to 2000. Plates of both the rotor and stator groups are soldered to insure perfect electrical contact.

Type 334-T Condenser, Capacity 100 MMF $4.00

Type 334-V Condenser, Capacity 50 MMF $3.75



TYPE 356 CRYSTAL HOLDER

The Type 376A Amateur Quartz Plate is intended primarily for use by amateurs in controlling the frequency of transmitters, but of course may be used for any purpose in which plates in general are adapted. Supplied at random frequencies between 1750 and 2000 kilocycles.

Type 276-A Quartz Plate $15.00

Type 356 Crystal Holders (As illustrated) $1.00

GENERAL RADIO Co

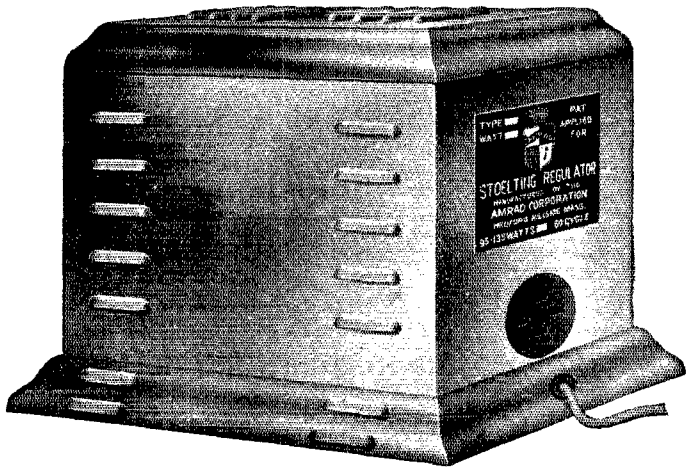
We welcome your correspondence in regard to technical problems. Bulletin No. 929 describing our complete line of apparatus will be sent on request.

30 State St., Cambridge, Mass. 274 Brannan St., San Francisco, Calif.

AMRAD

STOELTING VOLTAGE REGULATOR

No Tubes—No Adjustment
Entirely Automatic—No Moving Parts



In these days of fluctuating line voltages which seriously affect the operation of AC Receivers the Stoelting Regulator is a practical necessity and is one of the most noteworthy contributions to the radio industry since its inception.

(1) Maintains practically constant voltage input to the receiver even though the line voltage fluctuates from 95 to 135.

(2) The Stoelting Regulator functions in a manner to control or adjust the voltage applied to the receiver so that just the proper voltage is applied to the receiver at all times regardless of the line voltage at the light socket which enables the best operation on the receiver.

(3) Very compact and simple to install.

(4) Employs usual plug connection to lamp socket.

(5) Very simple nothing to get out of order, no replacements, will last a life time.

(6) Made in following sizes:

Type	A— 60	watts—	60 cycle
"	B—120	"	—60 "
"	C— 60	"	—25 "
"	D—120	"	—25 "

The 60 watt type units are designed for operating receivers using the standard 171 or 121 type power tubes. 120 watt units are designed to operate receivers employing the 210 or 250 type power units.

(7) The Stoelting Regulator will operate receivers regardless of the number of tubes employed. It greatly prolongs life of radio tubes.

(8) A boon to owners of radio receiving sets in localities where line voltage is constantly either excessively high or excessively low. If the line voltage is too low it automatically raises it or if it is too high it automatically lowers it to the proper operating voltage for the receiving set.

(9) The addition of the regulator adds practically nothing to the cost of operating the receiving set.

(10) The Stoelting Regulator will operate all types of receivers which operate on lighting current lighting from commercial light service.

(11) Manufactured exclusively by the Amrad Corporation under the applications of H. H. Stoelting.

Write for full information

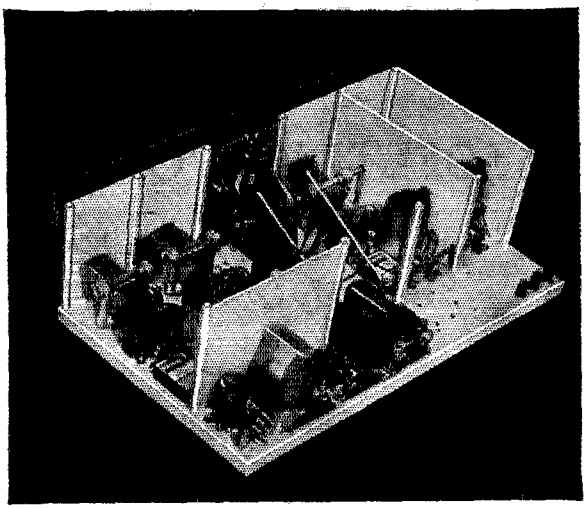
THE AMRAD CORPORATION

MEDFORD HILLSIDE, MASS.

Don't take Chances with Condenser Breakdown!

"The man who tries to save a few cents by buying cheap condensers is always in danger of having to pay out many dollars for replacement parts. A cheap condenser is expensive when it breaks down."

Leslie G. Bates



The famous Hammarlund-Roberts, Hi-Q Six employs parts produced by ten of America's finest radio manufacturers, including ACME PARVOLT *By-Pass Condensers.*

Play safe with PARVOLTS!

THE rapidly increasing use of by-pass and filter condensers in modern A. C. operated circuits demands the greatest caution against poor quality, inaccuracy of rating and non-uniformity in condensers.

Nothing can do so much harm to impair radio reception or effect such costly losses in assembled parts as defective or inaccurate condensers.

It is of vital importance to use condensers of proper ratings, and to know the ratings actually ARE as stated and that all stated ratings are UNIFORM.

It is vital to use condensers whose ratings are based upon CONTINUOUS DUTY.

It is vital to use condensers that are made with AT LEAST the overload factor of safety demanded by the R.M.A. and N.E.M.A.

Condensers which possess these qualities not only aid quality reception, but overcome the possibility of breakdown and heavy losses from ruined tubes, transformers and other parts. . .

All ACME PARVOLT Condensers are made and tested to standards of the R.M.A. and N.E.M.A. They are used and recommended by leading radio engineers, designers, service men and custom-builders everywhere. Play safe with PARVOLTS! Made by THE ACME WIRE CO., New Haven, Conn., manufacturers of magnet and enameled wire, varnished insulations, coil windings, insulated tubing and radio cables.

ACME PARVOLT FILTER CONDENSERS *are supplied in all standard mfd. capacities for 200, 400, 600, 1000 and 1500 Volt D. C. requirements. Uniform height and width for easy stacking. Supplied singly or in complete housed blocks for the important power supply units such as Thordarson, Samson, and others.*

ACME PARVOLT BY-PASS CONDENSERS *are supplied in all standard mfd. capacities and for all required voltages.*

ACME PARVOLT CONDENSERS

Made by the Manufacturers of

ACME CELATSITE HOOK-UP WIRE

ENAMELED AERIAL WIRE
Enameled copper wire in both stranded and solid types. Also Acme Lead-ins, Battery Cables, Indoor and Loop Aerial Wire.

CELATSITE FLEXIBLE and SOLID
For all types of radio wiring. High insulation value; non-inflammable. 10 colors.

ACME SPAGHETTI
A superior cambric tubing for all practical radio and other electrical requirements. Supplied in 10 colors.

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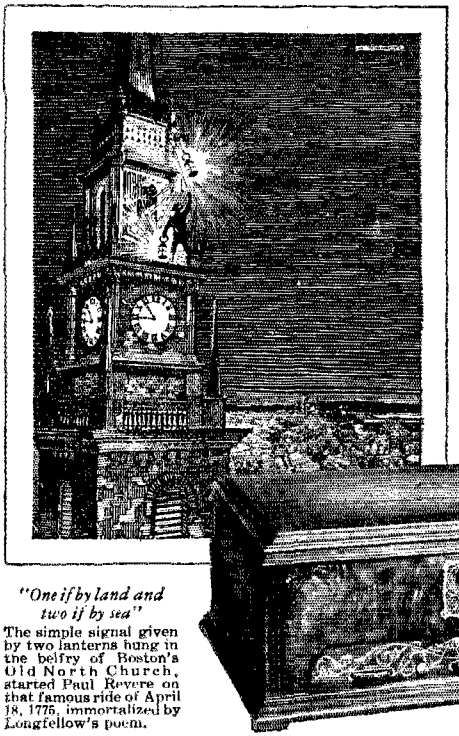
*Temporary officials appointed to act until the membership of the Section concerned choose permanent SCMs by the nomination and election.

Get it *Better* with a Grebe



"One if by land and two if by sea"

The simple signal given by two lanterns hung in the belfry of Boston's Old North Church, started Paul Revere on that famous ride of April 18, 1775, immortalized by Longfellow's poem.

Ease of operation—simplicity, as simple, indeed, as the signals which played so important a part in the birth of our nation; that is naturally expected in any A-C (alternating current) light-socket operated receiver.

But the Grebe Synchrophase A-C Six offers far more than mere ease of operation; far more than relief from bother with batteries.

In addition to the convenience of light-socket operation, you have freedom from A-C hum (so annoying in many A-C sets), incomparable tonal beauty, range and selectivity, and exclusive Grebe improvements resulting from nineteen years of outstanding leadership in the radio field.

Grebe Synchrophase Seven, $145; Grebe Synchrophase Five, $105; Grebe Natural Speaker, $35; Grebe No. 1750 Speaker, $17.50.

A demonstration of the Grebe Synchrophase A-C Six will convince you of its superiority. The features of this new receiver are fully explained in Booklet Q, which we'll be glad to send you.

GREBE SYNCHROPHASE

A-C Six RADIO

A. H. Grebe & Company, Inc., 109 West 57th Street, New York City

Factory: Richmond Hill, N. Y. *Western Branch*: 443 So. San Pedro St., Los Angeles, Calif.

Makers of quality radio since 1909

QST

The Official Organ of the A·R·R·L

VOLUME XII — JUNE, 1928 — NUMBER 6

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

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The American Radio Relay League

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

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

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

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

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Address General Correspondence to Executive Headquarters, Hartford, Conn.

EDITORIALS

THE current amateur regulations define an amateur station as 'a station operated by a person interested in radio technique solely with a personal aim and without pecuniary interest. Amateur licenses will not be issued,' the regulations say, 'to stations of other classes.' The regulations also state that 'amateur stations are not authorized to broadcast news, music, lectures, sermons or any form of entertainment, or to conduct any form of commercial correspondence.'

Today a number of stations are operating in violation of these regulations. Frequency assignments are hard to get these days and for this reason, or because the owners of these stations have a commercial interest in communicating with amateurs, our bands have been invaded. It is an improper situation and one to which the League objects. For some months it has been receiving the League's attention and we have protests on file at Washington now against the granting of amateur licenses to such stations. No company whose interest is a pecuniary one should be permitted to operate on the amateur waves. They are not amateurs, and even if we had plenty of kilocycles to spare, which we have not, these people should not be permitted to operate amateur stations to communicate with amateurs for their own business purposes. Their operation is so plainly in violation of the regulations that we do not see why their licenses are not cancelled. The very purpose of the specification against conducting commercial correspondence over amateur stations is to deny commercial companies the right to use our wavelengths for such purposes. If they are entitled to use radio they should have limited commercial licenses, which are provided for that purpose, and corresponding frequency assignments outside of the amateur bands.

If any such stations get definitely established in our bands there is no reason why any number of similar agencies cannot demand such licenses and result ultimately in crowding us out, so that our bands eventually become occupied by a collection of what ought to be limited-commercial stations. Naturally the League is opposing this tendency vigorously, and is demanding of the Commission that these stations be removed from our bands. The amateur bands are for amateurs, and it is the rankest kind of subterfuge for commercial establishments to carry on communications that relate to or are on behalf of their business enterprises, under an amateur license. Our bands must be protected, and we must arouse ourselves at this encroachment by business interests. We do not care whether these interests are eventually given limited commercial licenses or not—it is not for us to say what kind of license, if any, they should have—but we are certain that if their operation is permitted it should not be on amateur wavelengths. Some of these interests desire limited commercial licenses; some of them flaunt in the face of the Commission the promise to stop doing things which are illegal under amateur licenses as soon as they are given the other kind of license they are requesting; others do not seem to be particularly urging the matter because they wish to retain amateur licenses so that they may continue, for business purposes, to communicate with amateurs. Needless to say, the League feels that they have absolutely no right to such a license.

In addition to using frequencies improperly in our rapidly narrowing bands, some of these stations are making such a tremendous bid for the establishment of 'good will' amongst amateurs, on behalf of their proprietors, that they are quite completely monopolizing amateur message traffic in their vicinity. With their relatively enormous resources, compared with amateurs, they put in excellent high-powered apparatus and hire day and night shifts of operators, and, by their ability to afford constant operation, gobble up all of the message traffic in sight—in an endeavor, on behalf of the enterprises sponsoring them, to make contact with the amateur world, display interest in amateur affairs, and generally to ingratiate themselves with amateurs. As a result, amateur traffic distribution is monopolized, for the rest of us cannot compete with such practices, and in such districts it is getting to a situation where there is very little enjoyment in traffic operation except for the favored correspondents of these stations. While we would welcome the creation of so good a traffic-handling system by an amateur, and laud him in our columns as being a king of brasspounders, we can't be expected to like it when commercial enterprises come into our band and do this thing for their own selfish purposes—and we don't think we should have to put up with

it any longer than it takes Washington to cancel their licenses.

Such stations offer amateur radio no good. They should not receive encouragement from amateurs; we really ought to ignore them on the air. Communication with them constitutes 'fraternizing with the enemy' who has invaded our bands; traffic handling with them permits the monopolization of our traffic by people who are not amateurs; and friendly intercourse with them enables them to say that they have amateur good will, to which they are not entitled.

—K. B. W.

Standard Frequency Transmissions from 9XL

STATION 9XL is a special station, comprising one of the three portions of the 'Gold Medal Station', WCCO-9XL-9WI at Anoka, Minnesota. WCCO operates as broadcast station, 9XL purely as a standard frequency station and 9WI as a general amateur station, the three transmitters having independent equipment and antennas but a common power supply. Through arrangements made by K.V.R. Lansingh of the Official Wave Length Station Committee of the Experimenters' Section, A.R.R.L., 9XL is operated on schedules regularly announced in *QST*. The work of operating the station is done without charge by Chief Operator Hugh S. McCartney and his operating staff.

While no guarantee of accuracy is made on a gratis service, it is the aim of the staff to maintain an accuracy of 1/10 of 1%, which is materially better than can be held by most wavemeters. The frequency values are based on the standards of the Bureau of Standards and have been checked by the Communications Laboratory of The Massachusetts Institute of Technology, also by Cruft Laboratory at Harvard University.

Important Notice—The continuation of this free service from month to month depends on the response received. Direct acknowledgments to 'Experimenters' Section, A.R.R.L., 1711 Park Street, Hartford, Conn.', using ordinary stationery or else the special blanks supplied by the Experimenters' Section, on request. A goodly number of these blanks has been gathered and as the number grows we will gradually gain a unique and accurate record of transmission phenomena possible with no other station.

9XL now uses a small percentage of tone modulation to make the signal distinctive.

SCHEDULES

(Figures are frequencies in MEGACYCLES per sec.; approx. wavelengths in parentheses.)

Friday Evening Schedules
Central Standard Time

Time (PM)	Schedule A f	λ	Schedule B f	λ
8:30	3.5	(85.7)	7.0	(42.8)
8:42	3.75	(80.0)	7.2	(41.6)
8:54	4.0	(75.0)	7.4	(40.5)
9:06	8.5	(35.3)	7.6	(39.5)
9:18	9.0	(33.3)	7.8	(38.4)
9:30	9.5	(31.6)	8.0	(37.5)

Sunday Afternoon Schedules
Central Standard Time

Time (PM)	Schedule C f	λ
3:00	14.0	(21.4)
3:12	14.2	(21.1)
3:24	14.4	(20.8)
3:36	15.0	(20.0)
3:48	16.0	(18.7)

June	8	B
"	22	A
"	24	C
July	6	B
"	20	A
"	22	C
August	3	B
"	17	A
"	19	C
"	31	B

DIVISION OF TIME

3 minutes—QST QST QST nu 9XL.
3 minutes—5 sec. dashes broken by station call letters every half minute.
1 minute—announcement of frequency in megacycles per second (8.75 megacycles per sec. is sent as "8 r 75 MC.")

Special Notice—If you use the transmissions send a note to Experimenters' Section, A.R.R.L., Hartford, Conn.

—*H. P. W.*

Strays

The attention of all amateurs is again directed to General Order No. 26, Federal Radio Commission, appearing on page 15 of our May issue, announcing the termination of all old Department of Commerce amateur station licenses on August 31st. If not already done, application for renewal must be filed with the Supervisor not later than July 31st.

Another reference to that same page is important: amateur operator's licenses will not be renewed without re-examination unless application therefor is made prior to expiration. Keep your date in mind.

The postage to New Zealand is two cents for both cards and letters, explains Wood of oz1FE. Many American hams are putting five cents on their cards and letters, he says, and this is simply a waste of good cash.

Electrical Prospecting

A New Field for the Amateur

By J. J. Jakosky*

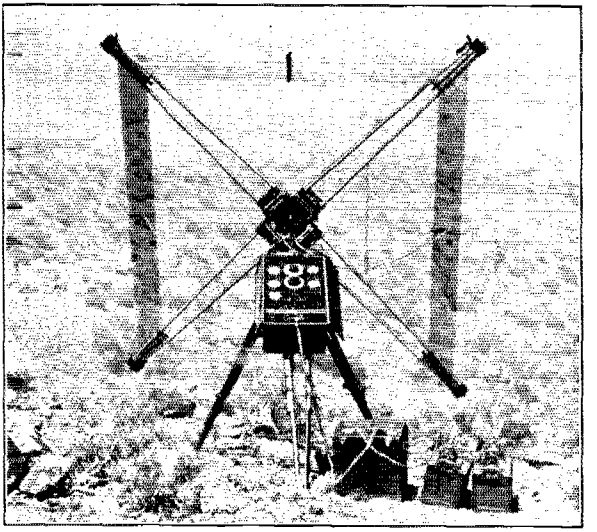
INDUCTIVE methods of prospecting such as those described in this paper open up another vocation for the radio amateur. Such work has all the thrills of prospecting and at the same time requires close attention and technical study.

Electrical methods of geophysical prospecting have been assuming increasing importance during the past two years. Geologists and mining engineers are finding such methods of great value, both for the first study and for the later development of mining property. Especially is this true in mountainous districts where the geology is complex and in territories where the geology has not been worked out sufficiently to be of direct help in predicting the location or extent of "mineralized zones".

Much of the mining area of Canada is overlain with glacial debris and the mining engineer or geologist has but scant surface indications on which to interpret the property. In such cases the electrical methods of prospecting are of inestimable value.

During the past two years it is estimated that electrical methods have surveyed ninety percent of the total area studied by geophysical methods in the United States and Canada for mining exploration (this does not include oil exploration). In other words, the electrical methods have been used in over ninety percent of the area surveyed, while the remaining ten percent of area was surveyed by the other methods, such as the torsion balance, magnetometer, variometer, seismic method[1], etc.

The Radiore field crew usually consists of four men; the crew chief, the assistant crew chief, the radio technician, and a junior engineer. The first two mentioned are usually graduate mining engineers with practical mining experience and knowledge of geology. The radio technician may be an electrical engineering graduate or an amateur with sufficient electrical knowledge to operate and keep in repair the transmitting and direction-finding equipment, and to carry out such tests and calibrations as may be required in the conduct of the work. The work is done by the "inductive" method. This paper will describe briefly the major phases of the inductive methods and point out a few of the electrical factors which must be studied and understood if reliable results are to be obtained from the field work. Before going to this, one must explain that all the electrical methods of prospecting depend for their results on the effects of electrical currents produced in the earth, and further that they detect the presence of bodies of ore (or other material to be found) by the fact that these bodies are usually much better electrical conductors than the "matrix" around them. Sometimes this relation is reversed but in all cases the material to be located must have a considerably higher or lower conductivity than the matrix. All this will be considered in detail later in this paper.



THE "ENERGIZER" OR TRANSMITTER

The battery output is converted to a.c. by the apparatus in the box on the ground. The vacuum tube oscillator on the tripod leg converts this to any desired frequency within a wide range so that the larger induction loop may carry audio frequency current, radio frequency or intermediate frequency. The field of the loop induces in the earth and in ore bodies the secondary fields on which the system depends.

1. See *QST* for March, 1928, page 43.

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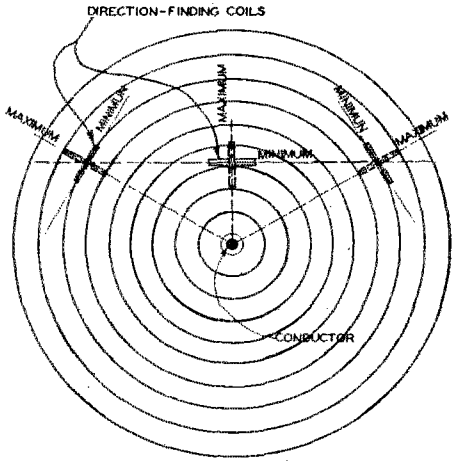
THE INDUCTIVE METHOD

The inductive method is so named because the current flowing in the earth is obtained by electro-magnetic induction instead of by the use of ground electrodes.

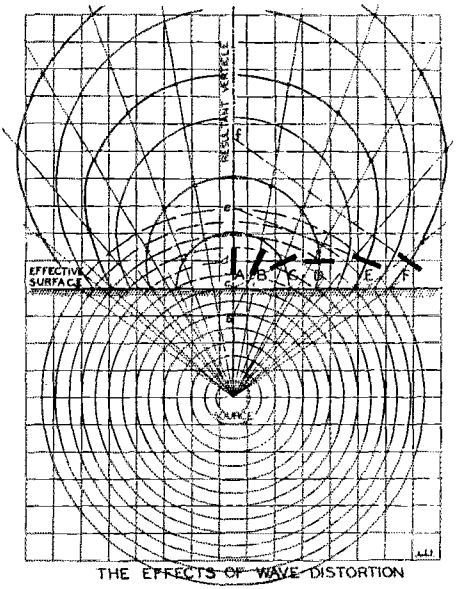


FIELD SURROUNDING A SIMPLE CONDUCTOR IN A HOMOGENEOUS MEDIUM

FIGURE 1

Inductive methods of geophysical prospecting as used by the Radiore Co. have two well known and comparatively simple operating phenomena; electromagnetic induction, by means of which an alternating electromagnetic field on the surface of the ground causes or induces a current to flow in a sub-surface conductive body, and second, a modified radio direction finding station by means of which directional readings can be made and the conductor located.

Whenever an alternating magnetic field cuts a conductor, an electromotive force is generated in that conductor, the magnitude of which is proportional to the strength of the alternating magnetic field and its frequency. In turn, the induced e.m.f. will cause a current to flow, the magnitude of which will be dependent on the effective conductivity of the conductor. In our practice the magnetic field is obtained by causing an alternating current to flow in a closed coil such as shown in the accompanying photograph of the Radiore high frequency "energizing" apparatus. The essential parts consist of storage batteries for power supply, a frequency changer where the direct current from the storage batteries is changed to a low frequency alternating current, an oscillator box where the low frequency is changed to a high frequency current, (usually 40,000 cycles) by use of power vacuum tubes, and the vertical loop or coil through which the high frequency current flows. The high frequency current flowing in the vertical coil creates the high frequency electromagnetic field, which induces a current to flow in the conductive ore-body.



THE EFFECTS OF WAVE DISTORTION

FIGURE 2

FIELD SURROUNDING A SIMPLE CONDUCTOR

An alternating current flowing in a conductor sets up an alternating electromagnetic field having the same frequency as the current. In the case of a simple conductor, such as a small diameter wire of great length suspended alone in air, the field will surround the wire and travel outward from it in the form of concentric circles as shown in Fig. 1. It is well known that in this simple case a direction finding coil would give maximum and minimum signals when located as shown in the figure. This must *not* be understood to mean that in the *practical* case the coil when giving max. signal will always "point" at the conductor. On the contrary it will "point" to the *apparent* location of the conductor, which is to say it will be at right angles to the advancing wave front, but that wave front will almost certainly be very much distorted. In radio compass work such distortion is a great nuisance but in Radiore work this is precisely one of the most important effects used in locating the conducting deposits one is in search of.

FIELD SURROUNDING A SIMPLE COIL CARRYING AN ALTERNATING CURRENT

An alternating current flowing in a simple coil will create an electro-magnetic field which will have the same frequency as the current, and will radiate outward in closed

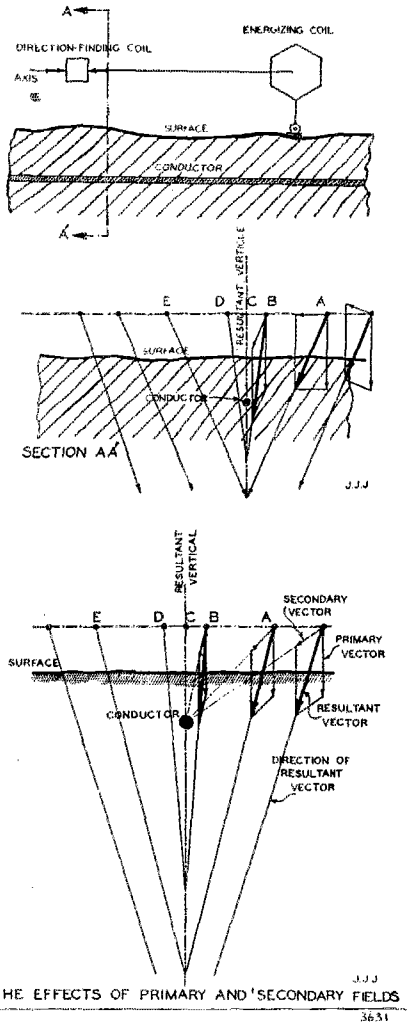
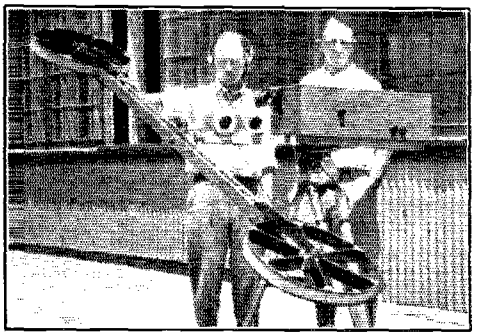


FIGURE 3
CASES OF DISTORTED AND UNDISTORTED SECONDARY FIELDS

magnetic or flux circles. The flux circles will travel outward with uniform velocity but the field *intensity* or flux *density* will not be uniform, but will be maximum in the plane of the coil and minimum along the axis of the coil perpendicular to that plane. If we plot intensity of the field in every direction in a plane containing that axis the well-known "figure-eight" curve will be obtained.

DETECTION OF SECONDARY FIELD

The field produced by the current in the sub-surface conductor (one body) is generally known as the secondary field in distinction from the primary field produced by the engineer. There are a number of methods that may be employed to study the secondary field. The most satisfactory form of detecting equipment is that employing a direction-finding coil and a set-box containing a vacuum tube "detector", amplifying and compensating stages, and



THE SPECIAL APPARATUS USED IN WORKING WITH OUT-OF-PHASE AND DISTORTED FIELDS

This apparatus consists of a completely shielded, (compensated antenna pick-up) receiver and two coils rotatably mounted on a six-foot arm. A graduated arc and vernier are attached to the arm to allow direct reading of angles. The two coils are of identical electrical characteristics and so connected that their induced Emfs. are impressed upon separate vacuum tubes. The output or plate circuits of these tubes are opposingly connected through a differential transformer.

head phones. This method is similar to the direction finders used by shore radio stations in determining the position of ships at sea. Maximum signal (for an undistorted wave-front) is obtained when the plane of the loop is in such positions as shown in Fig. 1, while minimum signal is obtained at 90° from those positions, that is to say when the plane of the coil is at right angles to a line joining the coil and the axis of the field. This is also shown in Fig. 1. In actual field practice, minima are observed due to the fact that they are much "sharper" than the maxima. It should be noted, however, that in the case of geophysical prospecting the coil is working in a vertical plane as opposed to the horizontal plane in which ship direction finders work.

In one of the photographs is shown the direction finding apparatus. The pick-up coil is mounted upon a surveying transit,

and the angle toward the conductor (called the "dip") is measured by the vertical arc of the transit. The operator rotates the coil until the position of minimum signal strength is noted.

The elementary conditions prevailing in actual operation can best be illustrated by referring to Fig. 2. Here is pictured an end view of a long, thin conductor so placed as

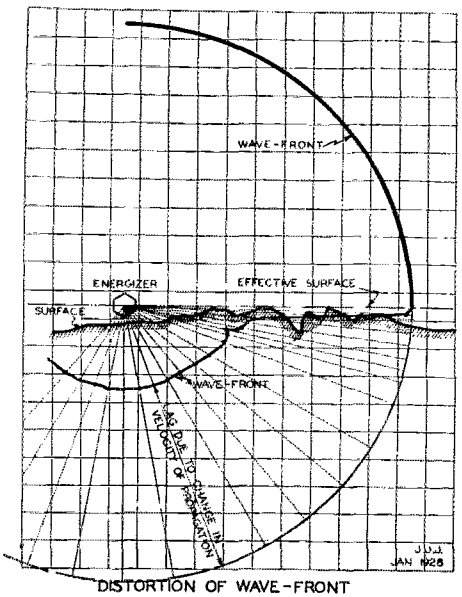


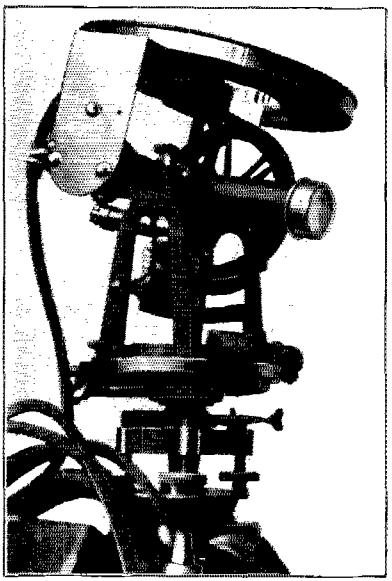
FIGURE 4. DISTORTION OF PRIMARY WAVE BY TOPOGRAPHY. See Figure 5.

to be in the field of the energizing coil. The primary, secondary and resultant fields are shown by vectors. The direction finding coil will be seen to have two fields linking it. At position A, the component fields would exert the following effect: Since the energizing coil is placed vertically, it will tend to cause the direction finding coil to give the maximum signal when it too is vertical as represented by the vertical or primary vector; the field surrounding the conductor will tend to produce the maximum signal in the direction finding coil at the angle shown by the vector (called the secondary vector) pointing toward the conductor. The resultant effects of the primary and secondary fields are added vectorially and the coil will actually give the maximum signal when in the position shown by the resultant vector. Moving the direction finding coil to the position C, which is directly above the conductor, results in a vertical angle being obtained. At this point both the primary and the secondary fields will induce the maximum signals in the coil when it is vertical. As the coil is moved beyond the vertical position the dip angle changes, as shown by the vectors D and E.

ADDITIONAL FACTORS

If the primary and secondary fields arrive at the receiver in phase a definite resultant direction will be obtained for any given ratio of strengths of the two fields; and also "sharp" minima will be obtained. The resultant is the vector sum of the vectors representing each field.

Oftentimes the two fields are *not* in phase, especially when using the higher frequencies. Under such conditions no position of zero signals is possible, and as



THE REGULAR RECEIVING COIL IS MOUNTED ON A STANDARD TRANSIT SO THAT ANGLES MAY BE DETERMINED RAPIDLY

a result the minima are not sharp, and will vary in direction depending upon the relative magnitude of the two fields. Such a condition is readily recognized in practice; the remedy of course is to change the energizer frequency until "in-phase" conditions are obtained.

A shift in the phase relation between primary and secondary fields is due largely to the following factors: average depth of the ore-body as compared to the distance between energizing and receiving equipment; distortion of wave-front; difference in velocity of propagation between air (through which the primary field travels in reaching the receiver) and the earth

(through which travel the portion of the primary field energizing the conductor and the useful portion of the secondary field); transformer action, and distribution of current in the conductor.

When working at low frequencies, say 500 to 1000 cycles, there is usually only a negligible shift in phase between the two fields. At a higher frequency the phase shift may be of sufficient magnitude to introduce a serious error in the indicated direction. Errors of 10° or more may be encountered in field work due to out-of-phase relations.

EFFECT OF DIFFERING MEDIA

An electromagnetic wave travels most rapidly through the air. The velocity in any other substance will be less than that for air, and dependent upon the magnetic permeability dielectric constant, and other factors. Measurements made in the Darwin, California, mining field gave an average value of velocity through the earth of about one-fourth that for air.

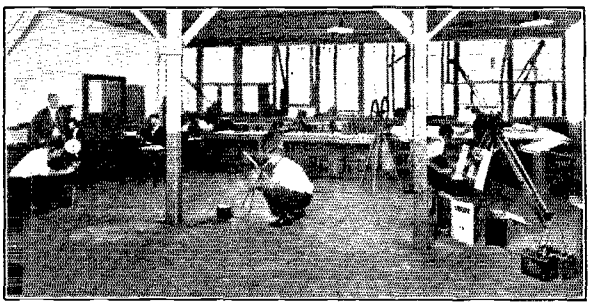
A simple example will show the phase shifting effect caused by waves traveling through different media. Consider an energizer generating a field of 60 Kc. frequency. *In air* this is equivalent to a wavelength of 5000 meters. Let us find the phase shift (due to difference in velocity of propagation alone) at a point near the surface and 500 meters distant from the transmitter. Assuming the test is made under similar conditions to those prevailing at Darwin, the wavelength of the *sub-surface wave* is ¼ x 5000 = 1250 meters. The phase shift is then

$$\left(\frac{500}{1250} - \frac{500}{5000}\right)360^\circ = 108^\circ$$

Now if we consider a wave whose frequency is but 500 cycles, the resultant phase shift will be only 0.9°.

Measurements are made of wave front distortion by use of the special apparatus shown in one of the photos. In making measurements, the apparatus is so placed that the axis of rotation for the arm carrying the two coils is parallel with the effective axis of the conductor. The arm is then rotated until no signal is heard. The angle which the arm makes with (for instance) the vertical gives the angle of the wave front at that particular point, after balancing out the primary field.

In Fig. 2 is plotted the secondary field wave front for conditions similar to those prevailing at Darwin. Note that the curve is not a circle after the wave emerges from the effective surface of the earth. This figure is plotted by assuming the earth as a homogeneous material or medium. The direction finding coil is shown in positions of maximum signal strength. A study of them will show the reason (see paragraph headed *Field Surrounding A Simple Conductor)* why particular attention was called to the fact that maximum signal strength is obtained when the coil is perpendicular to a tangent to the wave front, and *not* when it "points" toward the orebody. Compare this figure with Fig. 1.



THE LOS ANGELES RESEARCH LABORATORY WHERE VARIOUS THEORETICAL AND EXPERIMENTAL STUDIES ARE BEING CONDUCTED ON PHENOMENA RELATING TO ELECTRICAL METHODS OF GEOPHYSICAL PROSPECTING

Additional studies on the frequency characteristics of different ores and minerals are being conducted at Salt Lake City in cooperation with the department of Metallurgical Research of the University of Utah in cooperation with the United States Bureau of Mines.

The effect of wave front distortion is to give an indicated depth *less* than the true depth of the conductor. By making several readings on each side of the vertical it is possible to calculate the distortion and then to locate the conductor even though the wave front is highly distorted. An accuracy in depth of about ± 10% (sufficient for most mining purposes) may be expected for bodies less than 300 feet deep, though such calculations are subject to errors which often must be compensated for, such as effects of non-homogeneity, relative conductivity, adjacent conductors, topography, etc. In Fig. 3 is shown the primary and secondary field vectors where the secondary field is distorted. Note that the secondary field vectors do not point toward the conductor, and compare these directions with Fig. 2 and 1. The angles shown for the secondary vectors were taken directly from Fig. 2.

DISTORTION OF PRIMARY FIELD

The primary field from the energizer is also subject to distortion as indicated by Fig. 4 where again the velocity of the subsurface wave has been assumed as one-

fourth that of a wave in air. It will readily be seen that the distortion of the primary wave at the receiver will vary with the height of the receiver above the ground. Note that distortion caused by differing velocities of propagation is *independent of the frequency*. In other words this kind of distortion occurs whether a 500-cycle or a 50,000-cycle current is used in the energizing coil.

PHANTOM DIPS

Due to the distortion of the primary fields or improper alignment of energizing and receiving equipment it often happens

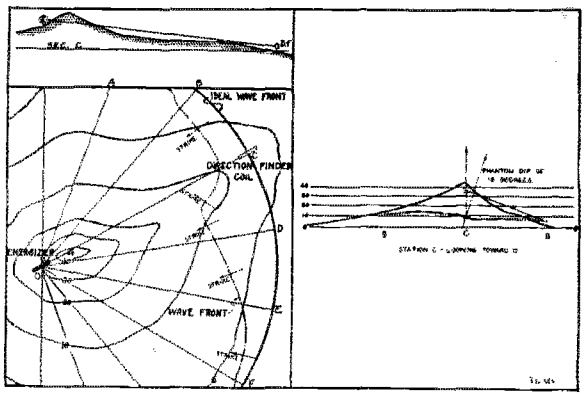


FIG. 5. AN ILLUSTRATION OF A DISTORTED WAVE-FRONT DUE ONLY TO THE ENERGIZER'S BEING PLACED "BACK" AND A LITTLE TO ONE SIDE OF A HILL

The heavy dot and dash line shows the position of the actual wave-front. (Here we are assuming that there is no secondary field present.) Note that the "strike" or "point" of the direction coil in most positions does not indicate the true direction of the energizer. The right-hand view (which looks from point C toward) shows that the wave-front is distorted vertically as well as horizontally. At that point a vertical distortion or "phantom dip" of 18 is obtained for the particular conditions shown.

that a (usually less than 20°) "dip" is obtained. This is called a *phantom dip* and is the angle which the direction finding coil makes with the vertical when no secondary fields are present (see right-hand view of Fig. 5). If the energizing coil is vertical, the direction finding coil will give a vertical reading only when the wave front is not distorted and no conductve mineralized zones are present. Phantom dips can readily be recognized by the experienced operator however. In case of doubt, it is usually only necessary to move the energizer and note changes in angles. Phantom dips do not, as a rule, give proper converging lines. Such dips are also obtained under proper conditions when the energizer and direction finding coils are located on a ridge or in a narrow valley or canyon. The greater the distance between the energizer and the direction finding coils, the greater is the wave front distortion. Distortion of wave front and improper alignment of energizer and direction finding coils can also cause phantom dips.

Because of the comparatively short operating distances between the energizing and direction finding coils in the application of the Radiore process, together with the small size of the energizing coil compared to the operating wavelength, the field is almost wholly induction, with a minor radiation component.

The emf. generated in a conductor by an induction field is proportional to the product of the energizer current, the frequency and the mutual inductance between the energizer and the conductive body. The voltage induced cannot be calculated in these cases, as the mutual inductance is a complicated relationship depending upon many factors. The current flowing in the ore body caused by the induced emf. will depend largely on the effective conductivity of the ore body. The current along the ore body will be less rapidly attenuated than the primary field; elementarily this may be considered a "line radio" effect. The signal strength of the induction field from the energizer traveling through air decreases much more rapidly (inversely as the square of the distance) than the waves traveling over conductors (often inversely as the square root of the distance).

FINAL DETERMINATION OF CONDUCTOR LOCATION

A. Plan Location of Conductor.

To make a plan view of the conductor or the "indication", it is merely necessary for the field surveying party to locate a series of points where the indications are vertical on either side of which converging dips are obtained. The simplest method is actually to move along a traverse until the vertical is found thereby locating a series of points which are vertically above the mineralized zone. Light weight direction finding equipment such as shown in the photographs allow this to be done rapidly. An average operator can set up the apparatus, level it, and make a reading in about 30 seconds.

B. DETERMINING DEPTH OF CONDUCTOR

In field practice the operator reads only the resultant direction. In determining the depth of the "indication" a series of read-

ings (often seven to ten) are made across the conductor, and the angles read. If these readings are plotted now, a series of lines would be obtained somewhat as indicated by A, B, C, etc. in Fig. 6 where the method of plotting is explained.

As previously mentioned, the ratio of primary to secondary field varies with the distance between energizer and direction finding apparatus. In Fig. 7 two curves are shown (plotted as shown in Fig. 6). Curve A was obtained for a strong ratio of

$$\frac{\text{Primary field}}{\text{Secondary field}}$$

while in curve B the two fields were approximately of equal strength. Note the general shape of the two curves, and the difference in the length of the "tips". In actual practice this is compensated for by making the directon finding readings within certain predetermined distances of the energizer coil. If a "smooth" curve were drawn, thereby neglecting the "tip", we would get an intersection with the resultant vertical which would be below the actual axis of the conductor. This may be seen by reference to Fig. 7, where the "smooth" correction curves are shown by dotted lines.

CORRECTION CURVE

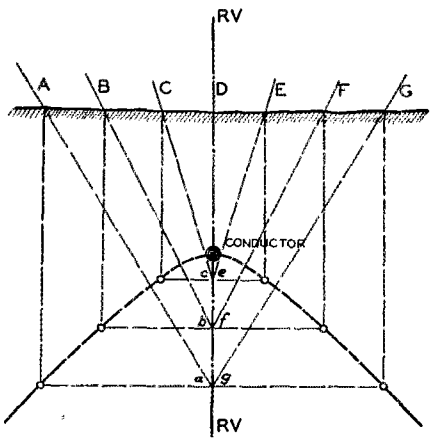


FIG. 6.—HOW A CORRECTION CURVE IS DRAWN FROM THE LINES aa, bb ETC., WHICH WERE OBTAINED FROM COIL POSITIONS

If line A is extended until it intersects the resultant vertical RV, i.e., where a vertical reading was obtained in the field, which is directly above the conductor, point a is located. By drawing a line thru a and parallel with the surface of the ground, and dropping another line from point A parallel with RV; the intersection of these two lines gives us a point. If a series of such points are determined we can draw a curve which will have the general shape shown. This curve in practice passes through the conductor, and as such compensates for two errors.

EXPERIMENTAL AND DEVELOPMENT SHOP WHERE NEW IMPROVEMENTS ARE WORKED OUT

It can therefore be seen that by neglecting the "tip" we get an indicated depth *below* the actual electrical axis of the conductor. As was shown in Fig. 2, however, distortion of wave front causes an indicated depth less than the actual electrical axis. Under proper operating conditions, these two effects are more or less compensating. In practice, therefore, the "smooth" curve shown in Fig. 7 is used. This curve is empirical and was originally obtained by studying the survey data of the experimental work at Darwin, California. However it has since been used extensively in the United States and Canada and found correct when later checked by diamond drilling or actual mining. The results obtained are sufficiently accurate for general mining work down to depths of 100 to 150 fee. Results of within ± 20% limits are obtained down to 300 or 400 feet, which still comes within ordinary mining limits.

COMPLETED SURVEY MAP

The method of determining the plan location of the conductor has already been mentioned; this is frequently known as the reconnaissance survey from the rapidity with which the general layout of the conductors of "indications" is learned. A detail survey then follows to ascertain the depth of the conductor at various points as mentioned in the paragraph above, from which an elevation view can be obtained. Fig. 8 shows a complete map such as is delivered to the owners after completion of the Radiore work.

WHEN ELECTRICAL METHODS CAN BE EMPLOYED

Electrical methods can be advantageously employed when the electrical conductivities of different strata or components of the earth's surface differ considerably. Generally speaking, this means that the ore body must be a good conductor in compari-

son with the surrounding envelope or country rock. Ratios of conductivity of approximately 100 to 1 or greater are usually necessary for good indications; these are common, while ratios of as high as 1000 to 1 or 10,000 to 1 are not uncommon. The results of the many surveys completed in

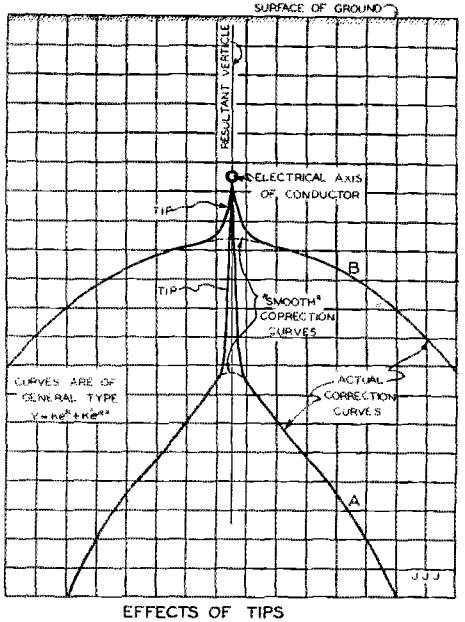


FIG. 7. THE EFFECT OF NEGLECTING THE "TIPS" ON THE CORRECTION CURVES OBTAINED IS TO CAUSE THE OBSERVED DEPTH TO BE GREATER THAN IF THE TIP IS USED This partly cancels out against the effect of Fig. 3.

the United States and Canada to date indicate that the mineralized areas are highly conductive, the conductivity varying considerably with the frequency.

The ores which are amendable to electrical prospecting are generally speaking those which occur in nature in such a form as to be electrically conductive. The question of conductivity is a relative one. The common "conductive" ores include pyrites, graphite, chalcopyrite, arsenopyrite, some anthracite coals, a few carboniferous shales, galena, pyrolusite, magnetite, and the metals.

Many ores (such as the majority of the oxides, carbonates, and silicates, and two common sulphides, stibnite and sphalerite) are non-conductive. Such ores may often be located indirectly due to their occurrence in association with another ore which is conductive. Thus zinc sulphide, a non-conductor, sometimes occurs with iron pyrite, a conductor, in which case the more commercially valuable zinc sulphide would be located by tracing the electrical indications of the iron pyrite, which in itself has no commercial value. In general, electrical prospecting shows the *location* of conductors without indicating the commercial value of the ores. This may be predicted to an extent, however, by the experienced geologist or mining engineer from previous investigations, outcroppings and general conditions.

ELECTRICAL CONDUCTIVITY OF ORES

All electrical prospecting methods depend for their operation upon the effects produced by a flow of current.

The effective conductivity of an ore-body takes into account the following factors: (1), type of mineralization; (2), relative conductivity; (3), frequency effects, and (4), current distribution. These will now be considered.

1. *Type of Mineralization.* It will readily be seen that the type of mineralization will have a great effect on the indications, mostly in its effect on the three factors considered below. The conductivity of the ore material is important but usually secondary to its continuity. If the ore material is thin or "sheet-like" or numerous conductive bodies occur in close proximity to each other, the current distribution will be different from that of a single body having uniform cross-section.

2. *Relative Conductivity.* The absolute or unit conductivity of an ore must be considered in connection with its effective area and mass. For instance, it is quite common for an ore-body of low unit conductivity and large cross-section to manifest the same electrical effect as an ore-body of high unit conductvity and small cross-section. In other words; conductivity, shape and size determine a factor which the writer calls "mass" or "total conductivity." The conductivity of the ore relative, to the surrounding envelope also must be considered. An ore having a relative conductivity of say 100 in an envelope of a relative conductivity 1, will behave electrically similar when using the inductive processes to another ore body having a relative conductivity 1000 in an envelope with a relative conductivity 10.

3. *Frequency Effects.* Frequency effects are of considerable importance since they influence both the unit conductivity and the effective conductivity due to "skin effect". In many ores the conductivity for direct current is quite different from that for alternating current; some ores have nearly the same conductivity to both direct and alternating currents.

Ores of broken or faulty structure, and particularly disseminated ores, exhibit quite different properties toward direct and alternating currents. Disseminated

ores may be considered as composed of small conducting particles distributed in a gangue or matrix. As a rule this matrix is calcite, quartz, etc., and has a low electrical conductivity; i.e., a high resistance.

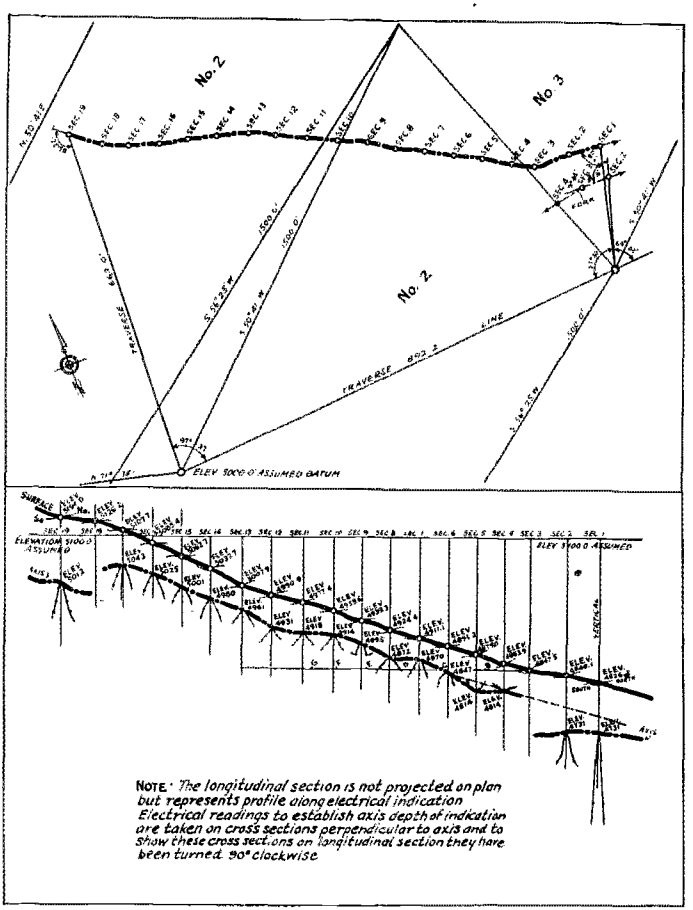


FIG. 8. A COMPLETED SURVEY MAP AS DELIVERED TO THE MINE OWNERS AFTER COMPLETION OF THE RADIORE WORK

As will be noted by studying the lower portion of the figure, a series of "correction curves" are plotted for traverses taken every 30 to 100 feet, and then the tops of these correction curves are connected to get the electrical axis of the conductor.

If two conducting particles or masses are separated from one another, an electrostatic capacity will exist between these two particles. This capacity will vary with the area of the particles, inversely as the distance of separation and the dielectric constant of the separating medium (the matrix material in the case of a disseminated ore). A disseminated ore may therefore, from an electrical viewpoint, be considered as a resistance shunted by a number of very small capacities connected in series-multiple. This is illustrated in Fig. 9 which also shows the equivalent electrical circuit.

The impedance offered by a disseminated ore body to an alternating current varies *inversely* with its effective capacity and the frequency of the impressed emf., when the matrix is considered to be non-conductive. In many ores, however, the matrix is conductive due to moisture and impurities. Conductivity is a factor which is dependent on the so-called constants of the electric circuit, which in this case are resistance (largely in the matrix) and *capacitance* between particles. The conductivity or admittance determines the current flow for a given emf. (electromotive force of 'voltage').

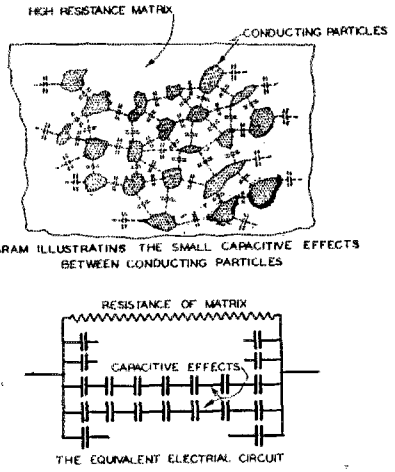
Returning to the question of frequency, the use of a high frequency results in a small value of capacitive reactance and a resultant large value for the admittance of a parallel circuit. Frequency, however, also must be considered from another viewpoint. The higher the frequency, the greater the skin effect or redistribution of current toward the outside of the conductive mass. The effective resistance therefore increases due to the fact that the central or interior portions of the conductor are carrying only a very small portion of the total current flowing through the conductor. As the higher frequencies are approached it will be found that the increase in effective resistance overcomes the decrease in capacitive reactance in broken or disseminated ores. It can thus be seen that the shape and size of a conductive body, together with the type of mineralization govern the frequency which will cause the greatest current flow in that particular conductor.

4. *Current Distribution.* The effect upon electrical geophysical instruments depends

considerably upon the distribution of current through the conductive ore-body and the surrounding earth.

ACKNOWLEDGMENTS

The information contained in this paper is largely the result of early investigative work conducted by the Radiore Company. Special acknowledgment is made to Messrs. A. B. Menefee, H. E. Olund, B. M. Snyder and members of the Research and Development staff including H. O. Walker, E. F. Tuttle, Jr., and K. V. R. Lansingh, for assistance during the investigations as well as data regarding United States explorations. Acknowledgment is also made to the Canadian Personnel, especially Messrs. E. H. Guilford, K. P. Swensen, W. L. Kirtley and Roger Clark. Thanks are due Mr. A. W. Knight, of Knight and Knight, for constant study and consultation regarding American and foreign patents.



ELECTRICAL EFFECTS IN DISSEMINATED ORES WHEN SUBJECTED TO ALTERNATING ELECTROMOTIVEFORCE
FIGURE 9

Strays

A.R.R.L. announces the appointment of Mr. Paul M. Segal, attorney of Denver, as its General Counsel. It will be remembered that Mr. Segal, who is also the Director of our Rocky Mountain Division and rejoices in the call 9EEA, successfully handled the A.R.R.L.'s legal action against "anti-amateur" local ordinances at Wilmore, Ky., and Portland, Ore., as has been reported in *QST*.

Mr. Perry O. Briggs, 1BGF of Hartford, has joined the Headquarters Staff as assistant to Mr. Hull in the technical development program announced in our last and preceding issues of *QST*. Mr. Briggs has eight years of successful amateur experience during which he has made most of his apparatus. His early shortwave tuner, in the first days of 100-meter work, attained a considerable vogue, especially in South America where it was put up in kit form and advertised as *el circuito P. O'Briggs*!

As mentioned elsewhere in this issue, L. A. Jones has resigned his position as Assistant to the Communications Manager to become radio observer and operator on the Yacht *Carnegie* which has just sailed for a three year cruise to all parts of the globe. 'LJ' will be missed at 1MK but we shall have plenty of opportunity to keep in touch through WSBS, the 250 watt C.C. outfit on the *Carnegie*. Louis R. Huber, 9DOA, of Tipton Iowa, well known as former Section Communications Manager of Iowa, will succeed Mr. Jones, coming to headquarters directly on completion of his University work at Iowa City.

Thanks are hereby publicly tendered Mr. R. H. Barclay of Stone & Webster at Boston for the calculation charts he so generously donated. The demand has in the end considerably exceeded the supply and many requests have had to remain unfulfilled.

Three autos-full of Headquarters staff drove up to the recent New England Division Convention at Boston. Ross Hull insists that he got a greater 'kick' out of the trip than anyone else. On the Saturday, he engaged his newly-purchased Hudson in a splendid auto wreck in which the other fellow's machine was almost demolished. After spending a half day trying to keep out of jail he drove his slightly bent auto back to the parking area at the Hotel from which, on Sunday, it was stolen. No, it was not insured.

Throughout May and June 1XM will transmit on 28 megacycles (10.71 meters) using crystal controlled 852's and an automatic tape transmitter. The schedules: Saturday, noon to 2 p.m., E.S.T. (1700-1900 Greenwich) and Sunday, 9 to 11 a.m., E.S.T. (1400-1600) and 1 p.m. to 3 p.m., E.S.T. (1800-2000). A ten-meter watch will be kept and stations worked when possible. Reports are requested and should be sent to 1XM.

A Short and Medium Wave Receiver

By Chauncey Coston*

THE set to be described is not 'just another tube base receiver'. I cannot make a secret of the fact that I have been actively engaged in radio only about two and one half years. However, during that time I have devoted a lot of it to the designing and building of radio sets, mostly short wave. Although at times activity was slight because of financial depression, I feel that enough progress has been made to justify my telling *QST* readers about it, not with the view of discouraging experimenters but of encouraging beginners and saving them money.

The set I am going to talk about is the old three circuit tuner with a few improvements. Variable (not merely adjustable) primary control was found to eliminate 'holes' in the tuning range when a choke coil failed. A fixed tickler with throttle control is essential to plug-in coils. Incorporating the idea (page 28, Dec., '27, *QST*) for preventing 'fringe howl', was necessary to the satisfactory reception of SW broadcasting. The coils and mountings themselves are self-designed for cheapness and efficiency. The set incorporates smoothness of control, both of tuning and regeneration, ease of change for different wavebands, adaptability to different aerials, compactness, good performance at all wavebands, and can be calibrated.

There are but one major and two minor tuning controls, and the two minor ones can be fixed to cover, in most cases, one waveband with the secondary condenser, without change. The regeneration condenser causes minimum change in tuning. The variable primary causes more change, however, and for that reason should always be placed as close to the secondary as possible, making calibration possible. This set can be calibrated with more accuracy than any plug-in coil receiver I have yet seen. There should be no dead spots within the 20-, 40- and 80-meter bands, broadcasting and ships, but on the 12- and 150-meter bands there may be. Here is where the variable primary comes in. You can tune the 80-meter band with ease but, if you drop much lower, say to KDKA on 63 meters, a tuning 'hole' (no regeneration) might be encountered. By moving the primary away from the secondary, the set is made to oscillate again. Little change in volume is noticed. (Using different aerials these 'holes' may be found on different waves.)

*7ABN, 924 Smith Ave., Hoquiam, Washington.

The annoying phenomenon called 'fringe howl', found on some wavebands just as the set is thrown in and out of oscillation, *must* be eliminated before SW broadcasting can be enjoyed. This is accomplished by a variable resistance, 0 to 500,000 ohms, across the secondary of the first audio

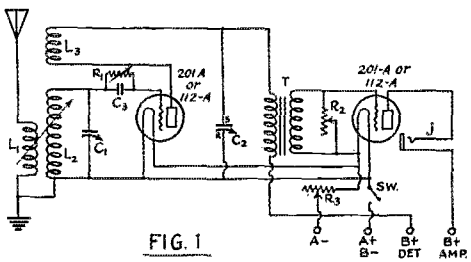


FIG. 1

THE LIST OF PARTS IS AS FOLLOWS

L1, primary coil, special construction and mounting.
L2, L3, secondary and tickler coils, ditto.
7 old UX tube bases for coil mountings.
3 UX sockets, (one for coil socket).
Bakelite or hardrubber for mounting coils, 3½" wide by 3.16" thick.
Two dozen 6/32 brass roundhead machine screws.
C1, C2, .00025 µfd. SLF variable condensers.
2 vernier dials, (any good make).
R1, variable grid leak.
C3, grid condenser to match Bradleyleak.
R2, 0-500,000 ohms variable resistance, (any good make).
R3, Bradleystat.
T, audio transformer, 6-1 ratio.
J, open circuit jack, (can be filament control to eliminate switch).
Bakelite or hardrubber panel, 7" x 18" x 3/16".
Subpanel, veneer or hardrubber, 9½" 16½".
2 subpanel brackets.

transformer and also serves the purpose of a volume control. No smaller resistance is recommended because it cuts down the volume. If a volume control is not wanted, a .5-megohm grid leak can be used. The rest of the set is conventional. The circuit is given in Fig. 1.

Proper construction of the coils is most important. The coils are of strictly low-loss and low distributed capacity design, especially on the higher frequencies. Because of their diameter of two inches, they are unusually compact. The smallest wire judged efficient for the frequencies was used. Even with their mountings, the weight is inconsiderable. The complete coil construction follows. First, comes the dope, a mixture of scrap auto side curtain celluloid and acetone. The celluloid can be obtained free at almost any garage and

the acetone at any drug store. The celluloid should be cut with scissors into strips about ⅛" wide and an inch long. These are to be mixed with the acetone until the acetone reaches a saturated solution or it seems hard to make the acetone dissolve the celluloid. It is easier to mix this dope about four ounces at a time. It should be mixed in a bottle and shaken until the celluloid is dissolved. It should be applied

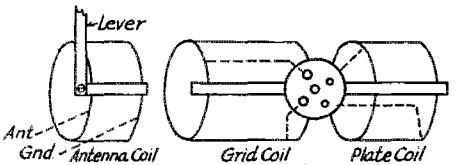
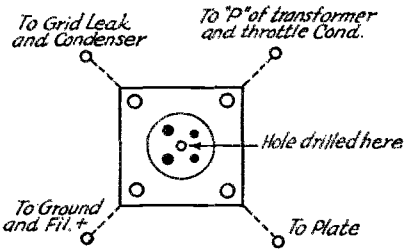


FIG. 2

with a small paint brush, preferably the water-color size. The bottle should have a narrow mouth to prevent evaporation of the acetone while in use.

The coils are wound on cardboard tubing two inches in outside diameter. It is easy to make enough tubing by winding cardboard around a bottle and glueing. The tubing can be cut away from the finished coil and not saved as it is not worth while to use twice. In winding the coils, the ends of the wire *must* be secure. I fastened them by punching three holes in the tubing and threading the wire through, ending with the wire on the inside of the tubing. The wire must be absolutely straight during winding. In the 40- and 80-meter coils that use No. 18 bare wire, allowance must be made for the spacing while winding. Allow about three fourths as much more space as there would be for the wire wound closely. This part may require a little experience. The 12- and 20-meter coils are wound the same way, but these only need to be spaced by eye, as they are made of No. 14 bare wire. On the 40- and 80-meter coils, this must be done with string, however, and may be done as follows. Four strips of celluloid ⅜" wide and as long as necessary are slipped under the wire and spaced equi-distant from each other. Care must be taken, when the coils are wound, that the wire ends on each go over the same celluloid strip. This secures the ends when the dope is applied. (The foregoing applies to all spaced coils as well as to the 40- and 80-meter ones.) After the strips are under the wire, take ordinary cotton twine, not cord, and starting at the beginning of the winding, wind the string between the turns. If the turns will not space straight, work at them with your fingers. When the turns are spaced, carefully unwind the string and on the wire over the celluloid strips paint the dope with the brush, taking care to paint between the turns. Go around the coil twice then let the dope dry about a quarter of an hour. Then go over the coil again until the dope lies rather rounded over the strips. If this precaution is not taken the wire will stick out like the ribs of a dead horse and the coil will not be so strong when finished. When the 'doping' is completed, let the coil dry for at least *two* hours. The longer you let it dry the less likely it will be to get out of shape when removed from the tubing. Don't be in too much of a hurry. The finished coil should have the leads all coming out at the same celluloid strip. After removing the coil from the tubing, all excess celluloid should be cut off.

We now come to the mountings. Take the UX-tube bases (they need not be removed from the tube) place them on something solid and with a hack-saw cut off the part with the prongs on it about 3/16" up from the bottom. Turn the base as you saw, to prevent cutting off the clinched part of the prongs. Drill a hole to fit your machine screws (6/32 screws need a 9/64" drill) exactly in the center of the base between the prongs. The bakelite for all the coil

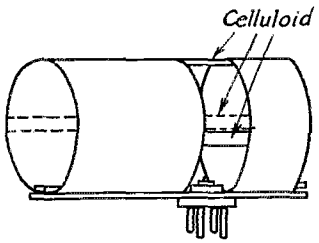


Showing connections to coil socket

FIG. 2-A

mountings should be cut ⅜" wide by as long as the coil. They go two to a coil and should be placed over the celluloid strip that holds the leads, clamping there by means of the machine screw that goes through the base, the bakelite strips and the celluloid between the secondary and tickler coils. The tap is placed on the screw inside the coil. It was not thought advisable to countersink a flathead screw in the tube base between the prongs, as it would weaken the base too much. Instead, a hole the size of the screw head must be drilled in the UX socket used as a coil socket, between the connection holes. This is neces-

sary to have the coil steady on its socket. Before fastening the coil to the base run the leads down the tube prongs as shown; if necessary, cleaning the prongs of solder with a drill. The coil is then fastened on the base and the leads soldered at the tips as they were formerly with the tube. The complete result should be a compact, strong coil. I have dropped them on the floor without hurting them except bending the edge wires. If you drop them always examine them carefully as an edge turn might be shorted. The 150-meter coil, as it is wound with no. 22 d.c.c., should be given four coats of dope, two at a time as before, covering the entire outside of the coil. On all the unspaced coils *no* celluloid strips are used. The same should be done with the broadcast and 600-meter coils but it is recommended that, because of the fine wire used in the latter, it be wound on bakelite tubing to give it strength, in which case the dope need not be used. The winding can be divided in order to let the machine screw through. The broadcast coil may also be wound on bakelite tubing and very little, if any, difference will be noticed in results. In all these coils, the tickler and secondary are always wound together. If the tickler is too far from or

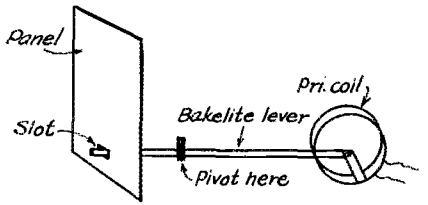


View of complete coil showing mounting

FIG. 3

too near to the secondary, the set may not be satisfactory in oscillation control. If so, a new coil should be wound. The number of turns as given, should be followed, however.

The construction of the primary coil and mounting is important. The coil itself is of No. 22 d.c.c., 15 turns and supported by the dope. As with all the others it is two inches in diameter. Two flexible leads go from it to their connections. The coil is made variable to the secondary by clamping it (with a small strip of bakelite) on one end of a lever, with the other end through a slot in the panel. The lever is of bakelite and is pivoted at a point that will be most satisfactory. Due to the fact that I had mine running under a variable condenser wih the slot under the dial, I had to use bakelite washers to build the lever up to have the primary on the same level as the secondary. This made it necessary to splice the lever. By putting your coil socket lower or your variable condenser higher, you may be able to keep from doing this. The lever should slide on a bakelite strip for smooth action. The



Showing construction and placing of primary coil mounting

FIG. 4

idea is to place the pivot at a point that will allow the coil to be moved far enough from the secondary without having too large a slot in the panel. Probably there are better ways of making the primary variable but the main thing is to get it variable from the panel. Placing it on a shaft as a rotor positively will not do, as the coil must always be as close to the secondary as possible except when used to 'iron' out 'holes.' The farther the primary is from the secondary, the easier the set oscillates. The connections to the coil base are shown in Fig. 2. The coil socket must be wired up to match so it is also shown in Fig. 2A.

SOME HINTS

There are a few tips I want to give about the set and its operation.

If the set doesn't oscillate at first maybe you have a 'bum' tube. Have your tubes tested and change them around.

Before connecting up the set to the batteries, examine the coils and socket to make sure that when you put the coils into the socket it will not connect the tickler to the secondary. This would short your B battery and burn out the audio transformer. It only requires a little care to prevent any accidents.

Be sure the throttle condenser is mechanically strong and has no rotor and stator plates touching. A momentary touch shorts the B battery and makes a lot of noise.

The throttle condenser need not be SLF but it looks better in the set if it matches the other.

Don't crowd your apparatus and be sure to place the coils at least two inches from the secondary condenser.

An eighteen-inch panel and a 9½-inch sub-panel should be ample for two stages of audio amplification. One stage gives good headphone volume. Add a power stage for loudspeaker operation.

If you want to use DuPont's or some favorite dope, go ahead, but be sure you

Coil No.	Range in Meters	Wire	Secondary Turns	Tickler Turns	Space Between Secondary and Tickler
1	530-800	28 d.c.c.	175	75	T. inside Grid end of S.
2	200-550	26 "	80	20	½" variable
3	100-220	22 "	25	20	7/16" variable
4	42-110	18 bare	15	9	¼"
5	30-65	18 "	10	8	5/16"
6	16-35	14 "	4	6	⅜"
7	10-15	14 "	2	3	¼"
8	4-10	14 "	1	2	¼"

FIGURE 5

have had experience. I believe the dope described is cheaper and better.

Be sure to wind all the coils the same way. I wind the wire away from me, over the top of the tubing.

The wire should be cut the right length and fastened to some object while being wound to keep it straight. To find the correct length of wire remember that it is the number of turns times the coil circumference plus six or eight inches for leads. The circumference of any circle is found by multiplying the diameter by 3.1416. In this case, the circumference would be about 6 5/16 inches.

Filament control jack and automatic filament control resistances may be used. The tube filaments are not critical.

A variable grid leak is recommended. It aids in short-wave broadcast reception. It should be placed on the sub-panel away from the panel.

Body capacity should not be encountered if the variable condenser *rotors*, the sub-panel brackets, and all the free metal in the set are grounded. The coils should be as far away from the panel as possible.

In my experimenting I used a UX socket and tube base for connecting the battery leads. As there are really only four leads to the set, this worked ok.

SPECIAL NOTES

The coils have very low distributed capacity. The turns given for the coils are not enough, if you wish to use a secondary condenser that exactly covers the SW bands. Add 2 turns to the 20-meter, 3 to the 40-meter, and 4 or 5 to the 80-meter coils. The coils were wound for the .00025-µfd. condenser and on the 20-meter coil go up to WGY, on the 40-meter down to the Australian bands and covers the naval stations, and on 80 meters goes down to KDKA and WLW. The range of the coils was intentional and not a mistake, as the amateur bands are easily covered with the condenser and a good vernier dial.

The coils may be used as the oscillator and first detector of a SW super-hetrodyne. The only difference is that the intermediate frequency transformer feeding the second detector must have a tickler for c.w. reception. These coils and set construction may also be used in a tubeless SW adapter. Here is a chance for the experimenter.

The operation of this set is exactly the same as any other regenerative set, so there is no use to take the space to explain it.

I will answer all inquiries regarding this set *providing a stamped, addressed envelope is supplied.*

Strays

Fred Schnell, 9UZ, will be delighted to send cigars to any Hams who care to forward him the coupon on page 98 of this issue. 9UZ announces, as justification for his gracious offer, the arrival on April 19th of Richard Elliott.

At a column bottom on the radio page of a local news sheet oh6DJU found this inspiring thought:

VOLTMETER NEEDED AROUND RADIO SET

One of the most useful investments to have around the set is a voltmeter of suitable ranges. With it one can tell whether the filament and plate volt acid can be neutralized with ammonium hydroxide, potassium or sodium hydroxide. These substances are found in every home in the form of ammonia water and lyes. Do not use too much nor too strong.

Yes, we are inclined to think not.

Additions to the Headquarters personnel invariably are the cause of anguish and distress among the stenographers. Dictaphones are used almost exclusively for the dictation of correspondence, and strange voices, according to the stenographers, sound tantalizingly un-understandable for the first few days. Which, perhaps, explains why Lamb, ex9CEI-3CEI, the new Technical Information Service man, discovered in one of his letters that, 'The tuning condenser may be a 75 µfd. Cardwell paper plate.' Anyway, Lamb says that the thing would be appropriate for a portable set for picnics this summer.

Keying for Break-In

By J. T. McCormick*

A LARGE share of the credit for this story belongs to Mr. Handy, because he gave us "heck" for not asking our neighbors about key-clicks. I asked mine. I received reply; sorrowed; tested; wept; went to work; tested again; wept again; began to really think; went to work again; tested, hopefully, but not confidently. Eureka!

Truly, virtue is rewarded.

For the benefit of the fellow who wants the "dope" without the "why," I shall put the cart before the horse and call your attention to Fig. 1. Now run along and hook it up. The rest of us wants to find out how the thing works.

The keying system shown in Fig. 1 has the following merits: 1. Break-in can be worked right on your own wavelength and without the use of remote control; 2. It is cheap. (Cheap parts can be used because they do not have to withstand high voltage or carry heavy current.); 3. It is reliable. (Same reason as No. 2.); 4. It tends to improve one's sending. (Who isn't familiar with the "squawk" produced by some keying circuits when the key is open, giving the effect of trying to read a backwave?); 5. It tends to reduce "nerves". (Same reason as 4.); 6. It permits a "bug" to be used without a relay. ("Bug" contacts can be made to carry heavy current, but there is another reason

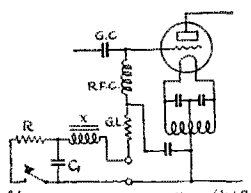


FIG. 1 PRACTICAL CIRCUIT

for using a relay. One must be able to listen to one's sending when using a "bug" and, if we use a keying method which produces a backwave effect in the receiver, we are forced to use a relay, so that we may listen to the relay!); 7. It may save your life. (It pacifies BCLs!)

Faults? Yes, if you want to call it that, there is one. If the grid of your tube is insufficiently excited, the tube will block at an audible frequency and produce an unbearable racket when the key is open. The reason for this is that the tube ceases to oscillate when the grid reaches a certain not-very-negative value. Oscillation starts, stops and starts again, etc.

If the feedback is ample, however, the tube blocks completely; no plate current flows, and thirty seconds to several minutes time elapse before oscillation again faintly begins. This can be stopped again by a touch of the key.

The phenomenon just discussed and which we called a "fault" should really be regarded as a blessing in disguise because it tells us when the transmitter is on the

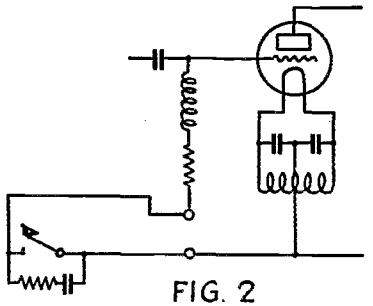


FIG. 2

verge of instability. Keying in the plate circuit, we would be unaware of this unstable condition and, upon closing the key, oscillation would not start until the plate voltage reached a fairly high value. Result? Clicks!—*in spite of all the thump filters under the sun.*

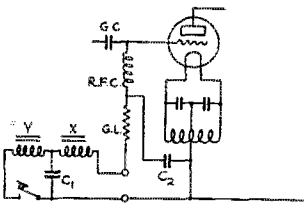
Adjusting the transmitter so as to obtain sufficient grid excitation is simplest in the case of the Ultraudion. Simply reduce the capacity of the condenser which controls feedback until the desired keying effect is obtained. The Hartley is a bit awkward. It will be necessary to move the grid clip so as to include more turns—and one turn may be too much, especially if the helix is large in diameter. However, we can console ourselves with the knowledge that the previous adjustment was equally wrong. The Colpitts is fairly simple. Decrease the capacity of the variable condenser between grid and filament and increase the capacity of the plate-filament condenser at the same time so as to preserve the original wavelength. You fellows who are using T.P.T.G., Meisner, etc., will have to work out your own salvation as I lack "first-hand" knowledge of these circuits.

As you have noticed, Fig. 1 is simply the usual form of grid keying shown in Fig. 2

*9BHR, 210 N. Knox, Topeka, Kansas.

with the addition of a thump filter which controls, not plate current, but grid current.

If we close the key in Fig. 2, the negative charge on the grid will be drained off so rapidly that the tube will go into oscillation with a "bang," causing a bad key-click. The grid leak allows current to flow according to Ohm's Law and this current flow is maximum *at the very instant the key is closed.* Opening the key will be much the same, the grid current will be



Same as Fig. 1 except that Y is used instead of R
Y = Primary of old audio transformer
FIG. 3 BEST CIRCUIT

almost instantly stopped and a charge will accumulate on the grid so rapidly as to cause a thump because of the sudden stopping of oscillation.

Inductance, in electrical circuits, is very similar to the phenomenon of momentum and inertia in mechanics. A locomotive *does not move* at the instant the engineer opens the throttle; soon it moves and then moves faster and faster as inertia releases it. A moving train cannot be stopped by the brakes until its momentum has been gradually overcome.

Now let's hook up our thump filter and see how it works. Consider the key closed and the set oscillating. Grid current is steadily flowing through the choke, X. C1, of course, is practically short-circuited by the key. Open the key. At first, grid current starts flowing into C1 as if nothing had happened. A charge soon builds up on C1, but it cannot instantly stop the grid current because the current flowing through X possesses a sort of electrical momentum (inductance). Eventually the grid current is stopped, but the stopping is done in the smooth manner of a train halting by means of its brakes. The action of Fig. 1 compares to Fig. 2 as the stopping of a strain by brakes compares to stopping by reason of collision. (Yeh, some thump!)

Now close the key. If R were not present, the entire charge on C1 would pass instantly through the contacts and, perhaps, cause them to stick. R being in the circuit, C1 discharges through R and the key according to Ohm's Law and all is well. Insofar as key-thump is concerned, R is useless, for the discharge is far too rapid, but our friend, "X," is on the job and refuses to allow current to flow at the instant C1 discharges. (The locomotive didn't move, you remember, when the engineer opened the throttle.) Current starts flowing through X and rapidly increases. The grid slides smoothly to operating potential as X allows the negative charge to drain off.

Speaking in terms of coulombs, however, there is not a great amount of electricity to be drained from the grid, regardless of its potential. The charge on C2 plus that on the grid condenser (both condensers of small capacity) constitutes the whole of the grid charge as soon as C1 has been "shorted" by the key. For this reason, the starting of oscillation is apt to be sufficiently abrupt to cause a little QRM if your BCL neighbors are *very* close. Never mind! We still have Fig. 3. This requires an additional choke, but surely you can find another old audio transformer in the junk box.

Fig. 3 works almost exactly like Fig. 1 when the key opens, but, whenever the contacts close, C1 finds that it must drain its charge through Y. Since Y is an inductance, the discharging of C1 takes time, because the electrical inertia of Y must be overcome. The grid charge, of course, cannot be drained except as C1 is drained. In Fig. 3, C1 is working on both halves of —shall I say, "the cycle?" The double primary of an output push-pull transformer might be used as "X" and "Y".

If you are causing no QRM to BCLs and feel that your dots are being clipped too short, use a smaller condenser at C1 or else substitute chokes of lower inductance for the transformer primaries used at X and Y. Does the filter work as well as all that? I'll say it does! If transformer secondaries are substituted for primaries in Fig. 3 and 2 microfarads capacity used at C1, the oscillator is not allowed to reach full power during the course of a dot made by a "bug" key adjusted to send at less than fifteen words a minute. Dashes will arrive late and wear "tails".

C2 is not absolutely essential to the system, but it does provide a "footing" for the grid choke and bypasses r.f. which would otherwise wander about the shack via the key wiring. If you wish to elaborate, a pair of r.f. chokes placed in the leads between key-filter and set will make C2 more effective. C2 does not affect the r.f. system of the transmitter provided the grid choke, R.F.C., is all that it should be. By winding the grid choke exactly like the plate choke, you can make sure that the former is at least as effective as the latter.

The general "leakiness" of the paper condenser used at C1 determines the length

of time the grid will stay negative after the key is opened. Frequent recurrence of oscillation is very annoying to the operator if he happens to be working break-in on his own wavelength. An ORS who handles much traffic will find it advantageous to incorporate the "keeper" battery shown. This battery has nothing to do with determination of grid bias. Its only purpose is to prevent leakage through C1 by neutralizing the voltage across it. The life of the battery will be equal to the shelf life. About 100 volts will keep the grid of a UX-210 blocked indefinitely.

The foregoing lengthy description of filter action is offered so that everyone may have an understanding of what is going on in the circuit and should not be taken to mean that there is anything particularly difficult about getting the affair into action.

Before one can hope to work break-in, the power supply must be quiet. Don't be discouraged. When the motor-generator used at this station was first installed, the situation looked hopeless. Nothing could be heard through the racket produced when the thing was running. It even caused QRM in neighboring BCL receivers. A pair of r.f chokes installed after the manner of the Esco ads helped a little, but break-in was still impossible. A ground attached to the frame common to both motor and generator solved the problem. The same ground, incidentally, is shared by the receiver. Mechanical noise was subdued by "mounting" the m.g. on two rolls of old rags. The receiver is just 3 feet distant from the generator and the latter *can* be heard in the former, but the effect is to raise the noise level but slightly.

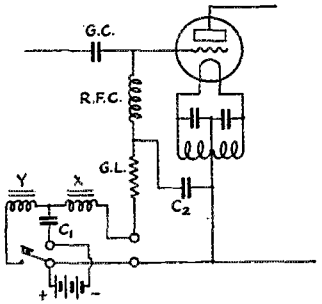


FIG 4 IMPROVING A LEAKY CONDENSER

The solution in your case may not be the same nor as simple, but there is a solution if you will only find it.

I do not advise the use of a relay to keep the receiver from paralyzing unless you are using high power. I once used such a relay to break the plate current of the detector tube. The tube no longer paralyzed, but my ears did! The popping was actually painful. I make one exception: one might use a second stage of audio with only about 4½ volts on the plate. This is really an excellent stunt, because it removes all painfully loud noises and decreases the DX not a bit. (See *QST*, June, 1927, p. 36.)

For the common, or garden variety of receiver, I suggest the use of a short receiving antenna. This may, or may not decrease your DX reception—depending on the noise level at your station. The higher your power, the shorter the receiving antenna will need to be for practical break-in work.

Financial Statement

BY order of the Board of Directors the following statement of the income and disbursements of the American Radio Relay League for the first quarter of 1928 is published for the information of the membership.

K. B. WARNER, Secretary.

STATEMENT OF REVENUE AND EXPENSES FOR THE THREE MONTHS ENDED MARCH 31, 1928

REVENUE

Advertising sales, QST	$16,133.81	
Newsdealer sales	13,453.11	
Handbook sales	5,108.41	
Dues and subscriptions	12,036.51	
Back numbers, etc	71.61	
Emblems	78.51	
Interest earned, bank deposits	483.82	
Cash discounts earned	317.87	$47,683.65
Deduct:		
Returns and allowances $8,886.37		
Less portion to charged to reserve for newsstand returns	1,559.18	7,327.19
Discount 2% for cash	302.58	7,629.77
Net Revenue		40,053.88

EXPENSES

Publication expenses, QST	13,750.90	
Publication expenses, Handbook	3,125.54	
Salaries	14,475.10	
Forwarding expenses	528.54	
Telegraph, telephone and postage	1,615.98	
Office supplies and general expenses	1,596.76	
Rent, light and heat	950.10	
Traveling expenses	1,077.15	
Depreciation of furniture and equipment	298.35	
Bad debts written off	130.00	
Communications Dept. field expenses	58.86	
Total Expenses		37,607.28
Net gain from Operations		$2,446.60

Some Overlooked Possibilities for the Radio Club

By M. H. Pancost*

SOME form of radio activity exists in nearly every high school program. In most schools, this is built around some existing feature in the program. It may be that in manual arts classes a few radio receivers are built; a physics laboratory may have a radio receiver or small transmitting station as a part of its equipment; one of the school clubs may be a radio club. In each of these cases, except the last, nothing is accomplished beyond the aims of the class to which radio is attached. In the last case, some knowledge or skill in radio itself may be attained.

It is my purpose to show that radio, organized as a separate part of the high school program, can accomplish each of the things noted above and in addition give the pupil a fair start in what may later be a remunerative vocation or an interesting avocation and at the same time widen his knowledge of geography, meteorology, physics, chemistry, foreign languages, foreign customs, merchant marine, Army and Navy, law, mathematics and civil service. Besides all this, it gives him a circle of acquaintances, limited only by the earth itself, and teaches him the value of 'fair play'.

To do all these things, we simply move the center of interest from the activities noted in the first paragraph to a radio station. This may cost anywhere from fifty to five thousand dollars, one hundred and fifty or two hundred dollars being a fair average cost and this need not all be spent at one time. Many schools spend this much for a few pieces of apparatus that are used but twice a year. The radio station can be used daily, almost hourly, by as many as twenty pupils.

The pupil must first receive some preliminary training in code work. In the Lansing (Michigan) High School, the pupils practice in pairs with a 'buzzer' until they can 'copy' twelve words a minute. At the same time, they learn the form of messages, operating procedure and radio theory, since they must pass an examination conducted by the federal Supervisor of Radio in order to obtain the operator's license which is required before they can operate the radio station. A certain amount of high school credit is allowed for each grade of license held by the pupil. The only teacher supervision required is to give periodical tests and to check the station 'log' to assure regularity of attendance at code practice. Lesson sheets give the pupil the needed information. Some of these are bulletins of the American Radio Relay League. One class period daily is required and from one to two semesters of code practice are needed to prepare the pupil for operating the station.

When the pupil has obtained his license to operate he is scheduled to operate the radio station at definite periods during the week. This includes keeping the station clean, batteries charged, etc. A station of moderate power is in communication distance with other amateur stations up to 1000 miles in daylight, and with foreign stations at more favorable times. There is no time, day or night, when some of these stations are not working, but contact is not always made.

Messages are easily obtained by soliciting the students in the school. This, by the way, gives everyone a chance to learn how to word a telegram. The student operator must know his geography to route his messages properly. He becomes familiar with the use of the telephone and city directory when delivering messages received. Since the opportunity to communicate with stations of the Army and Navy occasionally arises, he learns more about the branches of national defense; in fact, he becomes a potential part of it, since radio operators are always needed in times of emergency. While listening to, or communicating with, foreign amateurs, he has his interest in foreign countries aroused and incidentally, acquires a few foreign phrases. Weather becomes more than a local phenomenon, it affects the range of his station. It emphasizes itself when, while he gazes at a foot of snow, the man at the other end tells how hot it is in Florida. Explorers in the Arctic have depended on amateur radio for several years past for news and for the forwarding of messages to civilization. What boy handling these messages will not have his interest in explorations fanned to white heat?

Furthermore, he can continue his enjoyment of radio after school days are over. Amateur radio operators include all classes, all ages, and both sexes. It may serve as a means of travel, either in the Navy or merchant marine. It may lead to a lifelong

(Continued on Page 33)

*8KN, SZF; care Central Senior High School, Lansing, Mich.

Building a Wattmeter

By I. Vee Iversen*

HOW many of you fellows have wondered what your power input really was? That question has often been in my mind and would be solved occasionally by borrowing a portable wattmeter from the school. A friend of mine gave me the idea of converting an old watt-hour meter into a direct reading wattmeter. I hope you can make good use of the idea.

To start with, you will have to beg, borrow or steal an old watt-hour meter. The type I have found to be best suited for this purpose is the old round-case type, that sticks out about ten inches from the wall. This type has a round glass window in it—and after getting one the fun starts.

After removing the gear train carrying the dials (which can be used for a revolution counting rig if needed around the shack) one gets at the revolving disk. It is upon this disk that the calibration will be made. For this reason, one of the meters with a flat disk will be found unsuited for the job. In the watt-hour meter referred to above, the revolving member is an Aluminum cylinder upon which a paper strip may be fastened. As it is almost im-

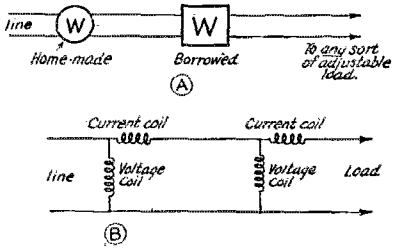


FIG. 1. THE SIMPLEST CONNECTIONS FOR CALIBRATING WHEN A GOOD PORTABLE WATT METER CAN BE SECURED

A shows the set up, and B the internal connections. In this method, the load can be almost anything that will draw current when can be adjusted.

possible to glue paper to metal, I just wrap the paper around the cylinder and fasten the ends of the strip together with a gummed sticker.[1]

When the paper strip is in place, the cylinder should be free to rotate without sticking. If the paper is very heavy it will jam, for the clearances are not great.

*7AW, 6554 18th Ave., N. E., Seattle, Washington.

1. Try Dupont household cement.—Ed.

If the disk rotates freely it is useless for your purpose so we must put a load on the cylinder to prevent it turning continuously. This is done by attaching a hair spring to the shaft. This spring should be fairly heavy. The springs out of alarm clocks

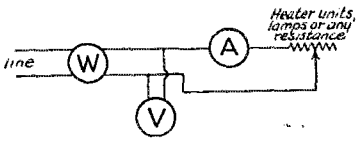


FIG. 2. METHOD USED WHEN AN A.C. VOLTMETER AND AMMETER BUT NO WATTMETER CAN BE HAD

In this case, the load must be a resistance that can be adjusted steadily or by steps and the results will be all wrong if a choke or anything of that kind is used for a load. Lamps, resistance cartridges, toasters, flatirons and the like are all right.

are too light. The spring in my meter is one from a Chronometer. Most jewelers can supply you with one. If you cannot get one of these you can make your own spring. I fastened my spring to the shaft above the cylinder by soldering it to the shaft; the other end I fastened by attaching it to a short length of copper wire which I had put under a screw to hold it in position. To do this, I bent a loop in the spring and slipped the wire into this loop which holds it tightly. You may fix some kind of a stop so the cylinder will make only one revolution but to do this the hair spring must be extra strong, and then the readings at the lower end of the scale will be crowded pretty close together. So, for that reason, I did not put a stop on the cylinder but let the cylinder return to zero setting by the complete unwinding of the spring. I will admit that this is possibly not so good for the readings below, say, 15 watts, but over that it will make no difference. On my meter I wanted it to read to one Kw. and to do this the cylinder makes *one and one half revolutions*. I used black india ink on the first revolution and green ink for the half revolution. A piece of copper wire fastened under a screw on the front of the magnet, makes a good pointer.

Now the meter is ready for calibration. I suppose every high school that teaches Physics will have a portable wattmeter and most of you fellows are advanced enough to be allowed the use of the instrument. If you can use one of these so much the

better; then your meter when it is calibrated will be correct. If you hook the two meters in series the readings will be sufficiently accurate to satisfy most of us. When this point is reached, all we have to

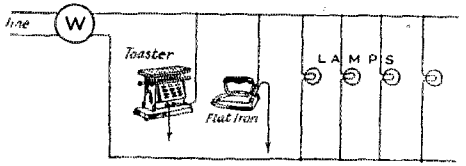


FIG. 3. IF NO OTHER METER IS AVAILABLE A ROUGH CALIBRATION CAN BE GOTTEN AS SHOWN HERE

All lamps and heating devices are marked with the wattage consumption and by connecting them in parallel the drains can be added. Be dead sure that the voltage is the same as marked on the device, since a 110-volt 600-watt heater will draw quite a lot more at 125 volts and therefore gives a completely wrong reading. This method is a poor one at the best.

do is to hang the old watt-hour meter up and place a load on the line through the two meters. Start with small loads and as the value of a load is found mark it on the paper strip on your meter. A variable choke or resistance will be found handy to make your loads show even watts on the meters. In this way, you can calibrate your meter to one or two Kw. very easily. If you cannot get a portable wattmeter you doubtless know you can use an ammeter and a voltmeter to do the same thing as the product of the readings of the two instruments will be the number of watts at that instant. If none of these are at hand you can approximate the thing by using lamps of different known values to build up your load. When you have completed your meter you will guess no more for it will say, 'Here are your watts, OM.' Incidentally, *it will show up poor rectifiers* for as they go bad they tend to pull the power house into them. Taken all in all, a wattmeter is a necessary addition to the shack.

The Midwest Division Convention

'APRIL showers bring May flowers'—but they also brought a large attendance than ever before to Iowa's Midwest Division Convention at Ames on April 13 and 14. Yes, we had WX, a lot of it, but let's talk about the convention. The opening gun was fired Friday afternoon by H. P. Westman of HQ., with a short talk on 'Preparedness for Jan. 1, 1929,' after which some very enlightening information was given by Prof Jansky of Minnesota U., Menzer of Iowa U., and Knouf of Iowa State College, on broadcast work. Friday p. m. was devoted exclusively to the amateur as a BC stn op—with great success.

The banquet came at 6.30 that evening, in Hotel Sheldon-Munn. Everyone agreed that it was one of the 'hottest' affairs ever put on in Iowa. P. H. Quinby, Midwest's director, certainly availed himself of the heat to brown the toasts with. *Barbecued Ham*, a farce in one act, was the riot of the evening. Prof. Ben Willis, of I. S. C., at the 'mike', kept the gang roaring for twenty minutes with his witty skits on both BCL and Ham, which could have come from many of the Middle West's BC stns —including WCCO, 'Pro'esser Yansky's own.' A liars' contest was held, and prizes from *QST*'s leading advertisers were awarded.

Plowing through the snowdrifts Saturday, a.m., the gang assembled again to hear SCM Kruse describe how Iowa leads the League in traffic. Ex-SCM Huber talked a little about future management of the Section. Quinby analyzed Mr. Average Ham's condition, and recommended increased diet of newspaper and BC station publicity. SCM Kruse took the key and gave a code contest, which was won by 9BAL. At noon a picture was taken of the whole gang.

In the p.m., SCM Diehl of Nebraska told us about the Army-Amateur Work in the Midwest. Westman followed him with a diagnosis of the good and bad in Frequency Meter construction. Ensuing discussion, which lasted until five o'clock, revealed an unusual interest in the technical end of amateur work. Everybody went home with new ideas and a resolution to return for a still better time next year.

—*L. R. H., 9DOA.*

Strays

Writing from a British Cruiser in the Orient an English ex-amateur, who must be nameless, is enthusiastic in his desire to explain that there are human beings on British war vessels even if they are severely abrupt when in communication with amateurs. The regulations and restrictions laid down by the Naval Authorities, he explains, are rigorous and unyielding, and the punishment for giving the ship's QRA, for instance, in response to the inevitable query from an amateur, would be swift and severe.

Notes on Design of the Radio Frequency Choke

By Kendall Clough*

BEFORE attempting the design of a radio frequency choke coil, we must set up certain definitions as to what the choke is and how it is to function in the circuit in which it is to be employed. Many of us have labored under the impression that the choke is necessarily an inductance, following the simple course of reasoning that it is a coil and therefore must be an inductance. This conclusion is far from the truth. As a matter of fact, the closest approach to that statement in practice, is the occasional operation of the choke at its natural period of resonance. In most instances, however, the choke functions as capacity. Whatever qualification this statement may need is supplied in the following.

Let us consider for the moment the circuit of Figure 1, which depicts a conventional tuned-grid tuned-plate oscillator with *series* battery feed. We employ the choke in the position shown in order to keep the radio frequency currents of the

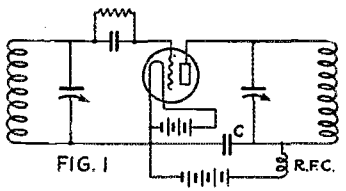


FIG. 1

plate circuit from flowing in the battery or supply circuit. This isolation is accomplished if the choke has an impedance that is numerically several times as great as the impedance of the condenser, C, at operating frequency. Note that we spoke of the *numerical* impedance of the choke. Nothing was said as to whether it was inductive impedance or a capacitative impedance at operating frequency, or the possibility that it might be resonant, for this point is of no import in a series feed circuit. We must note parenthetically, however, that if the choke is of such size as to function inductively, care must be taken that it does not resonate with the condenser, C, or the battery will experience a large circulating radio frequency current and the circuit would be better off from an operational standpoint in the absence of the choke.

*President, Research Laboratories of Chicago, Inc., 846 W. Jackson Blvd., Chicago, Ill.

Let us now consider the circuit of Figure 2 which is one form of the circuit used in the majority of amateur receivers. The nature of the arrangement requires the use of a shunt battery feed. Here, if the

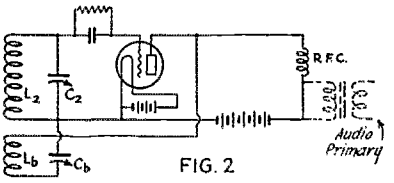


FIG. 2

numerical impedance of the choke is higher than the impedance of the condenser, Cp, and the tickler coil, Lp, in series, a current will flow through the latter which will cause the circuit to oscillate, assuming that the other features of the circuit are normal and correct. If the circuit constants are properly proportioned, we will be able to control the degree of oscillation in fine measure by the manipulation of the condenser, Cp, that is if the choke coil is operating below its natural period so as to function as a capacity. Those who believe that it may properly be an inductance may examine that which follows.

Suppose that we let the choke be purely inductive for the moment and isolate it as shown in Figure 3 by the elimination of the plate condenser and tickler. We will also make the inductance of the choke a variable. Now, certain investigations[1] lead us to believe that things will happen as we vary the inductance of the choke

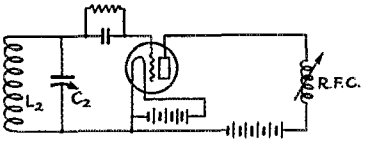


FIG. 3

about as shown in Figure 4. When the inductance of the choke is zero, the input conductance of the tube is zero; when the inductance of the choke is appreciable the conductance is negative; the tube conductance remains negative until a value of

1. Stuart Ballantine, *Physical Review*, Vol. XV, No. 5 (Author's Note).

La is reached for the choke when the conductance becomes and remains positive.

Now, if the tuned circuit L2, C2, is of any service at all, it will have a conductance (positive, indicating losses) that is smaller in magnitude than the line represented by G1. Measuring off this value below the axis, and projecting the points of intersection with the original curve upward we see that the circuit is capable of

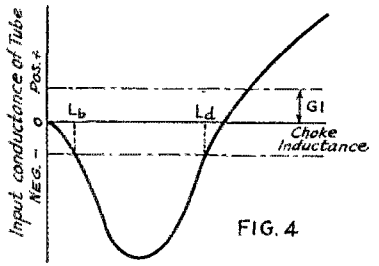


FIG. 4

oscillation with any value of choke inductance between Lb and Ld without the presence of the tickler or plate condenser.

It is unfortunate that, for purposes of illustration we had to vary the inductance of the choke and keep the wavelength of the secondary constant. By keeping the inductance of the choke a constant and altering the tuning, affairs are not changed in any way and there is always grave danger of the tube oscillating, independent of the tickler, unless the curve of Figure 4 is representative of the tube performance at the longest wave to which the circuit L2 C2 can be tuned and the inductance of the choke is greater than the value La.

Experience indicates that it is very difficult to design a choke of the necessary inductance to meet these conditions without having a distributed capacity more than sufficient to resonate the choke to the operating frequency. Hence the choke is operating below its natural period and has the properties of a condenser.[2]

The actual design of a choke will now be considered. Empirical studies indicate that it is possible to construct a choke that will operate effectively throughout the band of 15 to 545 meters. Figure 5 is a curve of the nature of the curve of Figure 4 representing the input conductance of a 201-A tube at detection voltages and at a wavelength of 545 meters. We see from this curve that by choosing a value of 6.8 millihenries for the choke that there will be no possibility of the choke provoking oscilla-

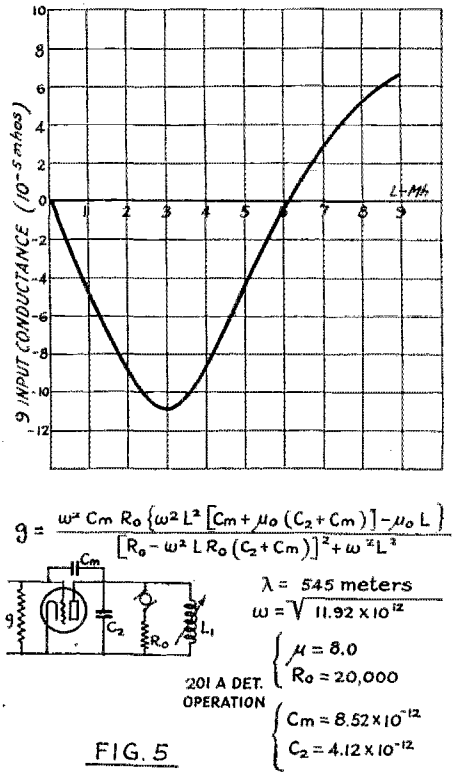


FIG. 5

tion unless the circuit is tuned to a longer wave than 550 meters.

From this point, the design is empirical throughout. Inasmuch as the coil is operating principally below its natural period we may consider it as a pure inductance and a pure capacity in parallel. The reactance of the inductance is steadily increasing with increase in frequency so that it will be no factor in reducing the parallel impedance at the very high frequencies. The capacity will determine the impedance at the high frequencies so it will be necessary that this be kept at the lowest feasible value.

The best way of keeping the distributed capacity low would be to wind a single layer solenoid but this construction forces us to a consideration of all the phenomena that accompany the treatment of a circuit with uniformly distributed constants. In other words the choke would show alternate periods of extremely high and very low impedances as we sweep the band

(Continued on Page 88)

2. The case for a transmitter is quite different. As Lidbury has pointed out (*QST*, p. 27, October, 1927) we desire a "*fairly good*" choke to operate over a *wide* range in the receiver but in a transmitter the action is desired to be *very* good over a *narrow* range. The former job is best met by a multi-layer choke such as shown by Mr. Clough while the latter is best met by a small-diameter single-layer choke of the Lidbury type which would be totally unsuited for a receiver.—Editor.

Fading on Short Waves at Long Distances

By E. Gherzi*

AN article by the well known amateur, Mr. Leon Deloy, one of the pioneers on short waves prompts us to describe briefly our impressions, or better, the results that we have obtained after twelve months of systematic listening on the short waves from 20 to 100 meters.

We intend later to prepare a more complete work, but for the present will confine ourselves to replying to the invitation in the article mentioned above.

Our observations have been made mostly on two stations, stations that appealed to us because of their location and also because of the fact that the probable paths of their signals was in darkness. The stations were KEL, San Francisco, on 95 meters and other waves, and IDO, Rome, on 102 meters, 60 meters and 32 meters. The first station is separated from Zi-ka-wei by the Pacific Ocean; the second, by the Eurasian continent.

We have also listened nightly to various amateurs in Europe and America, as well as Australia, the Philippines, Indo-China and our antipodes (Argentina and Uruguay). For checking and comparison purposes we have throughout had two reliable correspondents and observers at two different points. One, Brother J. Aguinagalde, S. J., is located at our astronomical observatory at Zo-se, 25 Km. from Zi-ka-wei; the other, the well-known op1HR (on 36 and 38 meters) is at Ft. McKinley, near Manila, about 2000 Km. from Shanghai.

At times, we have also asked the coöperation of radio officers of Italian and American warships stationed 800 Km. north of Zi-ka-wei in the vicinity of Tientsin and at Tchefou and to the south of Canton. These details will help in an understanding of the conclusions which follow.

To begin with, it is indisputable that the phenomenon of fading occurs on all the short waves; 100 meters as well as 40 and 20 meters. In this point, Mr. Deloy is quite right, and we are glad to share his opinion.

Another thing: For a given transmitter (our own on 120, 40 or 30 meters, for instance) there exists, at any given instant, a distance at which fading is imperceptible and another distance at which it is very pronounced. Thus, our d.c. transmissions were steady around Shanghai and varying between R3 and R6 at Tientsin. Our a.c. note was absolutely steady at Tchefou, or in the neighborhood of Zi-ka-wei, and varied slightly at Manila and Canton. Let us remark here that d.c. transmissions are much more unsteady than non-rectified a.c. There is more on this. Although a given station may send with the same amount of power, the constancy of the note at a given receiving station varies from day to day.

Let us now turn to our observations on stations 8000 or 10,000 Km. distant. For these, the established phenomena on our transmissions for much shorter distances, that is to say the alternation of moments of variation and of stability (of note) with distance and time, seem to be practically non-existent. Always, these distant stations have what has aptly been termed a 'twinkling', that is to say, a variation in the intensity.

The reception of these very distant stations, lends itself well to research into the causes of this 'twinkling' in intensity. We have listened to them a great many times with a stopwatch in hand in order to time the variation period. For the greatest accuracy, we have always tried to heterodyne each signal to the same musical note, it being fully realized that the human ear, as well as the telephone diaphragm, does not respond equally to all notes in the scale.

Fully admitting the inherent inaccuracies of the ear as an indicator of increasing and decreasing alternations of intensity, it seems to us well established that this variation has a period of several seconds. On this point we concur with Mr. Deloy.

Now, how can we explain this phenomena of a period of several seconds for intensity variations? This is the matter on which we wish to render an opinion. The solution set forth by Mr. Deloy, basing itself on the frequency of the emitted electro-magnetic waves, is perhaps not contradictory to ours.

Modern meteorologists admit as proved fact that the lower layer of the atmosphere, the troposphere, the seat of all the phenomena of rain, cyclones, anticyclones, etc., consists throughout its depth (which may be between 8 and 11 Km.) of superimposing layers which slide one over the other, mixing together, enveloping each other in cyclonic whirlwinds of more or less violence and 'breaking into foam' as they spread themselves over the surface of the earth.

Briefly, at any given point, especially at certain times, a balloon which in its verti-

*Observatory at Zi-ka-wei, near Shanghai, China. Translated from the French by A. L. Budlong.

1. L'Onde Electrique, Paris, 1926.

cal rise records the stratography of the atmosphere through which is passes, will find a succession of ethereal layers, heterogeneous from the hygrometrical, thermometrical and electrical points of view.

The thickness of these strata may vary from a few meters to (in large atmospheric disturbances) a number of kilometers.

Let us now turn to our little waves of 30 or 100 meters. Their complete wavelength is easily encompassed within a single one of these atmospheric strata. It is understood that the vector which will measure their 'propagation' in terms of the height above the earth's crust can not follow a regular law, since the electrical conductivity of the medium where these short waves travel varies constantly. This will cause speeding up and slowing down: That is to say, many reflections and refractions will take place before the waves ever strike the upper ionized layer, where electromagnetic waves are reflected or projected almost without loss of power.

In short, the short waves, quite contrary to the waves in which a single oscillation reaches the higher limits of the troposphere (8000 meters to 11,000 meters) will undoubtedly be much more liable to react to influences in the lower layers of the troposphere.

All this is, in the main, a function of the frequency of the wave in question, as expounded by Mr. Deloy.

Here is the point we want to add in order to complete our explanation: The entire troposphere oscillates continuously, or almost so, with a period which is a function of its thickness, its density and its mean temperature. As this period of oscillation is of the order of some seconds (10 or 20, we believe, at least in a vertical sense) the short waves will be affected by a 'twinkling' of the same value, for their propagation is effected through these layers. This will cause a variation in intensity at a given receiving point from a given station having constant input and radiation.

That this period of several seconds is actually that of the lower atmospheric layer, can perhaps be shown by the work that we have published elsewhere on the graph readings of our Galitzine seismograph in connection with the study of typhoons in the Chinese and Pacific seas.[2]

In any case, the oscillations of the vortex of a typhoon when it advances without variation in the friction of the lower spirals (on the surface of the ocean, for instance) are of the order of 4 to 8 seconds. This implies a probable height of the vortex itself in the neighborhood of 5 or 7 kilometers, since cirrus clouds are rarely observed in these spirals, and since these clouds indicate the upper limit of the troposphere. This would mean that the oscillation period of the entire troposphere is not far from 10 seconds.

Let us resume: These periodic variations of the order of some seconds that are encountered in the reception of short waves, especially at great distances, are due to the characteristic oscillations of the lower layer of the atmosphere, which is called the troposphere. This, because of its composition and other meteorological factors, has a period of vertical oscillation which appears to be of the order of something like ten seconds. As the wavelength of transmissions between 20 and 100 meters is in the limits of the thickness of the various layers of the troposphere, all vertical oscillations of these layers will influence the behavior of the electro-magnetic waves before their arrival at the region of reflection and 'travel'.

At times, of course, upon this oscillation of the troposphere as a whole can be superimposed local and internal oscillations of a single stratum and this might lengthen the period of fading or even, by phase interference, stabilize the reception of a remote signal which would ordinarily undergo intensity variations. It might even happen that with the same atmospheric layer between the two stations (transmitter and receiver) being homogeneous up to the upper limit of the troposphere, we would have exceptional stability of the received signal. For instance, we at one time were advised that our note was extremely steady, in spite of the presence of a typhoon in our vicinity. If one will concede that the vortex of a typhoon contains only equatorial air,[3] this will prove our last statement. However, for very distant stations, this chance of homogeneosity or of stabilization of the air through which the signal passes, would be the exception.

The experience of our 12 months of listening appears to us to prove this.

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2. Observatorie de Zi-ka-wei—Shanghai—"Notes de Seismologie" No. 5, 1924.

3. It is thus that we have explained the remarkable fact of the almost complete cessation of parasitic atmospherics during the passage of a typhoon's center. When, on the contrary, it is a question of an extra-tropical cyclonic center, where there is a mixing of polar air and equatorial air, it is entirely different, and the noise in the telephones makes for extremely difficult radio reception. In this latter case, there is in effect a rubbing and brushing of two different atmospheric layers, from the electrical point of view. This conception of the movements of the troposphere appears to us, thus, to explain logically many interesting phenomena. We are happy to share the ideas put forth by M. Lardry. Our articles "Radiogoniometric Research on the Progress of Typhoons" in L'Onde Electrique, Paris, November, 1925; "Static and Typhoons" in the *Marine Observer*, August, 1926. London, Air Ministry.

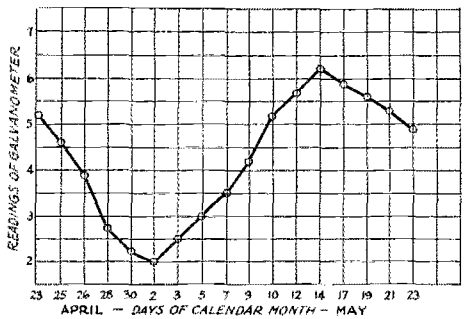
Lunar Effects on Electro-Magnetic Waves

By C. E. Paulson*

TO gain a preliminary idea as to any possible relation between the phase of the moon and radio transmission at short waves a test run was made on station 2XAF (32.77 meters) at Schenectady, N. Y. This station was chosen because of the constancy of its carrier wave. The carrier wave was used as it gave a true reading.

Readings were made and recorded each Monday, Tuesday, Thursday and Saturday night during later April and May, 1927, with the exception of May 16th when interference prevented a useful reading. The readings were taken at intervals of 5 minutes for one half hour and an average taken for the half hour. All readings were taken at approximately the same time of the evening.[1]

The receiving equipment consisted of a shielded receiver using a regenerative detector and one stage of audio amplification



with the output of the amplifier passed through a Leeds and Northrup mirror galvanometer shunted by a non-inductive resistance and a 2000-μμfd. condenser. With a shunt of 20 ohms resistance, deflections between 0 and 10 divisions were obtained which were useful for graphing.

Regeneration was controlled in the usual way by a variable bypass condenser, being maintained on all tests just beyond the point at which oscillations began.

In a preliminary test for a week, readings were taken every five minutes for two hours and averaged up for the time. A careful check on the meters was made to insure the same receiving conditions. These did not vary at all, at least varied so little as to be inconsiderable.

The receiver was untouched as far as any change in the tuning was concerned. Too, the author was the only one who had access to the room.

It will be noticed from the graph that on May 23rd the signal strength was 5.2, and then it declines until at new moon, May 2nd, it has reached a minimum of 2; then again it rose until at full moon, approximately May 14th, it reaches a maximum of 6.2.

In considering these effects I had a number of discussions with Prof. S. W. Hockett, Head of the Department of Physics, Penn College. We considered fully the gravitational effects of the moon upon the earth and a consequent effect on electro-magnetic waves. Since there was no evidence to support the theory in a satisfactory manner we abandoned it and took up the theory of the effect of plane-polarized light on electro-magnetic waves. This theory seemed to be the one that had a more sound basis.

It will be remembered from physics that plane polarized light is light in which the wave-motion is vibrating in only one plane. Reflected light is plane-polarized hence moonlight (being reflected light from the sun) is polarized. As light travels at the same speed and through the same medium as electro-magnetic waves, it is logical to believe that there could be an effect causing an increase in signal intensity.

The experiment that needs to be carried out to check this theory (The author is now doing this) is the study of the effect of plane-polarized light upon electro-magnetic waves both being made in the laboratory. The author would like criticism or suggestions from anyone working along this line.

*305 K. Ave. East, Oskaloosa, Iowa.

1. A rather slow galvanometer was used so that rapid variations would not be reproduced.—Tech. Ed

Some Overlooked Possibilities for the Radio Club

(Continued from Page 26)

occupation or may simply be a pleasant way of spending leisure time. Will any single school subject accomplish more?

Finally, does it actually do all this? Yes, but to do it the teacher must, himself, be an enthusiastic amateur operator, able to go as far as any pupil under him.

The Spaced-Turn Coil

By A. Binneweg, Jr.*

THE shield-grid tube has brought about many changes in radio apparatus and circuits. Coils for use in short-wave radio frequency amplifiers must be small in diameter and have limited fields if complete shielding is to be avoided. Smaller diameter coils usually have, also, a better form-factor for the shorter waves, giving, in general, somewhat lower losses, if that is necessary. Various practical methods of short-wave coil construction will be described.

The space-wound coil supported by a thin celluloid cylinder is perhaps the nearest approach to an 'air-supported' coil, but constructional difficulties have prevented their general use. The writer has developed a simple method adapted to the needs of the home constructor. As shown in the diagrams, the coil form consists of a wooden cylinder and two semi-circular pieces of bakelite tubing. A length of the tubing is threaded and then cut into two lengthwise sections. The wooden cylinder is turned down to a size which will exactly fit into this tubing.

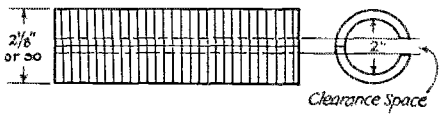
The two semi-circular pieces of tubing are placed around the wooden cylinder and thin celluloid is wrapped round the form. The wire is wound over the celluloid and into the threads in the bakelite tubing.

The threads must be of the proper depth and the celluloid should be thin. The coil is rigidly held by applying a thin layer of collodion to the celluloid underneath the wires. The coils are removed from the form by slipping off the bakelite tubing which then 'collapses', leaving the coil free. These coils are sturdy but the wire will unwind unless the ends are made fast by passing these through small holes pierced in the celluloid at the ends.

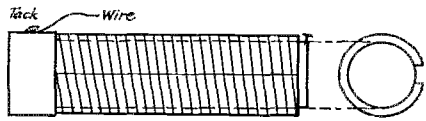
A small clearance should be allowed in the bakelite tubing so that it can be readily 'collapsed' within the coils and the tubing will slip out. The celluloid used is that so often found on candy and the like. Two layers of this thin material are about right. The collodion is obtained at any drug counter.

Bakelite tubing, 2 inches in diameter, is the proper size for general short-wave use below about 80 meters, and should be threaded with about 10 threads per inch. Any machine shop or well-equipped garage can do the job of threading the bakelite tube. The inductance of the 2 inch coil is somewhat smaller than the larger coils ordinarily used; at 40 meters, about 2 or 3 more turns will be required and similar increases at the other waves. No. 20 wire is about the proper size, these coils having a smaller diameter and gives good rigidity.

WOODEN FORM



THREADED BAKELITE TUBING



ASSEMBLY OF COMPLETE FORM

NOTE. *For different wire-spacings use tubing with different pitches of thread.*

The wooden form should be provided with a 'shoulder' against which the pieces of tubing will fit so that the threaded portions may be in their correct positions before winding the coils. A tack, driven into the form, will hold the wire. An entire set of coils can be wound in one operation, if the form is made long. The winding can be cut apart in sizes needed. Due to the accurate spacing obtained, matched coils are made.

A coil form of this type is easily constructed, so coils having good mechanical strength, appearance, and low losses may be made with a minimum of effort and time.

If a lathe is available, the wire may be fed to a similar form which revolves and any number of thread combinations may be employed depending upon the lathe. In this case, somewhat heavier celluloids should be used and this is first cemented around the form with collodion.

(Continued on Page 88)

*Experimenter's Section, A.R.R.L., University of California Radio Club, 6BX, Ex-6XAA, 524 Fairbanks Ave., Oakland, Cal.

Meow r r R R-9

By Ma

WELL I reckon as how this is The Ole Woman back on the job and a preparin' to spread a little philossifie and common hoss scents from stashun *QST*. Now T.O.M. has bin actin' sorta orful lattely and has increased his cussin' vocablaray quite consitrable but thank gudness ive got shet of his spoutins fer a few hours. When the duck season gets in full blast evry year he gets sorta impashunt and peevish like until he gets whizzin lizzie all iled up and redy to start and this mornin' abouten 3 a.m. our alarum clock started beatin' a heck awrful tattoo at the same time that Pa's partner Jonnie McGreggor started kickin' the kitschen door in. After pa gets all his junk loded includin' the ole 10-gage smooth boar cannon of hissn and also a bottle of snake bite medicin and sum caugh sirrup they get goin' headed fer the salt marshes. The doo is abouten 2-inches deep on the grass and pa'll take his death of cold or maybe he'll blow his blamed head off. The huntin bizness is all foolish anyhow; if you don't blow your head off with a gun you blow it off with a cold. Anyhow pa's gone for a while and thers piece in the fambly and kitty can take her nap under the stove without no danger frum one of pa's fits and I can set and think and preach without bein bothered non by the head man.

If you get sick you call a doctor an pay out sum jack and then get sickern ever. When you freeze ur feet and you washe em with snow to draw the cold out. When you burn ur hand you put it in hot water and draw the heat out. When your ole man goes on a rampage you feed him on bread an water. When you meet a lyar and he tells you a lye you feel like wringing his pesky kneck but you generally don't, you tell him one bigger. When sum cookoo drowns ur sigs out you goose the old toob till its plate begins to palpitate and ooze red hot perspirashun. Yeah there seems to be a cure for any brand of disseaze. Sum fellers always huntin nostrums. Thats a gud word and Webstur sez it means a "quack or pattent medicine" an that a quack is a big faker. If you believe in it and swaller a big enuf dose mebbe it will do the bizness. Well lemme see.

Abouten this QRK bizness pa allus had a knickname fer QRK an it wus "Quack Rubbin Kitty" and when he wuz floppin brass wid sum gooseberry out in Californy and this bird'd give him a report he wud luk at me over the top of hisn specks an say: "a quack is rubbin' kitty again." Mebbe you fellers have had a cat wunst and no a cat don't mind bein rubbed none and in fackt the more you rubbed its back the more it wud pur and the happyer it wud be. Paw allus felt he was like kitty and when he wud be rubbed 8 or 9 times he wud almost swell up and bust he wuz so proud and felt so gud even tho he knew it wuz sum quack handin him a big helpin' of apple sauce.

How cum this QRK bizness anyhow? Seems to me that wunst I wuz readin' a coppy of Pa's I.R.E. Proceedins abouten Diurnal and Noocturnal Variashuns of Signal Intensity written by a gent that goes by the handle of Dr. A. Hoit Taylor, the Big little man who is boss at NKF. Doc is purty brite and I think he smokes the same kind a tobaccy that paw does. Doc wuz a perfesser at Uni of north Dacota and wuz chief op at 9XN. Perfesser Blatterman was the old man at 9Y—sumthin-owned by George Washington Uni at Saint Luis wher no lyres are aloud. These wuz both pre-war stashuns and had a kick like pre-war likker. Doc Taylor and perfesser Blatterman put on sum hi-powered 24 hour boiled owl stuff. I no becuz listenin' to these tests wuz where T.O.M. lerned to burn the midnite ile. These fellers used a contrapshun called an audiobullity meter to find out how loud they wuz and then they did a lota figgerin to find out how much juice they wuz pickin' up outa the air. After all there tests had been made they wrote that there artical that wuz in the I.R.E. proceedins. It wuz a reglar wow. Youc'n always tell when somebody has done sumethin big becuz a lotta fellows started a criticizin and tryin' to pick it to pieces. If it hadn't have been gut it wud have died without attenshun. A prominent dutchman called Zenneck started a rumpus and sed an audiobullity meter warnt no gud nohow and he sed a lotta other things as how the personal equashun messed up the works. How a guy wud have to go to an ear spechillast and have his ears bored out with an augger and have his tinpanium tested to see how sencitive his ears wuz to certain sounds. There may be sumthin to this becuz one of pa's frens caint hardly hear anything over 1,000 cyckles while 20 cyckles is his meat. Pa dotes on 1,000 cyckles but 20 cyckles aint there fer him. Then this here dutchman sed the receivin toob wuznt accarate an it wud have to have 10,089 elecktrons flow per half minit per c.c. and have a certain amplifikashun faker to produce certain results, and that the fractured index of the simonized wave had

to be figgered where it disseckted the fundamental propagashun line of the heavy lying layer and a big bunch of bunk abouten it didn't mean nuthin but wuz bettern nutthin at that. If it caint be did in a labertory where they have a lotta instrumens and mathematick tabels to work it all out what cud you speck of a him what don't have no audiobullity meter and what wudnt no what to do with it if he had and even if he did it dident mean nuthin very accurate. Well we don't do it this way no more, at least hams don't, but have a tabel with 9 figgers and figger the audiobullity by sayin eney meany miney mo yer R-9 hr OM. Fer mi self a lotta times I don't think them sigs are R-9 when pa sez so but they orter be called assinine and it gves me a pane in my etomology, yet I have to laff at the funny sounds of sum of these here sigs. The fones hop up and down on the ole man's head sum times like they wuz full of Mexikan hoppin' beans an a funny sound cums outen 'em like what you can hear down by the hog pen. R-9 mebbe but it don' mean nuthin.

This QRK bizness has got on mi nerves. The big idear wuz by collectin' a flock of QRK reports a stashun cud get a real honust to gudness idear of how loud he wuz at certain parts of the cuntry, etc. This aint accerate but by getting a flock of reports that are honust it works purty nigh the way it wud with gud apparatuses at the labertory. The wust of it seems to be that you caint trust these here reports. Look at one of Pa's frends who has two audiobullity charts hangin' on the wall of his shack. One fer amerikans and the other for furriners. The one fer furriners reads like this.

R-1 Caint hear it
R-2 think I can hear it
R-3 know its here
R-4 can hear it by holdin my wind
R-5 can coppy it with struggle
R-6 can coppy it OK but week
R-7 can copy it solid with QSZ
R-8 purty gud sig
R-9 can hear it 3-inches frum fones

Pa axed this bird how cum one day and he laffed and tole pa that he wuz old and outat date and never wud make frens with any furiner. He sez make 'em like you and fill 'em full of audioBULLity. With this chart u can see rite away what to tell 'em and make 'em ur friend fer life. No don't you young fellers laff, this bird is OK on his psickology dope alrite, I no becuz I am a woman. Any woman likes to be told she is purty even if she looks as tuff as an ole mud fence. A fella likes to hear sum body tell him his sigs are R-99 when he is usin' a receiving toob and cumin' in only an honust R-3. Be croocked and make frens or be honust and make 'em run frum you. Ain't things got mixed up in a dern awerful shape?

Theres lotts of new fresh tender Hams just startin' and they hear this G.E. ur sigs R-8 hr OM and don't know what it means and they think its like sayin' gude evening or sumlhin' and things have got to where a feller gives you a goofy QRK report just like sayin' good bye.

Now boys Ma is an ole igerant woman and aint tecknickal and don't no much abouten how to cure this here runnin' sore that has gumed up the works but one thing is dead right and that is that theres at least 2 ways to cleanin' up house. One is by sum of you tecknickal men figgerin out a cheep, eazy and quick method of findin' out a fairly accerate QRK without dependen on ears certified by sum ear speschelust. The other way wud be fer you fellers to reform. Quit bein' a Quack and a Faker and tryin' to make frends by "rubbin' kitty" and maken 'em puff up and feel like they did sum thing when it ain't much after all. If you have a cat rubbin' kitty's back and see what end gets up first and then think what a shape these here hams are in when you don't shook square with 'em on reports. Too if one don't rub ur one back don't get sore and cut one point under them when you know he deserves better.

Now boys The Ole Woman asks you to think a bit and ask urself: Am I a "Quack Rubbin' Kitty"? Whats the golden rule anyhow?

A.R.R.L. Technical Information Service Rules

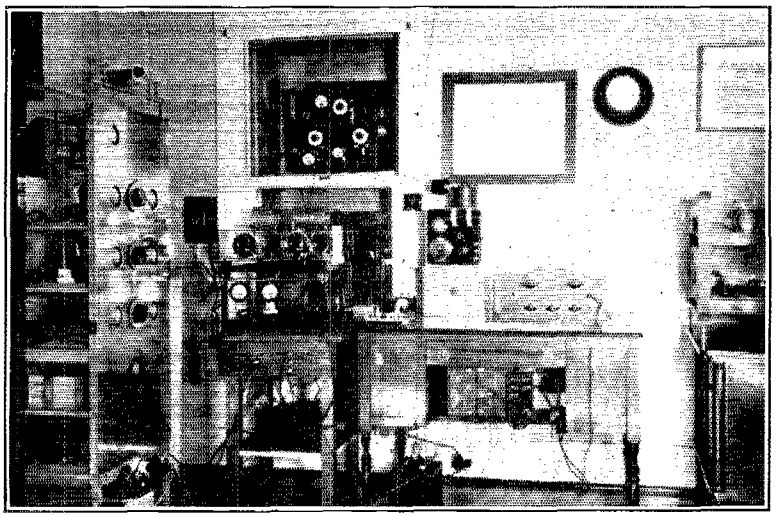
Please help us by observing the following rules:

1. Keep a copy of your questions and diagrams and mention that you did so.
2. Number the questions and make a paragraph of each one.
3. Make diagrams on separate sheets and fasten them to the letter.
4. Print your name and address (not merely your radio call) on your letter. Don't depend on the return address on the envelope as this is destroyed when the letter is opened.
5. Don't ask for a comparison of the various manufacturers' products.
6. Before writing, search your files of *QST—the answer probably is there.*
7. Address all questions to Information Service, American Radio Relay League, Inc., 1711 Park Street, Hartford, Conn.
8. It is not essential to enclose an envelope as long as you supply postage and PRINT CLEARLY your name and address on your letter.

8CPC

A Year-Old Home-Built Station Active on Three Wave-Bands

ABOUT twelve months ago, 8CPC was the typed call on a station license. That's all there was, there wasn't any other thing; with the exception, of course, of the latent enthusiasm of the owner. Today, 8CPC is quite a complete station. There is a separate self-excited transmitter on the 20-, 40-and 80-meter bands, a crystal-control transmitter for the 40-meter band, a couple of receivers, a 'Growler', a grid-meter driver, a wavemeter and three different plate supply systems. With the exception of one receiver all of the equipment has been assembled by the owner-operator who, with all the building and re-building activity, has found time to 'chew the rag' with more than eight hundred stations.



THE FOUR TRANSMITTERS AS THEY ARE AT REST

Squatting up in the 'window box' is the 7½-watt 20-meter transmitter. Below and in front of it is the 50-watt self-excited 80-meter set. To the left of it is the aluminum panel crystal controlled rig. At the extreme right is the 40-meter 50-watt Hartley.

THE POWER SUPPLY

An unusual feature of the station is the use of 25-cycle supply for the operation of all plate and filament power equipment. Strange as it may seem to some, this low frequency has been shown to be entirely satisfactory in practice and a pleasing d.c. note can be obtained with any of the transmitters providing that care is taken with the tuning adjustments and that continual checking is made with the 'Growler'.

The plate supply equipment can be treated as three separate units. The first of these is a motor-generator rated at 1,000 volts, 300 milliamps. The machine is located in the basement and is mounted on a concrete base topped with a three-inch thick cork pad. When first installed, the motor-generator was extremely noisy, electrically, and it was necessary to shut it off when receiving. Various filter schemes were tried and eventually the machine was enclosed by a heavy galvanized iron shield. With this shield and the frame of the machine grounded, the noise was reduced appreciably, but it was found necessary to provide a filter in the power leads to the motor and to ground the centers of the high voltage condensers before satisfaction was obtained. With the arrangement shown in Figure 1 the motor-generator is now practically noiseless and break-in working is not in any way hindered.

A bank of eight 50-watt lamps (to be seen immediately above the iron shield) is connected in series with the high voltage output of the machine in order to protect the transmitting tubes and the machine during adjustment. The lamps introduce only a slight voltage drop during normal operation but serve to hold the load within

the limits of the machine should anything happen at the station end.

As the station itself is on the second

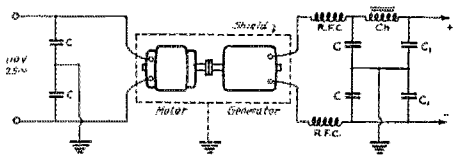


FIG. 1. SHOWING WHY THE 8CPC MOTOR-GENERATOR DOES NOT 'HASH' RECEPTION

C—1-μfd. condensers rated at 1000 volts.
C1—2-μfd. condensers of same rating.
Ch.—10-henry filter choke.
RFC—Chokes of 150 turns of 28 gauge d.c.c. wire 1" diameter.

floor, the supply leads to the motor are taken in conduit to the double pole switch at the operating table. The high voltage, after passing through the filter system, is carried to a box switch in the station with suitably insulated No. 14 gauge wires in conduit. The motor-generator is used chiefly to supply the 50-watt Hartley type transmitters.

The second plate supply unit comprises a 510-volt Acme transformer supplying a single Raytheon BH rectifier tube, the output of which is filtered by a 30-henry choke with a 2-microfarad condenser on the rectifier side and a 4-microfarad condenser on the transmitter side of the choke. This unit supplies the oscillator and intermediate amplifier tube of the crystal-control transmitter, the voltage being reduced to 300 for the oscillator by means of a series resistance in the plate lead to that tube.

The third high-voltage unit employs two of the 510-volt Acme transformers, the primaries being connected in parallel and the secondaries in series. The output of these transformers is rectified by two QRS high voltage rectifier tubes rated at 100 milliamperes and is filtered with 4 microfarads across the line. This unit delivers 900 volts on load and is used to supply the final amplifier of the crystal-control transmitter or, by the use of a switch, the 20-meter transmitter.

A Thordarson transformer with a Radiostat in its primary is used to supply the filaments of the 50-watt tubes and one UX-210 of the 20-meter set while all other filaments are supplied from a 250-watt Acme filament transformer, its primary also being fitted with a Radiostat for voltage adjustment.

FOR DX WORK

Sitting up in a box built outside one of the windows is the 20-meter tuned-grid tuned-plate transmitter employing a single UX-210 supplied with 800 volts, 70 mills without visible heating of the plate. The circuit of this set is given in Figure 2. Copper tubing ¼" in diameter is used for the inductances, four turns 3" in diameter being used for the grid and plate and eight similar turns for the antenna coil. The radio frequency chokes in both high voltage leads consist of 40 turns of No. 30 gauge d.c.c. wire wound on a one-inch form. The r.f. chokes in all transmitters are provided with 'plug-in' pins.

In speaking of this transmitter 8CPC says, 'I must confess that I am becoming very partial to the 20-meter band. QRM and QRN are practically absent and I have been able to work satisfactorily up until 11 p.m. E.S.T. The idea that 20 meters is unsuited for anything but DX has been found to be unsound since almost all the States have been worked with audibility reports varying from R5 to R9.'

THE CRYSTAL-CONTROL TRANSMITTER

Standing at the left in the general view of the station and illustrated in separate

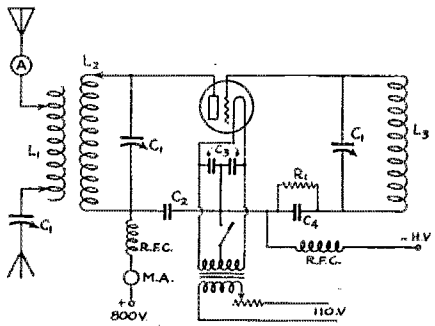
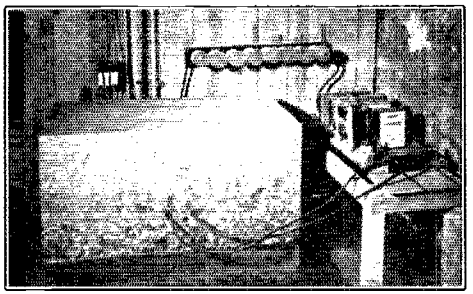


FIG. 2. THE WIRING OF THE 20-METER TRANSMITTER

A—Antenna ammeter 0-2 amperes.
L1—Eight turns of ¼" copper tubing 3" diameter.
L2-L3—Four similar turns.
C1—Tuning condensers, 150 μμfds.
C2—2000-volt fixed condensers, 2000 μμfds.
C3—500-volt condensers, 1000 μμfds.
C4—2000-volt condenser, 250 μμfds.
R.F.C.—Chokes of 40 turns of 30-gauge d.c.c. wire 1" dia.
R1—Gridleak, 12,000 ohms.
MA—0-200 milliammeter.

photographs is the transmitter which has seen most operation. The final amplifier in this set has been two UX210's in parallel, a UX-250 and a single 210. Strangely, the one 210 has been found more effective than the 250 and at least equal to the two 210's in parallel. This amplifier is excited from an intermediate 210 amplifier which in turn is run from a 210 crystal tube operating at waves of the order of 160 meters. A set of six crystals, each with its own holder, has

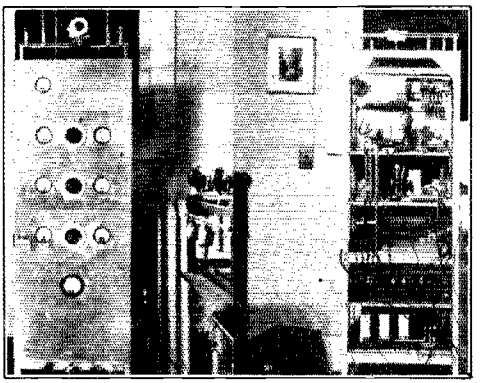
been obtained and these permit operation on 37.7, 38.5, 39.0, 40.1, 41.7 or 42.4 meters. The ability to use several waves throughout the band has been found in practice to be of considerable value. The oscillator is arranged with series feed for the 300-volt supply and is operated with heavy negative grid bias in order to accentuate the harmonics. With the 45 volts of bias and the 10,000-ohm series resistor in the grid circuit, the plate current is just 10 m.a., the radio frequency current through the crystal, as measured with a thermo-galvanometer, being also 10 m.a. The latter meter is, of course, not an essential requirement in the transmitter though it is often useful when making adjustments. The plate coil of the crystal tube consists of 40 turns of 14 gauge wire wound on a 3" bakelite tube the turns being spaced almost the diameter of the wire. Tuning is accomplished with a 250-μμfd. receiver type variable condenser. It is in the lead from this tube to the grid of the intermediate tube that keying is accomplished,



DOWN IN THE BASEMENT

Inside the galvanized iron shield is the motor-generator. On the right is the complete filter equipment. The protective lamp bank can be seen mounted on the wall.

the scheme being that described on page 33 of the July *QST* for 1927. In short, the arrangement consists of the two plates of a coupling condenser mounted on a relay in place of the contacts, a piece of .004" thick mica being glued to one plate. The throw of the relay bar (the relay is built from an old sounder) is adjusted so that the variation of capacity caused by its movement is from about 25 μμfd. to 400 μμfd. The scheme has been found to be a very desirable one. The intermediate amplifier and frequency doubler is supplied with 500 volts, the grid bias being adjusted to a value which drops the plate current to about 20 m.a. The plate coil of this tube is of similar construction to that of the oscillator though only 20 turns are necessary with a tuning condenser of 100 μμfd. A 0-3 amp. thermocouple meter is connected in this oscillatory circuit for adjustment purposes though a shunted Christmas tree lamp would serve almost equally well. The grid of the final amplifier (which is also a frequency doubler) is excited from the intermediate tube through a coupling condenser of 2000 μμfds. A 100,000-ohm grid resistor and sufficient bias is used to maintain the normal oper-



FRONT AND REAR VIEWS OF THE CRYSTAL CONTROL SET

The top shelf (including the two upper sections of the panel) is occupied by the final amplifier and its accessories. The three shelves below reading downwards contain the intermediate amplifier, the oscillator and the bias batteries. The lowest shelf houses the plate supply equipment.

ating plate current at approximately 60 m.a. when using a single UX-210. When the antenna is correctly adjusted, no appreciable heating of the plate is found even though the plate voltage is of the order of 800 volts.

Eight turns of ¼" copper tubing 4" in diameter are used in the plate circuit of the output tube, this coil being suspended with simple brass fittings from a glass 'towel-bar'. The antenna coil, mounted in the same manner, is of six similar turns. The values of all other apparatus can be obtained from the complete circuit given in Figure 3. Particular note should be taken of the fact that radio frequency chokes of different values are used in the circuits of the three tubes on account of the different frequencies being handled by them.

The frame is built from four angle-iron uprights connected together with horizontal pieces of maple which have been soaked in boiling paraffin. Five shelves are provided, these also being of paraffined maple. The lowest shelf contains the plate supply equipment for the oscillator and intermediate tubes. On the second shelf are the bias batteries. The next three shelves are occupied by the oscillator tubes and accessories, the intermediate amplifier and the final amplifier respectively. The panels are of

aluminum each being attached to a subshelf in such a manner that each unit can be removed separately for alteration or adjustment. The antenna series condenser, as can be seen in the photograph, is mounted on a glass rod immediately above the top panel.

FOR 80 AND 40 METERS

A single 50-watt tube is used in both of the 'Hartley' transmitters. The set mounted alongside the big crystal job is used for 80 meters and insofar as the circuit arrangement is concerned is completely conventional. The frame is built up from maple soaked in paraffin, as is the frame of the other 50-watt set, but in the 80-meter set (which is the more recent one) the inductances, condensers and meters are all mounted on or suspended from glass 'towelbars', an arrangement which has been found simple, inexpensive and very effective. In the 80-meter set the inductances are of ¼" copper tubing, twelve turns 4" in diameter being used for the primary and six for the antenna coil. The tuning condensers are Cardwells of 250 μμfd. capacity. The inductances of the 40-meter Hartley set are of R.E.L. manufacture the tuning capacities in this case being 150 μμfd. Cardwells. The tubes used are of the 211-D type, the filament current being maintained at a constant value, as suggested by the manufacturers, instead of filament voltage. For this purpose, a 0-3 ampere meter is connected in the filament circuits.

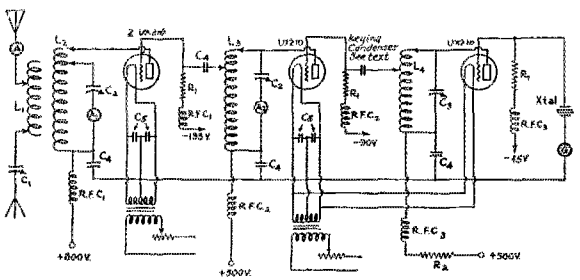


FIG. 3

FIG. 3. THE SERIES-FEED CRYSTAL CONTROL SET

Though only one or two UX-210 tubes are used in the final amplifier, sufficient grid excitation should be available from the intermediate tube to operate any tubes up to the 204 A as the output tube should higher power be desired.

A —Antenna thermo-coupled ammeter 0-2 amps.
A1—Thermo-coupled meter 0-5 amps.
A2—Thermo-coupled meter 0-3 amps.
C1—Antenna tuning condenser 250 μμfd.
C2—Double-spaced tuning condensers 100 μμfd.
C3—Receiver type condenser 250 μμfd.
C4—2000-volt fixed condensers, 2000 μμfd.
C5—500-volt fixed by-pass condensers, 2000 μμfd.
L1—Six turns of ¼" copper tubing 4" diameter.
L2—Eight similar turns.
L3—200 spaced turns of 14 gauge wire ¼" diameter.
L4—40 similar turns.
R1—Grid resistors, 10,000 ohms.
R2—Resistor to drop voltage for crystal tube; 20,000 ohms.
RFC1—80 turns of 30-gauge d.c.c. wire 1" diameter.
RFC2—120 similar turns.
RFC3—160 similar turns.

THREE ANTENNA SYSTEMS

Though various schemes were tried for operation of one antenna on the three bands not a great deal of satisfaction was obtained. Since plenty of space was available, three different antennas were erected and left permanently connected to the various transmitters. With this arrangement, a change can be made from one band to another in just a few moments. Of course, it is not claimed that the duplication of equipment on each band is simple, inexpensive or particularly efficient. The layout is merely the result of the keen desire on the part of the owner to be building apparatus continually and his interest in comparisons of the various wave bands.

For 20 meters, a horizontal fundamental antenna system is used, the total length of the wire being 35 feet. The two halves of this antenna extend from the 'window box' housing the 20-meter set in the form of a very open horizontal 'V' about 24' above ground. A condenser of 100 μμfd. is connected in series with the system for tuning. Pyrex bowls are used as lead-in insulators.

A somewhat similar fundamental system is used for 40 meters the wide 'V' in this case extending from another side of the room. The total length of the antenna is 65', tuning being accomplished with a 250-μμfd. series condenser. The leads to this antenna are taken through the three foot square plate glass pane in the window to be seen at the left of the general picture of the station. For 80 meters and 'voltage feed' fundamental system is used. This antenna is strung between a short pole on the house and another on the garage and is well clear of the other systems. No. 12 gauge enamelled copper wire is used for all antennas, insulation being provided in all cases with Pyrex glass.

FOR RECEIVING AND TEST WORK

Though a home-built receiver is also available the Grebe CR 18 is used almost exclusively. The receiving antenna is a 20 foot length of wire strung across the top of the room.

Other equipment includes a General Radio wavemeter, a grid-meter driver, and a "Growler" built from the description in the July, 1927, *QST*. The latter is used to

(Continued on Page 86)

Experimenters' Section Report

BECAUSE of the absence of Mr. Westman at the Ames-Midwest convention it comes to pass that the retiring Tech. Ed. is writing a last brief report for the section.

REPORT ON PROBLEM T-26 (KEYING)

This work was done by M. J. Hull, 653 Rozelle St., Memphis, Tenn. Keying was done in grid, plate and filament center tap circuits. The circuit was an inductively coupled Hartley (shunt feed) employing a 7.5-watt tube at a frequency of 7500 Kcs. The plate supply was chemically rectified and then filtered.

Observations:

1. 'Plate' keying, that is, keying in the supply to the plate circuit, at first resulted in heavy arcing at the key. No possible adjustment of apparatus would remedy the evil. So a resistance was shunted around

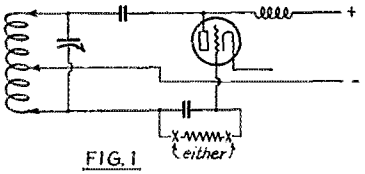


FIG. 1

the key. Such an arrangement, when the resistance was made low enough to stop arcing, resulted in a very strong 'back wave', which caused much interference and trouble at the receiving end. If the resistance was made high enough to give a moderate back wave, arcing at the key resulted.

With no keying resistance, it was found impossible to couple the antenna coil and closed circuit inductance closely, and tune the antenna circuit into resonance with the closed circuit. The less the valve of the keying resistance, the closer to resonance the two circuits could be tuned. If too close, it resulted in the circuit's oscillating erratically and the tube heating up most of the time. That is, if the circuits were too nearly in exact resonance for a given setting of the keying resistance.

2. Grid keying was the most unsatisfactory of the three. Both ways of connecting the grid leak were tried. The diagrams Figs. 1 and 2 will place the keys. They were at points marked "X". The circuit was very unstable, and showed a tendency to keep on oscillating after the key was up. Also, the key was 'hot' in Fig. 1.

3. Keying in the filament center tap was the most satisfactory of all. The circuit is shown in Fig. 3. Note that filament bypass condensers C3 (.002 μfd. each) were used, and were connected so that when the key was up they were not in the high voltage path (through the tube). The resistance was 20 ohms. This method was fairly stable but one thing was discovered that

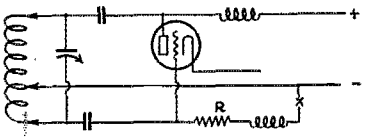


FIG. 2

should be of interest to all amateurs. In the circuit above, C_1 was .002 μfd. and C_2 was a home-made mica copper plate condenser with not nearly as large capacity. With such an arrangement, they key arcs badly at times. When C_1 and C_2 were both made .002 μfd. operation was smoother and keying troubles over.

The important effect noticed though was that the use of a .002 μfd. capacity at C_1 and C_2 greatly decreased the tendency toward flash-overs in the tube.

4. It was found that overloading the filament sometimes made the tube operate more steadily and the key better. Key thumps were perhaps less with the method of keying in the filament center tap. For a given keying arrangement and coupling arrangement, the tube operated better when

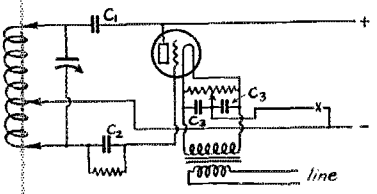


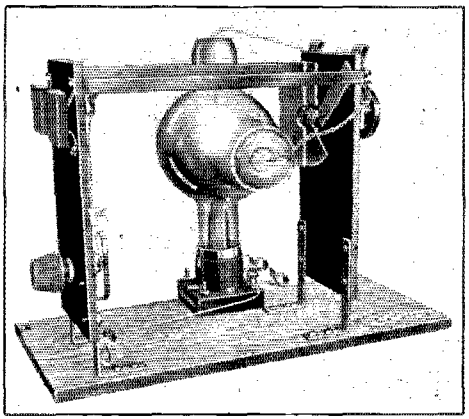
FIG. 3

the wavelength of the antenna circuit was tuned slightly below the operating wave, rather than above it.

CONCERNING THOSE SHORT WAVES

The 10-meter band is being worked on, but frankly it has been quite impossible for these desks to keep track of what is going on amidst the rather complete changing about. The developments seem not startling, however. They lie simply between the normal 20-meter results and the normal 5-meter results and to the present writer offer nothing of an experimental nature being rather semi-traffic waves.

The DX receptions have been fairly numerous, 6XI has been heard at Livermore Falls, Maine (L. C. Brown of 1AQD)



JUST TO SHOW THAT THINGS DO GET ON

The 5-watt 5-meter transmitter at 8CMP, the station of Director Woodruff, has become a 75-watt 5-meter set.

and 2EB has been heard in Europe, likewise much similar and shorter distance work has been done.

Victor Andrew of 4949 Indiana Ave., Chicago, casts the only light or originality into the matter by suggesting that he is quite anxious to work with anyone on "around the world" signals at waves below 20 meters; which is to say work on the 'echo effect'.

—*R. S. K.*

The New England Division Convention

THE 1928 New England Division Convention held at the Elks Hotel, Boston, Mass., on April 20-21 is a thing of the past, but the memory of it will last for a long time to come as having been the best ever held in point of attendance and program given the delegates.

With the largest registration on the first day ever noted, the convention was opened by G. W. Bailey, 1KH, President of the Eastern Massachusetts Amateur Radio Association and General Chairman of the Convention, with an address of welcome that made everybody feel at home. No convention is complete without a Traffic Session and the one held Friday afternoon, under the leadership of Communications Manager Handy, proved most interesting especially when all the Section Managers, with the exception of one, were present and took part in the discussions so valuable to the traffic fellows. The army was well represented by Major Van Horn and Capt. J. P. Ferriter of the first Corps Area and later, Rear Admiral Philip Andrews spoke for the Navy.

The Providence Radio Association again proved its versatility by staging a session of the International Conference much to the amusement of every one. Friday evening was devoted entirely to games and contests and the fellows did not hesitate to participate in view of all the good prizes donated by the manufacturers.

Saturday morning saw delegates divided in groups for visits to the plants of the General Radio Co., Navy Yard at Charlestown, WBZA Hotel Statler and Mass. Inst. of Tech.

The treat of the convention, however, was the Saturday afternoon session where lectures were so ably given by J. K. Clapp, 1XV, Director Elliott White, Glenn Browning, Director Woodruff of the Atlantic Division and L. B. Root.

The Banquet was one of the best and was enlivened by several popular scores being played on the big organ, by one who knows his 'pedals' (unfortunately we did not get his name), and Bob Emery, 'Big Brother' of WEEI, with his troupe of 'Jazzers'.

Our worthy President, Hiram Percy Maxim, gave us a surprise by showing up for the Banquet and made one of his good inspirational addresses. Treasurer Hebert spoke on what the A.R.R.L. had accomplished over a number of years in its fights for the recognition of the amateurs. When the different states were called upon to stand up it was noted that good delegates came from Vermont, Connecticut, Rhode Island, Maine and Massachusetts (the latter of course was expected) and New Hampshire did well considering the few licensed stations. The real convention 'hounds' were the Utica, N. Y., delegation who travelled 350 miles to see what a New England Division Convention was like; and we must also mention the Hudson Division delegation from New York City which had with them 4KT from Porto Rico.

With the distribution of prizes and the singing of 'Star Spangled Banner' the convention came to a close with every one expressing thanks to the convention committee for the wonderful hospitality shown.

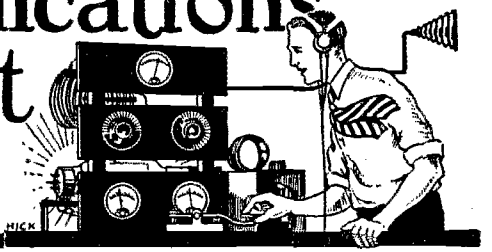
—*A. A. H.*

Strays

Robinson of nu3LW recently worked oa2YI on 20 meters at 6 p.m. E.S.T. (9 a.m. at 2YI) at which time there was daylight at both stations and all the way between, the short way round. 'Now', says 3LW, 'will someone tell me definitely and finally which way the signals travelled.'

The Communications Department

F. E. Handy, Communications Manager
1711 Park St., Hartford, Conn.



Amateur Status

WHAT is the most valuable thing that belongs to us amateurs? Without the least hesitation or doubt, it is our individual status as amateurs. It is then most important, that individually, and as an organization, we be most careful to preserve our standing as amateurs by doing nothing to harm that most precious possession, our amateur status.

Last month, a case came to our attention in which a station owner was reported to have accepted a prize (?) for originating a large quantity of messages of a direct advertising nature. The messages were of course of the 'rubber stamp' variety so that they had to be thrown out of the totals in accordance with the A.R.R.L. policy previously expressed in these columns. It may be considered a violation of the best amateur ethics for an amateur operator and station to assist rigorously in an advertising campaign even when no compensation is passed for the messages are neither friendly in character nor have they anything to do with experimental work or amateur radio as a hobby. Possibly, it is all right for an amateur to handle such messages as long as he accepts no compensation—a legal opinion probably would substantiate the right of the amateur to handle this business under those circumstances.

No brief can be held for the amateur who accepts direct or indirect compensation for handling specific messages. This is in direct violation of the terms of the amateur station license, the regulations of the Federal Radio Commission and the agreements in regard to the use of vacuum tubes and equipment 'for amateur and experimental use'. Such violations may be responsible for not only bringing individual amateurs into great trouble but may even throw a shadow of disrepute on the good name and record of amateur radio considered as a whole. The penalties are too great and neither the violations or the violators can be tolerated. Accepting compensation of *any* kind is dangerous business!

It is the purpose of this article to warn amateurs to avoid being 'used' by commercial interests in unethical ways. An amateur asked our advice recently on accepting a whole set of fine station equipment from a business house—the only string being that he should consistently try to handle some traffic with a certain foreign point. A hotel on the Pacific Coast offered an amateur radio club a fine meeting place with free light, power and heat—provided the amateurs would establish an amateur station and relay messages for guests of the hotel. A certain newspaper planned to 'organize an amateur radio club' and establish a 'net' for the collecting of amateur news for the paper. It offered the amateurs a club room and the facilities of a powerful station that it would install as 'net control station' in return for the things it could gain by making amateurs violate their amateur status! Not a month goes by without some case of this sort coming to the attention of League Headquarters. Interests finding difficulty in obtaining limited commercial licenses are trying to find ways to evade the rulings of the Federal Radio Commission and to 'use' amateur stations and status to the detriment of the amateur's own best interests.

There are plenty of legitimate activities in which amateurs may participate. The League approves amateur cooperation with worthy enterprises, sponsors tests to show the utility of short-wave communication, encourages worthwhile service to expeditions in getting their messages from the far parts of the earth. Be assured that there is nothing wrong in accepting trophies and prizes of any sort for legitimate amateur competition in communication contests. Watch carefully and refuse to enter into any agreements or alliances through which you accept anything in the nature of a consideration for services rendered in connection with your amateur radio station. There is no question of the good intentions of the amateurs involved in the several cases cited. Very great damage can be done unless there is strict observance of both the spirit and letter of the regulations involving amateur status. Avoid sugar-coated promises and opportunities which might be construed as direct or indirect compensation and a violation of amateur status. Seek competent advice before you jump at chances to get something for nothing. Preserve your most valued possession, your status as an amateur.

—*F. E. H.*

TRAFFIC BRIEFS

A radiogram from nc5AO via nu1BFT reports that nc5CP has just made the first contact between a Canadian '5' and England by working eg5HS.

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na7TE at Anvik Alaska says that winter mail service to his community is once in two weeks by dog team. Just after the carrier had left on one trip two cases of meningitis were reported from an Indian village 45 miles northeast of Anvik. Through the daily schedule between na7ADY (Latouche) and na7TE the news was sent out. 7ADY hooked up with Juneau and before the next arrival of the mail an effective quarantine was established with the cooperation of the government school agent and by authority of the health commissioner at Juneau. The arrangements were completed by amateur radio in less than one week. Just another example showing the value of short-wave communication in Alaska. Good work 7TE!

H. D. Oliver, na7AER, on St. George Island, Behring Sea, is using two complete transmitters and antennas. The 20-meter transmitter uses one UX-210 in T.P.T.G. with 400 volts d. c. from a motor generator using the third harmonic of a Hertz antenna. The 40-meter set has two UX-210's in a full wave self-rectifying T.P.T.G. with 750 volts of 900 cycle a.c. on each tube and the antenna worked at its natural period (half-wave). Both alternator and m.g. run from a bank of Exides charged by a 3 K.w. Delco plant. na7AER works numerous OA, AJ, OZ, OH, NC and NU stations in addition to eb4RS and ef8ORM. Most of his DX is worked on 20 meters as this wave is found most reliable. 7AER is on daily and has consistent schedules with nu7EK, nu6CLZ, oa5HG and most of the Alaskan stations.

When the sleet storm swept the wires away around Omaha, Nebraska, 9MI made contact with 9DR handling important A. T. & T. traffic and press. A full report of amateur work in the recent emergency in the Eastern and Central part of the country will appear in an early issue. Everybody handled his share FB as usual.

OFFICIAL BROADCASTING STATIONS

(With complete list of Canadian OBS.)

9DBJ, 9EFO, 9CAT, nc2BE, nc3EL, nc1DQ, ve3AN, nc1EI, nc1BZ, nc1DD, nc2AL, nc3CS, nc3AZ, nc5GO, nc4CU, nc4AF.

BRASS POUNDERS LEAGUE

Call	Orig.	Del.	Rel.	Total
6AJM	108	22	886	1016
7BB	288	115	234	637
9EZ	121	141	362	624
8RN	84	73	432	589
1MK	203	147	196	546
op1AD	298	82	129	509
9AIN	130	48	266	444
9DLD	16	40	384	440
6AMM	86	279	54	419
9COS	89	78	216	383
1AOO	137	82	157	376
6DJU	314	12	44	370
6CIH	8	20	322	350
8CDB	38	47	261	346
op1DR	195	83	76	344
9DTK	101	56	170	327
9BYU	88	68	170	326
8AHC	24	20	282	326
1IT	99	85	134	318
3AKB	14	51	243	308
9EBO	162	7	122	291
6CGM	53	77	146	276
9CS	16	17	236	269
8BEV	31	7	217	255
5AMO	15	28	194	237
9EAM	18	34	182	234
8DHT	61	145	26	232
1BIG	95	115	15	225
8DBM	13	18	192	223
6ZBJ	15	8	200	223
6AKQ	27	3	192	222
9CMV	61	92	66	219
1CGX	75	49	94	218
2AT	14	27	177	218
1BCK	87	57	72	216
8CVJ	75	35	98	208
8CFR	5	15	188	208
9FGD	130	22	56	208
8DED	51	34	120	205
9EAJ	4	75	125	204
7AKK	22	14	168	204
6BAM	24	47	129	200
9ENM	45	62	82	189
6BZO	15	72	70	157
9BMZ	23	52	51	126
2TY	51	59	14	124
1ACH	32	52	24	108
9ABM	6	76	22	104
7HP	21	52	25	98
9DQD	11	51	33	95

6AJM has boosted his message total and climbed to the top of the B.P.L. 7BB and 9EZ also occupy top-notch positions. Every station in the list is noted for its fine consistent operating and traffic work!

6AMM, 1MK, 8DHT, 9EZ, 7BB and 1BIG are stations responsible for over one hundred DELIVERIES in the message month. FB! Due to the delaying of official reports from the Philippines and other points some consistent Brass Pounder's cannot be included this month. Please call errors or omissions to our attention.

A total of 200 bona fide messages handled and counted in accordance with A.R.R.L. practice or just 50 *deliveries* will put you on the honor roll. Let's see you there next month, OM.

Ten Meters

A GOOD number of additional ten-meter contacts have been made over medium and long distances. This work coming so far in advance of the 10-meter DX Party, augurs well for the success of our ten-meter tests. oh6CFQ (Honolulu, T. H.) reports two-way 10-meter work with nu6BOE. He has also heard 2XBC and KEL. nu6UF since April first has been QSO 8EX, 8ALY, 8CSR, 8AHK and 2JN. He reports 8ALY's signal (Rochester, N. Y.) the best 10-meter signal on the air; the first to come in and the last to fade out. Using a 210 with 40 watts input, 6UF has been received R9 at 8ALY. They work often. nu2NM was the first real 10-meter station heard at 6UF. nu2EB has been copied R7 though. Both 5DQ (Cushing, Okla.) and 9BMX (St. Cloud, Minn.) have reported 6UF's signals several times showing that 10-meter is not necessarily a coast-to-coast wavelength.

nu6ANN (Long Beach, Calif.) built new coils for both transmitter and receiver the day he heard the band was open. After trying in vain to work a bunch of 20-meter harmonics, he hooked up with 8ALY on April 15 shortly afterward hearing 2EB, 5AUZ and 9DIJ all steady and better than R5. 6ANN suggests that the 'ten meter gang' sign 'ten' after each transmission to avoid being mistaken for 20-meter harmonic stations. 6ANN uses 80 watts input to a UX-210 in a T. P. T. G. circuit with a full wave Hertz voltage-fed. His coils are three inches in diameter and of one turn each. Schedules with east coast amateurs are invited. 7AAF (Hoquiam, Wash.) is experimenting on ten meters and will welcome test schedules with anyone.

Shifting to the East Coast nu2EB (Jamaica, L. I., N. Y.) has been copied locally by 2BEV, 2JN, and 2NM. Two-way work has been carried out successfully between these stations (across 25 miles of the sky-scraper section of N. Y. C.). 2EB has been copied on several Sundays by ef8CT (Archachon, Gironde, France). 2GP (Richmond Hill, N. Y.) has worked 2EB, 2BEV and 2AOL and heard 2NM, 2JN, 5AOW and ef8CT. 2AOL and 2BEV have heard 5AOW. 2NM and 2JN have both been QSO ef8CT and the latter says between 11 a.m. and 12 E. S. T. is the best time for this. 1CAX is said to have been reported as heard by ef8CT. 1AQD (Livermore Falls, Maine) has twice worked 5HE (San Antonio, Tex.) for considerable periods of time. He has heard 6UF and 6XI. A conventional tuner is used with 15μμf. (max.) tuning condenser. One UX-210 in Ultraudion circuit was used for the work with 5HE. 2BHF (Paterson, N. J.) reports hearing nu5PT, 5AXZ and 6XI on April 29 with very good strength for each. 8ALY was worked at various times. He was R5 at 1:30 reaching R8 to R9 at 3:00 p.m. and dropping to R3 at 4:30 p.m. 5AUZ came through very well from 2:30 to 6:00 p.m. and 6ANN was FB (R7 at 3:30 p.m.) 3AKW (Philadelphia, Pa.) has a ten meter schedule with 9ALZ and will be glad to take on some more test schedules.

eg5YK (Cambridge, England) reports copying nu2JN on Jan. 29th and later arranging a schedule with him.

8ALY says that he believes a half-wave antenna superior to similar antennas worked on harmonics. He first used a 2 λ horizontal antenna but now uses a vertical half wave Zeppelin, the antenna being a copper pipe 15 feet high. This brings in much better reports. 8ALY is planning to try full wave and third harmonic antennas soon to compare with the half-wave antenna and will let us know the result.

6UF has his transmitter fastened to ceiling of shack and uses a quarter-wave vertical portion and quarter-wave horizontal portion of his half-wave antenna. This is entirely in the clear. Next best results for him seem to have been obtained with a half-wave vertical antenna as installed at 6DBO. A horizontal antenna with Zeppelin feed has not worked out as well. 6UF points out that d.c. for an 852 may be obtained by using four 216B's or 281's bridge connected and three filament transformers insulated for high voltage, the plate-filament circuits of two of the tubes being used in series to handle the 2000 volts without a breakdown.

1MK

ALTHOUGH local time in Hartford and several other cities has been changed to Daylight Saving Time, 1MK operation and schedules continues as given in April and May QST in Eastern Standard Time as this necessitates fewest changes and inconveniences fewest people.

The list of scheduled stations remains as given last month with the exception of the following changes and additions:

WSBS (40) Yacht *Carnegie* Monday, 10:30 p.m. E.S.T.

1BIG (80) Augusta, Maine Tuesday 7:00 p.m. E.S.T.

3QP (80) Philadelphia, Pa. Mon. and Thurs. 9:45 p.m. E.S.T.

6BWH (40) San Francisco, Tuesday 12:30 a.m. E.S.T.

6CIS (40) Sacramento, Friday 12.30 a.m. E.S.T.

6EY (40) Oakland, Wednesday, 12:30 a.m. E.S.T.

8AAG (80) Oil City, Pa. Sunday 7:45 p.m. E.S.T.

na7TO (40) Ketchikan, Alaska Friday 1:00 a.m. E.S.T.

Further changes in the line-up will be made. From time to time, reliable stations properly located geographically will be given schedules and stations that are missing schedules for no good reason will be

dropped. It is suggested that when there is any delay in getting hold of 1MK direct that messages be given to any of the stations with which 1MK has schedules for QSR. Traffic for any individuals or departments at Headquarters is invited from A.R.R.L. members. Foreign members can place traffic with 9DNG, 9DGA, 9XI, 9ENM, 8CJ, nc2BR, 6NX, 6AMM or QSO 1MK directly on Tuesday, Wednesday, Friday or Saturday between 1:00 a.m. and 2:00 a.m. E.S.T. (1MK on 41.93 meters).

Official Broadcasts to A.R.R.L. Members are sent from 1MK simultaneously on 41.93 and 83.86 meters wavelength at the following times:

Sunday, Tuesday and Thursday at 8 p.m. and Midnight E.S.T.

Monday and Friday 8 p.m. and 10 p.m. E.S.T.

Whenever you want to QSO A.R.R.L. Headquarters, look for 1MK on 83.86 or 41.93 meters in the 'general' operating periods (mentioned in April, QST) and give us a call.

The Roberts' Cup

IN March, 1927, *QST*, we announced that Lt. Haydn P. Roberts was offering two cups, *'one for the Philippine amateur station that handles the most traffic with the States, and one for the American station that handles the most traffic with the Philippines, the traffic to be counted from April 1, 1927, to April 1, 1928 inclusive, and A.R.R.L. Headquarters to be the judge'.*

An award committee at A.R.R.L. Headquarters will consider station logs and message files received from U.S. and Philippine stations in line with this announcement. All logs and files must be received at League Headquarters in Hartford on or before July 1, 1928, to be entered in the competition for the cups. Philippine stations have been informed of this closing date by radiograms through op1HR and through Section Manager Jiminez, op1AT in early May. Owners of U.S. and Canadian amateur stations wishing to participate are invited to submit their entries in the form of logs and message files to A.R.R.L. Hq. before July 1, 1928. The cup winners will be announced as soon after this date as possible.

The 1927-1928 competition has been a contest between *stations* in accordance with the advance announcement (March, 1927, *QST*). As previously stated, the cup award will be continued indefinitely just as long as sufficient interest is shown. The following rules for the Roberts' Cup Award are herewith announced for the 1928-1929 competition. You will note some changes.

The 1928-1929 contest will assume the nature of a competition between individual Philippine and American *operators* of amateur radio stations. Logs and message files covering the period June 16, 1928 to June 15, 1929 inclusive will determine the winners. The closing date for receipt of logs and message files (entries) in the 1928-1929 contest is herewith set as Sept. 15, 1929. Any A.R.R.L. member in the Philippines or in the North American continent holding an operator's license and operating an amateur station is eligible to take part. Operators of stations where there are several ops must submit a separate count of the messages handled by themselves with an affidavit to that effect. The messages must be handled in accord with good A.R.R.L. practice to be counted and in verifying the message files the 'rubber-stamp' traffic will not receive full credit but will be thrown out in accordance with recognized A.R.R.L. policy so that only messages completely transmitted and received get credit. The contest is one of operating skill on the part of the individuals participating more than one of station performance although this will of course enter into the results obtained. While the 1927-1928 contest was a traffic contest in which the station handling most bona fide traffic will be the winner, the 1928-1929 contest will be of more general interest. Both traffic work and QSO's will count toward the cup.

Effort has been made to place traffic work and QSOs on a fifty-fifty basis. Separate cups will be given: one to the best operator in the Philippines and one to the best operator in the U.S.A. or Canada. Depending on where your log and message file stands as compared with the high point man in each classification, you will receive weighted credit in the correct proportion.

Logs and message files will each be rated on two counts which when added together will determine which Philippine and American operator among those entered will receive the cup award. (1) The operator handling the largest number of words (cable count check) will receive 50 points for his work. (2) The man with the highest score of QSOs will receive 50 points toward the cup. Each QSO up to and including 25 with a particular station counts one but more than 25 points per station shall not be counted. This rule in no way limits the traffic score and each further QSO should help under (1). Only solid contacts involving a communication of thought in addition to calls transmitted between the two operators concerned shall be deemed a QSO. One of the following shall be considered proof of QSO: (a) Formal exchange of messages in at least one direction; (b) entry in log of both stations showing comment exchanged. (c) Evidence in the form of bona fide QSL cards from the station worked confirming each QSO.

Participants here and in the Philippines will all receive this notice and word of the more general nature of the 1928-1929 competition at about the same time. Get busy everyone—NU's, NC's and OP's—and let's see those scores and the message totals in the B.P.L.

If you handled any North American-Philippine traffic *last* year be sure to send in log and message files at once.

Expeditions

AMATEURS are requested to listen for the Doytt-Brazil expedition (GMD) on 20.5 meters between two and five p.m. E.S.T., and on 36.6 meters 7 p. m. to 9 p.m. and midnight to 5 a.m. E.S.T. Traffic addressed to 'Alliance New York' should be mailed to North American Newspaper Alliance, 63 Park Row, N. Y. C.

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nu8CFR (Pittsburgh, Pa.) still works sb1IB nightly to handle GMD's traffic. Heavy rains have hampered operation of the main transmitter at GMD. sb1IB keeps a daily watch for GMD on 20.5 and 36.6 meters wavelength. nu8CFR and sb1IB are having most excellent success with the schedules.

Late in April, the S. S. *Morrissey*, VOQ, sailed north from Seattle, Washington into Alaskan and Asiatic waters. Operator Ed. Manley wants contact with as many amateur stations in the U. S. A. as possible. Listen and be ready to take his traffic on 20.1 and 82.3 meters wavelength. na7TO reports (via 1MK) that on May second the *Morrissey* stopped at Ketchikan, Alaska for fuel oil, leaving about two p.m. bound for Aleutian Islands and Siberia.

A large pair of walrus tusks or a polar bear skin will be presented by the Putnam Expedition to the amateur who renders the greatest service to VOQ during the present cruise. This and the H-tube offered by 8DME will be worth considerable effort. C. J. Heisey of 8DME has received a fine Narwhal tusk of ivory over four feet long, two walrus tusks eight inches long, a stone Eskimo lamp, and a Newfoundland dollar bill (result of a wager by radio) as valuable souvenirs of his good traffic work of last year with VOQ.

G. F. Hudson, engineer in charge, and R. L. Bunt ex-nc8MX, radio operator are at Nottingham Island, VCB, for the next eight or nine months with the Hudson Straits expedition. VCB is on the air on 42.5 meters every Wednesday night and has been QSO C. H. Starr, nc1AE, through which station we have the above information. A Marconi 250 watter is used with gas engine power supply. Noise from the ignition system prevents break-in and it is necessary to shut this down for copying weak signals. Give OM Bunt a long spiel while you are at it and wait while he goes into the next room and cranks the generator.

Operator George Maki who was behind the key of KDZ during the time the Wilkins expedition was at Fairbanks, Alaska writes to report the work with amateurs and to thank the stations helping to put traffic through. KDZ's first contact was with nu7ABH on March 1, the second with 6UE on March 8. Maki had to keep skedules at WXP and so seldom got a chance to get at the key of KDZ before 9.30 p.m. P.S.T. The KDZ transmitter was designed to operate from a gas engine driven generator and a d.c. driving motor had to be substituted for this gas engine to make the outfit comfortable to live with. When working 9DWN the coupling came apart and the rest

of the evening was required to get it together again. Schedules with 6ARD were kept with but few interruptions during all the time KDZ was at Fairbanks. Whenever signals were unheard or unreadable at 6ARD, 6CHL came to the front with a fine signal and this station was the last station worked. oa3WM was the greatest DX worked during the fifteen days the set was in operation. Tests made with the set in the plane proved satisfactory, signals being copied at Seward, Alaska.

WSBS

The Yacht *Carnegie* of the Department of Terrestrial Magnetism, Carnegie Institute of Washington, sailed May first for a three and one-half year world cruise. Europe and the waters of the North Atlantic will be visited in the summer of 1928. L. A. Jones, formerly of A.R.R.L. Headquarters is radio operator and observer of the *Carnegie*, WSBS. 'LJ' will work hams at every opportunity and from all parts of the earth. The transmitter uses two 250-watt tubes with 500-cycle plate supply and is crystal controlled. WSBS is licensed for 11, 16.4, 22.1, 33.2, 45.6, 65.6 and 53.5 meters, the latter wavelength being used for calling NKF on schedules which will be kept with the Naval Research Laboratory. 5AYL was the first QSO for WSBS. Except for certain hours when operation interferes with certain oceanic work tests can be made with amateur stations. The receiver covers from ten to about 78 meters and 'LJ' says to look for him on 45, 33, and 22 meters, which will be the main wavelengths for amateur work.

The measurements of magnetic declination and inclination, of electric potential gradient of the atmosphere, the study of ocean currents and temperatures at different depths and the collection of biological and geophysical specimens and the correlating of these and radio observations with the information obtained on previous cruises is intensely interesting and important work. We shall look forward to some radio reports of WSBS contacts and it will be great to work 'LJ' and hear about the strange places visited and the peculiar specimens brought to light. About 25 people are going along on the three-year cruise. It will be remembered that the Carnegie is a non-magnetic yacht completed for this work in 1909. In six cruises she has covered over 291,000 miles.

The Italian Polar Motorship, *City of Milan*, is now in Spitzbergen waters accompanying the dirigible Italia. The *City of Milan*, 1GJ, transmits a short news message on a wavelength of 30 meters just preceding each flight of the Italia and at 2300 Greenwich daily. All amateurs are requested to copy 1GJ and to inform newspaper agencies of any news sent broadcast.

Please remember to report work with expeditions to Headquarters so *QST* may carry a full account of the progress being made and of amateur accomplishment. We shall be pleased to forward QSL cards to expeditions. It is sometimes necessary to hold these until the return of an expedition when the expeditioners are at inaccessible places.

9BXB tells us that he is installing a short-wave transmitter on the Rockford-Stockholm Sweden plan which is expected to leave Rockford, Ill. about June first for the transatlantic hop. It is planned to make on stop in Greenland. The set is being built for 20- 40- and 80-meter operation and information on the call will be sent out through the O.B.S. as soon as known.

ENGLISH QRP TESTS

The Radio Society of Great Britain has arranged tests for its members, using 23, and 44-46 meters with very low inputs. Dates are: June 9 to June 17 inclusive. The fellows entering want to effect as many two-way contacts as possible, and we ask all other countries in the world to help them by giving preference to EG contacts during that period. We hope that all the EGs heard then will be using low power. Also, these fellows want cards confirming the QSOs. Don't mail them direct, but save cash by mailing them in one bundle to QSL Dept., R. S. G. B., 53 Victoria Street, London, S.W.1. In order to encourage EG contacts we will send a certificate to the station in each continent outside Europe who helps these fellows the most. There will be two certificates for North America.

TRAFFIC BRIEF

On April 19 the East Bay Section held a successful northern and central California hamfest and A.R.R.L. dinner at the Rainbow cafe in Oakland. 6CZR presided. Following interesting talks by Director Babcock and Lieut. White, 6NX, 6ALX, 6ZX, 6CKC, 6DDN, and 6CLS spoke. 6BAA, 6CW, 6RJ, 6CKC and 6BFU added their talent to the gathering and the meeting ended with a raffle of radio equipment.

DIVISIONAL REPORTS

ATLANTIC DIVISION

SOUTHERN NEW JERSEY—SCM, M. J. Lotysh, 3CFG.—Seven ORS reported this month. Some of the rest ought to be ashamed to look at their certificates. Unless a report or a good reason is forthcoming next month there will be some cancellations. 3CFG leads the section, but failed to make BPL. 3BSD worked like a Trojan and has a fine report. 3AOC's 201A was heard in Europe on 80! 3UT reports lots of activity down his way and has a fair total. 3ZI hindered by irregular work'ng hours. 3BWJ has bad QRM from school. Tough luck, OMs. 3JS went to the N. E. Div. Convention and had lots of fun. 3BSD worked 18 foreigners and 49 west coast hams this month! 3ABO, 3AIO, 3AOM and 3UK, all non-ORS, sent in nice reports. FB. 3ADL applied for ORS. Let's have more. Come on gang, you voted for me as SCM now do the rest and back me. Send in your monthly reports, as I hate to have to cancel any appointments.

Traffic: 3CFG 152. 3AOM 44, 3AOC 43, 3ZI 40, 3UK 24, 3ABO 17, 3BWJ 12, 3AIO 10, 3SJ 2, 3BSD 114, 3UT 23.

WESTERN NEW YORK—C. S. Taylor, SCM. 8PG—8AFG has been handling Traffic. 8AHC has a good report on Traffic. 8AID is a new addition to our throng. 8ANX is moving his shack so transmitter is out of commission. 8ARX is another new one busting into our ranks. 8AVS has worked 46 states and several foreigners. 8AWG will be with us again after an absence of two years or more. 8AYU has handed in his last traffic report as he will be off air until a place can be found to maintain station. 8BCM works West Coast and handles traffic. 8BFG handles Traffic when opportunity permits as he is working. 8BLP is building a new station. 8BRD reports 8AAU. 8AEC are new stations in Rochester. 8CYI is now 8BAF. 8BRJ handles traffic on 81.5 meters. 8BUP says traffic is slight due to trying out 20 meter band. 8BZP is silent because of an accident which laid him up for some time. 8CDB has a whale of traffic report. 8CTL is secretary and 8BIN President of the Syracuse Radio Transmitting Assn. 8CDC paid a visit to 8HJ at Elmira and to 8ASK. 8CNH is busy with school so his report is nil this month. 8CPC who conducted a radio class at R.A.W. N. Y. meetings has the distinction of having every student pass the Federal exams. 8CNT is now an official broadcasting station for the A.R.R.L. 8CAN has been heard in Germany. 8CNX still remains in the BPL. 8CMW a new born ham comes to notice after six years of practice and is after ORS. 8CRF is under-going extension repairs and intends using mercury arc rectification. 8CSW will soon be the proud possessor of an ORS. 8CTL shoots msgs to Germany through N.C.-1AX on schedule. 8CVJ makes the BPL again and has many schedules. 8CYB has come on again after being silent for some months. 8DBI is handling traffic afternoons from WHAM. 8DII a new ham in Binghamton, N.Y. 8DME got a fone call from WEAF and hooked up with NU-2UO to get press from Germany on Bremen fliers. 8AE worked 48 hours straight on this scoop after hooking up with 2UO. 8DQP sez his sigs don't go West anymore. 8DSP keeps in communication with his relative at Syracuse through 8DEH. 8NT is busy at college. 9PI has paid 8AKE a visit. 8PJ is still waiting to hear from some of the delinquent Hams who have promised to get their reports in regularly. 8TH is handling traffic and also doing fine work for the Boy Scouts.

Traffic: 8AHC-326; 8ARX 36; 8AYS 23; 8AWG 3; 8AYU 12; 8BCM 2; 8BFG 9; 8BUP 2; 8BUJ 2; 8BMJ 15; 8CDB 346; 8CDC 17; 8CNT 10; 8CNX 118; 8CSW 116; 8CTL 34; 8CVJ 208; 8CYB 9; 8DBI 18; 8DME 106; 8DQB 48; 8DSP 107; 8TH 10.

WESTERN PENNA., SCM—G. L. Crossley, 8XE—The following report from Erie. 8AMA is being rebuilt and will be on the air with a 50 watt bottle. 8LS is also installing a 50 watter. 8DOB and 8DRU have phones on 80 meters. 8BHN is trying phone on 5 meters. 8CAE is going to install phone. 8BTD is on the air again. 8DRU, 8CAE and 8VF are open for traffic. 8DBJ has left for Chicago to learn to fly. 8AEF has junked xstal for the old Hartley. 8CFR is doing some good DX message work. 8CUG is doing his bit with traffic on 80 meters. 8ARC is on 20 and sez he has yet to find any real traffic on that band. 8BGW sez he would like to see some real action on off wave stations. 8DKS has not been on much during the last month. 3GI has schedules but they were irregular. 8AGO had little to report but when a man is about to be married what can you expect. 8DOQ will operate 8DKQ while his 50 watter is taking a rest cure. 8CYP has a set on 10 meters experimenting. 8CMP spent plenty of time visiting other divisions, and their conventions. The gang at 8XE hopes to see some of the other Directors visit the Atlantic Division Convention in State College, June 14, 15 and 16. The gang at 8XE invites all in the A.R.R.L. to be at the convention. You will miss something if you don't come.

Traffic: 8CFR 208, 8GI 160, 8DOQ 70, 8CEO 62; 8XE 54, 8AEF 44; 8CUG 38; 8CNZ 18, 8CYP 16, 8BGW 16, 8DKS 10; 8AGO 9.

EASTERN PENNSYLVANIA—SCM—J. B. Morgan 3QP—3ZF is now the chief Route Manager for the Section. Dont forget to keep him informed of your schedules, fellows. 3ZF and 8RQ are both rebuilding. 8WJ has his new crystal perking nicely. 3AFJ was away for several weeks. 3LC is certainly stepping up with eight stations on schedule. 3QP is working 20, 40 and 80 and lost three good schedules when daylight saving started. 3AKB continues her good consistent work. 8AVK reports trouble with h's new crystal outfit. The BCLs are on the trail of 3AQI but it doesn't seem to cramp his total much. 8CWO is a new station in Scranton. 8DHT shows a good total and blames it in schedules. 3BFL will be inactive for a while. 3ADE isn't doing much just now due to irregular hours of working. 3ZM's xtal is working FB. 8RQ's new license has been received and when he gets going at his new QRA, all will be well. 3QM says things about the same with him. 3VF reports receiving trouble but hopes to have it fixed soon. 3HH took a msg from 1ART for England and placed it in the town in England to which it was addressed, in 12 minutes.

Traffic: 3ZF 71, 8WJ 49, 3AFJ 15, 3LC 97, 3QP 121, 3AKB 308, 8AVK 60, 3AQI 27, 8CWO 25, 8DHT 232, 3ADE 146, 3ZM 3, 3QM 69, 3VF 3, 3HH 14.

CENTRAL DIVISION

KENTUCKY—SCM, D. A. Downard, 9ARU—QRN season is here but thnigs are still going strong in this Section. 9ENR is waiting for a new 852. 9ATV is off until he gets a new license. 9EKM says he is going down to 20 meters and work some real DX. 9MN sports a new pair of sticks and Hertz. 9BWJ is working on xtal-control and expects to be on the air in a few days. 9BAZ worked two new countries with a 50 since his 250 went west. 9AID says EG stations report his signals R-7. 9BAN writes a letter each month instead of sending in the Form 1 card, thereby giving the SCM all the news of his locality. FB. 9BAN is a real live ham and operates a first class station. 4PU paid the Henderson gang a visit last month. Someone told the SCM that 9DQC owns two drugstores, a motor boat and a dog (by name of Jiggs) and still has time to pound brass. Hi. 9ARU is still hitting on 210. 9OX entertained a gang of hams from Louisville, Lexington, Ky. and Jasper, Ind. to again celebrate the departure of 9BCL for Sioux City, Iowa. Bod Parmenter. ex9WR, now op at 1MK, was certainly missed by the gang.

Traffic: 9FBV 94, 9BAN 50, 9BWJ 22, 9EKM 14, 9BGA 13, 9BAZ 13, 9ATV 10, 9AID 10, 9MN 6.

WISCONSIN—SCM, C. N. Crapo, 9VD—9DLD is determined to keep his place at the top of the list all summer and is adding new equipment for 20 meter work. 9DTK worked gi-A8 about 1000 miles east of Cape Horn on 40 meters. 9BYU has 10 skeds and says his ham bulletin brings him a lot of traffic. 9EBO piled up a lot of traffic by having a contest between ops. 9DLQ attends the Milwaukee club meetings regularly. 9BPW's skeds beginning to slip a little on 80 but will be using 20 more now. 9ABM says his 50 waiter is still doing duty. 9EEF keeps three skeds and reports things going fine. 9EK-XH now have 500 watts on 38.4 meters. 9BWO still works EG, EF, OH and all other foreign ports. 9SO handled some press traffic for Milwaukee during the Omaha blizzard. 9EMD is off the air until his new license comes. 9DNB has schedules with 9DLQ and 9BYU. 9DND keeps on schedule and works an occasional OA. 9LV uses a 210 on 40 and 80. 9EQB reports for the first time and is using a UX250. 9ESM's new TPTG is FB. 9FHS worked ef8FD and eg5YX. 9EIH says he only handles a few msgs so he can report each month. 9DEK is down on 20 for the summer. 9CVI has his new mast up and will be on 20, 40 and 80. 9AZN says the Lacrosse Radio Club will have two picnics this year. 9BJY says 40 is getting so terrible he has cancelled all his skeds. 9FHU is a new station at Mosines. 9EHD is pretty busy at college. 9BAW has one schedule and that one is doubtful. 9EBT is using fone. 9EYU works eg, oz, sb, fo, WNP on 20 meters. 9CFT has moved to 421 Walton Place, Madison.

Traffic: 9DLD 440, 9DTK 327, 9BYU 326, 9EBO 291, 9DLQ 149, 9BPW 136, 9ABM 104, 9EEF 88, 9EK-XH 53, 9BWO 51, 9SO 51, 9EMD 46, 9DNB 35, 9DND 38, 9LV 31, 9EQB 30, 9ESM 20, 9BWZ 20, 9FHS 19, 9EIH 18, 9DEK 16, 9CVI 13, 9AZN 13, 9BJY 10, 9FHU 10, 9EHD 7, 9BAW 7, 9EBT 7, 9EYU 4, 9ASL 2.

OHIO—SCM, H. C. Storck, 8BYN—Well, gang, only two made the BPL this time. 8RN and 8DBM. Old QRN sure has been getting in his death strokes on traffic and the summer slump is on. 8RN is leaving to pound brass in a commercial way. 8DBM is going to 40 for the summer but intends to keep his schedules going. 8CXD's 'S' tubes and plate transformer went west and he is looking for others. 8DSY reports his 852 going great on 20. 8BOR did some work locating a lost son for his parents. The SCM has been too busy otherwise to handle much traffic since schedules all dropped out of sight. 8AMI sends in a plea for a schedule with Cleveland and Pittsburgh. 8CQU has been very QRW. 8BBR has been much bothered with power leak and Xray QRM. 8CNO is working mostly on 80. 8DBM didn't do much because of sickness in his family. 8DDK has been busy fixing his set so as not to bother the BCLs. 8DTN is still keeping a traffic schedule with gi-A8. 8JB has had the tough luck to lose his call tho his license had not expired. 8GZ has a new Xtal on exactly 8000 kc. 8AZO has been experimenting with plate supply. 8BFA wonders if there are any good stations around Ohio to keep schedules with thru the summer. 8CCS also has been kept from his set because of the sickness of his mother. 8BAC has been too QRW work and YLs to do much with traffic. 8DJV has been getting good reports from DX stations. 8CQ had his Kenotrons and blew them within three days. 8CNC has been having trouble with the BCLs tho another is to blame. 8BBH at last is actively on the air again. 8CNU is lining up new schedules and hopes for more traffic next month. 8OQ also had his schedules go 'hay wire'. 8QV's antenna blew down and he has been working on a low 20 meter affair. 8AVX has no information. 8PL has been having transmitter trouble. 8BKM wants more stations on 80 at noon, when QSO is FB. 8BKQ has no news either. 8BOP is using a 210 now. 8CFL has been busy with baseball practice. 8DJG has been DXing. 8DQZ is busy at school. 8DMX had the tough luck to burn out his MG. 8DPF will be with us again about Sept. 8DHS had his antenna wrecked by a sleet storm. 8AQU has his QRM trouble cleared up and will be going again soon. 8BEV reported by radio and will be off for a while pounding brass commercially.

Traffic: 8RN 589, 8DBM 223, 8CXD 119, 8DSY 118, 8BOR 113, 8BYN 113, 8AMI 82, 8BAU 76, 8CQU 76, 8BBR 72, 8CNO 67, 8CMB 60, 8DDK 53, 8DTN 50, 8CWC 41, 8PP 38, 8GZ 33, 8AZO 26, 8BFA 19, 8CCS 19, 8BAC 18, 8DJV 16, 8CQ 15, 8CNC 18, 8BBH 18, 8CNU 13, 8OQ 11, 8QV 9, 8AVX 8, 8PL 7, 8BKM 7, 8BKQ 6, 8BOP 6, 8CFL 6, 8DJG 4, 8DMX 2, 8DQZ 2, 8BEV 255.

MICHIGAN—SCM, Dallas Wise, 8CEP—9CEX is active again and handles a few. 8AUB says the Club has slowed down a little but have some great things planned for the summer. 8CKZ has changed QRAs and will be off the air temporarily. 8DCD has opened

up again and is QRV traffic. 7CHT is now working 80 and 20 and has a new Op on the job also. 8BWR, the Michigan State College station, started out with a bang with their new 40 meter transmitter. 9CSI has dropped to 20 for the summer and says it is better than 40. 8AJL complains of YL QRM. 8DSF was silent most of the month but found time to get over to Lansing. 8BJQ is going great for a starter. 8RE reports hard luck working on 20 and doesn't seem to have the QSO's lately. 8DKX has been doing good work on 20 and worked an OH with an indoor Hertz. 8CAT will be ready soon with 2UX-210's with DC plate supply. 8CJ has been doing some 10 meter work. 9CM is building a new shielded receiver. 8AAF has been trying fone. 8AMS has the transmitter rebuilt but no time to use it. 8CU is going to change over to DC and use a UX 250. 8BRS reports traffic is poor up his way. 8NQ blew one of his fifties. 8DED says he will be busy with baseball from now on. 8BED still stays at the top of Michigan's tfc stations. 8DAQ has moved and reported via radio. The 7th Michigan Convention held at Lansing April 27-28 was well attended and a good time was had by all. Sure was great to see the old timers there and also the many new faces which shows that the game will never grow old. Congratulations to the gang that put it over. 1BUD, Budlong, represented headquarters, it being his firstMichigan Convention.

Traffic: 8BRS 5; 8CU 37; 8NQ 12; 8AAF 19; 9CM 10; 8CJ 20; 8DXK 57; 8RE 2; 8DJQ 21; 8AJL 12; 9CSI 70; 8BWR 27; 8CHT 3; 8DCD 18; 8CKZ 2; 8AUB 85; 8CEP 28; 9CEX 24; 8DED 205.

INDIANA—SCM D. J. Angus, 9CYQ—A new radio club has been organized at Richmond, Ind. Good amateur radio clubs are going full blast at Fort Wayne and Indianapolis and we urge all amateurs or others interested in the transmitting game to attend their meetings and if interested to join. 9DPJ and 9CLO were QRMed by the arrival of baby girls. The new R.I. held a license exam at Indianapolis and made a very good impression on the gang. 9EZ runs off with the honors this month. 9AIN comes next due to his many schedules. 9CMV got his total with a mercury arc rectifier. 9FGD operated 24 hrs per day to get his total. 9FQ is instructing at the telegraph school at Valparaiso. 9EYA is back after blowing a flock of tubes and condensers. 9FLU, a telegraph op, is a new ham at South Bend. 9ASX, after 3 years trying landed an OA and an OZ. 9DBJ is moving and putting in 20, 40 and 70 meter sets. 9AXH is building a new 40 meter Xtal controlled transmitter. 9AYO and 9ABW want skeds on 40. 9CSP and 9DBA want skeds on 80. 9BKJ is on 40 and 80 using two different Xtals for qsy. 9CMQ bought 9CUD's Xtal and is instal'ing it on 80 and 40. 9BZZ has installed a 203 tube on 21 and 42. 9EDC is a new station at Richmond. 9AEB is putting in a 10 meter set. 9CNC worked 1LAV on 40 meters. QRA? 9AIP blew two 210s and has no more. 9ENX has been ruined by the YLs. 9AJF was wrecked by the inspector for not attending the exam. 9EEY blew his plate transformer and is ND now. 9EPH is putting in a UX852. 9AUB is back on the air after a trip to South America as op. on a passenger ship. 9AAI is on fone with a 203A as an oscillator. 9BWI has a Xtal controlled fone. 9LR moved from 40 to 80. 9MQ gets out better since he put in his zepp antenna. 9EHQ is a new Fort Wayne ham. At the next club meeting the Fort Wayne gang intends to initiate all of the members taken in since Jan 1st, provided there are enough old timers to get away with it.

Traffic. 9EZ 624, 9AIN 444, 9CMV 219, 9FGD 208, 9CRV 184, 9ASX 111, 9CBT 58, 9CLO 36, 9CYQ 25, 9AUB 10, 9DSC 3, 9AEA 2, 9EKW 51, 9EPH 2, 9EEY 16, 9ENX 3, 9FCG 15, 9CNC 34, 9DBA 30, 9AEB 3, 9BZZ 27, 9BKJ 13, 9BYI 13, 9CSP 9, 9ABW 6, 9AYO 8, 9EGE 8, 9DBJ 13, 9FQ 77, 9EYA 24, 9AAI 11, 9BWI 5, 9AMZ 2.

ILLINOIS—SCM, W. E. Schweitzer, 9AAW—9AAW has been entirely rebuilt. 9AD is operating on 39 and 76 meters. 9ACU has been busy farming. 9AFA handled all their traffic with WNP. 9AFB is using T.P.T.G. on 37.8 meters. 9AFF is being rebuilt to run tests on Television. 9AFY is very QRW. 9AGG says morning schedules are FB but it's nice to stay in bed 9AHJ blew his transformer so will be off the air for a while. 9AHK reports traffic getting scarce. 9ALK has been sick so not much traffic was handled. 9AMN reports those messages to Russia in the Russian language are terrible. 9ANQ is on regularly on 20 meters and is arranging a schedule with eg-2NH on ten meters. 9APY has been rebuilding his transmitter to get away from key clicks. 9AQA is still pounding out lots of traffic. 9AVP has been keeping a schedule with fl-1AW. 9AWX reports the Joliet Radio Club is holding regular meetings. 9BHM is going to get the air port in Danville to install a station. 9BLS has been very busy with track and school work. 9BMZ moved to a new QRA in Maywood. 9BNI is keeping schedules with 9COS, 9AMO, 9DZW, 9EBO. 9BPX has been off the air rebuilding the station for fone operation. 9BRX put up a zepp antenna and it seems to be the berries. 9BSH has a schedule with oh-6CH but bad QRM caused a change to be made and Er-3 takes all the traffic for the west coast and Hawaii. 9BTX is still operating on 38 and 76 meters. 9BZO thinks he worked gi-A8 and is waiting for a QSL to check. 9CAR reports DX on 20 meters FB and the station is keeping several schedules. 9CCZ is operating on 80 meters. 9CKM didn't get good results on 40 so the station is back on 80 meters again. 9CKZ was off the air for two weeks with a burned out generator. 9CN has just returned from a trip to the east. 9CNB continues with good reception and DX. 9CNY says now that summer is here, he will be working in the early morning and also on 20 meters. 9CSB says DX is FB but is busy with school work. 9CUH is handicapped by some undiscovered QRM. 9CUO is building a portable transmitter for his Ford. He says 9DYW works the U.S.A. with a 201A and B eliminator. 9CZL shot his 50 and his plate transformer. 9CZT is rebuilding his chem rectifier. 9DBI worked a ship near Panama signing MD on 40 meters. 9DCK has worked all continents but Asia with his 210 tube. 9DGA says nine active stations are on in Galesburg. 9FGZ and 9FKO being new ones. 9DOX reports traffic somewhat better. His schedule with 9CNH was interrupted because the latter was busy painting. 9DSO worked oh-6ADH for 90 min. the other am. 9DSU is a ham actor in the school play "Penrod." 9DWP was kept busy with business. 9DXG kept on the air with a borrowed 50 after blowing his own. 9EAI moved his station to the high school for a demonstration. He reports that 9DQY forwarded 15 messages by Western Union that he had taken from storm-swept South Dakota. 9EAJ ran up a fine message total even though he had no schedules. 9ECR reports nothing new at the station. 9EHK just says "YLs". 9EJO worked OA, OZ, OO, EP, EF, EG, EC, NN, SJ, NM. NQ, XAR and FQ all on 40 meters. FB. 9EPG is going to get a 50 or 852 on the air soon. 9EPX is moving to Wright City, Mo. 9ERH worked several EF and EG stations. 9EYA is changing from a Hartley to a MOPA transmitter. 9FDR is a new station on the air. 9FDJ is the only ham in Atlanta, Ill. and finds it hard to learn the ropes without any others. 9FO says a new edition of the call-book will be printed in June. 9GV worked OA stations 46 times during the last month. 9IZ is going to try 80 meters. 9KA had little time for radio because of long hours at work. 9KB is trying out a new key clickless transmitting circuit. 9MI dropped down to 20 and gets out much better. 9QD has a crystal control transmitter, the first in Cicero. 9UX isn't on due to school but reports to let us know that he is still on earth. 9ZA worked OA-6SA in daylight on 40 meters.

Traffic: 9EAJ 204, 9AQA 194, 9BZO 157, 9BXB 155, 9BNI 138, 9BMZ 126, 9AMO 116, 9CAR 103, 9APV 94, 9BSH 83, 9AD 79, 9AFA 73, 9CSB 64, 9FO 60, 9CIA 58, 9CZL 56, 9DCK 57, 9CNB 45, 9DQY 44, 9BTX 42, 9DOX 40, 9DGA 36, 9CNY 36, 9EPG 32, 9AFX 26, 9AGG 23, 9AHK 66, 9DSO 23, 9CUO 18, 9AAW 17, 9EAI 16, 9EJO 14, 9QD 12, 9ALK 11, 9IZ 11, 9AFB 10, 9CUH 10, 9DSU 9, 9GV 9, 9BHM 9, 9FDR 8, 9ERH 8, 9ANQ 8, 9CKM 7, 9CCZ 7, 9CZT 7, 9CN 7, 9KB 7, 9AFF 6, 9AMN 6, 9AVP 6, 9DBI 5, 9EYA 5, 9MI-9PU 5, 9ECR 5, 9ACU 4, 9AHJ 4, 9DXG 4, 9EPX 3, 9CKZ 2, 9BLS 1.

DAKOTA DIVISION

NORTHERN MINNESOTA—SCM, Cy L. Barker, 9EGU—The end of this month official closes our Section Contest for the Shield Grid tube. 9ABV went after the tube with "win, wigor and witality" and he GOT it. FB and congratulations, OM. 9EHO comes in second place in traffic this month. 9EGF has been busy lately. 9AOK got a report of being the loudest nu heard in Brazil. 9CWA just got down to 20 meters and worked RJC right off the bat. 9KV reports that navigation is about to open on the

lakes and that means less short wave work for him. 9EGU has his crystal set perking nicely on 42.56 and 21.13 meters. 9CIY finds DX wonderful and works plenty of it. 9DPB built a new transmitter which perks fine. 9BMX is still working the same old set and had 24 foreign contacts last month. 9GZ put in a new 852 and wants a schedule with the Twin Cities. 8CF reports QRM fierce on 40 meters. 9ADS operates one night a week at 9XI and has lots of DX there. 9CTW sold most of his transmitter but has enough left for a set on 20 meters. 9BIW says he has been playing solitaire on 10 meters. 9AKM finally got arranged so he can QSY all bands. 9BVH has started to grind crystals and is on irregularly. 9EHI, a new ORS, is on 20 meters almost exclusively. 9BCT, another new ORS, just QSYed up to 80 meters. 9BBT says business is almost too good to be on the air. 9DUV is back at his home again, after several spasms of relief work.

Traffic: 9ABV 144, 9EHO 70, 9EGF 62, 9AOK 54, 9CWA 42, 9KV 28, 9EGU 36, 9CIY 25, 9DPB 25, 9BMX 21, 9GZ 17, 9CF 11, 9ADS 11, 9CTW 8, 9BIW 7, 9AKM 4, 9BVH 4, 9EHI 2, 9BCT 1, 9BBT 1.

SOUTHERN MINNESOTA—SCM, D. F. Cottam, 9BYA—9COS certainly has a beautiful batch of traffic. 9BN has been on regularly with 3 ops handling a nice bunch of traffic. 9BHZ is on 40 at noon and evening. 9EFK handled oh and nm traffic. 9BFO, a new reporting station, is doing very nice work. 9EFO is the new Army Amateur control station for Minneapolis. 9DOP after a change and revamp of the junk is doing some nice work. 9AIR is on 10, 20, 40 and 80 and has a new portable call, 9FGK. 9DBW has been working on a hamfest to be held May 26 so his traffic is low this month. 9XI has a new chief op who makes things hum. 9BTW was QSO gi-A8 for 1½ hrs. 9ELA worked KDWU on 20. 9BKX was out of commission for a few days on account of a blown rectifier tube. 9DGE is an op on the river barge line and on his trips down the river, has the hams meet him for a chat. 9DBC is still at school at Waukegan, Ill. but will be home May 5th. 9DEQ has had illness in his family so was off the air. 9ELY has QSY'd to 20 and says there is nothing like it. 9DZA is selling some of his junk as he is moving. 9ERT is on 20 with 4 ops and want to get in touch with other high school stations. Beginning May 1st, the Minneapolis Journal will print ham information of the state of Minnesota. Any information you have *please send* to 9DHP, 2515 Irving Ave. So., Minneapolis for publication.

Traffic: 9COS 383, 9BN 75, 9BHZ 57, 9EFK 43, 9BTW 40, 9BFO 25, 9EFO 21, 9DOP 20, 9AIR 17, 9DBW 14, 9XI 13, 9DHP 11, 9ELA 9, 9BKX 7, 9DGE 4, 9DBC 2, 9GH 2.

SOUTH DAKOTA—SCM, F. J. Beck 9DB—9DGR is keeping the daily sked with OA5HG when weather permits. 9BOW and 9BRI are having fine results on 20 keeping the NA sked in fine shape. 9DWN worked an "eg" on 20, also "OH." 9BKB is having trouble with RI subject renewal op. License. 9DB is on 20 except for A.A. skeds. 9DNS swears by his 222 R.F. AMP. and is figuring on a M.O. set 9EUH has fine results with new antenna. 9CJS is on 175 meter fone and building a bunch of new Xmtrs. 9FAZ is a new station in Bryant. 9DLY is working with the telephone crew. 9AJP reports dx and traffic good. 9AZR handled a bunch of rush death messages for W.U. when lines were down. 9ESP is a new station at Platte. 9BBF is working all the dx in sight as usual. 9BOT is busy on the farm. 9ADQ was appointed an official observer. A great many of our best traffic stations working on 20 meters complain of QRN on 80.

Traffic: 9DGR 73, 9BOW 37, 9DWN 35, 9BKB 34, 9DB 31, 9DNS 23, 9EUH 19, 9CJS 19, 9DLY 15, 9AJP 11, 9AZR 10, 9BBF 7.

NORTH DAKOTA—Acting SCM, Prof. H. L. Sheets, 9DM—9BJV has no traffic to report but bought a new UX-222 and is building a receiver around it. 9DYA is still trying low power fone on 160. 9DM has been on and off but managed to find time to handle a little traffic. 9BVF blew his 210 and is on with a 201A. 9BRR has been busy with his railroad work but manages to keep a few schedules. By the way, fellows, there is going to be a housecleaning of those dead ORS and those who do not report. It is up to everyone of you to make this Section a live one and that is one way of doing it—to report regularly! 9CDO is busy just now. Ex-9BHU at Hickson is back on with a spark coil plate supply. 9AAM at Colfax is on occasionally. Ex9EBT is back again with the call 9DIC. He has a real punch, too. 9CAP is not on very much. If any of the new members of the gang want any advice or information concerning traffic handling or reporting, don't be afraid to write your SCM. Traffic: 9BYF 93, 9BRR 36, 9DM 33.

DELTA DIVISION

ARKANSAS—SCM. Wm. Leonard Clippard Jr. 5AIP, ACA;—The spring fever may be the cause for several inactive stations this month but 5AQX turns in the best report we have had for a long time. 5AVA reports fierce QRM from school. 5JK has been silent this month for some unknown reason. 5SS worked an OZ. 5ABI continues to plug along fb. 5ABD has a mg. 5HN is winding up for summer work. 5AFR has been on a bit. 5CJ is planning to get back with us. Fellows, I have one more month to be your SCM before I leave. You had better be looking around for the fellow you want to take my place, because we don't want to drop out in the least. Let's stick to it and all stand by the SCM to be. You can sure help make his task easier by doing your bit.

Traffic 5AQX 56, 5ABI 30, 5SS 12, 5CK 12, 5AVA 5.

LOUISIANA—C. A. Freitag 5UK—5ANC is now on 40 meters with two UX-210 tubes. 5PM is trying hard to get down to 20 meters. 5EB has blown his 203 A tube and is now using an 852 with mercury arc rectifier. 5NS is working both 20 and 40 meter bands with good results. 5RD has been handicapped by a lack of proper power. 5WY is shut down as is QRW as Asst. Engineer KSBA. 5AGJ runs AIR-Phan Radio Shop and is very QRW. 5ML is using phone on 150 meters; 5FX is at Culver City Military School and is QRT. 5KZ has YL QRM. 5AXA is a new operator. 5KH has a first grade commercial ticket. He and 5APA who is back from seismograph party, have consolidated junk and are getting out with two 201-A tubes. ER-5 (US Army at Galveston) is arranging schedules, day and night, with Shreveport Stations to handle emergency airplane traffic for Army planes.

Traffic 5KH 77, 5ANC 33, 5PM23, 5IE 17, 5EB 16, 5NS 12, 5LV 9, 5AOZ 6, 5RD 2, 5UK 13.

MISSISSIPPI—SCM—J. W. Gullett, 5AKP—5FQ has been on the sick list so not much traffic handled. 5AYB has moved down to 20 meters and complains that there isn't much traffic in the evening. 5AJJ reports QRN on the gulf coast terrible. 5API says that fone has CW beat more ways than a country boy can go to town. 5AGS reports not much doing as he is only on the air from 6 to 6.30 pm every evening. 5ALZ is now back with us on 20 meters. 5AKP works all U.S. Canadian districts at will both day and night.

Traffic: 5AKP77, 5FQ 19, 5AYB 17, 5AJJ 6, 5ANP 6, 5API 5, 5AGS 3.

HUDSON DIVISION

EASTERN NEW YORK—SCM, F. M. Holbrook, 2CNS—Twelve stations report 317 total messages. This cheers the new SCM mightily. Thanks OMs. 2AXX, the sky pilot of Castleton-on-Hudson, is a new ORS. An ORS is reborn, 2BKE, ex 4UO from Atlanta who keeps two skeds a week with 4RN. The N. E. Div. Convention at Boston on April 20 and 21 gave a "good time" to our Larchmont Radio Club delegation, 2QU, 2JE, and 2AYK. 2APQ fears atfc jam and will soon put on a YL assistant op for life—more of this later. 2ANV burned out 3 transmitter tubes and grid leak but is back and happy again. 2ABY is open for tfc at noon daily. 2AYK nearly made B.P.L. and wants ORS. 2JE loaned the SCM a receiver in emergency. 2QU our RM is planning reliable routes to link all parts of our section for quick deliveries. 2BOW is playing with television. 2ACD has QRM from bad power leak. 2BV is still on DX but gets a real thrill in tfc. 2SZ has rebuilt transmitter to work on either 20 or 40 meters.

Traffic: 2AYK 83, 2QU 64, 2APQ 44, 2BKE 27, 2AXX 19, 2ANV 13, 2CNS 7, 2ABY 6, 2BOW 20, 2ACD 22, 2BV 1, 2SZ 11.

NEW YORK CITY & LONG ISLAND—Acting SCM, J. B. Kilpatrick, 2EV—Manhattan: 2KR has handled important tfc for NE8AE. 2BCB and 2BCU have been working nights. 2OV has logged 27 nu hams above WIZ. Bronx: 2ALP is doing good work and dx now. 2AET is being overhauled. 2BAD is still consistent on 20 meters. 2AWU has new QRA but not far from old one. Brooklyn: 2PF is busy with the affairs of the coming Convention. 2WZ is doing good work on 20-40-80 meters. 2AJL has been sick but is ok now. 2UI is on 80 meters now and lining up skeds. 2CRB will change his QRA soon. 2BDM tho busy still pounds brass. Staten Island 2ABO sez that 2AKK, 2AFV and 2AKR are all now at sea, also that 2BEY and 2CIS are now in partnership. A card from 2AFV (WFOE) at San Pedro Calif., says he is on 600 meters now! Long Island: 2AYS was QSO WNP. 2TY has 2ABF-2ADG as an op now and has several foreign skeds and has handled lots of tfc for GMD. 2BAZ kept sked with DCZ until April 11. 2BBX is experimenting on 10 meters. 2CTY's keep-alive transformer for M. A. rectifier broke down but he rewound it and its working FB now. 2BNL says 80 is FB for traffic. 2BO sent his report direct to the SCM instead of to the acting SCM 2EV.

Traffic: Manhattan: 2EV 39, 2OV 6, 2BCU 8, 2KR 76, 2BCB 23, 2BO 37, 2BNL 21. Bronx: 2BBX 31, 2AWU 7, 2JA 9, 2BAD 49, 2AET 5, 2ALP 68. Brooklyn: 2BAZ 18, 2CTY 8, 2CRB 11, 2WZ 35, 2APB 24, 2BDM 16, 2UI 21, 2AJL 4, 2APD 15, 2PF 52. Staten Island: 2ABO 64. Long Island: 2TY 124, 2AYS 6.

NORTHERN NEW JERSEY—SCM, A. G. Wester, 2WR—13 stations failed to report which is a very bad showing and a condition which might be improved at once. 2AT had the largest traffic total in our section. 2AT, 2CP go into the BPL this month. 2CP has not been on much due to household duties. 2WR since working a V.F. Hertz has trouble with BCL's. 2CW is keeping Caldwell on the map. 2DX maintained a schedule with 6BGP to keep in touch with a sick person in Calif. 2EY is back with a new transmitter and new licenses. 2JC is putting in a new MOPA which keeps that station off. 2KA finds social duties break up his schedules. 2JG says if he misses a schedule, it is because he is a fireman. Hi. 2BDF wants two schedules a week with a station in the south and one in the north. 2ANG is installing 2 210's in a MOPA. 2MD will have his new crystal xmitter on soon. 2CTQ gets a report of R 7 from NZ on 20. 2CJX is testing on 10 meters. 2BY reports that somebody else is using her call as she receives their QSL's. Business has kept 2BIR off the air. 2IS is very QRW with YL's and WKBO. 2ADL keeps a daily schedule with 3ANV for traffic. 2BAL has had a hot time playing with Hertz antennas. 2ABZ got a report of R 8 in France using a single wire VF Hertz. 2AOS is back on the air and will be on 42 meters.

Traffic: 2AT 218, 2CP 169, 2CW 10, 2DX 18, 2EY 3, 2KA 4, 2JG 33, 2BDF 20, 2ANG 11, 2MD 30, 2CTQ 6, 2CJX 30, 2BY 10, 2BIR 2, 2IS 2, 2ADL 98, 2BAL 5, 2ABE 2, 2ABZ 6, 2AOS 3.

MIDWEST DIVISION

NEBRASKA—SCM, C. B. Diehl, 9BYG—9QY and 9BOQ are very busy right at this season with farm work. 9EEW is doing a little BCL work but says slowing up. 9DVR was recently appointed assistant observer. FB. 9EW is very QRW with the Civil Engineering gang of the power company. 9DI reports 9FHI a new station at Fairbury and 9FEG a new station at Blue Springs. 9CHB holds several schedules but QRM holds back large traffic totals. 9BBS also holds a few schedules but not much traffic. 9CDB is too busy in his shop for much radio but says he is still with us. 9BQR wants to know where all the fellows are, can't raise anybody any more. 9EGJ hands in a fine report this month. 9EUT reports for the first time. 9EPP also reports this month. 9AEZ turns in a fine total, which we hope happens oftener. 9EUT also reports that two new stations 9FIU and 9FIZ are now operating in Omaha. If Nebr. keeps on, we will have as many stations as some of our neighbors.

Traffic: 9QY 5, 9EEW 22, 9DVR 24, 9EW 12, 9DI 3, 9BOQ 16, 9CHB 12, 9BBS 2, 9BQR 2, 9EGJ 17, 9EUT 19, 9EPP 5, 9AEZ 25.

IOWA—SCM, A. W. Kruse, 9BKV—Everyone had a bang-up good time at the Midwest convention held at Ames, Apr. 13th, 14th. Traffic has taken a bad slump due to poor weather conditions and more or less inactivity throughout the state. 9CS is keeping 4 daily schedules on 40 and leads the section. FB. 9PB has received his ORS. 9EDW has a new 852 and a mercury arc perking fine. 9BKV is too QRW to think much about ham radio. 9CIX says he got snowed under coming home from the convention. Hi. A new crystal-controlled transmitter is doing its stuff at 9EHN. 9CZC's receiver went on the bum so not much traffic. 9BCA is another new ORS. 9DZW reports traffic showing up. The transmitter at 9DRA is operated by remote control. 9RAT is hitting both coasts hard and often. 9DTM operates KICK when not pounding brass. 9EJQ is running some 5 meter tests on Sunday afternoons, 2.30 to 3.00 p. m. Let's have the dope on results, OM. 9CGY is keeping a few schedules. 9AHQ has a 40-meter schedule with ARDI. 9EIW says she is QRW with a new nephew. Hi. 9EHR is looking for a transformer to feed his 50 watter. 9ASM has an 852 that is pushing out a keen signal. 9DPL wants to know how many of the Iowa gang are going to C.M.T.C. in August.

Traffic: 9CS 269; 9PB 192; 9EDW 165 ; 9BKV 101; 9CUX 98; 9EHN 95; 9CZC 92; 9BCA 63; 9DZW 61; 9DRA 54; 9BAT 42; 9DTM 29; 9EJQ 27; 9CGY 22; 9AHQ 12; 9EIW 10; 9EHR 6; 9ASM 6; 9DPL 3.

KANSAS—SCM, F. S. McKeever, 9DNG—Traffic fell off 300% in one month. Only 50% ORS reported and most of them late. 9CFN, 9HL and 9DNG are only stations keeping any number of skeds 1MK Traffic as well as foreign traffic may be routed via the latter. 9BPL and 9CFN are working everything on 20 meters FB boys 9CV is the only station in Topeka reporting activity. 9DIH sez he hears 'em on 20 meters but can't connect. Too bad OM. 9HL and 9CKV are present per usual but where did the totals go OM's. 9BHR and 9EBM are rebuilding. 9BUY is cussing power leaks. 9BII is continually QRMing BCL's. 9DNG, 9AEK, keep skeds with the marine station in Nicaragua.

Traffic: 9DNG 126, 9HL 32; 9CFN 26; 9DIH 21; 9LN 25; 9BII 16; 9BPL 14; 9CXW 11; 9CFW 11; 9CKV 11; 9CV 8; 9BUY 7; 9EBM 10.

MISSOURI—SCM, L. B. Laizure, 9RR—9ZK and 9BEQ were high on traffic in St. Louis this month. 9AAO received his OBS and applied for an ORS. A new chapter of the OBP club has been organized in St. Louis, making four chapters now in existence. 9ZK reports an expected visit to K.C. soon. 9BEU says he cannot keep skeds on account of failure of the parties at the other end of the sked to be on at the agreed times. 9BHI put in a new Zepp but says his old 203A is suffering from senility. 9BMU had QRM trying to make a rectifier work and went back to 80 meters. 9DLB was called on to do something in a church entertainment and had to QRT for rehearsals. 9FBF sent in the biggest report ever seen in these parts. 9BVC reported on off-wave hams as usual, logging forty. 9BQS is building a portable for summer work. 9AVS wants 20 meter skeds and is on every day. 9EUB was reported in EG, worked NN and applied for an ORS. 9FIO tried to get reports from Joplin hams for the SCM by radio but his QSO was broken up by some accident at the other end. 9AJW kept skeds with 9BZM, 9LN, 9ECS and 9EBB. 9DAE had to QRT skeds due to QRN and did some work on 20 and 40. 9CCQ is still QRT due to farm work and QRN. 9CRM received wholesale congrats on the escape of himself and family from being in the explosion and fire in his town which occurred this month and caused the death of forty persons. 9LJ visited at 9DVF and plans 20 meter summer work. 9DKG continues his 9ENU sked and handled a fine total. 9FCD handled important train message for 7CJ and sick messages for Huxley Iowa. 9DMT worked both coasts at noon on 20 but is on 40 as a regular QRH. 9FBF reports 9EHN and 9EIW had an 8 hour QSO. 9LJ reports QRV for St. Joseph traffic daily 9:30 to 11 pm on 40 meters. 9ENU worked OMAHA stations four hours handling A.T.&T. work during the blizzard there the first part of the month. 9RR handled two thousand words of press for the Omaha World-Herald which was received by radio from Des Moines and forwarded by W.U. wire. 9DOJ and 9ZD were out of town much of the time and so had no traffic. 9ENU, 9DQN, 9FIO, 9AYL, 9AHZ and 9RR pounded brass vigorously when QRN per-

mitted and the general results were FB. 9FER, 9EZU and 9EXS are new stations here. 9DQN, 9ENU and 9FIO are prospective ORS. It is reported that the police dept. is considering a station working on 137 meters with limited com'l license with the idea of equipping patrol cars with sets for local QSO while the main station will also undertake handling traffic with stations in other cities. 9RR is arranging test skeds to take effect as soon as the station is in operation. Three stations are to be chosen for U.S. Dept. of Agriculture emergency tests starting in June. 9DOJ, 9FIO, 9ENU, 9ZD and 9RR are prospective entrants as it seems impossible for three stations to be on every time without sufficient substitutes in reserve. Attention of all Missouri amateurs is directed to the SCM election next month as announced in May QST. Do not neglect to file your nominating petitions as instructed as we do not want Missouri to have a postponed election.

Traffic: 9DOE 26, 9BEU 23, 9BHI 23, 9BEQ 51, 9BMU 10, 9ZK 55, 9FBF 3, 9DMT 4, 9CRM 57, 9LI 5, 9DKG 74, 9CDF 28, 9LJ 16, 9AJW 107, 9ASV 24, 9EUB 34, 9DQN 22, 9FIO 20, 9ENU 58, 9RR 59.

NEW ENGLAND DIVISION

CONNECTICUT—SCM, H. E. Nichols, 1BM—With the passing of the Convention at Boston, we are confident to say that it was by far the best of any ever held in the East and every one present at the Banquet left with an inward satisfaction and pride at the various tributes paid our organization both by government officials as well as our own. Credit is due the committee for its wonderful work. 1MK reports having worked Australia and Brazil as well as handling a big batch of traffic. 1BNS reports working Denmark 7MT and 1NO. 1VE has been very active and by schedule work, has turned in a good report. 1VB and 1CTI have been caring for the southern part of the state in their usual efficient way. 1BQH now at Boston is anxious to make skeds with some of his New Haven friends. 1AMC and 1ASD have been working fone and report good results. 1BWN received a card from Warsaw reporting his sigs and thinks this is fair DX for a 210. 1ZL is having his usual good fortune with working DX and says that if he gets Asia, he will be ready for his WAC ticket. We understand that 1VU has moved into our Section and would like to get acquainted if we can obtain his address.

Traffic: 1ZL 2, 1OS 3, 1BWM 4, 1HJ 4, 1AMG 6, 1BHM 6, 1BGC 8, 1AFB 9, 1BLF 10, 1ASD 12, 1AMC 15, 1NE 16, 1BQH 32, 1ATG 32, 1TD 61, 1VB 73, 1CTI 80, 1VE 97, 1BNS 101, 1MK 546.

MAINE—SCM, Fred Best, 1BIG—Plans are now under way for the Maine state convention at Augusta. The date has not been definitely decided upon as yet but as soon as the details are worked out, the Maine gang will be given the dope. Everyone interested and any who will attend such a Convention in late June or early July is requested to send a card to the SCM at once, informing him of the fact in order that preliminary estimates regarding attendance may be made. Shoot in your cards, gang. Mrs. [illegible] reports, as usual, with a fine total which puts 1AJC in line for an ORS certificate. 1BUB is now located on 76.6 meters and sent in his usual fine report. 1ANH has received his ORS appointment. 1BTT sent in a report. 1ACV reports a fine schedule with 1ANH and says he is getting out FB on 80 meters. He reported for 1BKN. 1BBE and 1BOA who, between them, and particularly 1BKN, handled a nice lot of traffic. 1AQL reports everything fine with the Queen City Radio Club and says he is taking the Army-Amateur Radio Course FB. 1CMD sent in a mighty fine report of traffic handled in spite of school QRM. 1AIT, reports being heard in Germany on 80. 1BFZ has gone DX crazy at last and is working 'em right and left. 1CDX turned in a report in spite of having been away most of the month. 1AQD and 1IJ sent in their first reports.

Traffic: 1BIG 225, 1AJC 48, 1BUB 48, 1ANH 47, 1BTT 30, 1ACV 42, 1BKN 38, 1AQL 23, 1CMD 20, 1AIT 14, 1BFZ 9, 1CDX 9, 1AQD 4, 1BBE 3, 1IJ 3, 1BOA 2.

NEW HAMPSHIRE—SCM, V. W. Hodge, 1ATJ—The SCM was pleased to meet so many of the gang at the Convention and hopes to see you all again soon. Traffic and news are scarce so this month's report will be rather brief. 1BFT is first in traffic and got his first class ham ticket while in Boston. 1IP handled a bunch even though he has cancelled most of his skeds. 1AOQ is working on 20. 1JN reports traffic getting scarce. A report was received from 1AFD. 1ASR shot some news of the Bremen to England. 1ANS shows the proper spirit by reporting even though he has a small total. 1ASR and 1AOQ are members of the Naval Radio Net. 1BKB is getting back in Claremont.

Traffic: 1BFT 126, 1IP 70, 1ATJ 60, 1AOQ 20, 1JN 17, 1ANS 12, 1AFD 5, 1ASR 3.

RHODE ISLAND—SCM D. B. Fancher, 1BVB—Your SCM's address is now 9½ Hobart St., instead of 22 Summer in case any drop in for a visit. 1BLS is our star station this month. 1BAT has just returned from the Convention and reports a great time. 1BQD is operating on all bands now—20 for DX and 80 for traffic. 1AWE our DX man is on 20 all time now. 1AMU is off the air and out of a job. 1CKB says 20 meters is great for DX but NG for traffic. 1MO has had trouble with Xmitter this month. 1BIL is off the air at home but is on from KDQV at sea. 1BDQ is rebuilding his Xmitter. 1BVB is on again and ready for action.

Traffic: 1BLS 105, 1BAT 64, 1BQD 28, 1AWE 22, 1AMU 17, 1CKB 6, 1MO 6, 1BIL 3.

VERMONT—SCM, 1AJG, C. T. KERR—1AOO leads the section with 376. Congratulations OM. 1IT was second which is sure pounding out real stuff. 1BCK and 1CGX came in next and the SCM thanks you for your real hard work in this race. 1AJG has not gotten over the convention cold yet and needs a prescription hw? 1AC is pounding out on 77 meters on schedule. 1EZ and 1CGX are new ORS. FB OM's. 1BD has been appointed Official Observer for the state. 1BEB is on the air regularly as usual with AA. 1BJP is house cleaning so not on too much. 1FN is our proud papa. Congrats OM on the new Jr. op.

Traffic: 1FN 4, 1CGX 218, 1BJP 34, 1BEB 49, 1AOO 376, 1IT 318, 1BCK 216, 1AC 32, 1EZ 5, 1AJG 78.

EASTERN MASSACHUSETTS—SCM, E. L. Battey, 1UE—Traffic took a slump this month with only 1ACH making the BPL. 1KY, the RM, is going to get after the ORS and try to jack them up. The convention, largest ever held in New England, is all over and everyone reports having a wonderful time. 1AHV has cancelled his summer call, 1QZ, and will use 1AHV at Baker's Island this summer. 1CRA reports 1AQT working oa2YI the long way around. 1RF worked his first '7' using a 202. 1BVL is fooling with ten meters. 1BDV is on the inactive list. 1NK has joined the Naval Reserve. FB. It was the biggest month for traffic in the past year at 1ASI. Convention work gummed 1SL's activities. 1UE was visited by 3CEB. 1BMS is working plenty since building a new rectifier. 1KY expects to get smashed up any day in an old Franklin she just bought. Hi. 1SB has a new receiver and can now hear answers to his calls. 1ABA is in Naval Radio Net. 1LM had a good time at the Convention. 1MR is working on 20. Comm. Mgr. Handy visited 1WV during his stay at the convention. 1KH is doing little experimenting on 10 meters. 1NQ received a report from Moscow, Russia and is getting R8 reports consistently from Europe. 1APK and 1AVY are QRW work, etc. 1GP fears he must resign his ORS. Spring weather is QRMing 1AAW. 1RY and his 17 month old 210 are still going strong. 1CMZ has a new xmitter. 1ALP is on now and then. 1RL is still on eighty and is trying to get on 20. 1AWB has been cancelled due to failure to report. Others, who are following in his footsteps, better watch out.

Traffic: 1BMS 123, 1ACH 108, 1LM 100, 1AHV 94, 1RY 80, 1KY 55, 1CMZ 60, 1ASI 47, 1SL 35, 1KH 26, 1AAW 26, 1WV 23, 1CRA 22, 1YC 19, 1ABA 17, 1NQ 12, 1UE 8, 1GP 7, 1BVL 6, 1APK 5, 1RF 4, 1NK 4.

WESTERN MASSACHUSETTS—SCM, A. H. Carr, 1DB—1AJK says he has got to remake his transmitter on account of all the prizes he got from the convention. 1AKZ says DX is good on 20 meters. 1AMZ was home on a vacation recently and says he will be back again in June. 1ANI says the Naval Reserve is occupying his center of interest. 1APL is having QRM from his motor cycle. 1BKQ re-

ports traffic activity at the Worcester Radio Club low owing to the lack of schedules. Ten of the Worcester members attended the Boston Convention. The Springfield Club has organized a vigilance committee and have taken in 5 new members. They are working a 50 watt T.P.T.G. set and building two low power sets. All the stations in this vicinity complain about a waning lack of interest with the coming of nice weather and lack of schedules. 1BGM says all his traffic was handled in the afternoons on 40 meters. 1UM says that 10 to 15 hams are attending the Worcester Club meetings on Sunday mornings. 1BVR spends a week at home once in a while and manages to work a few foreigners. 1BIV is QRW with school so has not been on the air much.

Traffic: 1AJK 4, 1AKZ 1, 1AMZ 6, 1ANI 63, 1APL 106, 1BKQ 10, 1BWY 8, 1BIV 4, 1BVR 2, 1EO 7, 1IL 50, 1UM 14, 1WQ 5, 1BGM 23.

NORTHWESTERN DIVISION

OREGON—SCM, R. H. Wright 7PP—7AKK is high traffic man again this month. 7AEC the R.M. is heard consistently. 7UN a new ORS on both 40 and 20 is doing splendid work in both dx and traffic. 7VQ is on regularly. QRM from work prevents 7EO from being on as regularly as usual. 7JO has joined the Navy and will see the world from a port-hole. 7ABH has at last received his WAC certificate. 7GQ is quv work so can only spend a little time with his station. 7HV is using rectifier tubes. 7ALK is still looking for the "Condenser Bearing Filter Tree." 7PL is putting in a 204a for 40 and 20. 7PE is on 80 meters regularly.

Traffic: 7AKK 204, 7AEC 135, 7UN 96, 7VQ 61, 7EO 50, 7ACG 29, 7GQ 15, 7PE 6, 7ALK 5, 7ABH 2, 7HV 2.

MONTANA—SCM, O. W. Viers. 7AAT-QT—7HP is running off with the whole section in traffic work. 7HT takes second place this month. 7DD says crystal control is tricky stuff but the new set's amplifier output will be ¼ kw. 7ZU has been playing around down on ¾ to 10 meters, and reports a new 40-80 meter transmitter. 7AAW has been in the hospital but is out now and will soon be ready to go again. 7FL had a little mishap on his motorcycle and hurt his leg pretty badly. 7CC, a non-ORS, sent in a nice report to let us know that Kalispell is "up and coming." He reports 7ADI is all ready to go on the air and promises to be a good traffic man. 7ABT is on with three operators. 7CC will soon be on with remote control. 7AAT-QT has been QSO OA consistently on the 852 and the 210.

Traffic: 7HP 98, 7HT 50, 7DD 12, 7AAT 42.

WASHINGTON—SCM, Otto Johnson, 7FD—Traffic totals have taken a decided jump due to two factors. The Engineer's Show at the U. of W. and better cooperation from ORS and others. All ORS have shown a fine spirit of cooperation. It is hoped that a 100% ORS organization can be built up. Many new stations are coming along with traffic and DX improving. A get-together banquet was held at Bellevue, with the Seattle hams as hosts to hams from Tacoma and Everett. Plans for the coming 7th District Convention were discussed. 7BB takes traffic honors, handling much traffic from the U. of W. show. 7EK rates a high place with both traffic and DX. Several new hams are on at Everett and Bellingham. 7AKU is going strong. 7AG is back on at the new QRA. 7QG keeps 40 meter skeds with 7NR and 7AJR. 7MX has been on more than usual. 7IZ is a new OBS. 7BM also wants to be one. The Tacoma gang are building a new club shack. Active stations desirous of ORS appointments are invited to QSO the SCM.

Traffic: 7BB 637, 7AKU 91, 7EK 87, 7QG 45, 7ACA 40, 7MX 33, 7AEV 33, 7BR 28, 7TX 9, 7FD 6.

IDAHO—SCM, H. H. Fletcher, 7ST—ALD—Only one report from the Idaho gang this month but that is to be expected when the SCM falls down on the job for two months. Certainly sorry about that gang, but have been QRW work 7ACN-JL has just about closed down for the summer. He is opening a picture studio so he can get some more shekels for the set. 7JF, 7CW-CU and 7PJ have all gone out for comm. brass pounding. 7YA is gradually getting back on the air with 50 watts TGTP. 7GL is still pumping 852 sigs into the ether. 7ABB is still wx prophet. 7AGU doesn't know whether to use a 250 or a 7½ watter. Hi. 7ACR is on with a fiver. 7JW operates week-ends.

Traffic: 7ACN 10.

ALASKA—SCM, W. B. Wilson—We are trying to get the Section reorganized just now and it takes quite a lot of time. Let's all help the SCM to build up a new Section. 7AER, 7ABE, 7TO and others of the regulars in the Section are doing good work and if you have business for Alaska, get in touch with one of them. 7NN has a new receiver and will soon put in a short wave transmitter. 7AER reported by radio and it is hoped that more will do likewise. 7TO reports the following: 7HL, Taku Harbor, has just opened up with an 852 and 500 cycle. 7AEB and 7DG are going. 7ALQ has a 100 watt DC supply 40 meter transmitter. 7ADY and 7TE are also on the air.

Traffic: 7AER 66, 7ABE 67, 7ALQ 14, 7TO 29.

PACIFIC DIVISION

EAST BAY—SCM, J. Walter Frates, 6CZR—The Section is coming up rapidly in traffic, and the fellows deserve to be complimented for their fine showing this month. 6CGM again hit the BPL and won the SCM's 5 watter for highest totals during March and April. 6IP also makes the BPL this month. 6CCT, 6DDQ-6CTX are new RMS. 6CCT, a consistent DX man, came back into traffic with a good total. 6DTM handled good traffic and worked AJ. 6RJ is building a backyard hotel for visiting delegates to the Pacific Division Convention. 6EDK is revamping his Xmitter for greater DX. 6OT still under reconstruction but working into FB job under care of 6BJW. 6IT is so busy with work as chief OO that he has no time for traffic. 6BZU says that he has eliminated his key clicks by means of an artificial center tap, using a 200-ohm potentiometer, 6CTX reports DX getting good. 6BOY is at sea, but reports he will be home soon. 6ALX is QRW on account of illness. 6AWM works traffic on 40 meters now when not playing with fone on 80. 6BHM is open for traffic. 6COL has worked EG, OA, SC. OZ, OO, AJ and AC on 20 meters. 6DWI worked OA and AJ for a change. 6AMI reports traffic took a flop since he dropped from 80 to 40. 6CZR is back on the air with a split Colpitts. 6CLZ burnt out MG and using a.c. while it is getting fixed. 6DDQ is getting FB reports with voltage feed Hertz. 6IM is too QRW fixing automobiles to do much DX or traffic. 6BSB says UX-226 tubes FB for receiving DX. 6CKC is very QRW with coming convention. 6BUX getting very QSA with studies as school is closing. 6EY expects to put in an 852 soon. 6BPC still rebuilding for 250-watt T.P.T.G. set. 6CDA hasn't much time but still pounding away. 6AAU operator on S.S. *Arctic* of Alaska Packers in Alaska, has been operating a "lunch box" transmitter with two seven and a half watters from Barsen Bay, Kodiak Island, with much success under call of 6ZZE.

Traffic: 6CGM 276, 6IP 189, 6CCT 95, 6DTM 63, 6RJ 53, 6EDK 39, 6BZU 39, 6CTX 36, 6BOY 36, 6ALX 25, 6AWM 23, 6BHM 22, 6COL 22, 6DKO 22, 6DWI 21, 6AMI 18, 6CZR 13, 6CLZ 13, 6DDQ 10, 6IM 7, 6BSB 3, 6CKC 2, 6BUX 2, 6CDA 2.

SAN FRANCISCO SECTION, J. W. Patterson—6VR SCM—Due to a change in the SCM's qra, the reports did not get through. See new address on page 3 QST. Lets go, gang! 6AWA is back on the air and is getting world wide reports on his sigs. 6RH is the other half of this station which hopes to get the first S.F. WAC certificate. 6WN, formerly 6CCR, has a midget receiver that sure brings the old DX in. 6DBM has two 210's in parallel and gets r7 in OA besides locking all the BCL receivers in his neighborhood. 6KW is still knocking holes in the ether with a 250 watter. 6CXI has at last got his xmitter working. 6DDN is qrw, convention committee work and rebuilding his xmitter.

Traffic: 6AWA 81, 6AWN 67, 6DBM 39, 6CXI 30, 6KW 32.

SANTA CLARA VALLEY SECTION—SCM, F. J. Quement 6NX—Neary all traffic seems to be running through stations working on schedules. A new route was formed this month for east coast-Philippine Island traffic. The route is 1MK-6NX and 6AMM-1HR.

This will greatly assist 6AMM in clearing some of his east coast traffic as well as speed up replies. 6AMM handled 419 over his sked with op1HR. 6AMM copied 15 messages with only one miss on a name on one of these occasions. Philippine Island Traffic sent to 6NX will be promptly turned over to 6AMM to be forwarded on his daily skedl 6BMW the RM and OO joined the USNR this month. FB. 6BCH is shipping out to sea. 6ALW has come back on the air and has been appointed ORS. 6AZS was QSO EJ, EG, FO on 20 meters this month. 6AOD lost his fifty and has decided to put in a 75 Watter. 6AJZ joined the USNR this month. 6BHY kept his 9CPS sked hot.

Traffic: 6AMM 419, 6BHY 91, 6NX 46, 6BMW 44, 6BCH 28, 6ALW 12, 6AZS 3, 6AOD 1.

ARIZONA—SCM, D. B. Lamb, 6ANO—This report finds Arizona trying to get organized in the USNR with 6CPX in charge of this Section. Write 6CPX if interested. Address W. M. Bannister, Box 172, University Station Tucson. 6CPX is on daily excepting Sunday, at 5pm on 417 meters. Anyone having traffic please give us a call. 6AZM has a mercury arc and will soon have it going. 6CRA is a newly appointed ORS wkg mostly on 20 meters. 6BJF is unable to locate 10 meters. 6CBJ works on 20 mostly now. 6ANO popped the 50 and had it rebuilt by 6EX and works FB again. 6BWS is using Kenotron in half wave. 6CDU is going to give the stn a complete overhauling including grinding valves on gas engine. 6EAA is a new ham in Phoenix. 6BYG is using 6BWS portable until his call shows up. 6DWQ has packed up and is going back to Michigan where he is 8BB. Good luck OM. 6CAP has been ill. 6SW says yls and new cars with Radio don't go so results another gud ham gone wrong. 6DTU is using 201-A's on 20 meters a.c. 6EBH is a new station. 6DIE is getting an 852. 6DIB is having tough luck with the transformers. 6DSA is back in Phoenix. 6BBH is QRW business as usual 6BHC has a new 852 on 40. 6BWS 6BJF report again not missing an ORS report since being issued a year and a half ago.

Traffic: 6CDU 61, 6BWS 167, 6CPX 52, 6AZM 1, 6ANO 40, 6CRA 10, 6BJF 52, 6CBJ 8.

SAN DIEGO SECTION—G. A. Sears, 6BQ, SCM—6AJM leads the section in traffic handled, and will probably lead the entire country, his schedule with op1AD is responsible for the bulk of this traffic. 6AKQ made the brass pounders this month most of his traffic from oh6DJU, with whom he maintains a regular schedule. Most of 6BAM's schedules were on 80 meters. 6BWI is in a new QRA. 6BQ has installed a new tuned plate-tuned grid transmitter on 21 meters. 6BAG is a new station reporting this month for the first time. 6EC has just been assigned special call 6XE to facilitate handling traffic from the Marine Corp at nn1NIC. 6DNS works plenty of DX on 40 meters now. 6BGL sends in his first report this month from Escondido. 6DGW and 6BFE report traffic regularly. 6AKZ reports traffic this month. 6CNK hope to have a better total next month. 6BDE recently picked up the New York American plane 2XBK and rebroadcast over KFSD. He was assisted by 6AKZ.

Traffic: 6AJM 1016, 6AKQ 222, 6BAM 200, 6BWI 150, 6BQ 131, 6BAG 85, 6EC 76, 6DNS 44, 6BGL 32, 6DGW 11, 6BFE 5, 6AKZ 4, 6CNK 2.

LOS ANGELES—SCM, Don C. Wallace, 6AM—6ALH, 6ZBJ and 6BSN make the BPL this month. 6ALH has moved to Pasadena and has become a professional pugilist. 6ZBJ is keeping some good schedules. 6 BSN worked all continents in 55 days on 40 meters. 6CQP delivered a message for 7alo and returned answer in ten minutes. 6COT tried 20 meters and found it very good for DX and daylight communication. 6CZO goes to night school to study telegraphy, and expects to have a pink ticket soon. 6CMQ is now on with an 852 again and working everything. 6AGR has a new Zepp and 50-foot tower. 6AM took his small portable on a trip North and was QSO Mrs. 6AM seven times from San Francisco and Oakland, using an antenna out of an hotel room. 6BVO reports that on April 2nd during a severe storm near Owens Lake, three towers on the Southern Sierras Power Company transmission line were blown down and all fone service interrupted for 27 hours. During that time all load dispatching, switching orders and reports were handled by Radio thru 6BVO, 6COQ and 6DXS. Perfect service was given throughout that time 6BGC had a sked with students on science class expedition into Death Valley 5BFP was one of the last to ditch Hartley but is T.P.T.G. 100% now. 6QL has sked with AJ4BK and asks that any NU wishing to send QSL to him please send it through 6QL. 6APW had Manager of Globe Mills, Honolulu at his station talking to four of the directors at Honolulu through oh6ADH. 6DGT is making some changes in his transmitter, and says DX is better. 6ABK just put up third harmonic antenna for 40 and it sure is FB. 6DOW reports that the 'Eagle Rock Ether Splitters' including 6ABK, 6BVT, 6AEC, 6DHU, and 6DOW went on a trip into the mountains during Easter week and took a portable along using spark coil supply and worked about 6 fellows. 6AHS just dropped from 40 to 20, and finds it FB. 6DCH keeps a reliable schedule. 6CHA a new ORS sends in a good report. 6DMG would like to have some skeds with East and North for about 12 midnight, every night. 6CQM always tries to get ham to qrs while he phones and gets answer providing q4n not bad. 6ANN has worked three stations on 10.6 and thinks it fb. 6BJX is still waiting for Henry to come thru with his new flivver, so he can go on his vacation. 6BVM put a little more soup on his 7½ this month. 6DEG wants skeds on 80 meter band also a sked on 40 and 80 with a SF ORS. 6BZC finds the OA, AJ and AC stations very easy to raise. 6CHT is still very busy operating KFQZ. 6DKX just erected a new ZEpp antenna. 6AKW reports qrn very bad on desert now. 6CZT sends in a good report. 6DPY tried for three weeks to get AJ4BK and got him on April 24th. 6ALR, reports having had several ham visitors. 6AKD had a nearby new ham come rushing over saying he could hear 6AKD on his BCL set. 6CAG is going to erect new mast and rebuild receiver. 6DHR is moving to a new QRA. 6CLK is contemplating T.G.T.P. circuit. 6BVG has increased the capacity and decreased the inductance in his Hartley circuit and finds that his sigs are steadier and better tone. 6AEC just arranged sked and hopes to have regular traffic. 6BZR is going to get a couple of 6EX Rectobulbs. 6DHU's B bats went west. 6BHR has been having trouble at his station. 6CUH build a new shield grid tube receiver. 6PY, 6BUX, 6BRO, 6CNJ all report as usual.

Traffic: 6ZBJ 223, 6BSN 150, 6CQP 86, 6COT 63, 6CZO 52, 6CMQ 48, 6AGR 48, 6BVO 45, 6BGC 42, 6BFP 41, 6QL 34, 6DGT 34, 6ABK 30, 6DOW 23, 6AHS 23, 6CHA 21, 6DMG 20, 6CQM 18, 6ANN 18, 6BJX 17, 6BVM 16, 6DEG 15, 6BZC 14, 6CHT 13, 6DKX 13, 6AKW 12, 6CZT 8, 6DPY 7, 6AKD 5, 6DHR 3, 6CLK 3, 6BVT 2, 6AEC 2, 6BZR 2, 6DHU 2, 6BHR 1, 6AM 44, 6CAG 4, 6ALR 5, 6DCH 22, 6APW 35.

PHILIPPINES—SCM, J. E. Jimenez, op1AT—This report by radio from op1DR and op1AD via 6AMM, 6NX, 6AJM and 1MK. op1DR is maintaining an hourly day schedule with op1AH. op1AD keeps a schedule with 6AJM daily which is very reliable.

Traffic: op1DR 344, op1AD 509.

HAWAII—SCM, F. L. Fullaway, oh6CFQ—6DJU kept his word and made the BPL this month. 6ADH says that a LCH and Zepp can't be beat for QSO. 6DQQ blew a tube but borrowed one and came back on. 6CH has skeds with 9BSH and 1BFL. 6DEY is working a fifty on a 360 meter antenna. He has given 10 meters a try but has antenna trouble. 6DLR is going out on manoeuvers soon so will be off for a time. 6DB still works 6KS. 6BDL has a 222 going and says it seems good. 6ALM says 20 is FB. 6DCU and 6CFQ are combining stations at 6CFQ. 6CFQ worked 6BOE on 10 meters. 6BOE has QSO'd EF on 10.

Traffic: 6DJU 370, 6ADH 174, 6DQQ 89, 6CH 72, 6DEY 59, 6DLR 39, 6DB 33, 6CFQ 21, 6BDL 15, 6ALM 14, 6DCU 1.

SACRAMENTO VALLEY SECTION—SCM, C. F. Mason, 6CBS—6CIS fell down this month on account of being sick. 6CIH ought to make a fine station. The regular monthly meeting of the Sacramento Valley Amateur Radio Club was held on March 20 with 33 members present.

Traffic: 6CIS 70, 6CIH 350, 6DON 32, 6AYI 5, 6ER 52.

ROANOKE DIVISION

VIRGINIA—SCM, J. F. Wohlford, 3CA—3KU says QRN ran him off down to 20 meters. 3WM and 3TN are also on 20 meters. 3JT has QRM from

the junior opr which keeps him QRT. 3II QRW YLS. 3WD is again coming back on the air. 3CEB has gone to sea and the station is off air temporarily. 3ASC blew several 201-A tubes. 3NM-3DL is leaving for the summer. 3IE says QST needs a new type setter—they ball up his call too often. 3AG is also suffering from YLS and has QRM from school work. 3RL is back on air. 3AOI is a new station at Harndon Va. 3BGS and 3KG are still waiting for power line. 3AAA will open up for the summer on return from sea. 3ALS works some DX but not much traffic. 3ANV is now ORS. 3ARV is an old timer back on the air. 3BZ has a regular sked with 8ZZ and is arranging others. 3BDZ says if the MG will stop all the noise he will be on the air again. 3CA chased an auto with license tag bearing "GB QQ" for fifteen miles—thought it was "OB and CQ." 3CKL continues to reach out with his flock of operators.

Traffic: 3KU 45, 3ASC 11, 3AG 1, 3RL 6, 3BGS 8, 3ANV 26, 3CKL 122.

WEST VIRGINIA—SCM, C. S. Hoffmann, Jr., 8HD—8ACZ had schedules with a half-dozen stations, handling the highest number of messages. 8VZ sent a message around the world and made a hit in the Fairmont newspaper. 8CLQ getting R-7 from os-5HG with a 310 tube! 8DPO is still working DX. 8DCM got the big set going and getting all kinds of foreigners. 8HD worked Wheeling end of A-A tests. 8BJB is installing a 852. Several of the gang are planning to go to the Atlantic Division Convention. 8LI, 8BJB, 2CYX, 3AGP, 9CEE and 9ECX were visitors at 8DCM during the month.

Traffic: 8ACZ 170, 8CLQ 28, 8DPO 18, DCM 6, 8BBM 2, 8BJB 2, 8BPA 2.

NORTH CAROLINA—SCM, R. S. Morris 4JR—4SJ is back strong again. He reports 4AFV and 4AFY new stations at Rocky Mount. 4VH is planning on handling traffic from Miami Shrine Convention via 4CK. 4AB is still heading the list for traffic handled. 4TS has a new 250 type tube in a Mo-PA set. 4TO is applying for ORS appointment. He reports 4AEC and 4AFM new stations at Asheville. 4JR has been on very little. 4OC has a schedule with FQ-PM Sunday nights. The entire section join in extending sympathy to 4ADJ in the loss of his mother. 4ACI is thinking of applying for ORS appointment. 4ADQ has been sick. 4CQ tried 10 meters but reports no luck. 4OH has installed two 281's as plate supply for his fifty.

Traffic: 4AB 64, 4SJ 44, 4ACI 20, 4TO, 15, 4OC 13, 4VH 6, 4JR 2, 4OH 4.

ROCKY MOUNTAIN DIVISION

COLORADO—SCM, C. R. Stedman, 9CAA—9EAM, 9DQD and 9ENM made the BPL this month. The latter two made it on messages Delivered, while 9EAM continues to bat out a good sized total to qualify for the 6th month in succession. 9EAM also also did some good work in putting emergency traffic thru for the railroads during a sleet storm recently. 9ENM has been doing good consistent work. 9DQD rebuilt his transmitter, but says he didn't miss any schedules on account of it. 9CAA just got his Mercury arc working. 9CCM and one of her YL friends were dated up by the Route Mgr. and the SCM respectively, but they decided to come home from the party with 9CDW and 9WO instead. Hi. 9CAW still hammers out, and seems to be going in for traffic again. 9CSR is a new ORS, and is doing consistent work on 20 meters. 9EEA built a new antenna, and reports fair results. 9CDE is going on his vacation now and intends to visit hams all through the middle west. 9ERN apparently is moaning about his 210 being NG. The ORS of 9CJY is being cancelled because of inactivity. Two others are due to be cancelled next month if the ops in question are unable to get things going. 9CJY however has always been a good man, and we are indeed sorry that school and work make it impossible for him to keep on the air.

Traffic: 9EAM, 234, 9ENM 189, 9DQD 95, 9CAA 49, 9CAW 132, 9CSR 18, 9ERN 14, 9CDE 10, 9EEA 6.

SOUTHEASTERN DIVISION

FLORIDA, SCM C. E. Ffoulkes, 4LK—The SCM is very sorry to lose 4RK from the Miami gang. We wish you luck OM. 4CK is forging to the front again this time with a large bunch of traffic. 4ADB sure worked a flock of DX this time. The Bryant Bros. of 4BL are leaving this month for the Great Lakes. Best of luck OMs. 4IE has a sked with Hdq. station 1MK. 4ACC is moving to Tampa and will make things hum from there. 4OB is still eating those Aussies for breakfast. 4LK is rebuilding the shack and the mast. 4OO took some press for the local paper during the storm over that way. 4TK is back with a.c. now. 4HY is very QRW on a new receiver. 4ON (KUCX) was a visitor in Jax this time and the SCM enjoyed meeting him very much.

Traffic: 4CK 120; 4ADB 73; 4BL 60; 4IE 29; 4ACC 27; 4OB 11; 4LK 7; 4OO 6.

ALABAMA—SCM, A. D. Trum, 5AJP—We have a new embryo to emerge from our midst in the person of 5BBA. Kilpatrick at once let the gang know that he is going to do his share of the traffic routine. 5JY is moving to Birmingham and we hope he organizes that bunch into as fine a gathering of hams that the town is worthy of. 5ATS is working consistently, so much that he blew all his tubes working Aussies. 5ADA is always on time with his report. 5AJP is still dormant on account of pressing business. 5NL still hopes to be back on the air. 5ATJ is trying his best for DX and more traffic. 5AWL is getting enthusiastic and makes all kinds of apologies for the small showing this month. 5JN is also going fine. 5UV went over big this month with traffic most everywhere. 5AYL bought a good deal of new apparatus this month including a super-sync. 5AQW-5AST gives us a splendid report on the Auburn stations. 5YB, the school station, has some trouble with their MG. 5JB is the call of one of the ops of old 5AYW. 5AYW is off the air and says that he will not be heard from until next year. 5AGA has been trying fone on 20 until the band was changed back to 85. 5OA is rather disappointed that he was not able to raise Asia this year. Auburn has developed two new hams,—5AJI and Paul Brake who is waiting for his call letters. 5AQW-5AST is temporarily off the air, the pair of 7½ watters died a natural death. 5AXN is on with a 200 watt Telefunken. 5VW had to leave school on account of the serious illness of his mother.

Traffic: 5ATS 16, 5YB 71, 5ADA 14, 5AWL 4, 5UV 24, 5AYL 15, 5JB 11, 5AGA 7, 5OA 11.

WEST GULF DIVISION

OKLAHOMA—SCM, K. M. Ehret, 5APG—5BAG reports losing his mast. 5ANL says QRN prevents regular schedules on 80 and so will probably be off the air until fall. 5AFX is installed in his new location with a 72 foot stick. 5AAV did some good DX work until his chemical rectifier went bad. 5AIR lost his mast but is putting up an 80 footer. 5AMO has worked all continents and is lined up for WAC certificate. 5AMO seems to be swamped with traffic. 5AYO is doing some good traffic work. 5ANT has been experimenting on 20 meters. 5QL has the big bottle controlled with a crystal and is getting out fine. 5APG holding regular 80 meter schedules in naval reserve work. 5AGN operates occasionally.

Traffic: 5APG 43, 5AGN 1, 5ANL 17, 5BAG 9, 5AYO 27, 5AIR 13, 5AMO 237, 5VH 24, 5AFX 30, 5AAV 18.

NORTHERN TEXAS—SCM, J. H. Robinson, Jr., 5AKN-BG—Please send your station reports to the new SCM now. See address on page 3 of QST. 5BAM is on late at night but finds lots of traffic. 5AKN-5BG is on both 20 and 40. 5OE blew all his filter condensers. 5AQ is doing lots of DX on 20 meters. 5ACL is on 10, 20 and 40 meters. 5JA is on 20 meters with an 852 tube. The SCM still has the UX222 offered for a prize. Hope he doesn't have to keep it.

Traffic: 5BAM 83, 5AKN 20, 5OE 12, 5AQ 11, 5ACL 6, 5JA 3.

SOUTHERN TEXAS—SCM, E. A. Sahm, 5YK—Activity is still very good in this Section, the approach of summer seems not to daunt the gang. 5ATM says his antenna came down but he has a good message total. 5AMG is on regularly now and sends a good message total. 5AHP has been on a vacation but handled some traffic. R. E. Franklin is recovering from his recent accident and will be on

the air again soon. 5OX is one of our old standby's at Houston. 5HS blew a fifty watter but is on again. 5LP sends in a fine report. 5EW sends in his usual interesting report. We have two newcomers, J. H. Burney of Bishop and 5ASY of El Campo. We are glad to have you with us. Word has just been received that the San Antonio Radio Club will have their annual Hamfest about the middle of July. Let as many as possible try to attend. H. D. Beckelmann at 215 Glenwood Court, San Antonio is the secretary of the club. Get in touch with him if you can attend. We also have a report from our old friend, 5PK, who is op on the SS Bessemer City. He has just returned from the far East and is sailing for South America.

Traffic: 5EW 20, 5LP 48, 5ATM 24, 5HS 8, 5AMG 5, 5AHP 7.

CANADA

MARITIME DIVISION

PRINCE EDWARD ISLAND—SCM, F. W. Hyndman, 1BZ—This report received by radio via nc1CO. 1CO reports 1BD and 1BY actively working on 40 and 20. 1CO works mostly on 20 and 52.5 and has been QSO WNP, Europe and oz.

Traffic: 1CO 4.

ONTARIO DIVISION

ONTARIO—SCM, W. Y. Sloan, 9BJ—Central Dist: 3AZ and 3 BL are on 52.5 meters. 3BC has been trying 20 meter as well as 52.5 and 40. 3DY is working on 20 and 52.5 with fine results. 3CJ has rebuilt his transmitter to a very efficient form and is using 20.6 and 52.5 meters. 3DC is on 52.6 meters, crystal controlled, every night. 3AI is experimenting with transmitting circuits. 3BT works everything on 19.5 meters. 3AY mourns the lack of DX. 3FC has been in action on 19.8, 21.3 and 52.5. 9BJ confines his efforts to 52.6 and has lots of fun and traffic. 9AL is a mighty busy man but he still finds time to pound brass on 52.5 and 80 meters. Southern Dist.: 3CS now has a second operator in 3DU. 3AQ is steaming along FB with his 210. 3DG is bothered by power leak QRM. 3IA is rebuilding and swearing off slop jars for life. Eastern Dist: 9CC is sending time signals at 3 p.m. daily on 52.5 meters. 3AFP has been assigned his new call and is now nc3AN. 3JW will be on again by the time this is in print. 3MD is rebuilding bigger and better. 3XQ's tube passed out on Fri. the 13th but a larger one took its place! 3XL has been on 40 lately using low power. Northern Dist: 3ET and 3ART are operating consistently at Parry Sound. 2NI operates on schedule every night on 52.5. 3HP has been doing wonderful work on 21.3 meters.

Traffic: 3AZ 38, 3CJ 34, 9BJ 26, 9AL 24, 3CS 20, 3AY 19, 3HP 30, 3BC 12, 3AI 11, 3DY 7, 3DC 6, 3CB 6, 3AQ 5, 3BL 10, 3FC 7, 3AR 6, 3BT 2.

QUEBEC DIVISION

QUEBEC—SCM, Alex Reid, 2BE—The gang is already preparing for this summer's picnic and the SCM will be glad to receive comments on the most suitable place and date for the picnic to be held. There was no hamfest this month but we hope to have one about the first week of May. This division has certainly made itself known around the globe, between 2BE, 2AL and 2AX over 150 foreign stations have been worked. 2BE worked his 54th country this month. 2BR has rebuilt and made a nice job of it. 2BB besides turning in a fine traffic report had his first real DX. 2BG is just waiting for confirmation from Asia, then there will be a WAC in our ranks. 2BW using only a 201-A turns in a very fine traffic report. 2AC leads in traffic handled this month. 2CA has a new 852 and getting out well. 2CW is on 20 and likes it much better than 40. 2AN and 2CD joined forces over the Easter holidays, and worked a number of stations. 2BM is moving to a new QRA.

Traffic: 2AC 38, 2BW 26, 2BR 23, 2AL 8, 2BB 13, 2BG 9.

VANALTA DIVISION

ALBERTA—SCM, E. J. Taylor, 4HA—Due to business pressure, 4GT has found it necessary to resign. Good luck to you, OM. 4HA has been elected SCM and we hope for the same support as given Mr. Asmussen. 4AH leads the message crew again. 4BV is in town—hope to see you started soon. 4HM is leaving on a 3 month's visit to EG and has some skeds here. 4CU is getting down on 20, experimenting with aerial. 4BC is going East to live. 4FF attended our banquet on April 7. 4HA and 4GT grabbed some Aussies on 20 and 40. 4CC is off at present but will resume activity soon. 4AG is on the air as long as his tubes last. 4GD has changed his location after working Hawaii. 4AF has resumed activity.

Traffic: 4AH 31, 4CU 15, 4GT 4, 4HA 4, 4HM 11, 4BC 3.

BRITISH COLUMBIA—SCM, E. S. Brooks, 5BJ—Spring has come, gang, but how about some monthly reports? This Section is going to look pretty small if you don't send in some news. 5AL is working nights now and has cancelled all his schedules. 5CJ is blessed with a junior op. Congrats. 5CE, 5CO, 5CC all use a 222 receiver. nc5GO and nu7BB paid a visit to the Victoria gang.

Traffic: 5CO 41, 5AD 40, 5GO 12, 5AL 12, 5CF 6.

PRAIRIE DIVISION

MANITOBA—SCM, D. B. Sinclair, 4FV—The following stations are now on the air pending receipt of their licenses: 4RM, 4SS, 4ST, 4JL, 4LB and 4NB. 4GG has a new job so found little time for his usual 20 meter work. 4EK has shifted to the Ultraudion circuit. 4CT's schedule with nc3HE still seems to be going strong though no information has been received this month. 4GQ is building a new transmitter. A new crystal control station is now on the air at 4DU. 4BT's new rectifier put too much voltage on the plate of his crystal oscillator! 4GI was obliged to go to California for his health but is back with us again and going strong with his 250 A rumor has it that 4BP is back on the air again. 4DW and 4DP are both pounding brass up north now and claim DX is great. Several locals report QSO with nc4JHB at Point du Bois. 4FS and 4AR are still being heard but do not report. The press of Univ. work has kept 4FV off the air all month except for a daily sked with nc4DW.

Traffic: 4EK 28, 4RM 25, 4BT 23, 4DW 20, 4GG 5, 4DU 3, 4GQ 2, 4JL 2.

SASKATCHEWAN—SCM, W. J. Pickering, 4FC—4IH expects that he will be on Sundays during the summer. 4BM has only the 1st Can. Dist. to work now. 4AO has moved to a new location and will be on soon with a 250 watter. 4AS, 4GA and 4GB are on regularly in Regina and ex4FV is installing a set. 4AJ and 4CE will be on soon while home from U. 4AQ has his 1st class ticket now. 4HS and 4CM turns in nice totals. 4AC is installing a Mercury Arc rectifier and an 852 and says he is going to try for a WAC. 4BL is on regularly at noon and says that the Saskatoon gang wants to link up with other nc's. 4CD and 4EF will be on soon. 4GR has been heard in Germany. 4CB says that local QSO's on 40 and 52.51 are possible now at night.

Traffic: 4HS 47, 4HH 30, 4CM 25, 4BM 23, 4IH 22, 4AC 19, 4BL 19, 4FC 8, 4CB 5.

LATE AND ADDITIONAL REPORTS

8CAE handled a few this month. 8AYH worked KDWU on 80 meters. 2BME handled quite a few messages. 6BAJ says 20 meters is FB. 6DPO reports direct to HQ. 9BWN handled some press to Omaha when the wires were down. 9EGN is QRW with school work just now. 9BRP is QRW store in the daytime and the YL at night. Hi. 9RV is not on much on account of school work at Univ. of Utah. 6BQ has been very consistently working England and France on 20 meters as reported by 6AJM.

Traffic: 8CAE 11, 8AYH 10, 2BME 81, 6BAJ 51, 6DPO 72, 9BWN 197, 9EGN 7, 9BRP 14, 6RV 9.

DENMARK

'During the last few months our society, the E.D.R., "Experimenting Danish Radio-amateurs" has been growing very fast. We have now about fifty active transmitters, but most of them are QRP stations which use powers of from ten to fifteen watts input. Only a very few are able to do real DX work.

'We would appreciate very much reports from DX stations on our signals. All QSL cards should be sent to QSL Section, E.D.R., Radioposten, 10, Snaregade. Copenhagen, K., Denmark. Our amateurs are generally using the 45-meter band, but now a few ED's are doing regular work in the 20-meter band. We expect to do a lot of work in this latter band in the coming summer months.

'Conditions for NU work have been fairly good on the 40-meter band; on the 20-meter band it is not so good, and as far as is known only ed7CZ has worked the United States. 7BL has worked a few NU's on 10 watts input. 7FR is without doubt our star QRP station; he has worked NU 1st, 2d, 3rd, 4th and 8th districts, NP and oz2AE several times, using 15 watts input, getting R6 to R7 from oz2AE. FB!

'7HP has succeeded in working oz2GA. 7JO (Faero Island) is often QSO with the U.S. on 30 watts. 7MT has rebuilt his whole station and is now working with two transmitters, a QRP and a QRO; he is on 85, 45, 35 and 21 meters and will appreciate reports on his 21 m. signals very much. He is now lacking only OZ in order to be a WAC member. On 20 meters he is using the 19th harmonic of the aerial. Hi!

'7ZG has worked various districts in NU.

'We shall always be pleased to publish any letters concerning tests, etc., in our journal.'

—*E. L. Poulsen, Communications Mgr., E.D.R., ed7MT.*

CHILE

'Winter is coming in fast now and with this the appearance of the first European stations, some of which are heard QSA. Also, QRN has begun to slacken, to the joy of SC hams.

'The twenty-meter band is getting FB again, and many foreign stations are being heard.

'February's international contest was a great success and thoroughly enjoyed by the SC gang. sc2AS obtained the highest score with 239 points.

'sc7AA located at Punta Arenas is the most southern amateur station in the work, and is doing plenty of DX work. He is on 33.5 meters with a fine steady d.c. note.

'Australia and North America have been worked for the first time on phone, oa5LG and oa4NW having held long rag chews with sc2AS recently.

'sc2AH and sc2AR are waiting for their WAC certificates, having worked all the continents.'

—*L. S. Pettit, sc2AS*

SOUTH AFRICA

'DX conditions are still favorable, although we are approaching winter. QSO as a ninstance has varied from seven to two during a period of a few mornings. The 20-meter band seems to be the most useful at present.

'foA5L has been doing some tests with ai2KT on 20 meters with great success. A local HAM has been QSO nrCTO, and I think this is the first NR-FO QSO. FO hams have been doing good work with low power.

'Certain tests have been made here with regard to the local Government Radio Defence Scheme, and the work has been greatly appreciated by our P.M.G.

'Tests are now being carried out to determine the best band for local conditions.'

—*F. P. Marks, foA5F*

U. S. S. R.

'We are quite proud of the fact that the number of transmitters in the U.S.S.R. is constantly growing. There are now 150 duly licensed amateurs, with about 120

(Continued on Page 66)

Calls Heard

W. Faber, *Mitchelton via Brisbane*, Queensland, Australia

1fs 1aao 1emp 1aiv 1eto 2ahm 2bj 2all 2awq 2clr 2ld 3btq 3afu 3bnc 3bms 3ekl 3cbt 3lw 4ar 4iz 4lk 4ar 4oz 4yh 5aka 5afq 5ak 5nw 5auz 5kl 5amq 6am 6amn 6bxd 6bhq 6cbz 6afs 6bq 6zat 6bwk 6baw 6dfa 6etx 6bvy 6ec 6ecs 6hc 6dxo 6amq 6dcr 6clj 7kl 7wy 7aef 7uo 7ef 7ek 8bau 8ajn 8al 8bes 8btv 9ej 9bib 9aon 9dea 9blv 9bra 9ahq 9aek 9dah 9czv 9ara 9day 9bwn 9ln 9asc 9drd 9axq 9arr 9crj 9fi 9eng 9dqy nc-4dv nc-5aj nc-5go nc-1ar nc-4gt nc-8kp ne-1br op-1dl op-1hr op-3ac op-1at ac-8em ac-2ff ac-8ma ac-1ma oh-6amu oh-6buc oh-6dcv aj-jkzb aj-1sm aj-1sk aj-1aa ch-1eg ch-2ld am-1ab am-3ab ai-2kt ai-2kw ai-2jy su-2ak su-1ed sc-2ar sc-2as sc-3ag sc-1pu sb-7ab sb-2aj sb-1ah sb-1ax fo-a3z fo-a3b fo-a4z oo-geo oo-klfl bam wnp ardi kfzq kzet pqs woby.

T. Stephens, Langdale, Hawthorn Rd., Caulfield, Melbourne, Victoria Australia

1bgq 1pe 1bke 1kk 1emp 1asf 1gv 1bhs 1mx 1enp 1bd 1azd 1gh 1xr 2alu 2tp 2kr 2cxi 2az 2xs 2bvg 2xaf 3pf 3lw 3ua 3bnu 3afw 4we 4oc 4qy 4iz 4bl 4fu 4si 5fu 5wz 5ql 5kc 5auz 5mx 5ahz 5sj 5ty 6xi 6bst 6ea 6dta 6cis 6bpc 6dwj 6dkt 6cdj 6am 6cbj 6dns 6dow 6rj 6bhv 6dmt 6abk 6bjl 6bow 6awy 6bth 6alz 6eb 6aij 6dkv 6ea 6kw 6ard 6ec 6cuh 6dwa 6deo 6der 6byz 6agr 6dev 6cgm 6bxi 6cpy 6bxv 6dhg 6biu 6alv 6bfp 6ps 6akw 6avj 6bwi 6bpo 6bkd 6djj 6dap 6dhs 6dkx 6chj 7df 7abh 7aax 7vl 7bb 7aef 7fs 7gj 8ahc 8dha 8air 8dpa 8na 8adg 8dkt 8cn 8dme 8dkx 8cnt 8gz 8jj 9ts 9ra 9ck 9dfz 9drd 9dng 9ara 9ckf 9emq 9ez 9so 9bxb 9arn 9cph 9cjw 9dih 9dr 9ebm 9baf 9clk 9crj 9ahy 9byc 9aok 9bwn 9brc 9eft 9dkc 9aue 9dq 9ahq 9cln ac-5mx ac-8na ac-1jc ac-2aw ac-1fg ac-a6l ac-2ff aj-4dx aj-jkzb aj-2dk ac-jkv oj-1hr op-lad op-1gz op-1mo op-1dl oc-8xz cf-8xq cf-8fd oo-1aj nc-2bg nc-9bz nc-5go nc-4ha nc-5cj oh-6dud oh-6ch oh-6wu oh-6dju oh-6bhl oh-6xk oh-6dvg oh-6xo oh-6adh oh-6dki oh-6dvb oh-6boe oh-6alm pcjj.

6BBN, James Findley, 3809 S. Denker, Los Angeles, Calif. S.S. San Pedro off the west coast of Central America

1amd 1apc 1asi 1bns 1mk 1se 2acn 2agl 2agp 2abb 2ahi 2ak 2aro 2avq 2axf 2bcb 2bdf 2bhv 2bv 2cvj 2cxl 2dr 2gk 2hc 2qh 2tp 2uo 2wy 3aed 3aim 3amx 3anc 3biw 3buy 3cdn 3ee 3qe 3sn 4acn 4acz 4aeb 4aeo 4bl 4cb 4cf 4cp 4ip 4jz 4ky 4nf 4pu 4si 5agl 5akn 5amb 5asm 5at 5bg 5ck 5ge 5jc 5mx 5ot 5rg 5ta 5uc 5yw 6aij 6am 6ard 6avb 6bch 6cew 6czz 6ea 6ec 6qf 7aax 7aep 7dl 7ef 7mv 8agy 8bct 8bqr 8brc 8cau 8cjw 8cnx 8cxi 8ddt 8dew 8dnf 8pp 8xa 9acl 9aid 9aui 9baz 9bnb 9bzm 9bzz 9ceb 9cku 9clp 9cnc 9cos 9efe 9elx 9ewp 9eva 9ez 9fgp 9ld oh-6dey nc-9bz na-7to.

(80 meters)

1abn 1aef 1agl 1bkq 1ta 2bhx 3awu 4aeg 4iw 4wg 8ano 8arc 8arx 8bkt 8vz.

KURS, R. T. Warner, Goodrich Transit Co., Chicago, Ill.

1acm 1aha 1ahx 1anz 1asy 1blf 1bw 1cb 1cv 1ii 1si 2afa 2afo 2agp 2apq 2bad 2bfi 2cxl 2cxm 2xbc 2cs 2dg 2uo 2sc 2wy 2xg 2xj 2xs 3anh 3aqz 3bsd 3cbt 3cdn 3ad 3cf 3ut 3wj 3zf 4cs 4fe 4gl 4oc 4rn 4wg 5amo 5ma 5oa 5pi 5za 6ajm 6avj 6avz 6ard 6abg 6awr 6bam 6bpm 6bvm 6bwi 6bfq 6bzu 6cei 6eci 6cmc 6cmq 6czm 6dnh 6djw 6dpy 6is 6mu 6xi 7ail 7bb 7gp 7mo 7no 7tj 7vq 8aef 8ahc 8ajk 8avs 8aub 8awh 8ayw 8bev 8cau 8cjl 8cmw 8dbr 8doq 8dhx 8cle 8ey nc-3ai nc-3ay nc-3bt nc-3in nc-4cb oh-clj oh-6xo nm-9a.

eg-2BQH, G. G. E. Bennett, 26 Blenheim Park Road, Croydon, Surrey, Eng.

(20 meters)

1aal 1aba 1abx 1acm 1aep 1aes 1aff 1afl 1ajd 1ajm 1akm 1akz 1amk 1apw 1aqa 1aqt 1ask 1asr 1atv 1awe 1axa 1axq 1axx 1ayg 1ayo 1azd 1bat 1bbr 1bcr 1bez 1bfz 1bhm 1biv 1bsg 1btq 1buc 1bvl 1bw 1bwm 1byv 1cd 1cmp 1cpb 1ctp 1cx 1ez 1fl 1fm 1ho 1ia 1ic 1ij 1in 1jg 1jl 1ka 1kh 1my 1nf 1od 1pe 1qb 1rl 1rp 1rw 1ry 1sw 1sz 1uo 1vs 1vw 1xam 1xv 1zt 2abu 2aez 2afr 2afv 2afx 2ags 2alp 2anq 2anv 2aol 2api 2avz 2awq 2ays 2azl 2baa 2bac 2bgc 2bgt 2bha 2bir 2bum 2bvg 2cdr 2ch 2emx 2cpg 2fn 2fs 2gl 2gp 2jn 2jp 2kq 2tp 2uh 2ui 2va 2vi 2xac 2xad 2xg 3adm 3ahr 3anh 3ani 3apx 3bcd 3bms 3ceb 3cee 3ckl 3hf 3hi 3lw 3nz 3qe 3qv 4ab 4act 4bl 4fu 4pp 4rr 4st 4to 4we 7bb 8abx 8adg 8adm 8agy 8ahc 8amu 8arb 8arg 8aro 8avd 8axa 8bau 8bcm 8bde 8ben 8box 8byn 8cbi 8ccl 8cfr 8cgo 8chz 8ckc 8clp 8cnj 8cns 8cnx 8cpc 8csr 8cug 8cvj 8ddn 8dfw 8dhs 8dhx 8djv 8dme 8don 8drj 8dsi 8gz 8hx 8xa 9avp 9cjh 9cst 9dbj 9dga 9ef 9efz 9eln 9ez 9rb 9rv naa npg waj wik wiz wll wnp af-1b ai-2kt ai-2kw ai2kx aq-1lm fd-crbc fe-1ac fm-8rit fo-a8m fo-a3z fo-a4e fo-a7n fo-a7u fo-aqa nc-cf nc-cj nc-1ad nc-1ap nc-1ar nc-1br nc-1co nc-2al nc-2ax nc-2be nc-3bt nc-3qs nc-sep nc-9ai np-4sa np-4xk oa-2me oa-viy od-and op-1xr oz-2bx sl-hjg.

(40 meters)

1aba 1adx 1aef 1afl 1age 1ajc 1akm 1arv 1asf 1axa 1axx 1bhs 1bqs 1bqt 1btf 1bxl 1cd 1cek 1epb 1cx 1fl 1fm 1ho 1ic 1kk 1mo 1mv 1nx 1si 1vs 1wv 2ags 2alu 2aoj 2atq 2bfq 2bgt 2box 2bsc 2ctx 2cuq 2cxi 2kl 2kr 2la 2mu 2ol 2ow 2sh 2tp 2up 2vc 2wy 3afl 3afx 3anh 3aqz 3aua 3bms 3bqz 3cbt 3cfg 3di 3dz 3hf 3ht 3ku 3qe 3sh 3wm 4acv 4aep 4bl 4dv 4ec 4iz 4oh 4qy 5aut 5eb 5oa 8ahc 8akc 8alu 8avg 8axz 8ayu 8ben 8bpn 8btr 8cau 8cbi 8chz 8cnx 8ctl 8dlj 8gz 8ov 8vt 8zg 9aar 9bht 9cgd 9cmq 9cph 9ez 9mn kel naa wiz ac-xom ac-1fb ac-8na ai-2kw ai-2kx aq-vtc fe-suc fe-suw fm-8ssr fm-ocrb nc-1ad nc-1ar nc-2al nc-9bz np-4sa oa-2ru oa-2yj oa-3hr oa-3ks oa-3lo oa-3lp oa-4aw oa-4go oa-5bw oa-5hg oa-6sa oa-7cw op-1xr op-kzed op-kzet oz-2gg oz-3aj oz-3au oz-4ae oz-4ao sa-lpi sb-por sb-sqcl.

(80 meters)

1aby 1afb 1apk 1bdt 1bjk 1bnh 1buc 1cba 1cdx 1ckn 1clm 1db 1fa 1it 1kv 1qb 1sl 1wq 2ag 2nd 2apg 2asc 2ayg 2ayi 2bey 2bfd 2bfp 2bgb 2bgm 2bif 2bij 2cp 2cpd 2rd 3akb 3ami 3aoc 3aqi 3ask 3bce 3ho 3dc 3hd 3hl 3mi 3sn 3zf 3zm 4cs 4fs 4gl 8ajk 8amh 8apt 8arx 8atq 8ayu 8bas 8bnr 8bpa 8byn 8bzm 8chi 8csi 8cud 8dat 8ddc 8dnx 8jb 8jrx 8vd 8vl 8xe 9bdt 9cpr 9dba 9ekw nc-1br nc-1cs ne-8ae.

eg-2HJ, K. E. Brian Jay, The Quinta, Elm Close, Amersham, Bucks, England

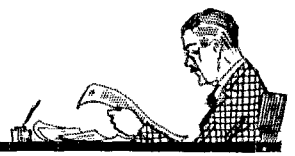
(40 meters)

1akl 1att 1btq 2bub 1cax 1cmt 1gw 1il 1nq 1yb 2aax 2aol 2awi 2bbh 2bgb 2bsk 2bvg 2bxr 2ku 2mb 2tt 2vy 3abo 3aef 3afw 3ag 3agb 3anb 3anh 3anv 3avk 3bns 3cef 3cfg 3qv 3ua 3ut 4acc 4acv 4bl 4fu 4iz 4lk 4qz 4uk 4we 4wk 5aec 5atf 5avs 5ayl 5kg 5oa 5rd 5vf 8aif 8alu 8amk 8atg 8bct 8byn 8cau

(Continued on Page 74)

Correspondence

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



Those Cards!

S.S. *Minnekahda,*
At Sea.

Editor, *QST:*

Have just been reading in *QST* another letter yelling on behalf of the QSL card. Migosh, is amateur radio going to progress in everything but the craze for cards?

Personally, I think that a law should be passed making it a cardinal offense for a ham with any sort of station at all, to ask, or more correctly demand, cards from stations less than 5,000 miles away. Any peanut tube can work that far now. Why yell because one doesn't get fifty cards from fifty-five QSOs made with stations in the next state? What useful purpose do they serve? Skip distances and the various effects of light and darkness make them almost useless as reports.

A decent station with a good operator hooks up with so many stations in a week that exchanging cards with all of them would require the services of a paid secretary. Uncle Sam is the only one who benefits and I'm waiting to hear that his income has been improved by a squeal for 'QSL card by Air Mail.' That will surely be next!

I was a Ham for many years before going to sea and remember vividly the work that QSLing by card for every QSO made. Let's forget the QSL card. It went out of date the minute an amateur c.w. peep got out of the U.S.A.

—*Roger W. Bunce, ex2BKL*

815 Stewart Dv.
Dallas, Texas.

Editor, *QST:*

Like many other Hams who are on the air daily and have a sizeable postal expense, I have been forced to stop replying to any report cards from within the United States. Every day cards arrive from Kansas, Nebraska and points still nearer home requesting a card in return and reporting my signals.

Back in 1921, the 'heard' card had some meaning. Then it was DX to work a Canadian and even Pacific Coast stations. A card from New York or Los Angeles was assured the best spot on the wall. These present day QSL fiends should realize that their cards are no earthly help to the Ham who has several foreign cards arrive in the same mail. And yet there are few stations that don't.

And now let's talk about the commercial stations with which the amateur bands are at present blessed. Much is written about the amateur who allows his wave to slip outside the bands; and it is all quite in order, for the amateur is often careless. But how about the commercial with ten or twenty kilowatts who thinks that 40.5 meters is his private playground (with R6 harmonics in our 20-meter band)? Almost any evening, several commercials may be found in our bands with the most terrible notes. It is a puny commercial indeed that cannot be heard for several degrees on the dial each side of what is supposed to be his wave. Even WIK, who is usually very clean, has been heard so out of adjustment that he has had a weak wave for about each degree of the dial from nineteen to twenty three meters; a sort of smoke screen through which signals arrive with a decided mince-meat effect. The same is true of 6XI except that that station thoughtfully climbs right into our band before starting these cunning little barrages.

However, every cloud has a silver lining. In 1929 we will not have to tune for sc3AG behind LP1 or eg5BY under HJG! Interference with amateur signals probably will be from amateur signals and they won't be backed with as many kilowatts as are the commercials. Also, their operators will not have the engineering knowledge necessary to design those cute little compensating waves and flivver exhaust effects for their transmitters.

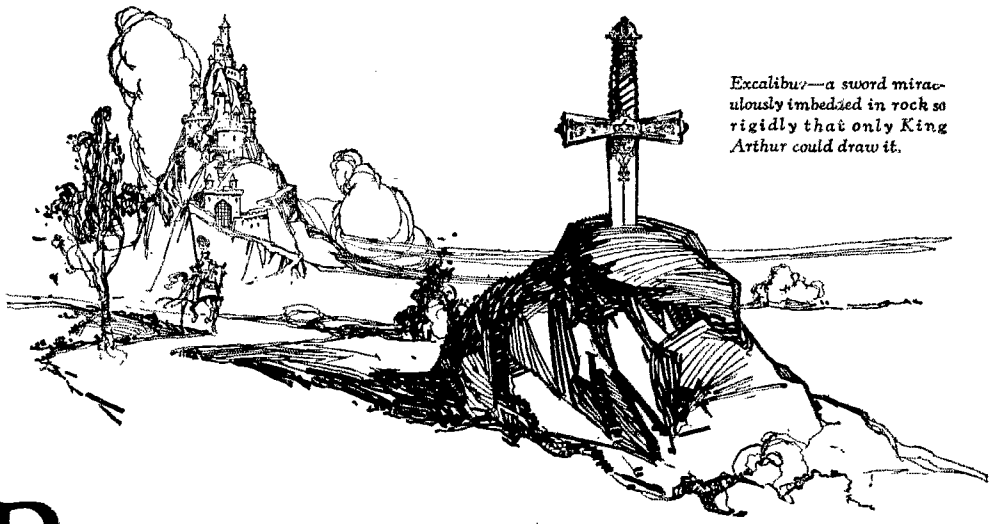
—*M. E. Lawson, 5ACL*

Fort Madison,
Iowa.

Editor, *QST:*

The splendid letter from nu7AAT in the March, *QST* inspires the writer to add a word to the QSLL discussion.

Certainly, there is something radically wrong with the operator who ceases to QSLL as soon as he gets all the cards he wants; and the situation amounts to that, more or less. In the year that the writer has been on the air with this low powered rig he has sent over 600 cards and the return has been about 60%—which seems mighty poor. Does this show the real ham spirit? Certainly not. Why can't we all have the courtesy and decency at least



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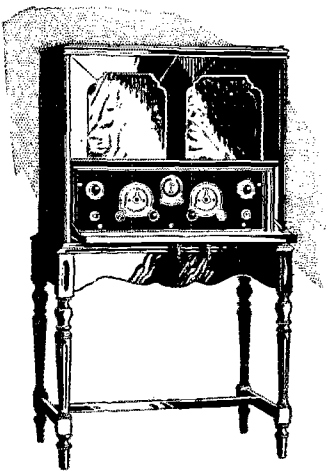
RIGIDITY
conserves TONE QUALITY



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to answer all cards received? We must keep the ball rolling. We can't all sit and wait for the other fellow to send his card or the old custom would die a speedy death.

Let's have a little less selfishness, indifference and carelessness in the matter of QSLL fellows. The other man wants cards even if you have outgrown the desire.

—*Frank E. Dailey, 9CKQ*

Obliterating Off-Wave Operation

68 Franklin Street,
Barre, Vt.

Editor, *QST:*

The Asst. Technical Editor's note under the letter of 9ACS in the April *QST* hits a hot spot. I for one would like to see a 'Calls Heard Below the Band' section in *QST*.

Lately, it has been possible to find half a dozen stations out of their band in as many minutes. I have been sending warnings to two or three every day. Some of them are newcomers to the ranks but what is to be said of the old-timers who permit their signals to wander down to 36 or 37 meters?

Yes, let's have some calls heard out of the band for a few months and see if it won't have a little influence on those amateurs who haven't enough sporting blood in them to take their chances with the rest of us in the rich QRM to be found nightly in the 40-meter band.

—*Roy L. Gale, 1BD*

173 Albany Avenue,
Shreveport, La.

Editor, *QST:*

The suggestion that a list of 'Calls Heard Outside the Band' be published has merit to it; but I believe that a more direct way to handle the matter is for the station who observes a violation to drop a card promptly to the violator calling his attention to the error. This is only common courtesy. I do not believe that these 'outlaws' are wilful in their outlawing. Notification by card will undoubtedly have the desired effect without subjecting the guilty one to embarrassment by the publication of his call in *QST*.

It might be well for each station to keep a log of these violators, notify them by card as suggested, and then forward the log monthly to the SCM to be placed on record. Then, if a station appears on the list too often a warning directly from Headquarters could be used to bring the matter to issue.

I am not in favor of calling the guilty station by radio because I am of the opinion that a man who QSO's an 'outlaw' is just as guilty as the 'outlaw' himself.

—*Bradford Hearn, 5ANC*

(For more than a year A.R.R.L. Official Observers have been notifying off-wave

stations by card. Though the number of Observers has been rather limited, the work has been splendidly successful. In some cases the Observers are rewarded for their sincere desire to help the game by a reply, 'There's a liar somewhere in your station; maybe it's the wavemeter', but usually the off-wave operator is fully appreciative and keen to coöperate.—Assoc. Tech. Ed.)

1801 Avenue 'A'
Flint, Mich.

Editor, *QST:*

After reading my April issue over for the seventeenth time the letter of 9ACS struck home and I began listening above and below the bands (40 and 80) to see how nearly he was right. I found that I had listed over fifty off-wave stations in the hour that I had listened.

It would seem that the condition is due almost entirely to carlessness. If we could make a practice of checking our waves more often the stations heard outside the band would soon be nil.

As for the proposed list of 'Calls Heard Outside the Band', let's have it as soon as possible.

—*H. Walker, 8BJQ*

Klemme,
Iowa.

Editor, *QST:*

I heartily agree that there are too many amateurs outside of their bands. 9ACS implies that one reason for stations getting off-wave is inaccuracy of their wavemeters. If, then, 9ACS attempts, along with all other amateurs, to police the air, hard feeling is certain to arise if lists of 'Calls Heard Outside the Bands' are printed. Many stations just inside the bands would be named as the result of this same inaccuracy in wavemeters.

—*Andrew J. Wellemeyer, 9DSG*

Grinding Crystals

1024 Southwest Ninth St.,
Miami, Florida.

Editor, *QST:*

I would like to correct a statement in my article 'The Grinding of Quartz Plates' in the January *QST*. It was stated that the 'Y' axis produced a wavelength of 117 meters per millimeter. I did not have the facilities to make my own determinations, and based this statement on those of Crossley (Proc. I.R.E., Jan., 1927). There appears to be a lack of accurate information on the subject. At any rate, it is quite certain that the true 'Y' axis produces from 140 to 170 meters per millimeter, and that the 117 meter relation is result of a combination between the thickness and another dimension, probably the 'Z' or optical axis, which has been known not to be entirely neutral. Thus, the frequency shifts spoken of in my article are not due to a changing

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between the axes, and it is not likely that a sharply defined point for this change exists, as previously supposed.

The 117-meter relation is present in all plates having the 'X' axis, or 104-meter per millimeter relation, sometimes on the same order of intensity. I have not been able to conduct an investigation into the factors involved and hope that some one engaged in the work will come forth with the particulars.

It has also been noticed that if a plate is ground slightly concave, i.e., with the center slightly thinner than the edges, improved operation will result in some cases. This is to be expected from the theory according to which the center of the plate vibrates, and the edges support the electrodes. Hand grinding usually produces a concave plate, even though efforts are made to keep the faces flat. But it is well known that it is difficult, if not impossible, to produce a plane surface by ordinary methods.

—*E. G. Watts Jr., 4FM*

Five Continents in 3 Hours

39 Sussex St.,
Victoria Park,
Western Australia.

Editor, *QST:*

In the I.A.R.U. News in the February, *QST* I notice that sb1AO worked five Continents in ten hours. It is also to be remembered that ss2SE (now am1AB) did the same thing in five hours.

I can go one better by quoting from my log for February 24th which shows five Continents worked in under three hours.

South America is my stumbling block and without it I still cannot claim W. A. C. A single UX-210 is used at this station.

—*S. C. Austin, oa6SA*

Why QSZ?

Lawrence,
Kansas.

Editor, *QST:*

It would seem that there are not many amateurs able or willing to take a straight twenty words per and really receive it. Nine out of ten of the fellows on the 40-meter band are QSZing whether they are asked to or not. This is not a desirable condition as it *doubles* the interference problem. If all amateurs used more judgment in the length of their calls, QSZed only when asked to and sent at a reasonable speed the QRM problem would be relatively insignificant.

When giving a report on the other fellow's note remember that 'r.a.c.' means even less than 'QSA' meant in the old days. Don't be afraid to use a few descriptive adjectives.

May the A.R.R.L. be blessed for its great guidance, without which we would be utterly helpless.

—*F. S. McKeever, 9DNG*

THE AMATEUR'S BOOKSHELF

Readers of *QST* appreciate the need for good radio books. What we consider to be the best standard text books are handled by A. R. R. L. Headquarters for the convenience of members of the League and readers of *QST*. Those listed below pretty well cover the requirements of the average amateur or experimenter.

The Radio Amateur's Handbook, by F. E. Handy, Communications Manager, A.R.R.L. Third edition. The standard text book and manual for transmitting amateurs. Contains immense quantity of data and information valuable to experimenters and all interested in any phase of radio. 256 pages, 207 illustrations **$1.00**

The Radio Amateur's Handbook, Cloth Bound Edition. Except for binding, identical with regular edition **2.00**

Radio Telephony For Amateurs, by Stuart Ballantine. One of the most valuable books we know of for the amateur. Theory, construction, practice. *Not* particularly about telephony. Heartily recommended for every amateur. 296 pp., 5½ x 8¼ **2.00**

Manual of Radio Telegraphy and Telephony, by Commander (now Admiral) S. S. Robison, U. S. N., published by the Naval Institute. "Ranks with the very best of all published radio matter . . . Not only worth its cost but is perhaps the best radio book that ever came to this desk."—*QST* Book Review. 895 pp., 6¾ x 10 ..... **5.50**

Experimental Radio, by Prof. R. R. Ramsey. Revised Edition. The book for the experimenter. A laboratory manual, describing 85 excellent experiments that help in understanding radio work **2.75**

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Thermionic Vacuum Tube, by H. J. Van der Bijl **5.00**

Radio Frequency Measurements, by Moulin **10.00**

Prepared Radio Measurements, by R. R. Batcher **2.00**

Elements of Radio Communication, by Ellery W. Stone **3.00**

Radio Questions and Answers, on Government Examination for Operators, by A. R. Nilson **1.00**

Radio Simplified, by Kendall & Koehler, revised by J. M. Clayton **1.00**

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Gentilemen:

I have a Radiaphone with out KEY and I Want to use it on short Distance Where there is no code or Ameture Stations and I Have no use for The KEY and I do not Want to go to the Expence of Putting a KEY and Brushing up on Code and after I get it I will Have no use For it in my Buisness and I can See no Reason to Compell me to get KEY and learn Code when there is no Code Stations in Ten Sleep or Worland Wyoming but Plenty of Recivers that I can call up and tell Them What I Want So Please See if I cannot get a licens with out the Expence of the KEY and Brushing up on Code I Have nt usd the Code For 5 years and Canot Use it in Worland or Ten Sleep Wyo and it will be no good to me After I get it and I Donot See why I Should get Something that I do not need Please See what you can do my Distince of Use is 25 miles.

—U. S. Hubbell

I. A. R. U. News

(Continued from Page 56)

more licenses belong to governmental, scientific and allied stations. There are about 50 amateurs waiting for licenses and temporarily working under illegal call letters. A good total of 300! Registered receivers number more than 700.

'Activity has been good lately, and many contacts have been effected between European and Asiatic stations. One schedule was established between Moscow and Vladivostok (Far East). Good traffic routes at present have been established on 40 meters between Nijni-Novgorod and Leningrad, and Nijni-Novgorod and Moscow in daylight. There is a night schedule from Moscow to Siberia. An interesting feat lately was the transmission of a long letter from Tomsk to Moscow via Tomsk, Nijni-Novgorod, Leningrad and finally Moscow. This was also forwarded by mail and took 6 days; the radiogram took only 48 hours, and was delivered without errors. This success for our amateurs has much significance.

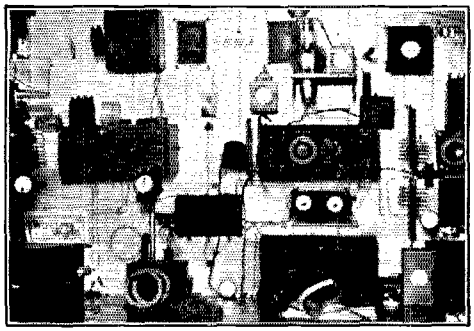
'Some good DX contacts were established with South and North America, but this kind of work has not yet reached the point where it may be called consistent. Many of our stations listened in on the February international tests. Several QSO's were established, but I do not know of any that might be called satisfactory.

'During January, a test with Spanish amateurs was put across and gave quite satisfactory results, proving the possibility of consistent two-way communication between the south-western and north-eastern extremities of the European continent.'

—W. Grzybowski, eul3RA

GERMANY

'Traffic conditions have improved immensely here during the last month, dud nights being very rare. Even after dark,



eg5NJ, SHOWN ABOVE, WAS THE FIRST STATION TO BE LICENSED IN NORTHERN IRELAND, AND HAS BEEN OPERATED SINCE JUNE 1925 BY FRANK R. NEILL, NEAR BELFAST

Both c.w. and phone are used at this station. The tube used is an Osram type DET2, the input being 1100 volts at 80 milamps from a Mortley Sprayne CF/147 generator. The circuit is t.p.t.g. with plug-in coils to permit quick QSY. Crystal control is used for the 32.5-meter transmission. A full-wave Zep antenna with a fundamental of 32.5 meters is used for all work. The set is badly screened from the U. S. A., but has regular schedules with South Africa and Australia.

it has been very easy to get in touch with Europe, as well as with NU. On the lower band conditions seemed to be very favorable, too, and it is easy to QSO the States practically all day long.

'The three Munich pioneers of amateur picture transmission succeeded very well, some pictures being sent by wireless nearly perfect. The monthly new German c.c. station is 4CD, of Berlin. We hope that lots of EK's will follow this example.

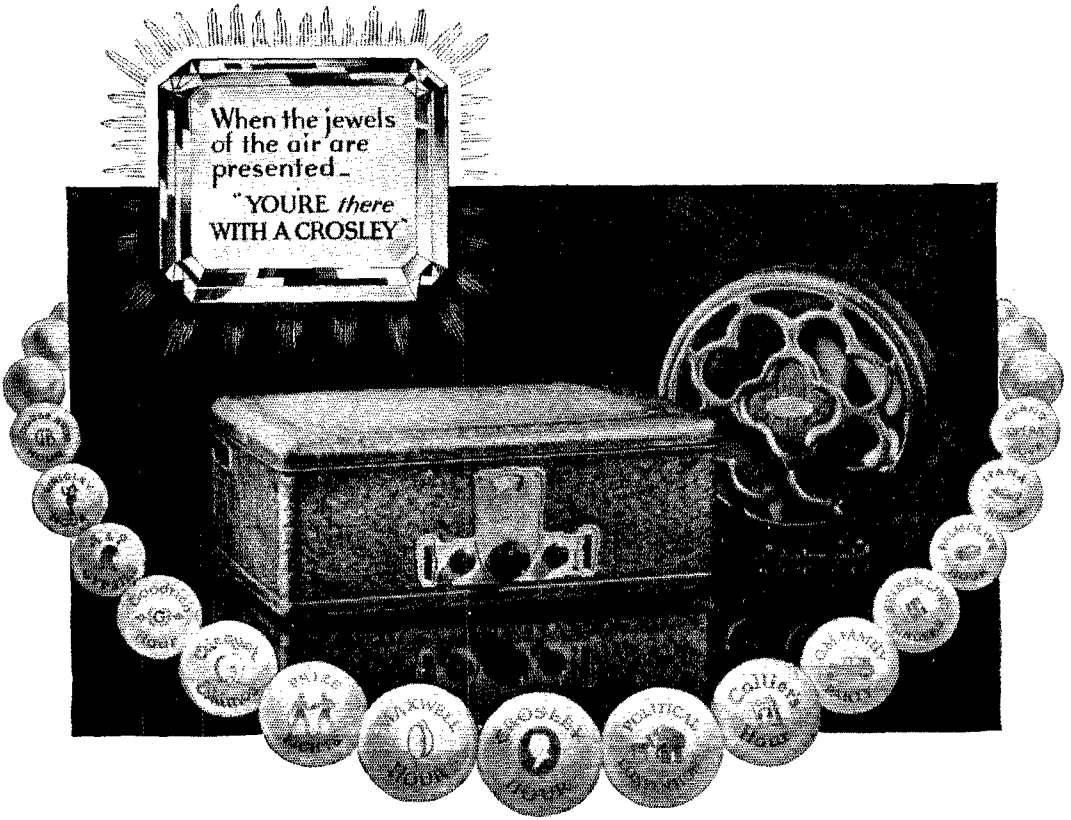
'Our third annual convention will take place in Dresden during whitsun. We should be very pleased to greet here any foreign hams, and hope to see many of them.'

—*Curt Lamm*

gIA8

This station, which everybody seems to have heard or worked during the short time it has been on the air, is owned and operated by George Moreau at Grytivken, King Edward Cove, South Georgia Island. South Georgia Island is about 1000 miles east of Cape Horn. From information sent in by many of the gang we learn that two sets are used, one consisting of a couple of 201-A's and the other a UX-210. Ten watts go into the 201-A rig, while the input to the 210 is 20 watts from a 550-volt, gas-driven a.c. generator.

The wavelengths used appear to be 20, 35 and 37, with most of the reports giving 37 meters. Signals have been reported from all over the United States, with a decidedly healthy kick which speaks well for the low-power outfit.



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The Musicone finished to match the Jewelbox, $15

The new Crosley Jewelbox is self-contained to operate from light socket.

All in one beautiful case. Add tubes and it's ready to operate! It is powerful. Supplying 180 volts to power output tube it gives full undistorted volume. Other sets supplying 110 to 135 volts result in poor quality, distortion and less volume.

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The new Crosley Jewelbox is up-to-date.

The dial is illuminated—a modern necessary feature. The set is completely shielded as all high grade radios should be. The rich brown finish high-lighted with gold makes it an ornament to grace the finest room. The beauty of the Jewelbox will charm you.

The price of the new Jewelbox is a triumph of manufacturing genius!

Crosley engineers designed this new Crosley Jewelbox under explicit instructions to make first a perfect radio. If the production of their final design had been limited to a few hundred, only wealthy persons could have afforded them. But with efficient Crosley production methods, facilities to manufacture parts in million quantities and a faith in the enormous demand such values would create, this splendid radio receiver is priced at $95.

Write Dept. 18 for literature.

QSL cards can be mailed direct to the address given, but don't expect an answer too soon, as the dope is that mail comes and goes but once a year to the island.

—*A. L. B.*

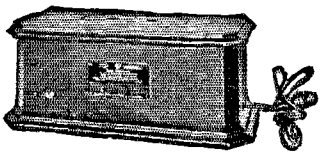
STATIONS BELOW 50 METERS
(Continued from May, QST)

20.	WSS, Rocky Point, N.Y.
20.	2XAW, Schenectady, N.Y.
20.	TUK, Tomsk, Siberia
20.	AGK, Nauen, Ger.
20.	CH, Quilicura, Chile
20.	NAL, Navy Yard, Washington, D.C.
20.	NEPQ, S.S. *Relief*
20.	OCTN, Mourillon, Toulon, France
20.	PCH, Scheveningen, Netherlands
20.	POX, Nauen, Ger.
20.	PCRR, Kootwijk, Holland
20.	GFR, Winchester, Eng.
20.	PUC, Curaccao
20.	GLSQ, S.S. *Olympic*
20.	RRP, Nijni Novgorod, U.S.S.R.
20.	J-1PP, Tokyo, Japan
20.25	JB, Johannesburg, S. Africa (BC)
20.3	ANF, Tjililin, Java
20.5	JKZB, Tokyo, Elec. Co., Toyko. Japan
20.69	PCH, Scheveningen, Netherlands
20.8	NKF, Bellevue, Anacostia, D.C.
21.	PCTT, Kootwijk, Holland
21.	NKF, Bellevue, Anacostia, D.C.
21.	RKV, Moscow, U.S.S.R.
21.127	PCH, Scheveningen, Netherlands
21.4	WDJ, Harrison, Ohio
21.4	KDZ, Point Barrow, Alaska
21.48	WIK, Rocky Point, N.Y.
21.5	WIK, New Brunswick, N.J.
21.5	PKP, Medan, Sumatra, D.E.I.
21.5	1PP, Toyko, Japan
21.5	GBO, Leafield, England
21.5	GBL, Leafield, England
21.5	GBM, Leafield, England
21.57	WOP-WEOP, Rocky Point, N.Y.
21.6	KTF, Midway Island
21.63	WPE-WEPE, Rocky Point
21.7	5DH, Dollis Hill, England
21.75	WGT-WEGT, San Juan, P.R.
21.8	RRU, U.S.S.R.
21.8	GLS, Ongar, England
21.8	KEB, Oakland, Calif.
21.8	KTA, Guam
21.8	HJG, Bogota, Col.
21.85	KLL, Bolinas, Calif.
21.96	2XAD, Schenectady, N.Y.
22.	KTA, Guam
22.	VIT, Townsville, Queensland, Aust
22.	VIX, Sydney, N.S.W., Australia
22.	RABL, Habarousk, Siberia
22.	VJZ, Rabaul, New Guinea
22.	RTRL, Tiflis, U.S.S.R.
22.	KGBB, S.S. *Ungara*
22.02	WGY, Schenectady, N.Y.
22.09	GLH, Dorchester, Eng. (Beam)
22.1	2XE, Richmond Hill, N.Y.
22.24	WAJ-WEAJ, Rocky Point, N.Y.
22.3	FY, Bordeaux, France
22.38	WND, Ocean Township, N.J.
22.5	OLQ, S.S. *Slamat*
22.8	WOWO, Ft. Wayne, Ind. (BC)
22.99	2XAA, Houlton, Me.

UNI-RECTRON POWER AMPLIFIERS

MODEL AP-935

AS the Uni-Rectron stands it is a super power amplifier, which can be used in connection with any radio set and loud speaker. Binding posts are provided for input to the Uni-Rectron and output to the speaker. Requires no batteries for its operation. It obtains its power from the 110 Volt, 60 Cycle alternating current lighting circuit of your house.



The UX-210 super power amplifying tube and the UX-216B or 281 rectifying tube are used with this amplifier, which cannot overload. From the faintest whisper to the loudest crash of sound—R.C.A. Uni-Rectron amplifies each note at its true value. High and low notes are all treated alike.

The volume and quality delivered will be a revelation.

Also by removing the input and output transformers it can be used as a source of power for an oscillating or transmitting tube, furnishing power for all circuits, grid, plate and filament and is the cheapest form of Power Supply for Amateur Transmitting purposes ever offered. New.

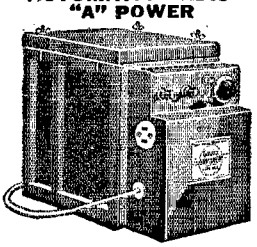
LIST PRICE $88.50
(Without Tubes)

SPECIAL $19.75 EA.

NEW

GOULD

AUTOMATIC RADIO "A" POWER



The New and Improved Gould Kathanode Unipower type AC-6K (6 volt). Automatic "A" Power Unit with built-in relay. Throws the charger on and off and controls a "B" Battery Eliminator if one is to to be used.

Fundamentally different from any other automatic charging "A" power device on the market. Its Kathanode construction insures longer life and is an exclusive patented feature, being used by the U. S. Government in their submarine batteries which are furnished by Gould. Its high capacity makes it especially adaptable to heavily worked or power tube sets.

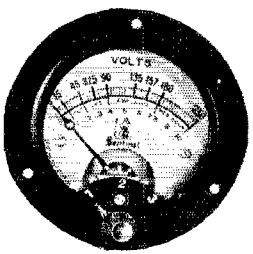
Equipped with the new noiseless Balkite Charging Unit, which has four graduated charging rates, and in addition one booster rate (1½ amps.), which always keeps the battery fully charged.

Operates on 110-120 volt, 60 cycle A. C.

LIST PRICE, $39.50
EXTRA SPECIAL $15.50

KATHANODE

UNIPOWER



JEWELL HIGH RESISTANCE VOLTMETERS

0-250 VOLTS D. C. (3 Readings)

A high grade, accurate, reliable instrument.

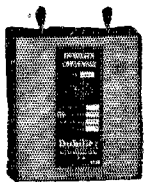
Just what you want for checking the true operation of your "B" Eliminator or any source of plate voltage which cannot be obtained from ordinary low resistance type meters.

Can be permanently placed in the set which will enable the user to apply desired plate voltage accurately to each circuit of his receiver. By means of the front switch three readings can be obtained without disconnecting any wires, namely; the detector circuit, the radio frequency or intermediate circuit, and the maximum or output circuit including last audio tube. Requires little current to operate due to its high internal resistance. Flush Panel Mounting. Zero Adjuster.

New and packed in original cartons.

SPECIAL Price $4.75 EA.

HIGH VOLTAGE FILTER CONDENSERS



Manufactured by Dubilier Condenser & Radio Corp.

1¾ mfd. 1000 volts rated D. C. Working Voltage — Special **$1.35** each

7 mfd. 600 volts rated D. C. Working Voltage — Special **$3.50** each

Manufactured by Stromberg-Carlson Tel. Mfg. Co.

3½ mfd. 600 volts rated D. C. Working Voltage — Special **$1.75** each

Manufactured by Radio Corp. of America

2 mfd. 300 volts rated D. C. Working Voltage — Special **65c** each

(Used but guaranteed as rated)

All of these High Quality Filter Condensers are new unless otherwise specified. They are excellent for use in your Transmitter, Eliminator or Experimental Work.

AMERICAN SALES CO., 19-21 Warren St., New York City

23.	KNN, Honolulu, T.H.	
23.	PKH, Soerabaja, Java	
23.	RAU, Tashkent, Turkestan	
23.	RLT, Tommot	
23.18	WNP, S.S. *Bowdoin*	
23.25	FFW, Sainte-Assise, France	
23.3	WBQ, Schenectady, N.Y.	
23.4	GBM, Osaka, Japan	
23.5	KTA, Guam	
23.7	KNN, Honolulu, T.H.	
24.	2XAD, New York, N.Y.	
24.	GBL, Leafield, England	
24.	JES, Osaka, Japan	
24.	GBO, Osaka, Japan	
24.	PKE, Amboina, D.E.I.	
24.	KNW, Palo Alto, Calif.	
24.	JEW, Osaka, Japan	
24.	SSW, Chelmsford, England	
24.	GDKB, S.S. *Dorsetshire*	
24.3	KFD, Denver	
24.3	FW, Sainte-Assise, France	
24.5	GLQ, Ongar, Eng.	
24.6	CJ. Drummondville, Can.	(Beam)
24.7	VIY, Melbourne, Aust.	(Beam)

(To be Continued in July, QST)

Our Cover

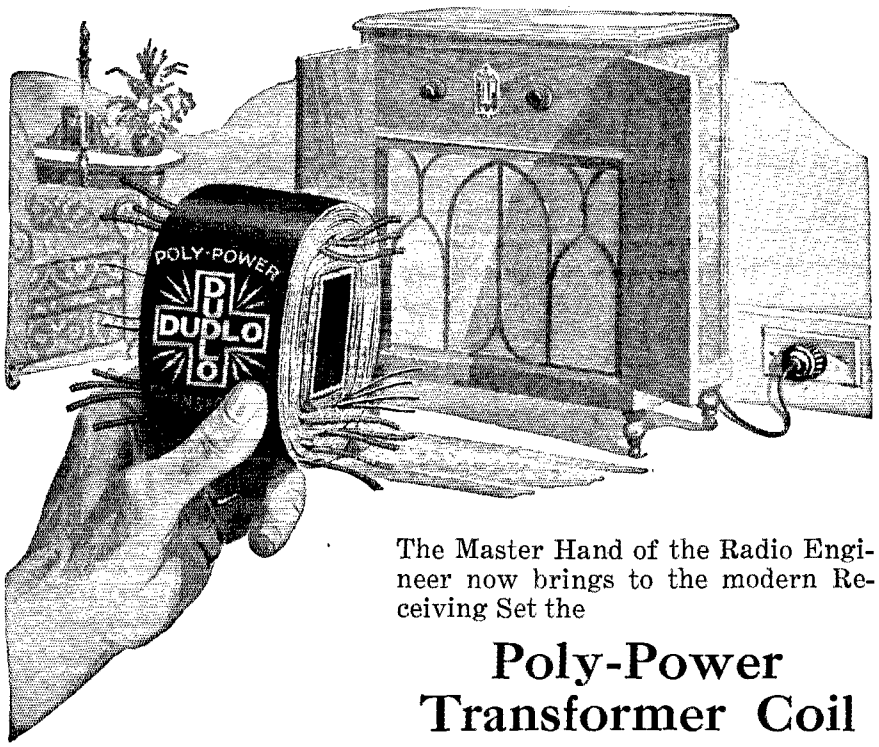
THE arrangement of apparatus at amateur radio station 1MK which is operated by A.R.R.L. Headquarters is shown in the photograph reproduced on our cover this month.

The operating position is at the right end of the table. Power supply to the two transmitters shown on the left is obtained from motor-generator and mercury-arc rectified alternating current and brought in through the three conduits shown in the center of the photograph, together with battery power for operating receiver filaments and control relays. At the right of the receiver are the keys and switches which control the power supply equipment installed in another room of the same building. Left of the receiver is the message file box with compartments holding traffic handled and that destined for different parts of the country. The station wavemeter is shown atop the receiver. The receiver itself is built on the 'traffic tuner' principle spreading the amateur bands over about eighty dial degrees. Complete shielding and tube-base coils are used. From left to right are the tuning condenser, 'beat note' condenser, resistance control of regeneration, volume control across second stage a.f. transformer secondary.

The main transmitter unit is in the foreground and is a 500-watt T.P.T.G. transmitter with interchangeable coils for changing wavelength to the different amateur frequency bands. The coils are of tubing with compression-type threaded brass couplings making it easy to change coils. The auxiliary transmitter under the table is a 250-watt Hartley always kept tuned to the same point in the forty-meter band. Both transmitters are keyed simultaneously in sending Official Broadcasts to A.R.R.L. Members on 40 and 80 meters.

Full-wave and half-wave horizontal

(Continued on Page 73)



The Master Hand of the Radio Engineer now brings to the modern Receiving Set the

Poly-Power Transformer Coil

With the source of power now made as convenient and reliable as electric lights, a great new market is opened up.

Thousands of folks who never before thought they could operate a Radio can now enjoy the wonderful programs without worry about the A, B, or C current supplies.

So again Dudlo meets the needs of the Radio manufacturer by preparing far in advance for volume production of these, the most intricate of all Radio coils. Special machinery has been designed and installed in anticipation of the greatest season the industry has ever known.

The Coil's the Thing!

that makes the "Light Socket" set possible

Dudlo Poly-Power Transformer Coils can be wound and tapped to furnish A, B, and C currents at any specified voltages required by Radio receivers or power units.

Dudlo engineers are at the service of Radio Manufacturers to assist in designing a Poly-Power coil to meet their special needs.

DUDLO

DUDLO MANUFACTURING CORP., FORT WAYNE, INDIANA

Division of the General Cable Corporation

56 Earl Street	160 North La Salle St.	4153 Bingham Ave.	274 Brannan St.
NEWARK, N. J.	CHICAGO, ILL.	ST. LOUIS, MO.	SAN FRANCISCO, CALIF.

Calls Heard

(Continued from Page 57)

8ccq 8cjl 8cnr 8cnx 8ctl 8czg 8czq 8dax 8dkt 8dln 9aok 9aue 9avp 9be 9beg 9beq 9brc 9cia 9cjw 9cph 9crd 9crh 9cwa 9dbw 9des 9dkg 9dng 9doe 9ds 9dws 9ebm 9egv 9eln 9eqk 9ez 9hi 9ju 9km 9mn 9pu 9rp nc-1br ne-8ae nq5fl ns-ofz oa-3bq oa-3jk oa-7jk oz-2ae oz-3ar oz-3au sa-de3 sa-d17 sb-1ah sb-1aw sb-1id sc-2ar sc-2as su-2ah su-2bt dcz sqcl.

(20 meters)

1adm 1aff 1ahx 1aja 1arc 1asf 1avj 1axx 1bcr 1bfz 1bhs 1bqb 1cpj 1cx 1ex 1hv 1ic 1ij 1io 1jl 1mr 1nf 1pd 1pe 1pm 1ry 1vw 1xm 1xv 1zz 2afx 2aho 2alp 2alw 2aok 2as 2avz 2awq 2ays 2baa 2bav 2bbx 2bgp 2bha 2bir 2bsc 2cvj 2cuq 2qu 2sz 2tp 2va 2vi 2xac 2xad 3adm 3anh 3bcd 3bma 3bsd 3bwt 3ceb 3cec 3ckj 3ee 3hf 3hi 3jm 3qf 3qw 3sz 3vx 4abl 4adg 4bl 4dt 4ft 4hh 4jm 4si 4we 5uk 6bch 8agq 8ajn 8amu 8aof 8arb 8aw 8axz 8ccq 8cln 8cta 8cug 8cum 8cyd 8dhx 8djw 8dm 8kq 8lj 8pi 9avp 9baz 9bkz 9bpl 9bzz 9crr 9csj 9dwe 9dy 9eln 9eyu 9ez 9fz 9pg 9pm af-1b fo-a3m fo-a3z fo-a9j nc-1ar nc-1by nc-2ai nc-3ap nc-3cs sb-1ib hjg wnp.

eg-BVJ, R. N. College, Dartmouth, Devon

1acm 1adm 1afx 1ahi 1ajd 1ale 1asf 1asu 1avl 1awe 1awm 1bat 1bcr 1bk 1bke 1bjr 1bw 1caw 1cax 1cmf 1cmt 1ii 1ij 1jl 1mk 1mr 1nf 1va 1vc 2adl 2afx 2ags 2avz 2ays 2baa 2bac 2bad 2bcr 2bfi 2bfq 2bgc 2bgt 2bha 2bt 2bvn 2bxr 2cmv 2tp 2va 2vi 3adg 3afv 3aih 3anh 3arq 3bjm 3cfq 3qs 4db 4ft 4nh 4to 5zav 8abw 8afq 8axa 8aw 8ayu 8br 8chc 8cnx 8cug 8cfw 8gk 8hx 8io 8iq 8sk 9dkv 9dsz 9ez nc-1ar nc-1fm nc-3bf nq-5fl sb-1ca sb-1cj sb-1cl sb-1ib sb-2af sb-2aj sb-2az su-1oa su-1bu su-2ah al-2kt fo-a3m fo-a3z oa-3gr oa-3pj oa-3vp oa-5hg wnp.

H. & W. Hazeldene, 23 Barry Rd., East Dulwich, London, England

(20 meters)

1aef 1ajd 1alr 1aqt 1awe 1axa 1bcr 1bhm 1bhs 1bnm 1bvl 1cd 1cpb 1ic 1ka 1pm 1vw 1vc 1wl 2aol 2awq 2bgt 2bum 3apx 3bf 4bl 4ob 8adg 8adm 8ahc 8avd 8axa 8axz 8ben 8cnh 8cug 8dkx 8dme 8gz 9che ne-1ad ne-1ar ne-2be nhca sb-1ib aq-1lm fm-8dot fe-1ac gkt wnp.

(40 meters)

1aaw 1abd 1ach 1acm 1acu 1ads 1afl 1ag 1aha 1ajc 1ajx 1akd 1akm 1akz 1amd 1amn 1anz 1aq 1aqt 1asf 1asy 1aus 1awe 1awm 1axx 1bat 1bdq 1bke 1bkp 1bl 1blf 1bob 1bqt 1bsd 1bwm 1ccf 1cbh 1cd 1cio 1cjc 1chq 1clv 1cnz 1cpb 1ctp 1dl 1dp 1ej 1fl 1fq 1gh 1gw 1id 1ih 1mo 1ow 1qa 1qc 1ro 1xv 1yb 1yc 1zs 2abe 2acc 2aed 2ach 2aet 2acz 2adl 2aef 2aes 2afa 2afr 2afv 2agn 2agu 2agw 2ahg 2aic 2ain 2ajt 2ald 2amf 2amh 2apc 2aqk 2aqo 2aqs 2aqu 2ard 2arm 2ass 2atq 2atx 2atz 2auh 2aun 2awi 2axk 2az 2bac 2bad 2bao 2bav 2bbc 2bbl 2bcc 2bck 2bcm 2bco 2bdc 2bdh 2bfw 2bgt 2bhf 2bbr 2bir 2biv 2bqh 2bsc 2bum 2bv 2cjd 2ctf 2cth 2cty 2cuq 2cvj 2dp 2ev 2fc 2fs 2hd 2hq 2ih 2jn 2kx 2md 2mt 2oc 2ov 2ow 2rs 2sz 2tp 2tr 2ty 2ub 2uh 2we 2wr 3adl 3aed 3adp 3ahp 3aib 3aih 3ais 3ajd 3akv 3alq 3aix 3amb 3anh 3ani 3apx 3aqm 3arq 3aso 3bms 3bn 3bph 3bqp 3huv 3cab 3cbt 3cch 3cfg 3ckj 3cjn 3cw 3dh 3dq 3dw 3fv 3gp 3ld 3mv 3ow 3pf 3pr 3qe 3vr 4aav 4aef 4aep 4bl 4bu 4fx 4gt 4hx 4jm 4mi 4oc 4oo 4qb 4qe 4qz 4rn 4tk 4tu 4ux 4wc 4we 5aak 5ack 5afb 5ahp 5aq 5aqe 5arl 5atf 5auu 5auz 5bf 5bj 5ih 5ja 5kc 5kg 5ty 5vf 5yb 5zav 6ahs 6am 6bkd 6bjl 6bjq 6dbc 6dhj 7ady 7alk 7uo 8adm 8ahm 8air 8akn 8akv 8akx 8ank 8avp 8ayn 8axc 8baz 8bep 8ben 8bfg 8bgo 8bhz 8bja 8bjb 8bjh 8bou 8bqi 8bqm 8brh 8bth 8bto 8bts 8bww 8bxh 8cbf 8ckq 8cnh 8cto 8cxd 8czh 8dcd 8dcm 8dhx 8dia 8djv 8dne 8drj 8eh 8ex 8hx 8li 8pl 8wb 9aeg 9afz 9agz 9agw 9aok 9asp 9axz 9baf 9bbw 9be 9bmm 9bpb 9bwj 9cjw 9emv 9en 9eph 9cpq 9cpr 9crd 9crj 9cya 9dek 9dlq 9dmj 9dpm 9dpw 9dro 9fam 9ff 9fs 9hj 9lz 9mz 9rk 9rp 9sj wnp.

eg-2NH, E. A. Dedman, 63 Kingston Rd., New Malden, Surrey, England

(20 meters)

1aaw 1aom 1adm 1afd 1aff 1age 1ahi 1ajd 1akm 1aor 1aqt 1asf 1asv 1aw 1awe 1axx 1bat 1bay 1bcr 1bfz 1bke 1bsg 1bw 1cax 1cfo 1cfz 1cki 1cpb 1cx 1fn 1ia 1ii 1jl 1ka 1mi 1mr 1rd 1vc 1vw 1zz 2afx 2aio 2akl 2alp 2aol 2aon 2ave 2avz 2ba 2baa 2bad

2baf 2bbx 2bci 2bfq 2bgc 2bha 2bhf 2bvg 2bxr 2ch 2cmu 2ctv 2cug 2gp 2jr 2kx 2nm 2ol 2tp 2va 2vi 2xv 3adm 3ahr 3akw 3arq 3awf 3bhf 3bjm 3ckj 3djm 3eq 3hf 3fv 3jm 3nz 3av 3ra 3rt 3sh 4adb 4adg 4aek 4dm 4fs 4io 4jm 4nh 4nl 4rn 4st 5acl 5agq 5akp 5atm 5auw 5bf 5dq 5gq 5nb 5sw 5uk 5vs 6bjh 6blg 6bzd 6dev 6dex 7ef 7ek 7fe 7if 7mn 7mo 7mx 8adg 8adm 8adr 8agy 8ajv 8akv 8aly 8ame 8ane 8aul 8avb 8avd 8axa 8axz 8baj 8bev 8bfz 8bhz 8bsr 8ccl 8cdb 8cfl 8cfr 8cil 8clp 8clr 8cmb 8cnj 8cpp 8cpu 8csr 8cug 8cvj 8cxi 8dgp 8dhs 8djv 8dmx 8eag 8ez 8gk 8gz 8hx 8io 8jq 8kq 8rd 8ro 8uk 8ve 8xe 8wt 9aas 9ajw 9ary 9avm 9avp 9eaq 9blw 9bmx 9btx 9bxi 9ccw 9cde 9che 9civ 9cjw 9cub 9dbm 9dkc 9dka 9dlu 9dsv 9dwe 9eag 9ecx 9ef 9ego 9ejs 9eln 9es 9esm 9eva 9ez 9hm 9pg af-1b ai-2kt am-3ab aq-1lm fo-a3m fo-a3z fo-a4f fo-a4n fo-a7n fo-a9a nc-1ad nc-1ap nc-1ar nc-1bd nc-1by nc-1co nc-2al nc-2ax nc-2be nc-3gg nc-3mp nc-4fv nc-5go nh-ca np-4ja np-4sa nq-2kp oa-2sh oa-2uk oa-2yi oa-2yj oa-3bk oa-3cp oa-3dc oa-3gr oa-3hl oa-4rb oa-5bw oa-5hg oa-7lj oz-2ac oz-3aa oz-3aj oz-3ap oz-3av oz-4ac oz-4am sb-1aw sb-1ib sb-2az sc-2as xed-oib xen-ocp wnp wsq.

eg-6YL, Miss B. Dunn, Stock, Essex, England

(20 meters)

2ch 4wb ec-1fm eei-ear65 ef-8fd ek-4au ep-1bk ep-1bx aq-1lm.

(40 meters)

1bkp 1bw 1kh 1mr 1se 2awu 2cjd 2dg 2fs 2hq 2qs 3cdn 3wj 4acz 4be 4oo 5kg 8bbs 8bqr 8czq 8grdb 9ez 9fs ej-7ff em-smrv em-smua em-smzy em-sdn em-sfv em-ska em-skb eu-08ra eu-49ra eu-ra58 af-hval fm-8ags fm-8psrv fm-8ssr fo-a9a nx-1xl su-1oa.

(90 meters)

fwg eg-5bd eg-5kl eg-5mu eg-6wn eg-6pa.

eb-4XS-3AC, Roger J. Parent, 38 Rue G. Maisier, Dolhain, Belgium

1aac 1acd 1ag 1aks 1ana 1aur 1axx 1aku 1ab 1afl 1asl 1avl 1btg 1bsa 1bgs 1cwz 1emp 1cvj 1cjc 1mv 1no 1si 1sl 1ww 2agn 2ahg 2afr 2atg 2amh 2btx 2bta 2cmp 2cty 2dl 2et 2fp 2fm 2jc 2fn 2rs 3aed 3amb 3adp 3apb 3bnf 3bzf 3bel 3bgg 3cdl 3car 3cdn 3cbt 3dp 3ee 3myu 3wj 4aeb 4aef 4ec 4eh 4fe 4io 4ir 4ge 4oo 5oa 8adh 8adm 8ayu 8apd 8kq 9bge nc-1ad nc-1br ne-8ae ni-2sh ni-sar nn-ek8 nm-5y nq-5cx sa-cb8 sb-1aw sb-1ck sb-1cl sb-1cm sb-1id sb-1xa sb-2ah sb-2as sb-2ay sb-2az sb-s94 sc-2yd su-1oa as-1dwk as-1lra aii-2au oa-1dx oa-5sg oz-1oa oz-2ab oz-2ml oz-3az oz-4ao.

ec-RP19, Alois Weirduch Mestec Kralove, Czechoslovakia

1aao 1axa 1ahx 1bux 1cmf 1cmx 1cnz 1gh 1gw 1ii 1vr 2avw 2bdh 2bir 2bor 2bir 2cyr 2hr 2tp 3aed 3ahl 3al 3alg 3ani 3blp 3sh 3qe 8dme 8ks nc-1ad nc-2bc nc-2bg sa-cb8 sb-1aw sb-1ca sb-1id sb-2ar sb-2ay oa-7cw oz-3ar aq-1lm.

ef-RO91, C. Conte, 24 Allee du Rocher, Clichy-sous-Bois (Seine-et-Oise) France

1aal 1acv 1adm 1agw 1akz 1agv 1anz 1apq 1aqt 1asf 1asy 1atz 1bjb 1bqd 1bqt 1chg 1cmf 1cmx 1cpc 1gh 1mx 1vw 1ze 2acc 2adl 2aed 2ags 2aol 2aow 2atg 2atq 2aub 2arb 2avz 2awe 2ayj 2beo 2ber 2bdk 2bgc 2bjm 2bjs 2box 2bsc 2bvd 2bvg 2cmu 2cub 2cuq 2cyx 2fs 2hc 2hd 2hr 2tr 2ty 2vy 2vi 2ev 3abo 3anh 3arq 3bms 3bph 3buv 3cdq 3cjn 3dg 3lc 3rf 3sz 3vr 4aar 4adm 4aec 4aef 4aik 4ay 4bl 4cy 4dm 4dv 4fe 4ft 4ha 4ll 4pu 4rf 5aav 5amn 5bg 5eb 5gr 5ty 7ek 8adm 8agy 8ahm 8aig 8avm 8avp 8avs 8azh 8ayu 8bbs 8bjh 8bnf 8bog 8box 8bqr 8bts 8cae 8cau 8cdm 8cke 8ckj 8cdm 8cug 8cvs 8czg 8czn 8dce 8ded 8dfo 8bgl 8dkt dmf 8dmx 8dod 8dot 8dps 8hl 8kq 8lw 8rh 8uj 8xe 9aaw 9aji 9ajp 9axh 9bbo 9bqe 9bxi 9cdk 9cej 9cis 9cjw 9cmv 9crd 9crp 9csb 9cvn 9des 9dk 9dkc 9dqn 9dtl 9eqk 9ez 9epj 9nr nc-1ar nc-3zb.

cj-700. B. Pilnar, Tuskanac 18e, Zagreb, Jugoslavia

1aae 1aaw 1abd 1acm 1adb 1afb 1afl 1agw 1ahv 1ahx 1ajx 1akm 1akx 1alr 1amf 1ao 1aqp 1arw 1asf 1atr 1avj 1avl 1avu 1avy 1awe 1axa 1bbm 1bck 1bcu 1lbdm 1bdy 1bh 1biv 1blf 1bqs 1br 1bux 1bvl 1bw 1cd 1cfp 1chr 1cjc 1ckd 1cmp 1cmt 1cmx 1cnx 1cnz 1cpi 1dl 1dnj 1ej 1ex 1ga 1gh 1ic 1ig 1igr 1ih 1iq 1ja 1kh 1kk 1km 1md 1mk 1mo 1mr 1mv 1mw 1om 1qs

1rd 1ro 1se 1wl 1yc 2abd 2abv 2acc 2acf 2aef 2afo 2afr 2agn 2agp 2ags 2agu 2agw 2alu 2ama 2amf 2amh 2an 2ang 2anm 2aow 2apq 2apy 2aqz 2ar 2arb 2aru 2ase 2ass 2aub 2avj 22avu 2axk 2az 2bck 2bct 2bcu 2bda 2bdf 2bek 2bfn 2bgq 2bqz 2bir 2bjm 2bk 2bkf 2bkh 2blc 2blf 2blx 2bot 2bvg 2cer 2ch 2chi 2cmu 2nm 2crb 2crs 2cuq 2cvj 2cxi 2cxm 2cyx 2fba 2fs 2gp 2hg 2jy 2kl 2kp 2kr 2kx 2mb 2rb 2rd 2rs 2tp 2tr 2ty 2uo 2up 2vc 2vd 2wd 2wk 2wq 2xad 2xaf 2za 3adp 3aer 3afw 3ahl 3ajd 3ajx 3anh 3ani 3aog 3aps 3aql 3ar 3auu 3auv 3bd 3bel 3blp 3bm 3bms 3bnu 3bqz 3bsd 3cdq 3ceb 3cfg 3cgu 3dh 3fz 3gr 3gt 3hf 3ku 3kt 3lp 3lw 3ow 3qe 3qt 3qw 3rb 3sk 3sz 3tc 3ut 3wj 3wm 4ac 4acc 4acn 4aef 4aep 4afm 4agn 4bj 4bl 4cs 4dl 4eq 4gl 4hy 4jr 4ky 4lk 4ob 4oc 4pac 4pu 4qy 4rn 4rr 4si 4st 4sx 4tq 4un 4we 5aq 5ayl 5da 5jb 5jc 5oa 5yb 8abw 8adg 8adq 8avw 8ay 8ayu 8bbj 8bbs 8bou 8box 8bts 8ccm 8cer 8evs 8czr 8dal 8dbi 8dcm 8dhx 8dnm 8dps 8dql 8eq 8er 8fu 8hx 8jq 8kg 8km 8li 8pl 8pp 8rh 8rw 8sp 9ao 9beu 9bkj 9bp 9crd 9dpv 9efo 9efz 9eml 9fs 9mad 9ta nc-1ad nc-1ak nc-1ar nc-1br nc-9bz np-4pq np-4sa nq-2ac nq-5cx nr-2fg nr-cto ac-1ax ac-2ck af-hval af-hza ag-67ra ai-2kt ai-2kw ai-2kx aq-1lm as-ra03 as-ber au-48ra au-86ra fe-1ac fe-egez fe-gm fe-suc fi-1ta fm-8ags fm-8kr fm-8ma fm-8rit fm-ocrb fo-1sr fo-a3a fo-a3z fo-a9a fq-pm fv-ocdb fz-1crt oa-2jw oa-2sh oa-2yj oa-3cp oa-3cw oa-3ks oa-3xo oa-4bd oa-5bw oa-5by oa-5hg oa-5qp oa-5wa oa-7ch oa-7ij od-and od-anf op-1hr oz-2ae oz-2aj oz-2bg oz-2bp oz-2me oz-3aj oz-3au oz-3az oz-4ao sa-fc6 sb-1ah sb-1ak sb-1aw sb-1ax sb-1be sb-1hg sb-1bo sb-1br sb-1ca sb-1cj sb-1cl sb-1cm sb-1ed sb-1id sb-1sb sb-1zt sb-2ag sb-2as sb-2az sb-7ab sb-8hl sc-2ah sc-2as sc-2ar sc-3bd su-1oa su-2aa xen-0cp.

oz-2GO, Harold G. Fownes, 110 Riddiford St., Wellington, New Zealand

1abz 1ai 1aj 1aqt 1ar 1asf 1bkp 1bl 1bwi 1caa 1chg 1cjh 1cnk 1cue 1dz 1ka 1kk 1nq 1rx 1wu 2aan 2abe 2ach 2ai 2awi 2bm 2bp 2dep 2gk 2hh 2iz 2rs 2sc 2uo 2vd 2xn 3aso 3bcd 3bqz 3cah 3ce 3ec 3mb 3pr 3ow 3qt 3uy 3ua 4aba 4acy 4az 4cv 4fx 4iq 4jj 4pe 4qb 4so 4tu 4tz 5afg 5afv 5ahp 5akk 5gr 5ns 5rv 5sf 5yh 7abh 7abx 7aef 7afs 7agn 7alk 7asi 7auk 7bb 7bd 7bq 7cs 7crp 7fe 7it 7mo 7mx 7wc ea-gp ea-fs ea-fk ea-ky ea-mp eb-4ac eb-4au eb-4ax eb-4bc eb-4co eb-4ft eb-4qq eb-4rs eb-4tm eb-4wx eb-k44 ec-2rk ed-7nc ee-ear6 ee-ear10 ee-ear50 ef-8acy ef-8brn ef-8akl ef-8ctn ef-8dui ef-8fiz ef-8gdb ef-8ger ef-8grg ef-8nox ef-8orm ef-8tis ef-8wel ef-8xix ef-8ynb ef-8zet eg-2sz eg-2xy eg-5mq eg-6oo eg-6wo ei-1ce ei-1cr ei-1gg ei-1gw ei-1no ei-1pl ek-4dbs ek-4ff ek-4oba ek-4uab ek-4vj ek-4xy em-smrn em-smxr em-smuk en-0ga en-0rz ep-lag ep-1bl ep-1bk ep-3co ep-3gb es-1co es-2nm es-2nx es-7us et-tpar eu-15ra ew-aa od-pk6 op-1at op-1bj op-1hr op-1gz op-1mo op-3ac op-9pb na-7aht na-7ajk na-7oe nc-3mv nc-4fv ne-8ae ne-8af ne-8wg nl-2t nm-xc53 nq-2ac nq-2mk nr-cto nr-2fg fe-ee fe-egez fm-8kr fm-8osp fm-8st fq-pm ac-1cl ac-2ck ac-2ff ae-8rj ae-8em ae-8hb ae-2rt af-1b ai-2by ai-2kt ai-2kw ai-2kx aj-jxax aj-jxix aj-1lm aj-1gs aj-1sk aj-1sm am-1ab am-3ab sa-en8 sa-hd4 sb-2ay sc-1ai sc-3ac su-2bt as-ra03 ocmb.

Our Cover

(Continued from Page 73)

Hertzian antennas are used respectively for 41.93- and 83.86-meter operation. Two Zeppelin feed lines from the transmitters excite these antennas. A separate receiving antenna is used in addition to facilitate break-in operation. Many schedules are kept by Chief Operator R. B. Parmenter whose 'sine' is 'RP'. All the brasspounders who keep 1MK on the air work in some department of A.R.R.L. Headquarters and they may be identified by the list of personal 'sines' in each *QST*. 1MK is a busy station but always ready for a call from any ham. The station handles a nice bunch of amateur traffic every month in addition to the general contact work.

REFERENCES and BOOK REVIEWS

By R. S. Kruse

EXPERIMENTAL Radio, by Prof. R. R. Ramsey. Published by R. R. Ramsey, Bloomington, Indiana. 230 pages, 152 line drawings, price $2.75 postpaid.

"Experimental Radio" in its mimeographed form is well known to our reader-members. In its new and much more convenient form it covers 117 radio operations in such a manner that they may be used for experimental learning (which is to say the book can be used as a text) or for reference in connection with other problems. What is to be admired about the book is that the various problems are discussed very briefly and to the point—but an opportunity is provided for further reading by giving good modern references under each discussion.

In general, Ramsey manages to provide that missing fact which seems to be hidden in other books.

Universal Frequency Standardization From a Single Frequency Standard, by J. K. Clapp, reprint from Journal Optical Society of Am. & Rev. of Sci. Inst. Vol. 15, No. 1, July, 1927.

This reprint is made as a contribution from the well-known Col. E. H. R. Green research for radio and brings to light a very interesting method that should have had more publicity before this. In brief the method is to employ a crystal oscillator and two multi-vibrateurs (tuneless oscillators rich in harmonics) with a wavemeter and a heterodyne, setting them up so that the crystal locks one of the harmonics of the first multi-vibrateur, which in turn locks the second so that the whole system acquires a stability akin to that of the crystal. By an ingenious method the harmonics of this stable system are identified and transferred to the wavemeter.

Data on the Voltage Amplification of R. F. Transformers, Burr K. Osborn, Bulletin No. 15, Michigan Engineering Experiment Station, East Lansing.

The title of this paper describes its contents excellently. The transformers used are all of the normal cylindrical form and vacuum tube voltmeter measurements are made to determine the effect on r. f. gain of the transformer-with-tube, the selectivity and the ease of neutralization for a wide variety of primary windings. In each case the measurements are made across the width of the broadcast band, the transformer-and-tube being operated under proper normal conditions.

Absolute Measurement of Capacity by Maxwell's Method, by Harvey L. Curtiss and Charles Moon. Scientific Paper No. 564 of the Bureau of Standards.

Since most of us are not fully conversant with the methods of the physicist it is well to explain that Maxwell's method (so-called) is a refinement of the crude "commutator method" of measuring capacity, such that the result is obtained from the solution of an equation in which there enter only resistances and the frequency of the commutating device. The paper states, "Maxwell's capacitance bridge is a Wheatstone network in which one resistance arm is replaced by an apparatus for charging and discharging a condenser at a known rate," and proceeds to solve the bridge mathematically, explain the apparatus requirements and describe suitable means, including those for "rating" the tuning fork on which one variation of the method depends.

Piezo Electric Resonance and Oscillatory Phenomena With Fleuxural Vibrations in Quartz Plates, J. R. Harrison, Proc. I. R. E. Dec. 1927.

VITROHM Transmitting Grid Leaks and Rheostats now cover the entire line of transmitting tube circuits. ¶The prices on these amateur products are reduced materially. ¶Your dealer should stock Vitrohm Transmitting Products. ¶If you have difficulty in obtaining them, write us direct.

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507-3	Grid Leak*	5000 ohms	200 watts	200 m.a.	1000 watts	2.80
507-4	Grid Leak†	50,000 ohms	200 watts	60 m.a.	1000 watts	6.50
507-5	Grid Leak†	20,000 ohms	200 watts	100 m.a.	1000 watts	4.25
507-51	Grid Leak*	10,000 ohms	200 watts	135 m.a.	1000 watts	4.00
507-66	Grid Leak**	15,000 ohms	200 watts	120 m.a.	1000 watts	6.00
507-63	Rheostat†*	50 ohms	50 watts	1 amp.		5.50
507-59	Rheostat*†	20 ohms	80 watts	2 amp.		5.50
507-83	Rheostat*†	12.5 ohms	60 watts	2.2 amp.		5.50

* Center-tapped
† DeForest P or R. C. A. 852 Tube
De Forest H Tube

** Steps at 5M—10M—15M
for R. C. A. 852 or DeForest P Tube
†* For Primary Control
*† Filament and Primary Control

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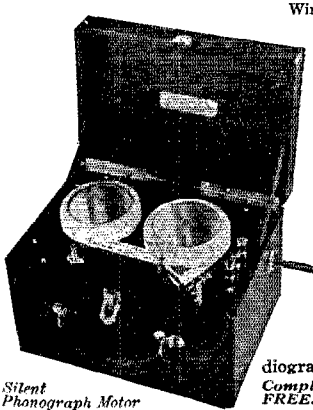

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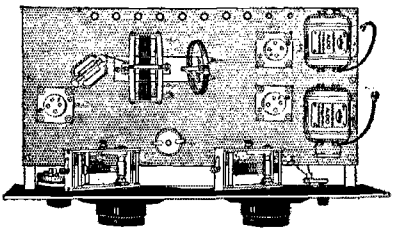

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Extremely well worth reading, despite the rather fearsome title. The text style is both lucid and interesting, which is difficult enough with such a subject in hand.

Samson Broadcast Amplifier Units, Samson Electric Co., Canton, Mass.

Though not of the sort of material that is usually reviewed this circular is so wholly meritorious that it deserves the most friendly mention. It is heartily recommended to anyone who has occasion to feed speech into a transmitter—either amateur or professional. The subject matter is not the devices themselves but their uses, which is characteristic of the Samson circulars.

Samson Inductance Units, Samson Electric Co., Canton, Mass.

What has been said above may be repeated here with suitable variation to make the comment apply to coil winding rather than the construction of speech-input systems.

The Inverted Vacuum Tube. A voltage reducing amplifier, by Frederick Emmons Terman, I. R. E. Proc., Feb. 1928.

Just why a reducing device may safely be called an amplifier is not too clear, but the suggested applications are extremely intriguing. To the laboratory man the oscillograph application will be most useful while for the man operating a transmitter the use of the "inverted" tube with a voltmeter will be both useful and economical.

Direct Coupled Detector and Amplifiers With Automatic Grid Bias. Edward H. Loftin and S. Young White, I. R. E., Proc. Feb. 1928.

If this paper serves no other purpose it is perhaps justified as one of those contributions which cause the engineer to reconsider his convictions in order to find whether they are based on fact or hearsay.

Some Characteristics and Applications of Four-Electrode Tubes. By J. C. Warner. I. R. E. Proc., Feb. 1928.

Coming from such an authoritative source as the laboratory which developed the UX-222 tube this article should be read by all with the closest attention. An excellent reference list is supplied.

The International Radiotelegraphic Conference of Washington, 1927. By W. D. Terrell, I. R. E. Proc., Feb. 1928.

Here are set down clearly and briefly all the principal conclusions arrived at by the conference. Wisely, the Chief of the Radio Section of the Department of Commerce has refrained from mention of the many tiresome arguments and the baseless opinions they disclosed. None the less, to us who know the inside story there is much in the statement that, "The allocation to amateur service of four exclusive bands and two non-exclusive bands was secured through the efforts of the American Delegation with the support of the delegates from Canada and New Zealand." Certainly this recalls afresh that incredible obstinacy of sheer unlighted ignorance and fear with which many of the delegations regarded the question. Perhaps even now it would do no harm to carry on in several countries a little education of those governmental authorities who so fully displayed their need of information.

Aluminum for Radio, Aluminum Co. of America.

This is another of those trade booklets that is so nicely put up and so informative that one must comment on it favorably.

What is Amateur Radio? Issued by the Inc. Radio Society of Great Britain.

The purpose of this 32-page booklet is well suggested by its title. It is evidently, and well, aimed

to dispel some of that very complete lack of understanding which the British delegation to the Washington conference displayed so thoroughly—and which we must therefore assume to represent at least some portion of the public mind in Great Britain. It is a great pity that other European countries are not taking similar steps—their delegations are fully as indicative of the need.

The Arcturus Manual, Arcturus Radio Co., Newark, N. J.

The Arcturus manual explains itself very well in saying that it has been "prepared principally for the information and use of Arcturus—dealers and individual experts engaged in rewiring receivers for Arcturus A-C tubes." The job is done much more nicely than the unhappy use of the hackneyed word "expert" would cause one to suppose, also the tube itself will be found to do some very pleasant things which are not at first suggested by its cheerful ignoring of several of the supposedly important considerations in heater or "thimble" tubes—such as using a 15-volt heater and connecting one end thereof to the emitter.

Gerichte Korte-Golf-Antennes te Kootwijk (The directive short-wave antennas at Kootwijk), Feb., 1928 Radio-Nieuws, The Hague.

It is most unfortunate that so meaty an article should have appeared only in one of the somewhat unpopular languages.

The Hysterical Background of Radio. By R. P. Clarkson. J. H. Sears & Co., N. Y. $2.00.

Too many people seem to have the idea that radio communication sprang full-armed, as it were, from the brain of Marconi in 1895. To dispel this illusion and show that radio, like every other modern development, is a product of the painstaking investigation and experiment of many men over many more years is the object of Mr. Clarkson, and his book is eminently satisfactory in this respect.

It is not a text-book. It is quite obviously intended for popular, rather than professional consumption. The facts, therefore, are set down with little exposition of the technical phases, but are surrounded instead with humorous details, human interest sidelights and anecdotes. Beneath this, however, is a wealth of actual historical detail which makes the book an adjunct to any amateur's bookshelf. We enjoyed reading it.

Reviewed by A. L. Budlong.

Cathode-Ray Tube for General Alternating-Current Measurements. Mrs Z. Tscherdanzev, Elektrotechnik u. Maschinenbau., Jan. 15, 1928.

Briefly this is one of those highly praiseworthy articles in which a tool well-known to one branch of the electrical science is introduced to another branch which has not properly utilized it.

Is Fading Caused by the Motion of the Earth, Raymond A. Heising, Popular Radio, Feb., 1928.

Now You Can Be a "Looker-In." Bennett DeLacy, Popular Radio, Feb. 1928.

A rather incomplete account of the recent General Electric publicity "stunt" as to television. The importance of the thing is hard to classify just now. It seems to be a mere simplification of the very precise Western Electric demonstration but may represent the beginning of popularization.

The Dufour Cathode-Ray Oscillograph, by I. E. Cole, Bell Laboratories Record, Jan., 1928.

Another of the many modifications of the Braun tube, this time one which stays on the pump while working.

The 5-A Audiometer, by L. G. Hoyt, Bell Telephone Laboratories Record.

A simplified audiometer in which the frequency is not variable but consists of a deformed 60-cycle wave drawn from a saturated transformer in such a manner that it arrives at the ear with many

harmonics present and therefore representing a content of a wide variety of harmonics.

The Design of Choke Coils and Transformers Which Carry Direct Current, G. W. O. Howe, Editorially in Experimental Wireless and the Wireless Engineer, Feb., 1928.

Rectification as a Criterion of Distortion in Amplication, Manfred von Ardenne, E. W. & W. E., Feb., 1928.

Further Notes on the Reflex Voltmeter, by W. B. Medlam, E. W. & W. E., Feb., 1928.

A most interesting article on a special form of vacuum tube voltmeter.

A New Method of Using Resistance Amplification With Screened Grid Valves. John J. Dowling, E. W. & W. E., Feb., 1928.

A system perhaps not applicable to radiophone but desirable for radiotelegraphy or wherever the unequal amplification of strong and weak signals does not matter.

The Accuracy and Calibration Permanency of Variable Air Condensers for Precision Wavemeters. Griffiths, Jan. & Feb., E. W. & W. E.

A quite extended consideration of the sources of error in wavemeter condensers.

A Novel Valve Detector, by J. H. Neill, Feb., E. W. & W. E.

The use of the push-pull detector to suppress undesired harmonics, and thereby to permit the use of a lower plate voltage for a given signal strength. There is included brief suggestion as to the usefulness of the harmonic-cancelling feature in the case where the detector works into an i. f. amplifier.

Valve Current From A. C. Mains, by J. K. Jennings, Feb., E. W. & W. E.

Constructional and design details for the transformer and accessories.

8CPC

(Continued from Page 40)

check the note and keying at all times when adjustments are in progress.

'Of course, the station will never be completed,' explains Dr. Burton T. Simpson, its owner. It will always be subject to changes of some sort. But now that the installation has assumed some sort of shape there is time to keep it "on the air" frequently. The crystal set usually is operated before dinner and during the early evening when interference with BCL's might be a consideration. The sharp wave is found rather a handicap for DX work and consequently the self-excited job is started up for an hour or so before bed time. Whenever QRM is very heavy and I feel like some DX the 20-meter set is taken in hand."'

—*R. A. H.*

Strays

The amateurs of Portland, Oregon, are thankful that 7AIC is employed at the local Post Office. QSL cards arriving with insufficient address are never allowed to get into the 'dead letter' department in that city.

Notes on Design of R. F. Choke

(Continued from Page 30)

with the tuner. Possibly the best way of surmounting this is to break up the uniformity of the winding by a winding of

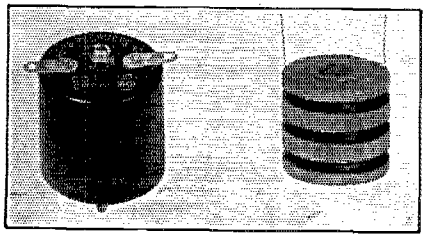

FIG. 6. A CHOKE OF THE 'RECEIVING' TYPE HERE DISCUSSED

the random type, such as is shown in Figure 6. It will be noted, also, that this winding has been broken up into three sections, an effective manner of keeping the distributed capacity at a low value. Such a subdivision of the winding allows a sufficiently low capacity as to render the choke effective at 15 meters.

The Spaced-Turn Coil

(Continued from Page 34)

Other methods make use of cardboard tubing so arranged that the tubing is destroyed after the coil is wound on, thus leaving the coil free. Accurate spacing of the wire cannot usually be obtained. One can use 3 strips of celluloid, about ¼ inch wide, evenly spaced around the circumference and cemented in place, with forms of this type. Measurements on coils of this type are not available, but extremely low-loss construction is not an all-important consideration, especially when radio-frequency amplification is possible, as it now is.

Strays

'Greeting of the Moonbeams and the Rose Buds. May you enjoy never-ending prosperity and your union be blest with seven sons. Goodby, hello, and have you any messages for my station.' This intriguing message was sent, according to the *New York Sun*, from a Chinese station to a trans-Pacific liner en route from Shanghai. Rather a nifty way to say QTC, eh wat?

To Our Readers Who Are Not A. R. R. L. Members

Wouldn't you like to become a member of the American Radio Relay League? We need you in this big organization of radio amateurs, the only amateur association that does things. From your reading of QST you have gained a knowledge of the nature of the League and what it does, and you have read its purposes as set forth on page 6 of every issue. We would like to have you become a full-fledged member and add your strength to ours in the things we are undertaking for Amateur Radio, and incidentally you will have the membership edition of QST delivered at your door each month. A convenient application form is printed below—clip it out and mail it today.

.....1928

American Radio Relay League,
Hartford, Conn., U. S. A.

Being genuinely interested in Amateur Radio, I hereby apply for membership in the American Radio Relay League, and enclose $2.50 ($3 in foreign countries) in payment of one year's dues. This entitles me to receive *QST* for the same period. Please

begin my subscription with the ..... issue. Mail my Certificate of Membership and send *QST* to the following name and address.

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.....

Station call, if any .....

Grade Operator's license, if any .....

Radio Clubs of which a member .....
Do you know a friend who is also interested in Amateur Radio, whose name you might give us so we may send him a sample copy of *QST?*.....

..... Thanks!

HAM-ADS

NOTICE

The "Ham Ad" Department is conducted strictly as a service to the members of the American Radio Relay League, and advertisements will be accepted under the following conditions.

(1) "Ham Ad" advertising will be accepted only from members of the American Radio Relay League.

(2) The signature of the advertisement must be the name of the individual member or his officially assigned call.

(3) Only one advertisement from an individual can be accepted for any issue of **QST**, and the advertisement must not exceed 100 words.

(4) Advertising shall be of a nature of interest to radio amateurs or experimenters in their pursuance of the art.

(5) No display of any character will be accepted, nor can any typographical arrangement, such as all or part capital letters, be used which would tend to make one advertisement stand out from the others.

(6) The "Ham Ad" rate is 7c per word. Remittance for full amount must accompany copy.

(7) Closing date: the 25th of second month preceding publication date.

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HAWLEY Edison element battery and parts standard for over five years. Look at our patent pending connector—no thin wire to drop off—contains 20 times more metal than regularly used. Heavy shock proof cells, fibre holders, etc. Everything for a rapid-fire "B" supply. Complete assembled 100 volt "B" $10.00. Knock-down kits at still lower prices. Chargers that will charge in series up to 160 volts $2.75 to $4.00. Trickle B Charger for 90 to 150 volt "B" $3.75. Special transmitter "B" batteries up to 6,000 milli-amp capacity, any voltage. Write for interesting literature, testimonials, etc. B. Hawley Smith, 360 Washington Ave., Danbury, Conn.

PURE aluminum and lead rectifier elements holes drilled brass screws and nuts, pair 1"x4" 13c, 1"x6" 15c, 1¼"x6" 17c, 1½"x6" 19c. Sheet aluminum 1/16" $1.00, lead $1.00 square foot prepaid, $1.00 or more. Silicon transformer steel cut to order .014" 10 lb. 25c, 5 lb. 30c, less than 5 lbs. 35c lb. .022" 5c less per lb. Not cut 2-7" wide 15c lb., minimum 10 lb. postage extra. Edgewise wound copper ribbon 7 sizes see January QST. Air pocket and stand off insulators 25c each. 4 for $1.00. Glazed porcelain 5 and 6½" long period on 4. Electrolytic condenser parts, $1.50 prepaid. Geo. Schulz, Calumet, Michigan.

BULLETIN 66-E Lists the Ensall Radio Laboratory receivers, transmitters, wavemeters, etc., Item No. 69 and 68-A type receivers are the most modern types for amateur reception. Four and eight tubes respectively. We also make all types of apparatus for any radio purpose, including inductances, power transformers, rectifier units, filter chokes, high voltage variable condensers, plate reactors, etc, We build to order any apparatus using your parts if desired. Kit and blue print service on any power amateur station. Write for copy of Bulletin 66-E. Thos. Ensall, 1208 Grandview Ave., Warren, Ohio, 8BDN.

GENERAL Electric 12-350 volt .143 ampere $18. Westinghouse 10-350 volt .08 ampere $20. ½ KW 500 cycle transformers good for any voltage $12.50. 500 cycle generators and gasoline engine power units. New SE1012 receivers no condensers $20. Henry Kienzle 501 East 84th Street New York.

SELL—used Aero short-wave kit. Good condition, $6.00. Extension coil No. 5, $2.25. Frank M. Davis, 1010 N. 6th St., Monett, Mo.

QSL cards $1.00 per hundred, plain cards, $1.85, Government cards. Prompt service. 9BEU, 9032 Windom Ave., St. John's Sta., St. Louis, Mo.

FOR sale: Brand new Grebe CR18 short wave receiver complete $65.00. RCA type ET3619, 20 watt phone transmitter, $40.00. Westinghouse motor-generator 350-550 volt 100 watt single phase drive, $50.00. New RCA 203A tubes, $35.00. A. Hass, (2MA) 168 Washington St., New York.

SELL—Aero transmitter with meters, completely wired, 36 to 90 meter coils. First forty bucks takes it. R. H. Bartholomew, Bath, Penn.

EDISON elements and supplies. First grade large type A elements with welded connector 5c per pair. Type 5-G, 3000 milliamp elements 9c. Prices include separators. ¾x6" tubes 3c. 1x6" tubes 4c. No. 20 pure nickel wire 1c per ft. Potash-Lithium for 5 lbs. Edison solution 85c, for 10 lbs. $1.60. 90 volt battery with trickle charger attached $10.95. 135 volt $15.00 Heavy duty 140 volt type 5-g, 3000 miliamp battery $16.00. Edison A batteries, 6 volt 112½ ampere, special $12.00. J. Zied, 834 N. Randolph St., Philadelphia Pa.

SELL—Grebe "RORD" detector two-step. Excellent condition, $18.00. C. S. Hoffman, 8HD, Chantal Court, Wheeling, W. Va.

ENGRAVING—Finest workmanship on radio and laboratory apparatus panels. A. L. Woody, 19 S. Wells St., Chicago.

BEAUTIFUL microphones, built for quality and service, spring mounted in studio type shell. Price, $15. Ronald Schroeder, Beverly, Kans.

SELLING out everything. What do you need in parts, O.M.? Write 1AJM, Leominster, Mass.

REL 175 transmitter, signal key, Brandes phones, $25 takes all. 9EWN, Dodgeville, Wisc.

FOR sale—Two complete radio transmitters, one 500 watt master oscillator power amplifier, one 500 or 750 watt crystal control power amplifier. UV204, UV204A, UX852 tubes, numerous small parts and other equipment. Write for list and prices. 9KG, Paul Harris, Graham Brothers, Evansville, Indiana.

SIGNAL Corps VT14 5 watters $3.00. 2mf. 300V filter condensers, $1.00, BX201A, BX11, $1.00. BX210, $7.00. Send stamped envelope for bargain sheets. Mac, Box 21, Seaford, N. Y.

SELL—UV204A 250 watt tube, $50. 6EA, 343 South Fremont Ave., Los Angeles, Calif.

FLUSH panel meters—0-300 milliameters, 85c, 0-100 $1.00, 0-10 A.C. filament v.m. $2.00, 0-6 volt D.C. 65c, 0-500V D.C. with external resistance, $4.50, UP1654 filter choke $10.00. Ed. Keers, 9CJR, 2300 E. Washington St., Joliet, Ill.

EDISON B battery parts for 400 cells, ¾"x6" tubes, type A elements wired with No. 20 nickel wire, hard rubber separators, $12.00. E. A. Turner, R.F.D. No. 2, Marlboro, Mass.

SELL—500V 200W ring oiled d.c. motor generator, fifteen bucks. Two 50 watt sockets and Kenotron UV217, eight bucks. 8CRF.

HAMS: Get our samples and prices on printed call cards made to order as you want them. 9APY, Hinds, 19 S. Wells St., Chicago, Ill.

SELL or trade: Hartley transmitter complete with 203A tube. Factory built appearance. Panel design four meters. Bargain. Write 9AZN.

REL transmitter kit, new with R.C.A. 75 watt tube, $50. Rectifying unit with suitable tubes for this set, $25. Box Z, c/o QST.

YOUR QSL cards represent your station to the other fellow. So you want the best. We print 'em to order, and our quality is high and our prices low. Want a sample? Drop us a card and we'll slip you the proof. 5AHU, Box 46, Comanche, Texas.

ORS 8CCS Bauer reports: "Your Radio Shortkut enabled me to increase my receiving speed from 12 to 30 per. Well worth the price and effort." Any slow Ham may profit by experience of 8CCS to the extent of 25 per by little effort in limited time. Price US $3.50. Elsewhere $4.00. Money Order only. C. K. Dodge, Mamaroneck, N. Y.

TRANSFORMERS—325-325 and 7½, 100 watt $5.50. Use two to furnish 650-650 volts using lead between secondaries for more accurate midtap. 275-275 and 5, $4.00. Specials made to order. Chokes, High grade ad-

justable core, 30 to 150 Henry 160 M.A. $5.00, 30H 100 M.A. $2.00, 30H 60 M.A. $1.50, 3H 2000 M.A. $3.25. A.B.C. eliminator 180 volts kit $19.00. 425 volt B.C. supply kit, $25.75. When building an outfit send a list of your parts for a quotation. Write for diagrams and lists. 20% discount on six. Add postage. M. Leitch, Park Drive, West Orange, N. J.

2000 volt 1000 watt generator connected to 3-phase 220 volt motor with separate field exciter, $275.00. 1000 volt 200 watt generator, connected to 110 volt motor $75.00. 750 volt 300 watt generator with 110 volt motor $65.00. 10 volt 8 ampere generator $12.00. ¼ HP. 110 volt motors 1750 speed $6.50. 1000 volt generator with 10 volt filament supply connected to 32 volt motor $150.00. Converters 110 DC to 75 AC 200 watt $9.50, 300 watt $12.50. James Smat, 1734 Grand Ave., Chicago, Ill.

7½ WATT transmitter for sale. Also parts. Send stamp for list. K. Retzlaff, 9CUT, Enderlin, No. Dakota.

POSTPAID and guaranteed brand new, Readrite panel mounting, flush type milliammeters. 0-300 or 0-400 Mils. Either type, $1.25. Readrite 0-15 A.C. voltmeters, flush type, $3.00. R.E.L. 2000 volt working voltage filter condensers, 1 Mfd., $3.10; 2 Mfd., $5.50. Sangamo .002 Mfd. 5000 volt tested fixed condensers, $1.75. General Electric 5000 ohm heavy duty gridleaks, $1.25. R.E.L. 5000 volt working voltage .002 mfd. fixed condensers, $7.50. Other prices on request. G. F. Hall, 535 West Hortter Street, Philadelphia, Pa.

QRM? Is your wavemeter accurate? Let us calibrate your wavemeter to utmost accuracy from crystal oscillators. Prices reasonable, work guaranteed. We build and calibrate precision wavemeters and oscillators. Write for prices. 9BVC, Lutesville, Mo.

PLATE and filament supply transformer, 25, 40, 50, 60 and 500 cycle to your order. Filter chokes of any size to order. We use the best of materials and specialize in the building of large transformers and chokes. Magnet winding, Silicon transformer steel, magnet wire and insulating materials supplied the experimenter. Junk, bargain and information seekers please save stamps. Nat G. Scott, New Albany, Miss.

HEADQUARTERS for hams:—Mueller 150-watt input tubes $15.00. Navy 5-watters $3.15. Complete 5-watt transmitters: tube, transformer, rectifier, key, etc. 20-40 meters, each $35.00. 20-40 meter receiver and one step $17.50. Aerovox 1000-volt 1-mfd Condensers $1.75. Potter 2000-volt tested 1-mfd Condensers $2.50; 2500-volt 1-mfd Condensers $3.25. "Ham-List" 4c. Robert Curtis, 1109 Eighth Avenue, Fort Worth, Texas.

CURTIS-Griffith 250-watt power-filament transformers 350-550 each side $10.50. New Thordarson mounted transformers: 550-volts each side; two 7½-volt filament windings, each $20.00; Thordarson 350-550 power transformers mounted $16.00; 1000-1500 power transformers $22.00. Thordarson 650-volt power-filament transformers for 7½-watters $6.90. Aluminum square foot 85c; Lead square foot 85c. Potter 2-mfd 1000-volt condensers $2.75. "Ham-List" 4c. James Radio Curtis, 1109 Eighth Avenue, Fort Worth, Texas.

TRANSFORMER reclaiming service. Stop throwing away valuable burnt out transformers. I replace with original factory windings. Give previous guarantee. Most makes reclaimed. A. F. transformers $1.25. Correct engineering. Also buy them burnt out, sell them reclaimed. Write your needs. H. A. Sears, 9 S. Reed Ave., Mobile, Ala.

1000 volt 250 watt M.G. 60 cycle AC in good shape. $50. Also remainder of 9EFZ junk. 9EFZ, Francesville, Indiana.

WANTED: back file of *QST*. As far back as possible. Write fully, condition, numbers, etc. C. Hayes, 2979 E. 73rd St., Cleveland, Ohio.

QSL cards that are different, $2.50 per 100, $1.00 each additional 100. Stamp for sample. G.E. dynamotor 24/1500 volt like new $25. 9CTW.

FOR sale: complete transmitter with UV203A, transformers and meters, $50. Shortwave receiver, Aero coils and two audio stages, $17. Write for list. 1ASY.

HAMS, here is what you want! Shelby Hi-Vac interchangeable inductance coils enclosed in vacuum. Free from moisture and dust. Not damaged or affected by handling. Easily changed, the same as a radio tube. Plug into standard UX sockets. These coils are unusually well made and guarantee maximum results. Coil No. 20 for 20 meter band; No. 40 for 40 meter band; No. 80 for 80 meter band. $2.50 each, set of three, $6.75, including parcel post. Cash with order. Duane Hadley, Shelby, Ohio, 8CTD.

MASTER radio wavemeters. Neat, sturdy instruments. Accurately calibrated, 15-200 meters. $5.50 and $8.50. Send for complete descriptions. Also details of free wavemeter offer. Specials: Slightly used Vibroplexes. Like new—$12.50 each. Fada 3½ ampere rheostats, 45c. Acme .0005 variable condensers. Heavy plates, widely spaced. Fine for transmitting, $1.50. "B" eliminator transformers, $1.95. ¼" copper tubing inductance: 4" diameter 12c per turn; 3", 9c. Pure aluminum and lead rectifier elements. Cut, drilled, and bolted. Per pair, complete: 1"x4" 7c, 1"x6" 10c, Extra heavy 12c, 15c. Quality merchandise and quick service. Send for free catalog. William Harrison, 35 Ft. Washington Ave., New York City.

CQ. CQ. CQ.—Hi—O.M. Genuine Amrad Mershon Electric Condensers—60 mfd—200 V—3 for $7.50. Telegraph Keys heavy contact 75c. Special key and buzzer set $2.25. Plug-in tip and jack, pr. 17c. New Signal Sematic key $16.00. Hoyt 2" panel meter 0 to 8V—$1.00. Small A. C. or D. C. Diehl motor $3.95. 5000 ohm transmitting grid leaks, C.T—10 W $1.50. New Neon bulbs $1.50. Latest QST Handy-Handibook $1.00. Lightning switches—6" blades 50c. Peep-Hole A. C. or D. C. voltmeters and ammeters $1.95. U.V. 712-RCA transformers $3.75. Express—P.P. extra. Radio Girl, D. B. Wolf, 70 Stuart St., Boston. Mass.

BEN'S *better buys.—Extra specials.* US Signal Corp field induction telegraph set in standard carrying case, complete with 1 DP DT Switch, one induction coil, heavy telegraph key and switch. polarized electro magnetic sounder, bargain, $6.50. New Robbins & Meyers standard dynamo 8V—10 Amp—*2000 RPM* with field rheostat connections. Diagram with each generator $16.50. Wavemeter box $1.75. Complete set shortwave coils 10-110 meter kit $3.95. 3 plate Kellogg vernier condenser and dial 35c. With each generator or telegraph set one Eaton oscillator free. Express—P. P. Extra. Ben Wolf, 228 Tremont St., Boston, Mass.

QSL cards, two colors, government postcards, $1.90 per hundred, white cards $1.00. Real ham stationery at $1.40 per hundred sheets and envelopes, pad form. Postage 10c. Free samples. 8DTY, 257 Parker Ave., Buffalo, N. Y.

FOR sale: Bremer Tully 12-200 meter receiver one stage with cabinet $12.00. Jewell 0-15 DC voltmeter $3.50. Remler superhet kit $8.00. VT1 tubes $1.00 each. 425V of Edison B battery $24.00. Will trade. Want 50 watter parts. Leslie Jaecke, Junction City, Kansas.

SELL: New Advance sync. Wheel and brush assembly. Never used. $10. 8DLX.

SELL—H tube, used about five hours, $10. RCA UP1016 transformer, filament 10.5 plate 1500 each side center, $10. 20,000 ohm gridleak, $1. RCA OT in two sections, $3. F.O.B. 3NM, 1111 Jefferson, Charlottesville, Va.

FOR sale or trade: 3 Sync rectifiers, 2 Western Electric 7A amplifiers, three wire Kellogg mike and transformer. 2-210 tubes. 0-8 Thermoammeter. Radiola semi-portable super. What have you? 6AHC, Warren Doller, 847 S. Philadelphia St., Anaheim, Calif.

LISTEN fellows, I'm back again with a bigger and better ham list than ever. The original long life, super sensitive Neon tubes sold only by me. Don't accept substitutes. Type "A" $.75; Type "B" $1.50; Here's one that the boys will snap up, 11,000 ohm W.L. Vitrohm gridleaks, 100 watts, only $1.50; 50h. 150 milliampere chokes, Dudlo wound, $2.95; No. 12 enameled wire $.90 100'. Drop me a card, and I'll send you a ham list that will open your eyes. Orders sent P.P. or COD. G. L. Lang, 2WW, 2AWH, 1128 Springfield Ave., Irvington, N. J.

CRYSTALS: 80-meter band power oscillators still going at $12.50 each. 1/10% calibration. Phone band if desired E. G. Watts, Jr., 1024 SW 9th St., Miami, Fla.

KENNEDY high and low wave receiver with 2 stage amplifier $45.00. Price includes 1 Western Electric tube. 30 henry chokes 60 M.A. $1.00 Western Electric 2 microfarad condenser blocks $.75. Step up transformers $1.85 with 6 volt center tapped, step up to 180 volts. No. 40 enameled $.75 a ½ pound. Saal loud speaker units Large type $2.00. Belden No. 18 stranded wire in 50 foot lengths $.35. 30 henry chokes 60 M. without laminations $.65. All merchandise guaranteed to meet with your utmost satisfaction or your money cheerfully refunded. Chas. Hoodwin, 4240 Lincoln Ave., Chicago, Ill.

WESTINGHOUSE four rate, copper oxide trickle chargers, new. No bulbs or acids and nothing to replace, $4.25. Complete with card and plug. Filament transformers, mounted, 150 watt, 12 volt secondary,

center tapped, new $6.50. Transformer laminations, stamped, shell type, end castings terminal boards, etc. All parts for the ham who wants to build his own transformer. Fred Finchow, 1221 E. New York St., Indianapolis, Ind.

TRANSFORMERS: Westinghouse 2 Kw. 2200-volt oil immersed $20.00. General Electric 2200 volt operates two 852s. $12.00. 9ASW.

NEW 275 volt generators will give up to 500 volts 120 watts. Fine for phone $8. 500 cycle motor-generator 120 volt direct current drive, new, ½ kw to 5kw. ¼ and ½ kw gasoline engine drive 500 cycle generators. 200 watt 500 cycle airplane type, $10. ½ kw $15. Used, 200 watt d.c. dynamotors, 6 volt input 400 volts output, used, $15. 216 Kenotrons, $1.75. Microphones, $1. 3 coil geared honey-comb mountings, $1. 120 watt spark set. 900 cycle generator 16 volt d.c. drive, $20. R. Wood, 46-20 102nd St., Corona, N. Y.

1KW tube—UV206 used twenty hours—just like new. Will sell cheap. Wanted: Type I send-receive switch and decade resistance box. 8MG, E. F. Goodwin, Ypsilanti, Mich.

MOTOR generator bargains almost new 750 Volt 200 Watt Robbins and Myers direct connected on iron base to 110 Volt 60 cycle single phase alternating motor $45.00. 400 Volt 100 watt direct connected to 110 Volt 60 Cycle motor $32.50. Five 400 Volt 150 watt 3500 Speed Emerson generators only with field resistance each $9.50. Three 110 Volt 3500 speed alternating current motors with coupling to direct connect to above generators or any machine having a ½ inch shaft 1/3 H.P. each $11.00, also a few larger generators and motor generators. George H. Harris, 1911 Chicago Av., Chicago, Ill.

CRYSTALS: Eighty and forty bands, sold subject your approval. Also blanks and re-grinding. Herb Hollister, 930 Baltimore, Kansas City, Mo.

SHORTWAVE receivers, transmitters, inductances and chokes made to order. Quaranteed products. Write for particulars. Specialty, QSL cards. $1.00 per 100 up. Write for free samples. Ham stationery, QSL cards and log sheets made to order. Try our work. Harry Barschdorf, 171 No. Summer St., Adams, Mass.

OMNIGRAPHS, Teleplexes, transmitters, receivers, chokes, meters, transformers, 50 watters, S tubes, motor generators, dynamotors, portable loop receivers, Electric Receiving sets, Vibroplexes bought, sold and exchanged. L. J. Ryan, Hannibal, Mo. 9CNS.

SPECIAL: X250 25 watter $7.50, 5 watter $1.50, CeCo 210 $5.75. Also new list of transmitting and receiving sets, tubes and parts. 9ASV, 1607 Picher Ave., Joplin, Mo.

SELLING out. Everything in shack. Write for list. 9DZA, L. Norgrant, Mapleton, Minn.

SELL fifteen G. E. transformers, 1100-2200 each side tap, carry 1000W continuously. Guaranteed. 110-220 primary mounted on marble for wall inside. $12.00. F. O. B. Detroit. F. G. Dawson, 5740 Woodrow Ave., Detroit, Mich.

ATTENTION Hams! How would you like to spend your vacation up here where Lake Michigan breezes fan you all summer and at the same time prepare yourself for a Commercial ticket? 8LA is running a special course exclusively for licensed amateurs during July and August. For detailed information write—C. O. Slyfield, 8LA, Frankfort, Michigan.

WAVEMETERS calibrated, 75c per curve. No wild points. 8MY. 1498 Hurlburt Ave., Detroit, Mich.

WANTED 204A or what have you. Have Roth constant potential charging outfit type MBC1. 110-220 single phase cost $275 perfect condition for exchange. 2ANS, New Rochelle, N. Y.

TRANSFORMERS—2 100W-650V each, 7½V filament $6.75. Filament transformer 7½V center tapped $3.50. One 300V each side, 5V filament. $4.00. Clarence Barnett, Corinth, Miss.

100 watt panel transmitter $65.00. 20 watt transmitter complete with tubes and 900 cycle power supply $50.00. Westinghouse M.G. 550V 200W 110 A.C. motor $55.00. Almost new W.E. 50 watters $20.00. Harold Palin, 6010 College Ave., Indianapolis, Indiana.

SELL: complete 100 watt master oscillator, and power plant. Apparatus of best class. Price reasonable. Information on request. 5AME. Austin, Texas.

AT last! A low price power transformer, 150 watt, 750 volts on each side of center tap, one 7.5 volt center tapped filament winding. Shipping weight 10 pounds. Price $8.75 each. Last call for Navy 5 watters plate 750 volts, filament 7.5, price only $1.30 each. All in original navy boxes. What a demand last month for the Cooper Hewitt perfect Neon lamp. Every user was astounded at the sensitivity of this special tube, see last issue for full dope. Price $1.50 each and worth twice that much. A 750 volt 110 mil rectifier tube at only $6.00 each. All parts guaranteed. COD on request. Please include postage. E. P. Hufnagel, 879 S. 18th St., Newark, N. J.

WHAT a line of stuff this time, just the thing you want at the price you want 'em. Vibroplex keys, hundred of 'em all in good condition, price from $8.00 to $12.00. Price governs condition. Station Emblems in genuine sheepskin leather, buff background with either red or blue call letters. Say 2BIF, 2WW, 2AOP, who have them, the finest station emblem made. NU before call if desired. The emblem for those who want the best! Price $2.50 each. Complete parts for key click filter for powers up to one fifty watter $6.00. Guaranteed to eliminate the KK's. Quick and courteous service. COD on request. Please include postage. Joe Bush, 178 Berkshire Place, Irvington, N. J.

IMPORTANT notice:—Due to a change in the manufacturers' price of Power Radio Wavemeters, the new price of $6.00 will become effective June 25th. Meanwhile the old price of $5.00 prevails. Take advantage of this opportunity! Why pay more for domestic transmitting tubes, when you can get our foreign transmitting tubes at from 50% to 25% less? They are specially adapted for short waves, having a very low internal capacity. 125 Watts—$30.00, 50 Watts—$9.00. Ten Watts—$4.90. Seven Watts, $4.00. Complete radio catalogue and samples of our QSLs are free. William Green, 207 Cathedral Parkway, N. Y. C.

NAVY standard transmitters and parts. Half kilowatt motorgenerators forty dollars. Two kilowatt hundred dollars. Dubilier .004 condensers eighteen dollars. SE1012 receivers thirty dollars. What do you want? Wanted—Navy receivers, SE1220, SE1420. State price, condition and manufacturer. Paul Trautwein, 17 Albany Street, New York City.

200 watt filament transformer 8-11V, $7.50, 200 watt 25 cycle 8-11V, $11.00, 700 watt 1000-1500 each side $14.25, 700 watt 2000-2500 each side, $18.00, 250 watt 550-700 each side, $10.25, 250 watt 25 cycle 600-800 each side, $14.00, 700 watt 25 cycle 1000-1500 each side $18.00, 700 watt 25 cycle 2000-2500 each side, $21.00, 1 kw.. 2000-2500 each side, $30.00, or any voltage you want. 80 Henry 150 mil. choke $10.00. 9CES. F. Greben, 1927 S. Peoria St. Chicago, Ill.

C. R. LEUTZ Phantom Receiver with current supply 30-3600 meter, cost $485.00, first $150.00 takes it. Whiting 118 Wall Street, Bridgeport, Connecticut.

Watch hams, watch where the buying is good. We give to all Hams a 10% discount on everything, and the best of service. Have a look at some of our Specials: Aero Short Wave Kit, $38.50. REL Type "A" Wavemeter, $18.50, All the following Jewel Meters $6.50. Type "F", No. 54, 0-10 volt, 0-100 mill., 0-300 mill., 0-500 mill. No. 54, 0-500 volts, $13.00, 0-1000 volts, $19.50, 0-1500 volts, $26.00. U. X. 852, 75 watts, $29.50, U. X. 210, $7.50, W. E. VT-2, 5 watts, $6.75, G. E. No. MK-11, Portable British Wireless Aircraft CW Telephone Transmitter, Gov. value, $137.50, our price, $35.37. (Size 7" 9" 6"). Write for our prices on REL Transmitting Apparatus. Hallman W. March, 407 State Road, Cynwyd, Penna.

Imagine an organization of radio "nuts" with over 3000 clients scattered throughout the world, hundreds of them hams, all of them radiowise—dealers, builders, experimenters. Over $40,000 stock of high-grade receiving and transmitting parts only, no sets. Spend over $5,000 yearly on our own experimenting, carry nothing until it passes our tests. 25c will bring prepaid over two pounds, catalog, circuits, data, etc. Weekly data sheets for experimenters and builders (more reliable data than all radio magazines together)—20 weeks $1.00, 52 weeks—$2.50. Full dealer's discounts to licensed hams, and radiowise builders. Fred Luther Kline, Established 1920, Kent, Ohio.

NATIONAL (6EX) Rectobulbs rectify 3000 volts at 400 mils $15.00, fifty watter $20.00, tubes repaired. Jewell $7.50 meters $5.50, R. F. $12.00 meters $9.50, 5000 volt Sangamo cond. $1.50, 99.6% pure aluminum 75c sq. ft., No. 12 enameled copper wire 95c 100 ft., extra large 82.2-85.7 crystals stand 600 volts $17.50. Write for prices on Signal keys, Leach relays, Ward Leonard leaks, Cardwell conds., Flechtheim filter cond., Super-sync, Thordarson trans. and chokes, R.E.L. parts, or anything else you need. I will save you money. Postage extra. R. E. Henry, 9ARA, Butler, Mo.

DISCOUNTS to Amateurs:—Aero Short Wave Kit, $7.75—Maximum Discounts on Jewell Meters, Ward Leonard Grid Leaks, Signal Keys and Relays, Blocking Condensers, REL Parts, Flechtheim Transmitting Condensers, Thordarson Transformers, Amsco Condensers. A postcard brings our prices. All parts guaranteed. R. N. Johnston, 66 E. Mill St., Akron, Ohio.

Q R A SECTION

50c straight with copy in following address form only:

1CSX—R. O. Mortensen, 171 Cherry St., Malden, Mass.

1WV—Miles W. Weeks, 40 Norfolk Road, Chestnut Hill, Brookline, Mass.

2APF—David L. Markowitz, 125 Madison Ave., Albany, N. Y.

2BIW—George Knapp, 48 Garden St., West Englewood, N. J.

2BUO—Werner H. Olpe, 14 Brooklyn Ave., Jamaica, Long Island, N. Y.

3AJM—L. W. Barnhart, 602 Hummel Ave., Lemoyne, Penn.

5AXZ—Norman J. Lea, 603 E. Houston Ave., Marshall, Texas.

9EJO—David R. George, 621 Franklin St., Geneva, Ill.

9FFD—Geo. D. Hansen, Box 27, Salix, Iowa.

9FKM—Edward M. Simmon, 1601 S. Fifth St., Louisville, Ky.

ac8RB—Reginald Broadley, 17 Baikal Road, Wayside, Shanghai, China.

oa3AB—J. W. Leonard, 18 Love St., Black Rock, Victoria, Australia.

sb2IA—Ruben Simas, Rua Riachuelo 19, Curityba, Brazil.

The following stations belong to members of the A.R.R.L. Headquarters gang. Mail for them should be addressed care A.R.R.L., Hartford, Conn. When operating 1MK they use personal sines as indicated.

1MK *Headquarters, Chief Operator, R. B. Parmenter* "rp"	1SZ *J. J. Lamb* "jim"
1AL H. P. Westman "ws"	1BUD A. L. Budlong "bud"
1BDI F. E. Handy "fh"	1ES A. A. Hebert "ah"
1BHW K. B. Warner "kb"	1KP F. C. Beekley "beek"
	1FL G. D. Meserve "dm"
	1SZ C. C. Rodimon "rod"

FOR YOUR CONVENIENCE
QST'S INDEX OF ADVERTISERS IN THIS ISSUE

AERO COIL

SUPER-SENSITIVE

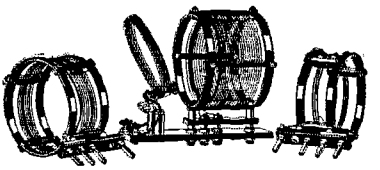
INDUCTANCE UNITS

The Perfect Inductances for All Low Wave Work

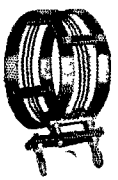
FOR RECEIVING

AERO LOW WAVE TUNER KIT — Price $12.50

Completely interchangeable. Adopted by experts and amateurs everywhere. Range 15 to 130 meters. Includes 3 coils and base mounting, covering U.S. bands, 20, 40 and 80 meters. You can increase or decrease the range of this short wave tuner by securing the AERO Interchangeable Coils described below. All coils fit the same base and use the same condensers. Use Code No. INT-125 in ordering.



PRICE $12.50



INTERCHANGEABLE Coil No. 0

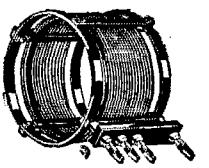
Range 13 to 29.4 meters. This is the most efficient inductance for this low band. Code number INT-0.

Price $4.00

INTERCHANGEABLE Coil No. 4

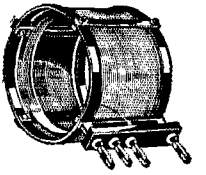
Range 125 to 250 meters. Fits same base supplied with low tuner kit. Code number INT-No. 4.

Price $4.00



THE NEW AERO INTERCHANGEABLE COIL No. 5

Normal range 235 to 550 meters. However, by using .0001 Sangamo fixed condenser across the rotor and stator of the .00014 variable condenser, the maximum wave band of this coil is increased to 725 meters. This gives you coverage of the following bands: Airplane to Airplane, Land to Airplane, Ship to Shore (Great Lakes) Ship to Shore (Atlantic and Pacific Oceans). Code number INT-No. 5. Price $4.00

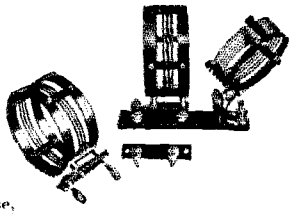


NOTE *This new Aero Short Wave Kit is wound with No. 16 wire on secondary, making it even stronger, and cutting down the resistance appreciably.*

FOR TRANSMITTING

KEY 2040 KIT — Price $12.00

Kit contains 2 AERO Coils, 17 to 50 meters each, 1 AERO Antenna Coil Mounting Base, 1 AERO Grid Coil Mounting Base, 2 AERO Essential Choke Coils.



KEY 4080 KIT — Price $12.00

Kit contains 2 AERO Coils, 36 to 90 meters each, 1 AERO Antenna Coil Mounting Base, 1 AERO Grid Coil Mounting Base, 2 AERO Essential Choke Coils.

KEY 9018 KIT — Price $12.00

Completely interchangeable with either of above kits. Range 90 to 180 meters. Contains 2 coils and mounting base.

COMPLETE AERO TRANSMITTER KITS

Complete Aero Transmitting Coils for the 20-40 and 40-80 bands, $20.00. Complete for 20-40, 40-80, and 90-180 bands, $28.00.

AERO PARTS

Transmitter coils (17 to 50 meters, Key 2040C, 36 to 90 meters, Key 4080C and 90 to 180 meters, Key 9018C) **$4.00 ea.**
Antenna Base, Key PRI-300, **$3.00 ea.**
Grid Coil Base, Key GRID-100, **$1.00 ea.**
Choke Coils, **$1.50 ea.**

RADIO MANUFACTURERS ASSOCIATION RMA MEMBER

PLAN FOR D. X. RECORDS *NOW!*

Order these coils direct from us if your dealer hasn't them and start now for wonderful records. Specify code or key numbers when ordering. Or write at once for complete descriptive literature.

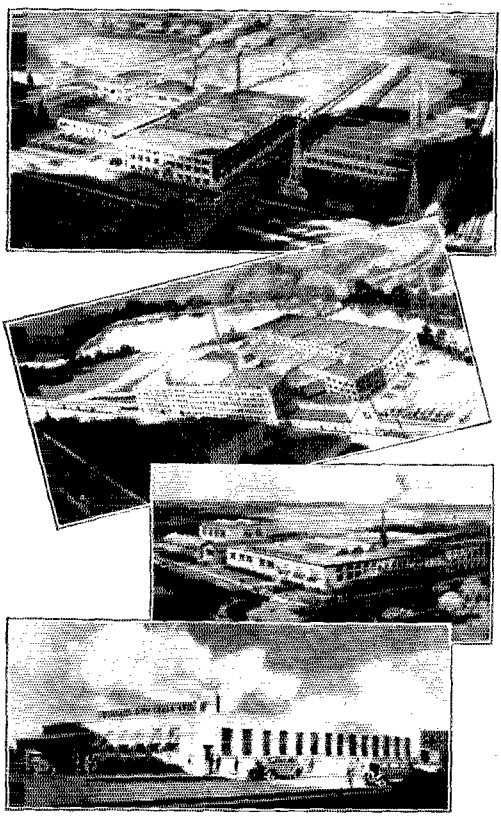
AERO PRODUCTS, Inc.

Dept. 16 — 1772 WILSON AVE., CHICAGO, ILL.

BURGESS

What's in a Name?

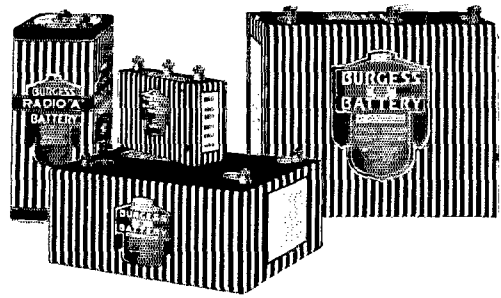
That depends on what is back of it



The four Burgess Plants:
Madison, Wisconsin
Freeport, Illinois
Niagara Falls, Ontario
Winnipeg, Manitoba

The name Burgess has a real background. The Burgess Battery Company has come to be one of the outstanding figures in the dry battery field. Burgess Batteries for years have been recognized as a standard of quality. They have been selected for use on expeditions to all corners of the globe where dependability was an absolute necessity. They have back of them years of scientific research and a record of satisfactory service.

And in the Amateur field Burgess Batteries stand out like a beacon light. From the days when the "Ham" game was all there was to radio right up to the present—Burgess has been a name to conjure with.



BURGESS RADIO BATTERIES